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**Mt. Nansen Mines Ltd.**

**Report on**

**PROPOSED DEVELOPMENT PROGRAMME**

**HUESTIS & WEBBER MINES**

**1969**

**January 10, 1969**

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**Vancouver Canada**

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## INTRODUCTION

The proposed development programme outlined in this report and on the accompanying plans is intended to be a guide for the mine operating staff and an aid for company budgeting and monetary planning. Specific details in the programme do not have to be followed unswervingly but the general programme and the total work proposed should be adhered to in order that the objectives of the programme be attained.

The primary objective of the development programme is to ensure a sufficient and continued supply of ore to feed a continuously operated, 250 ton per day concentrator and, hopefully, to develop sufficient reserves and producing areas to allow an eventual increase in the mine and concentrator production. These objectives can be reached by following an integrated exploration, development, and mining programme. It must be emphasized that all three of these phases require approximately equal long range priorities and that only for short time-periods should one phase receive higher priority than the other phases. This situation can be attained only by following the major proposals of a comprehensive long-range development programme.

The proposed development is not inflexible and should in fact come under periodic reviews. As information from initial work becomes available it will have an effect on remaining portions of the programme. Some proposals may have to be altered considerably in quantity, timing and short-term priority. However, it is important that the general concept and major proposals of the programme be adhered to until enough new information has been obtained to suggest major changes in the programme.

For the purposes of this report all raising except for ore passes has been considered as stope development and consequently has not been included in this report.

### ASSUMPTIONS AND CRITERIA FOR PLANNING

As a basis for estimating and planning the development programme some reasonably founded assumptions and standards have been employed. These have been determined by calculation, experience, and discussion with Mount Nansen personnel. With more operating experience at Mt. Nansen it may be found that these figures will require slight revision.

#### Assumptions:

1. Production during 1969 @ 250 TPD; 7500 TPM  
90,000 TPY
2. Cyanide plant to begin operation March 1, 1969
3. Sufficient equipment, air and water to do the work proposed.

#### Calculated Criteria:

1. An average of 15 tons of ore added to ore reserves per foot of lateral development.
2. An average of 5 tons of ore added to ore reserves per foot of diamond drilling.
3. Development advance rates - drifting - 5 ft per crew shift  
raising - 5 ft per crew shift  
diamond drilling - 30 ft per machine shift
4. From the above figures the following averages emerge:  
  
Required drifting (to maintain ore reserves) 500 ft/month  
  
Required diamond drilling - 1500 ft/month.

## ORE DEPLETION

Depletion of calculated ore reserves is the basis for determining when new ore sources must be available for mining. Some of these new ore sources are known or suspected (such as the 4100 level Webber) but some will have to come from essentially unexplored areas. The accompanying ore depletion chart (Figure 1) indicates that the Webber 4100 level must be available for mining by January 1, 1970 and new, unknown ore sources must be available by June 1, 1970. Both of these dates may be shifted further into the future if a few other suspected ore sources, such as the No. 13 vein on the 4300 level Huestis, prove to have appreciable tonnages of ore. However, even if several potential ore sources add appreciably to the ore reserves the total programme outlined in this report should not necessarily be reduced. The long-range objective should be to increase the concentrator production, if feasible, and to ensure a continued 2-3 year reserve of proven and probable ore.

The ore reserves used in the depletion chart have been determined by summing 100% proven, 75% probable and 50% possible of the mineable ore reserves for each area. This is believed to be a reasonably conservative estimate of the ultimate tonnage to be mined from each area for which ore reserves are now calculated.

The rates of mining from the four major stoping areas (H 4300, H 4100, W 4300, W 4100) are debatable but it is doubtful that changing the rates as shown in the depletion chart will appreciably change the critical dates indicated by the chart.

### Available Ore:

Huestis	4300	24,000 tons
	4100	60,000 tons
Webber	4300	49,000 tons
	4100	40,000 tons
	<b>Total</b>	<b>173,000 tons</b>

## DEVELOPMENT SCHEDULE AND SUMMARY

A development schedule has been included with this report for several reasons. It shows the preferred sequence of work to logically achieve the programme objectives. It indicates that the programme is workable from an operational point of view. And, finally, it should serve as a guide for more detailed scheduling and planning by the mine operating staff. It is not intended to be a firm operating schedule because there are undoubtedly operational details, known to the mine staff, which have not been considered in this report.

