DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT.BK.NO. 81/33
NITSCHKE'S SAND DEPOSIT, MOUNT COMPASS, SECTIONS 205, 206, HUNDRED OF NANGKITA

GEOLOGICAL SURVEY

by

J.T. VALENTINE

DME.90/81

FRONTISPIECE - February 1980.

Westerly view of spur showing Council gravel workings at top left with mantle of recent aeolian sand centre and right. Landrover parked near drillhole MCP3. Slide No.'s 15844, 15845, 15846.

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FRONTISPIECE: February, 1980. Westerly view of spur showing Council gravel workings at top left with mantle of Recent aeolian sand centre and right. Landrover parked near drillhole MCP3.

Slide No's 15844, 15845, 15846.

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NITSCHKE'S SAND DEPOSIT, MOUNT COMPASS SECTIONS 205, 206 HUNDRED NANGKITA

ABSTRACT

Reserves of Permian sand in excess of 2.0 million tonnes have been indicated by drilling 5 auger holes southwest of Mount Compass.

Most of the sand is too fine grained for structural concrete, and is unsuitable for glass and foundry use.

Some of the sand is suitable for use as packing sand, and most would be suitable for use as garden soil after addition of organic matter.

A possible base to the deposit was reached in only one hole and further drilling is required to fully evaluate the area.

INTRODUCTION

Following a request from Mr. R.J. Maslin, a sand deposit on sections 205 and 206 hundred Nangkita was inspected by J.G. Olliver (Supervising Geologist) and the author on 31 January 1980. Seven exploratory auger holes (MCP1-7), drilled by Monier Sands, were sited and logged by the author on 6 and 7 February 1980, and stadia surveyed with R.J. Harris (Technical Officer) on 13 February 1980. Samples were submitted to the Australian Mineral Development Laboratories (AMDEL) for sieving and evaluation for use as foundry, glass and garden sand.

LOCATION AND LAND USE

The deposit forms a broad northerly-trending ridge within an east-west hill located 2 km southwest of the township of Mount Compass, 55 km south of Adelaide (Fig. 1). Access is from Has Kett Road which runs westerly from the Adelaide-Victor Harbour road 1.6 km south of Mount Compass. A farm track leaves the

northern side of Has Kett road 900 m west of the Victor Harbour road and is followed for about 2 km to the top of the hill. This track is barely negotiable to conventional vehicles for 650 m beyond the dairy (Fig. 2).

The land is under Interim Development Control within the District Council of Port Elliot and Goolwa in the Outer Metropolitan Planning Area.

The property is used for dairying. Vegetation within the claim is mainly bracken fern, yacca and tea tree bushes with eucalypts along the watercourses (Pl. 1). A garden sand pit working similar material to that within the lease is located 2 km to the north (Valentine, 1979). Gravel for roadmaking has been removed from the hilltop by the Council.

MINERAL TENURE AND PRODUCTION

The property is perpetual leasehold land in the name of H.A. Nitschke of Mount Compass. Mineral Claim 1223 of 20 ha was registered for R.J. Maslin on 18 February 1980. Extractive Mineral Lease 4874 was granted for 7 years on 24 September 1980. No sand was mined from the deposit prior to granting the current lease, but an estimated 50 000 tonnes of gravel for road building was removed from the top of the hill by the council prior to exhaustion of reserves in 1966.

GEOLOGICAL SETTING

Regional geology as shown on Milang (Horwitz and Thomson, 1960) and BARKER (Thomson and Horwitz, 1962) is summarised on Figure 1.

The area is underlain by reworked Permian glacial and fluvioglacial deposits (Howchin, 1910) which extend over a wide area of Fleurieu Peninsula between Strathalbyn and Cape Jervis. These overlie Cambrian and Adelaidean rocks, which form prominent inliers within the glacial sediments.

The glacials comprise variably indurated sand and sandstone with gravel interbeds containing rounded, sometimes striated pebbles and boulders up to 40 cm diameter, overlying a basal clay sequence with minor interbedded sands. The sand is overlain by up to 0.5 metres of sandy soil, and has undergone aeolian reworking where the soil has been removed. Gravel beds and lenses of ferruginised sandstone form erosion-resistant residual cappings on small hills.

SITE GEOLOGY

The lease is underlain by reworked Permian fluvioglacial deposits comprising clean to slightly clayey, fine to medium grained subrounded to subangular quartz sand. Pale grey clayey sand at about 15 m in drillhole MCP1 forms a possible base to the deposit but was not intersected elsewhere. A thin bed of rounded gravel has resisted erosion, and forms a residual cap to an east-west hill containing a northerly-trending spur.

A cover of sandy soil, elsewhere up to 0.5 m thick, has been removed by prevailing winds from the spur between drillholes MCP1 and 4 spreading pale yellow aeolian sand for 150-200 m to the east (Frontispiece). This eastern flank of the spur is clearly visible from the Adelaide-Victor Harbour road 1.7 km to the east.

DRILLING AND TESTING

Seven holes averaging 11.5 m were sited by the author, drilled by Monier with a tractor-mounted Proline 'K' auger (Pl. 1) and logged and sampled on site at 1.8 m intervals. Five holes were drilled along the northerly-trending spur with two holes on the western flank. Only the first hole reached clayey sand which forms a possible base to the deposit. Hole locations are shown on Figure 3 and logs comprise Appendix B.

Results of sieving by AMDEL of twenty four composite samples are tabulated and plotted in Appendix C.

The size grading of the samples is summarised in Appendices B & C by the Fineness Modulus (FM) which is defined in Appendix D. FM is calculated here from the plus 200 mesh sample which excludes silt and clay. Hence, "fines", content must also be quoted when assessing suitability for construction sand.

Nine samples were tested using standard American Foundrymen's Association (AFS) procedures for glass and foundry sand and eight samples were tested according to AS2223-1978 for garden soils. Results are included in Appendices E and F respectively.

SAND QUALITY

Construction Sand

Specifications for construction sand are summarised graphically in Appendix A. Construction sand conforming to Australian Standard 1465-1974 for natural fine aggregates has an F.M. between 1.35 and 4.00 with Fines content less than 5%. Sands containing up to 30% Fines are upgraded to this specification by washing. The mortar sand specification A123-1963 allows up to 10% Fines, and all grades of plastering sand require less than 10% passing 100 mesh (150 microns). Most grades of structural concrete however, require natural sands with an F.M. higher than 2.0; e.g. the E. & W.S. specification DS3-1974 has limits of 2.20 and 3.45 (Appendix A). The E. & W.S. Department specifications for packing sand require no material coarser than 4.75 mm and not more than 5% passing 200 mesh.

Table 1 summarises the suitability of samples for construction purposes. The material in MCP1-4 is suitable with blending for fine construction sand and mortar sand. However, of

the twenty four samples tested only four have an F.M. greater than 2.0 and none will meet specification DS3-1974. The sample from MCP2, 6.40-11.0 m, for example, has the highest F.M. of 2.23, but contains too little minus 14, plus 25 mesh sand to meet DS3-1974.

Sand from MCP1-5 meets E. & W.S. packing sand specifications without washing.

Garden Sand

In the terms of AS2223-1978, the samples may be classified as moderately acid coarse (light) garden sand, except for MCP6 and 7 samples, which tend towards a medium texture of higher acidity. Provided 0.1-0.9% organic matter is added, the sand would be suitable for general purpose soil, top soil or top dressing (see Appendix F). Some dry screening of "stones" would be required for strict adherence to the standard.

Foundry and Glass Sand

None of the nine samples tested is suitable for glass or foundry use without beneficiation (Appendix E). All samples contain too much iron for glass manufacture and none meets the size distribution requirements. All but two of the samples are too poorly sorted for foundry use, being $4^1/2$ or $5^1/2$ screen sands. The two better sorted samples MCP1, 0-1.83m and MCP2, 3.66-6.40m, together with MCP2 1.83-3.66m and MCP6, 2.74-4.57m have high AFS clay contents.

RESERVES

A base to the deposit, represented by a change to pale grey clayey sand was reached in only MCP1. A total of 2.0 million tonnes are indicated to a depth of 10 m over 11.6 ha of EML 4874to the west of the broad spur defined by drillholes MCP 1-5. Workings to the west of this ridge line would not be visible

from the Adelaide-Victor Harbour road.

CONCLUSIONS

1. The deposit contains sand suitable for mortar, for some plastering applications and for fine concrete sand. However, no coarse grained concrete sand was intersected which would meet E & WS. specification DS3-1974 and the deposit is therefore of limited suitability for construction purposes.
2. The sand requires addition of organic matter to conform with AS2223-1978 for garden soil, but is otherwise suitable.
3. Approximately 80% of the sand intersected meets E & WS packing sand specifications.
4. The raw sand is unsuitable for either glass or foundry use.
5. Workings will not be visible from the Adelaide-Victor Harbour road if confined to the western half of the lease.
6. Reserves of 2.0 million tonnes are indicated to a depth of 10m within the western half of EML 4874. Further drilling will be needed to fully evaluate the deposit.

J.T. VALENTINE

Geologist.

REFERENCES

Horwitz, R.C. and Thomson, B.P., 1960. Milang map sheet, Geological Atlas of South Australia, 1:63 360 series. Geol. Surv. S. Aust.

Howchin, Walter, 1910. Description of a New and Extensive Area of Permo-Carboniferous Glacial Deposits in South Australia. Trans. R. Soc. S. Aust., XXXIV: 231-247.

Thomson, B.P. and Horwitz, R.C., 1962. BARKER map sheet, Geological Atlas of South Australia, 1:63 360 series. Geol. Surv. S. Aust.

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TABLE 1
SUITABILITY FOR CONSTRUCTION PURPOSES

Hole No.	Interval (m)	F.M.	Fines %	QUALITY					
				Concrete (AS1465-1974)	E.&WS Concrete (DS3-1974)	Mortar (A123-1963)	Plaster (CA27-(1959)	E.&WS Packing	Filling
MCP1	0-1.83	1.95	6	W	-	*	W	-	*
	1.83-3.66	1.98	3	*	-	*	*	*	*
	3.66-9.15	1.89	2	*	-	*	*	*	*
	9.15-12.8	1.82	2	*	-	*	*	*	*
	12.8-16.5	2.01	3	*	-	*	*	*	*
MCP2	0-1.83	1.41	7	-	-	-	-	*	*
	1.83-3.66	1.64	5	-	-	-	-	*	*
	3.66-6.40	1.79	3	*	-	*	*	*	*
	6.40-11.0	2.23	4	*	-	*	*	*	*
MCP3	0-5.49	1.56	2	*	-	*	*	*	*
	5.49-7.32	2.08	3	*	-	*	-	-	*
	7.32-8.23	1.85	3	*	-	*	-	-	*
MCP4	0-0.91	1.23	3	-	-	-	-	*	*
	0.91-8.23	1.43	2	*	-	*	-	*	*
	8.23-16.5	1.55	3	*	-	*	*	*	*
MCP5	0-1.83	1.42	5	-	-	-	-	*	*
	1.83-11.9	1.34	4	-	-	-	-	*	*
	11.9-14.6	1.27	5	-	-	-	-	*	*
MCP6	0-2.74	1.83	12	W	-	W	-	-	*
	2.74-4.57	0.95	9	-	-	-	-	-	*
MCP7	0-0.91	1.60	7	-	-	-	-	-	*
	0.91-1.83	1.51	7	-	-	-	-	-	*
	1.83-4.57	2.02	17	-	-	-	-	-	*
	4.57-9.15	1.70	10	*	-	*	*	-	*

* suitable
W suitable after washing
- not suitable

PLATE 1: February, 1980. Proline auger at MCP5 looking northeasterly.

Slide No.: 15847

APPENDIX A

Australian Standard Specifications

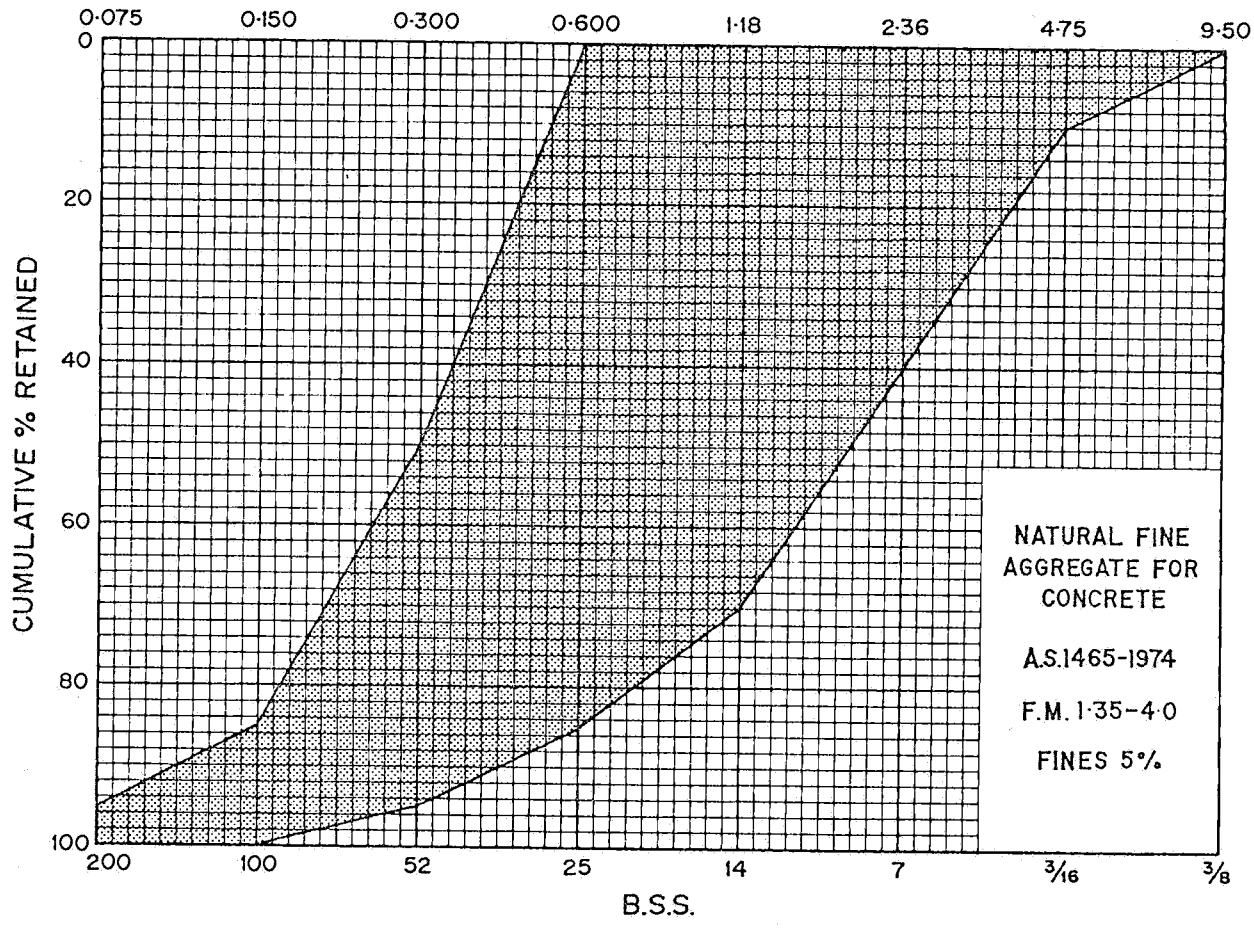
AS 1465-1974. Natural Fine Aggregates for Concrete

AS A123-1963. Mortar For Masonry Construction

AS CA27-1959. Internal Plastering on Solid Backgrounds.

Engineering and Water Supply Department Specifications

DS3-1974. Fine and Coarse Aggregates for Concrete.
Packing Sand.


