RB 37/16

DEPARTMENT OF MINES
SOUTH AUSTRALIA

D.M. 2595/53

SOIL EXAMINATION - HENLEY BEACH SOUTH

for SOUTH AUSTRALIAN HOUSING TRUST.

REPORT NO. 1.

INTRODUCTION:

The housing Trust has requested an examination of the soil profiles at Henley Beach South and advice on the nature of footings that will be required for houses to be built there.

The area tested is outlined in green on the plan furnished by the Housing Trust and reproduced herewith, and lies between the Tramways viaduct to the north and the Torrens Outlet channel to the south. The remainder of the proposed building area will be tested at a future date.

FIELD WORK:

This was undertaken with the assistance of D. Thatcher (Assistant Geologist) under the supervision of A. A. Gibson (Geologist).

It was decided to drill a widely spaced pattern of scout holes with a post hole auger to a depth of five to six feet to determine the general soil type. If marked variations in the profile were found thenadditional holes would be placed at closer intervals.

A total of 20 holes was drilled to an average depth of 6 feet, and logs of these are attached. The positions of these holes are shown on the plan. A pit four feet deep was also dug to examine the undisturbed soil profile.

SOIL TYPES & FOUNDATIONS RECOMMENDED:

The bores have shown that generally the soil is composed of alternating sand and sandy clay horizons becoming predominantly clayey at depth. Whilst the sequence of strata passed through is essentially the same there is considerable variation in the thickness of the sand and clay horizons over the area examined and this is due to the environment in which these soils were formed.

In the soils classification of the C.S.I.R.O. the soils of this area appear to have affinities with two groups:- The Torrens River Complex, type TA1 and the Patawolonga Association, type EM1.

The Torrens River Complex is the soil laid down by the Torrens River in its present and past localities and

soil of type TA1 may be layered in a random fashion with successive accumulations of coarse and fine sandy material. There is generally very little clay at any depth in this soil. This soil type is represented at the southern end of the area examined, south of bores numbered 14 and 15, with a gradual transition to type EM1 of the Patawolonga Association north of these two bores.

The soils of the Patawolonga Association occupy an area which receives the discharge from all the major streams (including the Torrens). This area lies behind the modern series of coastal sand dunes and in the lower parts is affected by tidal salt water as well as fresh river waters. The whole of the area is low lying, being generally not more than 10 feet above sea level and the ground water table lies within a few feet of the surface.

Due to variations in sea level the sediments are successively of marine, estuarine and fluviatile origin resulting in a layered system of sands, silts and clays.

Soil type EM1 of the Patawolonga Association is a soil in which river alluvium and marine sands are evident. Clay in variable amounts is present throughout the profile.

The water table in the area examined varies from 4 feet to 6 feet 3 inches from the surface in those bores which reached water. The remainder, which were generally sunk to over 6 feet were very wet at the base, although no water accumulated.

For houses of normal construction the foundation practice recommended by the C.S.I.R.O. for these soil types is the use of deep beam footings supported about one foot below the soil surface. The incidence of foundation failure on these soil types is infrequent and any failures are probably the result of settlement under load when the water table is high.

Considerable elevation of the water table in this low-lying area can be expected in the wet winter months. This will result in a greater tendency to settlement of the soil under load and increase the probability of damage to houses built on it. The problem of adequate drainage of the surface and sub-surface layers of this area is not easily solved, but a solution will have to be found in order to minimize the degree of settlement and its effects.

This applies to the whole of the area, not only to the area examined. Cutting a drainage channel under the Torrens Outlet Channel to drain the northern part of the area would be a temporary measure only and would be wholly inadequate. It is essential, if reasonably stable foundation conditions are to be maintained, that the ground water level be kept at least 4 feet below the surface. It is obvious from a study of the contours on the accompanying plan that no internal drainage system can achieve this. It is suggested that the most satisfactory drainage will be achieved by dissecting the whole area with a close system drainage channel, draining the northern section into the southern section under the Torrens Outlet Channel and then connecting the southern system of channels with the sea by means of a tunnel under the sand hills. Since the drainage channels are required to keep the water-table down, and not simply to carry off surface water, they would have to be open, unlined channels. The fall available for drainage is only very small and therefore the flow through the channels would be sluggish.

Such channels, therefore, would be difficult to keep clean and maintain, would add to the cost of road construction and would add to the already numerous breeding grounds for mosquitoes.

