Section

Rept. Bk. No. 59/143
G.S. No. 3037
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DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

ENGINEERING & SOILS GEOLOGY SECTION

MIDDLE RIVER DAM - KANGAROO ISLAND
FEASIBILITY STAGE GEOLOGICAL INVESTIGATIONS

PRELIMINARY REPORT - SUMMARY OF RESULTS

DECEMBER 1964

by

D. H. Stapledon
Senior Geologist

and

S. Robson
Geologist

64-4

8th December, 1964

D.M. 2295/63

RB 59/143

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MIDDLE RIVER DAM - KANGAROO ISLAND
FEASIBILITY STAGE GEOLOGICAL INVESTIGATIONS
PRELIMINARY REPORT - SUMMARY OF RESULTS
DECEMBER 1964

INTRODUCTION

The site for the proposed Middle River Dam is located about 4 miles upstream from the mouth of Middle River, in Section 79, Hundred of Duncan, Kangaroo Island. It is about 30 miles east of Kingscote, as shown on Figure 1.

At the site it is proposed to build a dam about 70 feet high to store water for the Kingscote - Parndana district.

Field geological studies for site selection and feasibility have been completed, and a detailed report is in progress. The work has included detailed geological mapping at the dam site and at possible quarry sites, and five diamond drill holes put down along a tentative axis line at the dam site.

Design Branch of Engineering and Water Supply Department are preparing preliminary estimates for pre-stressed gravity, earth and rock fill, and faced rock fill dams at the site. Mr. R. Good, Designing Engineer, Dams, has requested a summary of the results of the geological studies, for use in preparation of the comparative estimates for the three alternative schemes. The foundation requirements for each of these types of structure have been discussed with Mr. Good.

This report summarises the main results and conclusions reached. The detailed factual data upon which the conclusions are based will be in the main detailed report.

DAM SITE GEOLOGY

Quality of Foundation Rock

The site is in massive quartzite or greywacke, which is a

compact, durable, rock, of very high strength and elastic modulus. There are several nearly vertical planar zones up to 2 ft. thick in which the rock is thinly bedded and fissile. It is considered that when confined, this rock would not be appreciably weaker than the massive rock.

Quality of Foundation Rock Mass

The rock mass is intersected by three sets of joints (Fig. 2) which tend to divide it into blocks of approximately rhomboidal shape. Near the surface the rock itself is partly weathered, and in addition the joints have opened up as a result of weathering and become partly filled with soft materials including weathered rock, clay, organic soil, and roots of vegetation. Below the red line on Figure 2, the majority of joints are tightly closed, in many cases cemented by strong material such as quartz and calcite.

Near-horizontal joints occur at intervals of 1 to 5 feet in the relatively steep right abutment, and together with joints dipping about 50° downslope, appear to have allowed mechanical loosening of the rock mass to depths of 15 to 20 feet below surface. On the right bank the red line on Figure 2 does not go beneath the limit of mechanical loosening as indicated by the exploration; it is however below the levels of the last soil or clay filled joints recorded, and it is considered that the material below can be consolidated by cement grouting. The stepped shape of the line is in part diagrammatic - it is intended to show the shape which can tend to form on excavation with the existing natural joint pattern.

No wide zones of sheared or crushed rock were located in the exploration. It is possible that some relatively narrow zones of such material occur in the areas between the exploratory holes.

A steeply dipping zone of weathered rock exposed in the trench on the left bank was intersected in the uppermost 10 to 15 feet of Hole 4. It appears to be a localised zone about 10

feet wide in which joints are spaced 0.5 feet or less, with the result that the effects of mechanical and chemical weathering probably extend locally deeper than in the average rock.

Permeability of Foundation

All of the holes were tested for permeability by the single packer method. Except in Hole 1 at the top of the right abutment, 10 and 20-feet sections of the rock below the main weathered zone were almost watertight when tested at pressures of up to 40 lbs./sq.in.

Slope Stability

There are no signs of ancient or recent slope instability in the dam site area.

The orientation of joints on the right abutment favours sliding of rhomboidal blocks during excavation, but with cutting depths of less than 20 feet this should not create serious problems.