0·075
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2·36
4·75
9·50
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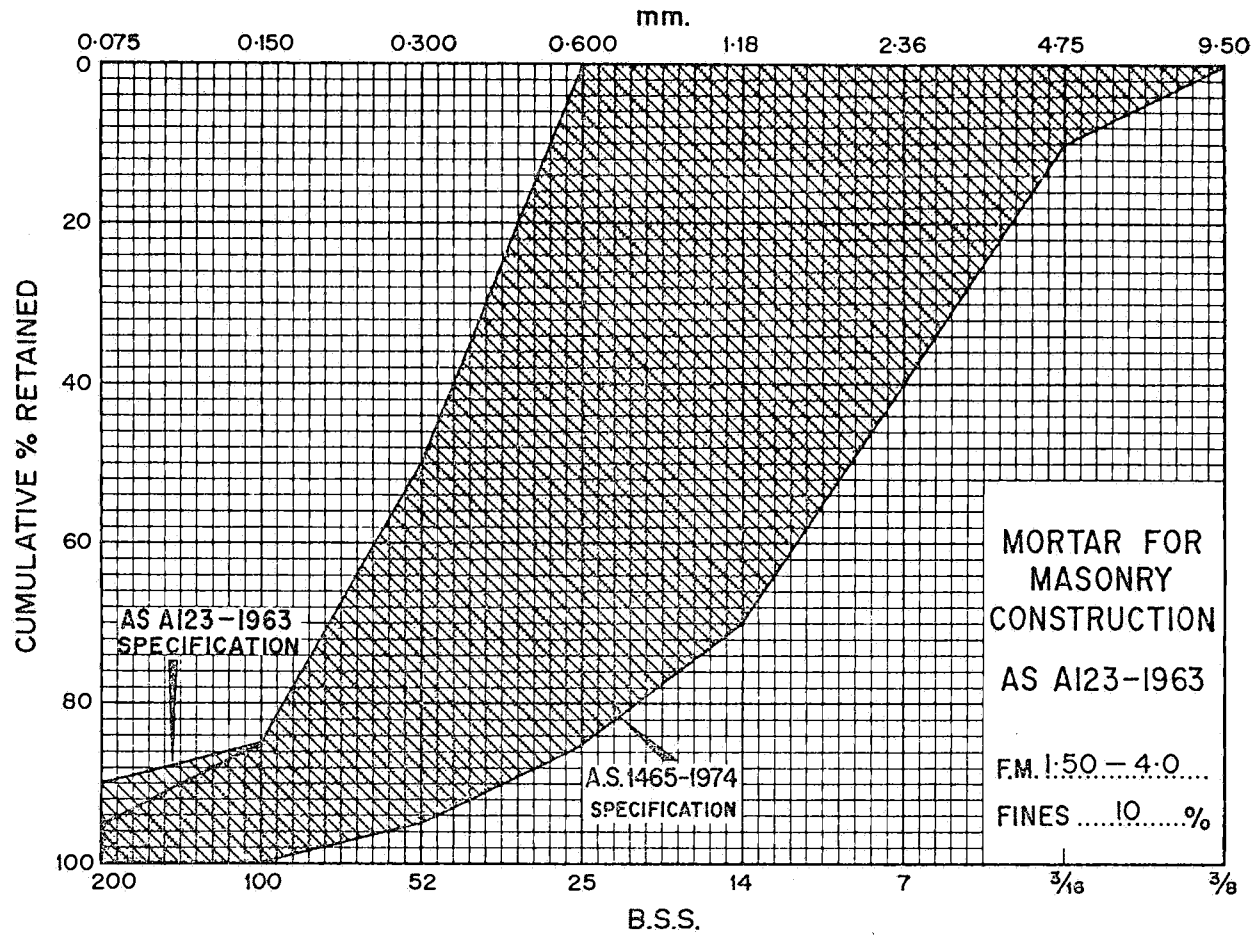
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
NATURAL FINE AGGREGATE FOR CONCRETE
A.S.1465-1974
F.M. 1·35–4·0
FINES 5%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AS A123–1963
SPECIFICATION
A.S.1465–1974
SPECIFICATION
MORTAR FOR
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CONSTRUCTION
AS A123–1963
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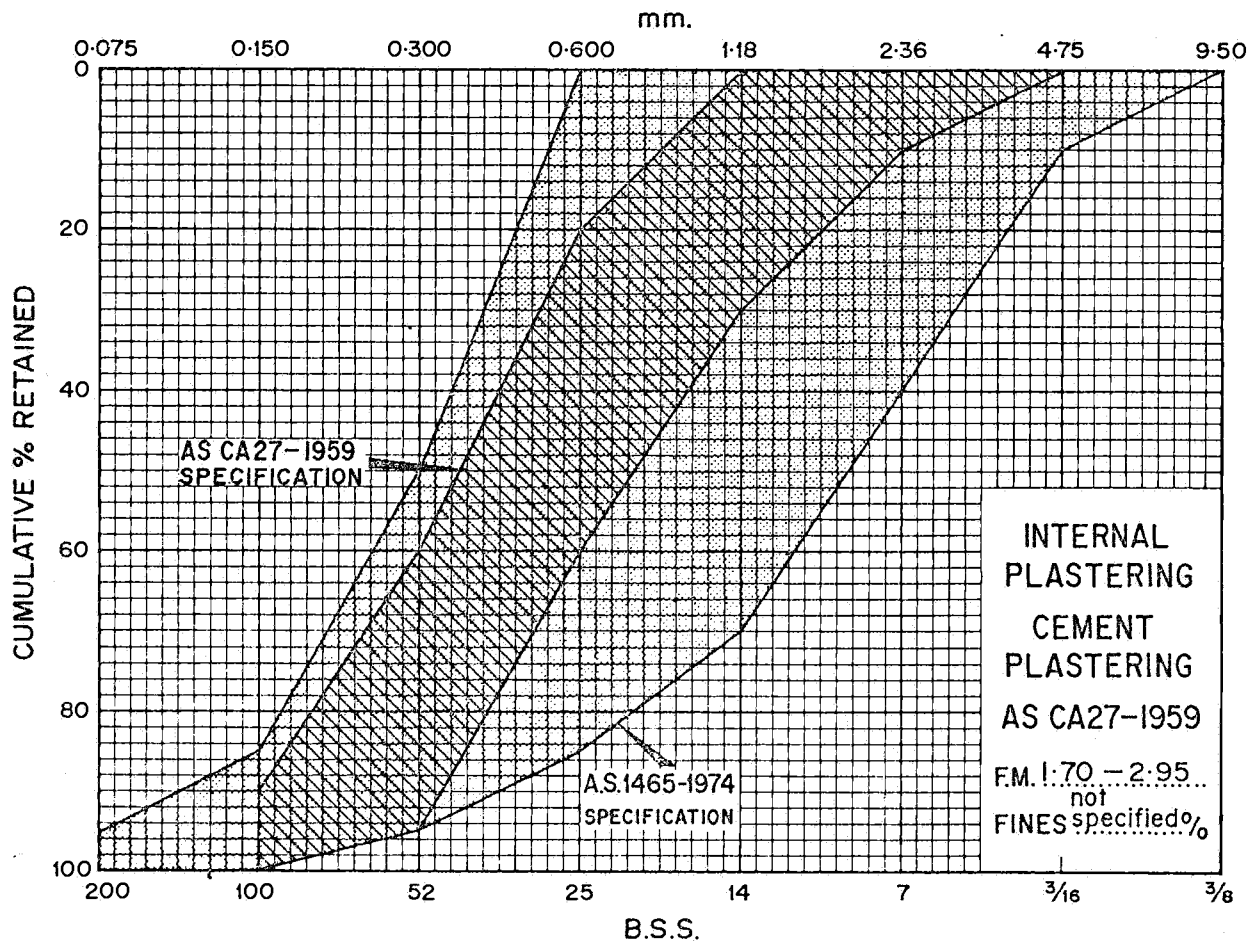
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CUMULATIVE % RETAINED
AS CA27–1959
SPECIFICATION
A.S.1465–1974
SPECIFICATION
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PLASTERING
AS CA27–1959
F.M. 1:70 – 2:95
FINES not specified %
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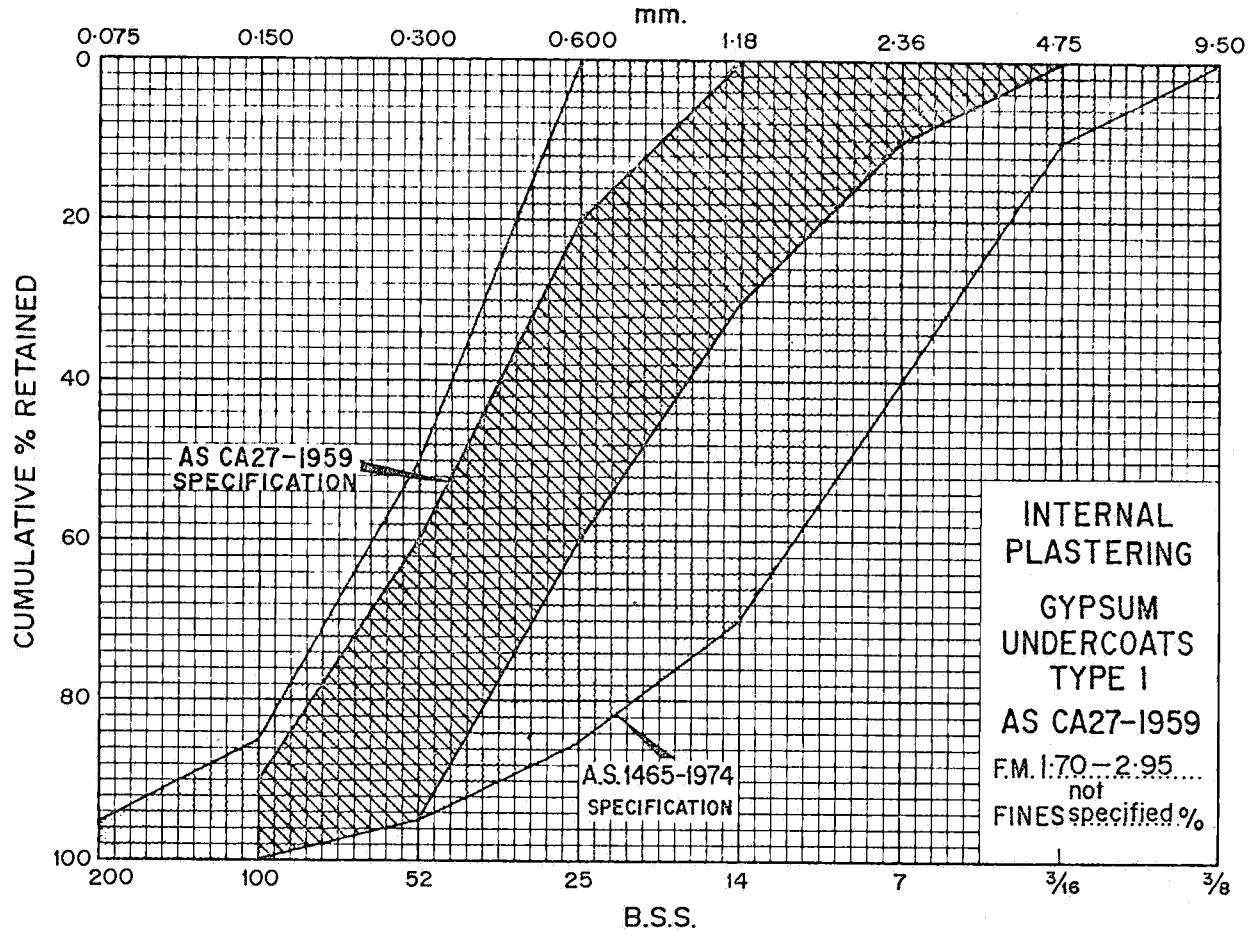
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CUMULATIVE % RETAINED
AS CA27–1959 SPECIFICATION
A.S.1465–1974 SPECIFICATION
INTERNAL PLASTERING
GYPSUM UNDERCOATS TYPE 1
AS CA27–1959
F.M. 1·70 – 2·95
FINES not specified %
200
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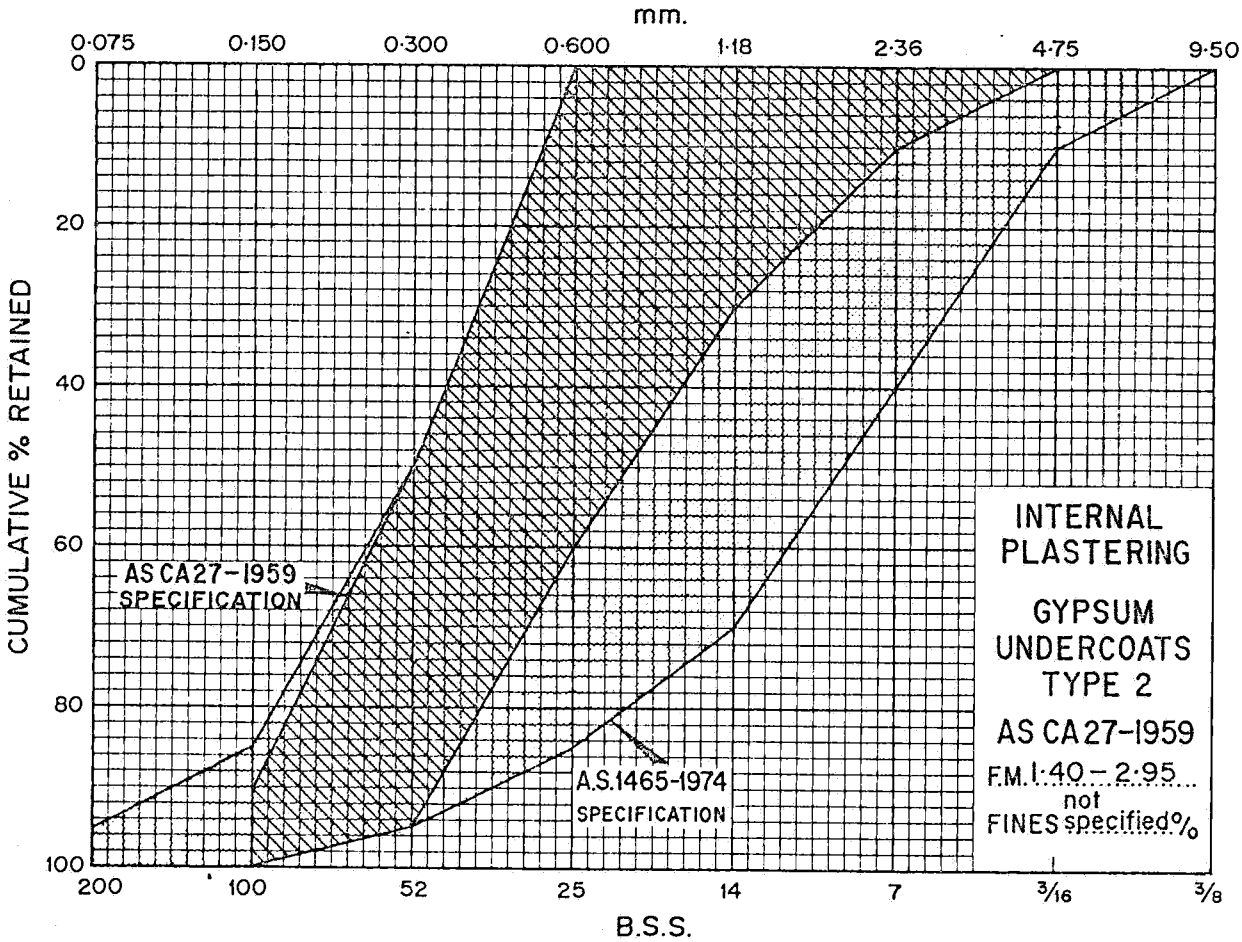
B.S.S.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CUMULATIVE % RETAINED
AS CA27–1959 SPECIFICATION
A.S.1465–1974 SPECIFICATION
INTERNAL PLASTERING
GYPSUM UNDERCOATS TYPE 2
AS CA27–1959
F.M. 1·40 – 2·95
FINES not specified %
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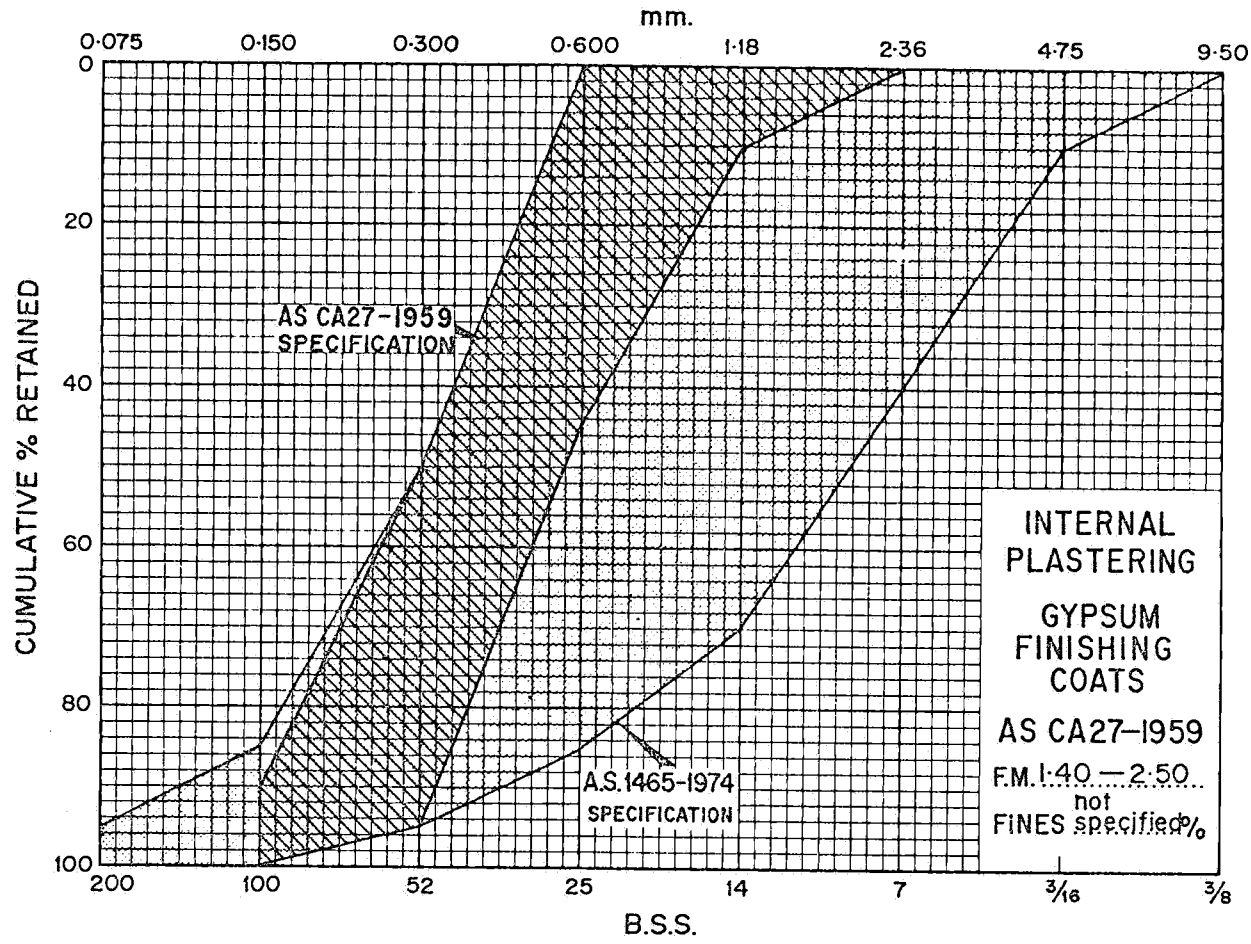
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CUMULATIVE % RETAINED
AS CA27-1959
SPECIFICATION
A.S.1465-1974
SPECIFICATION
INTERNAL
PLASTERING
GYPSUM
FINISHING
COATS
AS CA27-1959
F.M. 1·40 — 2·50
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FINES specified%
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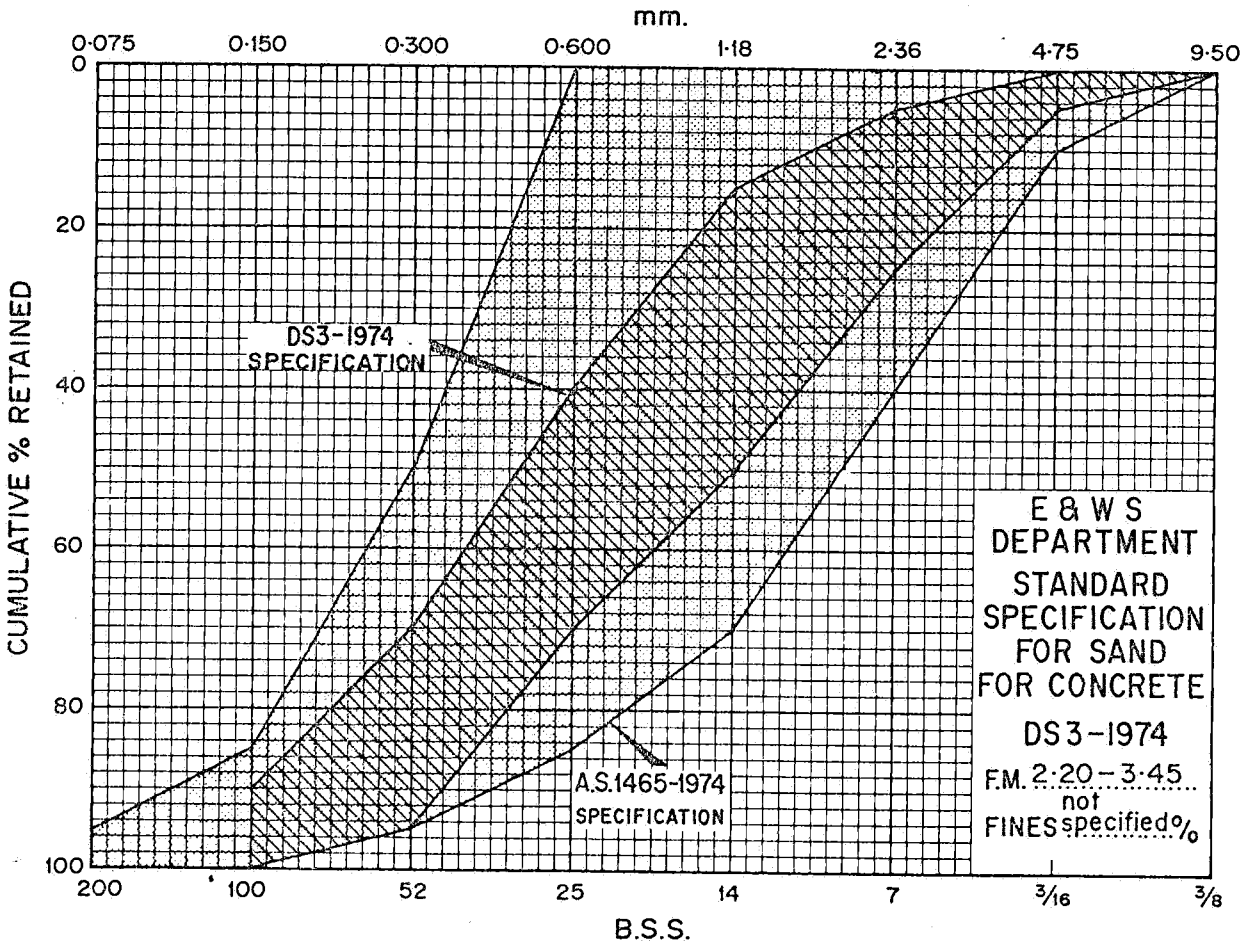
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CUMULATIVE % RETAINED
DS3-1974
SPECIFICATION
A.S.1465-1974
SPECIFICATION
E & W S
DEPARTMENT
STANDARD
SPECIFICATION
FOR SAND
FOR CONCRETE
DS3-1974
F.M. 2·20 — 3·45
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FINES specified%
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3/16
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B.S.S.

ENGINEERING AND WATER SUPPLY DEPARTMENT

STANDARD SPECIFICATION for PACKING SAND

(Edition January 1977)

1. QUALITY OF MATERIAL

The sand shall be obtained from pits, sand dunes or from the crushing of limestone or other rock for concrete aggregates, and be free, to the satisfaction of the supervising Engineer, (Sewerage), from lumps, rocks and injurious amounts of organic matter.

The sand shall be free from dangerous and noxious weeds as proclaimed in South Australia, by regulations under the Weeds Act 1956-1969 with amendments, and shall be non-plastic and resonably well-graded in accordance with Table 1 of this Specification.

TABLE 1

Seive Size (AS1152-1973)	4.75 mm	75 um
Percentage Passing	100	0-5

2. SAMPLES

A 25 kg sample of packing sand shall be submitted with each Tender and sent to the Supervising Engineer, (Sewerage) Sewerage Depot, East Terrace, Thebarton, for the attention of the Materials and Field Testing Laboratory, Each sample shall be clearly marked with the following information:

a. Specification
b. Type of material
c. Name of Tenderer
d. Origin of Supply

Testing of samples will be in accordance with AS1141-1974 Sections 11 and 12 respectively.

The sample of the successful tenderer will be retained by the Supervising Engineer, (Sewerage), for reference throughout the Contract.

3. REJECTION

Any material that is not of the required quality or grading, or is in any other way not in accordance with this Specification, will be rejected, and shall be removed from the worksite or stockpile by the Supplier at his own expense within the period prescribed by the Supervising Engineer (Sewerage). Material having a moisture content greater than 8 per cent will not be acceptable.

No payment will be made for such rejected materials.

4. DELIVERY

The material shall be delivered where and when required, and in accordance with the Standard Cartage Rates approved by the Supply and Tender Board.

APPENDIX B

GEOLOGICAL LOGS OF PROLINE AUGER HOLES

DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA

PROJECT MT. COMPASS Sand....

CONSTRUCTION SAND SURVEY
LOG OF ROTARY DRILL HOLE

HOLE Nº MCP1...
RIG Rotary.....
SAMPLE Auger...

LATITUDE.....
LONGITUDE.....
ELEVATION.....

PLAN REFERENCE..... SEC. 206 HD. NANGKITA
D.M..... REPORT BOOK.....
BORE S/Nº.....

AGE	CLASS	DESCRIPTION	LOG	DEPTH m	GRAPH REF	F.M.	FINES %
PERMIAN	CONSTRUCTION SAND FINE CONSTRUCTION SAND	SAND vf-vc, rounded. Slightly gravelly, becoming coarser with depth. Slightly clayey and silty, orange-brown				1.95	6
		SAND. f.-m. rounded, gravelly, brown					
		SAND. f.-m. rounded. some m-c. rare gravel Slightly silty and clayey orange-brown				1.98	3
		SAND f-m. rounded. Slightly clayey and silty with lumps white clayey silty sand. Pale Brown.		5			
		SAND f-m. rounded. Slightly clayey & silty. Well sorted. Pale brown					
		SAND. f-c., rare v.c., subround. - rounded, slightly gravelly. Slightly silty and clayey Orange-brown		10		1.89	2
						1.82	2
		SAND. f-c., rounded. Slightly silty and clayey with lumps of white plastic clay and sandy clay aggregates. Slightly gravelly. White and pale grey		15		2.01	3
		E.O.H. 16.46 m		20			

SPECIAL COMMENTS (ECONOMIC USES)

NON-METALLIC RESOURCES DIVISION

DRILL Nº..... LOGGED J.T.V
TYPE PROLINE 'K'.....
DRILLER MONIER.... DRAWN.....
START 6/2/80.... CHECKED.....
FINISH 6/2/80.... DATE.....
SHEET 1 OF.... DRG Nº S.....

DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA

PROJECT MT. COMPASS SAND

CONSTRUCTION SAND SURVEY
LOG OF ROTARY DRILL HOLE

HOLE Nº MCP2

RIG Rotary

SAMPLE Auger

LATITUDE .....
LONGITUDE .....
ELEVATION .....

PLAN REFERENCE ..... SEC. 206 ... HD. NANGKITA

D.M. ..... REPORT BOOK .....

BORE S/Nº .....

AGE	CLASS	DESCRIPTION	LOG	DEPTH m	GRAPH REF	F.M.	FINES %
PERMIAN	FINE CONSTRUCTION SAND	SAND, v.f-m, subang-rounded, white and fairly clean, becoming slightly silty and chocolate brown with depth				1.41	7
		SAND v.f.- v.c. subang-rounded, trace gravel Slightly clayey, yellow orange					
		SAND, v.f-v.c, subang-rounded. Slightly clayey. Yellow orange becoming reddish with depth.				1.64	5
		SAND. v.f.-c, subang-rounded, slightly clayey, orange, red & white		5		1.79	3
	CONSTRUCTION SAND	SAND, f.-c, rounded. Abundant rounded gravel to 1 cm, Slightly clayey, orange-brown				2.23	4
		SAND, f. -v.c. rounded. Slightly clayey, orange-brown		10			
		E.O.H. 10.98 m		15			

SPECIAL COMMENTS (ECONOMIC USES)

NON-METALLIC RESOURCES DIVISION

DRILL Nº ..... LOGGED JTV...
TYPE ... PROLINE 'K' .....
DRILLER MONIER ... DRAWN .....
START 6/2/80 ... CHECKED .....
FINISH 6/2/80 ... DATE .....
SHEET 1 OF ... DRG Nº S .....

DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA

CONSTRUCTION SAND SURVEY
LOG OF ROTARY DRILL HOLE

PROJECT . MT. COMPASS . SAND . . .

HOLE Nº . MCP3. .

RIG . Rotary . . . .

SAMPLE Auger . . . .

LATITUDE . . . . . .

LONGITUDE . . . . . PLAN REFERENCE . . . . . SEC. 106 . . HD. . NANGKITA

ELEVATION . . . . . D.M. . . . . REPORT BOOK . . . . . BORE S/Nº . . . . .

AGE	CLASS	DESCRIPTION	LOG	DEPTH m	GRAPH REF.	F.M.	FINES %
PERMIAN	Fine construction sand	SAND. v.f.-c., subang.-rounded, clean, poorly sorted. Yellow, becoming brown with depth.		5		1.56	2
	Const. sand	SAND, v.f.-v.c. subang.-rounded, 2% subround. gravel to 5mm increasing to 5% with depth slightly clayey, yellow-orange				2.08	3
	Fine const. sand	SAND, v.f.-v.c. rounded, trace rounded gravel to 1 cm. Slightly clayey, brown.				1.85	3
		E.O.H. 8.23 m		10			

SPECIAL COMMENTS (ECONOMIC USES)

NON-METALLIC RESOURCES DIVISION

DRILL Nº . . . . . LOGGED . . . JTV

TYPE . PROLINE 'K' . . . . . .

DRILLER MONIER . . . . DRAWN . . . . . .

START . 6/2/80 . . . . CHECKED . . . . . .

FINISH . 6/2/80 . . . . . DATE . . . . . .

SHEET . 1 . . OF . . . . DRG Nº S . . . . . .

DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA

PROJECT MT. COMPASS SAND ...

CONSTRUCTION SAND SURVEY
LOG OF ROTARY DRILL HOLE

HOLE Nº MCP4 ..
RIG Rotary ....
SAMPLE Auger ..

LATITUDE .....
LONGITUDE .....
ELEVATION .....

PLAN REFERENCE ..... SEC. 206 ... HD. NANGKITA
D.M. ..... REPORT BOOK .....
BORE S/Nº .....

AGE	CLASS	DESCRIPTION	LOG	DEPTH m	GRAPH REF.	F.M.	FINES %
PERMIAN	FILLING SAND	SAND. f.-m. subang.-rounded. Brownish grey, becoming yellow with depth				1.23	3
		SAND, v.f.-f., subang.-rounded yellow					
		SAND, f.-m. trace c.-vc. subang.-rounded, yellow 4.6-5.5m; trace rounded gravel to 1.5cm		5		1.43	2
	FINE CONSTRUCTION SAND	SAND, v.f.-m, subang.-rounded. Pale yellow		10		1.55	3
		SAND, v.f.-m, subang.-rounded. Traces orange and white plastic clay, increasing with depth. Pale yellow		15			
		E.O.H. 16.46m		10			

SPECIAL COMMENTS (ECONOMIC USES)

NON-METALLIC RESOURCES DIVISION

DRILL Nº ..... LOGGED JTV...
TYPE PROLINE 'K' .....
DRILLER MONIER ..... DRAWN .....
START 6/2/80 ..... CHECKED .....
FINISH 6/2/80 ..... DATE .....

SHEET 1 OF ..... DRG Nº S .....

DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA

CONSTRUCTION SAND SURVEY
LOG OF ROTARY DRILL HOLE

PROJECT MT. COMPASS SAND

HOLE Nº MCP5

RIG ROTARY

SAMPLE Auger

LATITUDE

LONGITUDE

ELEVATION

PLAN REFERENCE SEC. 206 HD. NANGKITA

D.M. REPORT BOOK

BORE S/Nº

AGE	CLASS	DESCRIPTION	LOG	DEPTH m	GRAPH REF	F.M.	FINES %
PERMIAN	Fine Const. sand	SAND v.f.-c, subang.-rounded, grey to brown				1.42	5
	Filling Sand	SAND, v.f.-m, subang.-rounded, orange to yellow Damp below 8.2 m Water cut 11.9 m		5		1.34	4
				10		1.27	5
		E.O.H. 14.63 m		15			

SPECIAL COMMENTS (ECONOMIC USES)

NON-METALLIC RESOURCES DIVISION

DRILL Nº

TYPE PROLINE 'K'

DRILLER MONIER

START 7/2/80

FINISH

LOGGED JTV

DRAWN

CHECKED

DATE

SHEET 1 OF DRG Nº S

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CONSTRUCTION SAND SURVEY
LOG OF ROTARY DRILL HOLE

PROJECT MT. COMPASS SAND

LATITUDE .....
LONGITUDE .....
ELEVATION .....

PLAN REFERENCE ..... SEC. 206 ... HD. NANGKITA
D.M. ..... REPORT BOOK .....

HOLE Nº. MCP6
RIG Rotary .....
SAMPLE Auger ...
BORE S/Nº .....

AGE	CLASS	DESCRIPTION	LOG	DEPTH m	GRAPH REF.	F.M.	FINE %
PERMIAN	Fine Const. sand	SAND, v.f.-c. Subang-rounded, abundant v.c. sand and subrounded fine gravel. Sl. silty and clayey, brownish yellow				1.83	12
	Filling sand	SAND, v.f.-m, subang-subround., yellow-orange				0.95	9
		SAND. v.f.-m, subang-round., Sl. silty and clayey, orange.					
				5			
		E.O.H. 4.57m					

SPECIAL COMMENTS (ECONOMIC USES)

ENVIRONMENT AND RESOURCE DIVISION

DRILL Nº ..... LOGGED J.T.V.
TYPE PROLINE 'K' .....
DRILLER MONIER ..... DRAWN .....
START 7/2/80 ..... CHECKED .....
FINISH 7/2/80 ..... DATE .....
SHEET 1 OF ..... DRG Nº S .....

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CONSTRUCTION SAND SURVEY
LOG OF ROTARY DRILL HOLE

PROJECT MT. COMPASS SAND

LATITUDE .....
LONGITUDE .....
ELEVATION .....

PLAN REFERENCE ..... SEC. 206 ... HD. NANGKITA
D.M. ..... REPORT BOOK .....

HOLE Nº. MCP7
RIG Rotary .....
SAMPLE Auger .....
BORE S/Nº .....

AGE	CLASS	DESCRIPTION	LOG	DEPTH m	GRAPH REF	F.M.	FINE %
PERMIAN	Fine const sand	SAND. v.f.-c. subang.-rounded. Fawn				1.60	7
		SAND. v.f.-c, subang.-rounded. Orange yellow				1.51	7
	Construction Sand	SAND. v.f.-v.c., subang.-rounded, 5% subang. gravel to 1 cm. Lumps white silty clay. Pale yellow.				2.02	17
	Fine Construction Sand	SAND. v.f.-c., subang.-rounded, yellow		5			
		SAND. v.f.-c, subang.-rounded. Sl. clayey, pale yellow Hard drilling 6.0-6.5 m -? gravel & clay				1.70	10
		SAND. v.f.-c, subang.-rounded, pale greyish yellow Sl. clayey with clasts soft claystone and lumps grey clayey sand and white plastic clay.					
		E.O.H. 9.15 m		10			

SPECIAL COMMENTS (ECONOMIC USES)

ENVIRONMENT AND RESOURCE DIVISION

DRILL Nº ..... LOGGED JTV
TYPE PROLINE 'K' .....
DRILLER MONIER ..... DRAWN .....
START 7/2/80 ..... CHECKED .....
FINISH 7/2/80 ..... DATE .....

SHEET 1 OF .... DRG Nº S.....

APPENDIX C

RESULTS OF SIEVING OF 24 SAMPLES TO AS1465-1974
EXTRACT FROM AMDEL REPORT MD3956/80.

RESULTS

(see Table C1 and attached graphs.

DISCUSSION

The size gradings of these samples vary somewhat especially in the size fractions below 600 microns. Of the twenty-four samples tested only ten (A29-A32, A35-A39, and A42/80) comply with AS1465 and are suitable for use as concrete sands. The remaining fourteen sands could probably be rendered suitable for this usage by washing them to remove some of the fines they contain.

Only four of the samples (A32, A36, A38 and A39/80) meet the requirements of Australian Standard CA27-1959, Internal Plastering on Solid Backgrounds. Again the rest of the samples are too fine and would require washing to remove some of the finer material.

