

REPORT ON SITE INVESTIGATION

RAILWAY YARDS - NARACORTE

for

S.A. CO-OPERATIVE BULK HANDLING LTD.

by

J. B. FIRMAN
Assistant Senior Geologist

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Rept. Bk. No. 57/93
G.S. No. 2746
D.M. 425/63

29th November, 1963

DEPARTMENT OF MINES
SOUTH AUSTRALIA

REPORT ON SITE INVESTIGATION

RAILWAY YARDS - NARACOORTE

for

S.A. CO-OPERATIVE BULK HANDLING LTD.

INTRODUCTION

This report deals with test boring at a silo site in the Naracoorte Railway Yards, Hundred of Naracoorte, County Chandon. Five bores were put down, each to a depth of 90 feet (See plan). Sealed tube samples were taken at intervals of 5 feet in all bores from ground surface to 35 feet. The remainder of the core was extruded at the site into plastic sleeves and returned to Thebarton Depot for logging.

Geological logs can be found in Appendix 1. A log of materials encountered in an adjacent hydrology bore (2TB) is given in Appendix 2. Water analyses are given in Appendix 3. Columnar sections showing lithology, texture, condition, moisture and penetration data are at the end of the report.

STRATA PENETRATED AND FOUNDATION CHARACTERISTICS

The bores penetrated fill, a reactive clay soil, sandy clays and clayey sands, sand, reworked polyzoal lime sand with flints, and a lower polyzoal lime sand - the Gambier Limestone.

The fill and the underlying reactive clay soil extending down to a maximum depth of 5 feet are not suitable foundation materials.

Penetration figures, in conjunction with other data on the graphic logs, suggest that the mottled sandy clay and underlying clayey sands are suitable foundation materials.

Sands overlying the polyzoal lime sand are fairly strong, but the lime sand is quite weak.

No cavernous ground was encountered during drilling.

GROUNDWATER

Water was cut in the foundation bores in three water-bearing horizons at about 20, 50 and 70 to 75 feet. Static water level of the upper waters is about 20 feet. The deep hydrology bore yielded 16,000 gallons/hour from an unspecified depth.

CONCLUSIONS

The following table shows a suggested depth for footings based on strength of materials inferred from lithologic and penetration data. If materials in Bore 5 are as weak as drilling rig penetration figures suggest, the site could be excavated to about 15 feet.

DATA FOR SELECTION OF FOOTINGS BASE

Bore No.	1	2	3	4	5
Maximum depth of weak surface material (ft.)	5	9	8-10	6	14
Minimum depth of weak material at depth (ft.)	25	32	47	20	30
Most suitable depth for base on strength alone (ft.)	15	22	12	6	14
Static Water level (ft.)	20	19	18	20	22
Depth of suitable base above static water level and below weak surface materials (ft.)	10	10	10	10	14

J. B. Firman
Assistant Senior Geologist
SOILS GEOLOGY SECTION

JBF:AGK
29/11/63

APPENDIX
GEOLOGICAL MAPS

APPENDIX 2

GEOLOGICAL LOG - BORE NO. 2TB, NARACGOORTE

DEPARTMENT OF MINES

WATER BORE LOG

Lat. 36°-57'-00"
Long. 140°-44'-00"

HUNDRED: Naracoorte

Section: Naracoorte T/S

Bore No.: 2TB

R.L.: 196

Name of Owner: E. & W. S. DEPT.

Date Drilling Completed: 1950

Depth: 537'

Tested/Estimated Output 16000

ANALYSES OF WATERS CUT (gr./gall.)

Date	Static Level Ft.	Supply g.p.h.	Total Salts gr./gall.	Carbonates			Sulphates			Chlorides			Nitrates	Hardness		Analysis No.
				Ca.	Mg.	Na	Ca.	Hg.	Na.	Ca.	Mg.	Na.	Na.	Temp.	Perm.	
6.3.40	-	-	96.6	9.0	10.5			2.3	14.6			57.3		21.5	1.9	13/3759
	14'	-	ATS 124													37/533
	13'9"	-	" 86													40/1335
	13'6"	-	" 83													40/1486
11.9.50	13'6"	16000	83.27	19.80	7.56			6.29			4.70	44.92	Trace	28.77	10.16	40/1487

REMARKS: * 11th July 1950. Bore cleaned out and backfilled to 177' ? Casing Slotted. Bore surged but sand continued to come in. Bore blown for 12 hours rate - 16-18000 g.p.h.

LOG OF BORE

0 - 1'6" Brown sandy surface soil
1'6" - 8' Yellow brown calc. sand
8 - 12' White medium sand.
12 - 32' White med. calc. sand
32 - 47' Yellow calc. sand.
47 - 78' Creamy bryozoal limestone with flints.
78 - 124' Ditto.
124 - 174' Ditto.
174 - 206' Yellow calcareous sandstone.
206 - 226' Yellow calcareous sandstone.
226 - 289' Dark brown highly carbonac. sandy siltstone.

289 - 340' Dark brown carbonac. siltstone (turritella)
340 - 390' Dark brown highly carbonac. siltstone.
390 - 420' Dark brown highly carbonac. siltstone.
420 - 431' Ditto
431 - 435' Brown carbonac. sandy silt.
? - 440' Brown carbonac. grits.
512 - 535' Bedrock

LOG BY N.H. Ludbrook

Footnote.

0 - 32' Pleistocene
32 - 174' Gambier
174 - 226' Compton (?)
226 - 435' "C" Buccleuch (?)
435 - 512' Knight.
512 - 537' Bedrock.

APPENDIX 3

WATER ANALYSES

TOTAL SALTS AND FULL ANALYSES

WATER ANALYSIS - S.A.B.H., NARACOOORTE

Bore No.	1				2			3			4			5		
Depth when sampled(ft.)	25	50	55	75	26	50	75	20	53	80	28	50	76	26	56	78
Water Level (ft.)	20	15	25	20	19	25	25	18	22	25	20	23	23	22	26	25
Water Cut (ft.)	18	47	53	72	23	49	73	18	50	75	20	45	72	22	54	74
Supply (G.P.H.)	80	200	350	500	120	300	400	80	300	400	100	180	300	80	200	350
Total saline matter Grains per gallon (ATG)	84	86	84	84	181	110	88	105	105	90	131	100	88	162	88	84

Samples collected between 4/6/63 and 28/6/63 by J. McGuire

Analysed between 14/6/63 and 9/7/63 by A. Nelson, Dept. of Mines.

AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

Our Reference. AN 1/4/0-862

26th June, 1963

W 1618/63

Sample of water marked as under yielded on analysis:-

	Grains per Gallon	Assumed Composition of Salts	Grains per Gallon
Chlorine, Cl	34.3	Calcium carbonate	16.7
Sulphuric acid (radicle), SO_4 , 7.1		Calcium sulphate	-
		Calcium chloride	-
Carbonic acid (radicle), CO_3 , 13.3		Magnesium carbonate	4.6
		Magnesium sulphate	8.9
Nitric acid (radicle), NO_3 , 3.6		Magnesium chloride	4.3
Sodium, Na	21.6	Sodium carbonate	-
Potassium, K	-	Sodium sulphate	-
Calcium, Ca	6.7	Sodium chloride	31.3
Magnesium, Mg	4.2	Sodium nitrate	5.0
Silica, SiO_2	-	Potassium chloride	-
Total saline matter	90.8		
Suspended matter			
Organic matter			

T.M.S.
15/7/63

Name S.A.B.H.
Address Naracoorte
Hundred -
Section -
Sample collected by J. McGuire
Bore No. 2
Water Cut 73'
Water Level 25'
Supply 400
Depth Bore 92'
Date Collected 17/6/63

HARDNESS
(as Calcium Carbonate)

	Grains p/call.
Total	34.0
Temporary	22.1
Permanent	11.9
Due to calcium	16.7
Due to Magnesium	17.3

Thomas R. Frost
Chief Analyst
for L. WALLACE COPPER
Director.

AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

Our Reference. AN 1/4/0-906

9th July, 1963

W 1642/63

Sample of water marked as under yielded on analysis:-

	Grains per Gallon	Assumed Composition of Salts	Grains per Gallon
Chlorine, Cl	34.9	Calcium carbonate	16.2
Sulphuric acid (radicle) SO ₄	6.9	Calcium sulphate	-
Carbonic acid (radicle) CO ₃	13.6	Calcium chloride	-
Nitric acid (radicle) NO ₃	3.6	Magnesium carbonate	5.4
		Magnesium sulphate	8.6
		Magnesium chloride	5.9
Sodium, Na	21.2	Sodium carbonate	-
Potassium, K.	-	Sodium sulphate	-
Calcium, Ca	6.5	Sodium chloride	50.3
Magnesium, Mg	4.7	Sodium nitrate	5.0
Silica, SiO ₂	-	Potassium chloride	-
Total saline matter	91.4		
Suspended matter			
Organic matter			

T.M.S.
15.7.63

Name S.A.B.H.
Address Naracoorte
Hundred -
Section -
Sample collected by J. McGuire
Bore No. 3
Water Cut 75°
Water Level 25°
Supply -
Depth Bore 90°
Date Collected 21/6/63

HARDNESS (as Calcium Carbonate)		Grains p/gallon
Total		35.6
Temporary		22.4
Permanent		13.2
Due to calcium		16.2
Due to magnesium		19.4