NOTES ON GEOLOGICAL FEATURES AFFECTING THE ALTERNATIVE TYPES OF STRUCTURES

The following notes have been prepared after discussion of the engineering requirements with officers of Engineering and Water Supply Department.

Concrete Gravity Dam (Pre-stressed)

Foundation

The red line on Figure 2 is a suggested excavation depth for this type of structure, based on the results of the five diamond drill holes and permeability tests. Except for the uppermost part, above about R.L. 590 on both abutments, the rock below this line is assumed to be mainly fresh, in general tightly jointed, and to contain no seams or zones of weak material liable to consolidate under load or fail by sliding. On the right bank the rock below the line probably contains some partly open joints but it is considered that this rock can be consolidated by cement grouting. The red line is generally several feet

below the main weathered zone, to allow the structure to be keyed into suitably sound rock.

Drilling of Holes for Anchors

Drilling of the vertical holes for pre-stress cables may require a careful approach because of the very hard and abrasive nature of the quartzite, and the presence of several near-vertical zones of softer, fissile rock. Two possible problems are recognised:

--- slight defections of the holes from vertical.

It is believed that there is more chance of deflection with percussion drilling than diamond drilling, and further, that there is more chance of deflection with a solid (non-coring) diamond bit, than with a coring bit. In any case, if exact verticality of holes is critical, it may be advisable to locate holes away from the contacts between massive and fissile rock.

--- high diamond usage if diamond drilling is used.

During the exploratory diamond drilling at the site, bits usually became polished after several feet only of drilling. Once polished their penetration rate became very slow and it was not economical to use them further at this site. The following figures show diamond usage and costs for the exploratory drilling.

Total depth drilled	243 feet
Initial Diamond Cost	£1403
Diamond Loss (usage)	£551
Percentage Diamond Loss	39.3%
Diamond cost per foot	£2-5-4.

It is considered that the use of a soluble oil lubricant in the drilling water may increase penetration rates and reduce diamond usage in this type of rock.

Spillway

The rock in the stream bed downstream from the proposed structure is of sufficient quality that no protective measures should be required. It is also considered likely that very little protective work would be required if a channel

spillway was constructed on the left bank, as indicated on Figure 2.

Coarse Aggregate Sources

Quartzite which appears suitable for crushing for coarse aggregate is exposed in a 30 to 50 foot high face about ½ mile downstream from the site (Fig. 3). The rock is generally massive or poorly bedded, and except in some localised thinly bedded zones, should provide coarse aggregate up to three inches in size.

Preliminary estimates on the basis of the surface geological mapping and sketch sections on Figure 3 indicate that at least 10,000 c. yds. of material could be obtained from this source.

The Bay of Shoals Quarry at Kingscote (Fig. 1) is in sheared columnar basalt. The rock is divided into thin platy fragments separated by limonite or soil-coated joints. A typical fragment would be 5 x 4 x ¾ inch. The rock in the core of each fragment is generally fresh, and adjacent to the joint faces it is slightly, and in some cases moderately weathered. It is understood that the rock is crushed and used for ¾ inch aggregate. However, it is considered unlikely that any larger size than ¾ inch could be obtained from this source.

Fine Aggregate Sources

Natural sand is worked intermittently for fine aggregate at the MacGillivray pit about 12 miles south-east of Kingscote (Fig. 1). The sand occurs in one of a series of elongated dunes. The depth of usable material appears to range from 4 to 6 feet and it is considered likely that the quantity required (approx. 4000 c.yds.) could be obtained from this source.

Quartzite from the proposed quarry site downstream from Middle River Dam may when crushed produce fine aggregate suitable for use in concrete, either alone, or else blended with natural sand.

Small alluvial terraces in the lower reaches of Middle River are underlain mostly by silts with some fine sandy silts rich in organic material. It is considered that these deposits contain no material suitable for use as concrete aggregate.

