DEPARTMENT OF MINES D.M.760/56

SOUTH AUSTRALIA

Report on

FOUNDATION TESTING FOR SUPREME COURT LIBRARY VICTORIA SQUARE, ADELAIDE

(Architect - in Chief's Department)

by

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Engineering Geology & Mineral Resources Section

Geological Survey

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Plan Ref.

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56 - 230	Plan showing borehole sites and Sections/ Foundation Test for Library/Supreme Court, Adelaide.	20ft. to 1in.

September, 1956.

G.S. 563

H.O. 43/44

SOUTH AUSTRALIA

Report On

FOUNDATION TESTING FOR SUPREME COURT LIBRARY, VICTORIA SQUARE ADELAIDE

(Architect-in-Chief's Dept.)

Abstract

Test boring (machine auger & percussion) to 100ft. for a new library at the Supreme Court, Adelaide, shows approx. 50feet of clay on 30feet of limestone overlying silts. The uppermost clays (10-24ft) are plastic and are underlaid by stiff silty clays. "Undisturbed" samples of the clays were obtained for testing by Engineering & Water Supply Department.

1. INTRODUCTION

In May 1956 the Architect-in-Chief requested foundation test boring for a new library building at the Supreme Court, Victoria Square, Adelaide. The present design is for a building of three stories supported on columns enclosing parking space at ground floor level. Two of the supported floors will be for the library and one for jury accommodation. Two extra stories may be added later. (See plan 56-230 attached) The building will be rectangular in plan, 120 feet long from north to south and 45 feet wide. It will extend from the back (i.e. the south side) of the present Supreme Court building, at its western end, to the new Local Court. It will occupy an area at present partly courtyard (Northern end) and partly a caretaker's house & store etc. The site is level and has been built on or asphalted for many years.

2. TEST BORING

Machine Auger Holes

Existing information on the area is limited. No foundation information exists for the immediate vicinity. The recent (1954) boring at the M.L.C. building site in the north-west corner of Victoria Square was too far away to be useful except in so far as it suggested that no hard rock would be likely to be found at shallow depth. A well exists in the basement under the western part of the Supreme Court building but was dug many years ago. No log has been found and it is reported to be brick lined. Mr. Boyes, Senior Structural Engineer in the Architect-in-Chief's Department put down three hand auger holes approx.

60 feet east of the northern end of the site (see plan) in January 1956 and these showed clay to over 16 feet. Logs are appended.

It was therefore decided that exploratory boring near the northern and southern ends of the site should be done using a machine auger (Proline Rockmaster mounted on a Land Rover). This could bore to approx. 35 feet. As "undisturbed" samples were needed for soil mechanical testing a percussion borehole was proposed also for the centre of the site, with a provisional depth of 100ft. This would simultaneously provide a geological sequence and enable samples to be taken at selected depths.

Machine augering at M.A. Hole No.1 in the courtyard at the northern end of the site was carried out on 13th June.1956 and 24 feet of plastic light brown clays were found overlying 10 feet of typical Adelaide mottled silty clays.

M.A.hole No.2 at the south end of the site was started on 14th June in the front yard of the caretaker's house but the hole had to be re-sited after the auger met an obstruction or impenetrable rock (probably fill) at 3'9". The second attempt nearby had to be abandoned at 10feet because very wet clay (probably affected by old leaking drains) was met and no samples could be retrieved through it. Two further attempts near the southern end of the site were equally unsuccessful for the same reason and efforts to put down this hole deeper were abandoned on 15th June. Such evidence as could be obtained showed that plastic clays imilar to those in M.A.1 existed so at least 10feet in this area.

Percussion Boreholes

The percussion borehole (P.B.1) was started on 29th June. At the request of Mr. Boyes it was decided to obtain "undistrubed" samples continuously from 15feet downwards. Sealed tube samples were taken from 16 feet to 56 feet when the rock became too hard to obtain tube samples. As the attached log shows, light coloured plastic clays similar to those in the upper part of M.A.1 and in M.A.2 were found from beneath the made ground to 11'6" with a

very wet zone from 5'6". This seemed likely to be due to leaking pipes. The plastic clays overlay typical Adelaide mottled stiff silty clay, often locally sandy to 48', followed by soft white limestone to 55'6", hard sandy limestone, to 82' with some soft limestone bands and with loose sand from 67' - 68'. Below the limestone were sandy clays, clays and silts, very carbonaceous in the lowest part, to 100'. Boring was stopped at this depth on 20th July.

