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DEPARTMENT OF SUPPLY AND SHIPPING.
MINERAL RESOURCES SURVEY.

REPORT No. 1945/65.
Plans Nos. 1299 and 1300.

PROPOSED DEVELOPMENT PROGRAMME FOR GREISEN OREBODY,
MOUNT BISCHOFF TIN MINE.

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CANBERRA.

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DEPARTMENT OF SUPPLY AND MINING.

Mineral Resources Survey Branch

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BISCHOFF TIN MINE.

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1. INTRODUCTION.

The Mine Manager at Mount Bischoff Tin Mine, Mr. Eddy, proposes to mine the Greisen Orebody by means of a system of gloryholes, in combination with stoping. The two gloryholes and the stope will be based on Main Tunnel level as the haulage level. The Deputy Controller of Minerals Production, Mr. G. Lindesay Clark, has asked that a scheme of development work necessary for opening up the orebodies preparatory to mining should be decided on and set out on paper. In addition, he has asked that a plan for gloryholing the orebodies should be set out so that some fairly definite idea could be gained of tonnage of ore and overburden to be handled and the number of passes required to ensure efficiency of mining and continuity of supply of ore to the mill.

The matter has been discussed with Mr. Eddy and general agreement reached on a development programme. The original scheme has been altered slightly in detail and this modified scheme is presented here.

Differences of opinion between Mr. Eddy and the writer on the gloryhole layout arise from different views on the grade of the block of ground above the tribute stope in the West Gloryhole area. Mr. Eddy considers that this block contains sufficient ore to pay for its removal. The writer on the other hand considers it highly probable that the block will be found to contain not more than 25 per cent. of ore. If the block is removed, the footwall ore beneath it could be mined by gloryholing instead of stoping. If this is done, the cost of removal of at least 75 per cent. of the block should be debited against the cost of gloryholing the footwall ore beneath the block (any profit from the 25 per cent. of ore would be, if desired, deductible from the cost of removal of the remaining 75 per cent. of the block). Development and testing work set out in this report will determine the grade of this block, and several other important factors, with a minimum of dead work. Results of this work would determine whether the larger gloryhole would be justified or whether a smaller gloryhole on the hangingwall ore and stoping on footwall ore would be a more profitable method.

Two Plates are attached to this report:-

- Plate 1 - Sections showing proposed development work.
- Plate 2 - Plan of proposed development work.

2. GENERAL.

A report (No. 1944/47) was prepared in November, 1944, dealing with the ore reserve position at Mount Bischoff Tin Mine, and estimates of ore reserves in the Greisen Orebody were included.

These estimates were computed from the assay plan and sections which were attached to that report. Since that date no further development work has been carried out. The only additional information has come from geological mapping which has shown that the favourable bed takes a sharp swing to the south at section line A.

The amount of diamond drilling and underground development work completed to November, 1944, was insufficient to test the Greisen Orebody adequately, but did indicate the presence of a considerable tonnage of ore. Estimates of tonnage were arrived at by

sketching in what were considered to be reasonable outlines to the ore shoots interpolated from diamond drill hole and underground and surface information. On this basis an estimate of 65,000 tons of grade 0.85% Sn. was computed.

A glance at Plate 2 of Report No. 1944/47 is sufficient to show that the limits of the ore shoots are still to a large degree undetermined. In some places, interpolations have had to be made from positive information from one drill hole taken in conjunction with negative information from adjoining drill holes. This was the best that could be done in the limited time set for the diamond drilling programme. In any event, it is considered that diamond drilling alone could not provide all the information required to give an accurate picture of the ore shoots. For example, when the leading stope to No. 1 Drive was being developed, sampling was carried out by the writer to gain some information about distribution of values across the ore shoot. Results of channel sampling were compared with chip samples from the face and grab samples from the broken ore. The general conclusion arrived at was that a channel sample did not necessarily indicate the true value of the ore in a block in its vicinity. Grab sampling of the broken ore from the block gives a much better result. This was borne out by results of sampling throughout the whole length of the No. 1 Drive, and is an expression of the patchy distribution of cassiterite within an ore shoot. The implication is that results of a single drill hole cannot be given too much weight in the estimation of grade.

On the other hand, the drilling of the No. 1 Drive shoot demonstrated that values did not occur outside fairly regular shoot boundaries. This seems to indicate that high values in single drill holes can be used for approximately defining the boundaries of ore shoots, while low values do not necessarily rule out the possibility of a block of ore occurring around the drill hole.

The above remarks apply particularly to the East Gloryhole ore shoot. The ore shoot was picked up in two drill holes only, on D and E lines. The only other information available is that the shoot does not reach M.T.level (three drill holes and a crosscut) and apparently does not reach the surface as a wide shoot except possibly on F line. More information on shoot limits is required before mine lay-out can be definitely decided on.

3. DEVELOPMENT PROGRAMME.

The Mine Manager proposed to gloryhole ore around several openings connecting with drives at M.T.level. A stope is also to be developed above No. 1 Drive between lines C and F. If this scheme is adopted the several gloryholes will, after the initial stages, merge into two distinct major openings called herein the West Gloryhole and East Gloryhole. A plan of the openings after completion of operations would be something like that on Plate 2.