Earth and Rockfill Dam

Foundation

It is considered that the impervious core zone of such a dam could be founded in a trench excavated down to a little above the red line on Figure 2. On the left bank this could be 3 to 4 feet above the line, and on the right bank almost 6 feet above. The requirement assumed is that the rock at these levels will be sufficiently compact, or can be made sufficiently compact by local dental treatment, to ensure that fine material from the core cannot be carried by percolating water into open joints or voids in the foundation. It is also assumed that a grout curtain will have to be constructed from a line of holes located roughly in the centre of the trench.

The filter zone should require a shallower excavation than the impervious core, and a suitable foundation for the rockfill will probably be found in most places within a foot of the natural surface. It is assumed that only the vegetation and organic topsoil will need to be removed before placement of the rockfill.

Rockfill Sources

It is considered that adequate quantities of suitable quartzite exist along the sides of Middle River gorge, within $\frac{1}{2}$ mile of the dam site. An extension of proposed concrete aggregate quarry, shown in Figure 3, may prove to be best source.

Filter Material Sources

It is assumed that either crushed quartzite from the dam site area, or crushed basalt from the Bay of Shoals quarry near Kingscote, would prove suitable for use as filter material. No natural gravel deposit suitable for consideration as a filter

source has been located.

Impervious Core Material Sources

Completely weathered and lateritized bedrock has been proven to depths of up to 40 feet beneath the plateau surface about 2 miles from the site. This weathered rock consists of silty and sandy clays generally of low plasticity, often containing laterite gravel in the uppermost 5 feet. It is considered that this weathered rock would probably prove suitable for use as core material, and that deposits of similar material should be found within 1 mile of the site. The groundwater table often lies close (within 10 to 15 feet) to the ground surface in this area, and so it may be necessary to obtain the material from very shallow depths.

Spillway

It is assumed that a channel spillway would be constructed on the left bank. The results of drilling suggest that this should be in partly weathered quartzite for the first 4 to 5 feet below the surface, and mainly fresh rock, with localized weathered seams and zones, below that depth. Much of the material excavated should be usable as rockfill, and it should be possible to leave the channel largely unlined.

Faced Rockfill Dam

Foundation

It is assumed that this type of structure would require a cut-off trench at the upstream toe, excavated down to rock which can be rendered impervious by cement grouting. At this initial stage it could be assumed that the depths required would be 2 or 3 feet less than those for the gravity dam foundation, i.e. 2 or 3 feet above the red line on Figure 2.

The rockfill foundation requirements would be the same as for the earth and rockfill structure, and it is considered that a suitable foundation will probably be found within 1 foot of the natural surface in most places.

Rockfill Sources

These will be local quartzite, the same as for rockfill for an earth and rockfill structure, described above.

Spillway

A channel spillway located on the left bank, would be mainly in rock which could be used as rockfill, and it is considered likely that the channel could be largely unlined.

D. H. Stapledon
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Geologist

ENGINEERING & SOILS GEOLOGY SECTION

DHS&SR/AGK
8/12/64

DEPARTMENT OF MINES — SOUTH AUSTRALIA

Hole No. 1

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MIDDLE RIVER DAM CO-ORDINATES R.L. 598 FT