Unfortunately several "undisturbed" samples were found to be very much disturbed when opened and useless for testing, particularly those taken between 16' and 39'. To obtain usable samples for this zone a second percussion borehole (P.B.2) was started adjacent to the first on 31st July. After discussion with Mr. Boyes "undisturbed" samples were taken at 5 feet intervals from 5 feet, but duplicated (i.e. 5' - 6'3", 6'6" - 7'9", 10' - - 11' 3" etc.) and sampling was continued to cover the whole clay zone above the limestone and stopped at 46' 3". As this borehole was only 2' west of P.B.1 no geological log was made.

3. CONCLUSIONS

Test boring shows that the site is underlain by plastic clays of variable thickness resting on "Adelaide" mottled stiff silty clays on a thick limestone, with silts below. The plastic clays have been shown to be 24' thick at one point under the northern part of the site, 11'6" thick at a point near the centre of the site and probably at least 10' thick at three points in the southern part of the site. The stiff "Adelaide" silty clays beneath are likely to vary in thickness according to the variation of the plastic clays, but will probably extend everywhere to 45-50 feet and rest on a thick limestone with a slightly irregular upper surface. This can be expected to be soft in its upper 10 feet or so, harder below, and to pass into soft silts at about 80 feet. Water found at 5'6" - 8'0" in the percussion boreholes and down to 10' in the southern machine auger holes is probably from leaking pipes and it is likely to have penetrated over much of the site at these depths. Main water level will be below 40 feet.

As detailed soil mechanical testing is being carried out on the "undisturbed" samples from the percussion boreholes no foundation recommendations are made here. It is clear, though, that with a variable thickness of plastic clay overlying stiff silty clay the site presents settlement problems especially for a building on columns lacking a basement.

ARCrawford

(A. R. Crawford)

GEOLOGIST

ARC:JAH. ENGINEERING GEOLOGY & MINERAL RESOURCES SECTION

September 6th, 1956.

Appendix

HAND AUGER HOLE LOG.

SUPREME COURT.

ADELAIDE.

Log supplied by Mr. A. J. Boyes, Senior Structural Engineer, Architect-in-Chief's Department.

Position: Between Old Court and No. 3 Court

Date bored: 6. 1. 56 and 27.1.56.

"Drilled to ascertain if safe for 36" auger hole to 12' 0" then manual boring to over 16' 0", resisting surcharge.

Log From	To	Description
Pavement level	1'	Filling mixture
1'	2'	Ditto plus brown clay
2'	3'	White and brown clay
3'	4'	Yellow brown clay } Very unstable,
4'	6'	Grey-white clay } breaks down
6'	9'	White clay } easily.
9'	11'	Hard "blue" clay, yellow streaks
11'	13'	Hard "blue" clay, darker, FeO streaks
13'	16'	Hard "blue clay getting progressively darker & darker and FeO streaks
Over 16'		Ditto to limit bored.

NOTE:

(1st bore) As bored close to wall of No.3 court which has a basement, it is possible that it passed through origonal back filling although this may be incorrect as the horizons are distinct without admixture of rubbish.

(2nd, 3rd bores)
Two extra borings put down, 2 with stones @ 5' 0" appeared to be all back fill, and therefore no check.
3 approximated 1 excepting that all horizons were slightly higher or lower, but his may be due to differences in grading. As the "blue" clay was foundat - 6'6" which should be the R.L. for that area, it appears that in 1 the hole was excavated to 9'0" which is abo t the level of the basement in No.3 court.

A. J. Boyes

S.S.E.

20/7/56"

DEPARTMENT OF MINES
SOUTH AUSTRALIA

MACHINE AUGER HOLE LOG.

Project: Supreme Court Library Foundation Test — D.M. 760/56.

Bore No. 1. — Plan Ref.

Hundred: Adelaide — R.L. of Collar 253-6

Section: P.T.A.408 — Driller R.McMahon.

Date boring started: 13/5/56. — Date boring completed: 13 6.56.

Proposed depth: Limit of plant (36 feet)

Actual depth: 34 feet

Object: Exploratory foundation test boring near proposed 100ft. percussion borehole and under northern part of site for new library building.

Result: Penetrated clays to 34 feet.