The development programme is set out below under three headings - West Gloryhole Area, East Gloryhole Area and No. 1 Drive Stope Area. The openings suggested will achieve the double purpose of determining shoot limits, where present information is not sufficient, and of providing main passes and drives for mining and handling the ore.

WEST GLORYHOLE AREA. In this area, the main mining problem is whether the whole of the ore can be mined profitably by gloryholing or whether only portion of the ore can be so removed, and the remainder won by underground stoping. The decision will, of course, be made by the Mine Manager, but, in the writer's opinion, the assumption, on the evidence available at the present time, that the larger gloryhole can be developed profitably is premature. The main factor on which the problem hinges is the grade of the block of ground above the tribute stope. The upper part of the block is shale which is practically barren. The mineralised material

below this has been tested by two diamond drill holes and several auger holes with disappointing results, although these results are admittedly not conclusive. The question of grade is so important that its proving should have a high priority in the development programme. Other factors which require determination are - (1) whether ore is continuous on the footwall side between the No. 1 Drive and the base of the tribute stope, and (2) whether any defined low grade band occurs between hangingwall and footwall ore between M.T.Level and R.L.1210 feet.

Suggested Development Work, Etc.

	<u>Feet.</u>
Rise on A line (No. 2 Rise)	60
North X-cut on B line to footwall of ore (No.2 X-cut)	40
Rise from No. 2 X-cut to tribute stope (No.3 Rise)	45
Rise on B line above Gossan Bench Adit (No.4 Rise)	20
Branch drive from No. 1 Drive along footwall of ore (No. 2 Drive)	<u>110</u>
	275 feet
Breaking of a strip 6 to 10 feet wide on B line above the tribute stope	400 tons
Test hole boring or diamond drilling from above strip	<u>80 feet</u>

The last two items should be carried out as early as possible. Breaking of the strip does not constitute dead work as it must be removed in any case for safety reasons if any gloryholing is to be carried out.

If information disclosed by the above development work indicates that the whole of the ore is to be won by gloryholing, a rise on C line (60 feet) will be required to handle the additional tonnage.

A X-cut driven south for 60 feet between A and B lines would explore the orebody along the West wall.

Sampling results from No. 1 rise are open to question. This rise should be sampled systematically by chip sampling all walls.

EAST GLORYHOLE AREA. The limits of the shoot and the grade of the ore must be determined in more detail before a decision is made on mine layout. In the programme set out below, provision is made for a drive from M.T.Level and two rises from this drive. The first rise has been located 10 feet east of E line and will pick up drill hole E3 a little above the rich footwall values. The rise will determine the vertical extent of the footwall ore. A X-cut from the rise at some convenient point within the shoot would determine the lateral dimensions of the shoot and the overall grade from hangingwall to footwall. This work would give some indication of whether overall grade and overburden-ore ratio pointed to gloryholing as the most economical method of mining. If so, a second rise would be put up about 40 feet west of the first rise. It may happen that a rich patch of ore occurs on the footwall which could be profitably stoped out, but which would not justify gloryholing. The first alternative is considered the more probable and the two rises are placed in what are regarded as the best positions for main passes for the gloryhole.

Suggested Openings.

	<u>Feet</u>
Drive from Main Tunnel (No. 3 Drive)	80
Rise 10 feet east of E line (No. 5 Rise)	110
X-cut from No. 5 Rise (No. 3 X-cut)	55
Rise from 20 feet east of D line to point 10 feet east (No. 6 Rise)	80
Short rise to tribute workings on F line (No.7 Rise)	15
	<u>340 feet</u>

The proposed No. 3 drive as shown on the sections and plan would be in footwall shale most of the way. If it is found preferable by the management to keep the drive in mineralised country, its position will be several feet to the south of the position shown.

NO. 1 DRIVE STOPE AREA.

<u>Suggested Opening.</u>	<u>Feet.</u>
Rise 16 feet east of D line to tribute workings (No. 8 Rise)	55

4. TONNAGE ESTIMATES.

The estimates given below are intended to serve as guides to the tonnage of material which may have to be mined in glory-holing operations. These have been computed from plates Nos. 1 and 2 accompanying this report. The uncertainty of ore shoot boundaries and therefore of estimates has been discussed under Section 2. After the proposed development work has been done, much more reliable estimates can be prepared. No allowance has been made for dilution of ore in mining. The lowest batter considered on the North side is 60 degrees. It is hoped that this, or a steeper batter, will be realized in practice.

Probable reserves of ore above M.T. level within glory-hole and stope limits are 62,000 tons distributed as follows:-

West Gloryhole Area.

Gloryhole A: With limits shown on sections A, B and C, with west wall coincident with slate wall, and east wall at batter of 60 degrees from line C at M.T.level.

