1980/35. Further test pits at the Guide River dam site.

W.L. Matthews
A.T. Moon

Abstract

Test pits have been dug with a backhoe along the new proposed centreline of the dam, along the proposed spillway, and in a possible borrow area. Apart from one pit on the east abutment which struck probable weathered Precambrian sediments, and another which struck some Precambrian boulders in basalt, the test pits along the centreline struck weathered basalt. Some of the less weathered zones of basalt had quite strong seepages, indicating a fairly high permeability for these zones. A fairly persistent polished slickensided surface with a low dip was noted in some pits. Test pits along the spillway were dug with relative ease to the proposed depth of excavation. Some possible weathered Precambrian boulders are intermixed with the basalt, together with some clayey quartz grit and sand. Up to about 48 000 m^3 of material is present in the borrow area to the depth dug. Some of this may be unsuitable, due to the presence of boulders (unweathered basalt), and this volume will be reduced because of the necessary reduction in moisture for some material before placement and compaction. Some of the material excavated from the spillway and cut off trench should be suitable for the dam construction. Eventually more material for construction will need to be proved.

INTRODUCTION

Interpretation of the previous investigations at the Guide River dam site (Matthews, 1980) suggested that a better location for the centreline on the east abutment may occur slightly upstream of that proposed. A cut off to bedrock appears possible over a wider section in this area. As drilling and test pits had been concentrated more near or just north of the original centreline, a series of test pits were dug along the newly proposed centreline. In addition, test pits were dug in a proposed borrow area upstream on the right bank, and also along the line of the proposed spillway.

TEST PITS ALONG PROPOSED CENTRELINE

Five test pits were dug on the proposed new centreline, four on the east abutment and one on the west (fig. 1). Two additional holes just north of the line examined the extent of possible problems seen in other pits.

It was thought likely that the test pits would strike less weathered basalt on the lower slopes of the east abutment and probably Precambrian rocks further up the slope. Ascertaining the lateral extent of the Precambrian rocks within reach of the backhoe was the main reason for digging the test pits in this area, because founding the cut off in this material would be a more reliable procedure than ending it within the weathered basalt and interbedded sediments, as would have been the case for the more northerly line. Test Pits D4 and D5 encountered basalt that was too hard to excavate at 3.4 and 4.2 m depth respectively. D5 was sited between Test Pit 7 of the previous survey, which struck very weathered Precambrian rocks at 3.1 m and less weathered siltstone at 4.9 m, and Auger Hole 8, which encountered probable Precambrian rocks at 6.4 m. It seems likely that Precambrian rocks will also occur at a slightly greater depth than was dug in pit D5. From

5 cm

2/26

Outline of proposed dam

Diamond drill hole (Nº & R.L.)

Auger hole (" " ")

Test pit (" " ")

Survey mark (with R.L.)

Fence line

Section line

Seismic traverse

Basalt outcrop (weathered)

Boulder bed outcrop

NOTE: All levels in metres
Datum mean sea level

PLANTATION
PINE
GATE
Access
Restricted Access
ROAD
EIGHTEEN MILE
RIVER
GUIDE
TOP WATER LEVEL
TOP WATER LEVEL
A
B
C
D
E
399·2
383·9
384·3
384·8
382·0
382·9
382·6
390·5
390·4
387·5
386·7
386·7
385·2
391·3
395·4
397·8
400·2
400·7
398·0
397·0
398·9
397·6
396·9
400·4
390·3
M1
M2
M3
T.N.
M.N.
12° approx.

SKETCH MAP

GUIDE RIVER PROPOSED DAMSITE

LOCATION OF INVESTIGATIONS

W. L. MATTHEWS GEOLOGIST

0 50 100m

DEPARTMENT OF MINES, TASMANIA.

4666

Figure 1

5 cm

UR 1980/15

previous results, it is probable that the basalt/Precambrian boundary dips steeply towards the west or north-west between Test Pit 7 and Diamond Drill Hole 4, and Precambrian rocks may occur at a considerable depth below the base of D4. It is of interest to note that siltstone and sandstone inclusions occur in D4. Both D4 and D5 had quite strong seepages, suggesting relatively high permeabilities at some locations within the pits.

Test Pit D1, further upslope from D5, encountered probable deeply weathered Precambrian sediments in the base of the pit at about 4.7 m. Again there were quite high seepage rates into the pit just above this level which prevented further digging and inspection.

Test Pit D2, near the top of the abutment, encountered deeply weathered basalt to the base of the pit at 5.8 m. In this pit a polished slickensided surface was located which extended around the pit and had a slight downslope dip. Deeply weathered basalt occurs above and below this surface, but with a distinctly different texture. There is a concentration of roots along the surface in some parts, although occasionally roots can be seen at lower levels. There is also a black oxide concentration up to about 10 mm thick.

Test Pit D3 was dug further to the north so that the extent of this surface could be examined. A similar polished slickensided surface was encountered in this test pit, but with a slight dip into the slope.

Test Pit D6 was dug near the previous Test Pit 6 where a sandy carbonaceous clay layer was encountered. The hole extended just below the depth of the previous hole without locating any obvious sedimentary layers. One corner of the new pit intersected the upper portion of the previous one, indicating the lenticular nature of these sedimentary horizons.

Test Pit D7 was dug about midway between DDH5 and DDH6, as there was little subsurface information in this area. The pit extended to 5.3 m and passed through deeply weathered basalt or basalt-derived material for its whole depth.

TEST PITS ALONG SPILLWAY

Five test pits were dug along the proposed spillway alignment to determine the ease of excavation to the designed depth, the deepest excavation required being about six metres. It is proposed to use the excavated spillway material in the dam construction, if it is suitable.

All of the pits were excavated with relative ease, although pits S1, S2 and S5 contained considerable quantities of less weathered basalt in pieces up to 0.6 m across. Pits S3 and S4 encountered mainly deeply weathered basalt, with only a few unweathered or less weathered centres.

Pits S1, S2 and S5 contained mixtures of deeply weathered basalt, clayey sand and grit, and possibly deeply weathered siltstone. The boundary between the basalt-derived clay and the zones containing material of sedimentary origin is very irregular. The method of formation of this mixture of material is unknown; it may be deeply weathered boulder beds or a result of sedimentary material picked up by the basalt, or sedimentary material in stream beds mixing with collapsing basalt from around the stream margins.

BORROW AREA

A possible borrow area upstream from the dam site was previously

investigated with three auger holes. This has now been further investigated with the digging of seven test pits to a maximum depth of 5.1 m (fig. 2). Much of the material dug through is deeply weathered basalt with some zones of less weathered basalt. One hole, Q1, extended only to a shallow depth before much less weathered basalt was struck. Apart from this hole, there appears to be an average of about 3.6 m of weathered material which should be suitable, subject to testing, for use in the dam construction. The lower part of each hole contains wet material and will need the moisture reduced before placing on the dam.

The area between the test pits, together with the surrounding area of similar topography, is about 1.35 ha, which suggests that about 48 000 m^3 of material is present in the area to the depth dug. Some of this material is probably unsuitable because of less weathered zones, the proportion of which cannot be estimated. The designed requirement for the dam is about 50 000 m^3, with about 12 000 m^3 for the cut off. Some of the material excavated from the spillway and from the cut off trench is expected to be useable for either or both the dam and the cut off.

DISCUSSION OF TEST PIT RESULTS

Test pits across axis of the dam

The test pits on the eastern abutment encountered material much as was expected from the previous investigations. Less weathered basalt occurs near the floor of the valley within relatively easy reach for the cut off, as in pit D4. Precambrian rocks probably underlie the base of D5 at shallow depth, and pit D1 struck probable weathered Precambrian rocks. As there were fairly high seepage rates in these holes at the time of digging it would be advisable to try and install the cut off to below these levels. The weathered basalt appears to have a variable permeability, and strong seepages often occur in localised zones around the less weathered layers. For this reason it would be advantageous to extend the cut off to the Precambrian rocks wherever possible. It will not be possible to extend the cut off to either unweathered basalt or Precambrian rocks towards the top of the eastern abutment, and the best method would be to extend it as far as practicable to increase the seepage path length. This is also the situation on the west abutment.

The polished slickensided surface was an unexpected find, particularly the continuity around the test pits. A similar surface was noted in one of the spillway pits (S3), as well as the two near the centreline on the east abutment. Across the valley, again at about the same level, there is a similar surface exposed in a road cutting. It had been noted previously but until recently excavated it was not realised that it had a polished surface. It is not known whether these are part of one continuous surface, even though they occur on about the same topographic level. On examining weathered basalt exposures in surrounding areas, similar surfaces have been noted in slightly less weathered basalt *e.g.* on the access road to the dam site. The polished surface does not appear to be always present, and the dip is much steeper in some cases.

The origin of the surfaces is unknown; they may be due to large old landslide movements. Assuming the surfaces observed near the dam site are part of the same surface, it would have to be a very old slip, as the stream has since cut through it. Alternatively the surfaces may mark the contact between two lava flows. Movement on the contact may be promoted by *in situ* weathering and compaction of the mass. Before the slip surface was exposed in the road cutting on the west abutment, it was thought that