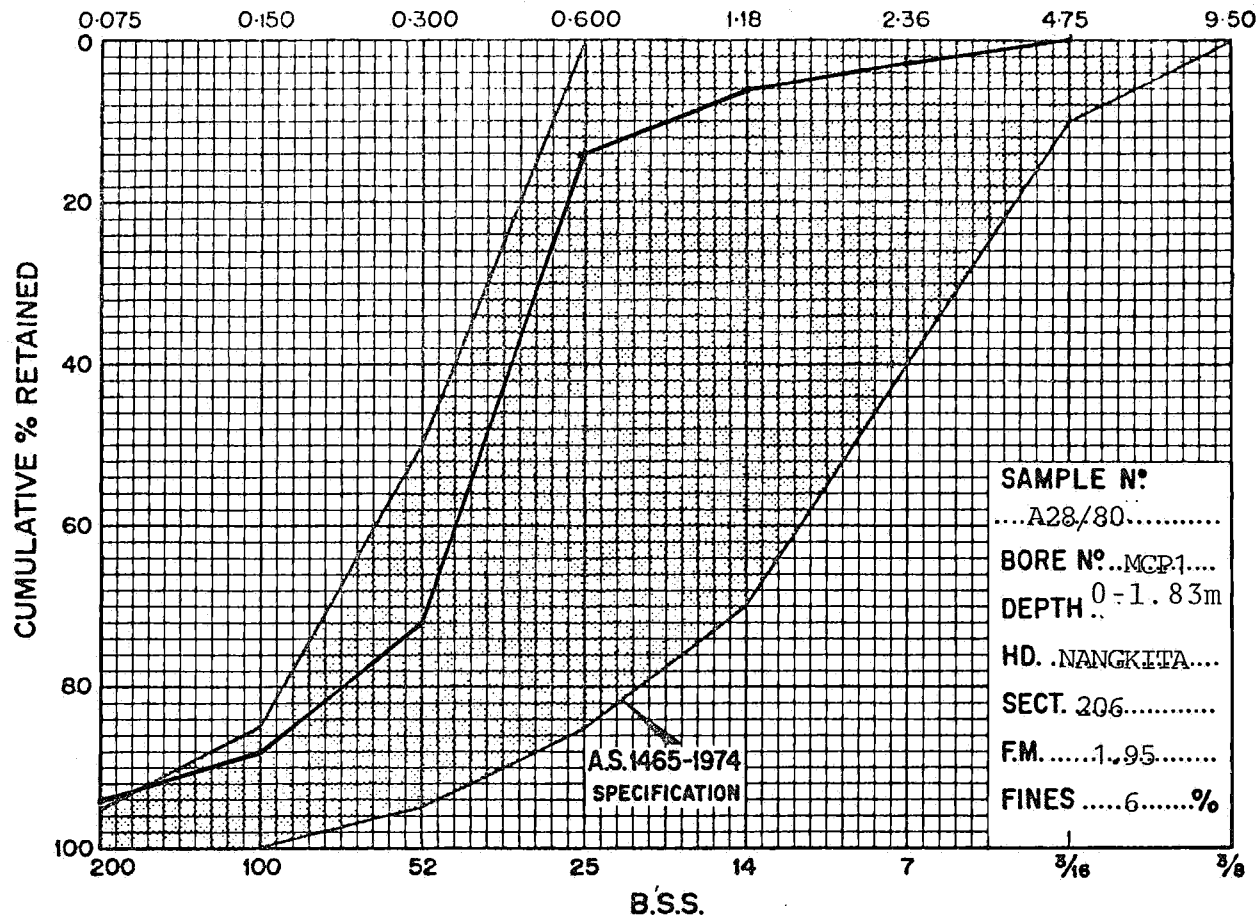
Specified grading for mortar sands are the same as those required for concrete sands except that a higher proportion of material finer than 75 micrometres is allowable (up to 10%). Only those sands which conform to AS1465 are suitable for mortar sands. The allowance for extra fines still does not make any of the other samples suitable.

TABLE C1: SIZE GRADING OF TWENTY FOUR SAMPLES

SAMPLE NO, BOREHOLE AND DEPTH

Sieve Mesh No Aperture	AS1465 Standard % retained	A28/ 80	A29/ 80	A30/ 80	A31/ 80	A32/ 80	A33/ 80	A34/ 80	A35/ 80	A36/ 80	A37/ 80	A38/ 80	A39/ 80	A40/ 80	A41/ 80	A42/ 80	A43/ 80	A44/ 80	A45/ 80	A46/ 80	A47/ 80	A48/ 80	A49/ 80	A50 80
		MCP1 0- 1.83	MCP1 1.8- 3.75	MCP1 3.7- 9.2	MCP1 9.2- 12.8	MCP1 12.8 16.5	MCP2 0- 1.8	MCP2 1.8- 3.7	MCP2 3.7- 6.4	MCP2 6.4- 11.0	MCP3 0- 5.5	MCP3 5.5- 7.3	MCP3 7.3- 8.2	MCP4 0- 0.9	MCP4 0.9- 8.2	MCP4 8.2- 16.5	MCP5 0- 1.8	MCP5 1.8- 11.9	MCP5 11.9- 14.6	MCP6 0- 2.7	MCP6 2.7- 4.6	MCP7 0- 0.9	MCP7 0.9- 1.8	MCP7 1.8- 4.6
9.50mm 3/8		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.75mm 3/16	0-10	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	2	0	0	1	4
2.36mm 7	0-40	3	4	0	0	6	4	3	1	6	0	7	2	0	0	0	1	1	0	5	1	2	4	7
1.18mm 14	0-70	6	5	1	1	10	8	7	4	13	1	13	4	0	1	0	2	1	0	8	1	6	6	9
600 um 25	0-85	14	16	13	13	22	14	15	13	30	12	25	7	3	7	7	7	5	2	17	2	14	12	31
300 um 52	50-95	72	74	75	68	65	30	46	66	73	53	63	73	33	45	52	42	39	38	51	18	45	37	47
150 um 100	85-100	88	93	96	96	92	75	85	90	92	87	91	92	83	87	91	83	83	81	78	64	82	80	70
75 um 200	95-100	94	97	98	98	97	93	95	97	96	98	97	97	97	98	97	95	96	95	88	91	93	93	83
Minus Minus 75 um 200 (fines)		6	3	2	2	3	7	5	3	4	2	3	3	3	2	3	5	4	5	12	9	7	7	17
AS1465 (concrete)		x	/	/	/	/	x	x	/	/	/	/	/	x	x	/	x	x	x	x	x	x	x	x
CA27 (plaster)		x	x	x	x	/	x	x	x	/	x	/	/	x	x	x	x	x	x	x	x	x	x	x
Al23 x (mortar)		x	/	/	/	/	x	x	/	/	/	/	/	x	x	/	x	x	x	x	x	x	x	x
F.M.		1.95	1.98	1.89	1.82	2.01	1.41	1.64	1.79	2.23	1.56	2.08	1.85	1.23	1.43	1.55	1.42	1.34	1.27	1.83	0.95	1.60	1.51	2.02