It is impossible to explore and develop all areas of the mine at the same time and therefore it is necessary to concentrate on some areas at the expense of others. For the 1969 programme, development on the upper level at both Huestis and Webber has been prioritized as has the connecting drift between Huestis and Webber on the 4100 level. Except for nominal diamond drilling footage no work is proposed for H 4100 east of 58,400 E.

The proposed diamond drilling is dependent upon the progress of drifting and the results obtained from initial holes in an area. In new areas (Huestis-Webber 4100) long exploration holes should be drilled first in order that subsequent intermediate holes can be drilled to optimum depths.

### Summary of Proposed Development:

		<u>Drifting</u>		<u>Diamond Drilling</u>	
		<u>1969</u>	<u>Total</u>	<u>1969</u>	<u>Total Proposed</u>
			<u>Proposed</u>		
Huestis	4300	1150'	2600'	3500'	5200'
	4100	2800'	4000'	9400'	18400'
Webber	4300'	600'	1250'	3600'	4600'
	4100'	* 2800'	3300'	7700'	7700'
<b>Totals</b>		<b>7350'</b>	<b>11150'</b>	<b>24200'</b>	<b>35900'</b>

\* Includes 200 ft of raising.

## DEVELOPMENT DETAILS

### HUESTIS 4300 Level:

- Adit - Diamond drill for the eastern extension of 12 Vein
- 11 Vein - Drill down-holes into 12 vein to guide stope development and stoping
- 12 Vein - Diamond drill for 13 vein; drift 300 ft to section 58000 E and drill flat holes 500 ft north and south.
- 13 Vein - Drill 15 and 17 Vein; drift western extension of 13 Vein
- 15-17 X-C- No work during 1969
- 15 Vein - No work during 1969
- 17 Vein - No work during 1969

### WEBBER 4300 Level:

- 1 Vein - Down-holes into 1 and 2 Veins
- 2 Vein - Drill for western extension of 2 Vein offset and down-holes into 2 Vein offset; drift east 600 ft; exploratory drilling.

Exploration North - No work during 1969

### HUESTIS 4100 Level:

- Adit - Exploration drilling after 1969
- 12 Vein - Horizontal drilling (no down-holes) into 13 Vein
- 13 Vein - No work during 1969

Main Drift to Webber - Drift 2800 ft at highest possible rate (a three-shift operation is assumed in this report) to the objective of 55500 E - 29900 N. Followed by exploration diamond drilling.

**WEBBER 4100 Level:**

**Main Drift to Huestis - Drift 1200 ft on a three-shift basis to 55500 E-29900 N. Immediately followed by exploration and development drilling on a three shift basis.**

- 1 Vein - Drift 600 ft after drilling completed from main drift**
- 2 Vein - Drift for remainder of year (800 ft.)**
- 2 Vein Offset Drift in 1970**
- Ore Pass - Raise to 4300 level (in weak section of vein if possible) after main drift completed and in conjunction with exploration diamond drilling.**

**SUGGESTED STANDARD PROCEDURES**

The employment of some standard development procedures at Mt. Nansen will help simplify planning and operation, will result in more logical information and should eventually lead to slightly lower development costs. The procedures suggested below are based on general experience combined with specific information about Mt. Nansen.

1. Diamond drill holes should be drilled on and parallel to section whenever possible.
2. Acid dip tests should be made on all holes over 400 feet in length.
3. Slashes (and short cross-cuts where required) should be cut on section, every 200 ft, when drifting is in progress. They will greatly facilitate diamond drilling and will often permit mining and drilling to be carried on at the same time in one heading.
4. When possible mine workings such as cross-cuts and raises should be driven along sections in order that the maximum geological information can not only be obtained but also recorded where it is most useful - on geological sections.

5. Initial drifting in new areas should be on line drive regardless (generally) of ore intersected. Diamond drilling done from this initial drift will provide information on which to base a well planned and scheduled ore development programme. The total development cost will almost certainly be lower by this method than by the method of following ore with the initial drift.

## CONCLUSIONS AND RECOMMENDATIONS

Calculated ore reserves and ore depletion based on a 250 TPD operation indicate that some ore must be available from 4100 Webber by January 1970 and more ore must be available from new sources by June 1, 1970. Both of these dates may be moved somewhat farther into the future if other potential ore sources on the 4300 level of Huestis and Webber prove to have mineable ore tonnages. However, this programme proposes the minimum development required to meet the above dates. Somewhat higher development rates would be preferable particularly when long range development is considered. There will be a period, probably beginning in about two years, when considerable effort and money will have to be expended towards deeper exploration and development. Although one more level may be serviceable by adits, a shaft or winze will eventually have to be sunk and new levels developed.