Thomas R. Frost
Chief Analyst
for L. WALLACE COFFER
Director

AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

Our Reference. AN 1/4/0-939

9th July, 1963

W1657/63

Sample of water marked as under yielded on analysis:-

	Grains per Gallon	Assumed Composition of Salts	Grains per Gallon
Chlorine, Cl	32.2	Calcium carbonate	14.0
Sulphuric acid (radicle) SO ₄	8.2	Calcium sulphate	-
		Calcium chloride	-
Carbonic acid (radicle) CO ₃	15.1	Magnesium carbonate	9.4
		Magnesium sulphate	7.4
Nitric acid (radicle), NO ₃	3.6	Magnesium chloride	-
		Sodium carbonate	-
Sodium, Na	23.4	Sodium sulphate	3.4
Potassium, K	-	Sodium chloride	53.1
Calcium, Ca	5.6	Sodium nitrate	5.0
Magnesium, Mg	4.2	Potassium chloride	-
Silica, SiO ₂			
Total saline matter	92.3		
Suspended matter			T.M.S. 15.7.63
Organic matter			

Name	S.A.D.H.	HARDNESS (as Calcium Carbonate)	
Address	Naracoorte		
Hundred	-		Grains per Gallon
Section	-		
Sample collected by	J. McGuire	Total	31.3
Bore No.	4	Temporary	25.1
Water Cut	72'	Permanent	6.2
Water Level	25'	Due to calcium	14.0
Supply	300	Due to magnesium	17.3
Depth Bore	90'		
Date Collected	28/6/63		

Thomas R. Frost
Chief Analyst

for L. WALLACE COPPER
Director.

AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

Our Reference. AN 1/4/O-1007

23rd July, 1963

W 1691/63

Sample of water marked as under yielded on analysis:-

	Parts per Million	Grains per Gallon	Assumed Composition of Salts	Parts per Mill.	Grains per Gallon
Chloride, Cl	460		Calcium carbonate	207	
Sulphate, SO ₄	11		Calcium sulphate	-	
Carbonate, CO ₃	194		Calcium chloride	-	
Nitrate, NO ₃	80		Magnesium carbonate	98	
Sodium, Na	270		Magnesium sulphate	14	
Potassium, K	-		Magnesium chloride	121	
Calcium, Ca	83		Sodium carbonate	-	
Magnesium, Mg	62		Sodium sulphate	-	
Silica, SiO ₂			Sodium chloride	610	
			Sodium nitrate	110	
			Potassium chloride	-	
Total saline matter 1160			HARDNESS (as Calcium Carbonate)		
Suspended matter			Total	462	
Organic matter			Temporary	322	
			Permanent	140	
			Due to calcium	207	
			Due to magnesium	255	
Name S.A.B.H. Ltd.			Thomas R. Frost Chief Analyst for L. WALLACE COFFER Director		
Address Naracoorte					
Hundred -					
Section -					
Sample collected by J. McGuire					
Bore No. 5					
Water Cut 74'					
Water Level 25'					
Supply -					
Depth Bore 90'					
Date Collected 5/7/63					

AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

Our Reference. AN 1/4/0-845

26th June, 1963

W 1593/63

Sample of water marked as under yielded on analysis:-

	Grains per Gallon	Assumed Composition of Salts	Grains per Gallon
Chlorine, Cl	34.4	Calcium carbonate	14.0
Sulphuric acid (radicle), SO ₄	6.4	Calcium sulphate	-
		Calcium chloride	-
Carbonic acid (radicle), CO ₃	14.8	Magnesium carbonate	9.0
		Magnesium sulphate	8.1
Nitric acid (radicle), NO ₃	3.6	Magnesium chloride	-
Sodium, Na	23.7	Sodium carbonate	-
Potassium, K	-	Sodium sulphate	-
Calcium, Ca	5.6	Sodium chloride	56.7
Magnesium	4.3	Sodium nitrate	5.0
Silica, SiO ₂	-	Potassium chloride	-
Total saline matter	92.8		
Suspended matter			T.M.S.
Organic matter			15/7/63

Name S.A.B.H.

Address Naracoorte

Hundred -

Section -

Sample collected by J. McGuire

Bore No. 1

Water Cut 72°

Water Level 25°

Supply 500+

Depth Bore 90°

Date Collected 7/6/63

HARDNESS
(as Calcium Carbonate)

	P.P.M.	Grains p/gallon
Total		31.7
Temporary		24.7
Permanent		7.0
Due to calcium		14.7
Due to magnesium		17.7

(Chief
Thomas R. Frost Analyst)
for L. WALLACE COFFER
Director

PERCUSSION DRILL LOG

Department of Mines,
South Australia.

Bore No: 1

Project: Silo Site Investigation

Purpose: Foundation Testing

Location: Naracoorte

Hundred:

Section:

Depth: 90' R.L. Core Diameter: 4 ins. Commenced:

Completed:

Bore Serial No:

Plant:

Bore Logged by: J.B. Firman

Date: 4/7/63

Driller:

Docket No: 425/63

From	To	Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Remarks
			From	To				
0	4	Six, ins. of dark grey sandy clay every grey, brown and dark grey finely mottled sandy clay.	0	1	8	Moist	Soft	1 *
			1	2	7	"	Firm	1.5
			2	3	8	Damp	Stiff	2.0
			3	4	8	"	"	1.0
4	5	Light greyish brown clay with dark yellow and dark grey mottles	4	5	13	Damp	Very stiff	4.0
			5	6'3"	12	"	Stiff	S.T.
5	7	Light grey sandy clay.	6'3"	7	9	"	"	4.0
7	8	Light and dark yellow mottled very clayey sand.	7	8	18	"	Dense	74.5
8	9	Disturbed sample of sandy clay.	8	9	17	"	Stiff	
9	10	As for 7 - 8.	9	10	14	"	Very Stiff	4.0
10	12	Light grey clayey sand with some dark yellow mottles.	10	11'3"	24	Too small to test		S.T.
			11'3"	12	21	Damp	Very Stiff	3.5

* Soil test Penetrometer. Unconfined compressive strength in Tons/sq.ft.

PERCUSSION DRILL LOG

Bore No. 1

Project: Site Site Investigation

Location: Naracoorte (Contd.)

Depth From To	Description	Sample From To	Depth To	Penetration Blows p/ft.	Water Condition	Consistency or Density	Remarks
12 13	Light grey and yellow mottled sandy clay.	12	13	16	Damp	Very stiff	4.0 *
13 14	Disturbed clay.	13	14	17	Damp	Firm	4.5
14 15	Light grey very sandy clay, with yellow mottles. As for 10-12 feet.	14	15	8	"	Stiff	4.5
		15	16'3"	16	"		S.T.
15 17	Uniformly light grey very sandy clay with abundant thin shell fragments.	16'3"	17	16	"	Stiff	
		17	18	20	"	Compact	
		18	19	13	"	"	
17 18	Light grey very clayey fine-grained sand.	19	20	17	"	"	3.0
18 19	Pale grey fine-grained quartz sand.	20	21'3"	17	"		S.T.
19 24	Light grey very sandy clay with yellow mottles. Limey and containing lumps of hard lime.	21'3"	22	20	"	} Irregularly lime cemented	
		22	23	20	"		
24 26'3"	Light grey very clayey sand.	23	24	15	"		
26'3" 27'	Light grey fine-grained quartz sand.	24	25	22	Damp	Firm	1.5
		25	26'3"	19	"	Soft	S.T.
		26'3"	27	16	Moist	Loose	

* Soil test pocket penetrometer. Tons/sq.ft.

Location: Naracoorte (Contd.)

Depth		Description	Sample Depth		Penetration Blows/pft.	Water Condition	Consistency or Density	Remarks
From	To		From	To				
27	28	Light grey fine sand.	27	28	25	Damp	Compact	*
28	29	Light grey very sandy clay.	28	29	24	Moist	Soft	0.5
29	30	" " " clayey sand.	29	30	15	"	Compact	
30	31'3"	" " " sandy clay.	30	31'3"	19	"	Soft	S.T.
31'3"	36'3"	Light yellowish grey somewhat clayey sand with irregular hard lime cemented lumps up to 2 ins. max. diameter.	31'3"	32'	20	"	Loose	Sequence below this point is limey throughout, S.T. Matrix only
			32	33	25	"	Compact	
			33	34	22	"	"	
			34	35	22	Damp	Dense	
			35	36'3"	22	"	Soft	
36'3"	39	Pale grey quartz sand.	36'3"	37	20	"	Loose	
39	40	Light grey limey and clayey sand with lime cemented lumps.	37	38	-	Moist	*	
			38	39	28	"	"	
			39	40	24	"	Compact	
40	42	Pale grey fine sand.	40	41	18	Damp	Loose	
42	44	Light grey sand with hard lumps. of lime-cemented sand up to 1 in.	41	42	18	"	"	
			42	43	14	"	Compact	
44	45	Light grey clayey fine sand with lumps of lime-cemented sand.	43	44	28	"	Dense	
			44	45	21	"	Compact	

Project: Silo Investigation

PERCUSSION DRILL LOG

Bore No. 1:

Location: Naracoorte

Depth		Description	Sample Depth		Penetration Blows/ft.	Water Condition	Consistency or Density	Remarks
From	To		From	To				
45	47	Medium-grained quartz sand with angular cemented lumps of gravel size	45	46	27	Damp	Loose	
			46	47	25	"	Very loose	
47	50	Pale greyish yellow silty fine sand.	47	48	11	"	Dense	
			48	49	24	"	"	
50	51	Medium to coarse grained quartz sand with lime-cemented granules and lumps of flint up to 1" max. dimension.	49	50	26	"	"	
			50	51	23	"	Loose	
			51	52	14	"	Dense	
51	56	Pale greyish yellow silty fine sand with limey lumps and flint.	52	53	13	"	Very dense	
			53	54	16	Wet	Soft	
			54	55	12	Moist	Dense	
			55	56	12	Damp	Dense	
56	57	Light grey coarse-grained quartz sand	56	57	12	"	Loose	
57	70	Pale greyish yellow silty fine sand with varying amounts of platy shell fragments up to 1/4" max. dimension. Lumps of cemented sand between 64 and 65ft.	57	58	8	"	Compact	
			58	59	12	"	Dense	
			59	60	13	"	"	
			60	61	12	"	"	
			61	62	14	"	Compact	
			62	63	21	"	"	
			63	64	24	"	"	
			64	65	27	"	"	
			65	66	15	"	Dense	
			66	67	9	"	"	
			67	68	12	"	"	
			68	69	11	"	Compact	
			69	70	19	"	"	
			70	71	22	"	Loose	

Location: Naracoorte

PERCUSSION DRILL LOG

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Remarks
From	To		From	To	p.ft.			
70	71	Pale yellow shelly sand, weakly cemented with lime. Lumps up to 3 ins. max. dimension in sand matrix.	71	72	11	Damp	Very Dense	Cemented
			72	73	15	"	in part loose	in part.
71	73	Pale yellow medium-grained quartz sand with some platy shell.	73	74	15	"	Very dense in part.	
			74	75	17	"	Compact.	
73	77	Pale yellow quartz sand with platy shell fragments. Weakly cemented lumps occur in a sand matrix.	75	76	22	"	"	
			76	77	20	"	"	
			77	78	26	"	"	
77	78	Pale yellow fine sand with irregular limestone lumps.	78	79	18	"	Loose	
			79	80	29	"	Compact	
78	79	Light yellowish grey medium-grained shelly sand.	80	81	19	"	"	
79	81	Pale yellow medium grained shelly sand with large lumps of lime-cemented shelly sand.	81	82	20	"	"	
			82	83	12	"	Dense	
81	90	Pale yellow silty fine sand with abundant shell fragments and containing lumps of lime cemented sand in a non-cemented sand matrix. Abundant pale grey lime cement from 81 to 82 feet.	83	84	20	"	"	
			84	85	23	"	"	
			85	86	25	Moist	"	
			86	87	17	Damp	Hard cemented, but broken by drilling	
			87	88	17	Moist	Soft	
			88	89	22	"	Compact	
			89	90	23	"	"	

END OF BORE

PERCUSSION DRILL LOG

Department of Mines,
South Australia.

Bore No.: 2

Project: Site Site Investigation

Purpose: Foundation Testing

Location: Naracoorte

Hundred: Naracoorte

Section: Railway Yards

Depth: 90' R.L. Core Diameter: 4 ins. Commenced: 11/6/1963 Completed: 18/6/1963 Bore Serial No.: 873/63 Plant: 19

Bore Logged by: J.B. Firman

Date: -

Driller: J. McGuire

Drill No.: 425/63

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Remarks
From	To		From	To	Blows/ft.			
0	1'	Sandy fill	0	1	15	**	Slightly Damp. Compact	
1'	4'	Dark grey sandy clay with a coarse granular structure. Bright sheen.	1	2	11		Moist	Soft
			2	3	12	3	Damp	Stiff
			3	4	8	3	"	"
4'	9'	Sandy clay. Light grey and light brown mottling between 4 ft. and 6 ft. 3 ins. (Limoy). Light greenish grey below 6 ft. 3 ins. with limoy patches from 7 ft. to 8 ft.	4	5	12	4.5	"	"
			5	6'3"	7		"	"
			6'3"	7	12	2.5	"	"
			7	8	10	2.5	"	"
			8	9	7	3.0	"	"
9'	13'	Light grey sandy clay with brownish yellow mottling. Pockets of clayey sand increase towards the base.	9	10	8	4.5	"	"
			10	11'3"	18		"	"
			11'3"	12	23	4.5	Slightly Damp.	Very Stiff
			12	13	18	4.5	"	"

** Figures show unconfined compressive strength of materials in tons/sq.ft. Soiltest Pocket Penetrometer.

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To	Blows/ ft.	Tons/** sq.ft.		
13'	21'3"	Light grey clayey sand. Clay increasing towards the base.	13	14	25		Damp	Loose
			14	15	24		"	Firm
			15	16'3"	14		"	"
			16'3"	17	23		Slightly Damp	Loose
			17	18	22		Moist	Firm
			18	19	25		"	"
			19	20	27		"	Firm
			20	21'3"	28		"	Very Stiff
21'3"	24'	Light grey sandy clay with brownish yellow mottles. Weakly and irregularly cemented with lime. Similar clay to 12 to 13 ft.	21'3"	22	29	4.5	Slightly Damp	" "
			22	23	10	4.5	"	" "
			23	24	32		"	" "
24'	30'	Light grey clayey fine sand with limey fragments from 29 to 30 feet	24	25	25		Moist	Loose
			25	26'3"	29		"	"
			26'3"	27	35		Wet	"
			27	28	29		"	"
			28	29	22		"	Very Loose
			29	30	26		Moist	Compact
30'	38'	Light greenish grey very clayey sand becoming very sandy clay from 31'3" to 32 ft. and containing irregular limey lumps from 35 to 38 ft. Coarse-grained from 37 to 38 ft.	30	31'3"	12		"	"
			31'3"	32	23	3	"	Stiff
			32	33	19		"	Compact
			33	34	21		"	"
			34	35	27		Wet	Loose
			35	36'3"	29		"	"
			36'3"	37	38		"	Compact
			37	38	34		"	Dense

Sealed Tube

Disturbed
Sealed Tube

Hard + water

Possibly wet
and loose orig-
inally
Sealed Tube

MARACORTE RAILWAY YARDS BORE NO. 2
(contd.)

-3-

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller Remarks
From	To		From	To				
					Blows/ ft.	Tens/** sq.ft.		
38'	41'	Light grey medium grained sand becoming coarse-grained from 40 to 41 ft.	38	39	15		Wet	Very Loose
			39	40	26		"	"
			40	41	15		Moist	"
41'	42'	Light greenish grey fine sand with abundant hard limey lumps	41	42	25		Wet	Dense
42'	43'	Light grey and brown medium-grained sand with abundant lime coating.	42	43	27		Moist	Very Loose
			43	44	23		Damp	Dense
43'	90'	Light grey limey silty fine sand with abundant lime cemented lumps. Flint from 45 to 46 ft. and 52 to 53 ft. Bryozoa from 48 to 49 ft., and becoming abundant below 50. Coarse-grained quartz sand abundant at 49-50 ft., 50 to 51 ft. and 86 to 87 ft.	44	45	23		"	"
			45	46	19		"	"
			46	47	32		"	"
			47	48	28		Moist	"
			48	49	23		"	"
			49	50	27		"	Loose
			50	51	23		"	"
			51	52	12		Damp	Very Dense
			52	53	9		"	"

NARAGORTE RAILWAY YARDS BORE NO. 2
(contd.)

-4-

Depth		Description	Sample Depth		Penetration		Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To	Blows/ ft.	Tons/** sq.ft.			
			53	54	8		Damp	Dense	Dried out
			54	55	7		Moist	Compact	" "
			55	56	8		"	Compact	
			56	57	12		"	"	Dried out.
			57	58	13		"	"	Probably
			58	59	15		"	"	moist to we
			59	60	17		"	"	and loose
			60	61	17		"	"	originally.
			61	62	13		"	"	
			62	63	17		"	"	
			63	64	11		"	"	
			64	65	9		"	"	
			65	66	8		"	"	
			66	67	9		"	"	
			67	68	5		"	"	
			68	69	6		"	"	
			69	70	7		"	"	
			70	71	19		"	"	
			71	72	22		"	"	
			72	73	17		"	"	
			73	74	19		"	"	

MARAGOOOTH RAILWAY YARDS BORE NO. 2
(contd.)

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Depth		Description	Sample Depth		Penetration		Water Condition	Consistency or Density	Remark	
From	To		From	To	Blows/ft.	Tons/** sq.ft.				
			74	75	21	)	Moist	Compact throughout, but probably wet and loose to compact originally. All compacted during transport.		
			75	76	22					
			76	77	19					
			77	78	14					
			78	79	15					
			79	80	32					
			80	81	25					
			81	82	22					
			82	83	24					
			83	84	20					
			84	85	22					
			85	86	25					
			86	87	23					
			87	88	28					
			88	89	26					
			89	90	27					
			END							

PERCUSSION DRILL LOG

Department of Mines,
South Australia.