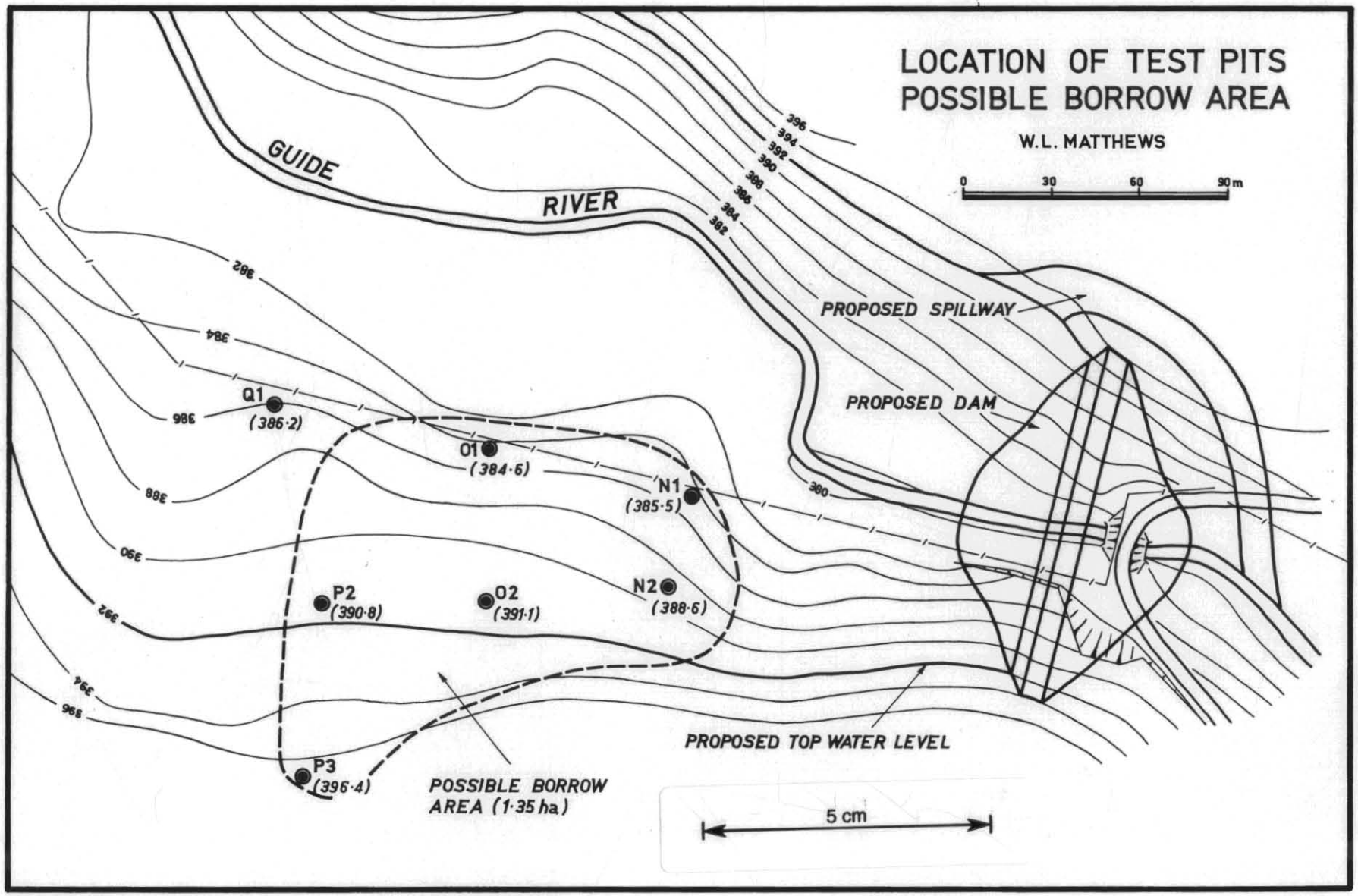

LOCATION OF TEST PITS
POSSIBLE BORROW AREA
W.L. MATTHEWS
0 30 60 90 m
GUIDE
RIVER
396
394
392
390
388
386
384
382
PROPOSED SPILLWAY
PROPOSED DAM
Q1
(386·2)
O1
(384·6)
N1
(385·5)
P2
(390·8)
O2
(391·1)
N2
(388·6)
P3
(396·4)
POSSIBLE BORROW
AREA (1·35 ha)
PROPOSED TOP WATER LEVEL
5 cm

Figure 2.

two flows were in contact on this surface and this was the reason for the widely differing texture in the weathered basalt above and below the surface.

Provided the surfaces are not excessively weak or do not occur on much steeper slopes than have been observed at the dam site, they may not be cause for particular concern. Samples have been collected for strength testing in a shear box, but it will be difficult to ensure that the strength being tested is along the polished surface. Testing under different loads causes some compaction of the samples, thus moving the sheared surface a little.

It is likely that there will be some variation in permeability on the polished surface compared with the surrounding material. Being made up of fine grained clay, some perching of seepage water above the surface could result.

Spillway area

The test pits indicated that excavation of the spillway should be possible with comparative ease. Only some of the excavated material may be suitable for use in the dam construction.

Borrow area

An indication of about 35-40 000 m^3 or more of probably suitable material has been determined from the test pits in this area. The raw volume available will be reduced because of moisture loss and compaction during placement. Although there is not likely to be any shortage of similar weathered basalt around the dam site area, it would be advisable to prove up much more than is required in case unexpected problems occur *e.g.* difficulty in drying some of the deeper weathered basalt quickly enough for use in the dam once construction begins.

OTHER CONSIDERATIONS

Stability of the areas around the dam is still of some concern. This applies to the west abutment where there are some benches which may represent old landslides, as well as to the east abutment. If construction material is obtained from the west side of the valley care should be taken not to reduce the present stability markedly.

REFERENCE

MATTHEWS, W.L. 1980. Subsurface investigations at the Guide River dam site. *Unpubl.Rep.Dep.Mines Tasm.* 1980/15.

[7 October 1980]

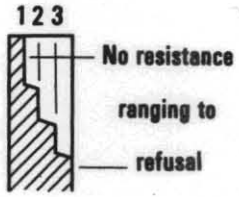
7/26

TASMANIA DEPARTMENT OF MINES

EXPLANATION SHEET FOR ENGINEERING LOGS

Borehole and excavation log

Penetration



Water

Notes - samples and tests

U50	Undistributed sample 50mm diameter.
D	Disturbed sample.
N	Standard penetrometer blow count for 300mm.
N*	SPT + sample.

Material classification

Based on Unified Soil Classification System.

In Graphic Log materials are represented by clear contrasting symbols consistent for each project.

Moisture content

D	Dry, looks and feel dry.
M	Moist, no free water on hand when remoulding.
W	Wet, free water on hand when remoulding.
LL	Liquid limit.
PL	Plastic limit.
PI	Plasticity Index.

eg. M > PL – Moist, moisture content greater than the plastic limit.

Consistency

		hand penetrometer (kPa)
VS	Very soft.	< 25
S	Soft.	25 - 50
F	Firm.	50 - 100
St	Stiff.	100 - 200
VSt	Very stiff.	200 - 400
H	Hard.	> 400
Fb	Friable.	

Notes: X on log is test result
— is range of results.

Density index

		%
VL	Very loose.	0 - 15
L	Loose.	15 - 35
MD	Medium dense.	35 - 65
D	Dense.	65 - 85
VD	Very Dense	85 - 100

Cored borehole log

Case - lift

Casing used.

Barrel withdrawn.

Fluid loss

No loss

50% loss

100% loss.

Lugeons

Lugeon units (μL) are a measure of rock mass permeability. For a 46 to 74mm diameter borehole 1 Lugeon is defined as a rate of loss of 1 litre per metre per minute. 1 Lugeon is roughly equivalent to a permeability of 1×10^{-4} mm/sec.

Graphic log

No core.

Rock substances represented by clear, contrasting symbols consistent for each project.

Weathering

Fr	Fresh.
SW	Slightly weathered.
HW	Highly weathered.
EW	Extremely weathered.

Strength

		point load strength index $I_{s\,(50)}$ (MPa)
EL	Extremely low.	< 0·03
VL	Very low.	0·03 - 0·1
L	Low.	0·1 - 0·3
M	Medium.	0·3 - 1
H	High	1 - 3
VH	Very high.	3 - 10
EH	Extremely high.	> 10

Note: X on log is test result.

Significant defects

Significant defects shown graphically.

Joint.

Sheared zone.

Crushed seam.

Infill seam.

Extremely weathered seam.

TASMANIA DEPARTMENT OF MINES

ENGINEERING LOG – EXCAVATION

5 cm

excavation no. D1
sheet 1 of 1

8/26

project GUIDE RIVER location DAM SITE, RIGHT BANK

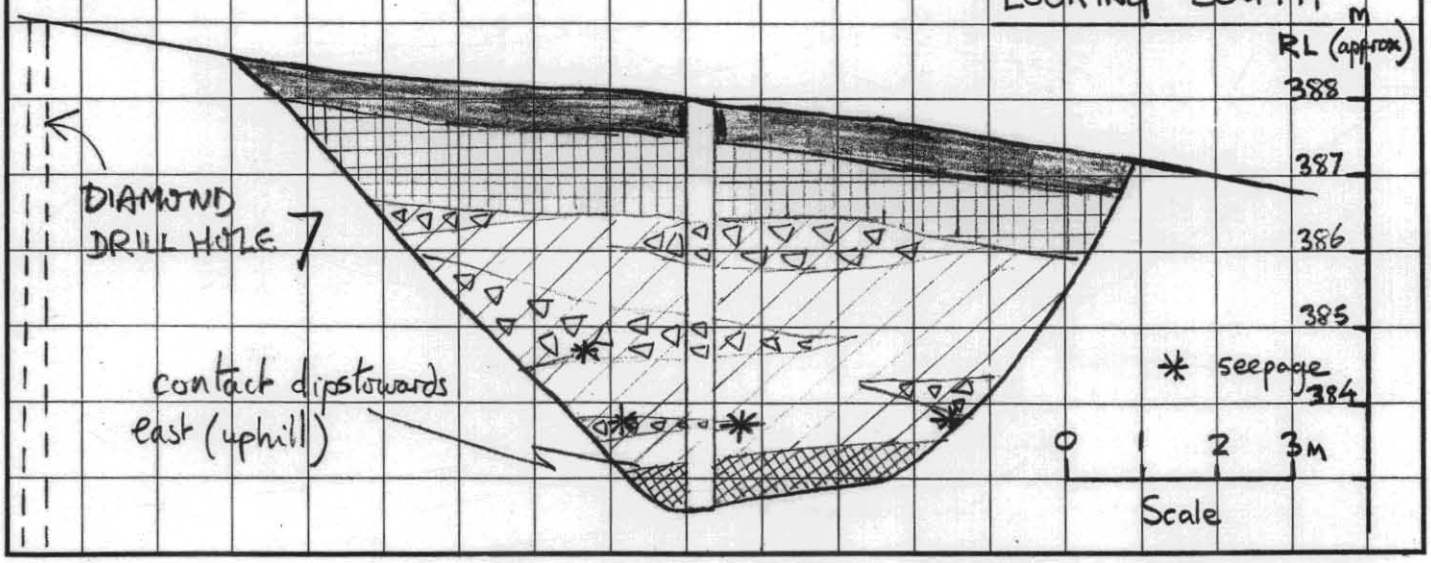
co-ordinates
R.L. 388m (approx.)
excavation dimensions 12 x 5.4 x 1m

exposure type Pit
equipment JCB 808, 1m bucket
operator Bill King (contractor)

pit commenced 19 Aug '80
pit completed 19 Aug '80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa 25 50 100 200 400	structure, geology
							CH	CLAY, brown, high plasticity, some fine gravel (rounded ironstone nodules), many roots	M	Fb		TOPSOIL
	NONE				1		CH	CLAY, red brown, high plasticity, with angular fragments of fresh to slightly weathered basalt up to 100mm across		VSt	x	RESIDUAL SOIL
				385	2		CH or MH	CLAY (70%), grey green, high plasticity, vesicular structure and ROCK (30%), Fresh to highly weathered basalt fragments, angular, platy up to 300mm across, occurs in lenses as shown. Most of the rock is highly weathered and extremely low strength and breaks up during excavation	M > PL	VSt to H	x	EXTREMELY WEATHERED VESICULAR BASALT. WITH FRESH AND WEATHERED ROCK FRAGMENTS
			Seepage around fresh basalt fragments		3							
			total seepage more than 20l/min		4						x	
					5		MH	Silty CLAY, mottled grey, yellow brown and red brown, high plasticity, some fine sand and platy ironstone fragments	M	St	x	EXTREMELY WEATHERED SEDIMENTS (PRE-CAMRIAN?)
								PIT STOPPED AT 5.4m, TOO MUCH WATER				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