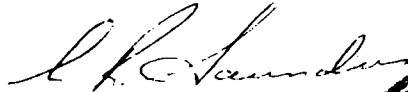
The overall programme and development schedule are not rigid proposals but the major objectives are extremely important. More detailed planning and scheduling should be done by the mine operating staff.

It is recommended that a minimum of 7350 feet of drifting (including a 200 foot ore pass) and 24,200 feet of diamond drilling be completed during 1969. This work should be completed in a sequence and with the proper priorities to achieve the objectives outlined in this report.

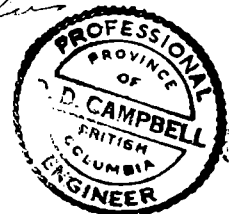
Respectfully submitted,

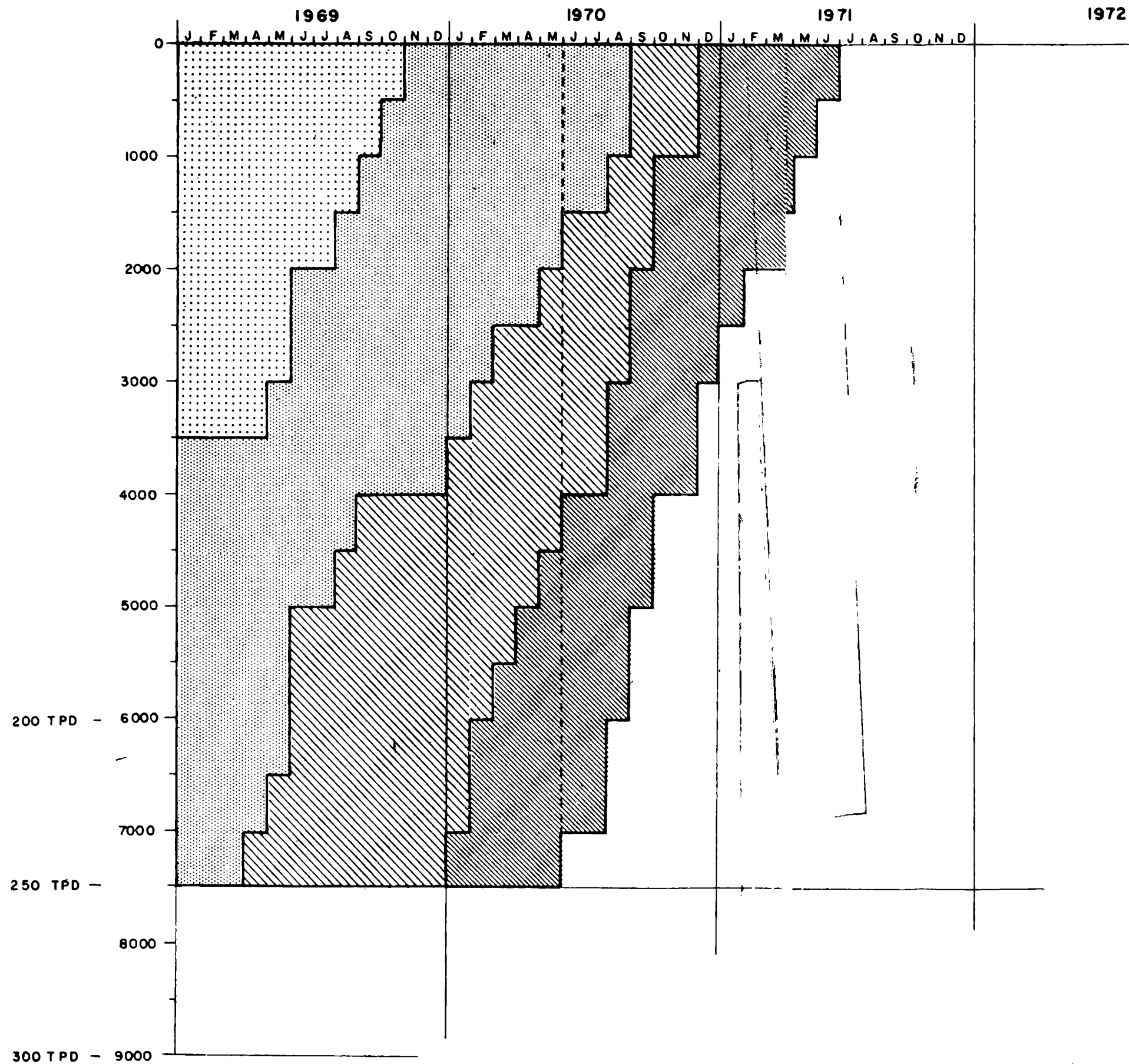


D. D. Campbell, P. Eng., Ph. D.







C. R. Saunders





**LEGEND**

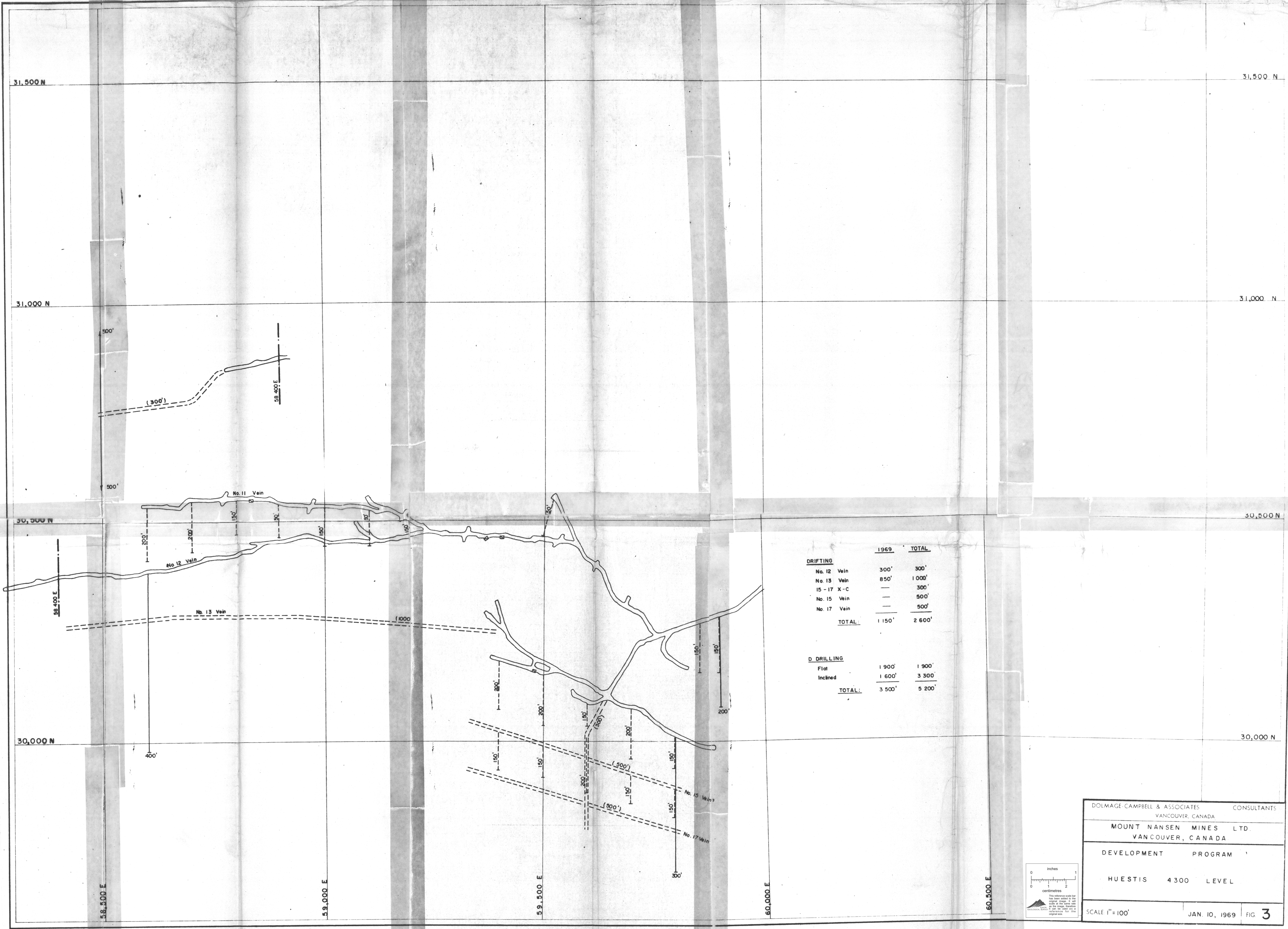
-  Huestis 4300 Level (24,000T)
-  Huestis 4100 Level (60,000T)
-  Webber 4300 Level (49,000T)
-  Webber 4100 Level (40,000T)

