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DEPARTMENT OF MINES
SOUTH AUSTRALIA

REPORT ON SITE INVESTIGATION

PROPOSED EXTENSIONS TO

NORTHFIELD INFECTIOUS DISEASES HOSPITAL

HAMPSTEAD ROAD, NORTHFIELD

SUMMARY:

Four test holes were put down on the above site, by means of the Landrover mounted power auger, for the purpose of determining the overall foundation conditions present. A total footage of 56' was drilled. Water was struck at shallow depth in three holes and subsequently prevented an adequate flow of auger cuttings coming to the surface.

The profile established is relatively uniform and consists essentially of a surface silty loam horizon, overlying soft sandy and limey clay, thence grading somewhat irregularly into a stiff green grey mottled clay, very stiff, impermeable and of good bearing capacity.

The recommended foundation practice is the use of surface footings, supported on piers seated well within the green grey clay horizon, i.e. at a depth of say 10' from the soil surface. Bearing capacity at this depth would be in the vicinity of 4 tons per square foot.

INTRODUCTION:

The investigation was carried out by the writer, in association with Mr. A.A. Gibson, Senior Geologist, on behalf of Messrs. Crooks, Michell and Peacock, 232 North Terrace, Adelaide, acting for the Architect-in-Chiefs Department.

The site is located on section 324, Hd. Yatala, at the corner of Hampstead Road and Folland Avenue, Northfield.

This report confirms verbal opinion given to Mr. Hosking, engineer in charge for Messrs. Crooks, Michell and Peacock.

GENERAL GEOLOGY:

The soil on the site most closely resembles Type BS 2, the dominant soil type of the Enfield Association. This profile is found to overlie a very stiff and plastic green-grey clay, somewhat sandy in part. It is essentially impermeable and possesses a moderately high bearing capacity.

Free water was encountered in three of the four holes drilled, at a depth of about 5' and remained static at 4'6". This would tend to suggest that the water occurs in a series of shallow basins, formed from slight depressions in the upper surface of the green grey clay. Hence, one could expect considerable variation in the water level over the seasonal cycle.

Due to the presence of this water, the continuous flow of auger cuttings to the surface was effectively prevented. By acting as a lubricant, the water thus allowed the cuttings to slip back down the auger flights before they could be successfully recovered. Various techniques were employed in an attempt to overcome this difficulty and some representative samples were obtained. They were nevertheless considerably contaminated by churning and excessive wetting.

The logs of these holes have been determined from such samples as were obtainable, by comparison with the material obtained from holes not significantly affected.

Hole No. 1. S.W. Corner

Surface	-	1'0"	Fine reddish brown silty loam.
1'0"	-	1'9"	Hard and dry, very silty red-brown clay.
1'9"	-	5'0"	Light red brown silty and limey clay. Numerous small pockets of lime, increasing with depth. Moist to wet.
5'0"	-	8'8"	Pale buff, very limey and silty clay. Very moist, becoming wet with depth.
8'8"	-	9'9"	Light greenish-grey clay, with yellow-brown mottling. Very wet, with free water present.

Hole No. 1 (Contd.)

9'9"	- 12'10"	Greenish-grey clay, with yellow brown and red brown mottling. Occasional patches of black organic matter. Very tough.
12'10"	- 14'6"	Red-brown and grey mottled, very sandy clay; very stiff and plastic.
14'6"	- 17'0"	Green-grey, slightly silty clay, with red brown and slight yellow brown mottling. Very stiff and plastic.

Logged by A.A. Gibson.

Hole No. 2 N.W. Corner

Surface	- 10"	Fine grained brown silty to sandy loam.
10"	- 2'5"	Light brown silty to sandy, very limey clay, with few small lime grit fragments. Soft and moist.
2'5"	- 3'9"	Ditto, becoming moderately stiff and plastic.
3'9"	- 4'6"	Light brown stiff and plastic silty clay, somewhat limey and with small pockets of greenish-grey clay, mottled with reddish-brown and yellow-brown staining.
4'6"	- 6'5"	Light brown to light green-brown mottled, stiff and plastic silty clay, with light yellow-brown staining. Odd small lime grit fragments and dark organic material
6'5"	- 8'8"	Becoming green-grey clay, with green-brown and yellow-brown mottling. Stiff and plastic, with kernels of even stiffer clay. Some small lime grit fragments.
8'8"	- 14'11"	Grey-green very stiff and plastic silty clay, with small pockets of yellow-brown and red-brown mottling. Some green-brown clay containing small lime grit fragments.

Hole No. 3 N.E. Corner

Surface	- 6"	Fine brown silty clay loam.
6"	- 1'0"	Dark brown sandy clay, with numerous small gritty lime fragments.
1'0"	- 2'5"	Becoming light brown silty to sandy and limey clay. Soft and moist and containing numerous small travertine nodules.
2'5"	- 5'0"	Light brown sandy and limey clay, soft and moist. Abundant lime, as small grit fragments and travertine nodules.

Hole No. 3 (Contd.)

5'0" Water struck - further cuttings as clay lumps in very wet limey mud.

5'0" - 10'10" (Inferred)

Green-grey silty clay with reddish and yellow-brown mottling. Very stiff and plastic although somewhat sandy in part. Small dark organic pockets irregularly distributed.

Water struck at 5'0", static level 4'6".

Hole No. 4 S.E. Corner

Surface - 9" Fine brown sandy to silty loam.

9" - 1'2" Brown sandy clay, fairly soft and moist with few small lime nodules.

1'2" - 4'5" Light brown sandy and limey clay, soft and moist with abundant grit and small travertine nodules.

5'0" Water struck - flowed freely to surface, thus preventing recovery of any further significant cuttings.

5'0" - 12'11" (Inferred)

Green-grey silty clay, with reddish and yellow-brown mottling. Very stiff and plastic, although somewhat sandy in part. Small lumps of dark organic matter.

Water struck 5'0", static level 4'6".

CONCLUSION:

The surface soil can be assumed to have a relatively poor bearing capacity, since the limey B horizon is soft, unstable and subject to considerable rise of the water table during winter months, which would considerably aggravate the position.

At a depth of 5', the grey green clay is encountered, which as has been previously mentioned, is very stiff, impermeable, somewhat sandy in part and possesses a moderately high bearing capacity, which has been conservatively estimated at about 4 tons per square foot, at depth.

It is suggested that the foundation beams for the proposed structure be supported at the soil surface by piers, seated well within this clay layer, i.e. at a depth of approximately 10' from the surface. This procedure would allow for any variation in depth of the clay horizon and would guard against any influence from the water table.

It is advisable to keep excess water, e.g. from overwatering of lawns, or roof drainage, well away from the foundation area.

R.D. Steel

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