

Rept. Bk. No. 56/74
G.S. No. 2583
D.M. 1598/62



DEPARTMENT OF MINES SOUTH AUSTRALIA

GEOLOGICAL SURVEY
SOILS GEOLOGY SECTION

REPORT ON SITE EXAMINATIONS
PERMANENT TRIANGULATION OBSERVATION STATION SITES
FOR ENGINEERING AND WATER SUPPLY DEPARTMENT
SECTION 227, HUNDRED NOARLUNGA
SECTION 535, HUNDRED KUITPO

by

A. A. Gibson
Senior Geologist

29th March, 1963

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ABSTRACT

Five test pits were examined at the sites of proposed permanent triangulation observation stations on the hills around Mt. Bold dam. The purpose of these stations is to provide highly stable observation points from which any movement of the newly heightened dam wall can be detected and accurately measured.

The sites are suitable for stations of the desired stability provided the stations are constructed as indicated.

INTRODUCTION

Since the recent increase in the height of the Mt. Bold dam wall by 20 ft. to a total height of 141.5 ft. it has been deemed desirable to check the wall for movement during filling and emptying. It is anticipated that most of the movements will be of very small magnitude and elastic in character. However, it is possible that a small, inelastic movement, or "set" will occur as the result of the first complete filling of the reservoir. Such movements will require surveying of a very high order of accuracy for their detection and measurement. Such surveying can best be performed from highly stable and permanent stations. It is not anticipated that any progressive strain will occur in the structure, but the surveying procedure is designed to detect any such strain at an early stage if it should develop.

TEST PIT PROFILES

The locations of the test pits are shown on the accompanying print. These test pits are also the excavations in which the concrete stations will be constructed.

The test pits were examined and the following data were obtained:-

PIT NO. 1

Average depth 2'6". Surface slopes north-westerly. Small fault occurs close to SE wall of pit. Fault strikes NE-SW and dips about 85°SE. Down throw of about 2 ft. on SE side. On NW side of fault pit is in sound, but slightly weathered, slightly felspathic sandstone, improving with depth. On SE side of fault there is 2 ft. of reactive clay and some rubble above the sandstone.

In this pit there is a distinct possibility of disturbance of the station by swelling clay and soil creep from the higher slope. A new pit, No. 1A, about 4 ft. to the north-west was recommended.

PIT NO. 1A

Average depth 2'6". Surface slopes north-westerly. In hard, sound, slightly felspathic sandstone throughout.

PIT NO. 2

Average depth 6'0". Surface slopes north-easterly.

0 - 1'0" Light grey, firm, strong and somewhat clayey sand-loam.

1'0"-6'0" Clay and root filled joint or fault enters pit on east wall at 2'6" and dips westerly to pass out of pit through corner formed by west wall and bottom of pit. Above this plane the rock is weathered, somewhat friable and jointed sandstone. Below it is slightly weathered, but sound and hard sandstone.

PIT NO. 3

Average depth 4'8". Surface slopes south-easterly. Phyllitic slates throughout, with foliation dipping 30° SE. Close jointing and much weathering along foliation planes and joints in upper part of pit, but improving with depth. The lowest 1 ft. is slightly weathered, but sound.

PIT NO. 4

Average depth 3'9". Surface slopes away from pit in three directions, gently to the south and more strongly to the east and west.

0 - 2'3" Weathered, flat-lying phyllite, with clay along foliation planes. Foliation dips about 7°S.

2'3"-3'9" Tight, moderately fresh phyllite, with foliation dipping about 7°S.

PIT NO. 5

Average depth 6'0". Surface slopes south-easterly

0 - 1'0" Stony soil.

1'0"-2'0" Red-brown and yellow-brown finely mottled, sandy and somewhat stoney clay, with deeper pockets extending to 3'3".

2'0"-6'0" Weathered and decomposed slates and phyllites with lenses of quartzite and siltstone, becoming hard in bottom of pit.

