Section

Rept. Bk. No. 61/15
G.S. No. 3193
D.M. 1636/64

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENGINEERING AND SOILS GEOLOGY SECTION

REPORT ON SITE INVESTIGATION

PRIMARY SCHOOL, MANSFIELD PARK

Public Buildings Department

by
S. Robson
Geologist

D.M. 1636/64

16th July, 1965

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PRIMARY SCHOOL, MANSFIELD PARK

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INTRODUCTION

A site investigation has been carried out for Public Buildings Department for a new Primary School at Mansfield Park (Fig. 1). The proposed design is for a concrete building with load-bearing walls, seated everywhere upon driven piles (Franki-piles) with point loadings of 30 tons, 50 tons and 80 tons, respectively.

The investigation was requested in a letter to the Director of Mines dated 28th August, 1964.

Two percussion drill holes were drilledat the site, Hole 1 penetrating to 63 feet and Hole 2 to 100 feet. Open tube samples were taken throughout both holes and sealed tube sampling also was undertaken in Hole 2 at approximately five feet intervals.

Standard Penetration Tests were made at selected depths in Hole 2.

The holes have been logged on a scale of 1 inch to 10 feet and the materials encountered have been classified according to the Unified Soils Classification System.

This report sets out the results of the drilling and briefly discusses the foundation characteristics of the soils at the proposed site.

OUTLINE OF REGIONAL GEOLOGY

The area is within the Lower Outwash Plain, an integral? part of the Adelaide Plains. Surface gradients over the whole

area are low and the topography is dominated by the outwash fan deposits of the River Torrens. Relief is low and generally less than 60 feet above sea-level.

Basement rocks in this western edge of the Adelaide Plains are masked by deep Cainozoic and Pleistocene sediments.

The Pleistocene deposits are dominantly fluvial and attain a thickness of nearly 245 feet in some places. They are mainly clayey sands and silts with occasional interfingering grav lenses. Mottling is a common occurrence throughout the sequence.

Post-Pleistocene times are marked by the development of an alluvial soil profile in the area, which was on the landward margins of successive sea transgressions.

GEOLOGICAL SUCCESSION SHOWN IN DRILL HOLES

A thin Recent brown soil is approximately three feet thick in both drill holes, with a veneer of fill material above it

Extending from the base of the brown soil horizon are Pleistocene sediments which can be subdivided from top to bottom into (a) sandy clay; (b) sandy silts; and (c) poorly sorted sands with some silt, respectively. In addition, thin gravel horizons occur at certain depth.s

These deposits show various mottlings and limy horizons throughout the profile.

FOUNDATION CHARACTERISTICS

Ground water is at shallow depth throughout the year? in the area investigated and this will be most important when foundation properties of materials are considered. All soil samples obtained below the superficial brown soil are saturated.

The top 10 feet of clays are stiff to very stiff, and shown an increased in consistency from top to bottom. The suitability of these horizons as foundations for pier and beam footings might be questionable however, due to the shallow nature of groundwater and the presence of silty material.

The upper silts are of a medium density, or compact, and Standard Penetration Test readings of 8 and 11 blows per

foot are recorded within them. Below about 42 feet in both holes they become more sandy and generally lower rates of penetration are a feature, requiring 30 or more blows per foot in Standard Penetration Tests. This suggests that 42 feet may be a suitable depth for seating piles .

The basal sands are dense sediments with thin very dense gravel lenses, but softer , clayey bands occur and their presence is reflected in abrupt increases in rate of penetration. These clays are not extensive, however.

GROUNDWATER

Water was struck at six feet in both drill holes and static level remained high. Total saline matter in the water? will probably be high, and analyses for sulphate content might be advisable if concrete piles are envisaged.

S. Robson

SR:AWK
16.7.65

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2. "Quaternary Geological Events near Port Adelaide". Firman, J.B. Quart. Notes Geol. Survey S.A. No. 7 July 1963.