Bore No.: 3

Project: Site Site Investigation

Purpose: Foundation Testing

Location: Naracoorte

Hundred: Naracoorte Section: Railway Yards

Depth: 90' R.L. Core Diameter: 4 ins. Commenced: 18/6/1963 Completed: 21/6/1963 Bore Serial No. 882/63

Bore Logged by: J.G. Firman Date: 18/9/1963 Driller: J. McGuire Docket No. 425/63 Plant: 19

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To	Blows/ ft.	Tons/** sq.ft.		
0	1'	Sand and clay fill. Limey	0	1'	15		Moist	Soft
1'	2'	Sand fill. Limey.	1	2	12		Moist	Loose
2'	4'	Grey and yellowish brown limey clay.	2	3	10	2.5	Moist	Stiff
4'	9'	Light grey sandy clay; sand increasing towards the base.	3	4	8	2-2.5	Moist	Firm
			4	5	8		Damp	Firm
			5	6'3"	5		"	"
			6'3"	7	9		"	"
			7	8	12		"	"
			8	9	22	0.5	Moist	Very Stiff
9'	12'	Yellowish grey and brownish yellow mottled clayey sand.	9	10	21		Dried out	Soft
			10	11'3"	26			Firm
			11'3"	12	33		Damp	Very loose
12	14'	Light grey clayey sand.	12	13	37		Dried out	Compact
			13	14	17		Wet	Firm
								Hard
								Damp. Soft.

** Soiltest Penetrometer: Unconfined compressive strength in tons/sq.ft.

NARACOORTE RAILWAY YARDS BORE NO. 3
(contd.)

-2-

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To				
					Blows/ ft.			
14'	16'3"	Light grey very clayey fine sand. Limey from 15 to 16 ft. 3 ins.	14	15	32	Humid	Very Dense	Firm
			15	16'3"	25	"	"	Sealed Tube
16'3"	28'	Light grey very clayey fine sand containing lime-cemented sandstone fragments from 21 ft. 3 ins. to 22 ft.	16'3"	17	23	"	Loose	Friable
			17	18	22	Moist	"	"
			18	19	21	"	"	Soft
			19	20	28	Humid	"	Friable, Damp
			20	21'3"	23	"	"	Sealed Tube
			21'3"	22	23	"	"	Friable.
			22	23	27	"	Very Dense	"
			23	24	25	"	"	"
			24	25	31	"	"	"
			25	26'3"	22	"	"	Sealed Tube
			26'3"	27	22	"	"	Friable
			27	28	31	"	"	"
28'	30'	Pale grey fine sand	28	29	25	Wet	Soft	Firm
			29	30	25	Moist	Soft	Soft
30'	34'	Light grey sandy clay, limey in part.	30	31'3"	12	"	"	Sealed Tube
			31'3"	32	12	"	Firm	Soft
			32	33	21	Damp	"	Firm
			33	34	18	"	Very Stiff	"
34'	37'	Light grey clayey sand	34	35	20	Humid	"	"
			35	36'3"	28	"	Very Dense	Firm. S. Tube
			36'3"	37	15	"	"	Soft

Depth.		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To				
37'	38'	As above, but containing angular quartz up to fine gravel size. Lime-cemented in part.	35	36'3"	28	Humid	Very Dense	Firm. S. Tube
			36'3"	37	15	"	"	Soft
			37	38	28	"	"	Firm
38'	43'	Pale grey quartz sand	38	39	25	Damp	Soft	Friable
			39	40	22	"	"	Soft
			40	41	21	Moist	Loose	Firm
			41	42	18	"	"	Soft. Wet.
			42	43	15	"	"	Soft.
43'	47'	Pale grey quartz sand with large hard lime-cemented lumps. Ferruginous staining from 43-46'. The material from 12 ft. to 47 ft. can be considered the same unit with lenses of sand and other variations as noted.	43	44	11	"	"	Soft. Wet.
			44	45	28	Humid	All compact	Friable
			45	46	32	"	to dense	"
			46	47	27	"	From 44	"
			47	48	28	"	to 71 ft.	"
			48	49	10	"	but shape	Soft
			49	50	15	"	suggest	Firm
47'	66'	Pale grey limy silty fine sand with flint from 50-51 ft., platy shell fragments at 62-63 ft. and quartz sand lenses at 47-48 ft. and 60-61 ft. Finely comminuted ?bryozoa make up much of the sediment.	50	51	9	"	very soft	Soft
			51	52	10	"	to soft.	Friable
			52	53	13	"	"	Firm
			53	54	10	"	"	Soft
			54	55	7	"	"	"
			55	56	12	"	"	Friable
			56	57	8	"	"	Soft
			57	58	9	"	"	"
			58	59	7	"	"	" . Wet
			59	60	8	"	"	Soft
			60	61	18	"	"	Friable
			61	62	15	"	"	"
			62	63	17	"	"	"

NARACOOOTE RAILWAY YARDS BORE NO. 3
(contd.)

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Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To				
66'	90'	Pale brown limey sand, mostly finely comminuted fossiliferous material (? bryozoa). Weakly lime-cemented lumps from 73 to 74 ft., 77 to 79 ft., 85 to 86 ft. and 89 to 90 ft. Samples on opening were loose to very loose. Original condition unknown	63	64	15	Humid	Firm	
			64	65	14	"	"	
			65	66	16	"	"	
			66	67	12	"	Soft	
			67	68	7	"	"	
			68	69	12	"	"	
			69	70	13	"	"	
			70	71	12	"	"	
			71	72	15	"	Friable	
			72	73	12	"	Soft	
			73	74	22	"	Friable	
			74	75	21	"	"	
			75	76	22	Damp	"	
			76	77	28	"	"	
			77	78	26	"	"	
			78	79	28	"	"	
			79	80	26	"	"	
			80	81	25	"	"	
			81	82	26	"	"	
			82	83	22	"	"	
			83	84	24	"	"	
			84	85	28	"	"	
			85	86	32	"	"	
			86	87	26	Moist	"	
			87	88	27	"	"	
			88	89	28	Damp	"	
			89	90	34	"	"	
			END					

PERCUSSION DRILL LOG

Department of Mines,
South Australia.

Bore No.: 4

Project: Silo Site Investigation

Purpose: Foundation Testing

Location: Naracoorte

Hundred: Naracoorte

SECTION: Railway Yards

Depth: 90' R.L. Core Diameter: 4 ins. Commenced: 24/6/1963 Completed: 28/6/1963 Bore Serial No. 886/63 Plant: 19

Bore Logged by: J.B. Firman Date: Driller: J. McGuire

Docket No.: 425/63

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To	Blows/Ft.			
0	1'	Grey brown sandy clay, Fill	0	1	8	Opened	Compact	Soft
1'	3'	Grey sandy limey clay with poorly developed granular structure.	1	2	7	Damp	Stiff	"
			2	3	4	Moist	Firm	"
3'	4'	Grey brown sandy clay with yellow mottles	3	4	13	Humid	Very Stiff	Firm
4'	12'	Light grey, light greyish brown very clayey sand with tubular shaped grey and pale brown staining. Very clayey from 6 ft. 3 ins. to 8 ft. becoming sand lower except for clayey sand from 11 ft. 3 ins. to 12 ft.	4	5	10	Opened	Hard	Soft
			5	6'3"	19	"	Very Dense	S.Tube. Firm
			6'3"	7	37	Humid	Dense	Firm
			7	8	38	"	"	"
			8	9	42	"	Compact.	Friable.
			9	10	45	"	Dense	Hard
			10	11'3"	24	"	Compact	S.Tube. Firm
			11'3"	12	48	"	Very Dense	Firm.
12'	45'	Pale grey and greenish grey very clayey sand with clay lenses from 14 to 15 ft., 16 ft. 3 ins. to 23 ft. Lenses of sand with little or no clay from 22 to 23 ft., 27 to 33 ft. and from 39 to 43 feet. Cemented limey patches from 17 to 18 ft.,	12	13	39	"	"	"
			13	14		"	"	"
			14	15	9	Damp	Firm	Soft
			15	16'3"	21	Humid	Dense	S.Tube. Friable.
			16'3"	17	16	Damp	Very Stiff	Firm
			17	18	24	"	"	"

NARACORTE RAILWAY YARDS BORE NO. 4
(contd.)

-2-

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To	Blows/ft.			
12'	45'	19 to 20 ft. and 24 to 25 feet. Sequence is limy below 38 feet.	18	19	24	Moist	Soft	Firm
(contd.)			19	20	28	Damp	Stiff	"
			20	21'3"	27	Moist	Soft	S.Tube. Friable
			21'3"	22	19	Wet	Soft	Friable
			22	23	16	Wet	Very Soft	Friable. Wet
			23	24	15	Damp	Compact	Firm
			24	25	23	Humid	Dense	"
			25	26'3"	20	Moist	Firm	S.Tube. Firm
			26'3"	27	19	"	Compact	Friable.
			27	28	20	"	"	Wet. Friable.
			28	29	20	"	Loose	Friable.
			29	30	25	"	"	"
			30	31'3"	15	Wet	"	S.Tube
			31'3"	32	15	"	"	Soft
			32	33	21	"	"	Friable. Wet
			33	34	20	Moist	Compact	Friable.
			34	35	18	"	"	"
			35	36'3"	8	"	"	S.Tube. Soft
			36'3"	37	24	"	"	Soft.
			37	38	28	"	"	Friable
			38	39	28	"	"	"
			39	40	26	"	Loose	"
			40	41	31	"	"	"
			41	42	30	Damp	Very Loose	"
			42	43	36	"	"	"
			43	44	38	"	Compact	"
			44	45	43	Moist	"	"

NARACOORTE RAILWAY YARDS BORE NO. 4
(contd.)