ENGINEERING LOG – EXCAVATION

excavation no. D2
sheet 1 of 1

project GUIDE RIVER — location DAM SITE, RIGHT BANK

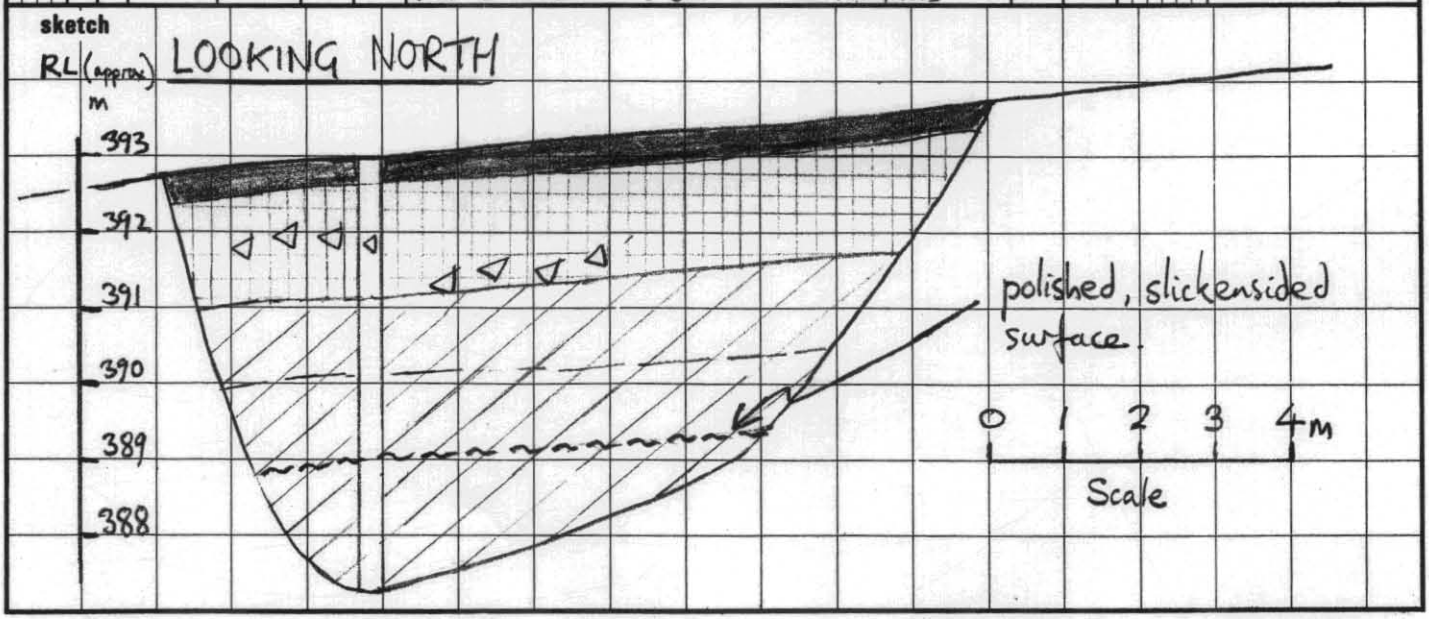
co-ordinates
R.L. 393m (approx.)
excavation dimensions
11 x 5·8 x 1m

exposure type Pit
equipment JCB 808, 1m bucket
operator Bill King (Contractor)

pit commenced 20 Aug '80
pit completed 20 Aug '80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L. / depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE	NONE	No Seepage	393		CH	CLAY, brown, high plasticity, some fine gravel, many roots	M	Fb		TOPSOIL
				1		CH	CLAY, red brown, high plasticity, with angular fragments up fresh to slightly weathered basalt up to 100mm across	M > PL	St to VSt	x x x	RESIDUAL SOIL
				2		CH or MH	CLAY, mottled grey green, red brown, dark grey, and yellow brown, high plasticity, some basalt fragments (about 5%)		VSt	x x	EXTREMELY WEATHERED VESICULAR BASALT
				390 3		CH	as above, mainly yellow brown, some pale grey		St	x	
				4			POLISHED SLICKENSIDED SURFACE – BLACK		VSt	x	
						CH or MH	OXIDE COATED, MANY ROOTS, SLIGHTLY IRREGULAR SHAPE, DIP ABOUT 5° WEST (DOWNSLOPE)		VSt to H	x	
				5			CLAY, as above, mottled, grey green, red brown, yellow brown, dark grey and purple.			x x x	
							PIT STOPPED AT 5·8m – SLOW PROGRESS				

sketch



5 cm

19/26

TASMANIA DEPARTMENT OF MINES

ENGINEERING LOG – EXCAVATION

excavation no. D/3
sheet of

project GUIDE RIVER DAMSITE location HAMPSHIRE – Near proposed centreline (North)

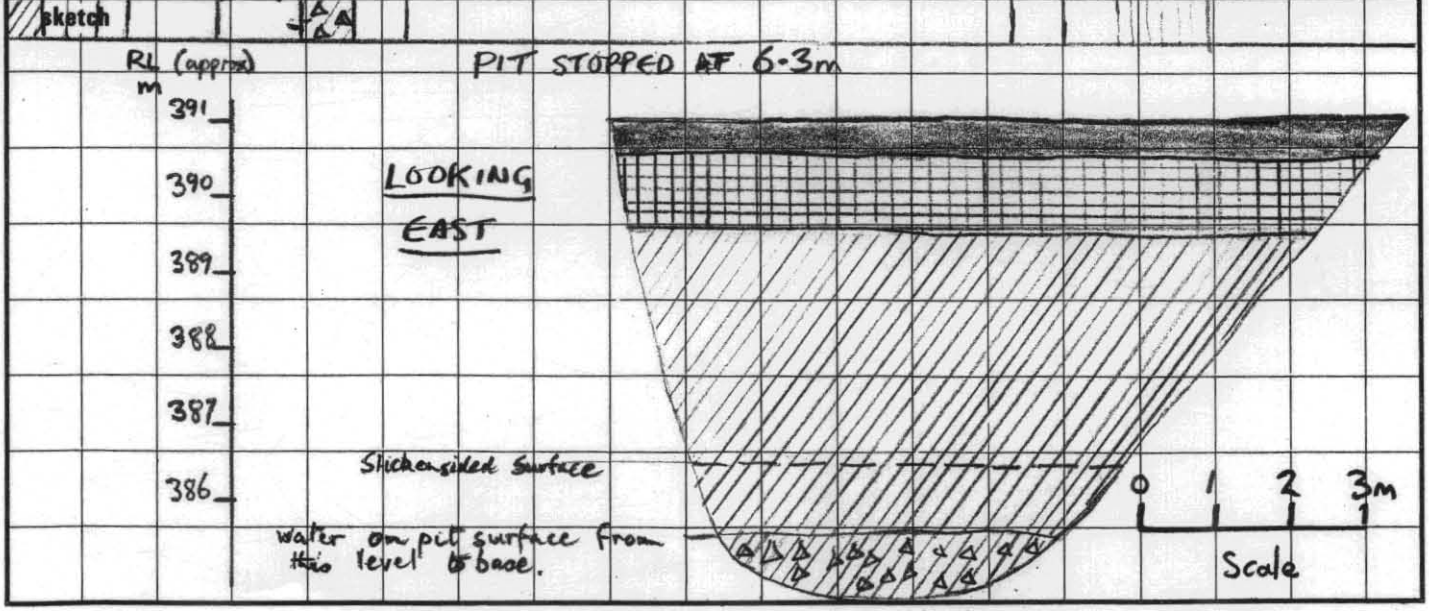
co-ordinates
R.L. 391m (approx.)
excavation dimensions
10 x 6·3 x 1m

exposure type Test Pit
equipment JCB 808
operator Bill King - contractor

pit commenced 19/8/80
pit completed 19/8/80
logged by WLM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa 25 50 100 200 400	structure, geology
	NONE						CH	CLAY, red brown, plastic	M			TOPSOIL
				390	1		CH	CLAY, orange brown, high plasticity	M	V St.		RESIDUAL SOIL
					2		CH or MH	CLAY, brown, purple, orange fragmental, contains small spherical inclusions and small cavities in some zones. Slickensided surface at about 4·6m from surface - has slight dip component (about 5° into hill and to the south)	M	VSt to H		Deeply weathered Basalt with vesicles
					3							
					4				W			
					5							
			< 1cm of water	385	6			CLAY and ROCK intermixed	W			Deeply weathered basalt with less weathered kernels

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. D4
sheet 1 of 1

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER — location DAM SITE, RIGHT BANK