/ suitable
x not suitable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0·600
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2·36
4·75
9·50
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60
80
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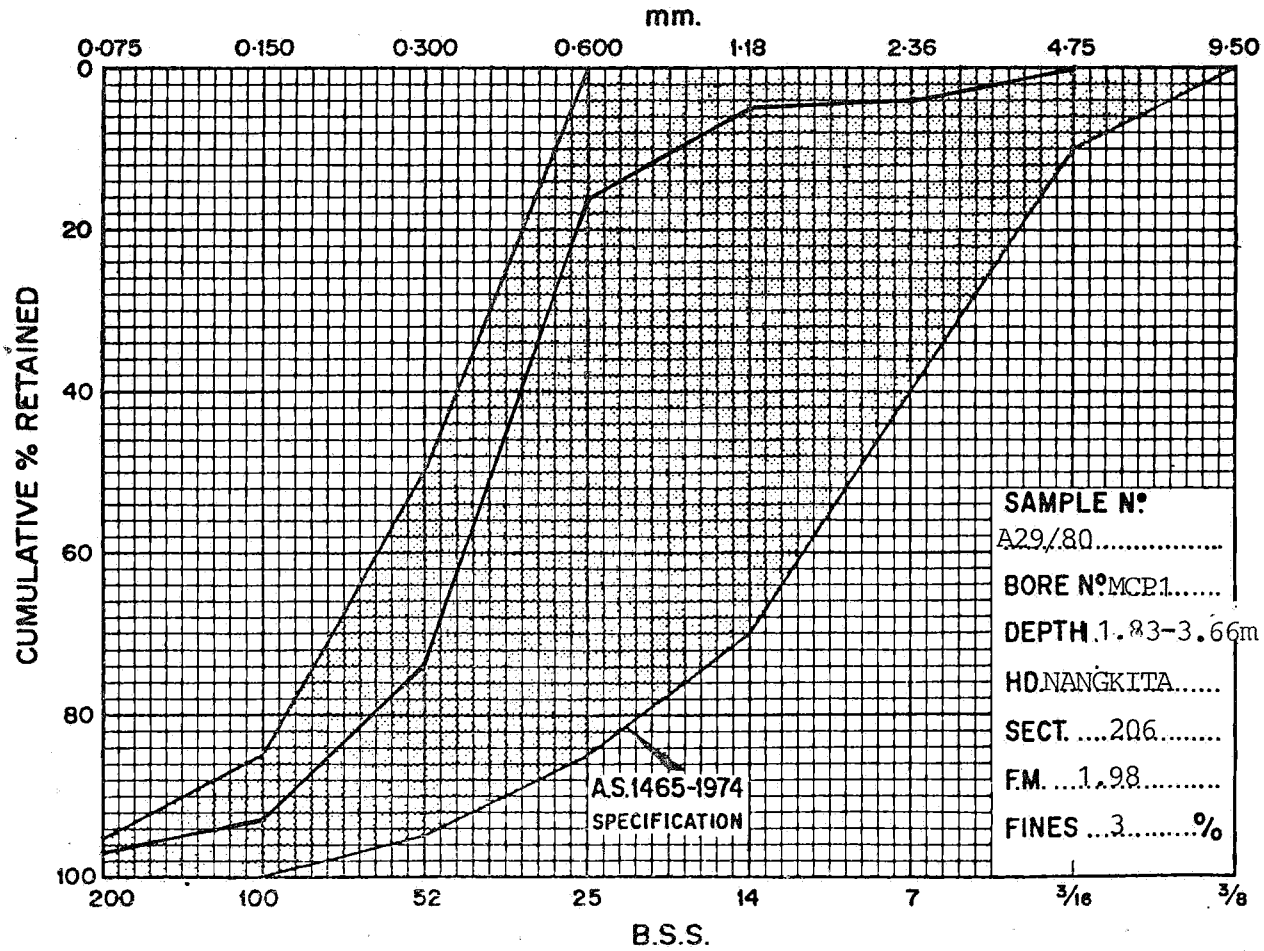
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
....A28/80.....
BORE N°..MCP1....
DEPTH ..0-1.83m
HD. .NANGKITA....
SECT. 206.....
F.M. .....1.95.....
FINES .....6.....%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0·075
0·150
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1·18
2·36
4·75
9·50
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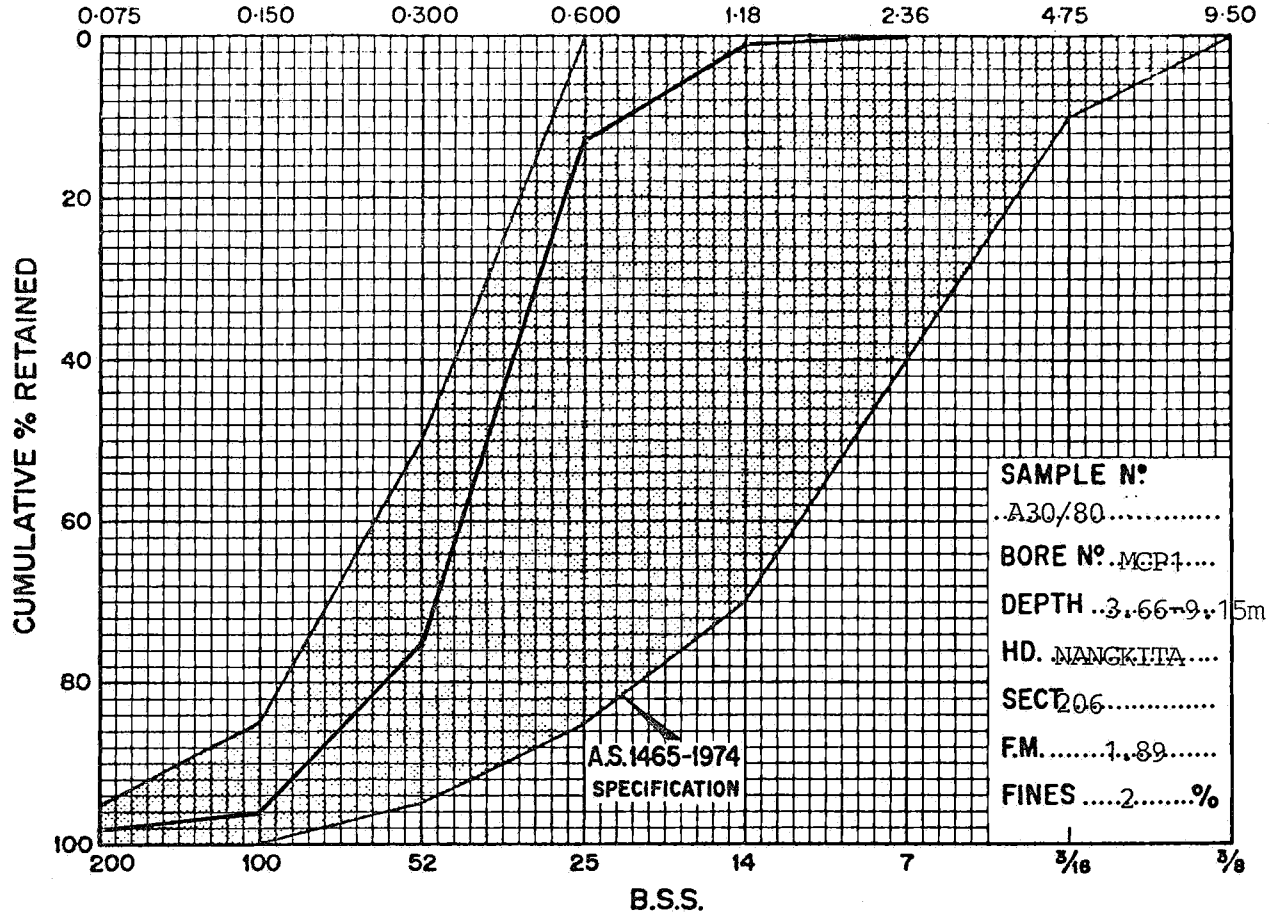
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A29/80.....
BORE N°MCP1.....
DEPTH 1.83-3.66m
HD.NANGKITA.....
SECT. ....206.....
F.M. ...1.98.....
FINES ...3.....%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4·75
9·50
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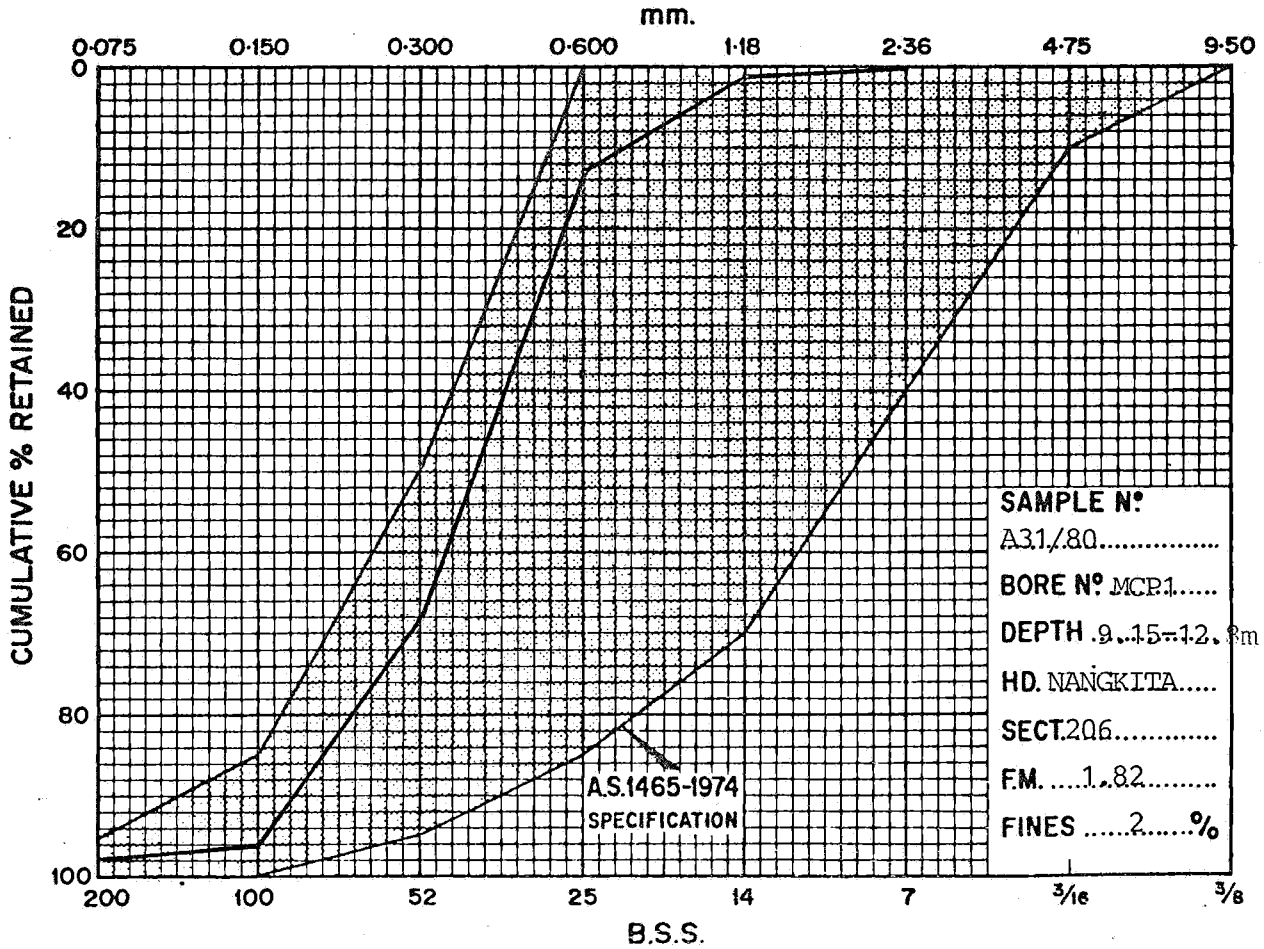
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A30/80
BORE N°. MCP1
DEPTH 3.66-9.15m
HD. NANGKITA
SECT 206
F.M. 1.89
FINES 2 %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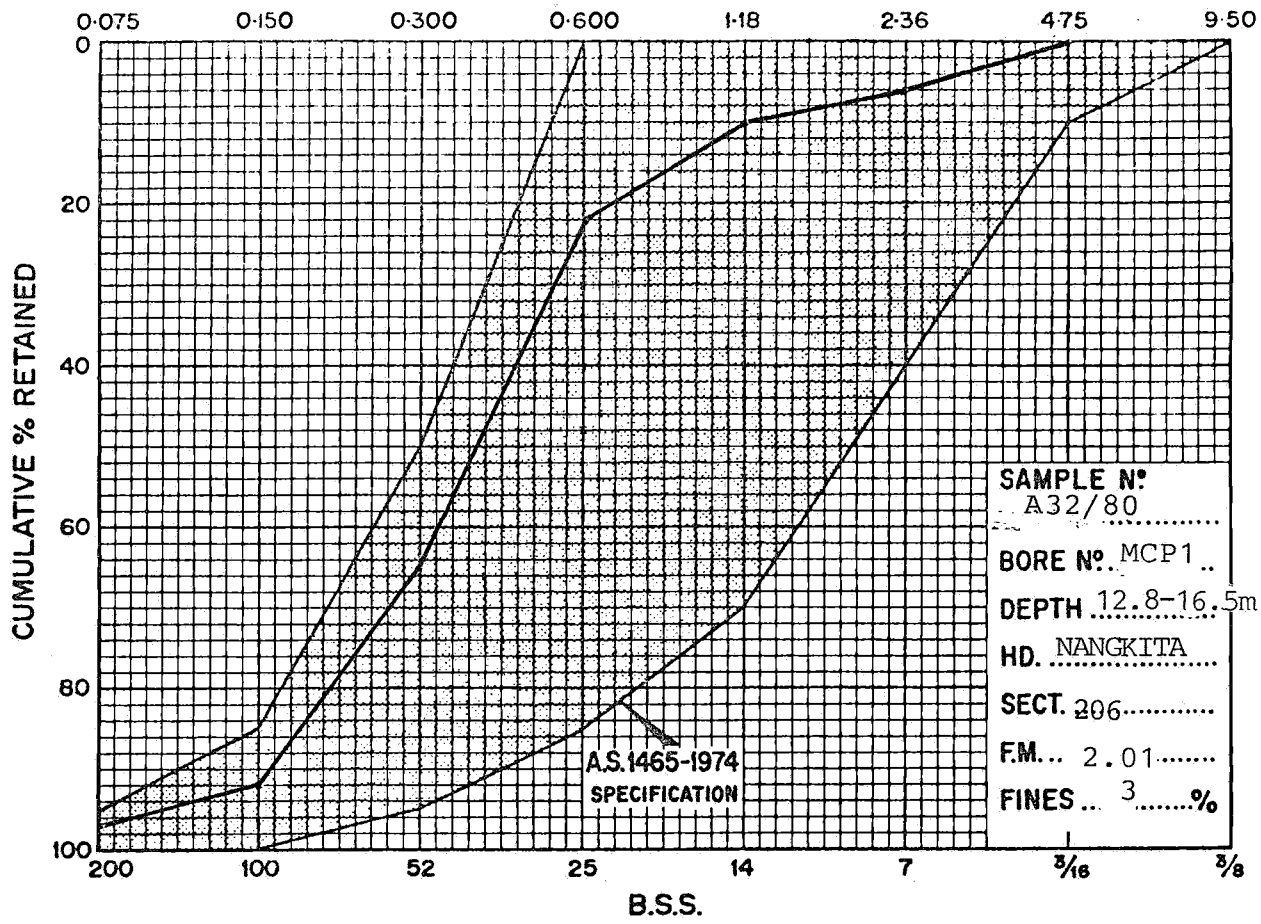
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A31/80
BORE N° MCP1
DEPTH 9.15-12.8m
HD. NANGKITA
SECT 206
F.M. 1.82
FINES 2 %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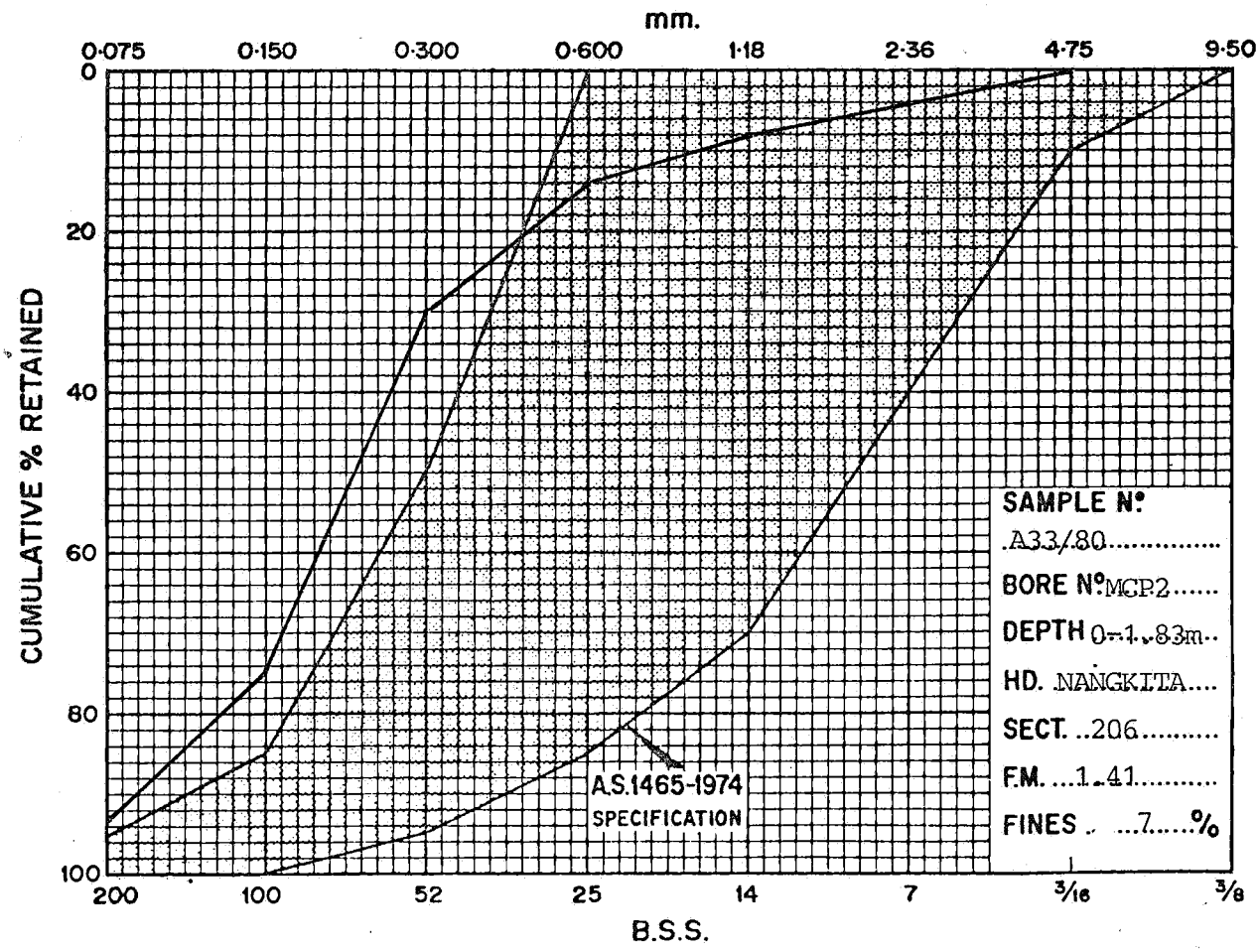
0·150
0·300
0·600
1·18
2·36
4·75
9·50
mm.
CUMULATIVE % RETAINED
0
20
40
60
80
100
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A32/80
BORE N°. MCP1
DEPTH 12.8-16.5m
HD. NANGKITA
SECT. 206
F.M. 2.01
FINES 3 %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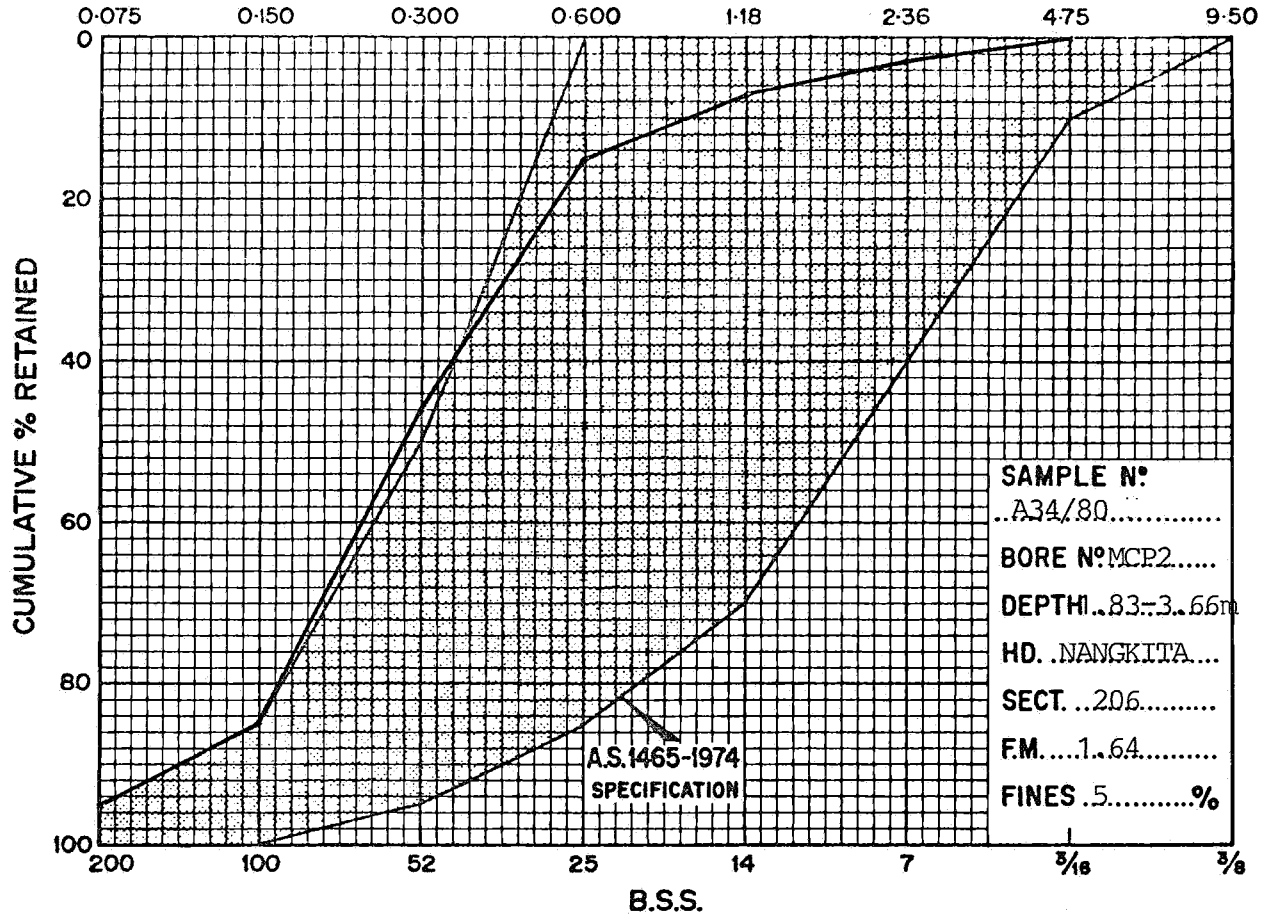
2·36
4·75
9·50
mm.
CUMULATIVE % RETAINED
0
20
40
60
80
100
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A33/80
BORE N° MCP2
DEPTH 0-1.83m
HD. NANGKITA
SECT. 206
F.M. 1.41
FINES 7 %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9·50
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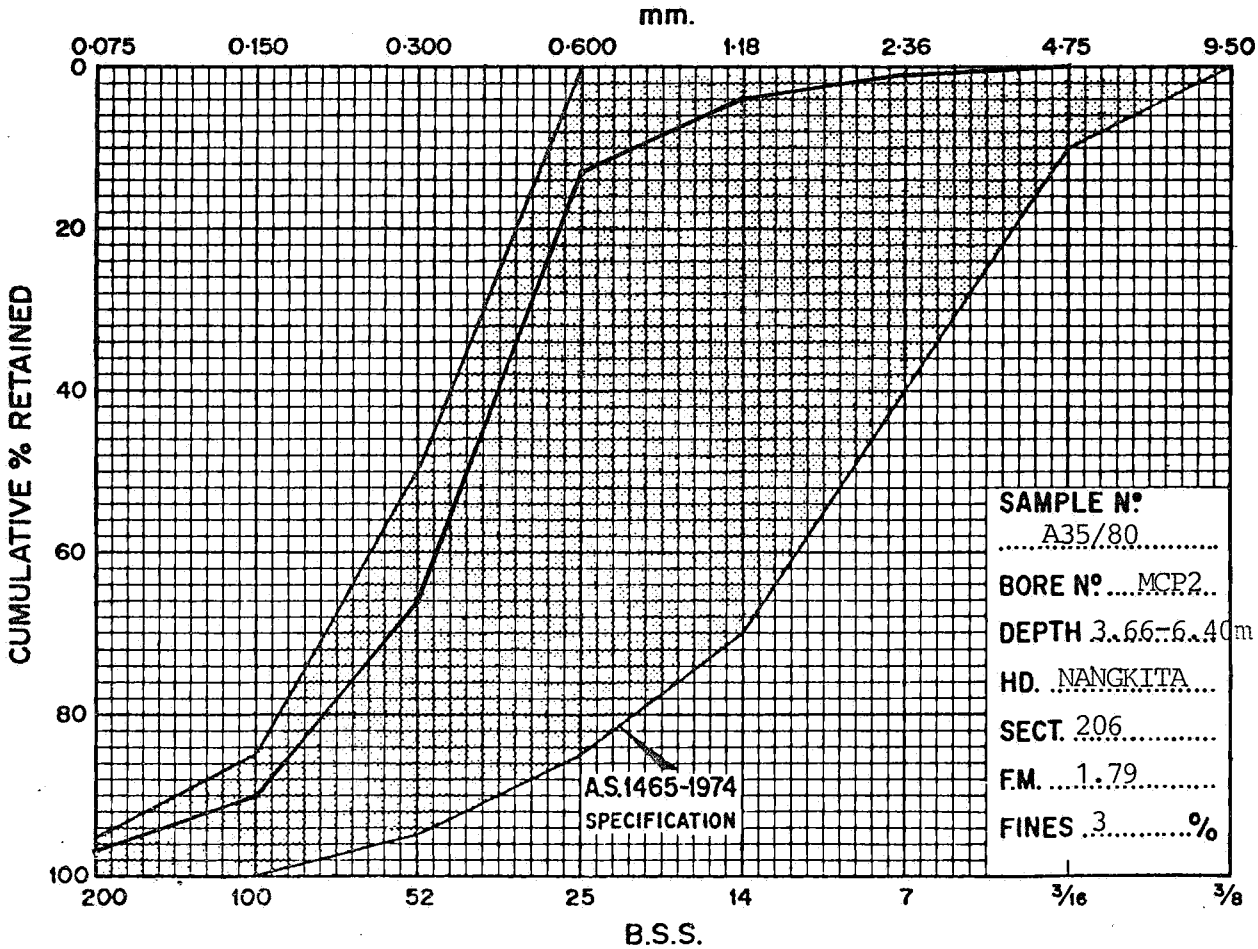
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A34/80
BORE N° MCP2
DEPTH 3.83-3.66m
HD. NANGKITA
SECT. 206
F.M. 1.64
FINES 5 %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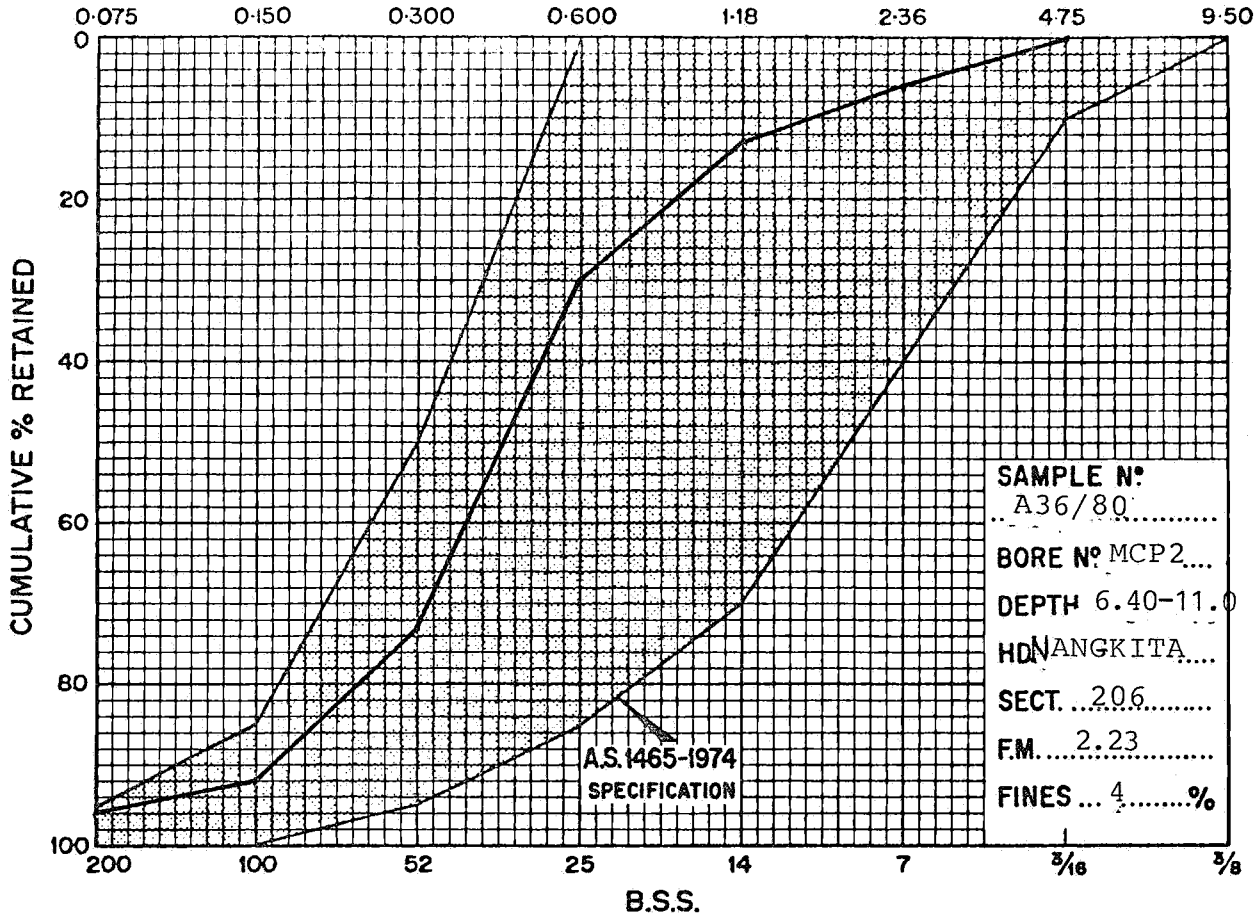
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A35/80
BORE N° MCP2
DEPTH 3.66-6.40m
HD. NANGKITA
SECT. 206
F.M. 1.79
FINES 3 %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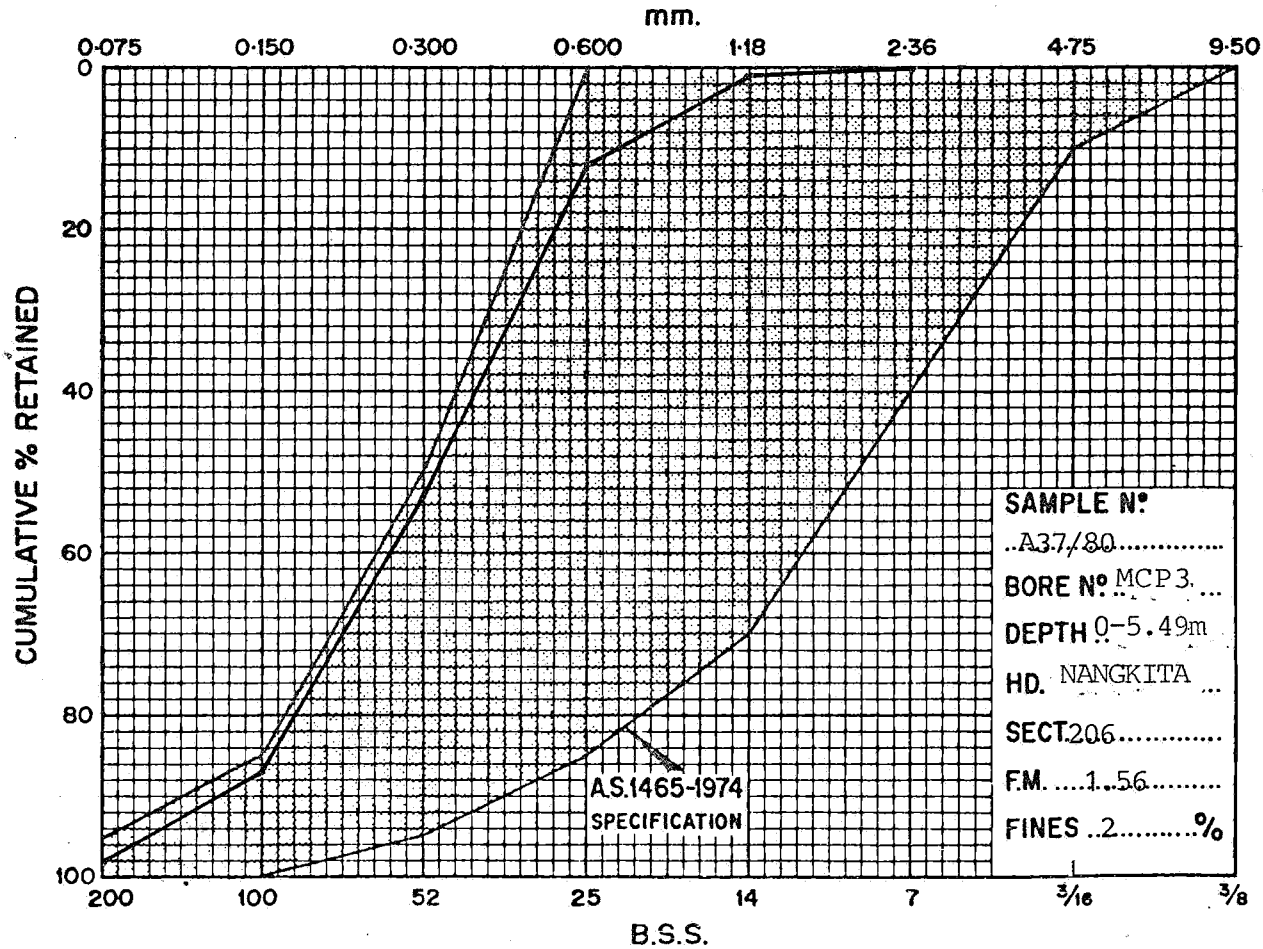
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A36/80
BORE N° MCP2
DEPTH 6.40-11.0
HD NANGKITA
SECT. 206
F.M. 2.23
FINES ... 4 ....%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0·075
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0·600
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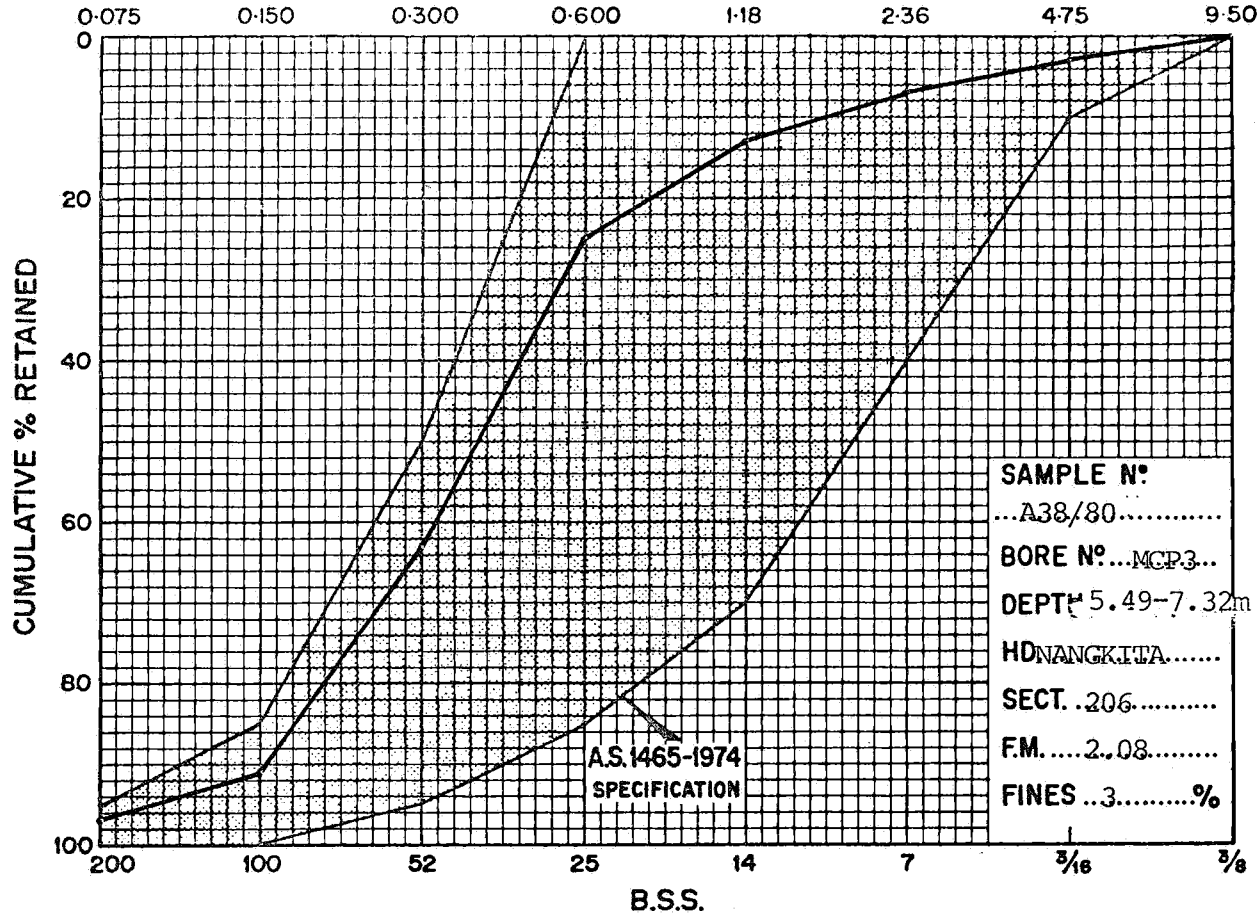
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A37/80
BORE N° MCP3
DEPTH 0-5.49m
HD. NANGKITA
SECT 206
F.M. 1.56
FINES 2 ....%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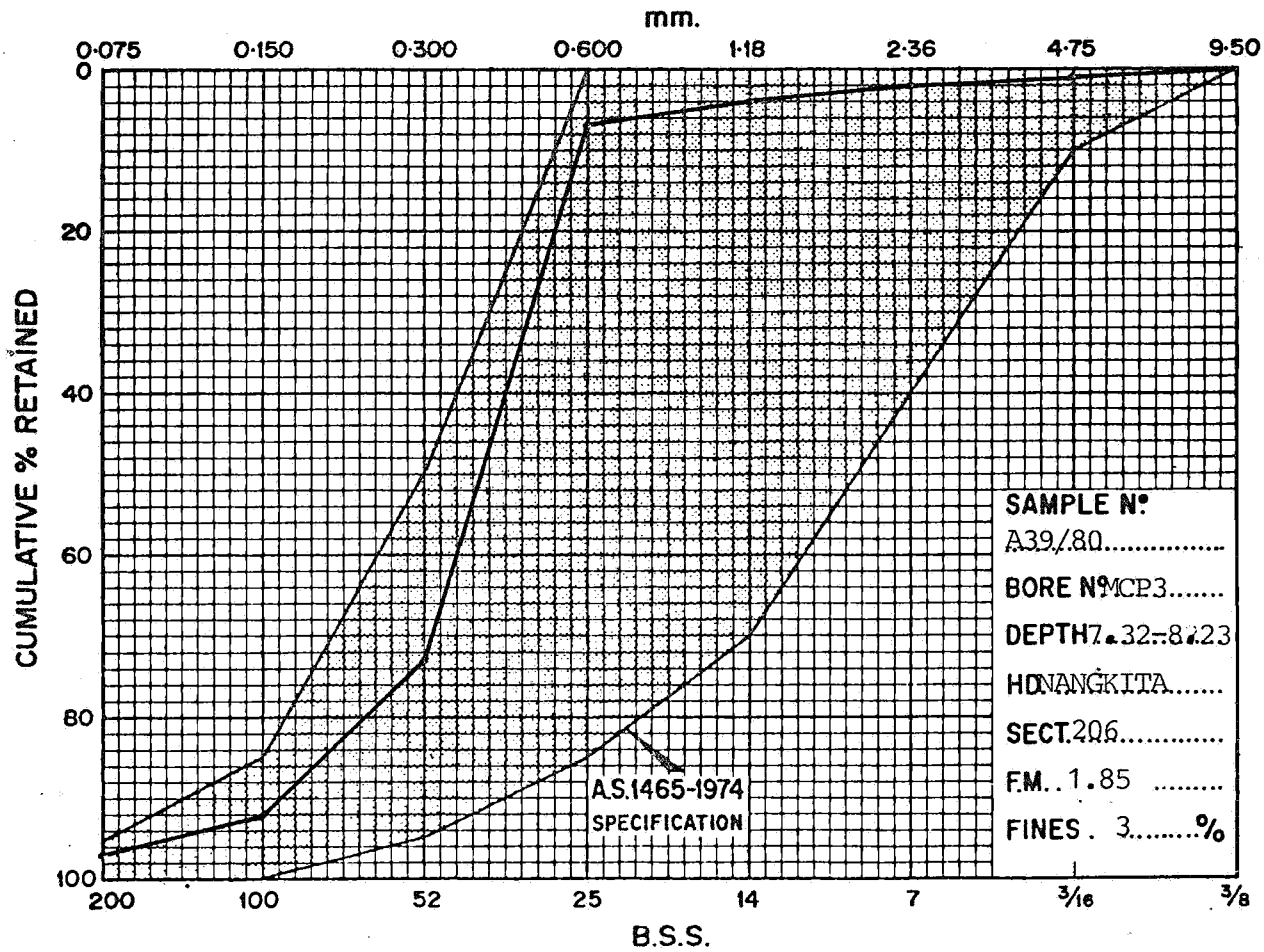
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
A.S.1465-1974
SPECIFICATION
SAMPLE N°
...A38/80.....
BORE N°...MCP3...
DEPTH 5.49-7.32m
HDNANGKITA.....
SECT. .206.....
F.M.....2.08.....
FINES ..3.....%
200
100
52
25
14
7
3/16
3/8
B.S.S.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0·300
0·600
1·18
2·36
4·75
9·50
0
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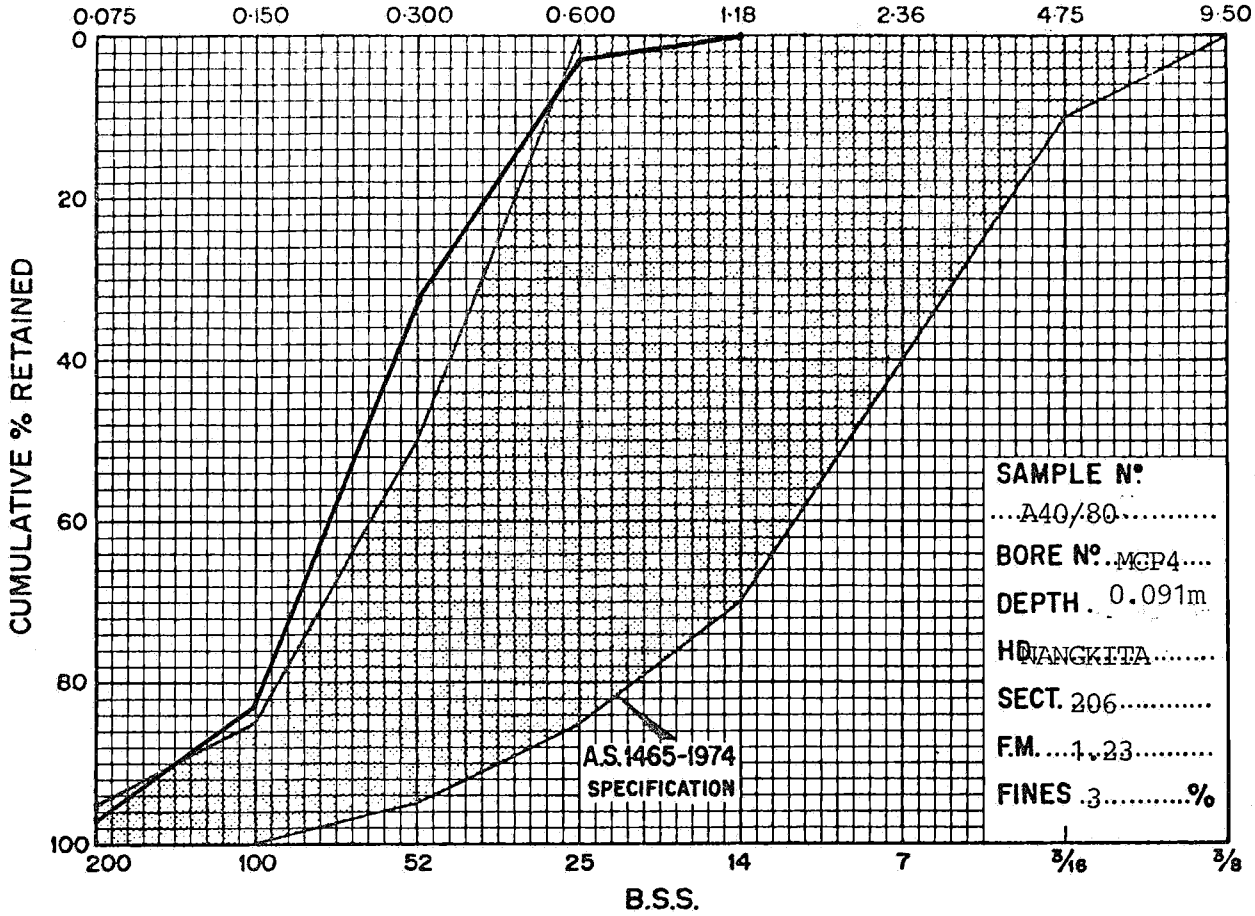
40
60
80
100
CUMULATIVE % RETAINED
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A39/80.....
BORE N°MCP3.....
DEPTH7.32-8.23
HDNANGKITA.....
SECT.206.....
F.M..1.85 .....
FINES . 3.....%
200
100
52
25
14
7
3/16
3/8
B.S.S.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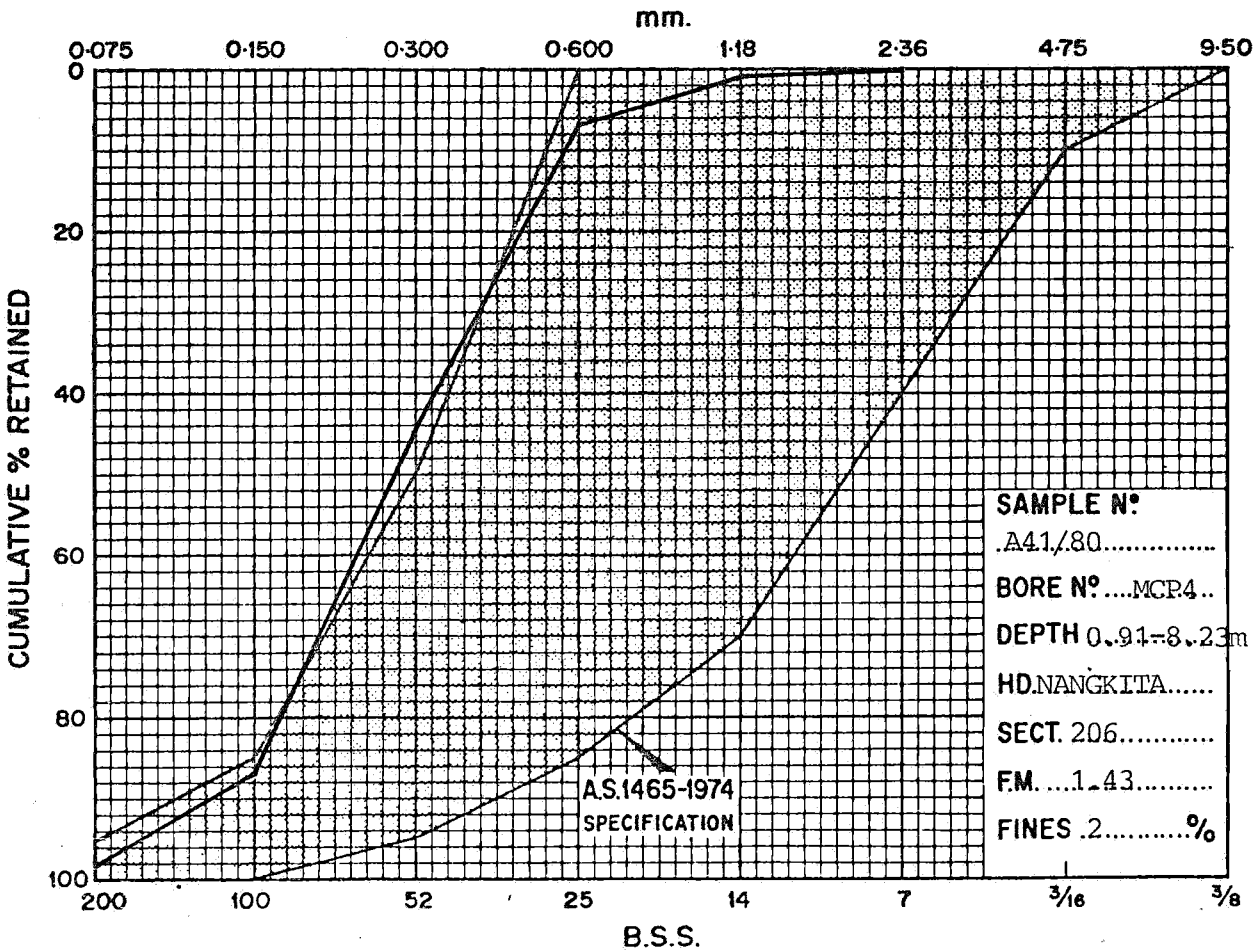
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
....A40/80.....
BORE N°..MCP4....
DEPTH . 0.091m
HD.NANGKITA.....
SECT. 206.....
F.M. ....1.23.....
FINES .3.....%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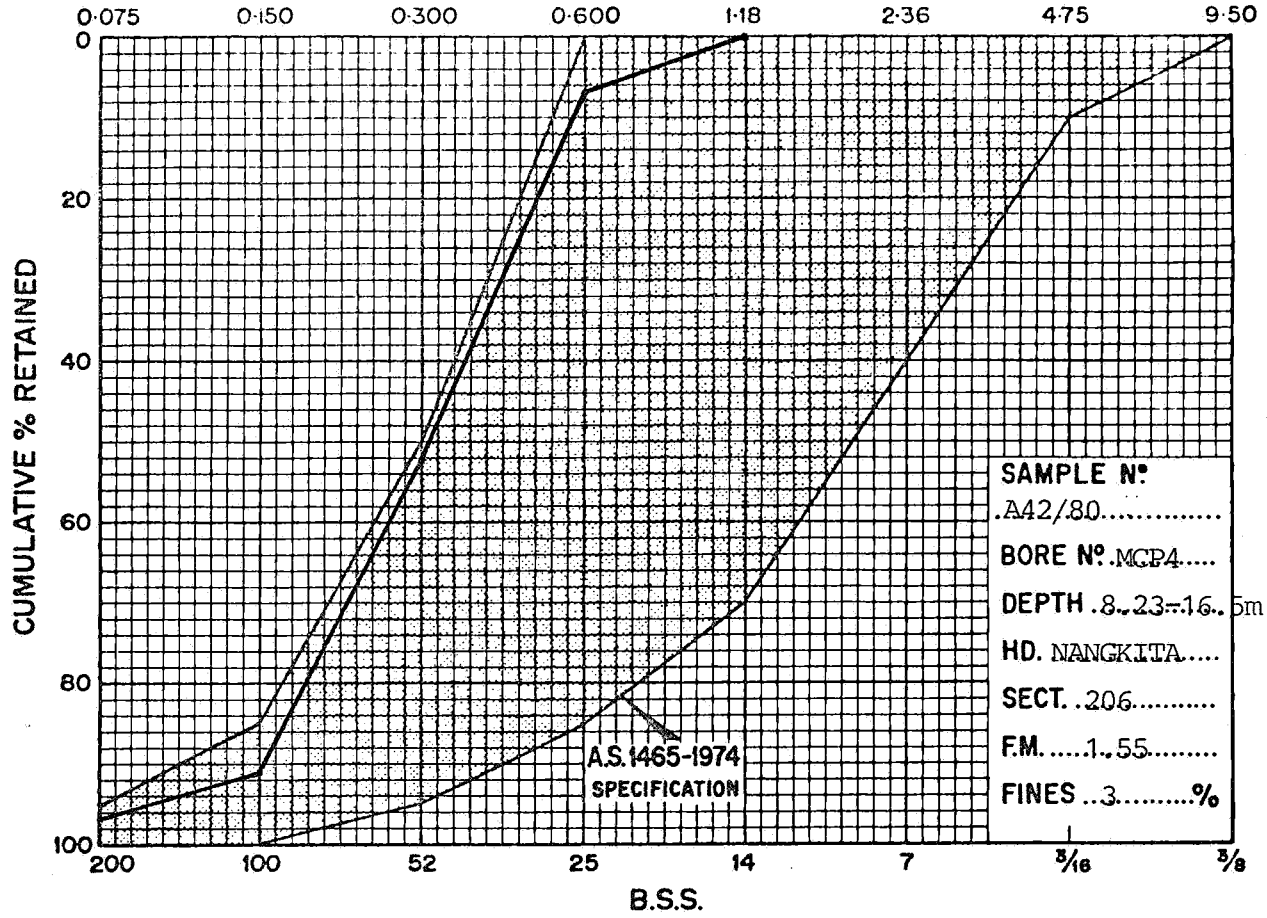
0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
.A41/80.....
BORE N°....MCP4..
DEPTH 0.91-8.23m
HD.NANGKITA.....
SECT. 206.....
F.M. ....1.43.....
FINES .2.....%