-3-

Depth		Description	Sample Depth		Penetration Blows/ft.	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To				
45'	63'	Pale grey and light brown limey silty very fine sand with flint pebbles at 45 to 47 ft. and 49 to 50 ft. Probably re-worked bryozoal limestone	45	46	17	Moist	Loose	Soft
			46	47	20	"	Compact	Friable
			47	48	20	"	Dense	"
			48	49	17	"	Compact	"
			49	50	16	"	"	"
			50	51	11	"	"	Soft
			51	52	11	"	"	"
			52	53	10	"	"	"
			53	54	8	"	"	"
			54	55	10	"	"	"
			55	56	22	"	"	Friable
			56	57	24	"	"	"
			57	58	16	"	"	"
			58	59	14	Damp	Loose	"
			59	60	16	"	Compact.	Soft
			60	61	17	"	"	Friable
			61	62	22	"	"	"
			62	63	23	"	"	"
63'	90'	Pale grey, pale yellowish grey and light brown fine-grained limey sand (medium-grained from 74 to 76 ft.). Composed of fossil debris, principally ?bryozoa, and containing large lime cemented lumps below 78 feet.	63	64	24	"	"	"
			64	65	25	"	"	"
			65	66	19	"	"	Soft
			66	67	15	"	"	"
			67	68	10	"	"	"
			68	69	10	"	"	"
			69	70	13	"	"	"
			70	71	15	"	"	"
			71	72	19	"	"	Friable
			72	73	17	"	"	Soft

PARACORTE RAILWAY YARDS BORE NO. 4
(contd.)

-4-

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To	Blows/ft.			
			73	74	18	Damp	Compact	Soft
			74	75	20	"	"	Variable
			75	76	20	Moist	Loose	"
			76	77	14	Damp	"	Soft
			77	78	11	"	Compact	Soft
			78	79	12	"	Loose	Variable
			79	80	24	"	"	"
			80	81	32	"	"	"
			81	82	28	"	"	"
			82	83	33	"	"	"
			83	84	28	"	Compact	"
			84	85	25	"	"	"
			85	86	28	"	Loose	"
			86	87	18	"	"	"
			87	88	18	"	"	"
			88	89	23	"	"	"
			89	90	22	"	"	"
			Finish.					

Department of Mines,
South Australia.

PERCUSSION DRILL LOG

Bore No.: 5

Project: Silo Site Investigation

Purpose: Foundation Testing

Location: Naracoorte

Hundred: Naracoorte

Section: Railway Yards

Depth: 90' R.L.: Core Diameter: 4 ins. Commenced: 1/7/1963 Completed: 5/7/1963 Bore Serial No. 501/64

Bore Logged by: J.B. Firman Date: 2/9/1963 Driller: J. McGuire Docket No.: 425/63 Plant: 19

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To				
0	1'	Brown sand over grey sandy clay	0	1	12	Damp	Loose, Stiff	Firm
1'	5'	Grey and light brown mottled sandy clay	1	2	8	"	Stiff	"
			2	3	12	"	"	"
			3	4	5	"	"	Soft
			4	5	8	"	"	Firm
5'	14'	Pale grey sandy clay with small soft limey particles. Slickenside face between 9 and 10 ft. Dark brown ferruginous staining from 5 to 8 ft.	5	6'3"	10	"	"	S. Tube Firm
			6'3"	7	9	"	"	Firm
			7	8	5	"	"	"
			8	9	4	"	Very Stiff	Soft
			9	10	7	"	"	"
			10	11'3"	3	"	"	S. Tube Firm
			11'3"	12	7	Wet	Soft	Soft
			12	13	5	Damp	Stiff	Soft
			13	14		"	Very Stiff	Soft
			14	15	14	Opened		Firm
14'	15'	Light grey somewhat clayey fine sand						
15'	23'	Light greenish grey and dark yellow mottled very clayey sand. Sand lens from 19 to 20, limey patches from 15 to 17 and 21 ft. 3 ins. to 24, hard lime cemented patches	15	16'3"	19	Humid	Very Stiff Firm.	S. Tube
			16'3"	17	23	Damp	"	Firm
			17	18	24	"	"	"
			18	19	28	"	"	Friable

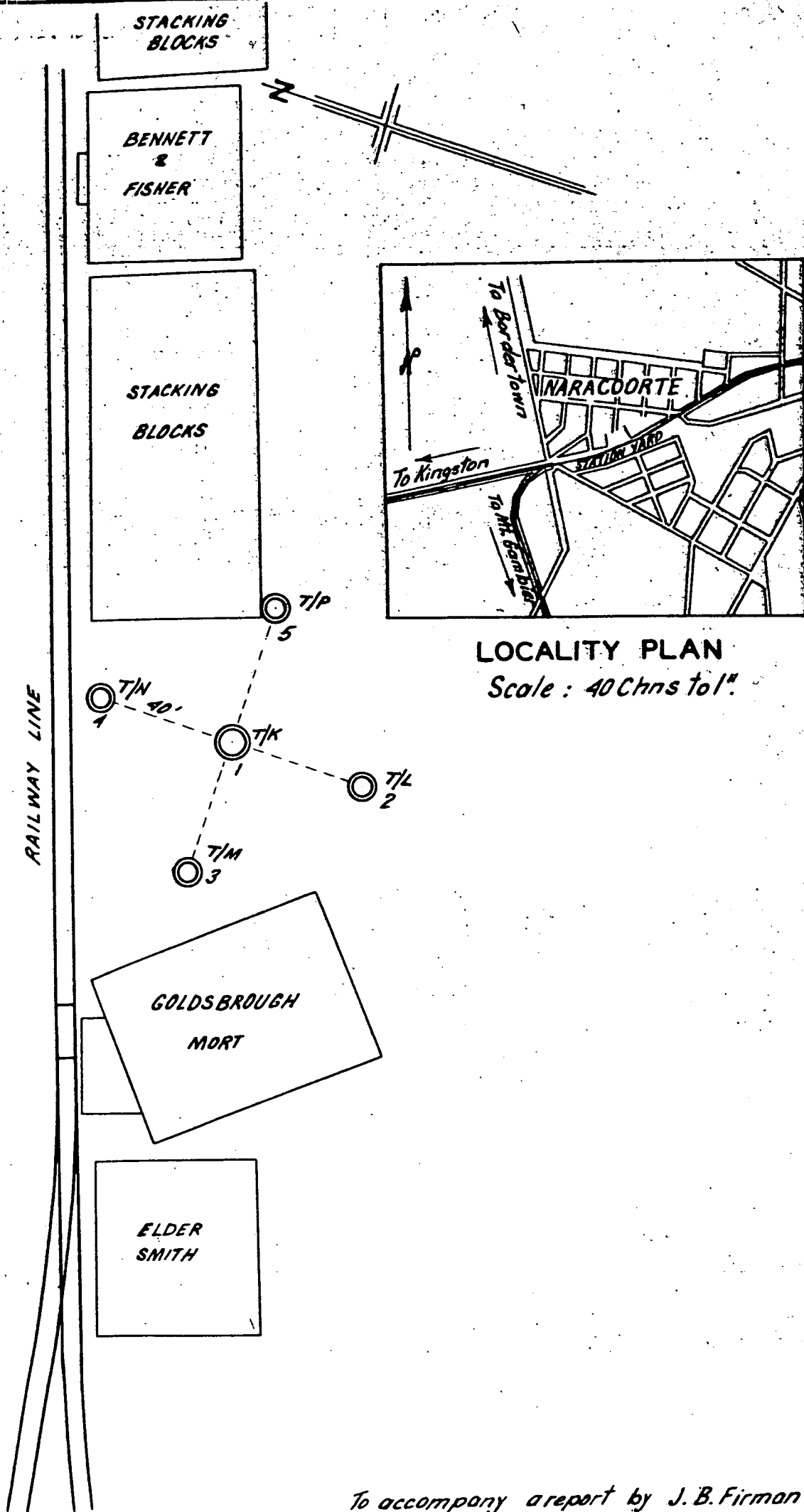
PARACOORTE RAILWAY YARDS BORE NO. 5
(contd.)

-2-

Depth		Description	Sample Depth		Penetration	Water Condition	Consistency or Density	Driller's Remarks
From	To		From	To	Blows/ft.			
15'	23'	from 17 to 19 ft. and 21 ft. 3 ins. to 24 ft.	19	20	32	Moist	Compact	Friable
(contd.)			20	21	31	Damp	Firm	S. Tube
			21	22	22	Humid	Hard	Friable
			22	23	32	"	"	"
23'	44'	Light grey to pale brownish grey fine sand with lenses of pale greenish clayey sand from 33 to 34 ft. and from 35 to 37 feet.	23	24	28	"	Cemented	"
			24	25	32	Moist	Compact	"
			25	26'3"	19	Wet	Loose	S. Tube. Friable.
			26'3"	27	29	Moist	"	Friable
			27	28	25	"	"	"
			28	29	28	"	Very Loose	Friable
			29	30	26	"	"	Friable. Wet
			30	31'3"	15	"	"	Friable.
			31'3"	32	29	Wet	"	Soft
			32	33	16	Moist	Loose	Friable
			33	34	18	Damp	Compact	"
			34	35	22	Moist	Loose	"
			35	36'3"	26	Damp	Compact	S. Tube
			36'3"	37	36	Moist	Dense	Friable
			37	38	28	"	Very Loose	"
			38	39	15	"	"	Soft
			39	40	22	"	"	Friable
			40	41	21	"	"	"
			41	42	25	"	"	"
			42	43	24	"	"	"
			43	44	22	"	"	"