FEATURE FOUNDATION HUNDRED DUNCAN DIRECTION 267°

LOCATION UPPER RIGHT ABUTMENT SECTION 79 ANGLE FROM HORIZONTAL 45°

ROCK TYPE Degree of Weathering Shown in Core	DESCRIPTION	R.L. Casing	Depth and Size of Core	Log	Lift and Core rec'y %	STRUCTURES Joints, Veins, Seams Faults, Crushed Zones
	Topsoil		NO CORE			
QUARTZITE SW to HW with MICACEOUS THINLY BEDDED ZONES CW HW CW SW-MW	core in 0·2 to 0·5ft lengths.		NXC		0	
					95	Several irregular joints soil and limonite coated dip 90° on core
			NMS		0	
	NO CORE					
	Grey sandstone with dark grey-brown phyllite bands.	590	10			Bedding dips 80° to 90° on core
	NO CORE				85	Joints, near horizontal with up to 0·01ft clay & decomposed roots.
	Core in 0·25 to 0·5ft lengths.				100	Joints near horizontal rough, limonite coated
QUARTZITE Mainly FRESH, with SW to HW zones near joints as shown HW	Bluish-grey fine sandstone inter-bedded with dark grey well laminated greywacke with slump bedding below 26ft		20			
	NO CORE				92	
SW to HW		580			75	
	NO CORE					
	Core mostly in 2 to 4ft lengths				100	
SW to MW			30			Joints, near horizontal with up to 0·02ft clay and decomposed roots, limonite coated, rough
					100	
SW to MW		570	40			Joints, near horizontal with up to 0·01ft clay, limonite coatings, rough
SW to MW						
SW to MW	Vuggy quartz along bedding in places					Joint dipping 25° on core clay veneer, limonite coated
SW to MW			50			Joints, near vertical & horizontal, clay and limonite coatings.
	50·15ft END OF HOLE					

WATER LEVEL: 9th July '64 ▼ 13th July '64

WATER PRESSURE TEST GALLONS PER MINUTE LOSS 5 10

NOT TESTED

10 15 18 pump capacity

30

20

10

Drill No. 7

Type E 1000

Driller T. Briggs

Commenced 6th July '64

Completed 10th July '64

EXPLANATION

FR – Fresh

SW – Slightly weathered

MW – Moderately weathered

HW – Highly weathered

WATER LEVEL ▼ DATE

Logged S. Robson

Sheet No. 1

Drawn S. Robson

Checked

Submitted

Vert. Scale 1" = 10'

Sheet 1 of 1

53775

L1

250 7.60 8036

DEPARTMENT OF MINES — SOUTH AUSTRALIA

Hole No. 2

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MIDDLE RIVER DAM CO-ORDINATES R.L. 581 FT

FEATURE FOUNDATION HUNDRED DUNCAN DIRECTION 215M °

LOCATION RIGHT ABUTMENT SECTION 179 ANGLE FROM HORIZONTAL 60 °

ROCK TYPE Degree of Weathering Shown in Core	DESCRIPTION	R.L. Casing	Depth and Size of Core	Log	Lift and Core rec'y %	STRUCTURES Joints, Veins, Seams Faults, Crushed Zones	WATER LEVEL	WATER PRESSURE TEST GALLONS PER MINUTE LOSS
NO CORE		580	NXCC		0			NOT TESTED
NO CORE	Dark bluish grey to grey brown, bedding dips 65°.		NX		20	Limonite coatings & thin, sandy clay veneers along bedding plane.		
HW-	Pale grey brown, iron stained.		NM3		0			
HW- NO CORE MW-HW	Dark grey schistose band.	570	10		45	Few joints as shown with up to 0·1ft clay and rootless 0·3 feet in length, limonite veneers along joints and some bedding planes.		
HW-CW Zone -	Bedding dips 65° on core slump bedding prominent below 16ft some fractures along planes of higher schistosity.				100			
			20		85			
		560			100			
					100			
			30		100	Quartz vein, limonite stained.		
					100			
		550			100			
	Few felspathic bands up to 0·1 ft thick parallel to bedding				100	Irregular quartz bands, near-horizontal joint, rough with traces pyrite?		
			40		100			

MICACEOUS ZONES Mainly slight to moderate along joints and seams.

Mainly QUARTZITE with Mainly FRESH moderate to lightly weathered along joints.

Zone of dark grey greywacke

Core in 0·2 feet to 0·5 ft lengths, mainly 0·2 ft.

Core in 0·1 to 0·5 ft lengths ft. length, mainly 0·3 ft. mainly 0·5 ft.

Core in 0·1 ft to 2·0 ft lengths mainly 2·0 ft.

Joints, mainly vertical or horizontal, some 60° on core, with up to 0·02 ft clay, decomposed rootlets, limonite coatings.

Water level 17th July

WATER PRESSURE TEST GALLONS PER MINUTE LOSS — 5 — 10

14

10

20

10

END OF HOLE 42·0 feet.