	<u>70° North Batter.</u>	<u>60° North Batter.</u>
Possible ore	35,000 tons	35,000 tons.
Hangingwall overburden	7,500 "	7,500 "
Footwall overburden	11,500 "	15,500 "
Possible mullock	52,000 "	55,000 "
	<u>106,000 "</u>	<u>113,000 "</u>

Gloryhole B and Stope: With limits shown on sections A, B and C, and with east and west batters similar to Gloryhole A.

	<u>In Gloryhole</u>	<u>In Stope</u>
Possible ore	21,000 tons	10,000 tons
Hangingwall overburden	7,500 "	
Footwall overburden	9,000 "	
Possible mullock	4,000 "	
	<u>41,500 "</u>	<u>10,000 "</u>

In either gloryhole, about half of the footwall overburden, largely shale, could be scraped west into the old Magazine workings. The remainder, below R.L. 1295, would have to be handled through the gloryhole passes. The hangingwall overburden could be broken to the No. 4 Gossan Bench and scraped to the west-wall opencut.

If Gloryhole A is developed, three passes in operation simultaneously would be necessary, but two passes would probably be sufficient for a limited gloryhole on the lines of Gloryhole B. Short subsidiary rises would have to be put up, of course, in the final stages to allow extraction of remnants of ore in either gloryhole.

East Gloryhole.

Within the limits shown on sections D, E and F, and

east wall at batter of 30 degrees from F line, and west wall at batter of 55 degrees from a point 25 feet west of line E at R.L.1190.

	<u>70° North Batter</u>	<u>60° North Batter</u>
Possible ore	20,000 tons	20,000 tons.
Possible mullock	25,000 "	31,000 "
	<hr/>	<hr/>
	45,000 "	51,000 "
	<hr/>	<hr/>

No. 1 Drive Stope.

with limits shown on sections D, E and F.

Possible ore 7,000 tons.

CANBERRA, A.C.T.
5th September, 1945.

C. L. Knight
C. L. KNIGHT,
Geologist.

SECTIONS SHOWING PROPOSED DEVELOPMENT WORK. GREISEN OREBODY, MOUNT BISCHOFF TIN MINE. ALSO POSSIBLE GLORYHOLE LIMITS.

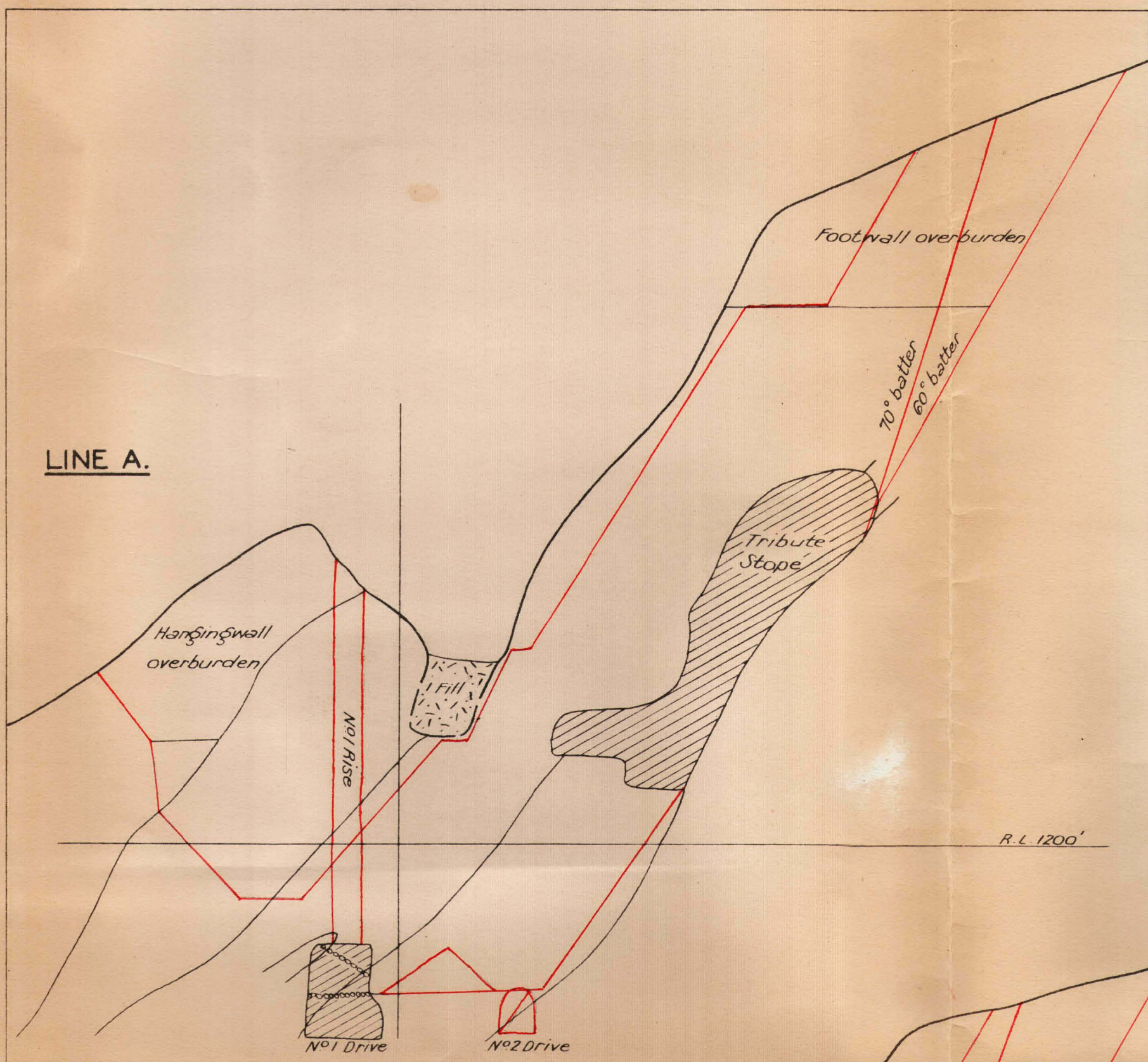
SCALE 1 INCH = 20 FT.