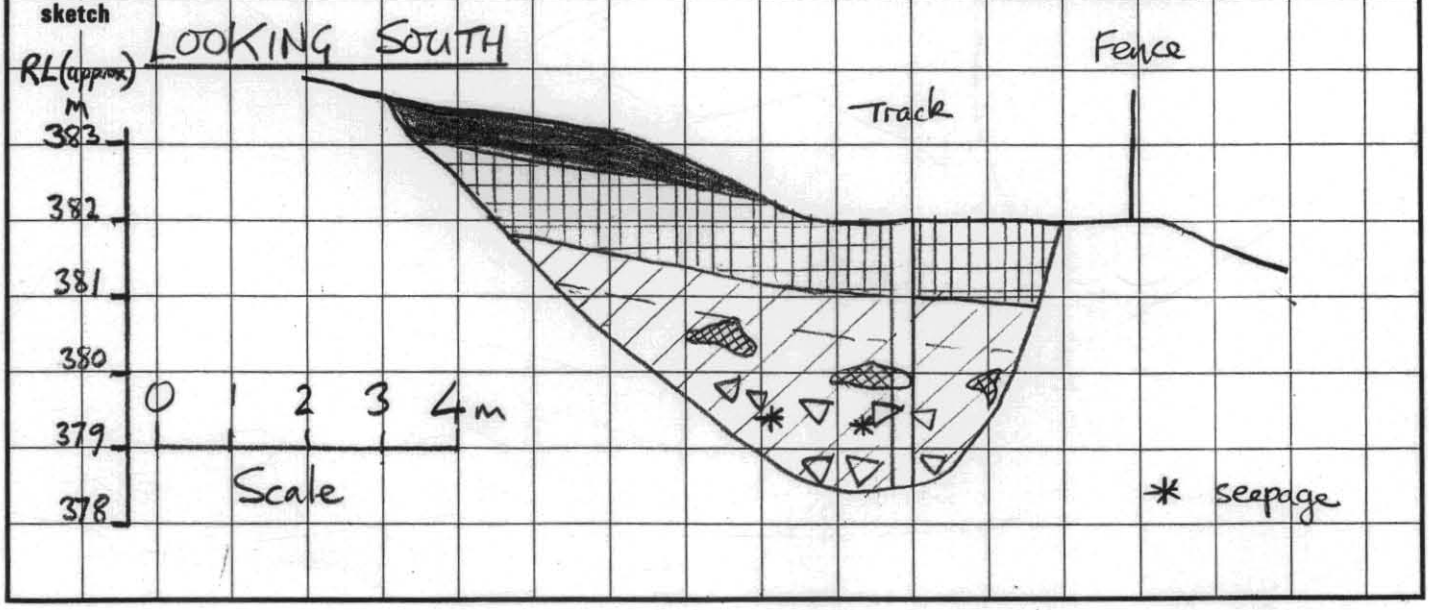
co-ordinates
R.L. 382m (approx.)
excavation dimensions
9 × 3·4 × 1m

exposure type Pit
equipment JCB 808, 1m bucket
operator Bill King (contractor)

pit commenced 21 Aug '80
pit completed 21 Aug '80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE				1		CH	CLAY, red brown, high plasticity, with angular fragments of fresh to slightly weathered basalt up to 100mm across	M	St to VSt	* *	RESIDUAL SOIL
				380	2		CH	CLAY, mottled red brown, yellow brown and dark grey, high plasticity	M > PL		* *	EXTREMELY WEATHERED BASALT
								between 1·5 and 3·0m irregular inclusions of weathered coarse siltstone and fine sandstone as shown		H	*	WITH INCLUSIONS OF WEATHERED SILTSTONES
			total seepage more than 10L/min		3		MH CH	5 to 10% boulders of highly weathered low strength basalt		St to VSt	*	
								CLAY (50%) and ROCK (50%) - basalt boulders				
								REFUSAL at 3·4m				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. DS
sheet 1 of 1

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER location DAM SITE, RIGHT BANK

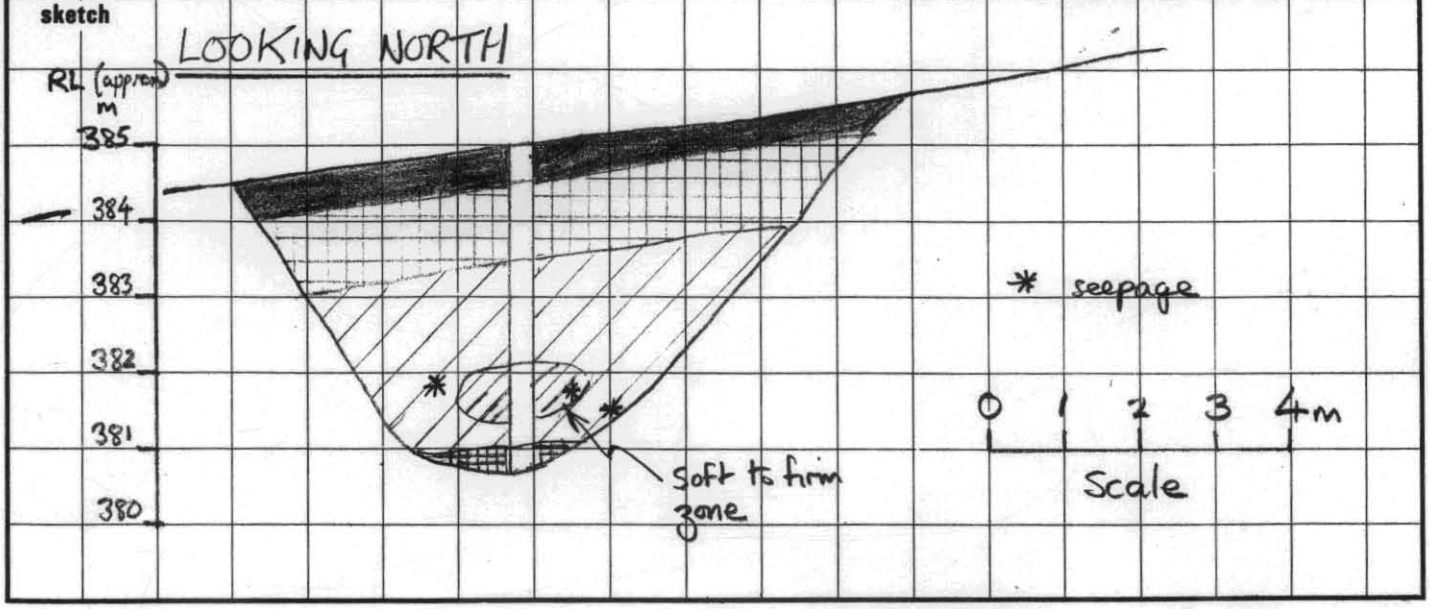
co-ordinates
R.L. 385m (approx)
excavation dimensions 9 × 4·2 × 1m

exposure type Pit
equipment JCB 808
1m bucket
operator Bill King (contractor)

pit commenced 21 Aug '80
pit completed 21 Aug '80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
							CH	CLAY, brown, high plasticity, many fine roots, some basalt boulders	M	Fb		TOPSOIL
	NONE				1		CH	CLAY, red brown, high plasticity, with angular fragments of fresh to slightly weathered basalt up to 100mm across	M > PL	St to VSt	× ×	RESIDUAL SOIL
					2		CH or MH	CLAY, mottled yellow brown, red brown, orange brown, and grey, high plasticity. Some (less than 5%) fragments of angular weathered basalt			× × × × ×	EXTREMELY WEATHERED BASALT
			total seepage about 10l/min		3					S to F	× × ×	
					4					St	×	
								ROCK, weathered and fresh basalt				BASALT
								REFUSAL AT 4·2m				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. D/6
sheet of

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER DAMSITE

location HAMPSHIRE – just north of proposed centreline

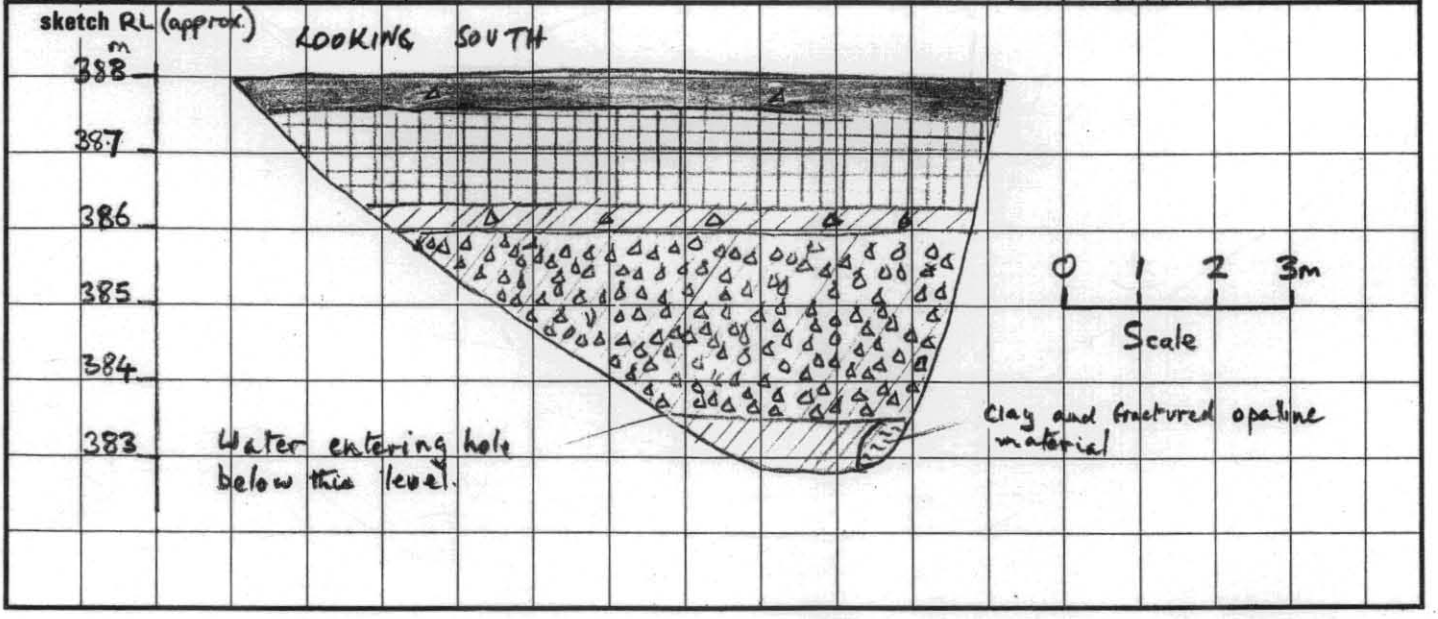
co-ordinates
R.L. 388m (approx.)
excavation dimensions
10 x 5·1 x 1m

exposure type Test Pit
equipment JCB 808
operator Bill King – contractor

pit commenced 21 Aug '80
pit completed 21 Aug '80
logged by WLM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa 25 50 100 200 400	structure, geology
	NONE						CH	CLAY, brown, plastic with occasional boulders up to 0·2m across, some roots	W	St		Topsoil with basalt boulders
					1		CH	CLAY, brown, plastic	M	St to VSt		Residual Soil
					2			CLAY, brown, plastic – fragmental, some boulders	M			Weathered and unweathered basalt
				385				CLAY, brown, fragmental to plastic making up about 50% by volume and weathered and unweathered boulders and rock making up the remainder	M			Basalt – weathered and less weathered zones.
					3							
					4							
					5			CLAY, grey brown, fragmental and sandy texture, 0.6m diam zone of black clay and brittle fractured opaline material (SW corner)	W	St		Deeply weathered basalt
								PIT STOPPED AT 5·1m				