0·075
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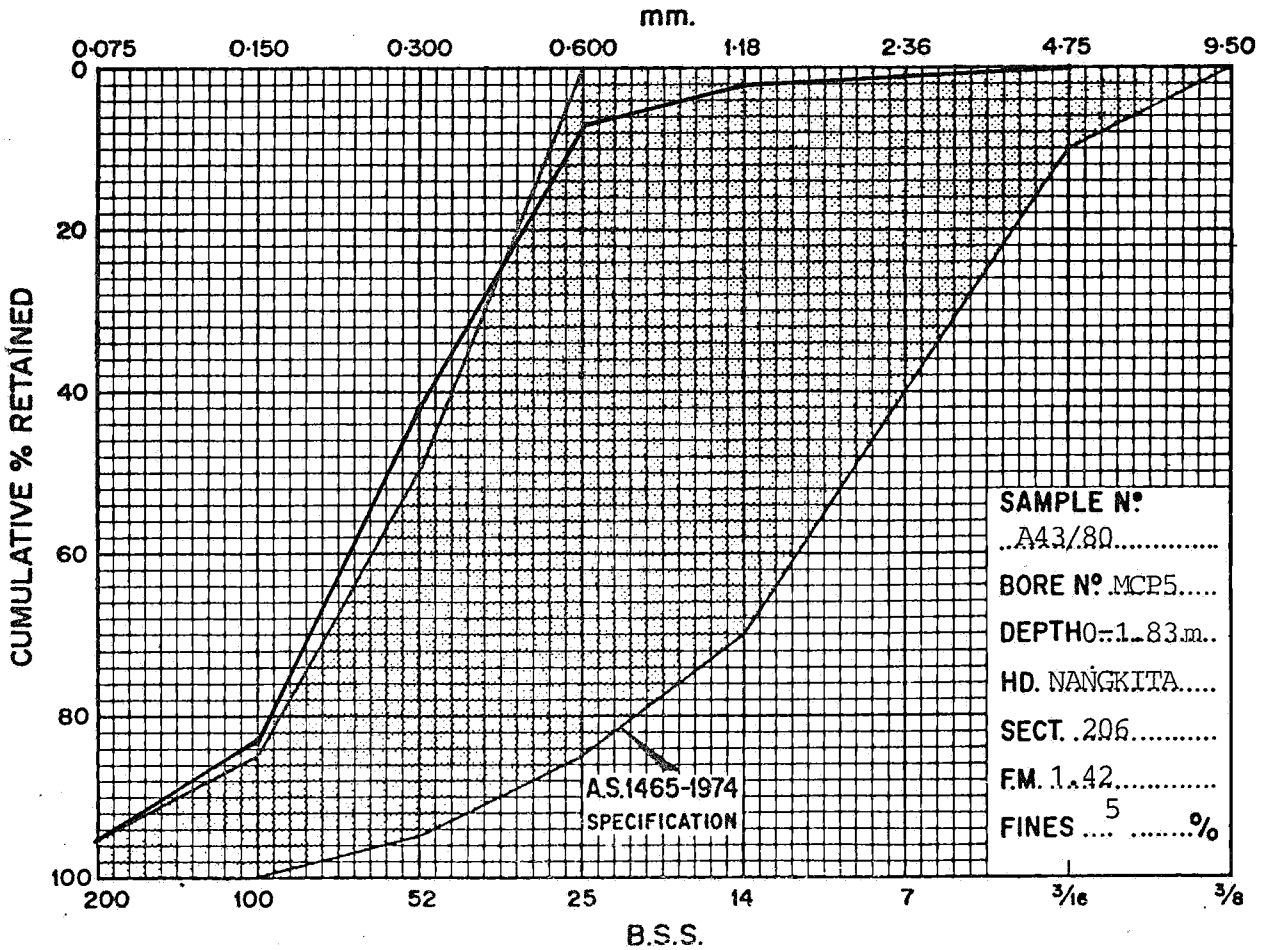
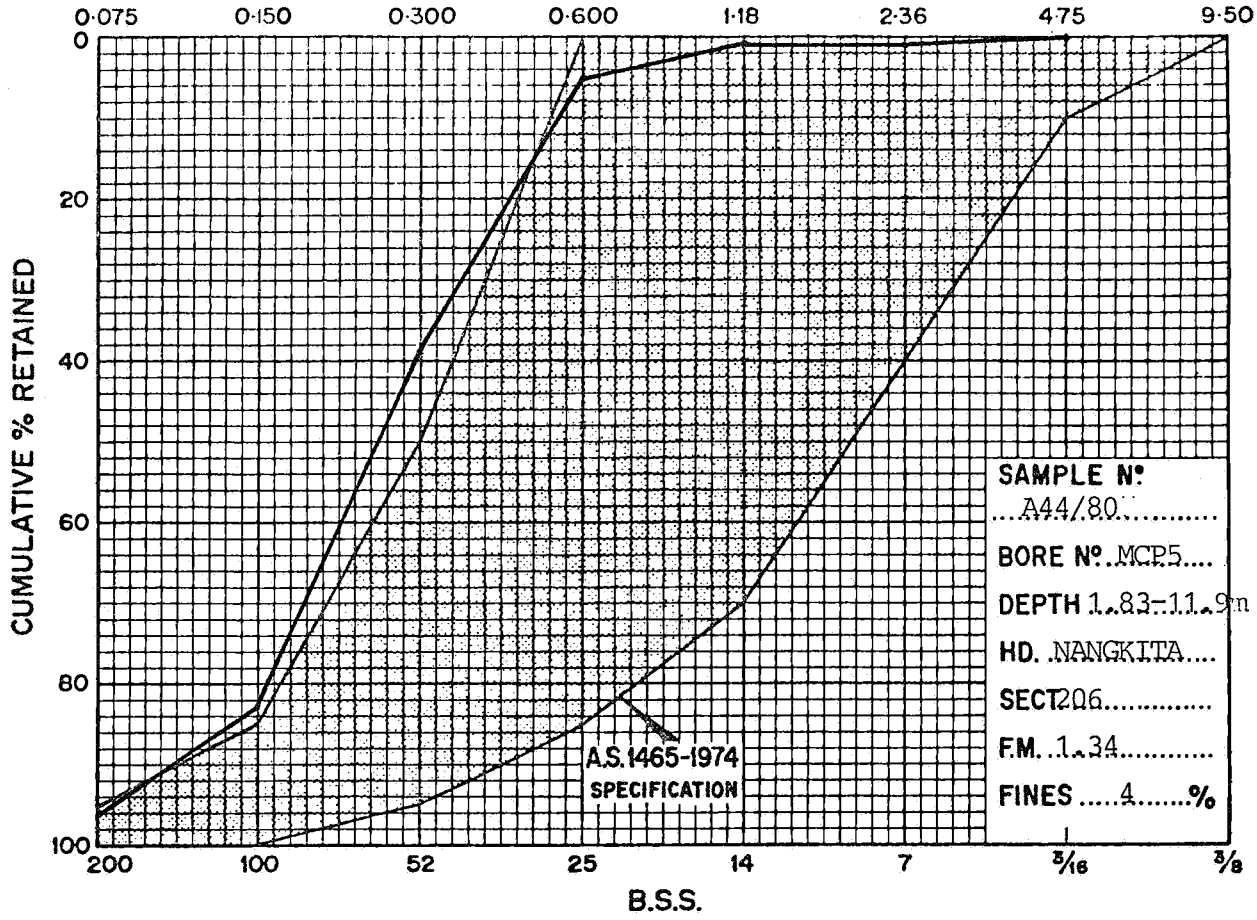
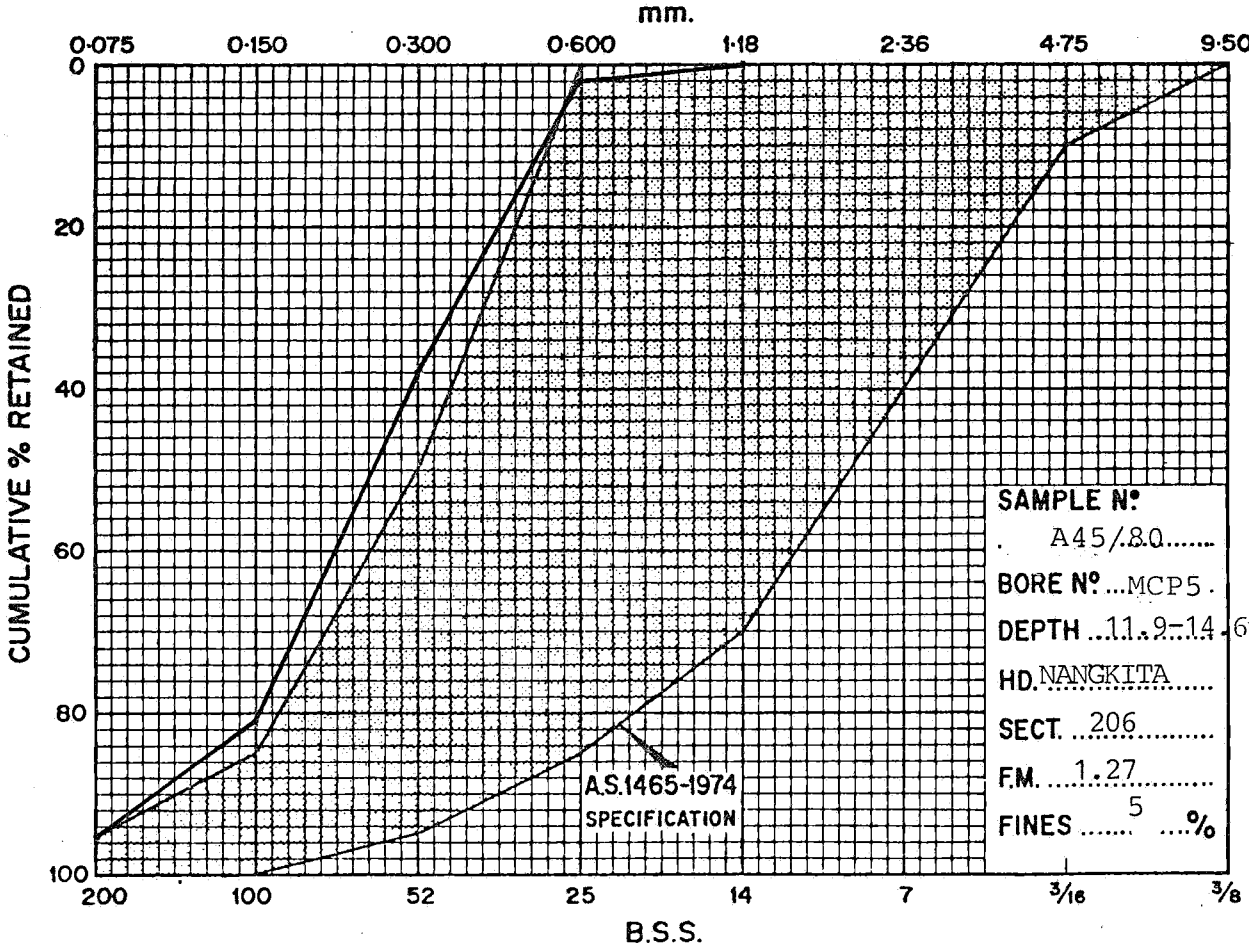
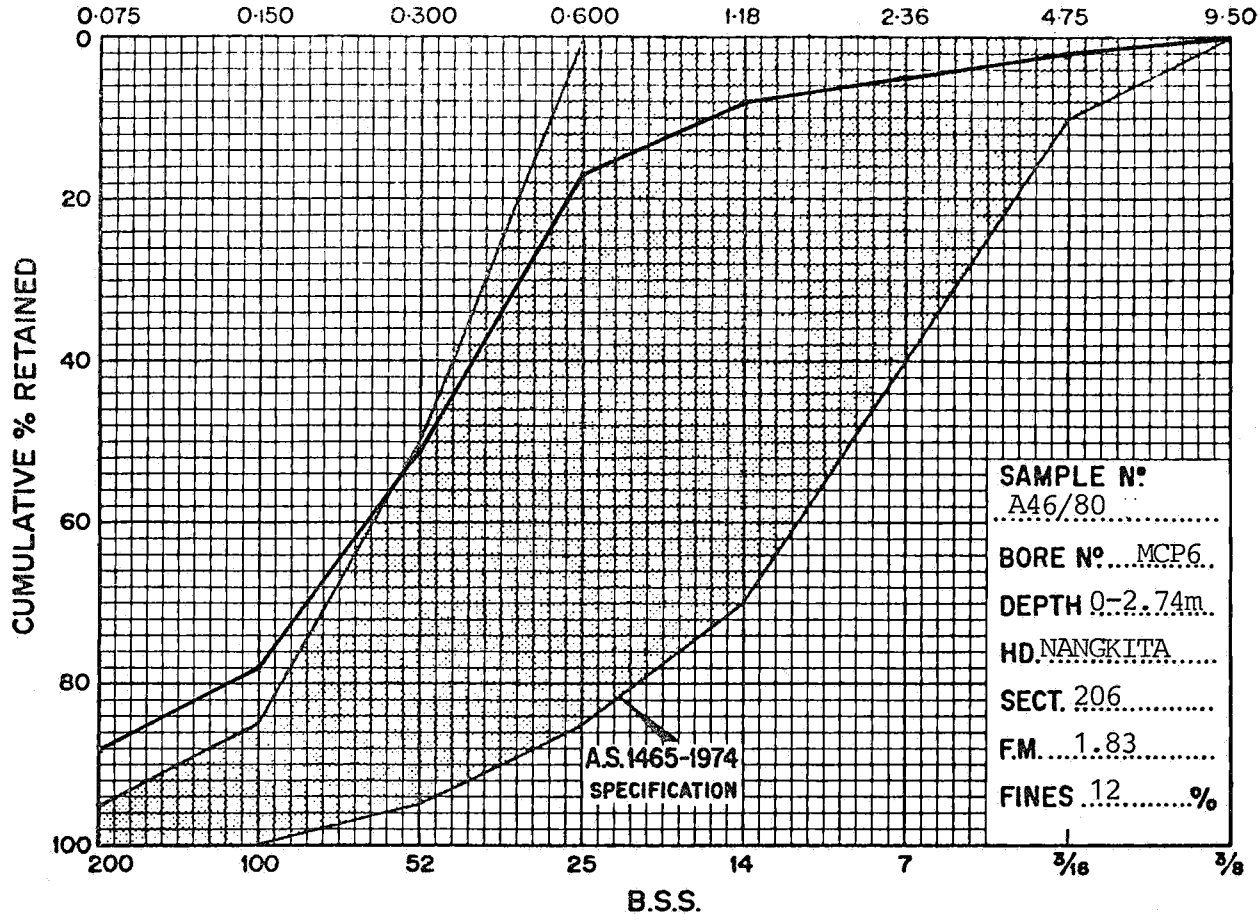
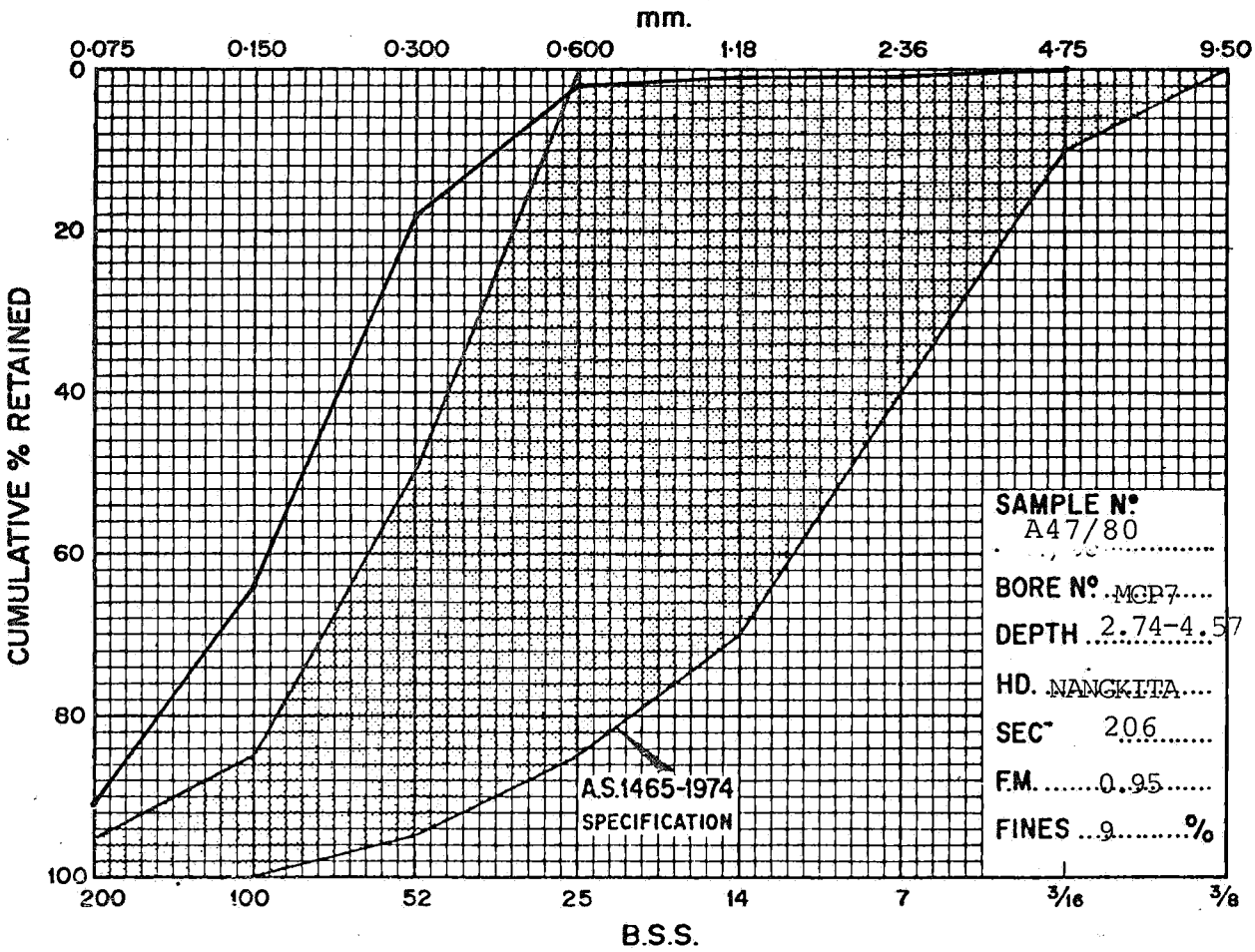
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
A.S.1465-1974
SPECIFICATION
SAMPLE N°
.A42/80.....
BORE N°.MCP4....
DEPTH .8..23-16..5m
HD. NANGKITA....
SECT. .206.....
F.M. ....1..55.....
FINES ..3.....%
200
100
52
25
14
7
3/16
3/8
B.S.S.

