DEPARTMENT OF MINES
SOUTH AUSTRALIA

REPORT ON FOUNDATION TEST FOR HOTEL IN CENTRAL AREA OF NEW TOWN NEAR SALISBURY

by

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Plan Reference

Number	Title	Scale
55 - 344	Outline Plan of Hotel, Centre of New Town near Salisbury showing Borehole Sites.	20 ft. to 1 inch

Report Reference
G. S. 387

H.O. Report Book Reference
41/104

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1. Introduction

In July 1955 the S.A. Housing Trust requested a foundation test for an hotel centrally sited in the new town near Salisbury. The site covers approx. 3.5 acres of Section 3136, Hd. Munno Para, and is in open grassland, formerly farmed, with no buildings in existence within a quarter of a mile. The general area is almost level, with slopes of less than 1 in 100: the hotel site quite level but crossed by an existing unsealed metalled road with a surface about 2 feet below paddock level.

The hotel plan is in the form of a cross with a long axis from north to south and an extra arm attached to the northern end extending north-eastwards (see plan 55-344 attached). The present proposals are for a one storey building to which another storey may be added later.

The hotel will have no cellars.

Acknowledgement is due to Mr. M. Holder, Site Engineer, New Town and his assistant Mr. MacBean for help and arrangements.

2. Soil Examination

A first group of six hand auger holes was put down by Mr. R.C. Mirams, Geologist, on 4th and 5th August. These are Nos. 1-6 inc. and as can be seen from the plan (on which the outline of the hotel walls is necessarily approximate as no large scale plan was made available) they were sited to cover the whole area concerned. The logs of these holes are attached in an Appendix. They showed an apparent general similarity of conditions around the circumference of the site (holes 3,4,5 and 6) but somewhat different conditions in the centre (holes 1 and 2). The four circumferential holes, the deepest of which was 8'6" (hard clay prevented deepening by hand auger) showed a general profile of from 6 to 8 feet of red-brown clay overlying limy clay. The two central holes showed red brown clay to 10-12 feet, limy clay in the zone from 10-14 feet, and, in No. 1 hole, red-brown clay below 14 feet, with water at 15 feet (12'6" in hole 2).

It was therefore decided to put down three more holes.

As other investigations in the area made possible the use of an E.T.S.A. earth-boring machine, three holes 1'6" in diameter and an extra one 2'6" in diameter were bored as holes 7,8, 9 and 10 respectively. All these holes were bored to 10 feet (approx), the maximum depth the machine can bore. In logging the material from these holes, samples of soil were taken from the blades of the screw, which was run so as to bore about one foot at a time. Hole 7 was later deepened to 17'6" with a hand auger by Mr. Buist and the writer.

The logs of this second group of holes are also appended. They show a generally similar profile of cloddy red-brown and light-brown clays and clay loams, variably but on the whole only slightly limy, overlying rather more limy light brown clays. They are thinly covered at the surface by rather more silty clay loams. At all levels sand and larger grain-sized material is conspicuously absent. (There are a very few pebbles in some holes). The log of hole 7 suggests a water table at 12-14 feet, which agrees with that found in the first group of holes. In hole 10, which the writer descended, distinct polygonal cracking extending from about 9" below the surface (i.e. the bottom of the silty light brown loam) to about 8' and minor cracking to 9'6".

3. Foundation Conditions

In the writer's view the material revealed in the two groups is essentially similar. The apparent differences are in colour and lime content and these are too restricted in range and too variable vertically and horizontally within that range to permit the drawing of any sections which would be useful. As foundation material, all the soil is subject to some seasonal swelling and shrinkage. Short of much more detailed examination and quantitative testing, it is not possible to say more than that the vertical movement resulting is likely to be comparable with that of the RB3 soil type of the Adelaide district (i.e. 1½" approx.) and could be rather greater.

The presence of permanent water at 12-14 feet just after the end of a wet winter suggests that the water table in this area is neither deep nor shallow and there is therefore likely to be a zone between a few feet below the surface and a few feet above the winter water table in which water content remains practically constant. Without determining this zone by tests on "undisturbed" samples it is

practicable only to assume that in the particular circumstances it lies between about 8 feet and 10 feet. Between these depths soil volume should be almost constant, and it would be best to place the footings at this level: preferably at 10 feet. Under-reamed reinforced piers should be used with the structure supported on beams resting on and tied into the piers, the beams being kept clear of the ground surface by at least three inches. It would be very much better if the building, instead of being one lengthy block of complicated shape, were designed as a series of small units connected in some way which would permit independent movement, or in such a manner that slight flexing of the structure would be possible. It is always possible that some very slight differential movement of the footings might take place even where placed at considerable depth, as the seasonal movements are bound to vary in intensity from year to year.