sketch RL (approx.) m — LOOKING SOUTH



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. D/7 (14/26)

sheet of

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER DAMSITE location HAMPSHIRE – PROPOSED CENTRELINE

co-ordinates

R.L. About 389m

excavation dimensions 12 × 5·3 × 1m

exposure type Test Pit

equipment JCB 808

operator Bill King – Contractor

pit commenced 21/8/80

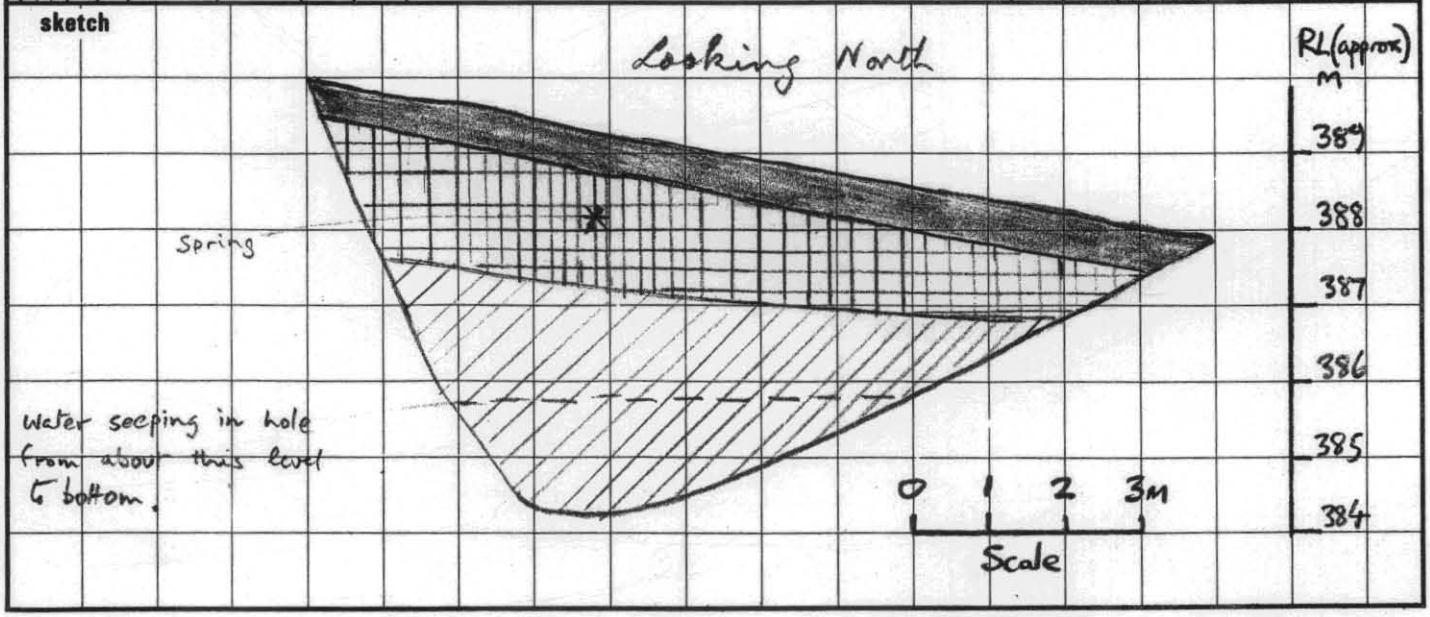
pit completed 21/8/80

logged by WLM

checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE						CH	Silty CLAY, grey brown, plastic, coarse and fine roots	M			Topsoil
					1		CH	CLAY, brown, plastic. Variable thickness (thickest on west or uphill end)	M	st to VSt		Residual Soil
			seepage 6 to 8 l/min	385	2 3 4 5		CH or MH	CLAY, dark grey, brown and purple, fragmental – sand size grains. Brown fine grained hard clay zones are included in the fragmental clay are abundant weathered zeolite? or zones of weathered volcanic glass?)	W	St to H		Deeply Weathered Basalt
								PIT STOPPED AT 5·3m				

sketch



TASMANIA DEPARTMENT OF MINES

ENGINEERING LOG – EXCAVATION

5 cm

excavation no. N/1 (15/26)
sheet of

project GUIDE RIVER DAMSITE location HAMPSHIRE – BORROW AREA

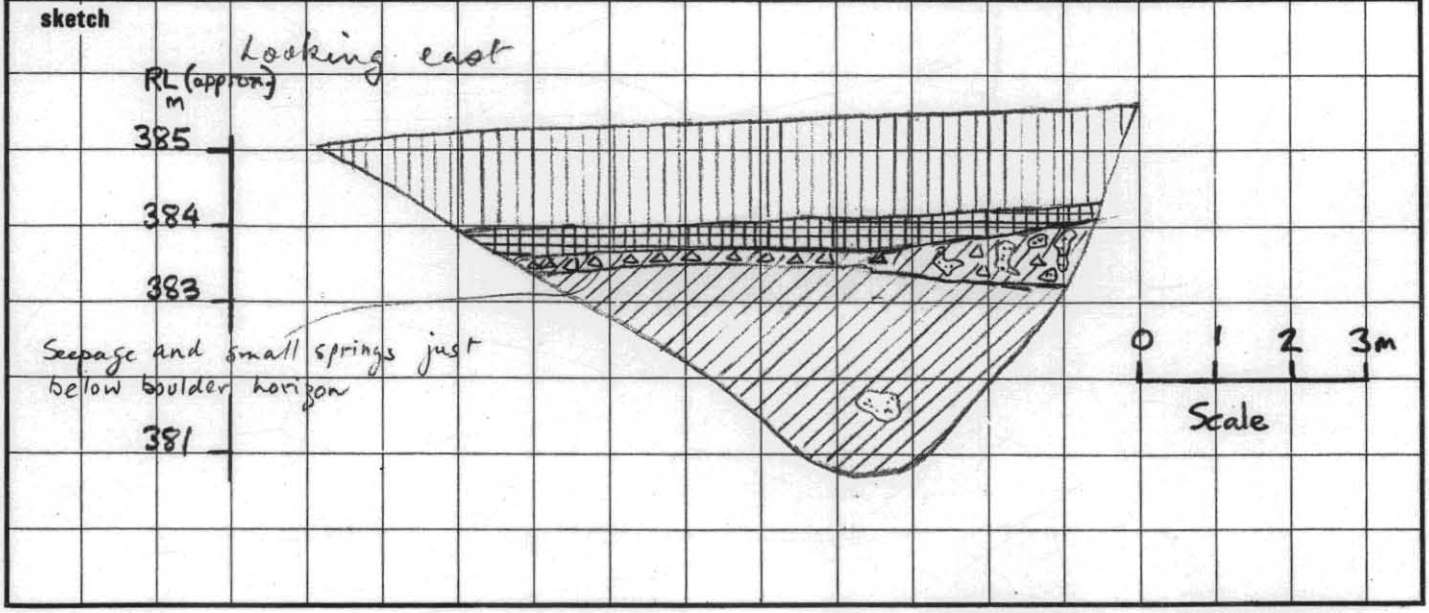
co-ordinates
R.L. 385.5m
excavation dimensions 11 × 4.7 × 1m

exposure type. Test Pit
equipment JCB 808
operator Bill King - contractor

pit commenced 18/8/80
pit completed 18/8/80
logged by WLM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE			385	0		CH	CLAY, some silt, red, fragmental to plastic. Lower part contains abundant platy siltstone fragments up to 2cm across.	M	VSt	x	Soil - probably transported, mainly derived from basalt some Precambrian fragments.
					1		CH	CLAY, some silt, light grey brown plastic.	M	St	x	Residual weathered basalt. No original outlines left
								BOULDERS and CLAY, boulders only slightly weathered and up to 0.15 m across				less weathered basalt
					2							
					3		CH to MH	CLAY, sandy and silty, brown, fragmental some zones harder with small cavities, some iron oxide seams. Included are lenses of weathered BOULDER BEDS consisting of fragmental sandy clay and clayey quartz grit interbedded (eg. 1.5-2.4 m on south wall and at 3.7 m on east wall)	W	St to H		Deeply weathered basalt. Texture remaining, also some uncollapsed voids. Mainly weathered basalt in boulder beds, some only slightly weathered
					4			PIT STOPPED AT 4.7m				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. N2 (16/26)
sheet 1 of 1

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER location BORROW AREA ONE

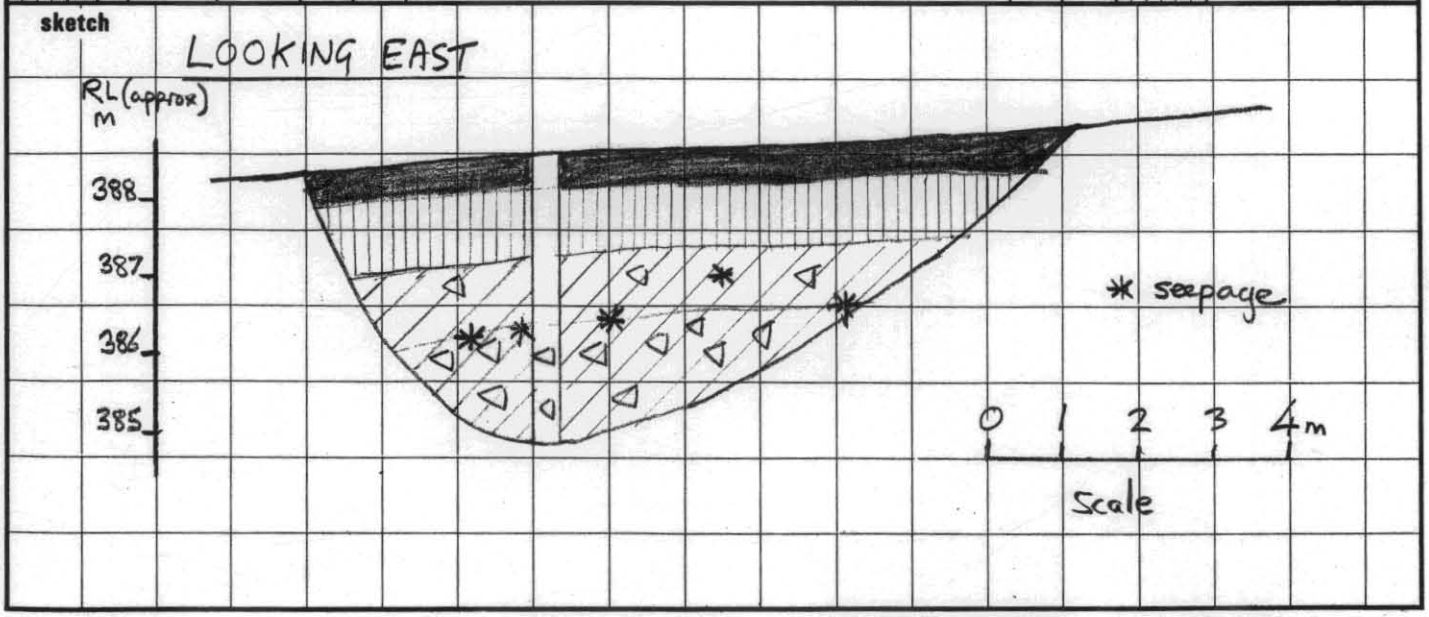
co-ordinates
R.L. 388·6m
excavation dimensions
10 x 3·8 x 1·5m