REFERENCE

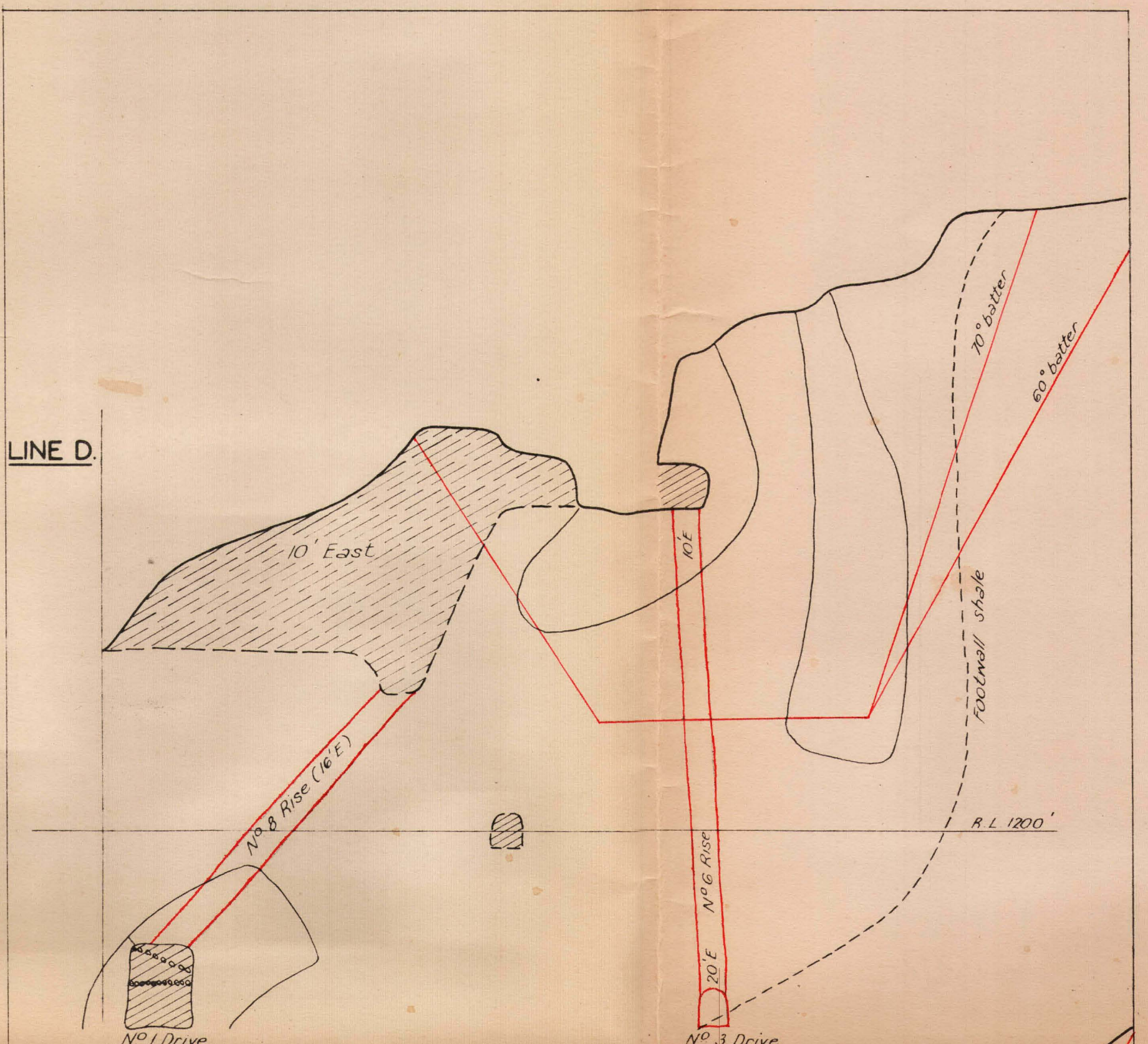
- POSSIBLE ORE SHOOTS
- WORKINGS COMPLETED
- WORKINGS PROPOSED