4. Conclusion

Examination of a site for a hotel in the centre of the new town near Salisbury has revealed deep red-brown clays likely to have a seasonal vertical surface movement of 1½ inches or more. Reinforced and tied pier and beam footings based at 10 feet below surface, with under-reamed pier bases and beams kept 3 inches above ground surface are recommended. Because of the length and shape of the building a design permitting slight independent movement of parts of the building is suggested as preferable.

The problem has been discussed with the architect, Mr. Gilbert of the West End Brewery, who thinks in consequence that engineering tests of the soil are desirable. This is in agreement with the writer's view that some general investigation of the central area of the New Town is necessary, involving both geological and engineering tests.

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28/10/55

FOUNDATION TEST, HOTEL SITE, NEW TOWN NEAR SALISBURY LOGS OF FIRST GROUP OF HOLES (NOS 1-6 inc) (hand augered) REFER TO PLAN 55-344

Hole 1

Depth	As bored	When dry
0 - 2'6"	Dark red-brown loamy clay	Sets like rock. Cracks.
2'6" - 3'0"	Red-brown clayey loam	Tough & earthy.
3'0" - 4'6"	Red-brown clayey material	Lime evident when dry. Cracks.
4'6" - 12'0"	Red-brown clayey earth	Friable 4'6"-8': lime evident. 8'-12':more clay, not so friable.
12'0"- 14'0"	Limey horizon	Mixture of limy material & leathering clay(50/50)
14'0"- 16'0"	Red-brown clay with some lime and occasional small stones. Wet from 15'.	Leathery clay with some limey material to 25%.
16'0"- 17'0"	Wet light red-brown clay	Apparently same as 14'-16' but clay slushy

Hole stopped as auger would not retrieve clays below the water table.

Logged by R.C. Mirams.

Hole 2

0 - 9"	Dark red-brown loamy clay
9"- 2'6"	Red-brown clayey loam
2'6"- 8'6"	Red-brown clayey material, some lime (more than in Hole 1 at this level)
8'6"-10'6"	Red-brown leathery clay. Tough Augering.
10'6"-13'0"	Limey horizon. Water at 12'6"

Logged by R.C. Mirams.

Hole 3

0 - 6"	Dark red-brown loamy clay
6" - 1'3"	Red-brown clayey loam
1'3" - 4'0"	Red-brown earthy clay. Some lime.
4'0" - 5'6"	ditto some sheen. Lime only evident after wind drying.
5'6" - 6'6"	ditto. Lime as 1'3"-4'0".
6'6" - 8'6"	ditto. Lime increasing. Hand augering.

Logged by R.C. Mirams.

Hole 4

0 - 2'0"	Dark red-brown loamy clay
2'0" - 3'0"	(changing into)
3'0" - 4'6"	Red-brown plastic clay with distinct sheen
4'6" - 8'0"	Red-brown limy clay. Leathery & hand augering.

Logged by R.C. Mirams

Hole 5 (At roadside: collar 2' below collar level of Holes 1-4 inc.)

0 - 6"	Dark red-brown loamy clay
6" - 1'6"	Grades into red-brown clayey material. (Some contamination of upper layers from road and drain)
1'6" - 6'9"	Red-brown limy clay, some sheen. Becoming tougher with depth.

Logged by R.C. Mirams

Hole 6 (at roadside: collar 2'6" below collar level of Holes 1-4 inc)

0 - 2'0"	Red-brown clay, slight sheen
2'0"- 6'3"	Red-brown limy clay, friable; occasional pebbles & very hard augering

Logged by R.C. Mirams

Logs of second group of holes (7-10 inc.)(machine bored, except for lower part of hole 7 which was hand augered)

Hole 7

Machine bored to 10'; 1'6" dia.; 10'-17'6",4"hand auger hole

Depth	Wetness	Description
Surface	dry	Choclate brown loam
2'0"	slightly damp	ditto
3'3"	ditto	Cloddy limy light brown clay loam
4'5"	ditto	ditto
5'2"	ditto	ditto
6'6"	ditto	ditto, stiffer
8'0"	dry	Cloddy light brown clay
9'0"	dry	ditto
10'0"	dry	ditto
10'6"	dry	Limy light slightly red-brown clay, some nutty & granular;beneath this a zone of hard limy claystone probably 2" thick.
11'0"	dry	Soft very limy light brown clay,becoming slightly red-brown & less limy with depth.
12'0"	damp but lumps dry when broken	Limy light red-brown clay
12'8"	do.	do.
13'0"	damp	Very much less limy semi-plastic light red-brown clay
13'3"	wet	do. One rounded pebble,1" diam.
13'10"	damp	Slightly limy light brown clay
14'0" approx.	wet	Slightly more limy light brown clay
14'2"		Water table
14'4"	wet	Slightly limy light red-brown clay
14'10"	wet	ditto
15'4"	wet	ditto
15'9"	wet	ditto
16'3"	wet	Light brown clay } very slushy
17'6"	wet	ditto }