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<b>HUESTIN &amp; WEBBER</b>		
<b>ORE DEPLETION CHART</b>		
SCALE: _____	JAN. 10, 1969	FIG. 1

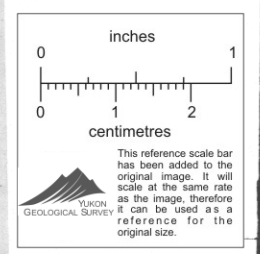
LOCATION	1969												AVAILABLE				
	DR JAN DD	DR FEB DD	DR MAR DD	DR APR DD	DR MAY DD	DR JUNE DD	DR JULY DD	DR AUG DD	DR SEPT DD	DR OCT DD	DR NOV DD	DR DEC DD	DRIFT	D. DRILL	DRIFT	D. DRILL	
H 4300 No. 12 Vein	400'							150'	150'		500'	500'	300'	1400'	300'	1400'	
No. 13 Vein			300'						100'	250'	250'	250'	850'	300'	1000'	1200'	
15-17 X-C															300'	200'	
No. 15 Vein															500'	600'	
No. 17 Vein															500'		
No. 11 Vein		1200'	100'											1300'		1300'	
ADIT	300'	200'												500'		500'	
W 4300 No. 1 Vein	700'													700'		700'	
No. 2 Vein		700'	600'		250'	250'	100'		700'	700'	200'		600'	2900'	600'	2900'	
EXPL. N															650'	1000'	
H 4300 MAIN DR.	300'	400'	400'	400'	400'	400'	400'	100'	700'	1400'	1400'	1400'	1400'	2800'	6300'	2800'	9300'
No. 12 Vein			1000'	2100'											3100'		6600'
No. 13 Vein																1200'	
ADIT																	2500'
W 4100 MAIN DR.	300'	400'	400'	100'	2100'	2100'	2100'	1400'						1200'	7700'	1200'	7700'
No. 1 Vein							150'	250'	200'					600'		600'	
No. 2 Vein									50'	250'	250'	250'		800'		1000'	
No. 2 Vein off.																300'	
ORE PASS				200'										200'		200'	
TOTALS: DRIFT	600'	800'	800'	700'	650'	650'	650'	500'	500'	500'	500'	500'	500'	7350'		*11150'	
D. DRILL	1400'	2100'	2000'	2100'	2100'	2100'	2100'	2100'	2100'	2100'	2100'	1900'		24200'		35900'	

\*Includes 200' raise ftge. (ORE PASS)