- WEST GLORYHOLE 'A' LIMITS
- " " " B & STOPE LIMITS
- EAST " " LIMITS

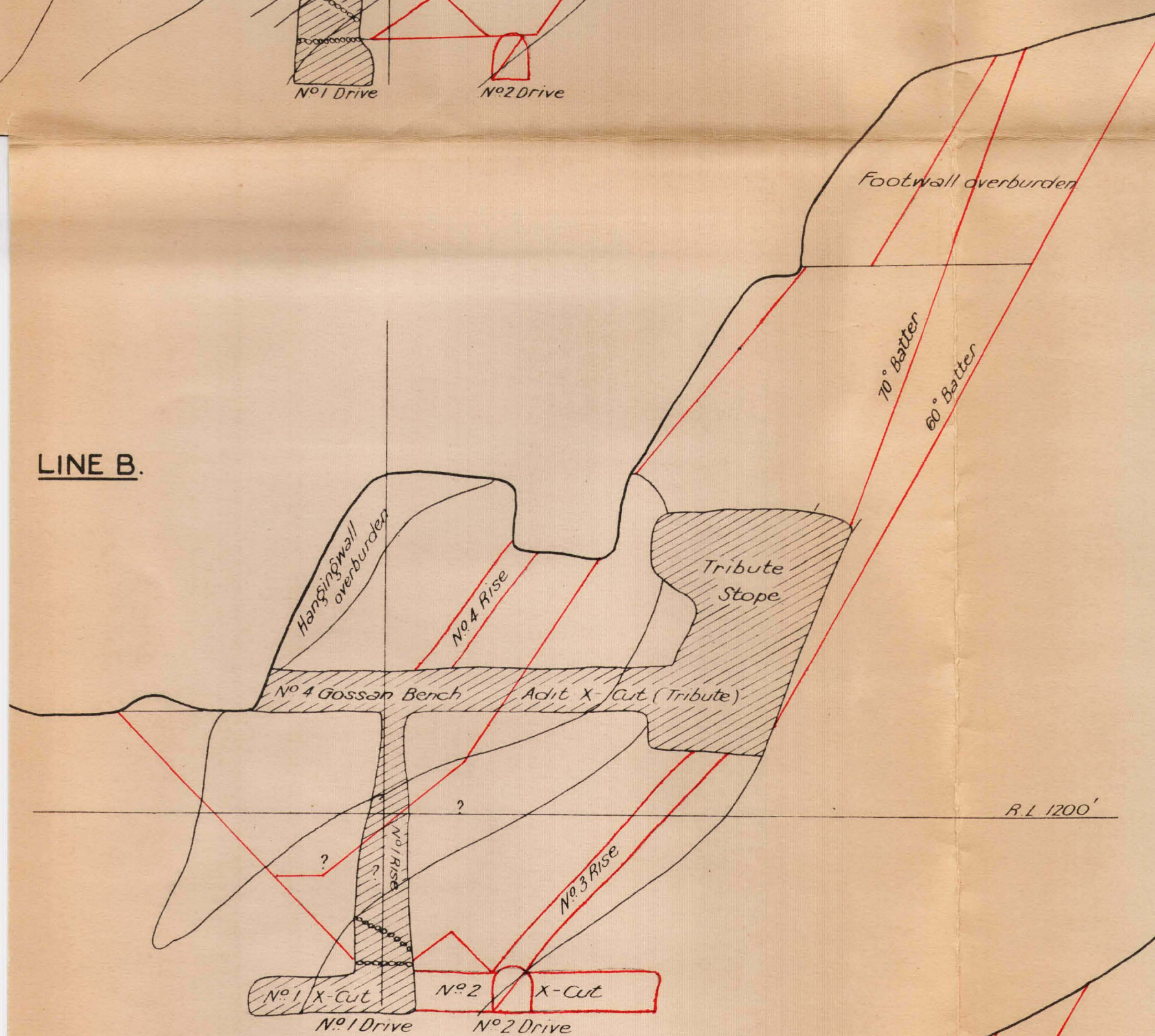
LINE A.



