DEPARTMENT OF MINES

SOUTH AUSTRALIA

GEOLOGICAL SURVEY

SOILS GEOLOGY SECTION

REPORT ON SITE INVESTIGATION

S.A. CO-OP. BULK HANDLING SITE

RAILWAY YARDS - MONARTO SOUTH

by

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D.M. 1228/62

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DEPARTMENT OF MINES
SOUTH AUSTRALIA

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INTRODUCTION

Two bores were put down at Monarto South in the Hundred of Monarto to test foundation conditions at a proposed silo site. The site is in the south-west quadrant of the Mobilong 1-Mile Sheet, Number 821, in Zone 6 of the Australian National Grid.

Bore No. 1 was put down to 63 ft. 3 ins. A sealed tube sample was taken at about 5 feet (see geological log), but other samples could not be collected successfully because the materials were too hard. Bore No. 2 was put down 50 ft. east of Bore No. 1 to a depth of 35 ft.

Maps showing locality and geology and a section showing lithologic correlation between bores, together with penetration data, are set out on the attached plate. Bore logs are contained in Appendix 1 and a preliminary note on the site is contained in Appendix 2.

STRATA PENETRATED AND FOUNDATION CHARACTERISTICS

The bores passed through non-indurated sediments of Pleistocene to Recent Age (the upper 6 feet or so being a layered soil) into schist bedrock belonging to the Kanmantoo Group of Cambrian age. The similarity of materials numbered 4, 9 and 13 in the two bores leads to a fourfold subdivision of the non-indurated sediments above the bedrock. The materials are described from top to bottom as follows:

Layered Soil

A thin layered sequence of limey and sandy clays falls within the zone of seasonal moisture variation. Of the clay layers, only that numbered 4 onthe section will be everywhere present below the site. The others will have an irregular distribution.

The limey clays numbered 3 and 4 will be weak when saturated. The clay layer numbered 7 has been subject to movement of some kind as revealed by planar structures with a dull sheen. Penetration figures are low throughout.

Light Grey and Red-Brown Mottled Sands and Clays

Most of this sequence (numbered 8, 9 and 10 on the section) is sand, but sandy clay occurs at the top (from 7 ft. 3 ins. to 9 ft. 3 ins.) and at the base of the sequence in Bore 1. In Bore 2 a clay underlies the sand from 18 ft. to 22 ft.

The clay in Bore 2 numbered 10 on the section has a fine prismatic structure between 19 and 20 feet which shows some potential for shrink and swell, and a platy structure between 21 and 22 feet which may indicate some shearing within the clay.

Penetration figures are high (about 70 blows/foot) for much of the sequence in Bore 1, and for the central part of the sequence in Bore 2.

Sand and Clay Beds 11 and 12

A soft, moist, bright yellow fine-grained sand occurs between 22 feet and 27 feet in Bore 2. This bed may overlie a light greenish clay penetrated between 24 feet 3 ins. and 30 feet 3 ins. in Bore 1.

Strong slickensides occur between 26 feet 3 ins. and 27 feet 3 ins. in the clay of Bore 2 indicating fairly strong shearing movements within the mass. Granular structure between 21 feet 3 ins. and 30 feet 3 ins. shows some potential for shrink and swell.

Mottled Fine-Grained Sands

Bed 11 is similar to Bed 13 and these sands may both be overlain by the clay of Bed 12. This alternative correlation makes for a much less symmetrical distribution of materials than is shown on the section.

Schist Bedrock of the Karmantee Group

Bedrock from 40 ft. 3 ins. to 43 feet 3 ins. is decomposed, but below this material the light grey quartz-mica schist is quite strong. Penetration figures are all uniformly high for the lower part, but pocket penetrometer readings of damp patches give figures less than 4.5 tons/square foot.

GROUNDWATER

Water was struck at 29 ft. and stands at 21 ft. in Bore 1. In Bore 2 water was struck at 22 ft. Two analyses of groundwater are known from an earlier Railways bore at Menarto Railway Station, these are 514.10 and 599.50 grains/gallon. The yield from the bore was reported to be 10,000 gallons/hour.

J. B. Firman
Officer-in- Charge
SOILS GEOLOGY SECTION

JBF:AGK
20/12/62

APPENDIX 1

BORE LOGS - MONARTO SOUTH SILO SITE

DEPARTMENT OF MINES
SOUTH AUSTRALIA

PERCUSSION TEST BORE NO. 1

LOCATION: MONARTO SOUTH **DOCKET:** 1228/62

HUNDRED: Monarto **SECTION:** Railway Yards

PURPOSE: Foundation Testing

HIRER: South Australian Bulk Handling Ltd.