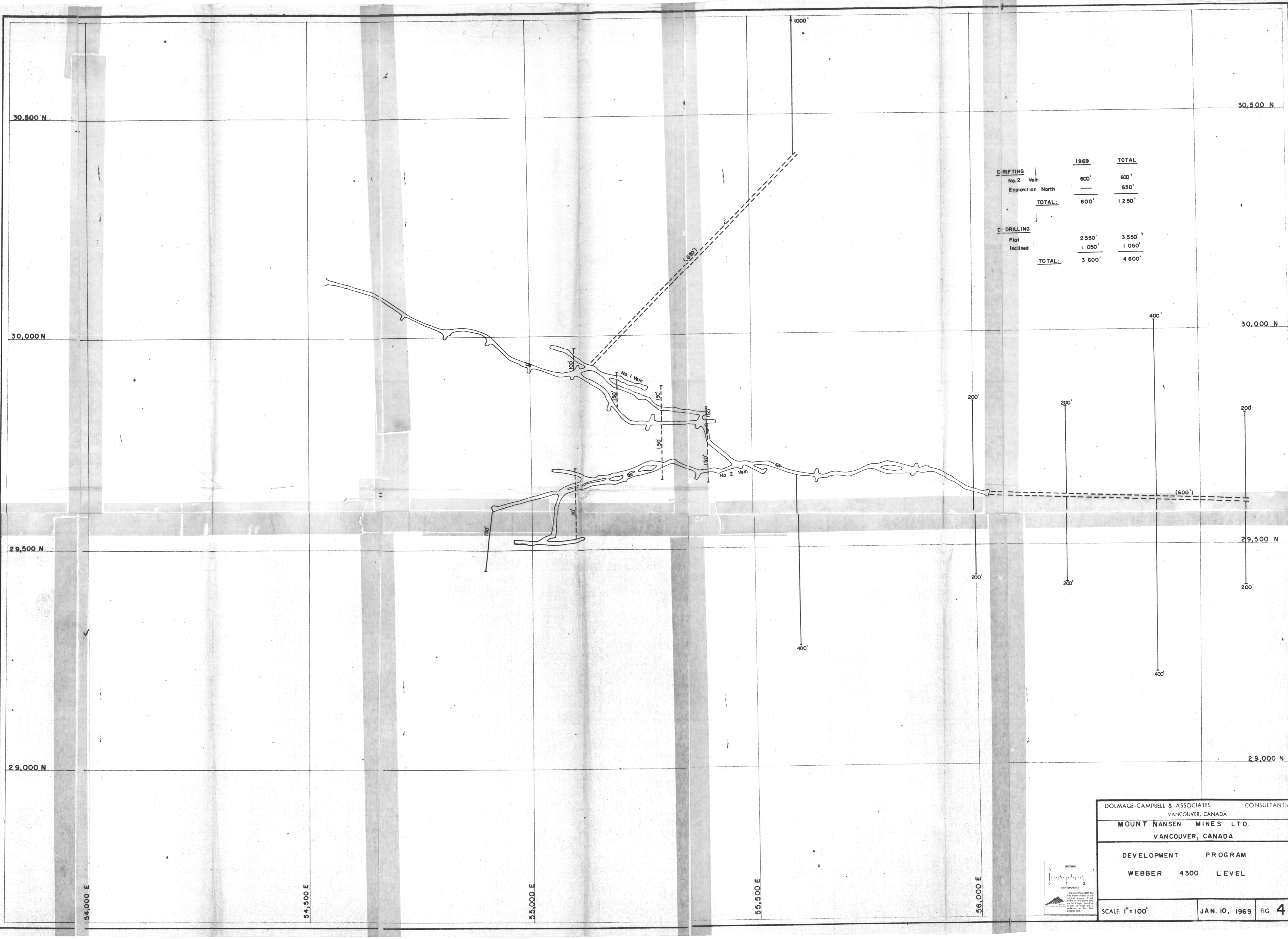
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HUESTIS & WEBBER	
<b>PROPOSED UNDERGROUND DEVELOPMENT SCHEDULE 1969</b>	
SCALE: —	JAN. 10, 1969 FIG. 2



	1969	TOTAL
<b>DRIFTING</b>		
No. 12 Vein	300'	300'
No. 13 Vein	850'	1000'
15 - 17 X-C	—	300'
No. 15 Vein	—	500'
No. 17 Vein	—	500'
<b>TOTAL:</b>	<b>1 150'</b>	<b>2 600'</b>
<b>DRILLING</b>		
Flat	1 900'	1 900'
Inclined	1 600'	3 300'
<b>TOTAL:</b>	<b>3 500'</b>	<b>5 200'</b>



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DEVELOPMENT	PROGRAM
HUESTIS 4300 LEVEL	
SCALE 1" = 100'	JAN. 10, 1969 FIG 3



	1969	TOTAL
<b>D RIFTING</b>		
No. 2 Vein	600'	600'
Exploration North	—	650'
<b>TOTAL:</b>	<b>600'</b>	<b>1 250'</b>
<b>D DRILLING</b>		
Flat	2 550'	3 550'
Inclined	1 050'	1 050'
<b>TOTAL:</b>	<b>3 600'</b>	<b>4 600'</b>