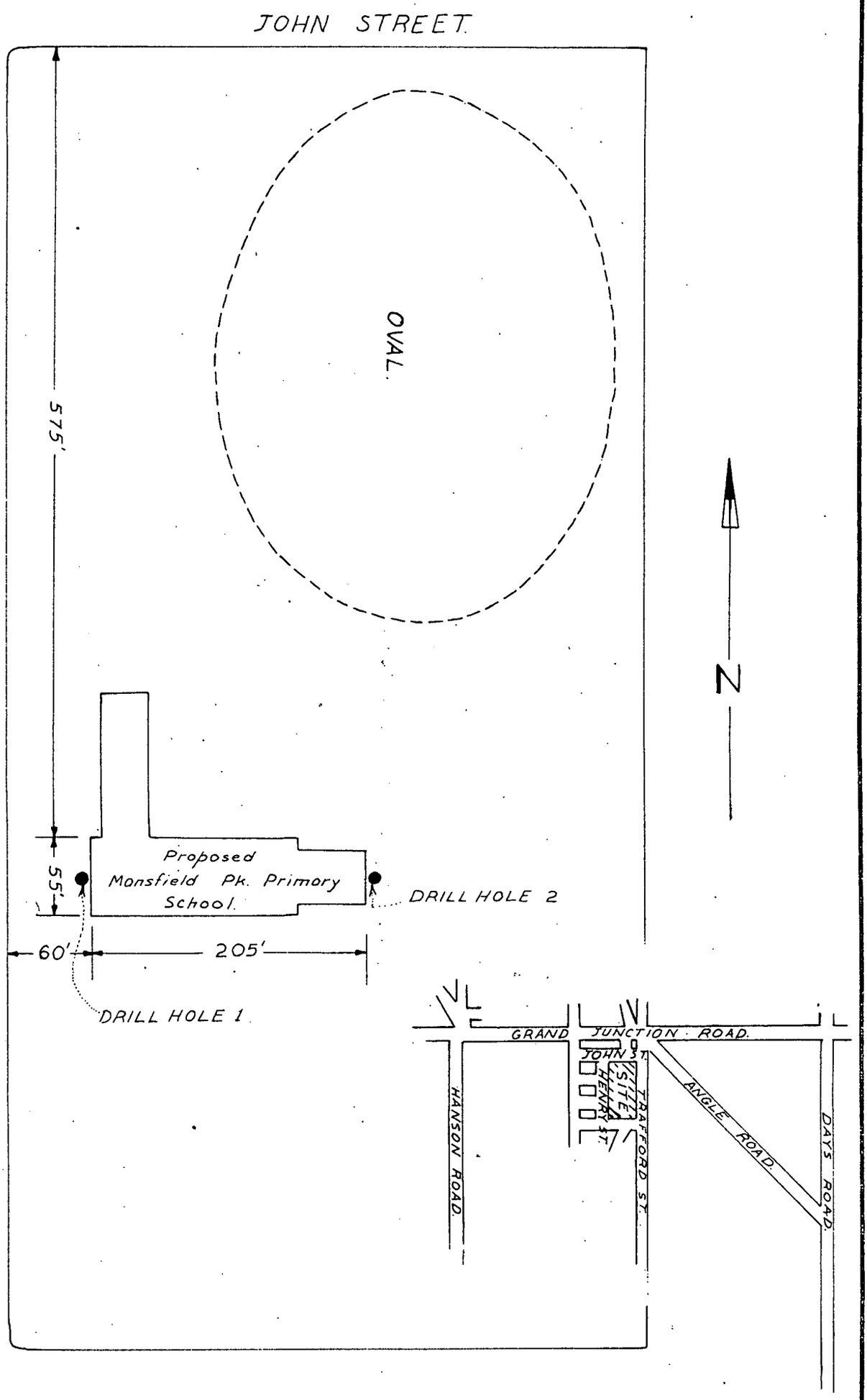

FIG. 1

DEPARTMENT OF MINES — SOUTH AUSTRALIA			
	Drn.	SITE INVESTIGATION	SCALE: 1in. : 100ft.
	Tcd.	MANSFIELD PARK SCHOOL	S 4365 Ho 5
	Ckd.	LOCALITY PLAN	
	Exd.		DATE:

DEPARTMENT OF MINES - SOUTH AUSTRALIA

LOG OF PERCUSSION DRILL HOLE

HOLE NO. 1

SHEET 1 OF 1

PROJECT PRIMARY SCHOOL Hirer P.B. DEPT.

LOCATION MANSFIELD PARK. Sec. — Hd YATALA

FEATURE FOUNDATION Depth 63ft. R.L. — Coords —

SOIL TYPE GEOLOGICAL DESCRIPTION	CASING R.L. (FEET)	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION GROUP NAME	CONSISTENCY REL. DENSITY	MOISTURE CONTENT	WATER LEVELS	PENETRATION DATA BLOWS/FOOT 20 40 60 80 SOIL TEST PENETROMETER 1 2 3 4
RECENT: FILL Brown soil horizon				SC / SP	clay fines, red, brown abundant stone fragments approx. 3-5mm. across, some lime	M			Tons/sq. ft.
Alluvial clays, sands, and silts, with hard, irregular lime nodules in upper part, cloddy to blocky structure poorly developed in clayey parts.				CL	SAND, poorly graded fine to medium grained, excess silt fines, dark brown.	Stiff	Humid	Water Cut 11th Jan '65	
				CL / ML	CLAY SOIL, low plasticity, some sand, red brown to off-white approx. 30% hard fragments, up to 0.2ft. across, limey.	VS	M		
		10'		SC	CLAY SOIL, low plasticity, excess silt in parts, some coarse sand, grey-brown, red and green mottled, approx. 30% of soil hard fragments up to 0.2ft. across, porous, gradational	Medium		Water Level 11th Jan '65	
		20'		ML / SM	SAND, poorly graded excess clay fines, brown, grey and yellow mottled, becoming red brown below 18ft. approx. 75% particles between 0.1mm. to 0.5mm across, 20% approx > 0.5 mm.				
PLEISTOCENE? "Mottled" clays Numerous, hard limey nodules and limey pockets		30'			SILT SOIL, low plasticity, abundant fine to medium sand grey, red brown, yellow and red mottled, some clayey pockets, hard fragments upto 0.2ft. across scattered throughout, slightly limey.	Dense	Saturated	Water Level 12th Jan '65	
Yellow mottling predominant below this level.		40'				Medium			
		50'				Medium to Dense			
		60'			END OF HOLE 63ft.				

