Rept.Bk.No. 61/68
G.S. No. 3248

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENGINEERING DIVISION

MOUNT GAMBIER PUMPING STATION
GEOLOGICAL PROGRESS REPORT NO. 2
SEPTEMBER 1965

by

D.H. Stapledon

Supervising Geologist

10th September, 1965

D.M. 1486/62

RIB 61/68

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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DEPARTMENT OF MINES
SOUTH AUSTRALIA

MOUNT GAMBIER PUMPING STATION
GEOLOGICAL PROGRESS REPORT NO. 2
SEPTEMBER 1965

INTRODUCTION

At the request of the Resident Engineer, Southern District, Engineering and Water Supply Department, an inspection was made on the 1st September, 1965, of excavations in progress at the site of the Mount Gambier Pumping Station.

Progress Report No. 1 dated December 1964 (Ref. 1) sets out details of proposed pumping station and pipeline. Excavation of the pipeline trench above the site (Fig. 1) is about 60 percent complete. The excavation has been carried out using hand tools.

NOTES ON TRENCH EXPOSURES

Above Approx. R.L. 275

Fig. 2 shows the trench in plan and a sketch elevation of the eastern wall. Above R.L. 275 the material removed has been mainly basaltic ash consisting essentially of poorly graded sands and gravels. The ash mostly shows poorly defined bedding or layering, as shown on Fig. 2, east face elevation. Much of the material is uncemented, loose, and friable. Some horizons however are partly cemented to form materials grading from very strong soils into weak rocks. The wet strengths of these materials are generally not noticeably lower than their dry strengths.

Excavation of the cutting has removed most of the near-surface disturbed material, except on the eastern edge where a mass of partly cemented ash, probably slide material, lies steeply against horizontally bedded uncemented ash. At the boundary of the two materials is an old fissure, now sand filled, which dips steeply downslope. The surface expression of these features was noted earlier (Ref. 1) as a probable slide scar.

Below Approx. R.L. 275

Below R.L. 275 the excavation still in progress has exposed loosely packed, irregularly shaped blocks of scoriaceous basalt. A pilot trench 2 ft. wide excavated up to 6 ft. into this material has shown that it can be excavated readily by hand methods. This material was shown in Fig. 1 (Ref. 1) as "possible slumped material", concealing the upper surface of the basalt layer. The material now exposed appears to be a pocket of broken up and contaminated lava, extending several feet below the normal surface of the lava flow. Because of its very loose nature it was planned to cut this material back to a slope of 45° above the basalt layer. From the new exposures it appears likely that cutting this material back to 45° may remove most of it, and just expose the basalt layer.

EXAMINATION OF BASALT LAYER

The construction activity has resulted in cleaning off of vegetation cover from the basalt below and adjacent to the trench, and the structure of the basalt mass can now be more clearly seen.

In the gully immediately to the east of the base of the trench three near-vertical joints are visible. These joints

are gaping between 0.2 and 0.5 ft. and are probably partly filled with soil. They appear to strike within 30° of the general direction of the hillside, and occur very approximately at horizontal distances of 5, 15 and 50 ft. in from the face of the pumping station cutting. (Fig. 2, sketch plan).

These cracks in the basalt are immediately above the large collapsed block in the weathered limestone underlying the basalt (Fig. 1). There may be some direct connection between this cracking in the basalt and the collapsed block below, but this need not necessarily be so. As pointed out in Report No. 1 such opening up of joints adjacent to very steep slopes is a part of the normal mechanical weathering process. In addition some opening up of joints would have occurred initially as the lava solidified and cooled, and again during later explosions. The Access Tunnel showed numerous gaping joints.

CONCLUSION

1. Excavation of the pipeline trench has removed near-surface disturbed materials, and the materials exposed in the base of the trench are very little disturbed and appear stable. At the top of the cutting on each side however, it may be necessary to smooth off the sharp ridges formed at the intersection of the cutting with the natural slopes.