NOMINAL BORE DIAMETER: 6 ins. **DRILLER:** A. Sturak

TOTAL DEPTH: 59 ft. 3 ins.

LOGGED BY: J.B. Firman

Depth From	Depth To	Description	Penetration Depth From	Penetration Depth To	Blows p/ft.	Unconfined Compressive Strength Tons Sq./ft.
0	1'	Light brown and reddish brown finely mottled sandy clay	0	1'	12	>4.5
1'	2'	Light yellowish brown limey clay	1	2'	9	2.5
2'	4'	Pale yellowish brown limey clay with old tree roots	2'	3'	12	1.5
			3'	4'	14	1.5
4'	7'3"	Light yellowish brown and pale brown mottled very sandy clay	Sealed Tube - 4'	5'3"	13	2.0
			5'3"	6'3"	9	3.5
			6'3"	7'3"	8	2.5
7'3"	9'3"	Light grey and dull red-brown coarsely mottled very sandy clay	7'3"	8'3"	12	4.5
			8'3"	9'3"	23	
9'3"	24'3"	Light grey, dull red-brown and yellow mottled fine sand, becoming light grey and clayey towards the base	9'3"	10'3"	38	
			10'3"	11'3"	85	
			11'3"	12'3"	63	
			12'3"	13'3"	71	
			13'3"	14'3"	65	
			14'3"	15'3"	79	
			15'3"	16'3"	64	
			16'3"	17'3"	62	
			17'3"	18'3"	60	
			18'3"	19'3"	62	
			19'3"	20'3"	66	
			20'3"	21'3"	63	
			21'3"	22'3"	73	
			22'3"	23'3"	66	
			23'3"	24'3"	54	
24'3"	30'3"	Light greenish grey sandy clay with fine light red mottling and banding. Yellow mottling lower. Strong slickenside at 26ft. 3 ins. to 27ft. 3 ins. Granular structure at 27ft. 3 ins. to 30ft. 3 ins.	24'3"	25'3"	30	>4.5
			25'3"	26'3"	36	"
			26'3"	27'3"	30	4.5+
			27'3"	28'3"	37	4.5+
			28'3"	29'3"	33	>4.5
			29'3"	30'3"	35	>4.5

Depth From	Depth To	Description	Penetration Depth From	Penetration Depth To	Blows	Unconfined Compressive Strength Tons/s.ft.
30'3"	38'3"	Light yellow and light red coarsely mottled fine-grained sand becoming medium-grained and somewhat clayey below 35 ft. 3 ins.	30'3"	31'3"	34	
			31'3"	32'3"	30	
			32'3"	33'3"	38	
			33'3"	34'3"	38	
			34'3"	35'3"	36	
			35'3"	36'3"	34	
			36'3"	37'3"	34	
			37'3"	38'3"	34	
38'3"	40'3"	Light brown and grey coarsely mottled clayey fine sand with scattered fine quartz gravel in the lower feet.	38'3"	39'3"	34	
			39'3"	40'3"	42	
40'3"	43'3"	Light yellow and yellowish-brown decomposed schist.	40'3"	41'3"	37	4.0
			41'3"	42'3"	20	>4.5
			42'3"	43'3"	31	>4.5
43'3"	59'3"	Light grey and light yellowish grey quartz-mica schist (originally a clayey siltstone). Some damp patches of this layered material are less than 4.5. Dip of schistosity near vertical	43'3"	44'3"	35	
			44'3"	45'3"	53	
			45'3"	46'3"	77	
			46'3"	47'3"	75	
			47'3"	48'3"	82	
			48'3"	49'3"	86	
			49'3"	50'3"	85	
			50'3"	51'3"	87	
			51'3"	52'3"	91	
			52'3"	53'3"	88	
			53'3"	54'3"	84	
			54'3"	55'3"	83	
			55'3"	56'3"	89	
			56'3"	57'3"	88	
			57'3"	58'3"	87	
			58'3"	59'3"	88	
			59'3"	60'3"	90	
		END OF BORE AT 59'3"	60'3"	61'3"	94	
			61'3"	62'3"	98	
			62'3"	63'3"	98	

Values for unconfined compressive strength slightly higher than the limit of the pocket penetrometer are shown as +

PERCUSSION TEST BORE NO. 2

LOCATION: Menarte South **DOCKET:** 1228/62

HUNDRED: Menarte **SECTION:** Railway Yards

PURPOSE: Foundation Testing

HIRER: South Australian Bulk Handling Ltd.