exposure type Pit
equipment JCB 808
1·5m bucket
operator
Bill King (Contractor)

pit commenced 18 Aug '80
pit completed 18 Aug '80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L. / depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE					CH	CLAY, dark grey brown, high plasticity, basalt boulders up to 0.2m across, many fine roots	M	Fb		TOPSOIL
				1		CH	Silty sandy CLAY, brown, high plasticity, weathered platy fragments of siltstone (Pre-Cambrian?) up to 20mm across and fresh basalt boulders up to 0.1m across		Vst	X	TRANSPORTED SOIL?
				2		CH	CLAY, brown, high plasticity, basalt fragments up to 0.2m across		Vst	X	EXTREMELY WEATHERED BASALT WITH WEATHERED ROCK FRAGMENTS
			total seepage about 10L/min	3 / 385		CH or MH	CLAY (90%) mottled yellow brown and grey brown, high plasticity Rock (10%) boulders of basalt, mainly fresh, up to 0.2m across	W	St to H		
							REFUSAL ON BASALT BOULDERS at 3·8m				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. 01

sheet of

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER DAMSITE location HAMPSHIRE – BORROW AREA.

co-ordinates

R.L. 384·6

excavation dimensions 12 × 5·1 × 1m

exposure type Test Pit

equipment JCB 808

operator Bill KING – contractor

pit commenced 19/8/80

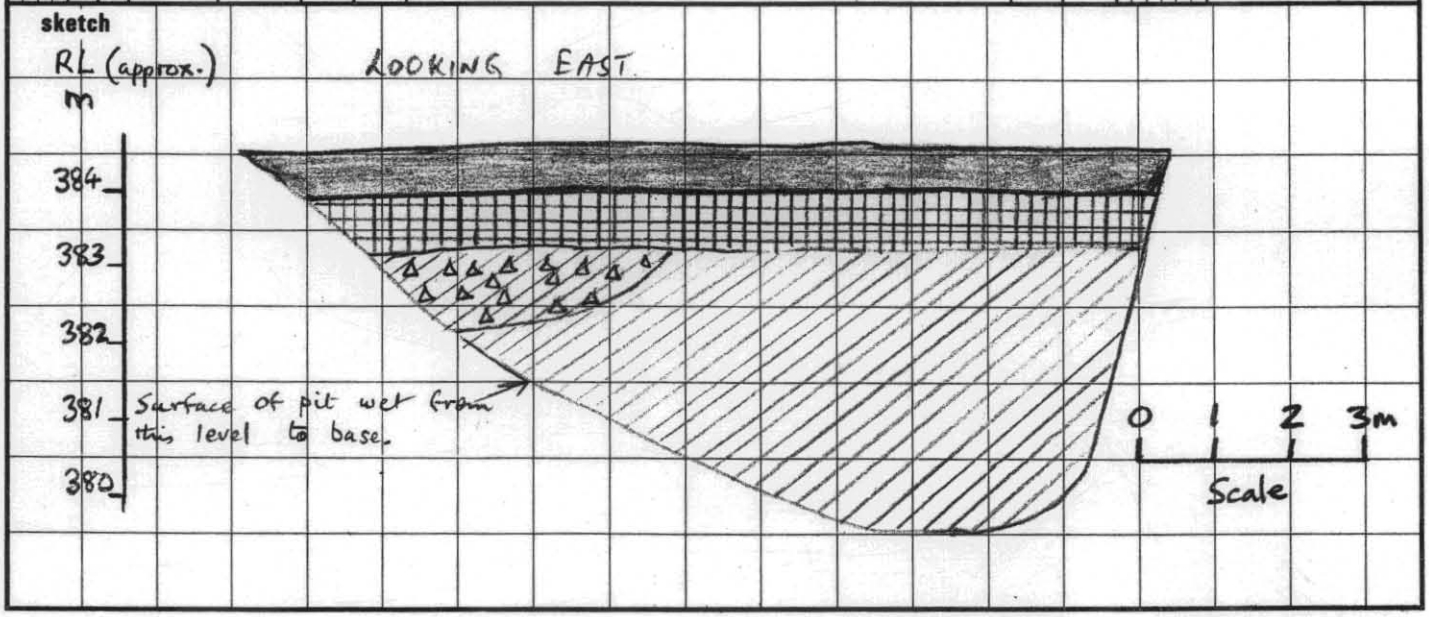
pit completed 19/8/80

logged by WLM

checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L. / depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE			384		CH	CLAY, some silt, brown, plastic, stiff to very stiff, abundant fine roots, moist	M	VSt		Topsoil
				1		CH	As above, without roots, black seam about 20mm wide iron oxide (or manganese) near base.	M	VSt		Residual Soil
				2		CH	CLAY, sandy and silty, brown, grey brown and purple, wet, contains small spherical cream coloured inclusions. Contains a lens of partly weathered rock from 1·3–2·2m on north end of pit (estimated 60% less weathered rock, 40% clay)	W	St to H		Deeply weathered basalt (vesicular zones)
				3							
				4							
				380 5			PIT STOPPED AT 5·1m				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

ENGINEERING LOG – EXCAVATION

excavation no. 02 (18/26)
sheet 1 of 1

project GUIDE RIVER location BORROW AREA

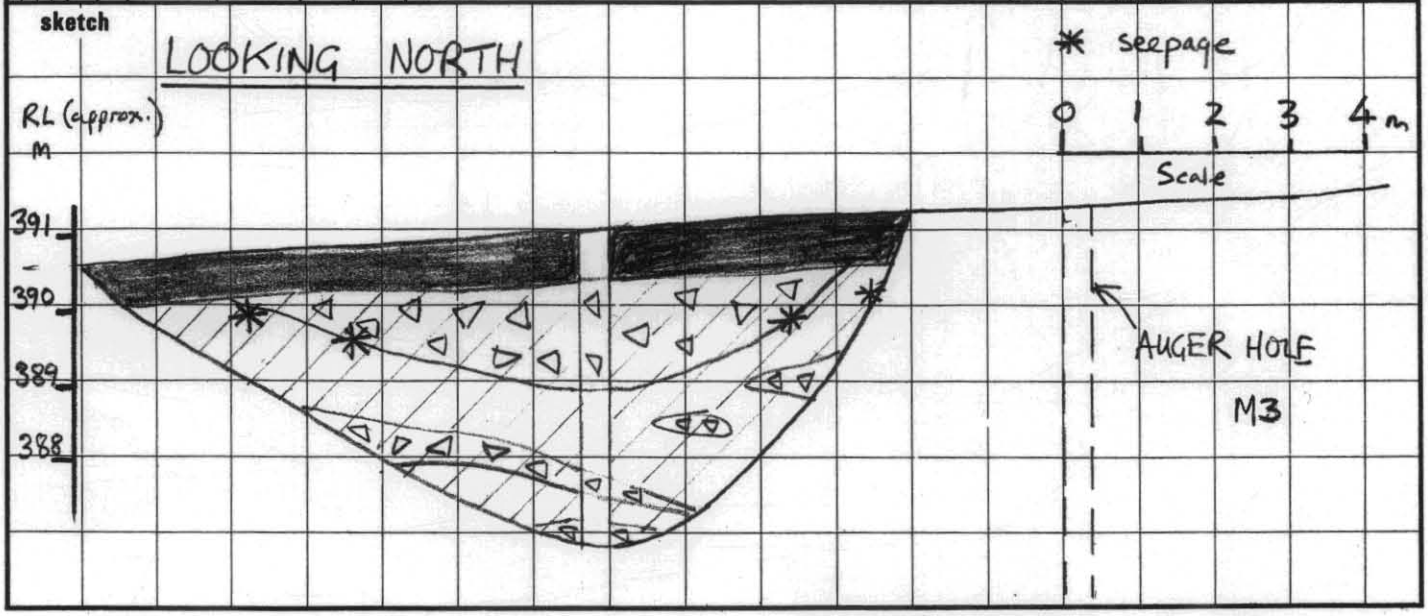
co-ordinates
R.L. 391·1m
excavation dimensions
11 × 4·2 × 1·5m

exposure type Pit
equipment JCB 808
1·5m bucket
operator Bill King (Contractor)

pit commenced 18 Aug '80
pit completed 18 Aug '80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa 25 50 100 200 400	structure, geology
	NONE		total seepage about 2L/min	390	1		CH	CLAY, light grey, high plasticity, many roots, fragments of weathered basalt	M	Fb		TOPSOIL
							CH	CLAY, (80 to 90%), mottled red brown and yellow brown with black veins of iron or manganese oxides ROCK (10 to 20%) angular fragments of basalt up to 0·3m across, mainly highly weathered low strength, occurs in pockets and lenses as shown		VSt to H		WEATHERED BASALT; DISCONTINUOUS LAYERS AND LENSES OF HIGHLY WEATHERED FRAGMENTS IN EXTREMELY WEATHERED MATRIX
					2							
					3							
					4			PIT STOPPED AT 4·2m – VERY SLOW PROGRESS				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