GEOLOGICAL LOG

From Ft.	From In.	To Ft.	To In.	Description
Surface		0	2	Asphalt pavement
0	2	3	6	Made ground and brown and red-brown clays.
3	6	18	0	Light brown plastic clay
18	0	24	0	Light grey-brown plastic clay
24	0	33	0	Pale grey-green mottled red brown silty clay 1" of soft limy clay at base.
33	0	34	0	Red-brown sandy clayey silt.

REMARKS

Hole stopped by driller at limit of tools available.

Logged by geologist (A.R.Crawford)

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SOUTH AUSTRALIA.

MACHINE AUGER HOLE LOG.

Project Supreme Court Library Foundation Test. D.M. 760/56.

Bore No: 2 Plan Ref.

Hundred: Adelaide R.L. of collar: 253-5

Section: P.T.A. 408 Driller: R. McMahon.

Date boring started 14.6.56. Date boring completed 15.6.56.

Proposed depth: Limit of plant (36 feet)

Actual depth: Four attempts were made to bore in the vicinity
M.A.2(a) struck rock (or obstruction) too hard to penetrate at 3'9".
M.A.2(b) entered very wet clay at 8'
M.A.2(c) entered very wet clay at 7'
M.A.2(d) entered very wet clay at 6'
No further attempts were made.

Object: Exploratory foundation test boring under southern part of site for new library building.

Result: Unable to penetrate very wet clay at shallow depth. Hole abandoned after four attempts.

GEOLOGICAL LOG of M.A.2(b)

From Ft.	From In.	To Ft.	To In.	Description
Surface		1	6	Made ground
1	6	5	7	Light brown plastic clay
5	7	5	9	Soft white limestone .
5	9	8	0	Light brown plastic clay
8	0	10	0	Very wet slimy light brown clay

REMARKS

Hole abandoned at 10' by geologist as no sample could be retrieved.
Water stood at 5'6" (similarly in M.A.2(c) & M.A.2(d).
Logged by geologist (A.R.Crawford)

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PERCUSSION BORE LOG.

Project: Supreme Court Library .M. 760/56.
Foundation Test.

Bore No: 1 Bore Serial No. PD 981/56.

Hundred: Adelaide Plan Ref.

Section: P.T.A.408 R.L. of Collar: 253.0

3 (Victoria Sq., NW of) Driller: Wilson.

Date Boring Started: 29.6.56. Boring completed: 20.7.56.

Proposed depth: 100feet.

Actual depth: 100 feet.

Object: To test foundations for library building of (initially) 3 stories.

Results: Stopped at 100 feet having penetrated silty clays to 48 feet, mainly limestone 48 feet - 84ft. 4 in. and then silts to 100 feet.
"Undisturbed" sealed tube samples were taken from 16ft. to 56 ft; several were unsatisfactory and others were therefore taken from an adjacent bore P.B.2 two feet west See PD1046/56.

GEOLOGICAL LOG

From Ft.	From In.	To Ft.	To In.	Description
Open Tube Samples				
Surface		5	6	Made ground
5	6	8	0	Light grey very limy plastic clay
8	0	11	6	Ditto, very wet. Some brock fragments? Fullen in.
11	6	16	0	Pale grey-green mottled yellow-brown stiff silty clay
Sealed Tube Samples				
16	0	48	0	Ditto
48	0	55	6	Soft white clayey limestone
55	6	56	0	Fragments of hard sandy limestone in soft white powdery limestone
56	0	60	0	Hard off - white sandy fine-grained limestone.
60	0	67	0	Ditto, harder, but with softer bands (acc. to driller)
67	0	68	0	Fine very light brown sand and comminuted shells
68	0	82	0	As 60' - 67'
82	0	83	0	Wet sandy clay with wafers of hard black shale.
Open-tube samples				
83	0	84	4	Poorly cohesive yellow-brown clayey silty sand with a few fine shell fragments.

HCS 82 56 26

Ft.	In.	Ft.	In.	
84	4	95	0	Brown slightly clayey silt locally carbonaceous and more especially 88'-90' (dark grey mottling).
95	0	100	0	Very carbonaceous silts. Many mollusc fossils.

45.00
16. 3.5
28.65

REMARKS

Water struck at 8'-11'6", 56' (seepage), 67'-84'. Water stood at 54'6"
Boring stopped at 100' and logged by geologist (A.R.Crawford)

All sealed-tube samples delivered to E. & W. S. Department.