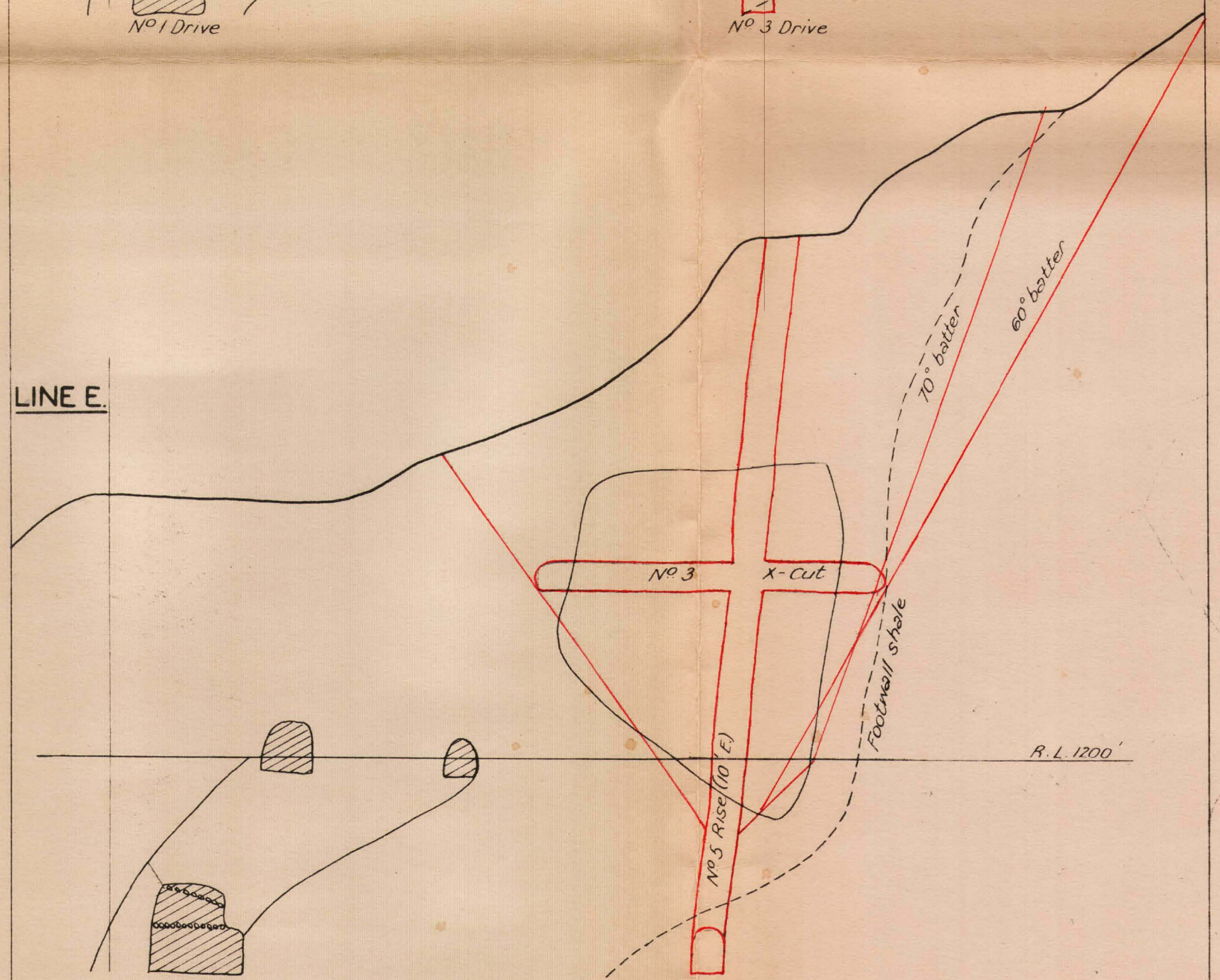
LINE D.



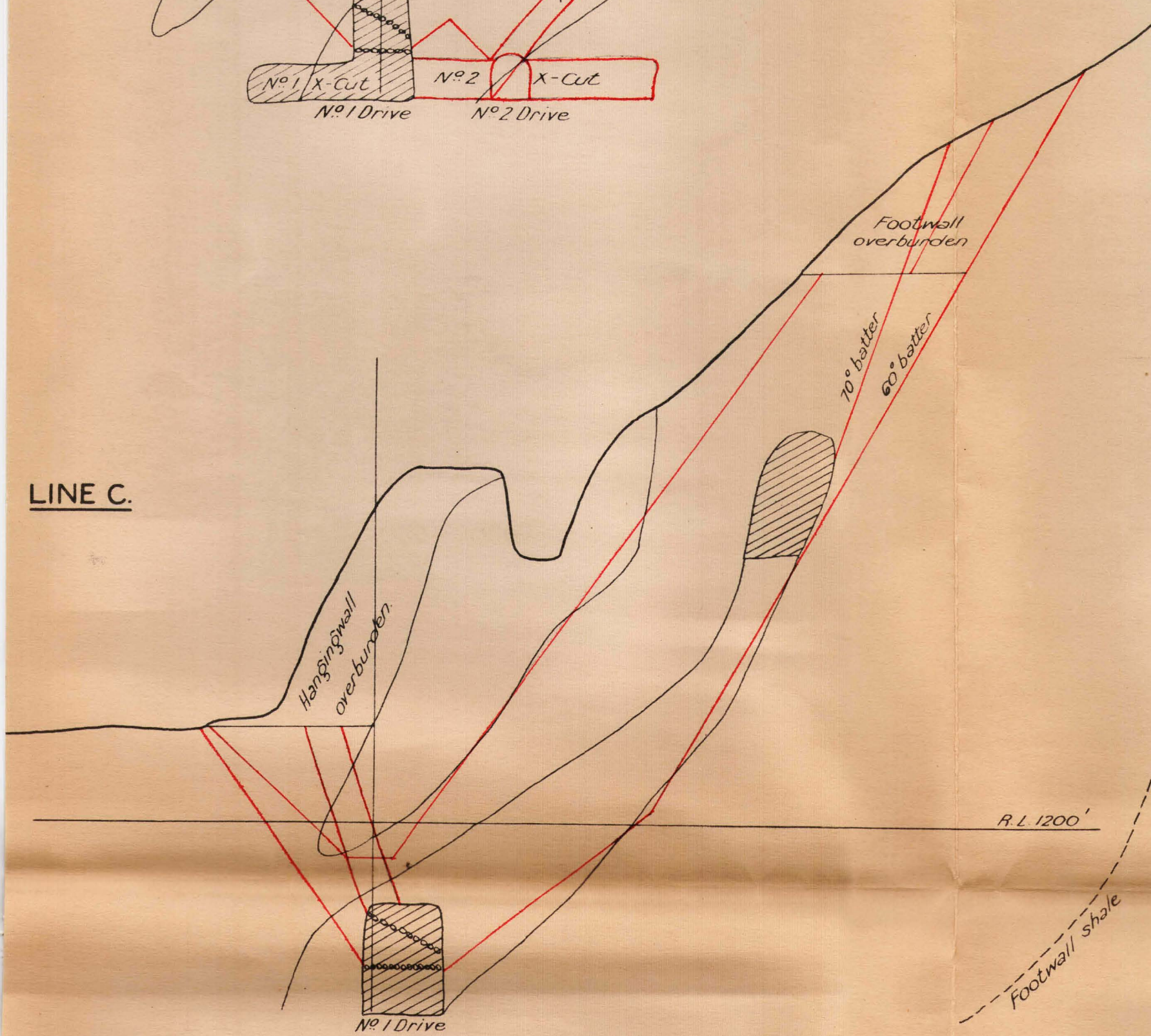
LINE B.