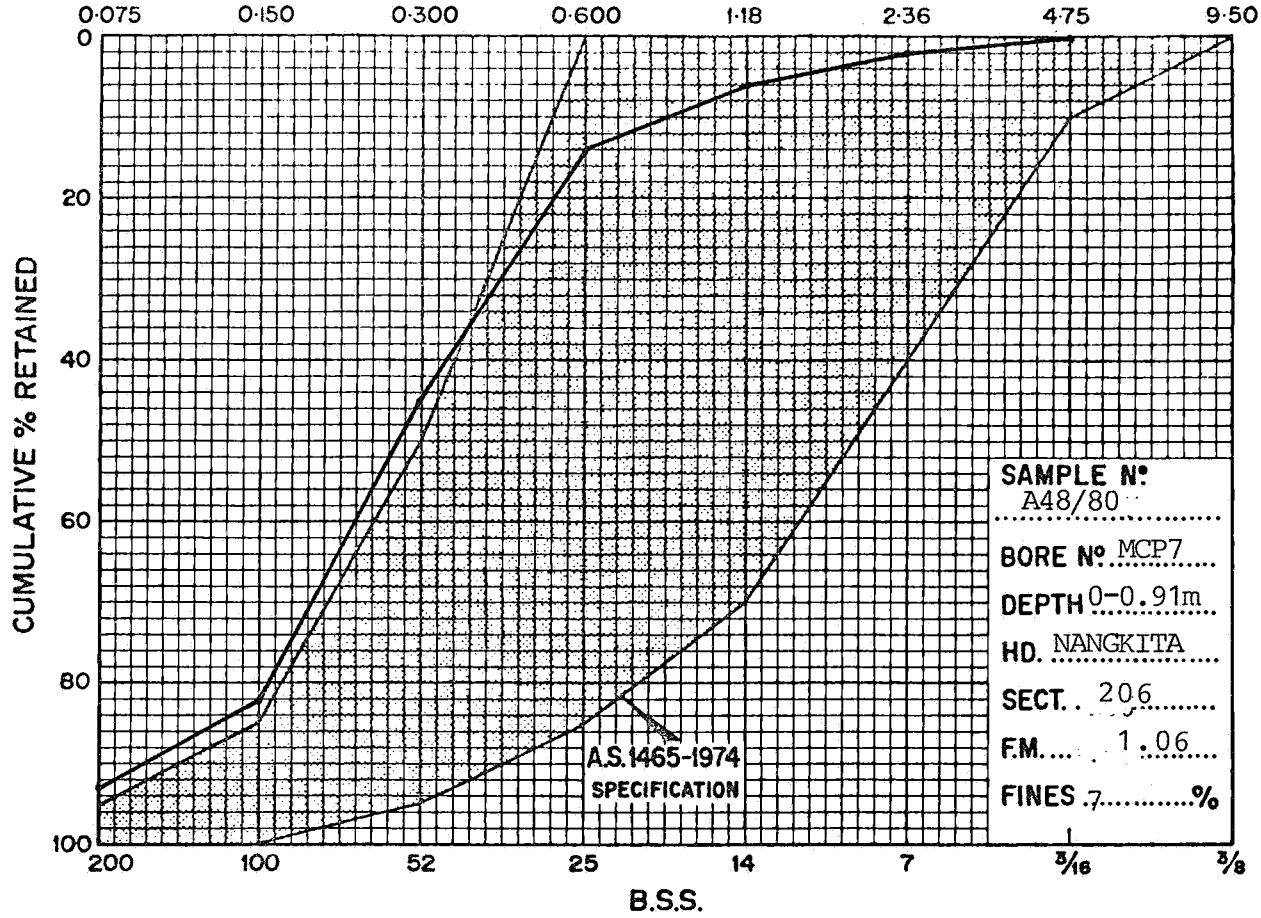

mm.
0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
A.S.1465-1974
SPECIFICATION
SAMPLE N°
..A43/80.....
BORE N°.MCP5.....
DEPTH0-1..83m..
HD. NANGKITA....
SECT. .206.....
F.M. 1..42.....
FINES .... 5 .....%
200
100
52
25
14
7
3/16
3/8
B.S.S.

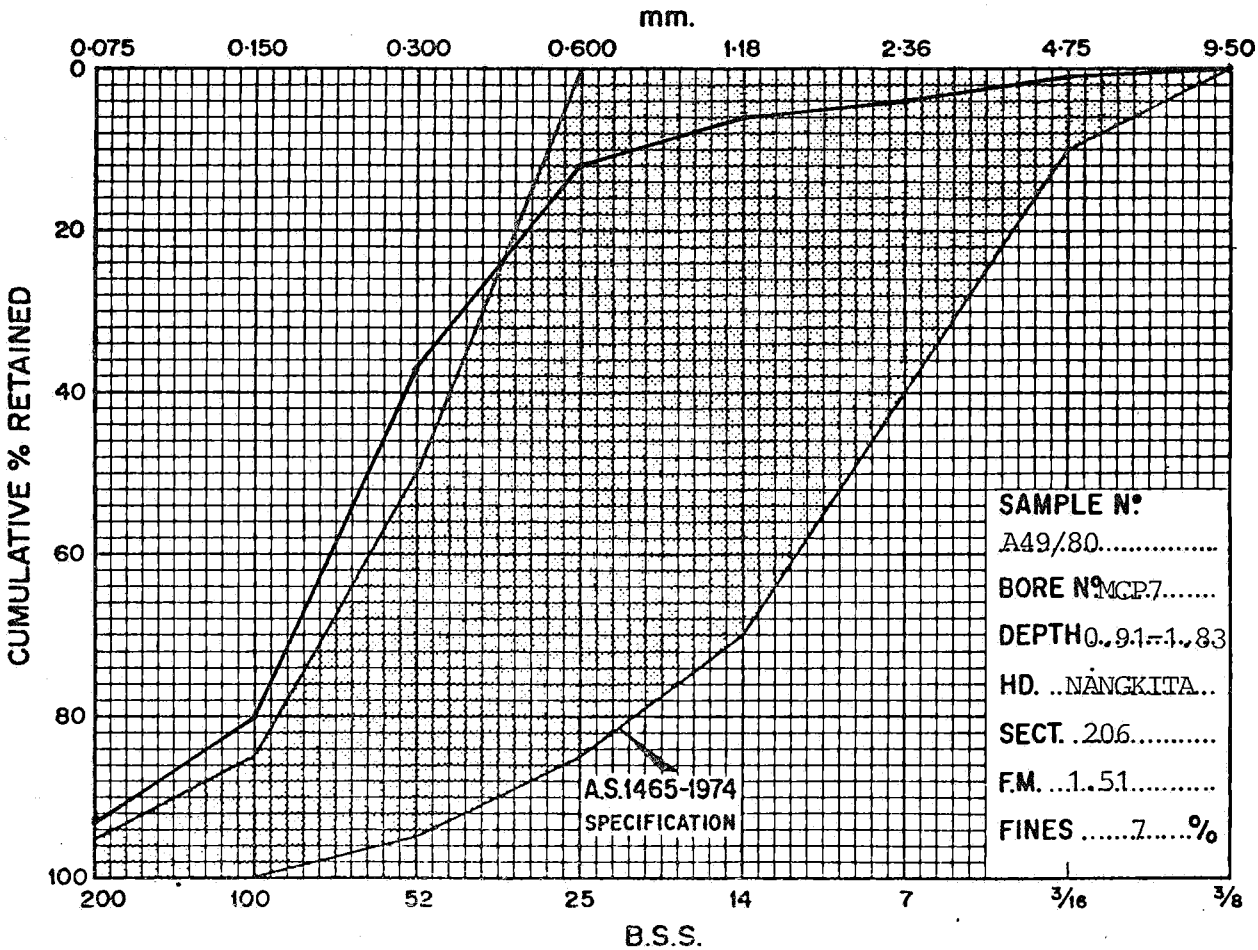

0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A44/80
BORE N°. MCP5
DEPTH 1.83-11.9m
HD. NANGKITA
SECT 206
F.M. 1.34
FINES 4 %
200
100
52
25
14
7
3/16
3/8
B.S.S.

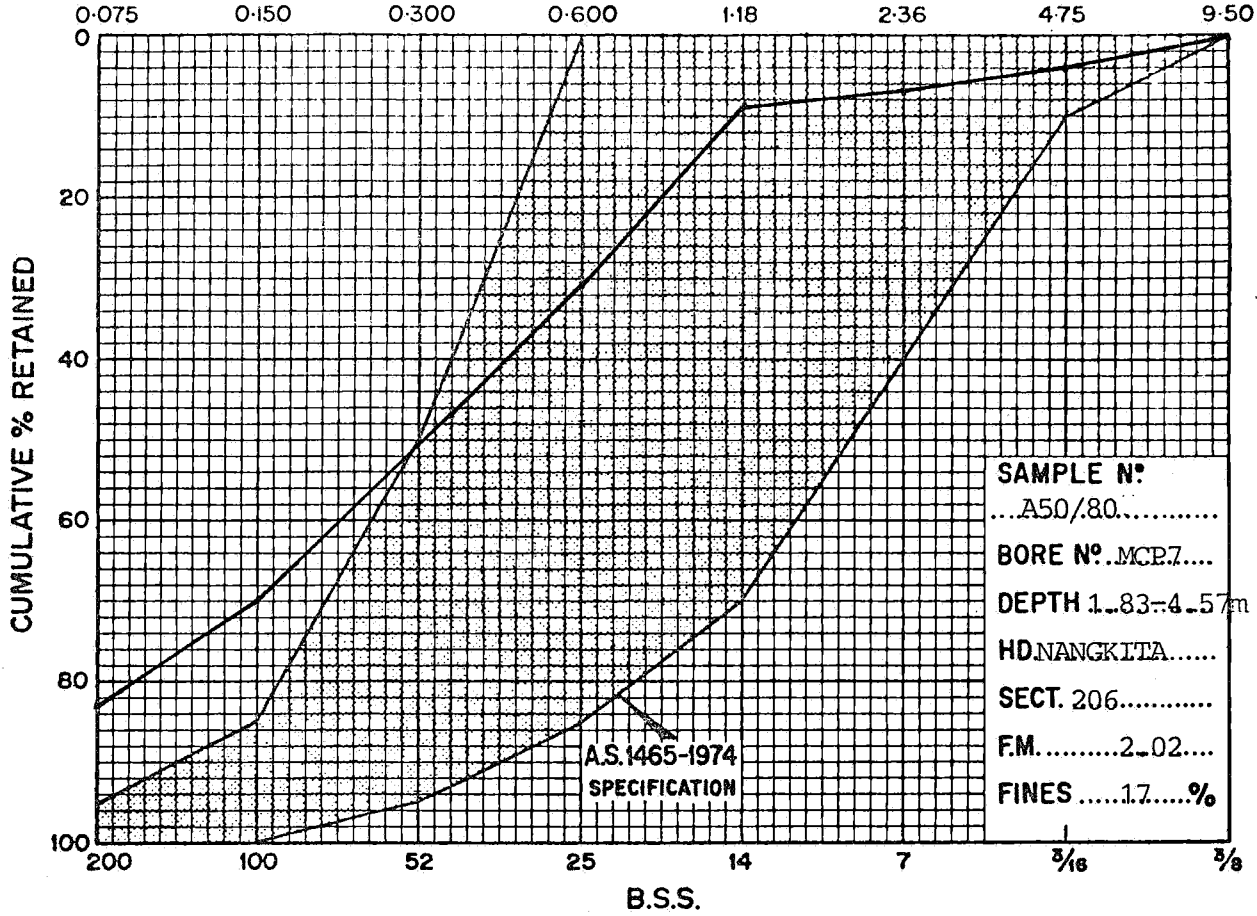

mm.
0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A45/80
BORE N°. MCP5
DEPTH 11.9-14.6m
HD. NANGKITA
SECT. 206
F.M. 1.27
FINES 5 %
200
100
52
25
14
7
3/16
3/8
B.S.S.

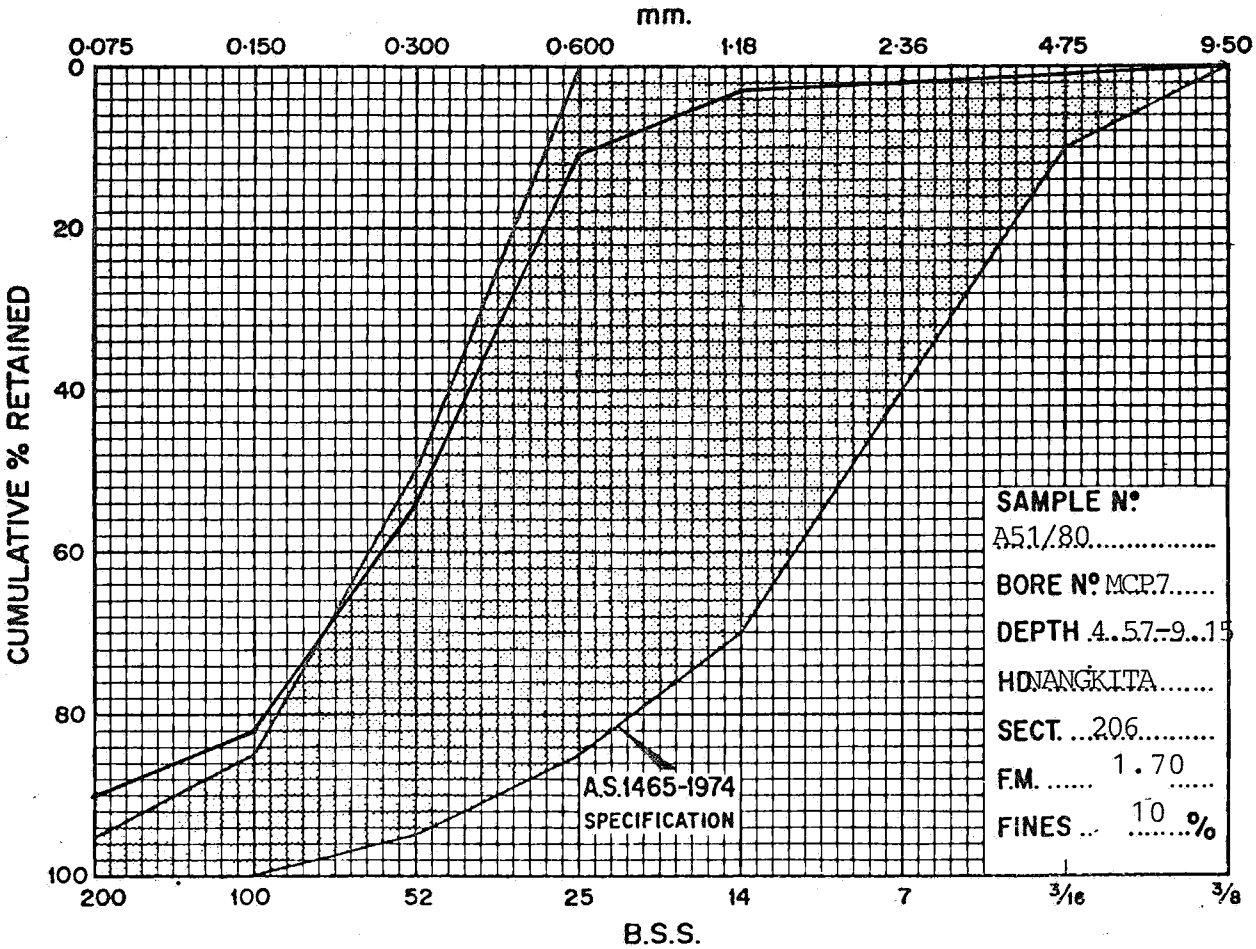

0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A46/80
BORE N°. MCP6
DEPTH 0-2.74m
HD. NANGKITA
SECT. 206
F.M. 1.83
FINES 12 %


mm.
0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A47/80
BORE N°. MCP7
DEPTH 2.74-4.57
HD. NANGKITA
SEC° 206
F.M. 0.95
FINES 9 %


0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A48/80
BORE N° MCP7
DEPTH 0-0.91m
HD. NANGKITA
SECT. 206
F.M. 1.06
FINES 7 %


mm.
0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A49/80
BORE N° MCP7
DEPTH 0.91-1.83
HD. NANGKITA
SECT. 206
F.M. 1.51
FINES 7 %


0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
mm.
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A50/80
BORE N°. MCP7
DEPTH 1.83-4.57m
HD NANGKITA
SECT. 206
F.M. 2.02
FINES 17 %


0·075
0·150
0·300
0·600
1·18
2·36
4·75
9·50
mm.
0
20
40
60
80
100
CUMULATIVE % RETAINED
200
100
52
25
14
7
3/16
3/8
B.S.S.
A.S.1465-1974
SPECIFICATION
SAMPLE N°
A51/80
BORE N° MCP7
DEPTH 4.57-9.15
HD NANGKITA
SECT. 206
F.M. 1.70
FINES 10 %

APPENDIX D

DETERMINATION OF FINENESS MODULUS

DETERMINATION OF "FINES FREE" FINENESS MODULUS

1. Particle size distribution is determined according to the procedure described in A.S. 1141-1974, sections 11 and 12. Sieves are chosen such that each has nominal aperture double that of the preceding one:-

Aperture (mm)	0.075	0.15	0.30	0.60	1.18	2.36	4.75	9.5	19.0
B.S.S. Mesh	200	100	50	25	14	7	3½	3/8	3/4

2. The proportion of material finer than 0.075 (200 mesh BSS) is designated as "fines".

3. The cumulative amount of sand retained on each of the nominated sieves is recalculated as a percentage of the material coarser than 0.075 mm (200 mesh).

4. Cumulative percentages calcuated in 3 (above) retained on 100 mesh BSS and coarser sieves are summed and divided by 100 to give Fineness Modulus.

Example

BSS Mesh	Nominal Aperture (mm)	Cum. Wt. Retained (gm)	Cum. % Retained	Cum. % of +200 mesh fraction retained	
3/8"	9.50	0.00	0.00	0.00)	
3/16"	4.75	0.56	0.28	0.29)	
7	2.36	4.36	2.19	2.26)	
14	1.18	13.34	6.70	6.91)	Sum=166.5
25	0.60	35.71	17.93	18.50)	
52	0.30	85.67	43.03	44.39)	
100	0.15	181.65	91.23	94.12)	
200	0.075	192.99	96.93	100.00	

Fines = 100.00 - 96.93 = 3.07% FM = $\frac{166.5}{100}$ = 1.67

APPENDIX E

EVALUATION OF NINE SAMPLES FOR GLASS AND FOUNDRY USE

EXTRACT FROM AMDEL REPORT MD3956/80

TABLE EI: BRIEF MINERALOGICAL DESCRIPTIONS OF NINE SAND SAMPLES

Locality	Sample Number	Colour	Shape	Morphology - Major Constituents Fe-staining, $CaCO_3$, organic etc.	Estimated % Heavy Minerals	Heavy Minerals Present
50m NW MCP7 0-0.91m	A27/80	Pale buff	Well rounded to sub-angular	Poorly sorted unconsolidated quartz sand with very minor iron staining. Majority of grains sound and unfractured. Traces of organic matter (root hairs). Noncalcareous.	Trace	Fe-oxides
MCP1 0-1.83m	A28/80	Light coffee brown	Sub-rounded to well rounded	Moderately well sorted unconsolidated quartz sand with very heavy iron staining. Isolated quartz grains up to 8 mm ø are present. Most grains almost completely encapsulated in a thin coating of Fe-oxide. Noncalcareous.	Nil	-
MCP2 1.83-3.66m	A34/80	Light coffee brown	Sub-angular to sub-rounded	Poorly sorted, unconsolidated quartz sand with very heavy iron-staining. A few aggregates of quartz grains up to 8 mm in size, weakly cemented by Fe-oxides are present; and many of the smaller grains are weakly banded into tiny aggregates. The presence of isolated unstained rounded quartz grains with irregular partial coatings of white clay (?kaolin), were also noted. Noncalcareous.	Nil	-
MCP2 3.66-6.40m	A35/80	Coffee brown	Sub-angular to sub-rounded	Poorly sorted, unconsolidated, ferruginous quartz sand in which the heavily ironstained grains are weakly cemented into abundant small aggregates and some larger aggregates up to 10 mm, by heavy concentration of Fe-oxides and ?clay. Noncalcareous.	Nil	-
MCP3 0-5.49m	A37/80	Light-tan	Sub-rounded to well-rounded	Moderately well sorted unconsolidated quartz sand with minor iron-staining. Rare 'sugary' quartz grains with heavy iron-staining are present. Trace of organic matter. Noncalcareous.	Trace	Fe/Ti-oxides.

MCP4 0-0.9m	A40/80	Light-brown	Sub-rounded	Moderately well sorted fine, unconsolidated quartz sand with fairly heavy iron-staining on all grains. Minor amounts of organic material present, in the form of woody root debris and root hairs. Noncalcareous.	Traces	Fe-oxides and ?silicates.
MCP5 0-1.83m	A43/80	Dark-brown and grey (salt & pepper)	Sub-rounded to well rounded	Moderately well sorted unconsolidated fine quartz sand consisting of approx-imately 50/50 mixture of heavily iron stained quartz grains and clean iron-free quartz grains. Organic matter in the form of woody debris is common. Some ferruginous clay is probably associated with the iron-stained grains. Noncal-careous. Rare coarse aggre-gates of weakly Fe-cemented grains also occur.	Trace	Fe-oxides
MCP6 2.74-4.57m	A47/80	Pinkish brown	Sub-angular to sub-rounded	Poorly sorted fine, uncon-solidated quartz sand, having all grains heavily coated with ferruginous ?clay. Large (10 mm) aggre-gates of quartz grains weakly cemented by ferruginous? clay are common. Non-calcareous.	Trace	Fe-oxides
MCP7 0-0.91m	A48/80	Brown and grey (salt & pepper)	Sub-rounded	Moderately well sorted fine, unconsolidated quartz sand consisting of approx. equal proportions of clean iron-free quartz grains and heavily iron-stained grains. Organic material in the form of root hairs and plant debris is common. A few small aggregates of grains weakly cemented by iron-oxides are also present. Noncalcareous.	Traces	Fe-oxides ?amphibole

TABLE E2: CHEMICAL ANALYSIS

Element	50mNW MCP7 0–0.91m A27/80	MCP1 0–1.83m A28/80	MCP2 1.83–3.66m A34/80	MCP2 3.66–6.40m A35/80	MCP3 0–5.49m A37/80	MCP4 0–0.91m A40/80	MCP5 0–1.83m A43/80	MCP6 2.74–4.57m A47/80	MCP7 0–0.91 A48/80
SiO_2	99.0	88.5	84.0	84.0	97.5	96.0	97.5	90.0	88.0
TiO_2	0.60	0.20	0.33	0.37	0.60	0.10	0.10	0.21	0.21
Al_2O_3	0.04	4.8	6.7	7.0	0.63	1.43	0.85	5.0	4.7
Fe_2O_3	0.31	3.00	2.87	2.95	0.68	0.81	0.82	1.78	2.00
MnO	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MgO	<0.01	0.07	0.14	0.15	<0.01	0.03	0.02	0.05	0.08
CaO	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.02	0.04
Na_2O	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.07	0.07
K_2O	0.05	0.17	0.17	0.20	0.05	0.06	0.09	0.14	0.16
P_2O_5	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03
LOI	0.15	2.87	5.08	4.80	0.53	1.26	1.64	2.48	4.08
Total	99.7	99.7	99.4	99.6	99.5	99.8	99.5	99.8	99.4
Organic C	0.02	0.04	0.06	0.04	<0.02	0.10	0.43	0.04	0.65
CO_2	0.05	0.05	0.25	0.20	0.20	0.35	0.30	0.05	<0.50

See also Tables E3-E11 and corresponding graphical plots.

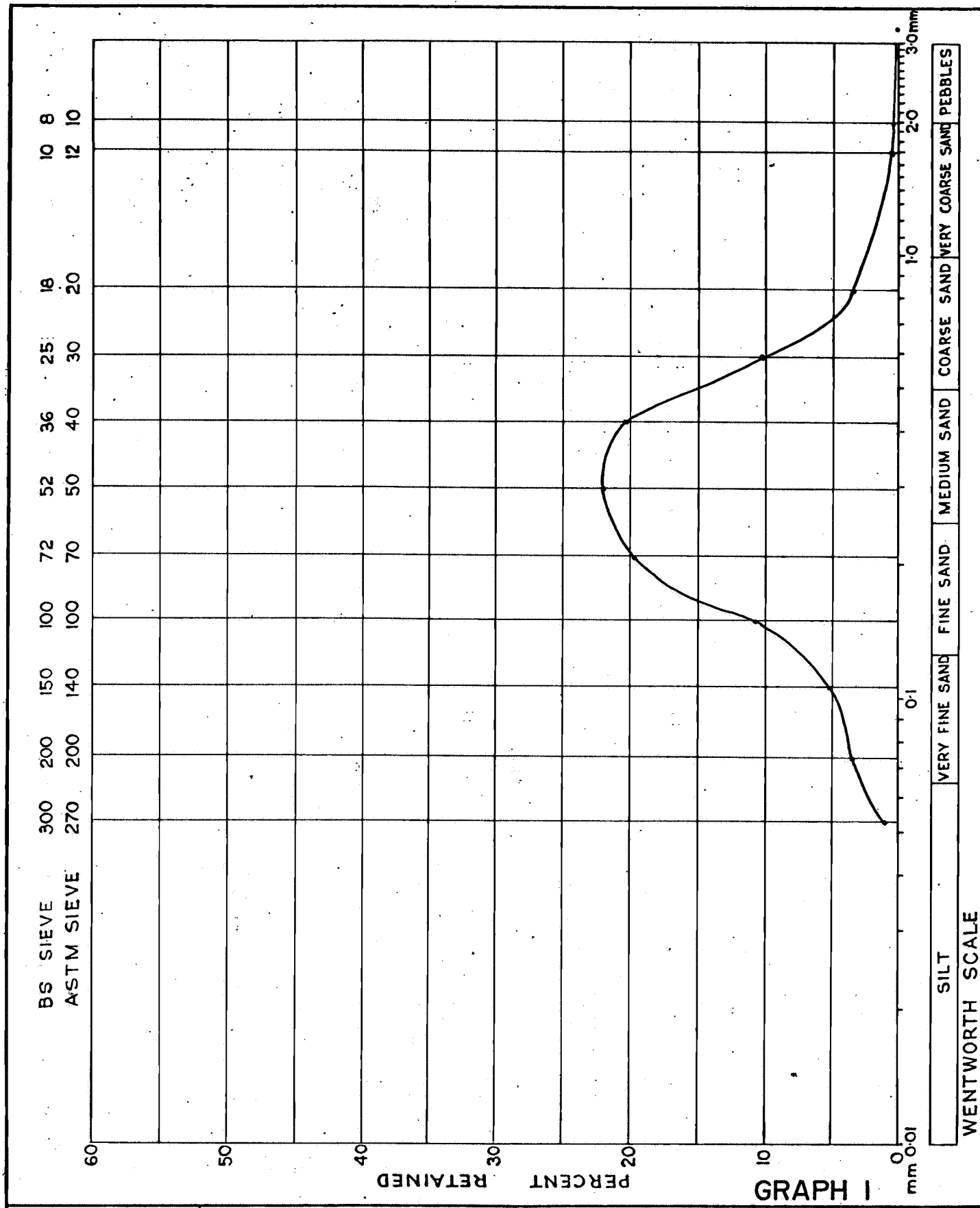
DISCUSSION

The samples tested for glass and foundry use vary considerably both in composition and size grading. None of the samples are suitable for glass making due to their high iron contents. They are not well sorted, most being 4-5 screen sands. Their AFS grain fineness numbers vary from 53 to 118. There is also considerable variation in their AFS clay contents which range from 0.5% to a very high 18.4%. These values are reflected by the high Al_2O_3 contents of some of the samples.