TEST PRESSURES SHOWN IN POUNDS PER SQ. INCH MEASURED AT GROUND SURFACE

Drill No. 7

Type E100

Driller T. BRIGGS

Commenced 14 July '64

Completed 17 July '64

EXPLANATION

QUARTZITE

MICACEOUS THINLY BEDDED ZONES

WATER LEVEL DATE

Logged S.R

Sheet No. 1

Drawn S.R.

Checked

Submitted

Vert. Scale 1" = 10'

Sheet 1 of 1

53880

L1

250—7.60 8036

DEPARTMENT OF MINES — SOUTH AUSTRALIA

Hole No. 3

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MIDDLE RIVER DAM — CO-ORDINATES — R.L. 554 FT

FEATURE FOUNDATION — HUNDRED DUNCAN — DIRECTION 26 M. °

LOCATION RIVER CHANNEL — SECTION 79 — ANGLE FROM HORIZONTAL 45 °

ROCK TYPE / Degree of Weathering Shown in Core	DESCRIPTION	R.L.	Depth and Size of Core	Log	Lift and Core rec'y %	STRUCTURES Joints, Veins, Seams Faults, Crushed Zones	WATER LEVEL	WATER PRESSURE TEST GALLONS PER MINUTE LOSS
Slight / NO CORE / Fresh to slight — QUARTZITE FRESH	Core in 0·1 to 0·3 ft. lengths.	550	NXC		0 30 70 100 40	Joints spaced 0·1 to 0·3 ft. with rough irregular surfaces, limonite and soil veneers, some fine roots.	10 Aug '64	NOT TESTED
	Mostly pale grey, fine to medium grained, felspathic micaceous in part. Core mostly in 0·5 to 2 ft. lengths.		NMLC 10		100 100 100 100	Driller's note:- "River gravel in core loss at 5 feet."		10
	Mainly massive to poorly bedded, contains several dark grey, thinly-bedded micaceous zones as shown. Core tends to break along bedding, particularly in thinly bedded zones	540	20		100 100 100 100	Joints spaced 1 to 5 feet mostly dip 15° or 45° on core. Most joints are tightly closed with rough, irregular surfaces, mostly with chlorite veneers. Traces of pyrites along some joints.		20 30
	core in 0·02 to 0·5 ft. lengths.	530	30 NMS		100 100			20 30 50
	Core mostly in 0·5 to 2 ft. lengths.	520	40		100 100 100			
			50					

50·5 ft. END OF HOLE

TEST PRESSURES SHOWN IN POUNDS PER SQ. INCH MEASURED AT GROUND SURFACE

Drill No. D.M. 7
Type E.1000
Driller T. Briggs
Commenced 4 Aug '64
Completed 10 Aug '64

EXPLANATION

QUARTZITE — WATER LEVEL — DATE

MICACEOUS, THINLY BEDDED ZONE

Logged S.R. D.H.S.
Drawn 26 Aug '64 S.R.
Checked D.H.S.
Submitted

10 ft. - 1 inch. Vert. Scale

Sheet 1 of 1

Drawing No. S 3856/1

250—7.60 6036

DEPARTMENT OF MINES — SOUTH AUSTRALIA

Hole No. 4

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MIDDLE RIVER DAM — CO-ORDINATES — R.L. 569 FT