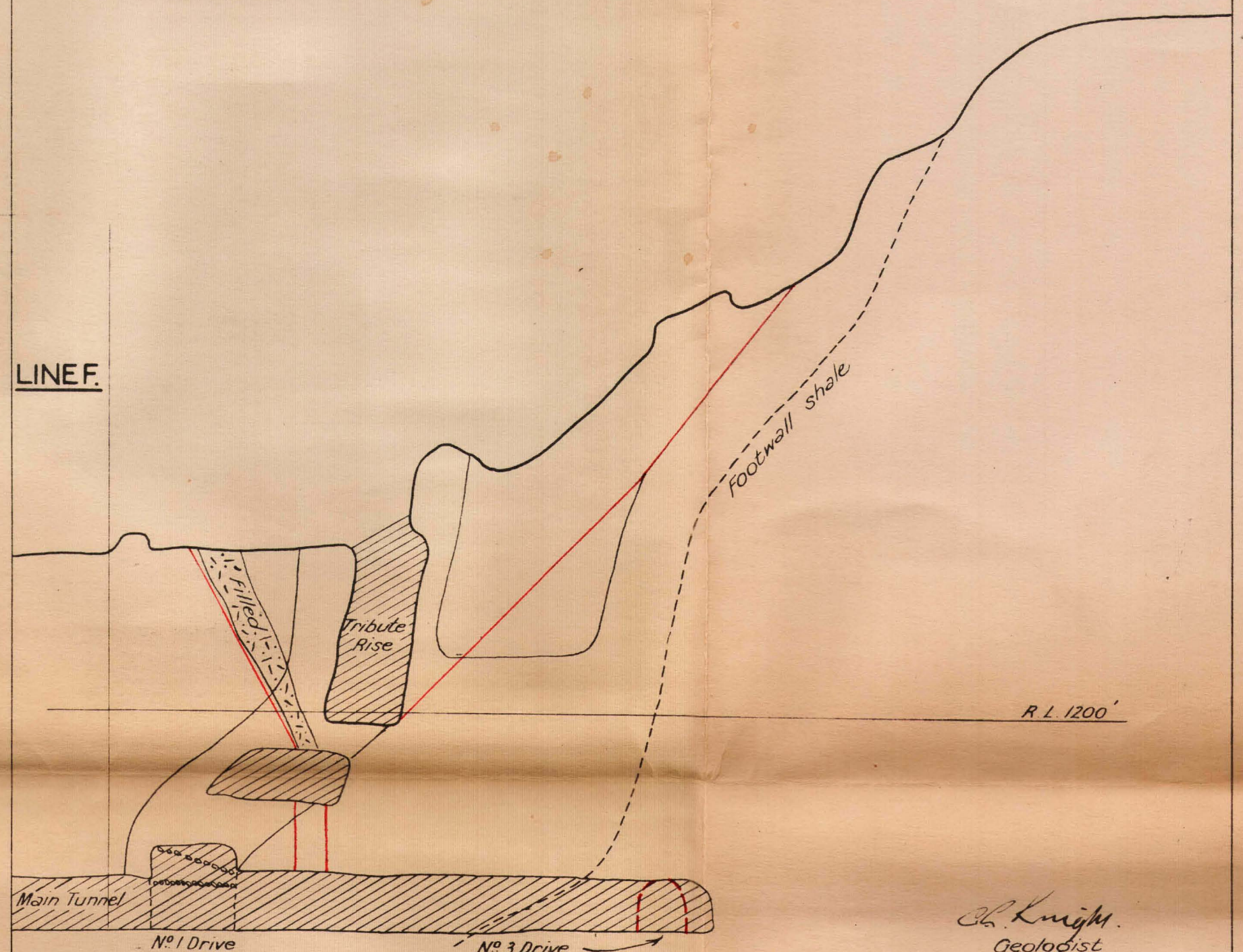
LINE E.