Bag samples delivered to Departmental Palaeontologist as follows:

1 bag each for 5'-16', 47'-50', 50', 50'-53', 53-56', 56'-60', 60'-67', 67'-68', 68'-74', 74'-81', 81'-85', 85'-90', 90'-95', 95'-99', 99-100'.

August, 1956.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

PERCUSSION BORE LOG.

Pro Project: Supreme Court Library Foundation Test. D.M. 760/56.

Bore No. 2. Bore Serial No. PD1046/56.

Hundred: Adelaide, Section P.T.A.408 (Victoria Sq., S.W.of) Plan Ref:

R.L. of collar: 253.0

Driller: Wilson

Date Boring started 31/7/56. Date boring completed: 3.8.56.

Proposed depth: Maximum of 47ft.

Actual depth: 46ft. 3 ins.

Object: To obtain "undisturbed" samples between 5ft & 47ft.

Result: Stopped at 46'3" having obtained samples.

REMARKS.

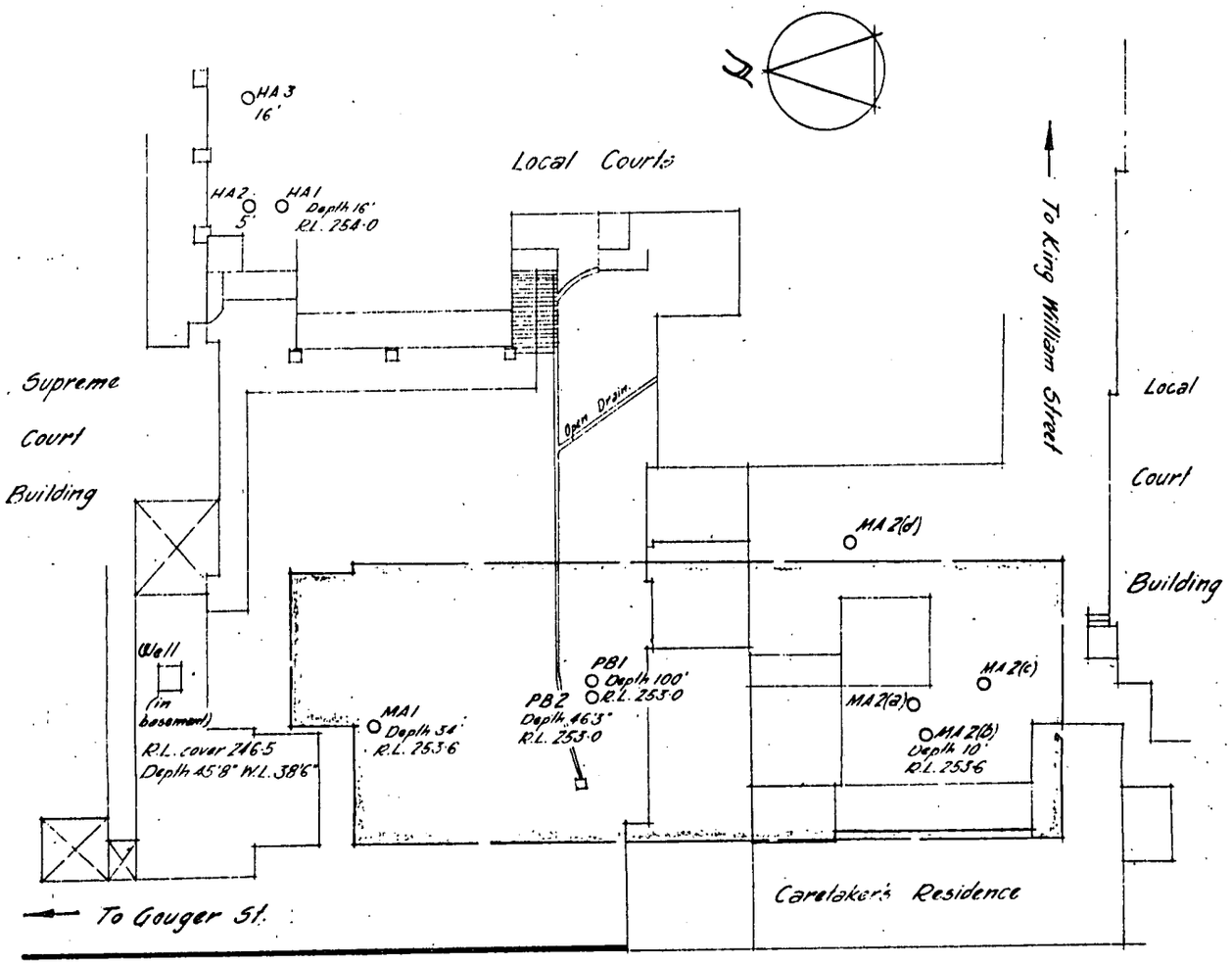
No geological log made. Refer to P.B.1 bored 2ft. to east
Water struck at 7' 6"