CONCLUSIONS & RECOMMENDATIONS

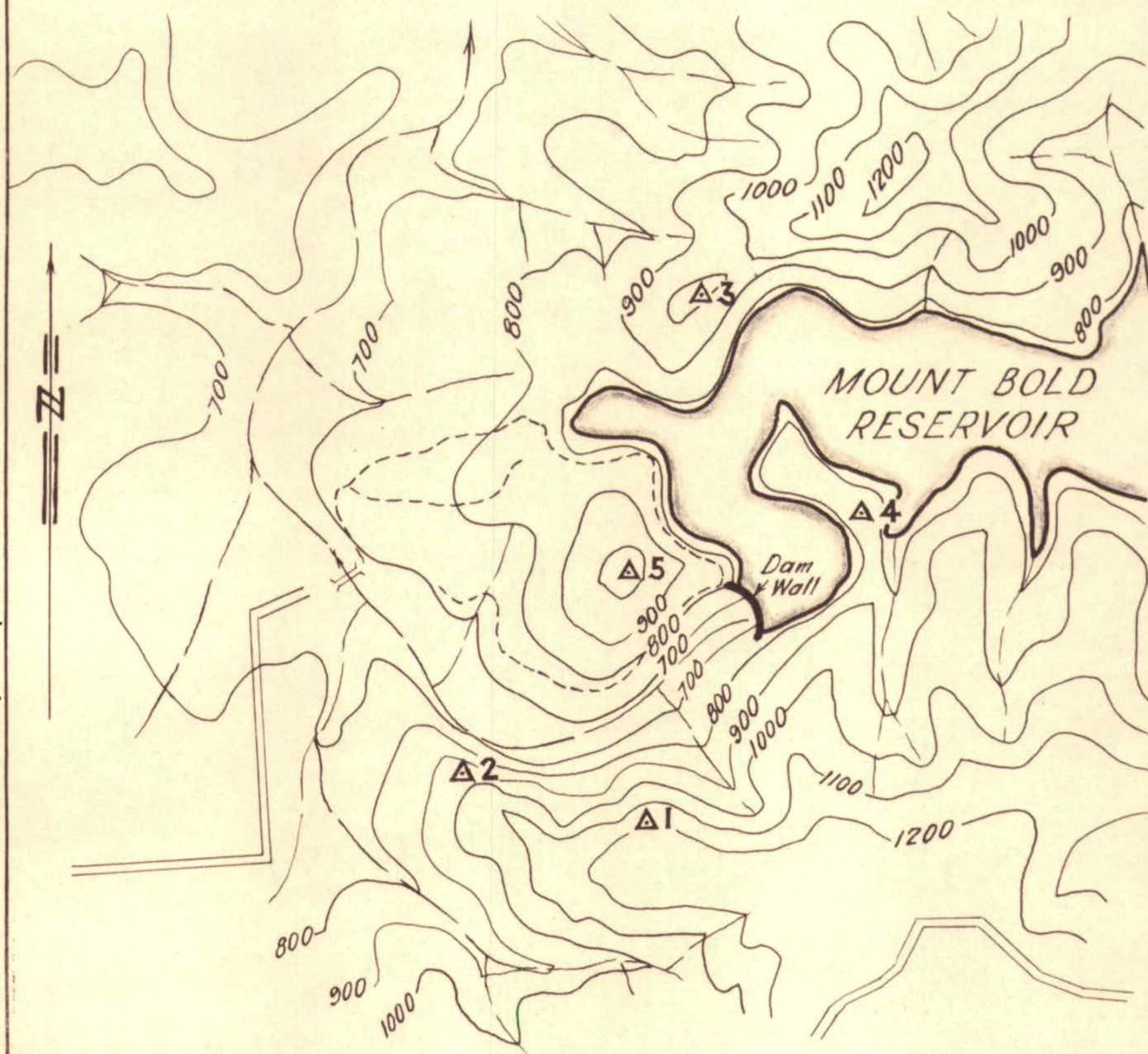
The locations of the stations are determined by their functions and the topography and little or no modification of these locations is possible. Hence, it is necessary to utilize the sites chosen and accommodate any disabilities which might exist. Sites Nos. 1A, 2 and 4 should be completely stable and present no difficulties. At all of these sites the pits should be completely filled with concrete and the stations set in it. At site 3 the attitude and condition of the rock and the topographic slope indicate a strong possibility of soil and rock

creep down slope in the upper part of the profile. Here the station should be set in concrete in the bottom of the pit, the concrete having a maximum thickness of 15" and a smooth, level upper surface. A large diameter reinforced concrete protective pipe should then be placed around the station. The bottom of this protective pipe should be free to slide over the surface of the concrete base. Backfill around the protective pipe should consist of soil-free fragmented rock in the size range 1" to 4" maximum dimension, simply shovelled into place and left untamped.

The condition of the rock at site No. 5 is not very satisfactory, even at the depth reached by the pit, and it is unlikely that any material improvement would be encountered at any reasonable depth below the bottom of the pit. However, since this site is almost at the top of a hill it is unlikely that any stress will be imposed by rock creep. The only likely source of trouble is that resulting from swelling clay. It is recommended that this pit be filled with concrete to within approximately 3 ft. of the surface. The station should be set in this concrete and a protective pipe placed around it as described for site No. 3.

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AAG:AGK
29/3/63



SCALE
Chains 20 10 0 20 40 Chains

- Δ5 Triangulation observation station sites.
 —700— Contours - interval 100ft.
 - - - Track

To accompany report by A.A. Gibson

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	MOUNT BOLD RESERVOIR Triangulation Observation Station Sites	D.M.	Scale 20 ch. to 1 in.
		Tcd. M.B.L.		Req.	S 3371
		Ckd.			Ha 9
Director		Exd.			Date 27.3.63