TYPE OF SAMPLE	HYDROLOGY	CONSISTENCY	REL. DENSITY: MOISTURE
Open Tube	Water cut	VS-Very Soft	VL-Very Loose H-Humid
Sealed Tube	Static level	S-Soft	L-Loose D-Damp
Auger barrel	Supply	F-Firm	C-Compact M-Moist
Slush pump	Analysis (p.p.m)	St-Stiff	D-Dense W-Wet
Casing	← Water level. (Date)	VSt-Very Stiff H-Hard	VD-Very Dense S-Saturated

Plant No 9 Logged S.R.

Type Ruston Date 25 Jan 65

Driller D. Phillips Drawn S.R.

Started 7th Jan 65 Traced B.L.S.

Finished 12th Jan 65 Checked

PLAN No S4034 Ha5

Vertical Scale 1 inch to 10 feet

DEPARTMENT OF MINES - SOUTH AUSTRALIA

LOG OF PERCUSSION DRILL HOLE

HOLE NO. 2

SHEET 1 OF 1

PROJECT PRIMARY SCHOOL Hirer P.B. DEPT

LOCATION MANSFIELD PARK Sec. Hd YATALA

FEATURE FOUNDATION Depth 100ft. R.L. — Coords —

SOIL TYPE GEOLOGICAL DESCRIPTION	CASING R.L. (FEET)	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION GROUP NAME	CONSISTENCY REL. DENSITY	MOISTURE CONTENT	WATER LEVELS	PENETRATION DATA BLOWS/FOOT 20 40 60 80 SOIL TEST PENETROM 1 2 3 4
RECENT — FILL				CL	CLAY SOIL, low plasticity, abundant sand, brown, some stone fragments, 2mm to 5mm across, limey		Humid	Watercut 13 Jan 65	
Brown Soil Horizon				SP	SAND, poorly graded fine to medium grained few silt fines, dark brown				
				CL	CLAY SOIL, low plasticity, yellow brown, some sand approx 20-30% hard fragments up to 0·2ft across.	Stiff to V. Stiff			1·75 2·0 3·5 Standard Penetration Test 6 blows
Alluvial sands, silts and clays, limey at certain restricted horizons, mottled throughout profile, some thin coarse sand and gravel lenses,		10		CL					
				ML / SM	CLAY SOIL, low plasticity some silt and coarse sand, grey-brown, red and green mottled, approx 30% hard fragments up to 0·2ft. across.			Water level 15 Jan 65	
		20							S.P.T 11 blows
					SILT SOIL, low plasticity abundant fine to medium sand, grey-brown, red and yellow mottled, some clayey pockets, few hard fragments up to 0·2 ft. across, slightly			Water level 21 Jan 65	
		30			Some coarse salty particles	Medium			S.P.T. 8 blows
		40							S.P.T. 30 blows
		50			Some coarse sand particles.				S.P.T. 33 blows.
Sand and gravel lens.		60		SP	SAND, poorly graded, coarse grained, approx. 80% grains >1mm across, few pebbles 0·15ft. across.	Dense			Drive Pump S.P.T 33 blows
PLEISTOCENE ? MOTTLED CLAYS		70		SM / CL	SAND, poorly graded, fine to medium grained, red brown, grey, green and red mottled, in parts with excess clay and silt fines, few scattered soft lime patches, generally 70% clay and silt, 30% sand, approx.	Very Dense	Saturated		S.P.T. 33 blows.
		80							S.P.T. 45 blows
		90							S.P.T. 47 blows
		100		SP	SAND, poorly graded coarse grained, approx. 75-80% particles >1mm across, few pebbles 0·2 ft. across				
					END OF HOLE 100 FT.				

TYPE OF SAMPLE	HYDROLOGY	CONSISTENCY	REL. DENSITY	MOISTURE
Open Tube	Water cut	VS-Very Soft	VL-Very Loose	H-Humid
Sealed Tube	Static level	S-Soft	L-Loose	D-Damp
Auger barrel	Supply	F-Firm	C-Compact	M-Moist
Slush pump	Analysis (p.p.m)	St-Stiff	D-Dense	W-Wet
Casing	← Water level (Date)	VSt-Very Stiff	VD-Very Dense	S-Saturated
		H-Hard		

Plant No 9 Logged S.R.

Type Ruston Date 26 Jan 65

Driller D. Phillips Checked S.R.

Started 13 Jan 65 Tracked B.L.S.

Finished 22 Jan 65 Checked

PLAN No S 4035 H05

Vertical Scale 1 inch = 10 feet