However, the only alternative would be to build up the general level of the area with sand, and this would be extremely costly.

CONCLUSIONS:

In the area examined the soil would appear to be suitable for houses of normal construction, using foundations supported about one foot below the surface, providing the area is properly drained.

R. G. Shepherd

R. G. Shepherd,
ASSISTANT GEOLOGIST

ENGINEERING GEOLOGY & MINERAL RESOURCES SECTION

RGS:BK
28/1/54

NO. 1

0 - 2' 1"	Brown sandy loam with minor clay
2' 1" - 3'	Sandy brown clay, fairly plastic
3' - 3' 3"	Coarse yellow brown sand
3' 3" - 4' 2"	Damp sandy clay with pockets of yellow brown sand
4' 2" - 5'	Coarse greyish yellow sand grading to yellow brown sand with minor clay
5' - 5' 3"	Very wet plastic brown clay with pockets of coarse sand
5' 3" -	Plastic dark grey clay, wet, and containing occasional small pockets of coarse sand
	Water level 6' 3" from surface
	End of Bore 6' 5"

NO. 2

0 - 7"	Brown sandy loam
7" - 10"	Light brown very sandy loam
10" - 1' 10"	Brown sandy clay, slightly damp
1' 10" - 2' 11"	Light yellow sandy clay grading downwards to coarse yellow sand.
2' 11" - 3' 3"	Brown sandy clay, slightly damp
3' 3" -	Plastic grey clay becoming darker and wetter with depth.
	Water Level 4' 10" from surface
	End of Bore 5' 7"

NO. 3

0 - 1' 5"	Brown sandy loam
1' 5" - 2' 1"	Fine brown loamy sand
2' 1" - 2' 9"	Brown sandy loam with minor clay
2' 9" - 4'	Coarse yellow sand with occasional pockets of yellow brown clay
4' - 4' 8"	Plastic brownish grey clay
4' 8" - 5' 6"	Fine grey damp clayey sand with occasional pockets of grey plastic clay and coarse brown sand
5' 6" -	Plastic dark grey clay
	End of Bore 6' 2"

NO. 4

0 - 11"	Brown sandy loam
11" - 1' 8"	Coarse yellow sand
1' 8" - 4'	Sandy brown clay, slightly damp
4' - 4' 9"	Coarse yellow sand with occasional pockets of clay
4' 9" - 5' 6"	Plastic brown clay

NO. 4 (cont)

5' 6" -	Dark grey plastic clay becoming wetter with depth
	Water Level 6' 3" from surface
	End of Bore 7' 5"

NO. 5

0 - 1' 7"	Light brown sandy loam
1' 7" - 2' 10"	Brown sandy loam with minor clay
2'10" - 4'	Plastic brown sandy clay
4' - 5'	Coarse yellow brown sand with minor grey clay
5' - 6' 6"	Sandy brownish-grey clay becoming less sandy and more plastic with depth
6' 6" -	Wet brownish grey clay with pockets of coarse yellow brown sand
	End of Bore 6' 11"

NO. 6

	Small pit dug in side of drain.
0 - 2'	Brown sandy loam
2' - 4'	Fine light brown sand with minor clay
4' - 6'	Coarse yellow brown sand with minor clay

NO. 7

0 - 8"	Light brown sandy loam
8" - 2' 11"	Brown sandy loam with minor clay
2' 11" - 4' 5"	Coarse yellow brown sand with occasional patches of clay
4' 5" - 5' 10"	Dark brown to grey plastic clay
5' 10" -	Wet dark grey plastic clay
	End of Bore 6' 6"

NO. 8

0 - 1' 3"	Brown sandy loam
1' 3" - 2'	Fine light brown sand
2' - 2' 10"	Dark brown sandy loam
2' 10" - 3' 8"	Brown sandy friable clay
3' 8" - 4'	Coarse light grey sand with occasional pockets of clay - slightly damp
4' - 5'	Plastic brownish grey clay with some sand
5' - 6'	Grey to red brown clay grading to dark grey plastic clay
6' -	Wet, light grey sandy clay with some gravel
	End of Bore 6' 5"

NO. 9

0 - 8"	Brown sandy loam
8" - 2' 3"	Brown sandy clay
2' 3" - 3' 3"	Fine light brown sand
3' 3" - 3' 11"	Brown sandy clay
3' 11" - 4' 8"	Coarse yellow sand
4' 8" - 4' 11"	Brown clay containing some sand
4' 11" - 5' 5"	Coarse light grey sand
5' 5" - 6' 3"	Plastic brown clay
6' 3" -	Dark grey plastic clay with occasional lenses of sand

