Section V
64/81

Rept. Bk. No. 61/6
G.S. No. 3184
D.M. No. 1635/64

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENGINEERING AND SOILS GEOLOGY SECTION

REPORT ON SITE INVESTIGATION
PRIMARY SCHOOL, AIRDALE, PORT PIRIE
- Public Buildings Department -

by

S. Robson
Geologist

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9th July, 1965.

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REPORT ON SITE INVESTIGATION

PRIMARY SCHOOL, AIRDALE, PORT PIRIE

- Public Buildings Department -

INTRODUCTION

A site investigation has been carried out for Public Buildings Department for a two-storey Primary School at Airdale, Port Pirie (Fig. 1). The school is proposed as a concrete building with load bearing walls, seated upon driven piles (Frankipiles) bearing loads of 30 tons, 50 tons and 80 tons, respectively.

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

Two percussion drill holes were drilled at the site, Hole 1 to 90 feet and Hole 2 to 51.5 feet. Open tube samples were taken throughout apart from certain intervals in Hole 2 where sealed tubes and Standard Penetration Test samples were obtained.

The drill holes have been logged on a scale of 1 inch to 10 feet and the soil materials were classified according to the Unified Soils Classification System (REf. 1).

This report describes the results of the drilling and discusses the foundation characteristics of the materials encountered.

OUTLINE OF REGIONAL GEOLOGY

Port Pirie lies on the seaward side of the Pirie-Torrens Basin. Within this rift valley of pre-Tertiary age, the sequence of sediments encountered in this report was deposited in Pleistocene to Recent times.

The sediments are essentially horizontal. They consist of nearly 70 feet of ?non-marine mottled clays and sands correlated with the Pleistocene "Mottled Clays" near Adelaide, overlain by a series of red brown, brown and grey clays and silty sands with shelly "marl" deposited under marine and estuarine conditions.

The marl, containing abundant fossil shells and shell fragments is of probable Recent age and can be correlated with the high sea-level Anadara phase along the coastal margins of the Adelaide Plains.

GEOLOGICAL SUCCESSION SHOWN IN DRILL HOLES

The succession penetrated was generally uniform in both holes, both in respect of depth and composition.

A red brown clay soil profile has developed upon the estuarine silty sands and this forms a veneer 7 feet thick across the site.

Below this are sands and clays containing plant remains and other organic matter deposited under deltaic conditions. These form a uniform but thin horizon overlying the shelly, silty, sandy "marl" which is 6 feet in thickness.

The "marl" is pale brown to yellow brown in colour and contains calcareous nodules, shell fragments and specimens of the pelecypod Anadara trapezia.

From the base of this horizon to the bottom of the holes is a sequence of sandy mottled clays of piedmont-valley flat origin. In Hole 2 they can be divided into three distinct units:-

a) Light red brown, green mottled very sandy clays with hard lime nodules and pockets, extending to 50 feet.

b) Green mottled, brown medium grained sand, extending to approximately 80 feet.

c) Red brown, coarsely green mottled clay with a few lime pockets.

FOUNDATION CHARACTERISTICS

Generally uniform foundation conditions exist across the proposed site. However, the upper horizons above 20 feet are thin and contain soft wet materials which would allow settlement at certain levels.

Below 20 feet the sediments become gradually stronger with depth. The clays are structured and fissured with slickensiding along faces, suggesting that movement has occurred along them. Locally, fossil limy soil horizons occur, being also indicative of periods of desiccation.

Readings of unconfined compressive strength (qu) using the Soiltest Penetrometer are in many places in excess of 4.5 tons/sq. ft. but where limy areas occur the clays are only firm to stiff. These conditions prevail over only short intervals, however, and the clays generally should offer good lateral and vertical resistance to piles.

GROUNDWATER

Groundwater at the site was struck at 5 feet in both holes and drainage of the foundation area may be difficult. Sulphate content will benerally be high in this water and analyses might be advisable before concrete piles are poured.