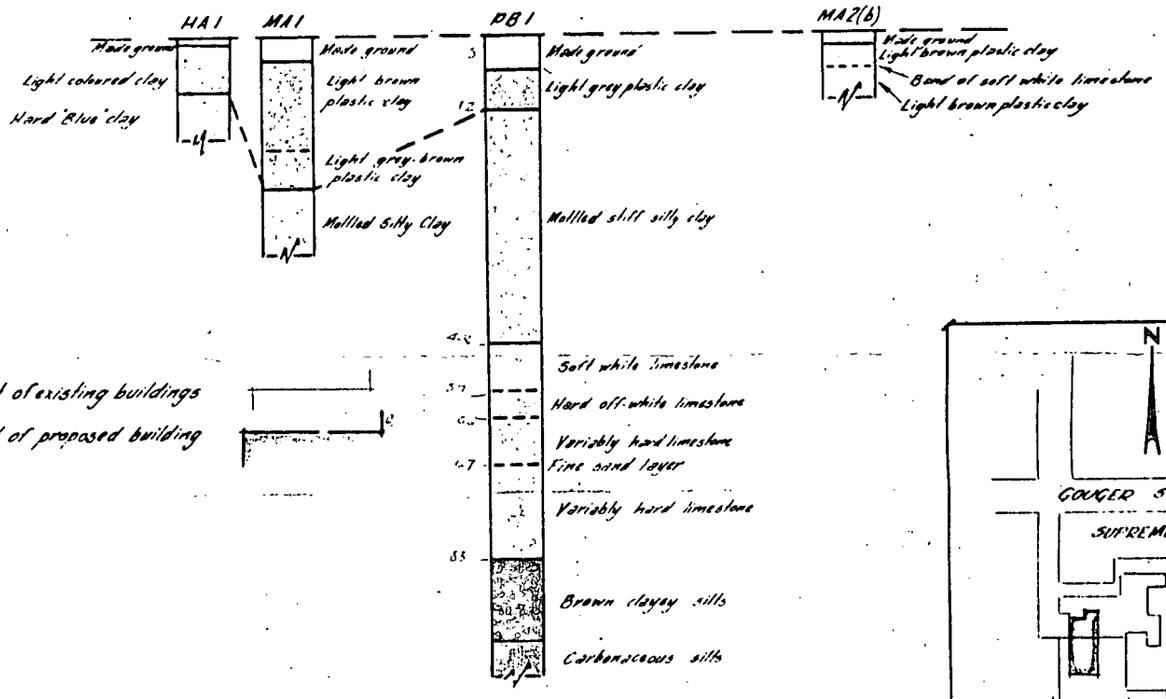
Borehole stopped by geologist (A.R.Crawford).

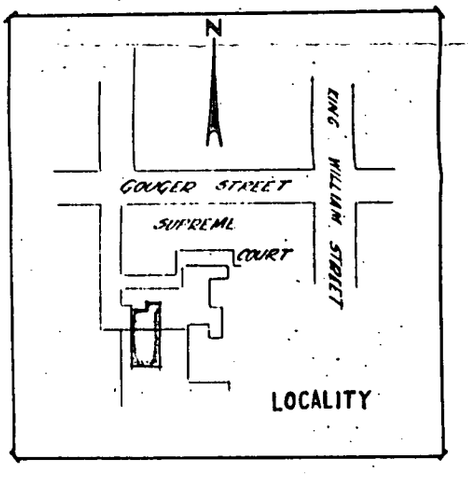
All sealed tube samples delivered to E. & W. S. Department

Samples were taken at 5ft. intervals, two at each horizon (i.e.5'-6'3",6'6"-7'9",10'-11'3",11'6"-12'9" and so on)

August, 1956.







To accompany report by A.R. Crawford.

S.A. DEPARTMENT OF MINES

PLAN SHOWING BOREHOLE SITES AND SECTIONS
FOUNDATION TESTS FOR LIBRARY
SUPREME COURT ADELAIDE

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