End of Bore 7' 2"

NO. 10

Pit to 3' 6"

0 - 7"	Light brown sandy loam
7" - 1' 4"	Brown silty loam
1' 4" - 1' 9"	Fine yellow brown sand
1' 9" - 2' 11"	Brown sandy clay with occasional patches of sand
2' 11" - 3' 1"	Fine yellow brown sand
3' 1" - 3' 5"	Brown sandy clay with lenses of sand
3' 5" - 3' 10"	Coarse yellow brown sand
3' 10" - 4' 9"	Plastic brownish grey to grey clay
4' 9" - 6'	Dark grey plastic clay
6' -	Fine grey sand and gravel with some clay

Water level 5' 11" from surface
End of Bore 6' 4"

NO. 11

0 - 1' 3"	Brown sandy loam
1' 3" - 2' 8"	Light brown find sand with patches of clay
2' 8" - 3' 8"	Brown sandy clay, slightly damp
3' 8" -	Dark grey plastic clay

Water level 4' 6" from surface
End of Bore 5'

NO. 12

0 - 4") +	Brown sandy loam
4" - 3')	Fine white sand
3' - 4'	Light brown sandy loam
4' - 5'	Fine light brown sand with minor clay
5' - 6' 1"	Brown sandy clay - wet
6' 1" - 6' 10"	Dark grey to red brown plastic clay with occasional lenses of sand

NO. 12 (cont)

6' 10" -	Yellow - brown to grey plastic clay

End of Bore 7'.

+ Material dumped in this vicinity during construction of the Torrens Outlet Channel.

NO. 13

0 - 1'	Brown sandy loam
1' - 2' 6"	Dark grey sandy loam, slightly damp
2' 6" - 3' 5"	Fine brown sand, wet
3' 5" -	Light grey sand, occasional darker bands, wet

Water level 4' from surface
End of Bore 6' 10"

NO. 14

0 - 2' 6"	Dark grey sandy loam
2' 6" - 5'	Yellow-brown to grey sand, damp
5' -	Fine yellow sand - wet

End of Bore 6'

NO. 15

0 - 11"	Brown sandy loam
11" - 1' 11"	Fine light brown sand
1' 4" - 1' 10"	Light brown sandy clay
1' 10" - 2' 1"	Dark grey sandy clay
2' 1" - 4' 8"	Coarse light to dark grey sand with hard band of limestone at 4' 8"

End of Bore 4' 8"

NO. 16

0 - 1' 5"	Brown sandy loam
1' 5" - 2' 1"	Light brown sand with minor clay
2' 1" - 3' 4"	Plastic brownish grey clay with occasional lenses of sand.
1' 4" - 4' 9"	Dark grey plastic clay
4' 9" -	Fine light grey sand with some clay - wet

Water level at 5' 2" from surface
End of Bore 5' 9"

NO. 17

0 - 1' 3"	Brown sandy loam
1' 3" - 4' 9"	Coarse pale yellow sand
4' 9" - 5' 11"	Brown plastic clay
5' 11" -	Dark grey plastic clay - wet

Water level 6' 5" from surface - End of Bore 6'