LINE C.



LINE F.



WEST GLORYHOLE AREA

EAST GLORYHOLE AREA

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Aug 1945

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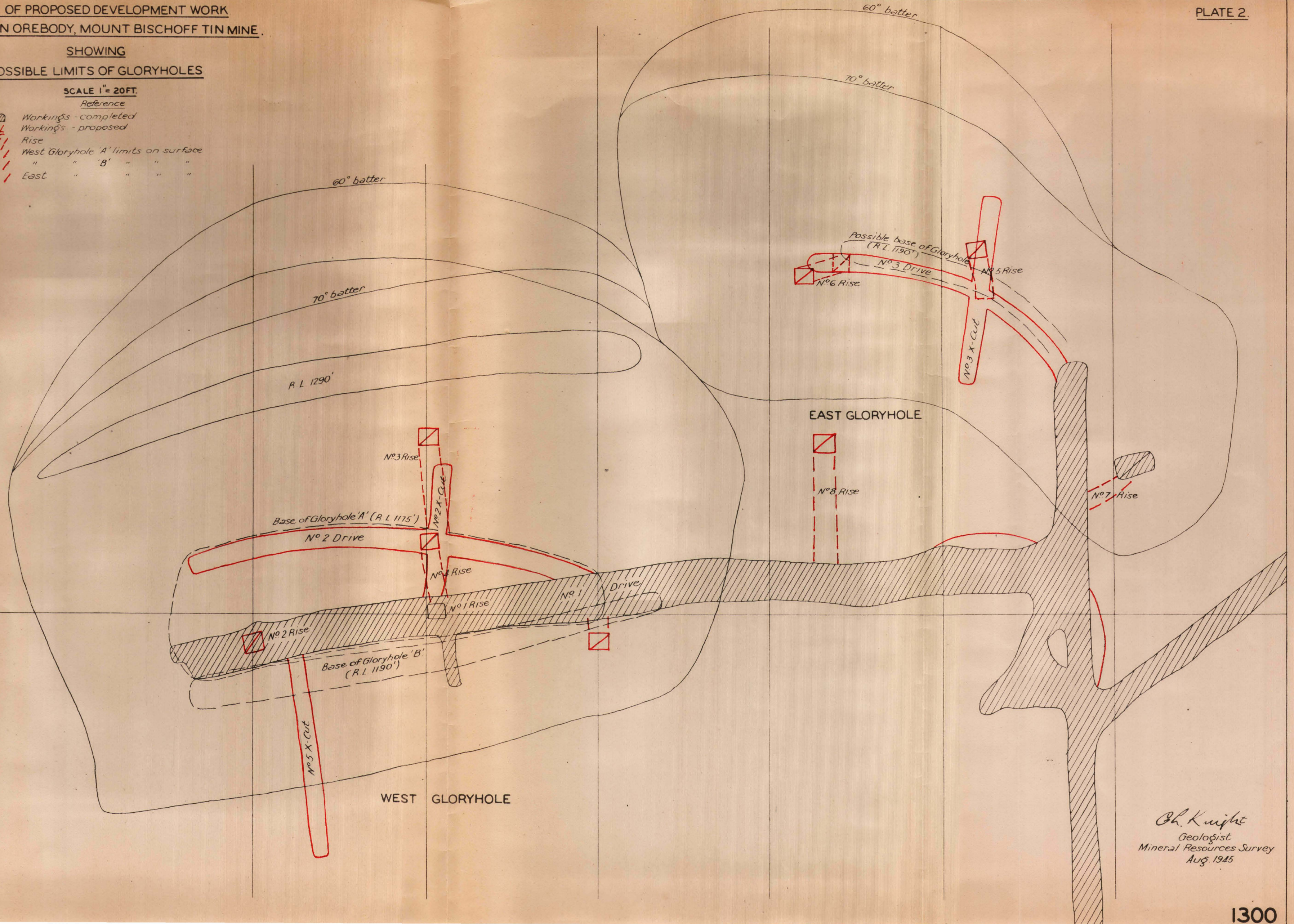
PLAN OF PROPOSED DEVELOPMENT WORK
GREISEN OREBODY, MOUNT BISCHOFF TIN MINE.

PLATE 2.

SHOWING
POSSIBLE LIMITS OF GLORYHOLES

SCALE 1" = 20 FT.

- Reference
- Workings - completed
 - Workings - proposed
 - Rise
 - West Gloryhole 'A' limits on surface
 - " " 'B' " " "
 - East " " " " "



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