FEATURE FOUNDATION — HUNDRED DUNCAN — DIRECTION 33M. °

LOCATION LEFT ABUTMENT — SECTION 79 — ANGLE FROM HORIZONTAL 45 °

ROCK TYPE Degree of Weathering Shown in Core	DESCRIPTION	R.L. Casing	Depth and Size of Core	Log	Lift and Core rec'y %	STRUCTURES Joints, Veins, Seams Faults, Crushed Zones	WATER LEVEL	WATER PRESSURE TEST GALLONS PER MINUTE LOSS
Slight to high NO CORE Complete	Mostly pale grey, fine to medium grained, felspathic, micaceous in part		NXC		0	Joints and bedding partings spaced 0·05ft. to 0·4ft, rough, irregular surfaces. Coatings include clay, sandy soil with roots, and limonite.	17 Aug '64	NOT TESTED
	Mainly massive to poorly bedded, contains several dark grey, thinly bedded micaceous zones as shown		NX		20			
			NMS		60			
			10		100			
		560			60	Completely weathered seam 0·15ft. thick.		
					100	Clay seam 0·03ft. thick.		
					100			
			20		100	Joints generally spaced 0·5 to 3ft., in three main directions:		10
					100	(1). parallel to bedding, dip 65° on core.		20
		550			100	(2). dip 20° on core.		30
			30		100	(3). dip 70-90° on core.		
					100	Most joints tightly closed, mostly smooth or slickensided, with veneers of chlorite, in some places crushed rock.		10
					100			20
			40		100			40
		540			100	Several mineralized quartz chlorite veins up to 0·01ft. thick along joint direction(2).		
					100			
			50					

50 feet — END OF HOLE.

QUARTZITE FRESH

TEST PRESSURES SHOWN IN POUNDS PER SQ. INCH MEASURED AT GROUND SURFACE

Drill No. D.M. 7
Type E 1000
Driller T. Briggs
Commenced 12TH Aug. '64
Completed 18TH Aug. '64

EXPLANATION
QUARTZITE
MICACEOUS, THINLY BEDDED ZONE
QUARTZ VEIN
WATER LEVEL
DATE

Logged Date S.R. / D.H.S. 26TH Aug '64
Drawn S.R.
Checked DHS
Submitted

10ft - 1 inch Vert. Scale
Sheet 1 of 1
Drawing No. S 3857

250—7.60 8036

DEPARTMENT OF MINES — SOUTH AUSTRALIA

Hole No. 5

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MIDDLE RIVER DAM CO-ORDINATES — R.L. 587 FT

FEATURE FOUNDATION HUNDRED DUNCAN DIRECTION 216 M °

LOCATION UPPER LEFT ABUTMENT SECTION ANGLE FROM HORIZONTAL 45 °

ROCK TYPE Degree of Weathering Shown in Core	DESCRIPTION	R.L. Casing	Depth and Size of Core	Log	Lift and Core rec'y %	STRUCTURES Joints, Veins, Seams Faults, Crushed Zones	WATER LEVEL	WATER PRESSURE TEST GALLONS PER MINUTE LOSS 5 10
INMAN HILL FORMATION mainly QUARTZITE with some MICACEOUS THINLY BEDDED ZONES mainly fresh, slight near joints, many of which are limonite coated mainly slight moderate to high near some joints FRESH	Pale grey, fine grained, well bedded to massive, shows slump structures in some parts. Locally dark grey banded due to high biotite content.	580 570 560 551	NXC NMS 10 20 30 40 Core mainly in 0·2 to 1·5 foot lengths Core mainly in 0·1 to 1 foot lengths		90 70 95 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100	Joints spaced 0·1 to 1 foot, mostly slightly open, rough, with earthy limonite coatings. Several joints, as shown on log, contain roots and completely weathered rock Bedding dips 55° on core. Joints spaced 0·1 to 1 foot, mostly along bedding and near-horizontal, rough irregular surfaces with earthy limonite coatings up to 0·01 ft thick Bedding dips 55° to 80° on core. Joints spaced 0·5 to 2 feet. They occur in 3 main directions: (i) along bedding (ii) near horizontal (iii) strike 100° to 120° dip near-vertical limonite coated joints Some have rough, limonite or quartz coated surfaces, others smooth, chlorite Only 2 limonite coated joints occur, as shown.	Water level 3rd Aug	NOT TESTED 10 20 30 40 20 10

50·25 feet END OF HOLE

TEST PRESSURES SHOWN IN POUNDS PER SQ. INCH MEASURED AT GROUND SURFACE

Drill No. 7
Type E 1000
Driller T. Briggs
Commenced 24TH July '64
Completed 3RD Aug '64