ENGINEERING LOG – EXCAVATION

excavation no. P/2 19/26
sheet of

project GUIDE RIVER DAMSITE location HAMPSHIRE – BORROW AREA

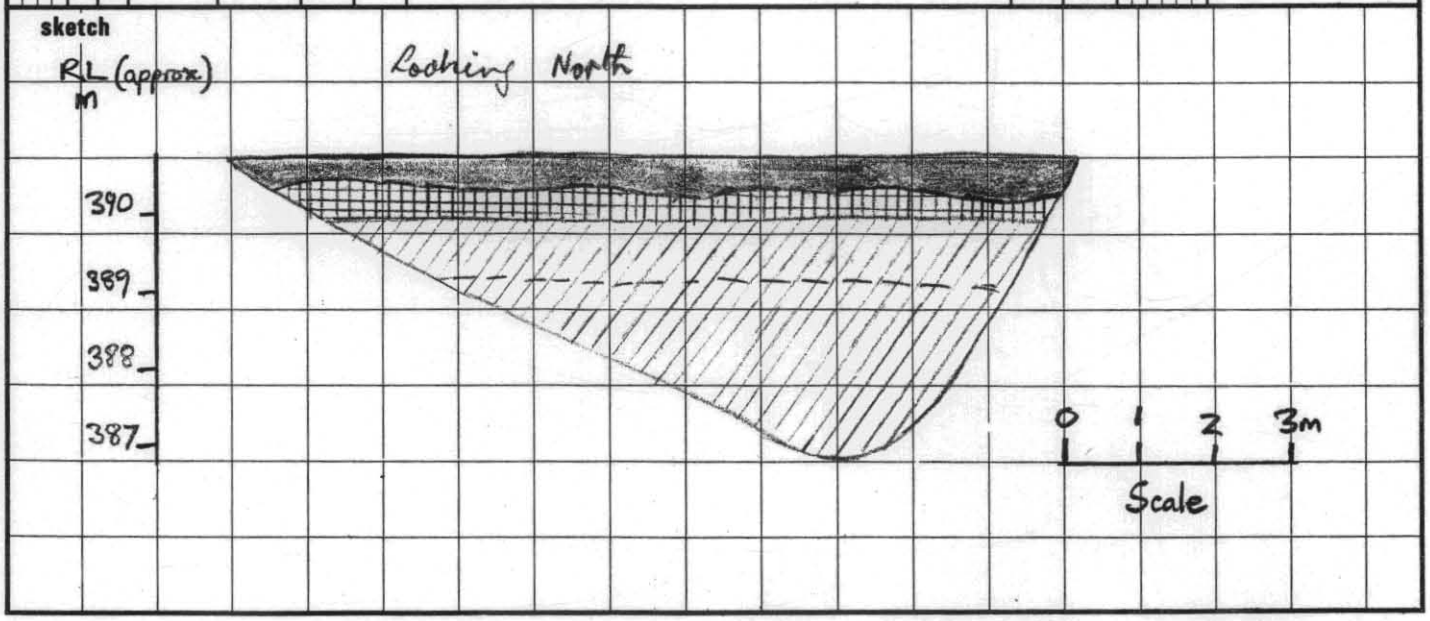
co-ordinates
R.L. 390·8 m
excavation dimensions 11 x 4·0 x 1m

exposure type TEST PIT
equipment JCB 808
operator BILL KING - CONTRACTOR

pit commenced 19 Aug '80
pit completed 19 Aug '80
logged by WLM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa 25 50 100 200 400	structure, geology
	NONE			390	0			silty CLAY, light grey brown, plastic - fragmental, fine roots, some fragments of siltstone, uneven thickness.	M to W			Top soil
								silty CLAY, light brown, plastic.	M to W	St		Residual Soil
			About 10l/m		1			CLAY, dark grey black and light brown mottled.	M	St to H		Deeply Weathered basalt
					2			Clay, silty and sandy, grey green	W	VSt to H		Deeply Weathered basalt.
					3							
					4							
					5							

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. P/3 (20/26)
sheet of

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER DAMSITE location HAMPSHIRE – BORROW AREA

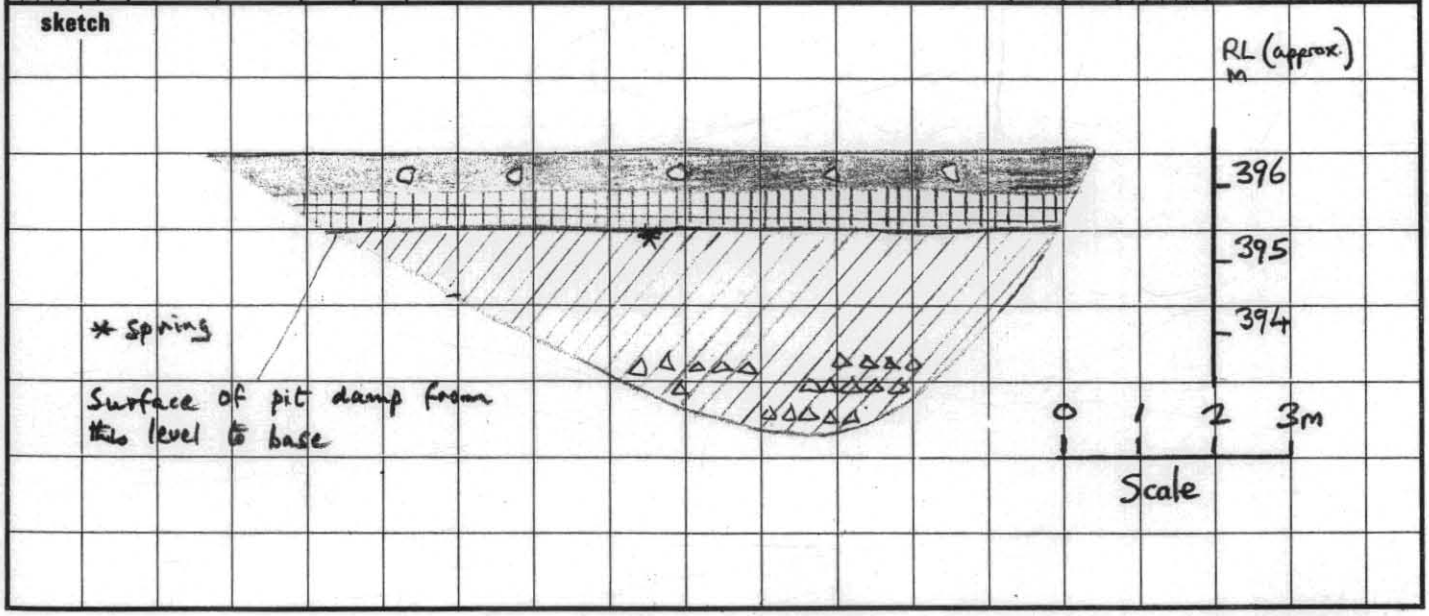
co-ordinates
R.L. 396·4m
excavation dimensions 11·5 × 3·6 × 1m

exposure type Test Pit
equipment JCO 808
operator Bill King - contractor

pit commenced 19 Aug '80
pit completed 19 Aug '80
logged by WLM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE		abt 2 e/m	395	1		CH	Silty CLAY, red brown, plastic, fine roots, contains boulders up to 0.8 m across.	W	St-VSt		Topsoil with basalt boulders
							CH	Silty CLAY, light grey brown, plastic, some small siltstone fragments.	W	St		Residual Soil
					2		CH	CLAY sandy, fragmental. Towards base, zones of harder weathered rock interspersed with fragmental clay.	W	St to H		Weathered Basalt.
					3							

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

ENGINEERING LOG – EXCAVATION

excavation no. Q/1 (24/26)
sheet of

project GUIDE RIVER DAMSITE location HAMPSHIRE – BORROW AREA

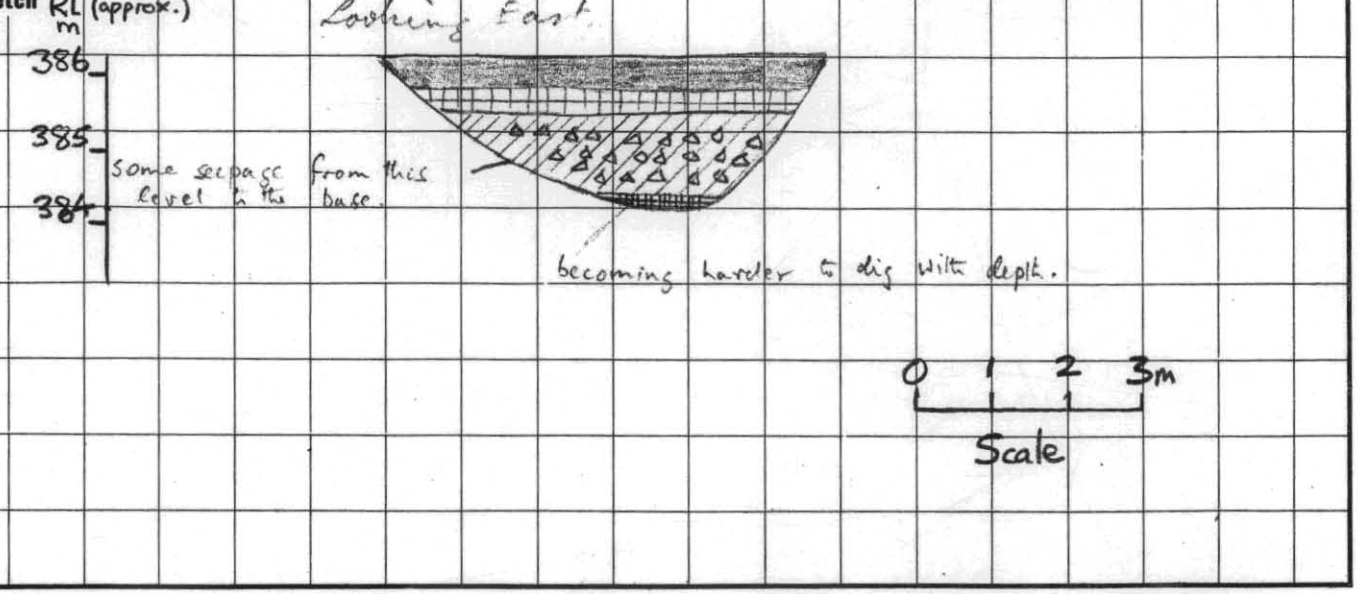
co-ordinates
R.L. 386·2m
excavation dimensions 6 x 2·0 x 1m

exposure type TEST PIT
equipment JCB 808
operator Bill King – CONTRACTOR

pit commenced 19/8/80
pit completed 19/8/80
logged by NLM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa 25 50 100 200 400	structure, geology
	NONE							Silty CLAY, light grey brown, roots				TOPSOIL
							CH	CLAY, grey brown, plastic.		St-VSt		Residual Soil
				385	1			CLAY brown, sandy with some rocky sections				Deeply Weathered Basalt
								Further digging prevented by rock and weathered rock at 2·0m				

sketch RL m (approx.)