S. Robson

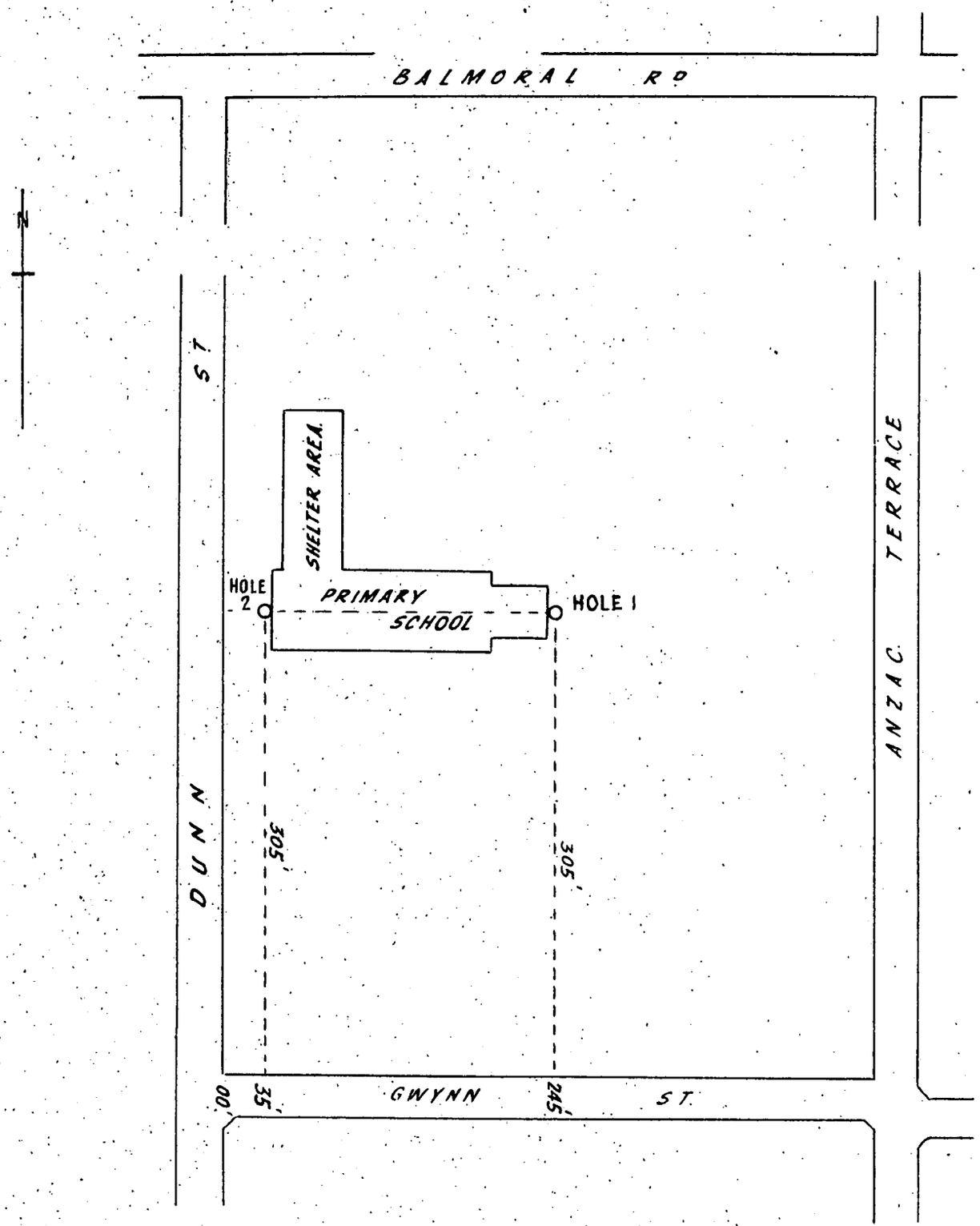
S. ROBSON
GEOLOGIST
ENGINEERING AND SOILS GEOLOGY SECTION

SR:HG
9.7.65

REFERENCES

1. U.S. Bureau of Reclamation "Unified Soils Classification System". Earth Manual. Denver. 1960.

2. "Foundation Conditions - Silo Site - Baltic Wharf - Port Pirie". M.N. Hiern. Rept. Bk. 57/54 1963. S.A. Geol. Survey.



To accompany report by S. Robson.

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	SITE INVESTIGATION PT PIRIE (AIRDALE) SCHOOL LOCALITY PLAN	D.M.	Scale 100 ft. to 1 in. (approx)
		Tcd.		Req.	S 4434
		Ckd.			
Director		Exd.			Date 8.7.65