NO. 18

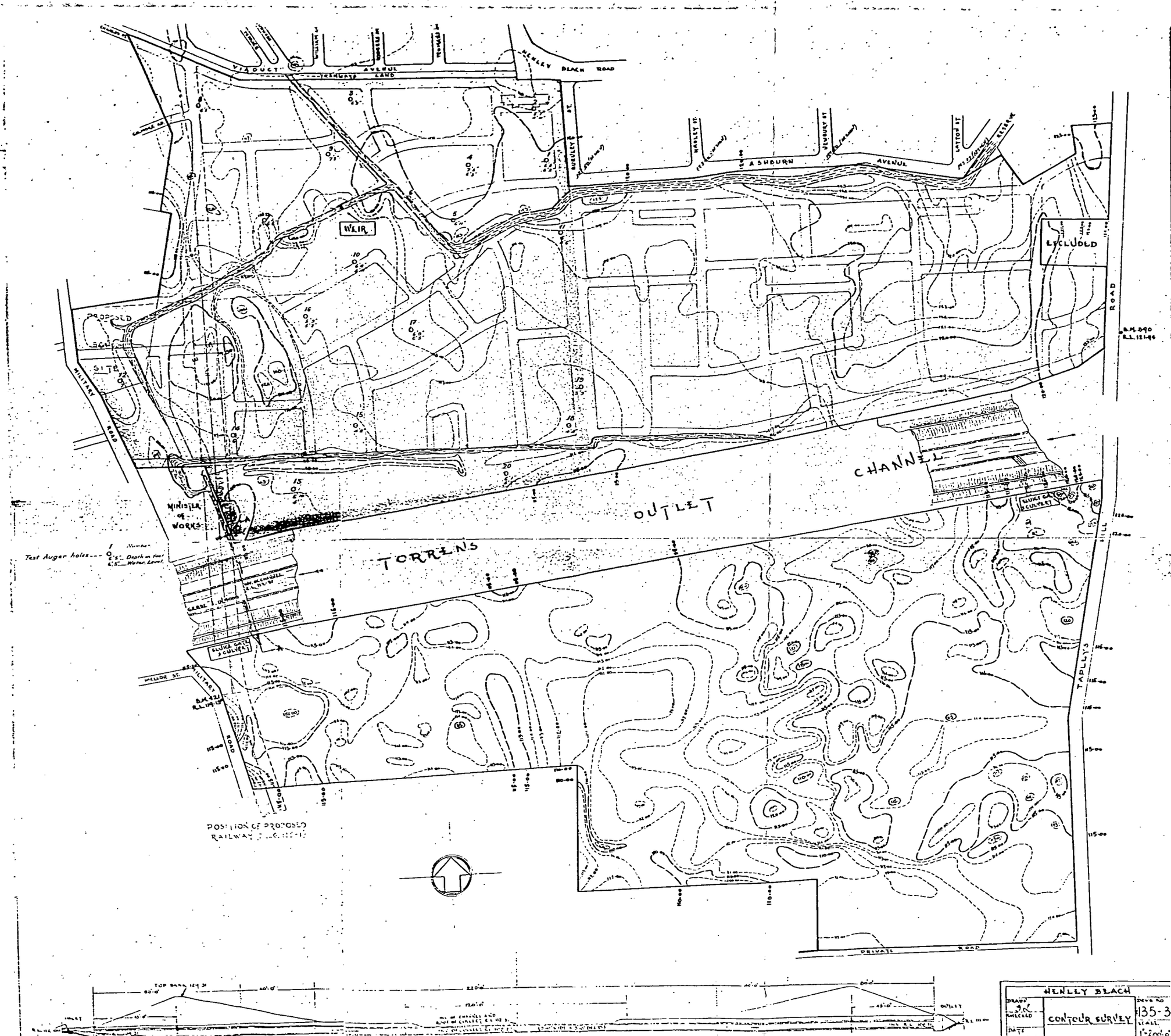
0 - 1' 3"	Light brown sandy loam with minor clay
1' 3" - 2' 10"	Light to dark grey sandy clay containing a hard narrow limestone band.
2' 10" - 4' 4"	Yellow brown fine sand - wet especially at 4' 2"
	Hard limestone layer at 4' 4" - wet
	End of Bore 4' 4"

NO. 19

0 - 6"	Brown sandy loam
6" - 1' 6"	Fine light brown sand
1' 6" - 2' 10"	Brown sandy clay
2' 10" - 3'	Dark grey plastic clay
3' - 3' 7"	Light grey sandy & calcareous clay, wet. Hard band of limestone at 3' 6"
3' 7" -	Fine light brown clcareous sand with some limestone nodules
	End of Bore 5' 9"

NO. 20

0 - 9"	Brown sandy loam
9" - 1' 9"	Light brown very sandy loam with occasional pockets of dark grey clay
1' 9" - 2' 6"	Dark grey plastic clay with minor sand
2' 6" - 3'	Dark grey calcareous clay with some limestone nodules
3' - 5' 8"	Fine yellow grey sand, wet, with minor clay and grading to coarse yellow brown sand
5' 8" -	Wet grey plastic clay
	Water level 5' 2" from surface
	End of Bore 6' 1"



SECTION 'AA'
SCALE: 1"=20'-0"

HENLEY BEACH

CONTOUR SURVEY

DRAWN J.P.C.
CHECKED
DATE 16.10.52

DRG. NO. 135-3

SCALE 1"=200'-0" (APPROX.)

SOUTH AUSTRALIAN HOUSING TRUST