EXPLANATION
SANDSTONE
MICACEOUS THINLY BEDDED ZONE
WATER LEVEL ◀ DATE

Logged D.H.S. & S.R.
Sheet No. 1
Drawn
Checked D.H.S.
Submitted

Vert. Scale 1" = 10'
Sheet 1 of 1
53881
L1

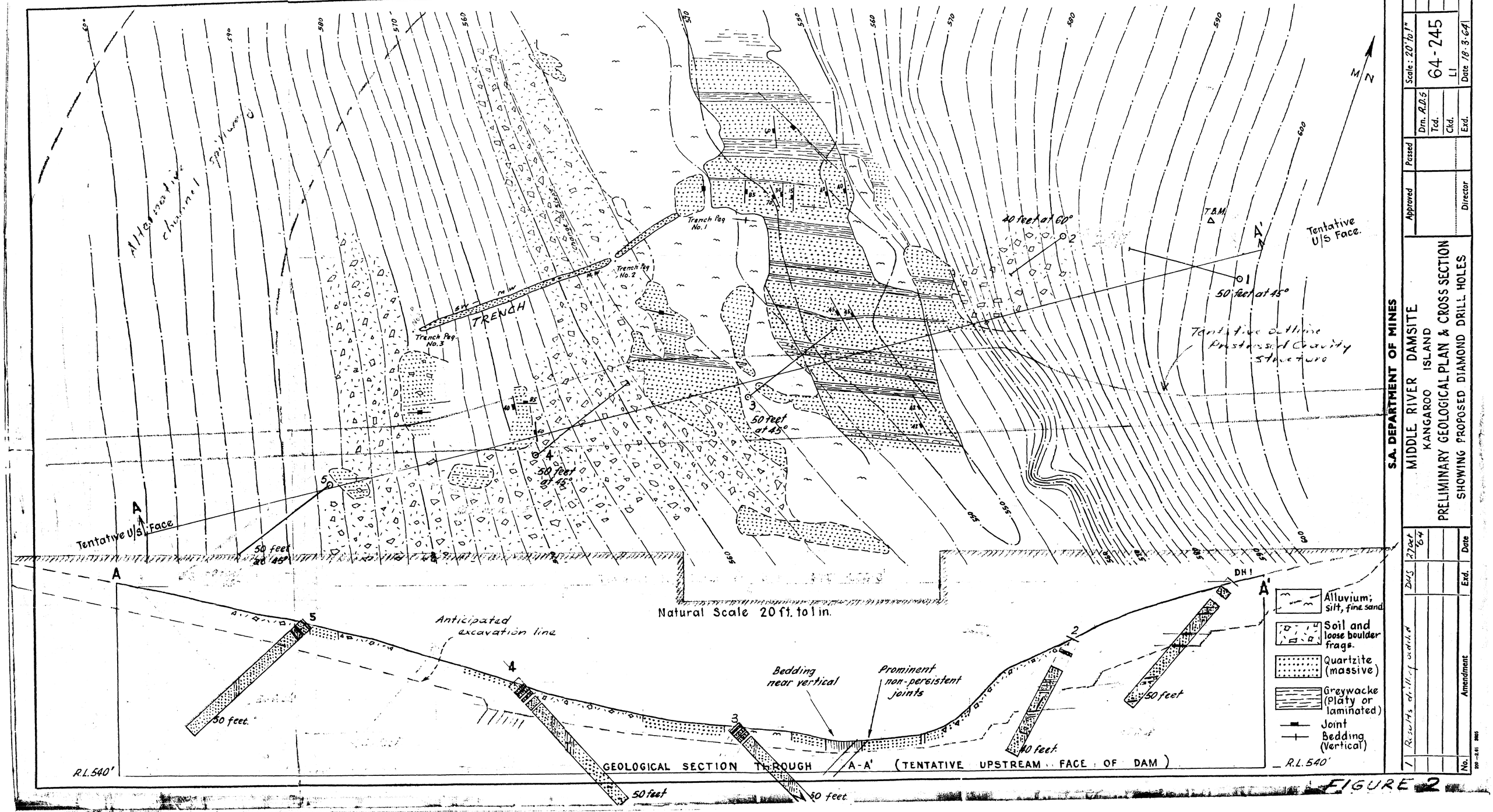

Alluvial terrace
channel
Spillway
TRENCH
Trench Pag No. 1
Trench Pag No. 2
Trench Pag No. 3
T.B.M.
40 feet at 60°
50 feet at 45°
Tentative U/S Face.
Tentative outline Prestressed Gravity Structure
50 feet at 45°
50 feet at 45°
Tentative U/S Face
50 feet at 45°
Natural Scale 20 ft. to 1 in.
Anticipated excavation line
Bedding near vertical
Prominent non-persistent joints
50 feet.
50 feet
50 feet.
40 feet.
50 feet
R.L. 540'
R.L. 540'
GEOLOGICAL SECTION THROUGH A-A' (TENTATIVE UPSTREAM FACE OF DAM)
DH 1
Alluvium; silt, fine sand
Soil and loose boulder frags.
Quartzite (massive)
Greywacke (Platy or laminated)
Joint
Bedding (Vertical)
S.A. DEPARTMENT OF MINES
MIDDLE RIVER DAMSITE
KANGAROO ISLAND
PRELIMINARY GEOLOGICAL PLAN & CROSS SECTION
SHOWING PROPOSED DIAMOND DRILL HOLES
Scale: 20 ft/1"
64-245
Date 18-3-64
Drn. A.D.S
Tcd.
Ckd.
Exd.
Approved
Passed
Director
27 OCT 64
DAS