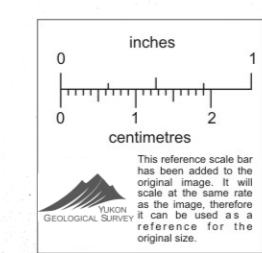
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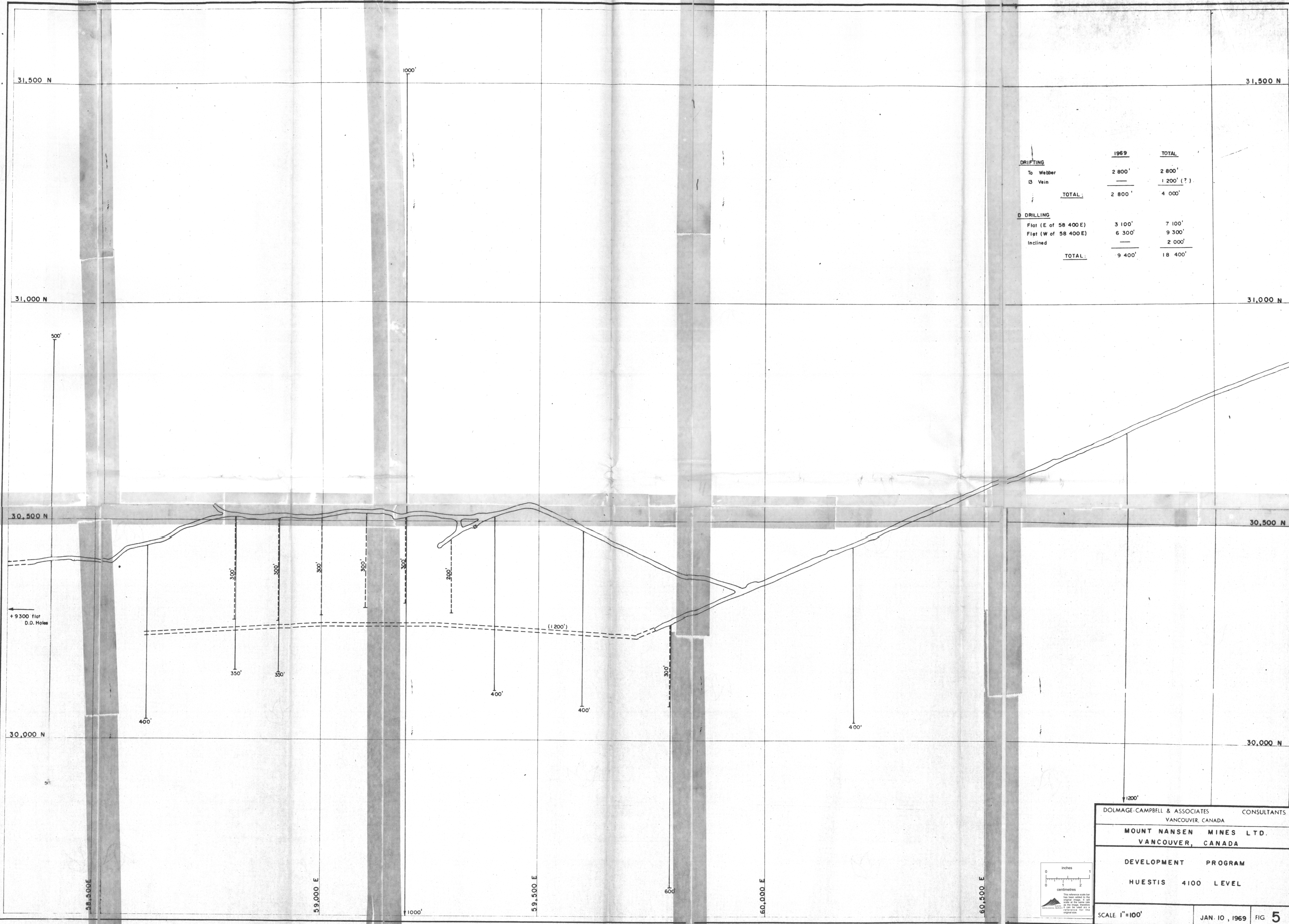
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DEVELOPMENT PROGRAM  
WEBBER 4300 LEVEL

SCALE 1" = 100'