Logged by A.R. Crawford & D.S. Buist

Hole 8

Machine bored to 10'; 1'6" diameter

surface	dry	Chocolate brown clay loam
1'11"	do.	Slightly reddish brown clay loam
2'8"	do.	Slightly lighter & slightly limy brown clay loam
4'2"	do.	do., cloddy
5'3"	do.	do., more limy
6'6"	do.	do.
7'10"	do.	do. ,granular
8'11"	do.	do. do. some fragment claystone
10'0"	do.	Slightly orange brown cloddy & granular limy clay loam

Logged by A.R. Crawford & D.S. Buist

Hole 9

Machine bored to 10'; 1'6" diameter

Surface	Dry	Chocolate brown clay loam
1'4"	do.	do. partly cloddy
2'9"	do.	Light brown clay loam
4'3"	do.	do. but granular with semi-plastic small clods also
5'1"	do.	Limy light brown clay loam; cloddy
6'4"	do.	do.,but harder clods, tending to soft claystone
7'10"	do.	do., do., slightly darker
9'2"	do.	As 7'10" but more friable
10'0"	do.	Cloddy & granular slightly limy light brown clay loam

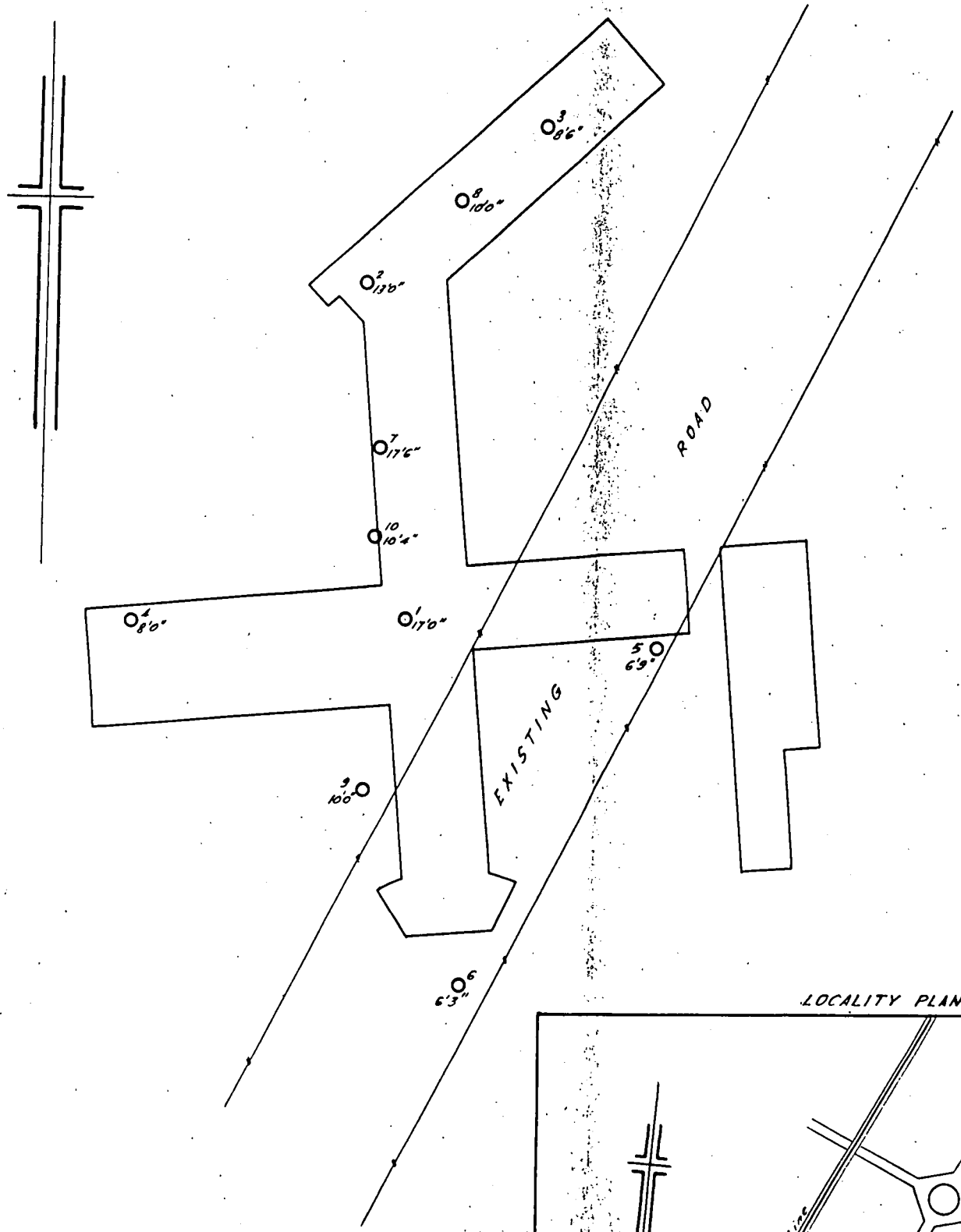