400— 0.63 1423

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 AIRDALE PORT PIRIE — Sec

FEATURE FOUNDATION — Depth 90FT 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 BLOWS PER FOOT	Soil test Penetrometer tons/sq ft.
clays gypsiferous in top 2 feet				SP	SAND, poorly graded, few silty and clayey fines, red brown, medium grained, 75% grains approx 0.5 mm across	N				
				CL	CLAY SOIL low plasticity, red brown, abundant platy fragments up to 0.05 ft. across in top 2 feet.	Stiff	Damp			1.0, 1.5
				SM	SAND excess silt fines, poorly graded, red brown.	Medium				
? RECENT Some black staining - organic matter.		10		CL	CLAY SOIL low plasticity few silt particles, red brown slight green mottling	V. St.		Water cut 26 Nov '64		2.25 - 2.5
Anadara shell bed Silty sand with lamelli branch fragments and shells				SM	SAND medium to coarse grained, excess silty fines, pale yellowish brown, green mottled, moderately abundant shell fragments, clayey in top 2 ft.	Medium	Saturated			3.75 - 4.0, 2.5
		20		CL		V. St.				> 4.5
Mottled sandy clays with fossil limy soil horizons, fissures and some slickensiding in more clayey parts, lime less evident below 31 ft., few plant remains.				I	CLAY SOIL, low plasticity, abundant coarse sand, red brown, green mottled below 24 ft., hard lime fragments up to 0.05 ft. across and soft limey patches, sand particles between 0.5 to 2 m.m. across approx. 40 - 50% of soil in places.	St.				just > 4.5, 1.0 - 1.75, 2.5, 1.75 - 2.0, 2.5 - 3.5, 3.5 - 4.5, > 4.5
PLEISTOCENE MOTTLED CLAYS		30		SC		Stiff to very stiff				Sandy & lim areas: 2.0 - 3.0 Clay: > 4.5
		40						Water level 6 ft 21st Nov 64		> 4.5
		50			Becoming very sandy, approx 70% sand 30% clay.					1.75
					gradational					3.0 - 4.0
		60		SC	SAND, medium grained, excess clay fines, red-brown, green mottled approx 60 - 70% sand, 30 - 40% clay, 5 - 10% sand particles > 1 m.m. across.		Saturated			> 4.5
		70								
pronounced irregular fissures		80			CLAY SOIL, low plasticity red brown, some green mottling, few lime patches, approx. 5% sand particles up to 0.5 m.m. across.	Very Stiff	Damp			> 4.5
		90			END OF HOLE 90 FT.					

TYPE OF SAMPLE: Open Tube; Sealed Tube; Auger barrel; Slush pump; Casing

HYDROLOGY: Water cut; Static level; Supply; Analysis (p.p.m); ← Water level. (Date)

CONSISTENCY: VS-Very Soft; S-Soft; F-Firm; St-Stiff; VSt-Very Stiff; H-Hard

REL. DENSITY: VL-Very Loose; L-Loose; C-Compact; D-Dense; VD-Very Dense

MOISTURE: H-Humid; D-Damp; M-Moist; W-Wet; S-Saturated

Rig No 21 — Type Ruston — Driller A. Porter — Started 25:11:64 — Finished 1:12:64

Logged S.R. — Date 26.11.64 — Sec S.R — Traced J.M.H. — Checked

PLAN No S4026 Go1

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 **AIREDALE, PT PIRIE** Sec 43

FEATURE **FOUNDATION** Depth 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
RECENT				SP	SAND, poorly graded, few silty and clayey fines, red brown, 75% grains 0.5mm	L	Humid		
				CL	CLAY, across.	St			1.0-1.5
					SOIL, low plasticity, red brown small limey patches and fragments up to 0.05ft across				
		10		SM	SAND, excess silt fines, fine grained, red brown, graduational	Loose	Saturated		
dark organic? staining				CL	CLAY SOIL excess sand, red brown, slight green mottling	Se			1.0-1.5
Anadara Shell bed				SM	SAND, medium to coarse grained, excess silty fines, pale yellowish brown, green mottled, some shell fragments.	Medium			
silty sand with fossil and shell fragment		20							
PLEISTOCENE MOTTLED CLAYS				CL I SC	CLAY SOIL, low plasticity abundant medium to coarse sand, red brown to green mottled, lime fragments up to 0.05 ft across, some soft lime patches, particles up to 2mm. across	VSt Stiff	Damp		=4.5
Sandy mottled clays with fossil limy soil horizons fissuring and stickensiding, some decomposed organic matter,									1.5
		30				H			>4.5
									1.75
									3.5-4.5
									S.PT 23 blows Range from 2.0-4.5 even in some sample
		40						S.T.	
									S.P.T. 32 blows
		50							S.P.T. 25 blows
					END of HOLE 51.5 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 H-Hard	VD-Very Dense	S-Saturated

Plant No 21 Logged S.R.

Type RUSTON Date 7.12.64

Driller PORTER Checked S.R

Started Dec 7.64 Traced G.M.

Finished Dec 12.64 Checked

PLAN No S 4061 Gal

Vertical Scale 1in. = 10ft.