TABLE E3: FOUNDRY SAND SCREEN SIZE ANALYSIS
Sample Identification: 50m NW MCP7, 0-0.91 m

Mines Dept. No. A27/80
Size of sample: 65.1 g
AFS Clay (average): 0.5%.
AFS Grain finenes No.: 56

US series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	0.1	0.2	0.2
12	10	0.3	0.5	0.7
20	18	2.1	3.2	3.9
30	25	6.8	10.4	14.3
40	36	13.3	20.4	34.7
50	52	14.2	21.8	56.5
70	72	12.8	19.7	76.2
100	100	7.1	10.9	87.1
140	150	3.3	5.1	92.2
200	200	2.3	3.5	95.7
270	300	0.6	0.9	96.6
	-300	1.9	2.9	99.5
Total % Sand Grade				99.5



GRAPH 1

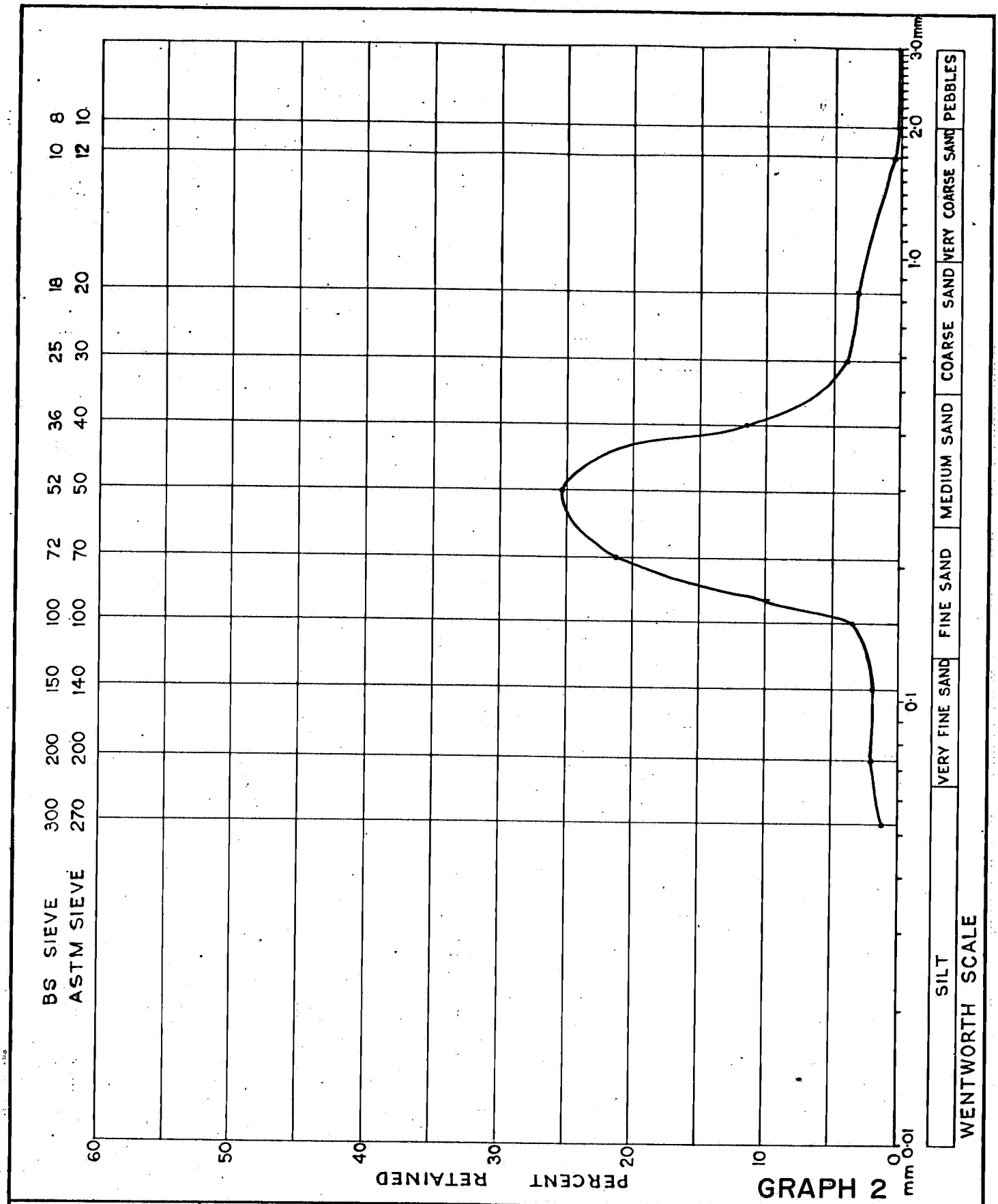
	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKE'S SAND DEPOSIT SECTION 206 HD NANGKITA SURFACE SAMPLE A 27/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER, '80
Drn. D.W.W. Ckd.		Drg. No. S15240
9-7-81		

2242

TABLE E4: SCREEN SIZE ANLAYSIS
Sample Identification: MCP1, O-1.83 m

Mines Dept. No.	A28/80
Size of sample:	38.00 g
AFS Clay (average):	12.4%
AFS Grain fineness No.:	82

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	-	-	-
12	10	0.2	0.4	0.4
20	18	1.7	3.4	3.8
30	25	2.0	4.0	7.8
40	36	6.0	12.0	19.8
50	52	12.8	25.6	45.4
70	72	10.7	21.4	66.8
100	100	1.7	3.4	70.2
140	150	1.0	2.0	72.2
200	200	1.1	2.2	74.4
270	300	0.6	1.2	75.6
	-300	6.0	12.0	87.6
Total % Sand Grade				87.6



GRAPH 2

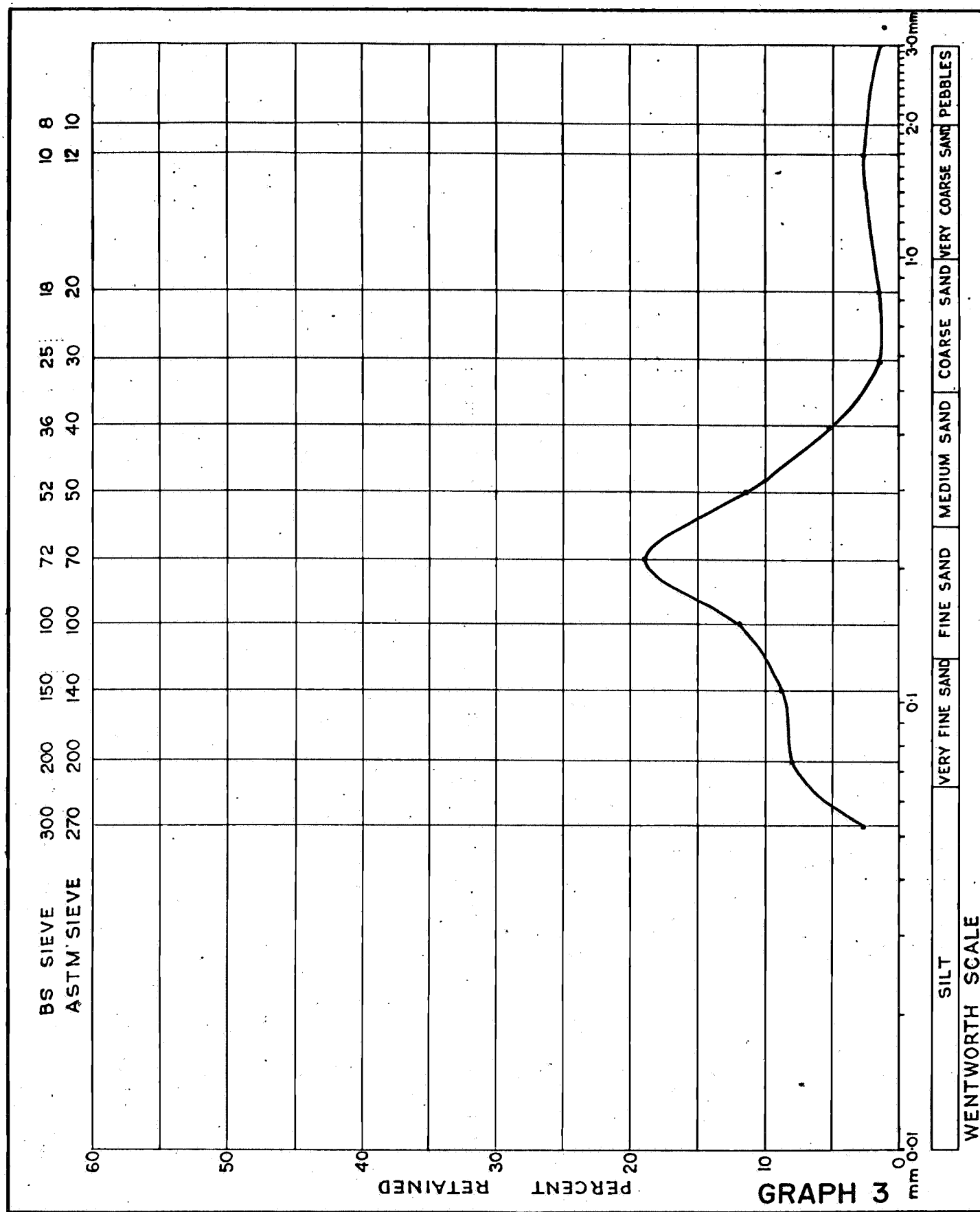
	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKE'S SAND DEPOSIT SECTION 206 HD NANGKITA MC PI, 0 - 1·83m A 28/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER, '80
Drn. D.W.W. Ckd.		Drg. No.
9-7-81		S15239

1242

TABLE E5: SCREEN SIZE ANLAYSIS
Sample Identification: MCP2, 1.83-3.66 m

Mines Dept. No.	S34/80
Size of Sample:	50.00 g
AFS Clay (average):	11.5%
AFS Grain fineness No.:	94

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	0.6	1.2	1.2
12	10	1.3	2.6	3.8
20	18	0.8	1.6	5.4
30	25	0.8	1.6	7.0
40	36	2.6	5.2	12.2
50	52	6.3	12.6	24.8
70	72	9.4	18.8	43.6
100	100	5.9	11.8	55.4
140	150	4.4	8.8	64.2
200	200	4.0	8.0	72.2
270	300	1.4	2.8	75.0
	-300	6.7	13.4	88.4
Total % Sand Grade				88.4



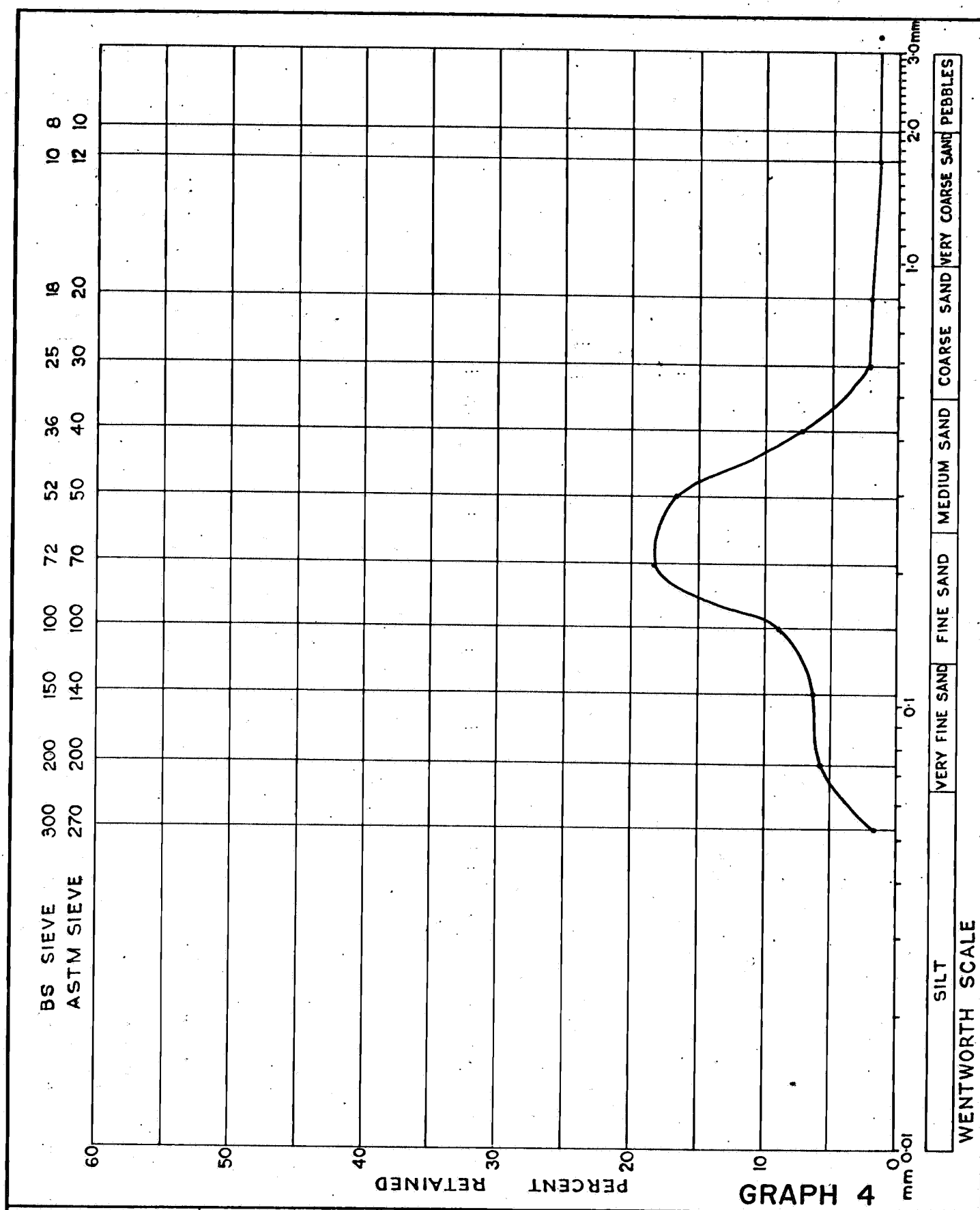
	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled J.T.V.	NITSCHKE'S SAND DEPOSIT SECTION 206 HD NANGKITA MC P2, 1·83 - 3·66m A 34/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER, '80
Drn. D.W.W. Ckd. 9·7·81		Drg. No. S15246

1242

TABLE E6: SCREEN SIZE ANALYSIS
Sample Identification: MCP2, 3.66-6.40 m

Mines Dept. No.	A35/80
Size of sample	50.0 g
AFS Clay (average):	18.4%
AFS Grain fineness No.:	89

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	0.6	1.2	1.2
12	10	0.8	1.6	2.8
20	18	1.0	2.0	4.8
30	25	1.0	2.0	6.8
40	36	3.6	7.2	14.0
50	52	8.4	16.8	30.8
70	72	9.0	18.2	49.0
100	100	4.5	9.0	58.0
140	150	3.1	6.2	64.2
200	200	2.9	5.8	70.0
270	300	0.9	1.8	71.8
	-300	4.9	9.8	81.6
Total % Sand Grade				81.6



GRAPH 4

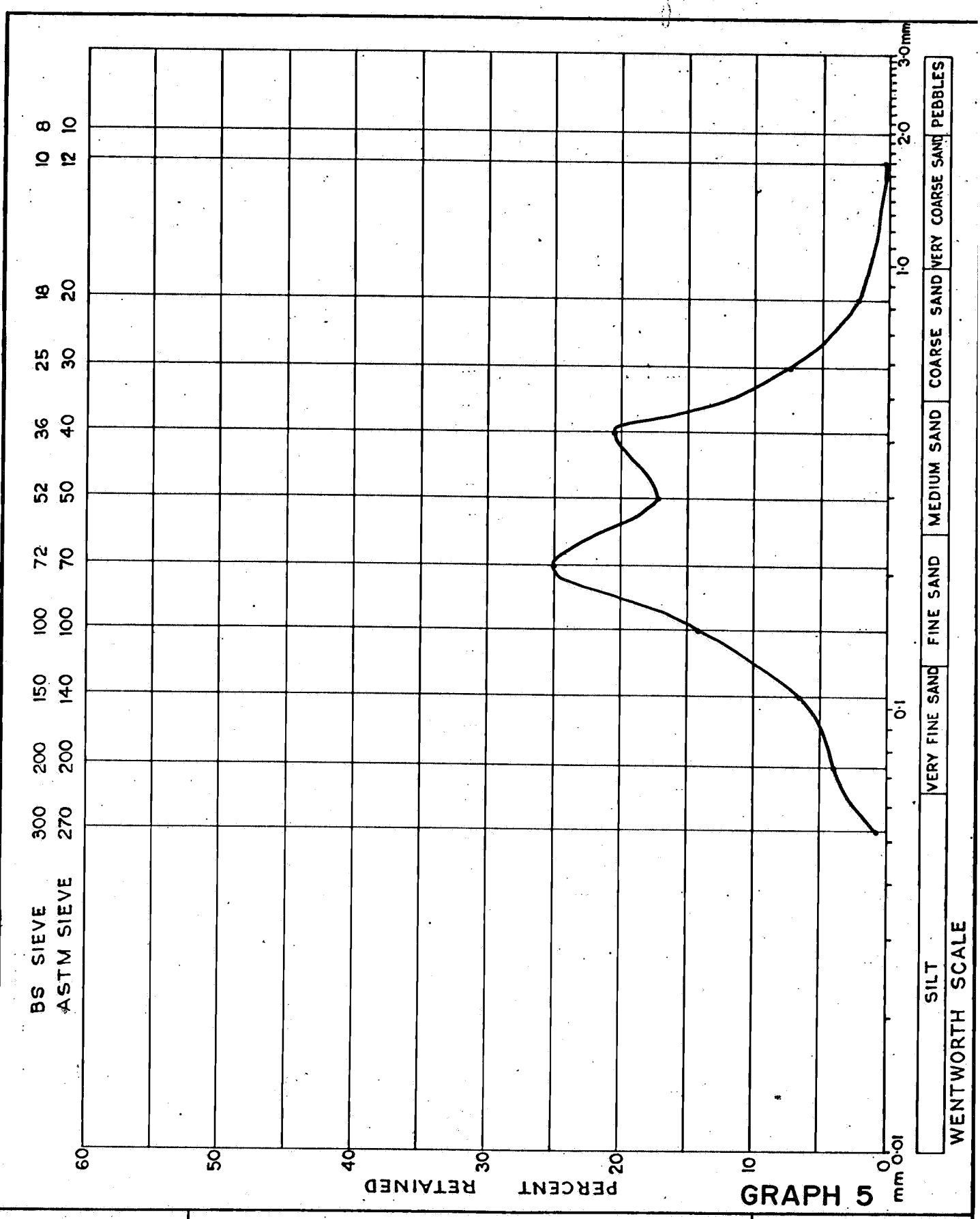
	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKE'S SAND DEPOSIT SECTION 206 HD NANGKITA MC P2, 3·66 - 6·40m A 35/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER, '80
Drn. D.W.W. Chd.		Drg. No. S15241
9·7·81		

2242

TABLE E7: SCREEN SIZE ANALSYSIS
Sample Identification: MCP3, 0-5.49 m

Mines Dept. No.	A37/80
Size of sample:	76.0 g
AFS Clay (average):	2.3%
AFS Grain fineness No.:	53

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	-	-	-
12	10	0.1	0.1	0.1
20	18	1.6	2.1	2.2
30	25	5.6	7.4	9.6
40	36	15.4	20.3	29.9
50	52	13.0	17.1	47.0
70	72	19.0	25.0	72.0
100	100	10.8	14.2	86.2
140	150	4.9	6.4	92.6
200	200	3.0	3.9	96.5
270	300	0.5	0.7	97.2
	-300	0.4	0.5	97.7
Total % Sand Grade				97.7



GRAPH 5

	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKE'S SAND DEPOSIT.	Date: DECEMBER, '80
Drn. D.W.W. Ckd.	SECTION 206 HD NANGKITA	Drg. No.
9·7·81	MC P3, 0-5·49m A 37/80	S15245
	FOUNDRY SAND SIEVE ANALYSIS	

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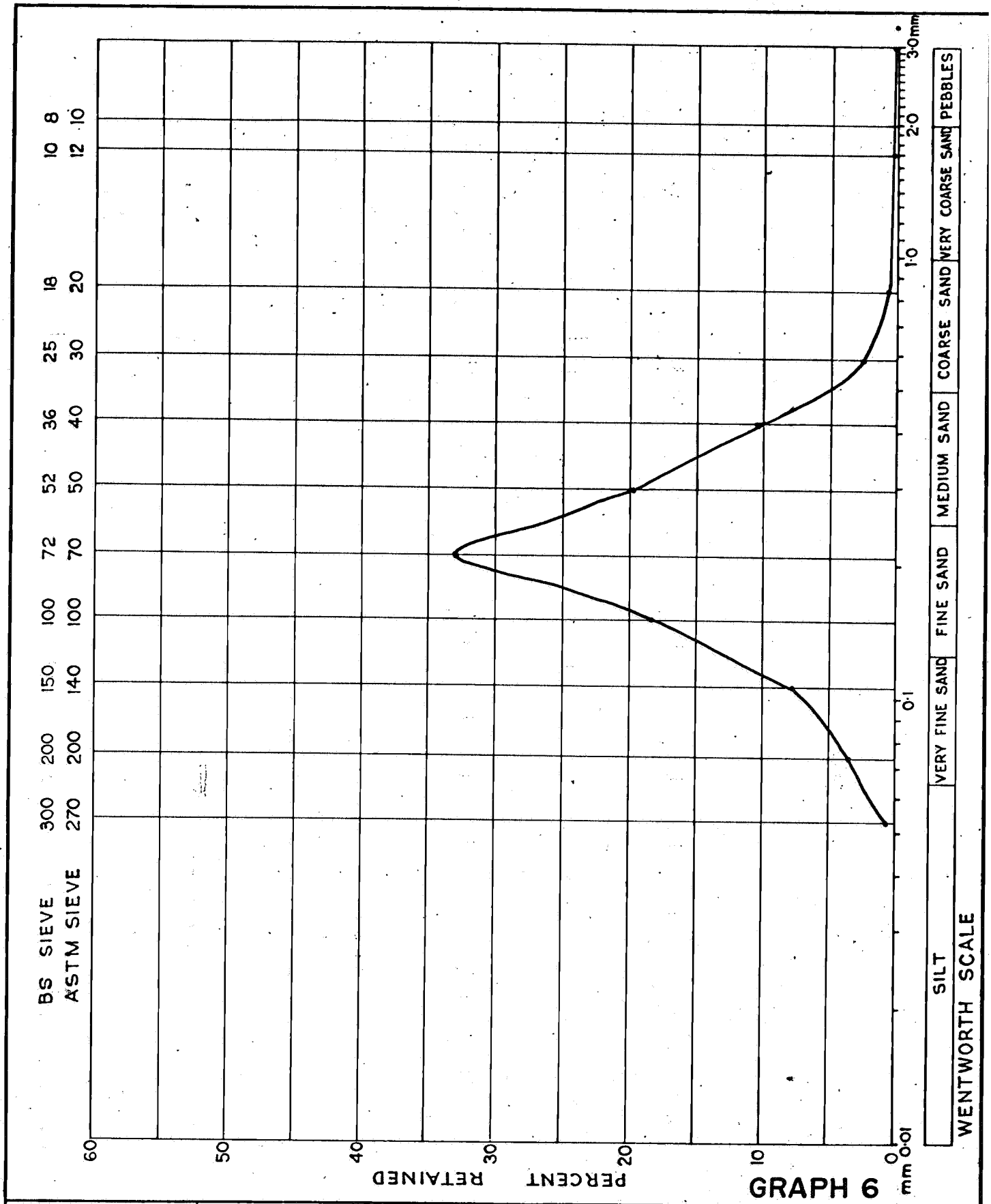
TABLE E8: SCREEN SIZE ANALSYSIS
Sample Identification: MCP4, 0-0.91 m

Mines Dept. No.	A40/80
Size of sample:	66.7 g
AFS Clay (average):	1.6%
AFS Grain fineness No.:	59

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	0.1	0.2	0.2
12	10	0.1	0.2	0.4
20	18	0.5	0.8	1.2
30	25	1.8	2.7	3.9
40	36	7.0	10.5	14.4
50	52	13.2	19.8	34.2
70	72	22.0	33.0	67.2
100	100	12.3	18.4	85.6
140	150	5.1	7.6	93.2
200	200	2.3	3.4	96.6
270	300	0.4	0.6	97.2
	-300	0.8	1.2	98.4

Total % Sand Grade 98.4



GRAPH 6

	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKE'S SAND DEPOSIT SECTION 206 HD NANGKITA MC P4, 0 - 0·91 m A 40/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER, '80
Drn. D.W.W. Chd.		Drg. No. S15243
9·7·81		

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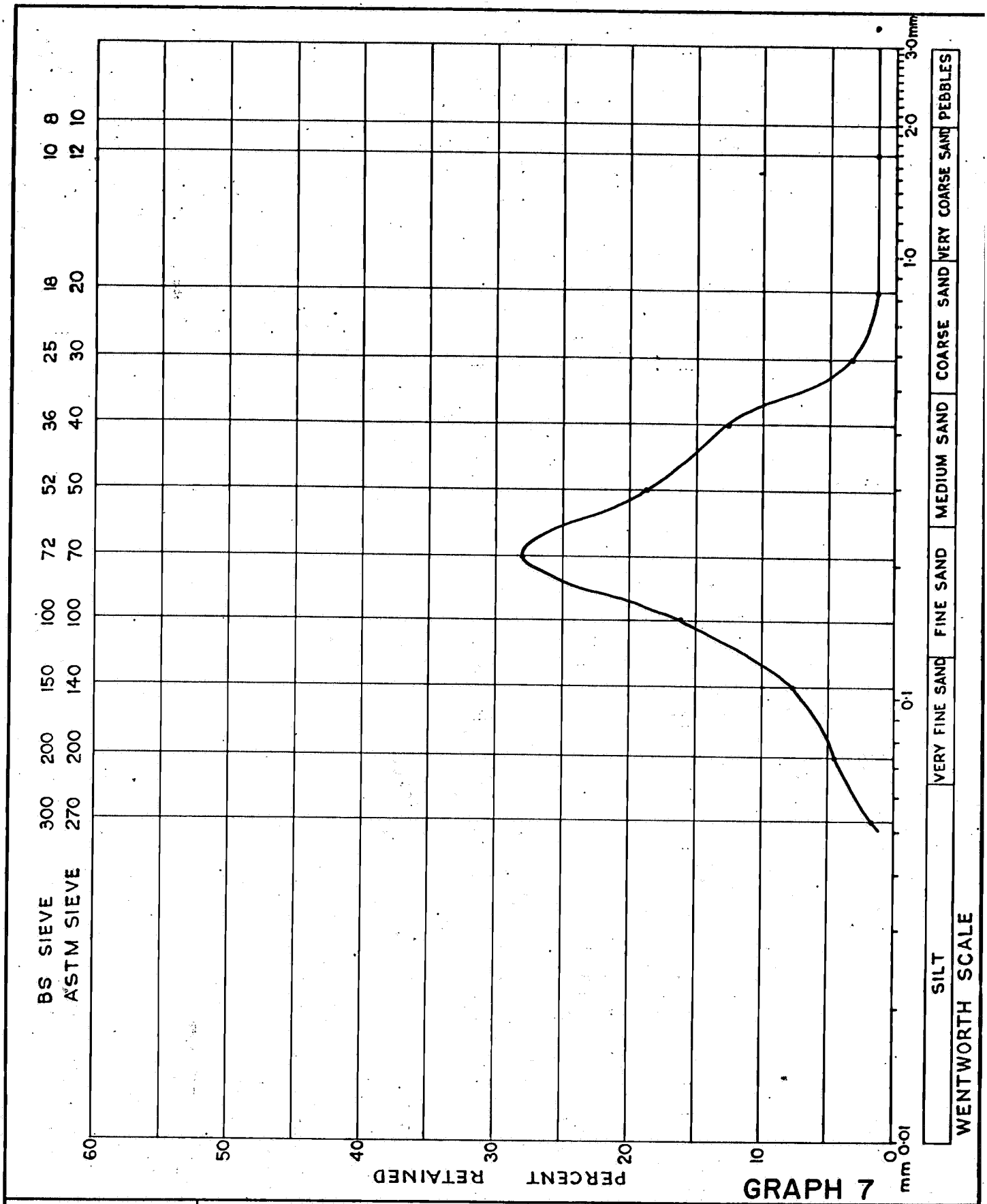
TABLE E9: SCREEN SIZE ANALYSIS
Sample Identification: MCP5, 0-1.83 m