2. Below R.L. 275 the excavation is incomplete, but it appears likely that most of the material down to the proposed excavation level can be removed by hand methods.

3. The problem of gaping joints in the basalt is considered worthy of further investigation when excavation of the trench has been completed, exposing more of the basalt. Detailed geological sections are desirable before the type of support for the basalt is decided upon. It is clear that if anchor bars or cables are used, these would have to be much longer than the rock bolts originally intended, and that careful caulking and dental treatment of open joints will be required.

D. H. Stapledon
Supervising Geologist
ENGINEERING DIVISION

DHS:AGK
14/9/65

Reference 1

Stapledon, D.H., 1964. "Mount Gambier Pumping Station, Geological Progress Report No. 1. S.A. Dept. of Mines, Rept. Bk. No. 59/134.

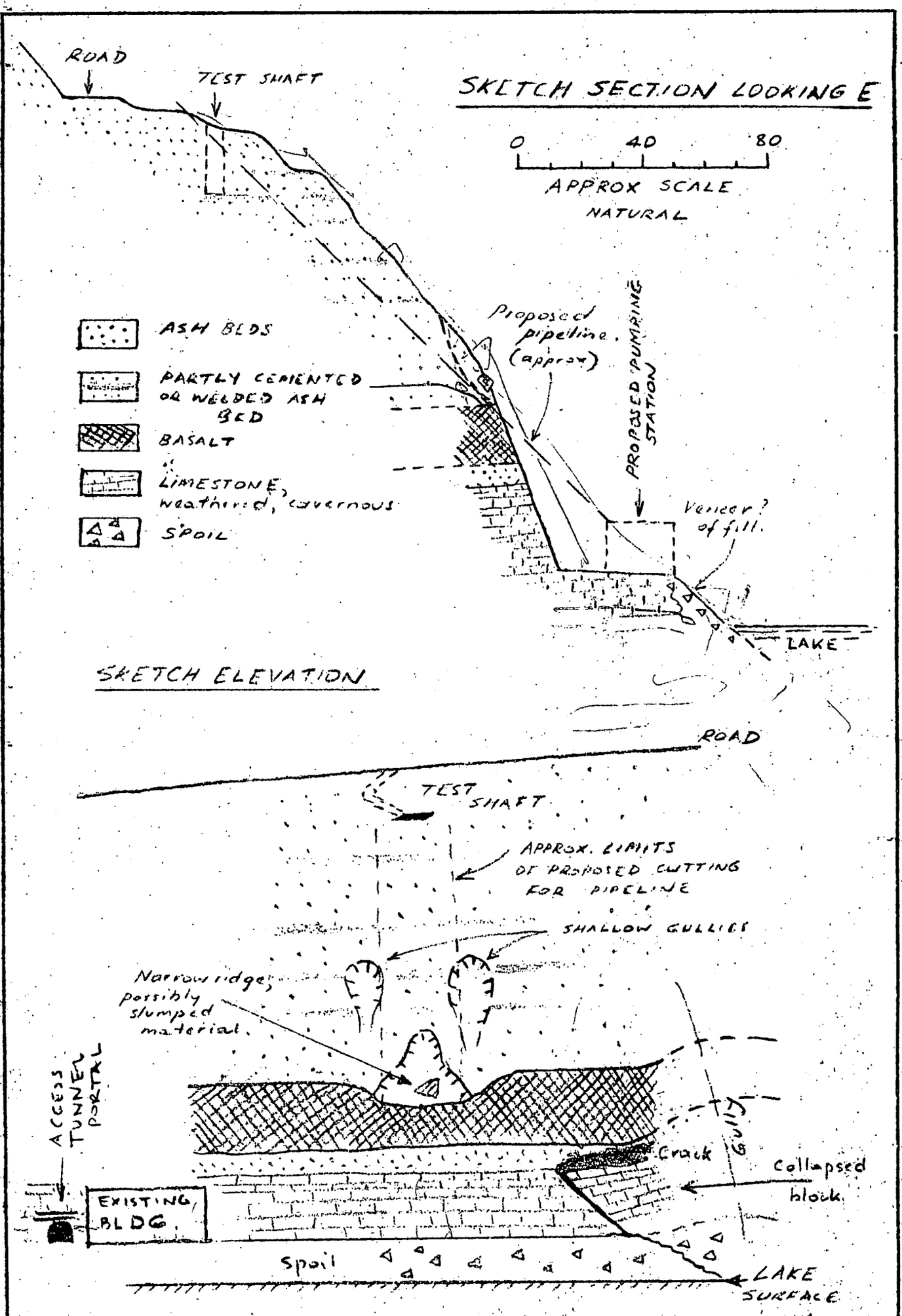


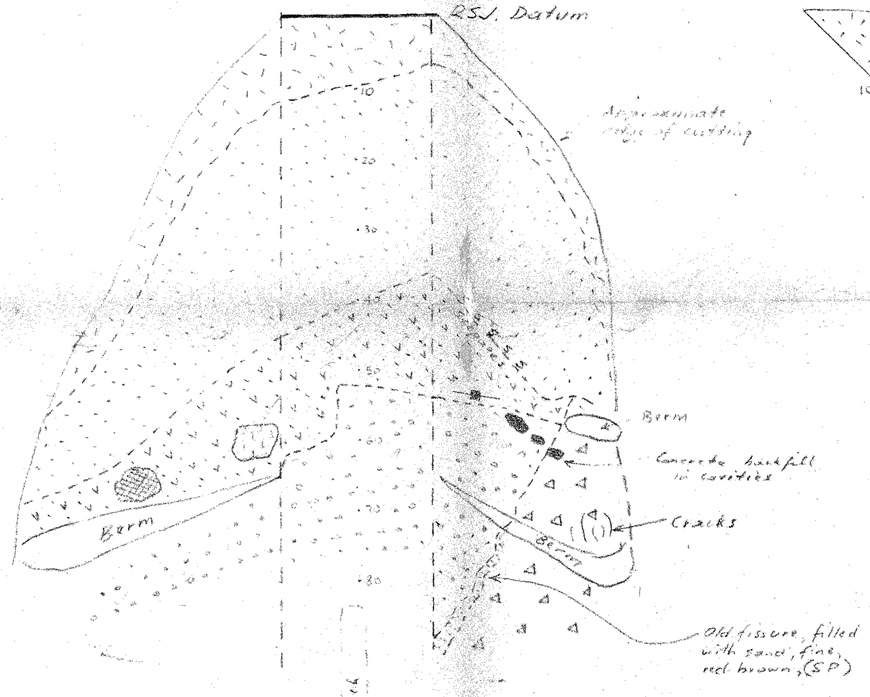
FIGURE 1

S.A. DEPARTMENT OF MINES

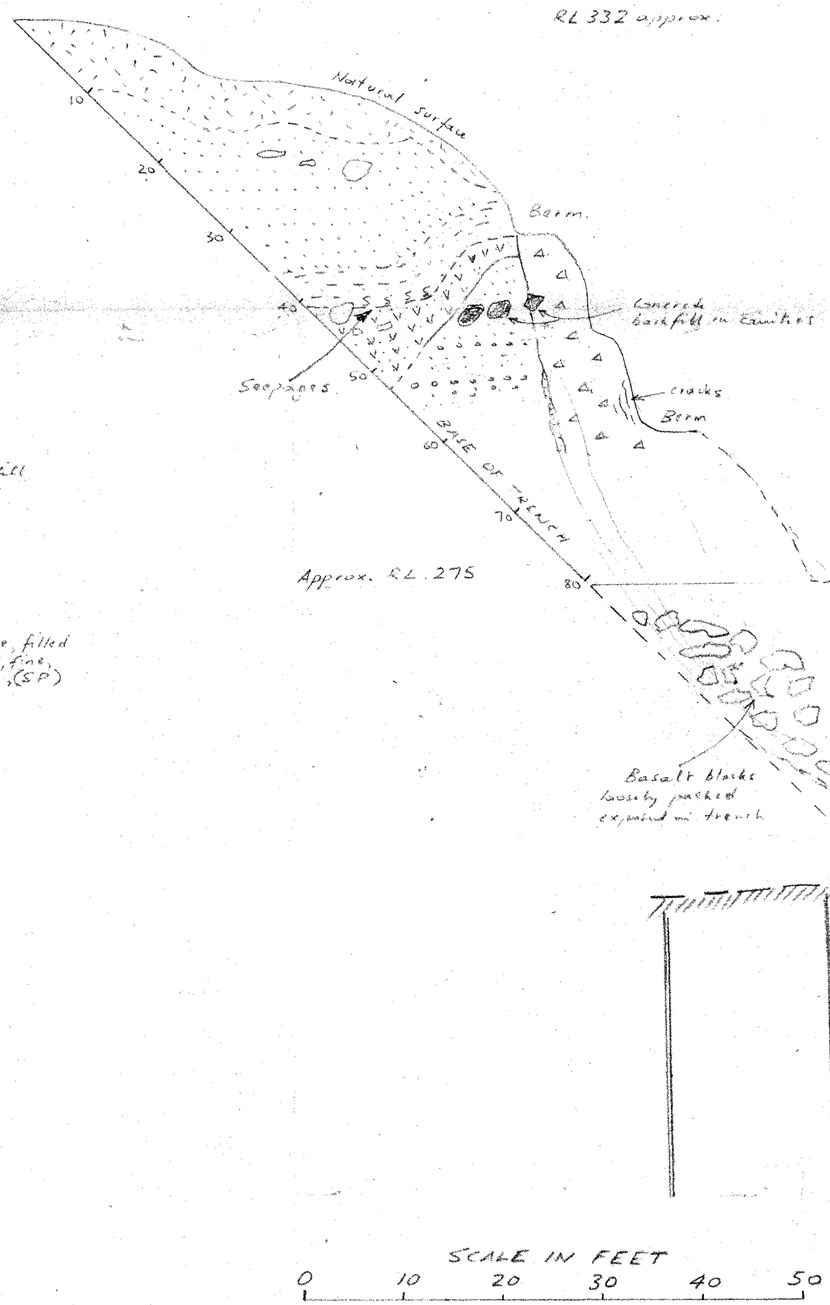
Approved	Passed	Drn. DMK	PROPOSED MT. GAMBIER PUMPING STATION SKETCHES SHOWING GEOLOGY	D.M.	Scale 1" = 40' approx
		Tcd.		Req.	S 4017
		Ckd.			KD 17
Director		Exd.			Date

400—4.84 8409

SKETCH PLAN



SKETCH ELEVATION
EAST FACE
DIAGRAMMATIC IN PART



LEGEND

- TOPSOIL, ORGANIC RICH, abundant roots. (OL - SM)
- ASH, LOOSE (SP) clayey (SC - CL)
- ASH, partly clay-bound and cemented. (SC - CL)
- ASH, well bedded, varies from loose, friable to well cemented (SP - GP)
- PARTLY CEMENTED DEBRIS non-bedded, semi-coast in part
- LOOSE BASALT BLOCKS
- BASALT

SCALE IN FEET
0 10 20 30 40 50

FIG. 2.

DEPARTMENT OF MINES — SOUTH AUSTRALIA			
MOUNT GAMBIER PUMPING STATION SKIPWAY AND RISING MAIN GEOLOGICAL RECORD DURING CONSTRUCTION			
		Drn. DMS	SCALE: As shown.
		Tcd.	65-896 Kd 18
Director of Mines		Ckd.	
		Exd.	DATE: 13 Sept '65