Results of drilling added
Amendment
No.
Date
Exd.

FIGURE 2

A

SECTION A-A'

MR7

8.

80 ft.

A'

SECTION FROM 8. TO 10.

B

MR6

SECTION B-B'

5

70 ft.

B'

SECTION C-C'

C

C'

SECTION FROM 1. TO 3

A

MR7

8

A'

10

P377/64

7

9

30°

20°

55

6

MR6

B

B'

12

5°

P375/64

5°

20°

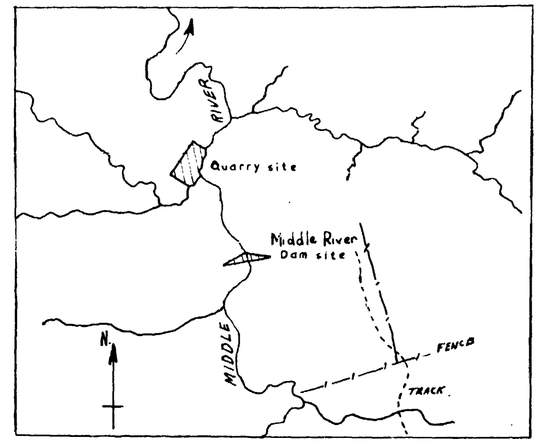
52°

C

C'

P376/64

MIDDLE RIVER



½ ¼ 0 ½ 1

SCALE IN MILES

N

LEGEND

- STRIKE AND DIP OF BEDS
- QUARTZITE
- SOIL
- PLATY ZONE
- ALLUVIUM, LOOSE BLOCKS
- BOULDERS, LOOSE BLOCKS
- GEOLOGICAL BOUNDARY, DEFINITE; QUARTZITE OUTCROP
- GEOLOGICAL BOUNDARY, INDEFINITE; SOIL AND LOOSE BLOCKS
- TRAVERSE POINT
- DIAMOND DRILL HOLE INCLINED
- P650/64 SAMPLE
- 55 STRIKE AND DIP OF SHEARED ZONE
- 70 STRIKE AND DIP OF JOINTING

20 0 20 40 60 80

SCALE IN FEET

S.A. DEPT. OF MINES

Associated Drawing	No.	No.	Amendment	Exd.	Date
		1		S.R. 29-9-65	

Req. No.
D.M.
Compiled from

MIDDLE RIVER DAM, KANGAROO ISLAND

QUARRY SITE No. 1

GEOLOGICAL SKETCH PLAN AND SECTIONS

Approved	Passed
Director of Mines	

Drn. S.R.
Tcd. S.R.
Ckd. D.H.S.
Exd.

Scale: 20 ft to 1 inch

64-970
L1

Date 7 Oct '64