Mines Dept. No.	A43/80
Size of sample:	6.01 g
AFS Clay (average):	1.3%
AFS Grain fineness No.:	67

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	0.7	1.2	1.2
12	10	0.7	1.2	2.4
20	18	0.8	1.3	3.7
30	25	1.8	3.0	6.7
40	36	7.3	12.4	18.8
50	52	11.2	18.6	37.4
70	72	16.8	28.0	65.3
100	100	9.6	16.0	81.3
140	150	4.5	7.7	88.8
200	200	2.7	4.5	93.3
270	300	1.0	1.7	95.0
	-300	2.2	3.7	98.7
Total % Sand Grade				98.7



GRAPH 7

	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKES SAND DEPOSIT SECTION 206 HD NANGKITA MC P5, 0 - 1·83m A 43/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER, '80
Drn. D.W.W. Ckd.		Drg. No. S 15242
9·7·81		

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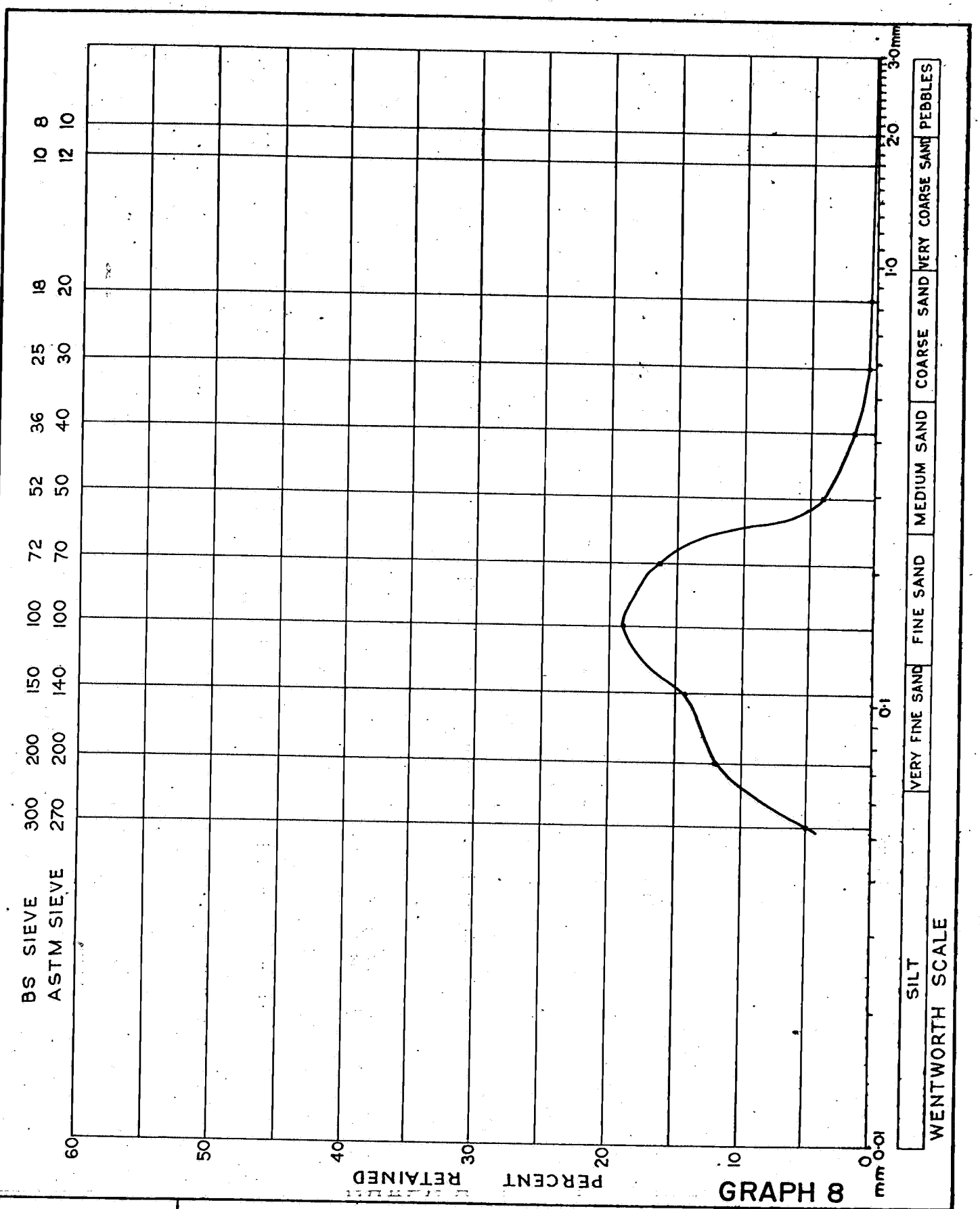
TABLE E10: SCREEN SIZE ANALYSIS
Sample Identification: MCP6, 2.74-4.57 m

Mines Dept. No.:	A47/80
Size of sample:	50.0 g
AFS Clay (average):	15.7%
AFS Grain fineness No.:	118

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	0.1	0.2	0.2
12	10	0.1	0.2	0.4
20	18	0.1	0.2	0.6
30	25	0.2	0.4	1.0
40	36	0.8	1.6	2.6
50	52	1.9	3.8	6.4
70	72	8.1	16.2	22.6
100	100	9.4	18.8	41.4
140	150	7.1	14.2	55.6
200	200	6.0	12.0	67.6
270	300	2.5	5.0	72.6
	-300	5.8	11.6	84.2
Total % Sand Grade				84.2



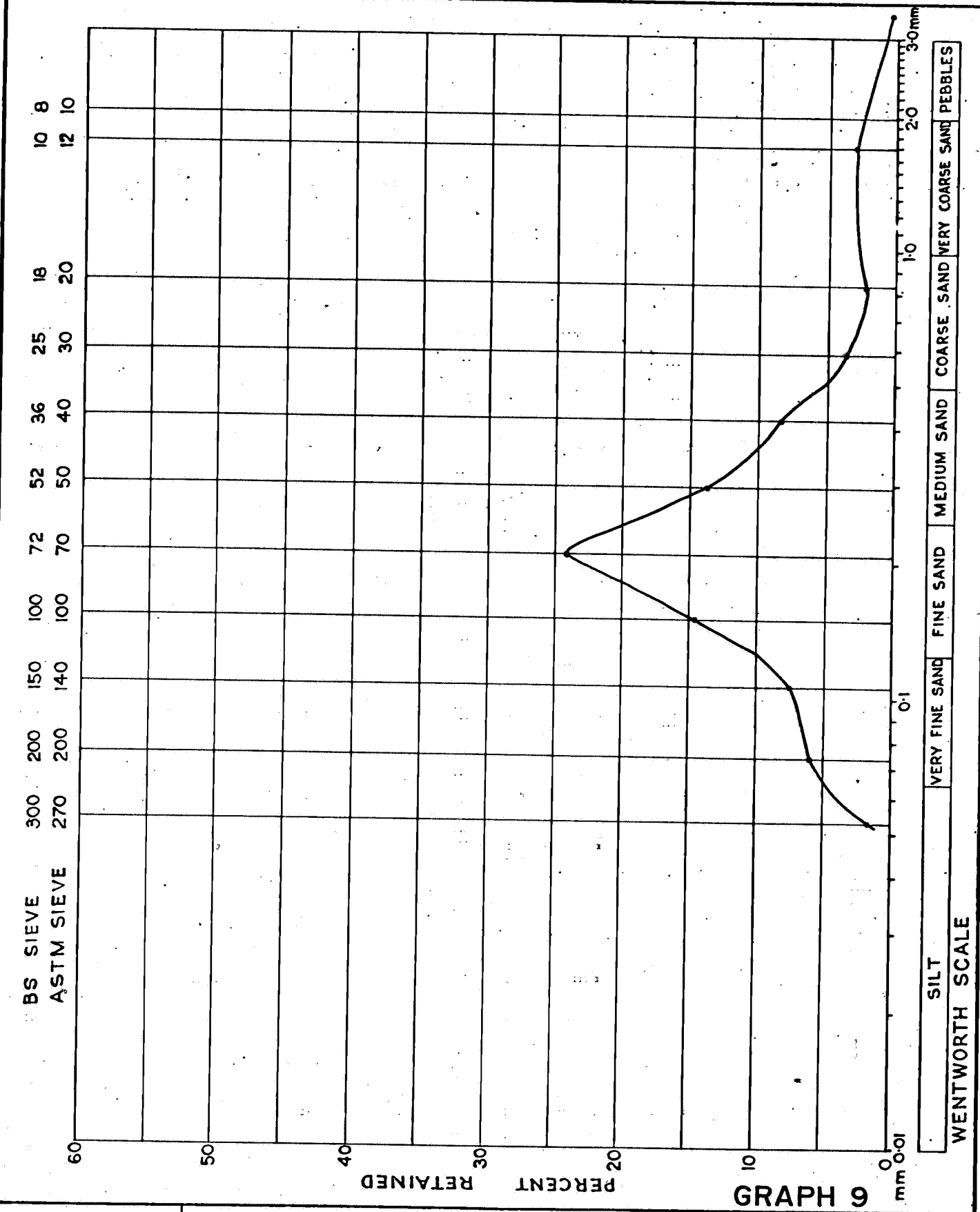
GRAPH 8

	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKES SAND DEPOSIT SECTION 206 HD NANGKITA MC P6, 2·74 - 4·57 m A47/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER, '80
Drn. D.W.W. Ckd.		Drg. No. S15247
9-7-81		

TABLE E11: SCREEN SIZE ANALYSIS
Sample Identification: MCP7, 0-0.91 m

Mines Dept. No.	A48/80
Size of sample:	50.0 g
AFS Clay (average):	5.6%
AFS Grain fineness No.:	81

US Series No. (ASTM)	Equivalent Mesh, BSS	Weight Retained	% Retained	% Cumulative
6	5	0.3	0.6	0.6
12	10	1.6	3.2	3.8
20	18	1.2	2.4	6.2
30	25	1.8	3.6	9.8
40	36	4.2	8.4	18.2
50	52	6.8	13.6	31.8
70	72	12.1	24.2	56.0
100	100	7.3	14.6	70.6
140	150	3.8	7.6	78.2
200	200	3.0	6.0	84.2
270	300	0.9	1.8	86.0
	-300	4.2	8.4	94.4
Total % Grade Sand				94.4



GRAPH 9

	DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA	Scale:
Compiled: J.T.V.	NITSCHKE'S SAND DEPOSIT SECTION 206 HD NANGKITA MC P7, 0 - 0·91m A 48/80 FOUNDRY SAND SIEVE ANALYSIS	Date: DECEMBER,'80
Drn. D.W.W. Chd.		Drg. No. S15244
9·7·81		

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APPENDIX F

TESTING TO AUSTRALIAN STANDARD AS2223-1978 (GARDEN SOILS FOR DOMESTIC USE):

EXTRACT FROM AMDEL REPORT M3956/80

RESULTS

TABLE F1: GARDEN SOIL PROPERTIES

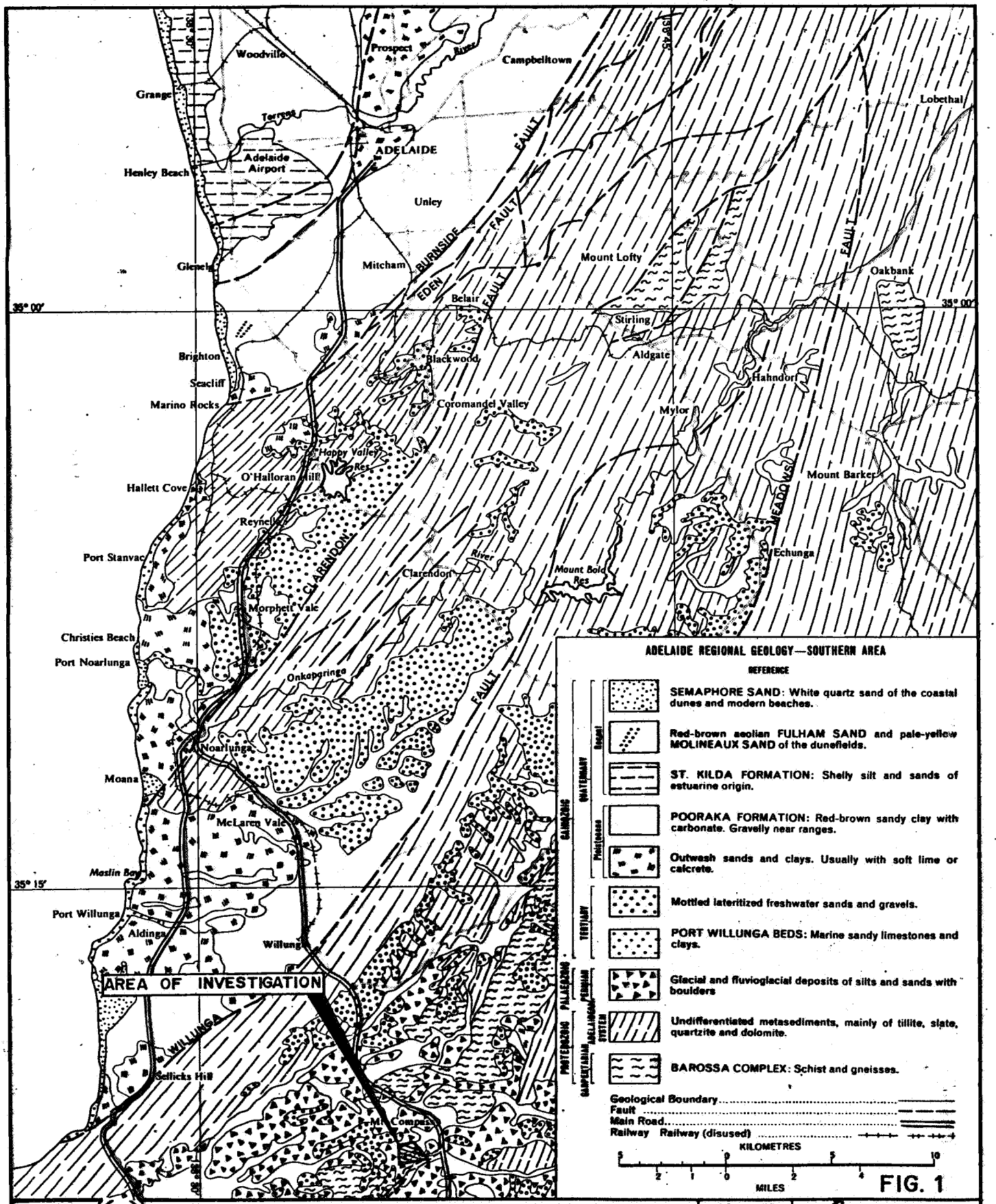
Sample. No.	Locality	Organic Matter % by mass	pH	Soluble Salts %
A28/80	50mNW,MCP7,0-0.91m	0.1	5.5	0.032
A34/80	MCP2,1.83-3.66m	0.2	5.4	0.004
A35/80	MCP2,3.66-6.40m	0.1	5.4	0.006
A37/80	MCP3,0-5.49m	0.1	5.4	0.002
A40/80	MCP4,0-0.91m	0.3	5.7	0.003
A43/80	MCP5,0-1.83m	0.9	5.8	0.003
A47/80	MCP6,2.74-4.57m	0.1	5.0	0.002
A48/80	MCP7, 0-0.91m	1.1	5.3	0.006
Standard	(AS2223/78)	General purpose soil >1 Premium Garden soil >5	5-8	0.06 max.

TABLE F2: CLASSIFICATION OF GARDEN SOILS ACCORDING TO THEIR TEXTURE

Texture of soil	Classification test	Typical composition	General description	Disadvantages	Advantages	Typical uses
Medium	When thoroughly moistened the soil can be moulded into casts using the hands. The casts are not sticky and have a rough surface when rubbed with the fingers. The casts will withstand a reasonable amount of handing without falling apart.	Contains between 10% and 25% of clay	The soil is described as loam and contains small clods	The soil may break down and pack tightly if worked too often	The soil is easier to work than fine soil and is easier to bring to a seed bed condition. The soil drains well.	For preparing garden beds
Coarse (light)	When thoroughly moistened it may be possible to mould the soil into casts using the hands. The soil will lack cohesion and will easily fall apart.	Contains more than 75% of sand and less than 10% of clay	The soil contains few clods, if any, and is very friable	The soil may dry out rapidly in hot weather and may not readily absorb water	The soil is easy to to spread and level and drains rapidly.	For top dressing and as a surface soil

DISCUSSION

All samples meet the requirements of pH (5-8) and soluble salts content (less than 0.06%. However, only one sample, A48/80, has the required amount of organic matter (1% or greater).



DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

COMPILED J.T.V. | C.D.O. 9-7-81 DATE

DRAWN S.R. | SCALE 1:250 000

DATE 8/12/80 | PLAN NUMBER S15282

CHECKED

NITSCHKE'S SAND DEPOSIT—MOUNT COMPASS
HUNDRED OF NANGKITA, SECTIONS 205,206
LOCATION AND REGIONAL GEOLOGY

2242

PF No S9993 6H

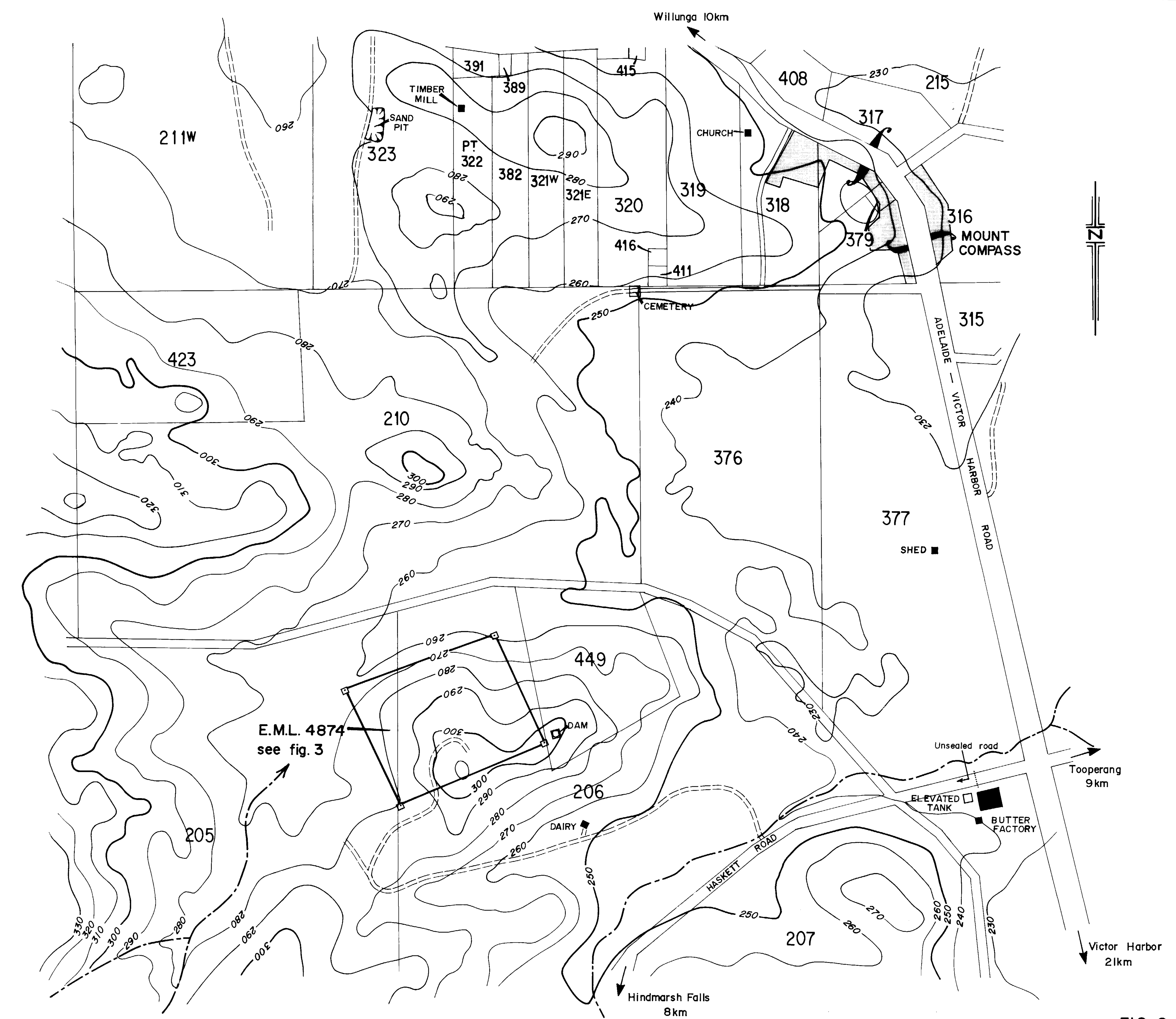


FIG. 2

LEGEND

Road

Track

310 — Contours in metres A.H.D.

Lease corner post.

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

NITSCHKE'S SAND DEPOSIT — MOUNT COMPASS

HUNDRED OF NANGKITA, SECTIONS 205, 206

LOCALITY PLAN

COMPILED	J.T.V.
DRAWN	S.R.
DATE	11/12/80
CHECKED	9.7.81
C.D.O.	DATE
SCALE	1:10000
PLAN NUMBER	80-883

2242

T.N.

G.N. M.N.

MCP 5

MCP 4

MCP 3

MCP 2

MCP 6

MCP 1

MCP 7

SEC 205

SEC 206

SEC 449

Dam

Dairy

260

270

280

290

300

310

250

A

A'

Metres 50 0 50 100 150 200 250 Metres

SCALE

LEGEND

MCP 3 — Drillhole and number.

Lease corner post (EML 4874).

Track.

290 — Contours in metres (A.H.D.).

A — A' Geological cross section (see fig 4 plan S15238)

Area worked by council for gravel.

FIG. 3

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

NITSCHKE'S SAND DEPOSIT — MOUNT COMPASS

HUNDRED OF NANGKITA, SECTIONS 205,206

DRILLHOLE LOCATION PLAN

COMPILED	J.T.V.
DRAWN	S.R.
DATE	13/12/80
CHECKED	
C.D.O	9·7·81 DATE
SCALE	1:2500
PLAN NUMBER	80–884

2242

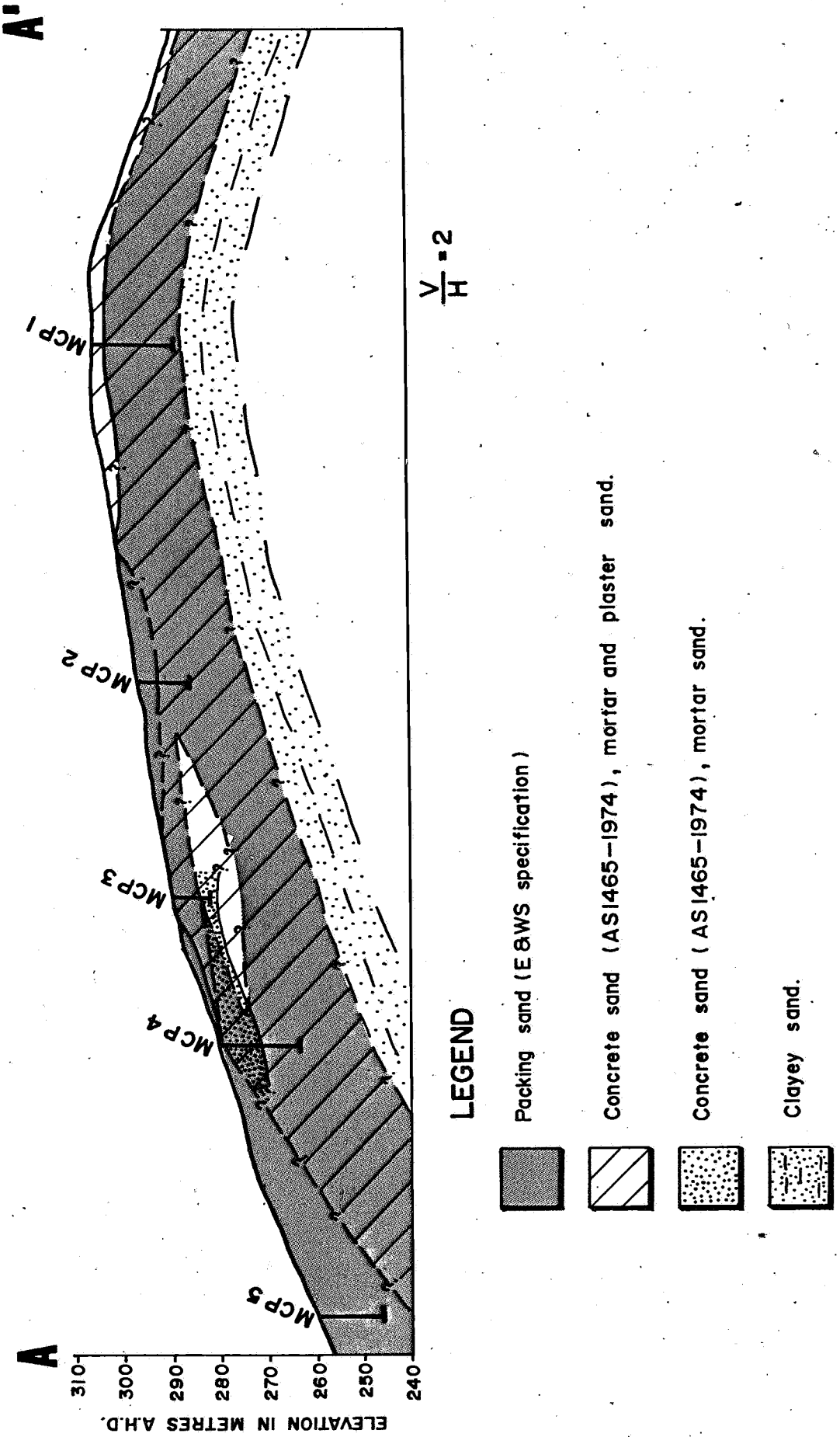


FIG.4

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

COMPILED J.T.V.
C.D.O. 9.7.81 DATE
DRAWN S.R.
SCALE HOR. 1:2500
DATE 12/12/80
PLAN NUMBER S15238
CHECKED

NITSCHKE'S SAND DEPOSIT—MOUNT COMPASS
HUNDRED OF NANGKITA, SECTIONS 205,206
SECTION A–A'

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