Depth		Description	Depth		Penetration	Condition or Density		Remarks
From	To		From	To	Blows/ft.			
44°	50°	Pale grey limey fine sand with weakly cemented lumps. Lens of pale green medium grained sand from 46 to 48 ft.	44	45	22	Moist	Compact	Friable
			45	46	27	"	"	"
			46	47	25	"	"	"
			47	48	25	"	"	"
			48	49	38	"	"	"
			49	50	36	"	"	"
			50	51	29	"	"	"
50°	65°	Pale yellowish grey, pale brown and light yellow brown very limey silty fine sand. Numerous flints from 50-59. Large fragments of bryozoa from 66 to 67.	51	52	5	"	"	"
			52	53	5	"	"	Soft
			53	54	8	"	"	Soft
			54	55	14	"	"	"
			55	56	14	"	"	"
			56	57	15	"	"	"
			57	58	15	"	"	Friable
			58	59	18	Damp	"	"
			59	60	22	"	"	"
			60	61	9	"	"	Soft
65°	90°	Pale to light brown fine to medium-grained limey sand. Finely comminuted fossil material including abundant bryozoa.	61	62	10	"	"	"
			62	63	4	"	"	"
			63	64	11	"	"	"
			64	65	13	"	"	Friable
			65	66	22	"	"	Yet
			66	67	12	"	"	Soft
			67	68	8	Moist	"	"
			68	69	8	"	Loose	"
			69	70	11	"	Compact	"
			70	71	13	"	"	Friable
			71	72	25	"	"	"
			72	73	26	"	"	"

Depth		Description		Depth	Penetration	Condition	or Density	Remarks	
From	To			From	To	Blows/ft.			
				73	74	15	Moist	Loose	Friable
				74	75	16	"	Compact	"
				75	76	14	"	"	Soft
				76	77	13	"	"	"
				77	78	17	"	"	Friable
				78	79	20	"	"	"
				79	80	15	"	Loose	"
				80	81	15	"	Compact	"
				81	82	23	"	"	"
				82	83	23	"	"	"
				83	84	19	"	"	"
				84	85	23	"	"	"
				85	86	21	"	"	"
				86	87	22	"	Loose	"
				87	88	19	"	Loose	"
				88	89	21	"	"	"
				89	90	23	"	"	"
				Finish.					

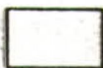


To accompany a report by J. B. Firman

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	NARACOORTE SILO SITE S. A. CO-OP BULK HANDLING LTD. LOCATION OF TEST BORES	D.M.	Scale 40' to 1 inch
		Tcd. B.G.		Req.	S3553
		Ckd.			<i>Ka 6.</i>
Director		Exd.			Date 2-12-63

LEGEND

-  *Fill*
-  *Reactive clay soil*
-  *Mottled sandy clays and clayey sands*
-  *Light grey and greenish grey very clayey sands and sandy clays with sand and clay lenses*
-  *Pale grey and light grey quartz sand with some sandy clay and clayey sand lenses.*
-  *Reworked polyzoal lime sand (calcarenite) with flint.*
-  *Polyzoal lime sand (calcarenite).
(Mt. Gambier Limestone).*

// // Shell fragments

° ° ° Lumps of hard lime

• • • Flint

|| || Lime cement

⊠ Structure showing reactive clay.

Weak patches of lime

• • • Gravel

To accompany report by J.B. Firman

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	NARACOORTE SILO SITE LEGEND FOR LOGS OF PHYSICAL PROPERTIES	D.M.	Scale —
		Tcd.		Req.	S3530
		Ckd.			Ke6
Director		Exd.			Date 7-11-63

LOG OF PHYSICAL PROPERTIES

Location Naracoorte Silo Site

Bore No. 1

Date: 7.11.63

MOISTURE

PENETRATION

Depth below surface
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES

TEXTURE CONDITION

Humid.
Damp.
Moist.
Wet.

Blows per foot.

PENETROMETER
Tons per foot.

Depth below surface	GEOLOGICAL FEATURES	TEXTURE	CONDITION	MOISTURE				PENETRATION				
				Humid.	Damp.	Moist.	Wet.	Blows per foot.	PENETROMETER			
								20 40 60 80	0	1	2	3 4
			Soft									
			Firm									
		Sandy clay	Stiff									
5		Clay	Very stiff									
		Sandy clay	Stiff									
			Dense									
			Stiff									
10		Clayey sand	Very stiff									
		Sandy clay										
		Clay	Firm									
15		Sandy clay	Stiff									
		Clayey sand	Compact									
		Sand										
20		Sandy clay	Stiff									
25		Clayey sand	Firm									
			Soft									
		Sand	Loose									
			Compact									
30		Sandy clay	Soft									
		Clayey sand	Compact									
		Sandy clay	Soft									
			Loose									
35		Clayey sand	Compact									
			Dense									
			Compact									
			Loose									
40		Sand	Compact									
		Clayey sand	Dense									
			Soft									
		Sand	Loose									
45		Clayey sand	Compact									
			Loose									
		Sand	Very loose									
50		Silty sand	Dense									

S3531a
K66

LOG OF PHYSICAL PROPERTIES

Location Naracoorte Silo Site

Bore No. 2

Date: 7.11.63

MOISTURE

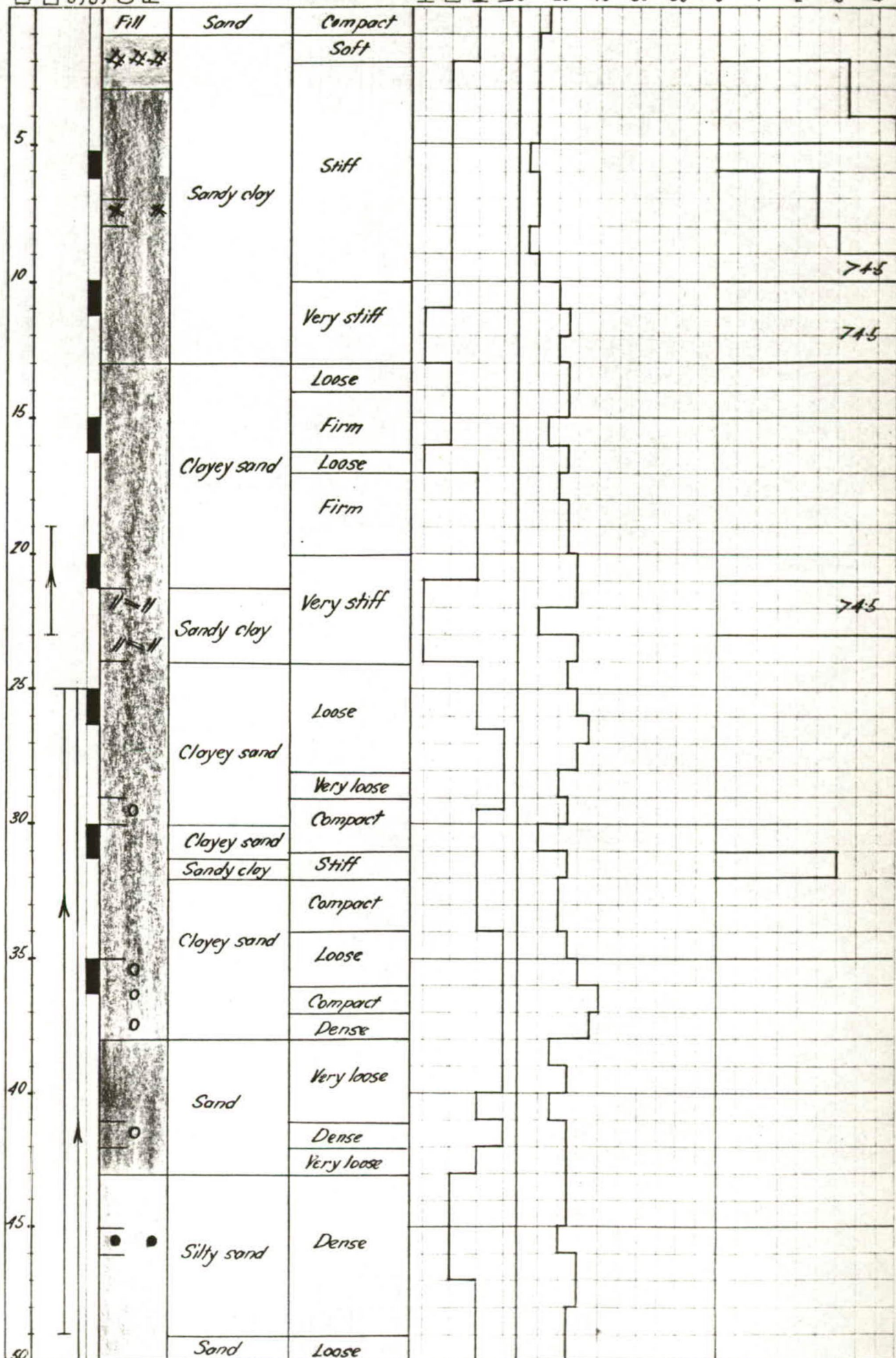
PENETRATION

TEXTURE CONDITION

Humid.
Damp.
Moist.
Wet.

Blows per foot.

PENETROMETER
Tons per sq foot.