Logged by A.R. Crawford & D.S. Buist

Hole 10

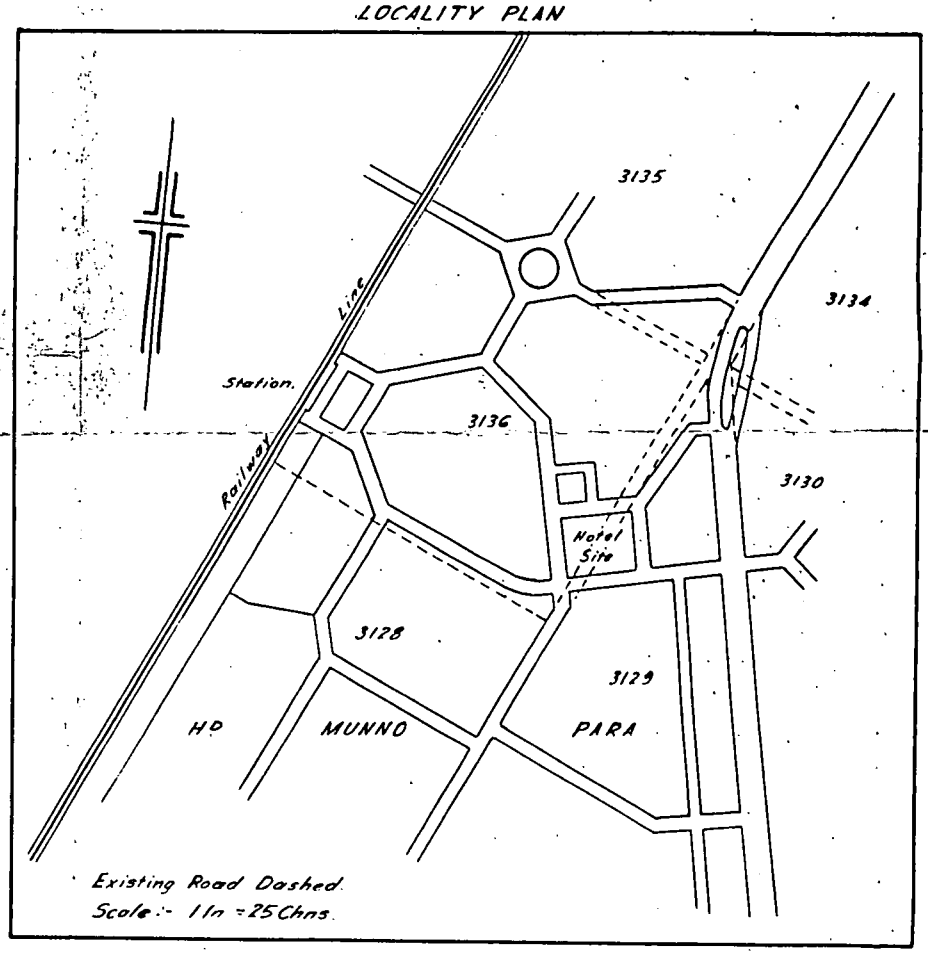
Machine bored to 10'4"; 2'6" diameter

Depth	Wetness	Description
Surface	Dry	Silty light brown loam
1'8"	do.	Chocolate brown semi-plastic cloddy silty clay
2'9"	do.	Red-brown clay, slightly plastic, slightly limy; a few clods
3'8"	do.	do., very slightly lighter
4'4"	do.	do. do.
5'4"	do.	Light red-brown clay, slightly cloddy
6'1"	do.	do., very slightly plastic
7'0"	do.	do. do.
7'11"	do.	do. do.
8'6"	do.	do. do., very slightly crumbly
9'5"	do.	do. do. do. but not plastic
10'4"	do.	As 9'5", mostly granular.

Logged by A.R. Crawford & D.S. Buist.



LOCALITY PLAN



To accompany report by A.R. Crawford. Geologist.

S.A. DEPARTMENT OF MINES

OUTLINE PLAN OF HOTEL
CENTRE OF NEW TOWN
NEAR SALISBURY
SHOWING BORE HOLE SITES

No.	Amendment	Init.	Date

Approved	Drawn		Scale: 40 ft. to 1 in.
Director		Dm. R.G.C. Ck. Loc.	55-344 Ha 2. Date: 19-10-55