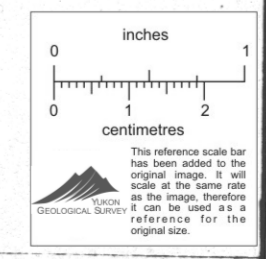
JAN. 10, 1969 FIG 4



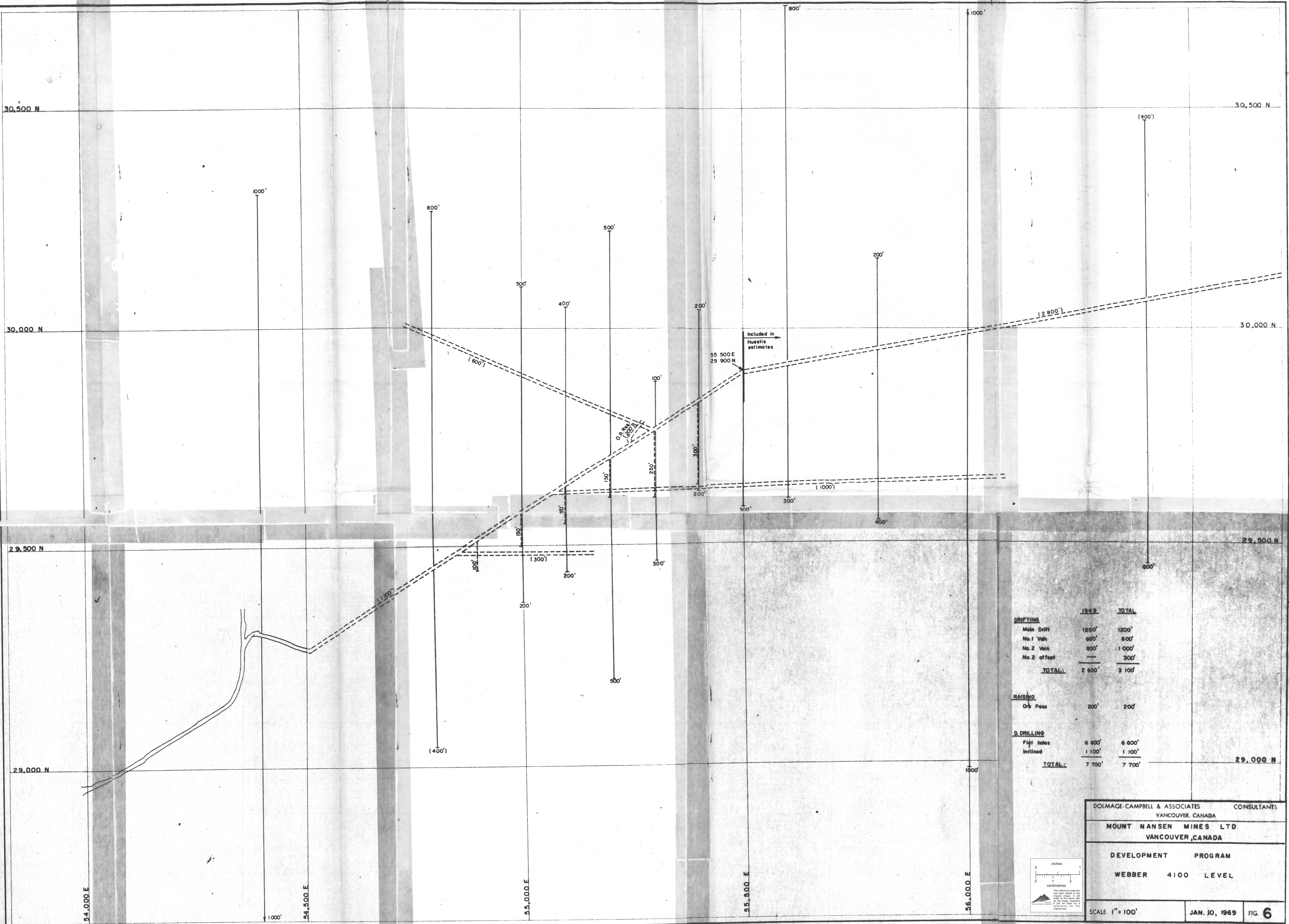


	1969	TOTAL
<b>D RIFTING</b>		
To Webber	2 800'	2 800'
to Vein	—	1 200' (?)
<b>TOTAL:</b>	2 800'	4 000'
<b>D DRILLING</b>		
Flat (E of 58 400 E)	3 100'	7 100'
Flat (W of 58 400 E)	6 300'	9 300'
Inclined	—	2 000'
<b>TOTAL:</b>	9 400'	18 400'

← + 9300' Flat  
D.D. Holes



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DEVELOPMENT PROGRAM	
HUESTIS 4100 LEVEL	
SCALE 1"=100'	JAN. 10, 1969 FIG 5



	1969	TOTAL
<b>DRIFTING</b>		
Main Drift	1200'	1200'
No. 1 Vein	600'	600'
No. 2 Vein	800'	1 000'
No. 2 offcut	—	300'
<b>TOTAL:</b>	<b>2 600'</b>	<b>3 100'</b>
<b>RAISING</b>		
Orb Pass	200'	200'
<b>D. DRILLING</b>		
Flat holes	6 600'	6 600'
Inclined	1 100'	1 100'
<b>TOTAL:</b>	<b>7 700'</b>	<b>7 700'</b>

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DEVELOPMENT PROGRAM  
WEBBER 4100 LEVEL

SCALE: 1" = 100'

JAN. 10, 1969 FIG. 6