DRILLER: A. Sturak

NOMINAL BORE DIAMETER: 6 ins.

TOTAL DEPTH: 35 ft.

DATE COMMENCED: **DATE COMPLETED:**

LOGGED BY: J. B. FIRMAN

Depth From	Depth To	Description	PENETRATION Depth From	PENETRATION Depth To	PENETRATION Blows p/ft.	Unconfined Compressive Strength Tons/sq.ft.
0	1'	Light red-brown limey clay with abundant soft limey nodules. Fill in part.	0	1	15	>4
1'	3'	Pale brown fine sandy limey clay with small hard angular nodules of lime	1	2'	9	≤0.5
			2	3'		
3'	4'	Pale brown fine sandy clay with scattered rounded granules of ferruginous sandstone	3	4'	10	2
4'	5'	Pale brown and brown finely mottled sandy clay with scattered particles of ferruginous fine gravel.	4	5'	9	1.5
5'	6'	Ditto with small planar faces with a dull sheen	5	6'	12	4.5
6'	18'	Light grey and dull red coarsely mottled fine sand. Sandy clay from 6 to 8 ft., and very clayey sand from 17 to 18 ft. 8 to 15 ft. friable.	6	7'	15	4.5+
			7	8'	20	
			8	9'	30	
			9	10'	45	
			10	11'	65	
			11	12'	67	
			12	13'	69	
			13	14'	82	
			14	15'	82	
			15	16'	72	
			16	17'	68	
			17	18'	54	
18'	22'	Light grey clay with red mottling between 20 and 21 ft. and yellow mottling between 21 and 22 ft. A fine prismatic structure with a dull sheen on structure faces is present between 19 and 20 ft. and a platy structure occurs between 21 and 22 ft.	18	19'	33	
			19	20'	30	4.5
			20	21'	24	4.5
			21	22'	29	2.5

Monarto South Bore 2 (contd.)

Depth From	Depth To	Description	Penetration Depth From	Penetration Depth To	Penetration Blows p/ft.	Unconfined Compressive strength Tons sq/ft.
22'	27'	Fine sand. Bright yellow between 22 and 23, becoming mottled with pale brown lower. Soft and moist throughout.	22	23'	28	
			23	24'	27	
			24	25'	31	
			25	26'	33	
			26	27'	32	
27'	35'	Light yellow and dullylight red coarsely mottled fine sand. Soft and moist throughout.	27	28'	30	
			28	29'	30	
			29	30'	24	
			30	31'	-	
			31	32'	29	
			32	33'	27	
			33	34'	26	
			34	35'	28	

END OF BORE AT 35'.

APPENDIX 2

MONARTO SOUTH SILO SITE

PRELIMINARY NOTE

D.M. 1228/62

PRELIMINARY NOTES ON SILO SITE INVESTIGATION

- MONARTO SOUTH -

HD. MONARTO, MOBILONG 1-MILE SHEET

The site was briefly visited on 25.7.62, in order to assess the drilling conditions and to peg drilling sites.

Two drilling sites were pegged 50 ft. apart, each 25 ft. from the centre mark as given by S.A.C.B.H. Ltd. plans. The pegs are 4 ft. out from the mouse-proof wall.

There are no bores known nearby and the subsurface conditions are not known to depth. Shallow diggings suggest that clays occur down to at least 6 ft. It is probable that the area is underlain by Kanmantoo Group metamorphosed sediments of the Eastern Mount Lofty Ranges. These sediments may include micaceous sandstones and greywacke. It is possible that these sediments occur at shallow depth at the site.

The area is nearly flat but very low gently undulating hills do occur.

There is a record of a railways bore at Monarto Railway Station but no log is available. There is mention of two analyses of groundwater, 514.10 and 499.50 grains per gallon.

The area is covered by three aerial photographs. These are Mobilong, Run 3, Nos. 9267, 9268 and 9269.

If soft drilling conditions continue to some depth, it is proposed to drill the first bore to 65 ft., taking sealed tube samples at 5, 10, 15, 20, 25 and 35 ft. Depending on the results of drilling the first hole and discussion with Mr. Corbet, it may not be necessary to take sealed tube samples in the second hole or to drill the second hole to full depth.

If firm, relatively unweathered bedrock is penetrated within 15 to 20 ft. from the surface in the first bore, it would then be appropriate to drill two additional bores to shallow depth to confirm these occurrences. The three bores could be situated about 50 ft. apart in a triangular pattern.

RIC:EMD
31/7/62

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