LOG OF PHYSICAL PROPERTIES

Location **Naracoorte Silo Site**

Bore No. **2.**

Date: **7-11-63**

MOISTURE

PENETRATION

Depth below surface.
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES

TEXTURE CONDITION

Humid
Damp
Moist
Wet

Blows per foot
20 40 60 80

PENETROMETER
Tons per sq foot.
0 1 2 3 4

Depth below surface	Texture	Condition	Moisture	Penetration
	Sand	Loose		
		Very dense		
55				
60				
65				
70	Silty sand			
75		Compact		
80				
85				
	Sand			
	Silty sand			
90				
	End			
95				
100				

Line cemented lumps recorded from 43-90 feet

Plan No

S3532a
Kec

LOG OF PHYSICAL PROPERTIES

Location Naracoorte Silo Site

Bore No. 3

Date: 7.11.63

MOISTURE

PENETRATION

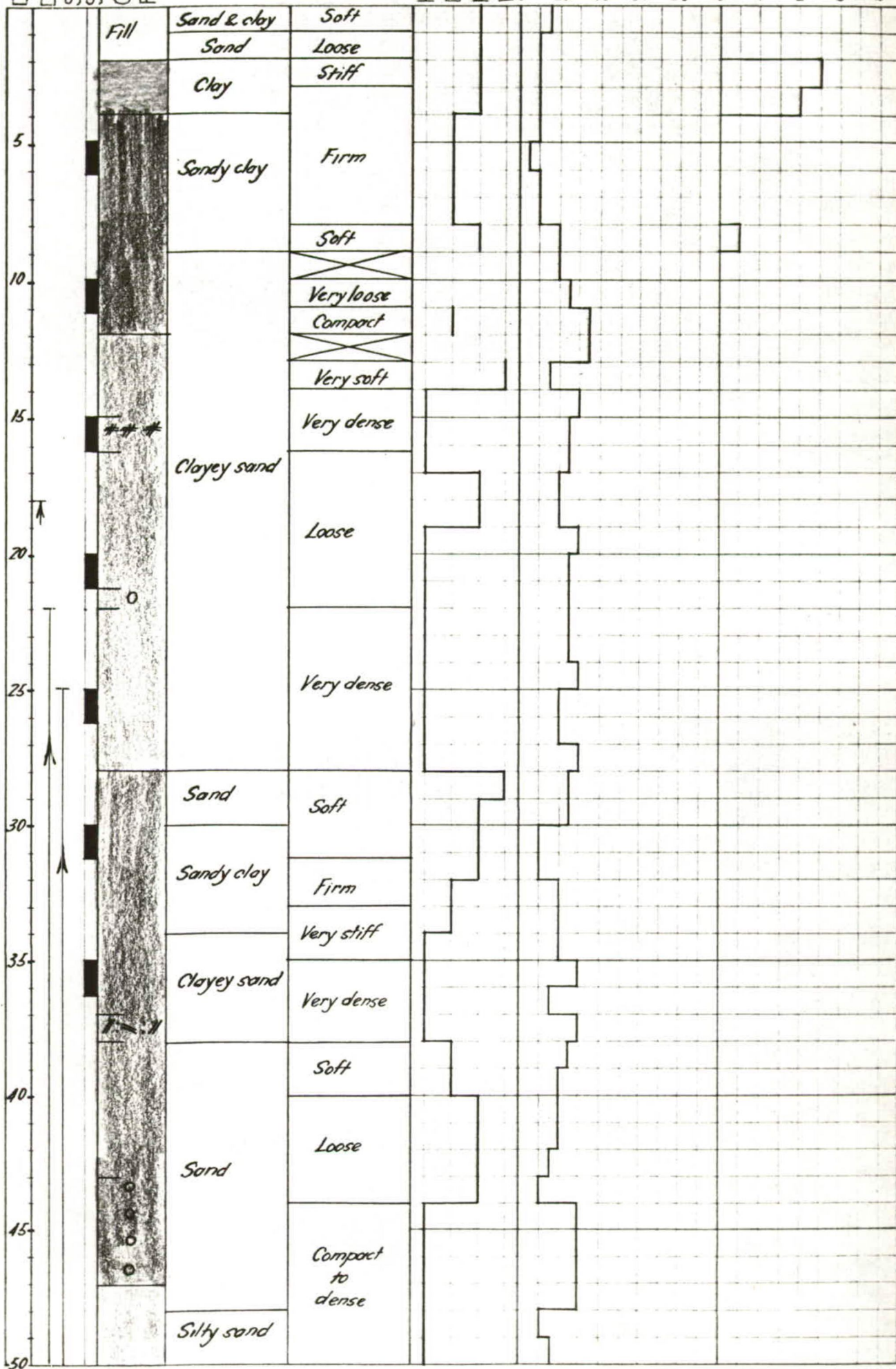
TEXTURE CONDITION

Humid. Damp. Moist. Wet.

Blows per foot.

PENETROMETER
Tons per sq foot.

Depth below surface.
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES



LOG OF PHYSICAL PROPERTIES

Location **Naracoorte Silo Site**

Bore No. **3**

Date: **7 · 11 · 63**

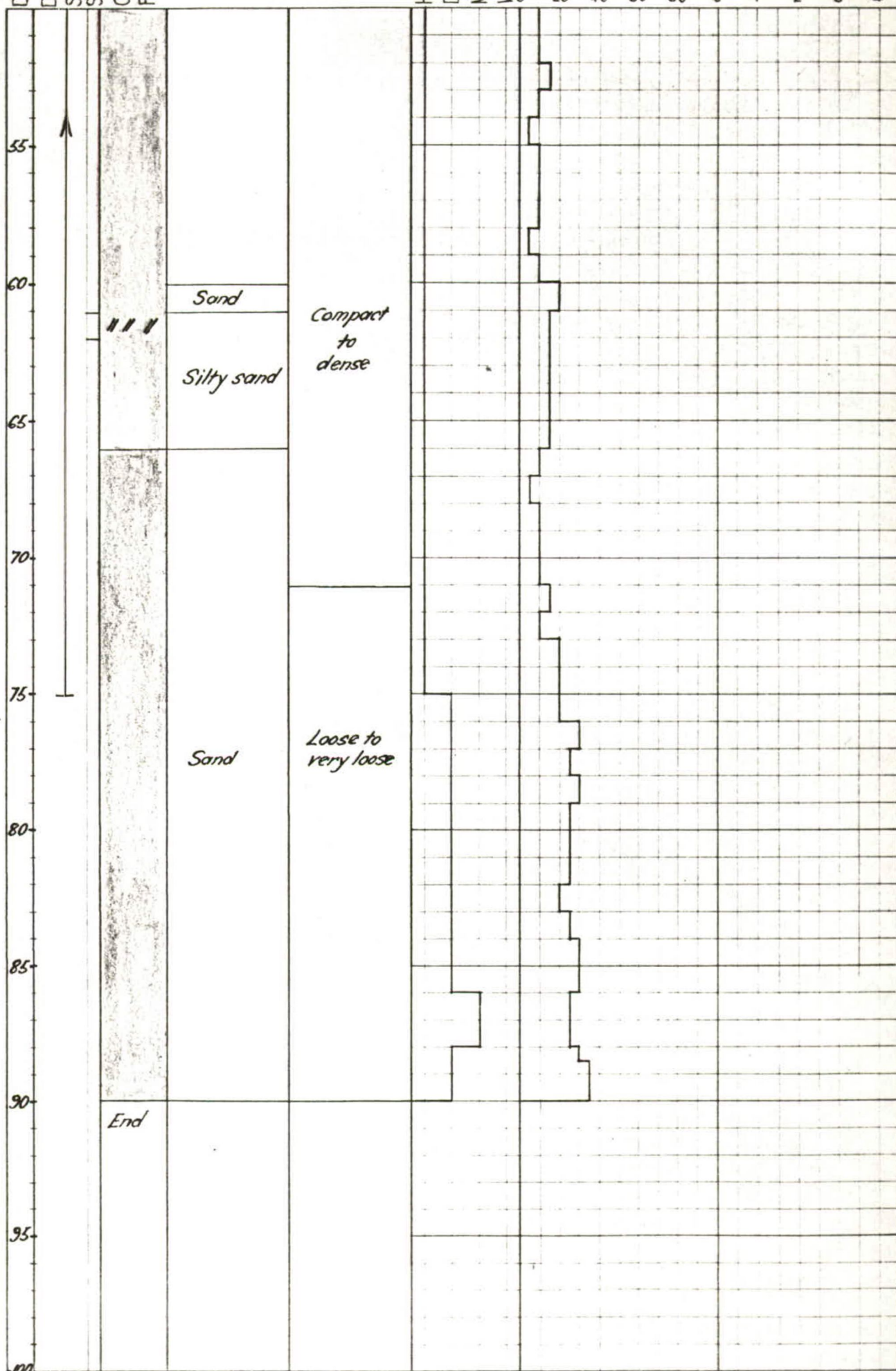
MOISTURE

PENETRATION

Depth below surface.
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES

TEXTURE CONDITION

Humid. Damp. Moist. Wet. 0 20 40 60 80 0 1 2 3 4
Blows per foot. PENETROMETER
Tons per sq foot.



LOG OF PHYSICAL PROPERTIES

Location Naracoorte Silo Site

Bore No. 4

Date: 7 · 11 · 63

MOISTURE

PENETRATION

Depth below surface.
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES.

TEXTURE CONDITION

Humid.
Damp.
Moist.
Wet.

Blows per foot.

PENETROMETER
Tons per sq foot.

Depth below surface (ft)	GEOLOGICAL FEATURES	TEXTURE	CONDITION	MOISTURE				PENETRATION				
				Humid.	Damp.	Moist.	Wet.	Blows per foot.				PENETROMETER Tons per sq foot.
								20	40	60	80	0 1 2 3 4
		Sandy clay	Compact									
			Stiff									
			Firm									
			Very stiff									
5		Clayey sand	Hard									
			Very dense									
			Dense									
10		Sand	Compact									
			Dense									
			Compact									
		Clayey sand	Very dense									
15		Clay	Firm									
		Clayey sand	Dense									
			Very stiff									
20		Clay	Soft									
			Stiff									
			Soft									
		Sand	Very soft									
25			Compact									
		Clayey sand	Dense									
			Firm									
			Compact									
30		Sand	Loose									
35		Clayey sand	Compact									
40		Sand	Loose									
			Very loose									
45		Clayey sand	Compact									
			Loose									
			Compact									
			Dense									
50			Compact									

Plan No

S3534
ke6

LOG OF PHYSICAL PROPERTIES

Location Naracoorte Silo Site

Bore No. 4

Date: 7-11-63

MOISTURE

PENETRATION

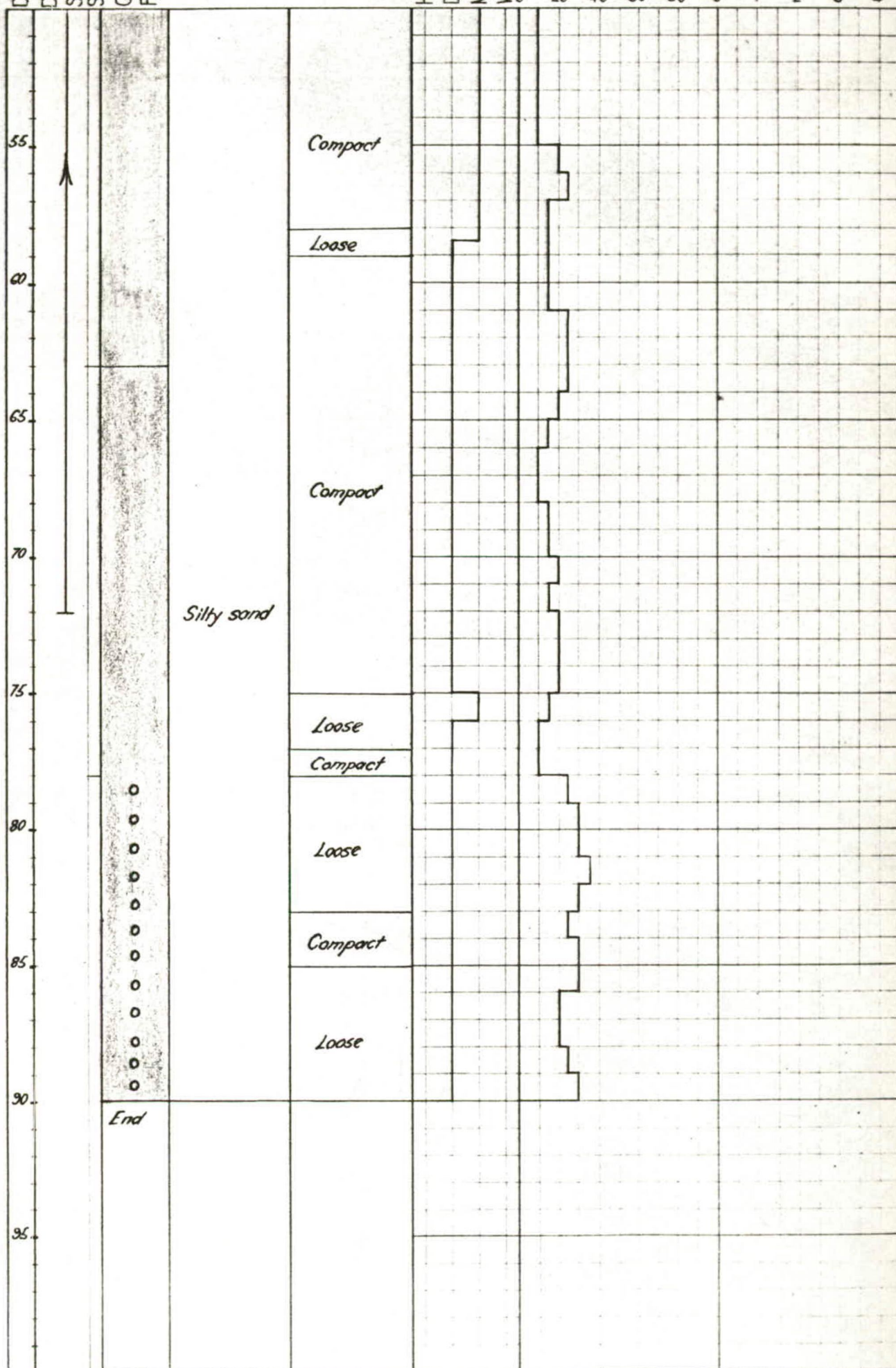
Depth below surface.
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES

TEXTURE CONDITION

Humid.
Damp.
Moist.
Wet.

Blows per foot.

PENETROMETER
Tons per sq foot.



LOG OF PHYSICAL PROPERTIES

Location Naracoorte Silo Site

Bore No. 5

Date: 7. 11. 63

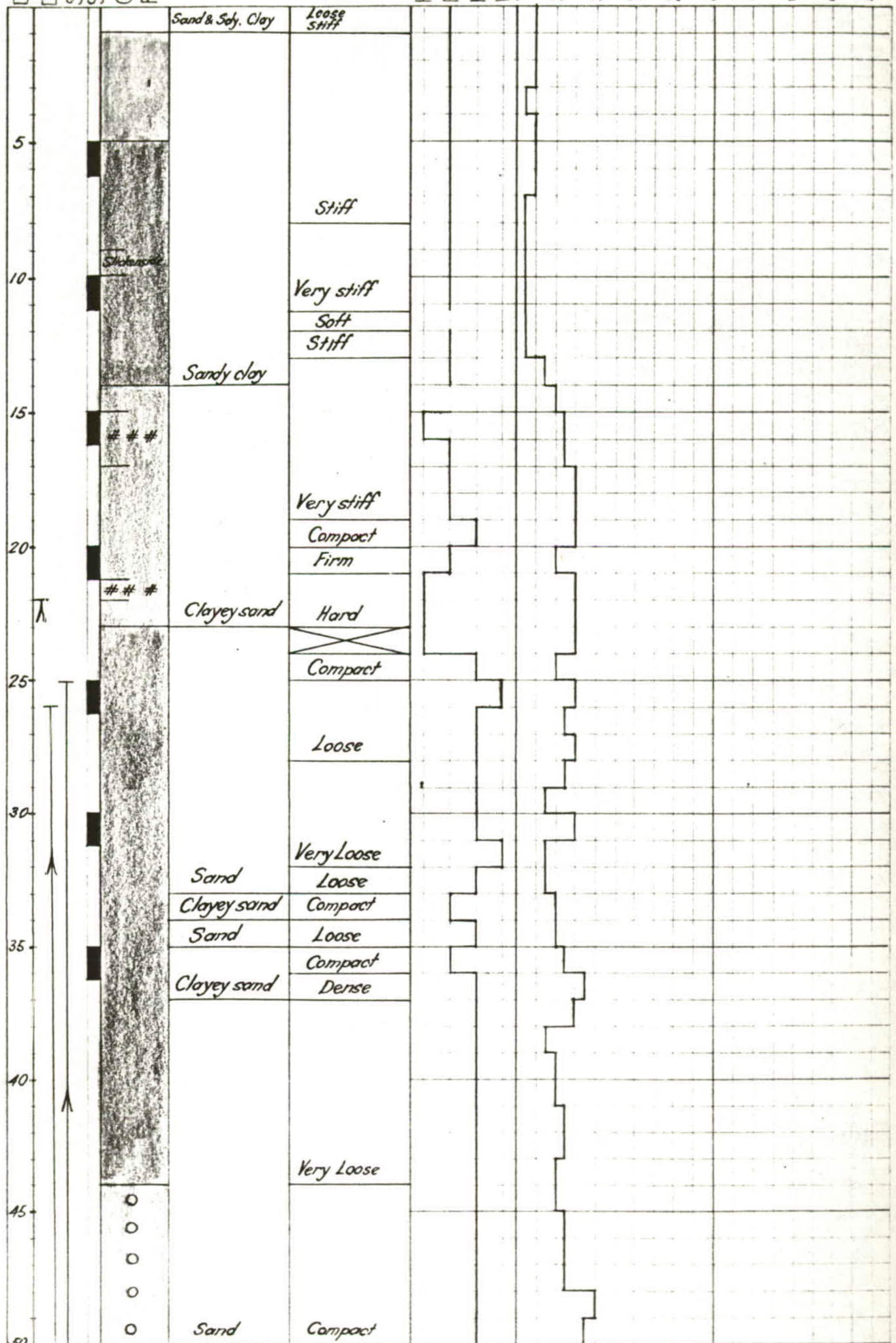
MOISTURE

PENETRATION

Depth below surface
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES

TEXTURE CONDITION

Humid. Damp. Moist. Wet. 0
Blows per foot. 20 40 60 80 0 1 2 3 4
PENETROMETER
Tons per sq foot.



Plan No.

S3535
Ke6

LOG OF PHYSICAL PROPERTIES

Location Naracoorte Silo Site

Bore No. 5

Date: 7 · 11 · 63

MOISTURE

PENETRATION

Depth below surface.
Depth water cut &
Static water level.
Sealed tube sample.
GEOLOGICAL
FEATURES

TEXTURE CONDITION

Humid.
Damp.
Moist.
Wet.

Blows per foot.

PENETROMETER
Tons per foot.