TASMANIA DEPARTMENT OF MINES

5 cm

ENGINEERING LOG – EXCAVATION

excavation no. S/1 (22/26)
sheet of

project GUIDE RIVER DAMSITE
location HAMPSHIRE - Spillway area

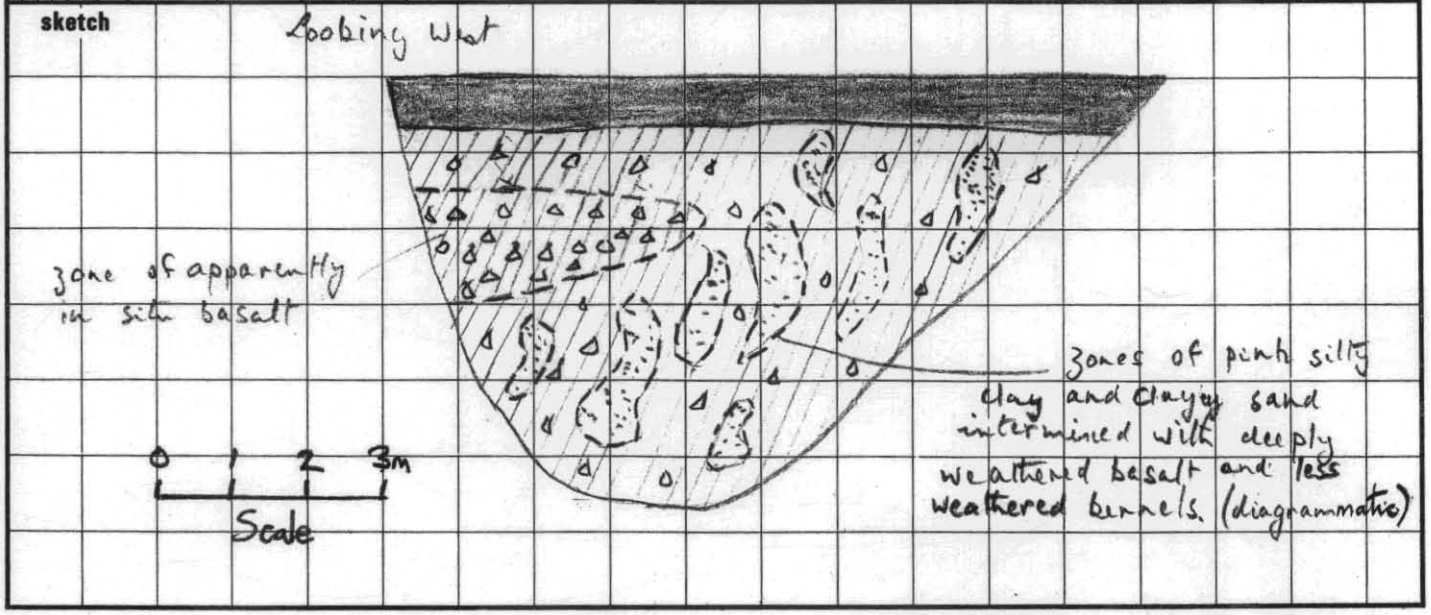
co-ordinates
R.L.
excavation dimensions 10 × 5·6 × 1m

exposure type Test Pit
equipment JCB 808
operator Bill King-contractor

pit commenced 20/8/81
pit completed 20/8/81
logged by WKM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE						CH	CLAY, reddish, plastic	M	St		Topsoil
					1			CLAY, silty CLAY and clayey SAND with BOULDERS. Sand grains are of quartz and much of silt may be also. About 50% silty clay and clayey sand (pinkish) and 50% fragmental clay and boulders, boundary between them is irregular				Basalt – deeply weathered and less weathered 50% and silty clay with clayey sand (Tertiary and/or Precambrian boulders?) making up the remainder.
					2							
					3							
			very slow seepage on lower surfaces		4							
					5							
								PIT STOPPED AT 5·6m				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. S/2 (23/26)
sheet of

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER DAMSITE — location HAMPSHIRE - Spillway.

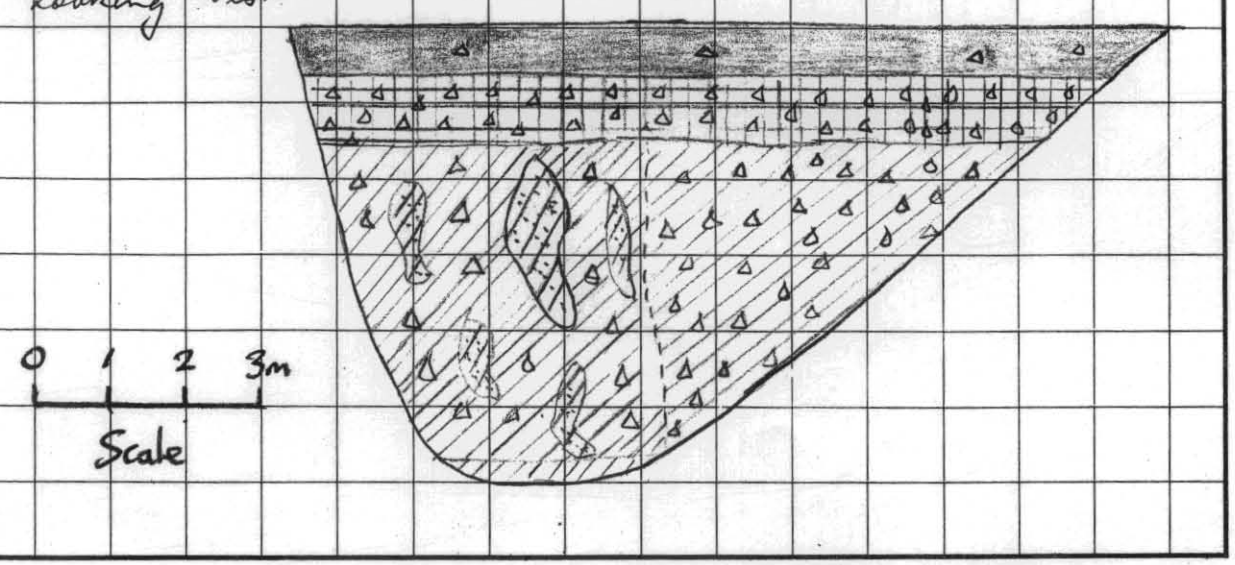
co-ordinates
R.L.
excavation dimensions 11·5 × 5·6 × 1m

exposure type Test Pit
equipment JCB 808
operator Bill Ring - contractor

pit commenced 20/3/80
pit completed 20/3/80
logged by WLM
checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE				0		CH	CLAY, brown, plastic, occasional boulders	M			Topsoil
					1			CLAY and BOULDERS. brown clay plastic, boulders up to 0.3 m across.	M	St to VSt		Residual soil with boulders of basalt.
					2			CLAY, brown, fragmentary with boulders of rock. On the south end of the pit there are zones of light grey to pink silty clay and sandy clay, the sandy material being quartz grains of fine to medium sand grain size				Weathered basalt with zones of included sediments.
					5			CLAY, pinkish brown, with small cavities fragmental, sandy texture.				Deeply weathered basalt.
					6							

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. S3
sheet 1 of 1

24/26

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER location SPILLWAY

co-ordinates

R.L.

excavation dimensions 11 x 5·9 x 1m

exposure type Pit
equipment JCB 808 1m bucket
operator Bill King (contractor)

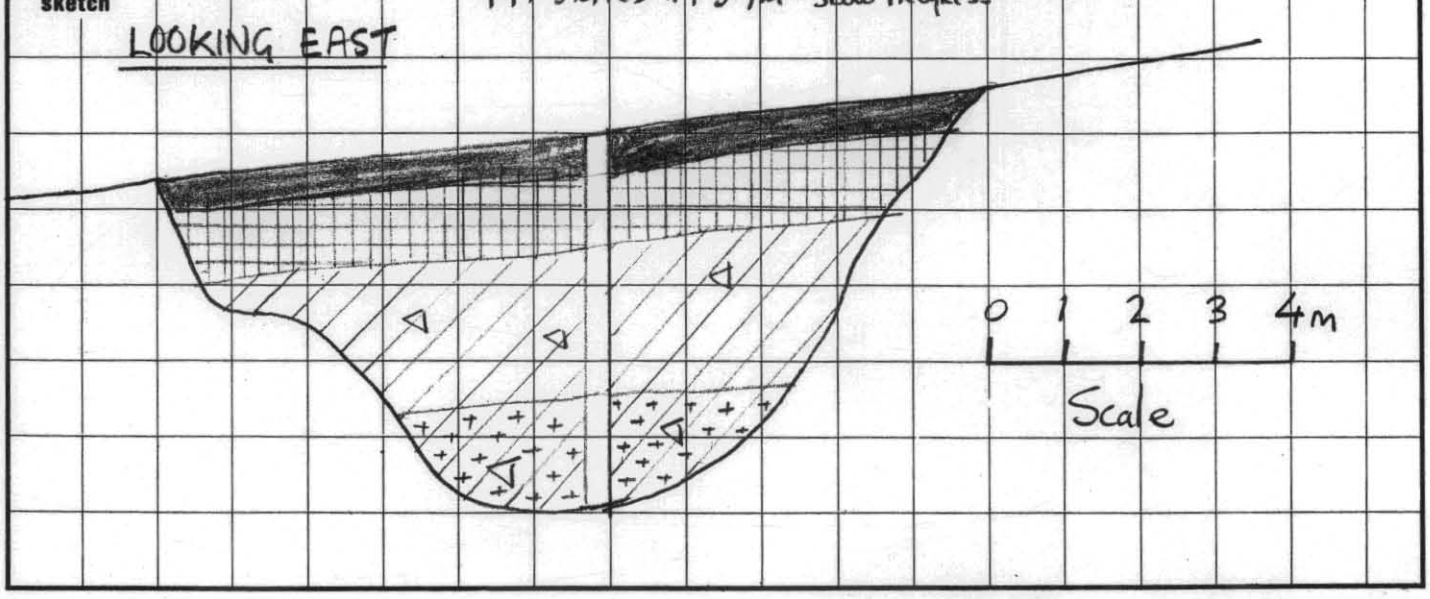
pit commenced 20 Aug 80
pit completed 20 Aug 80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L. / depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE	NONE	no Seepage			CH	CLAY, brown, high plasticity, many fine roots, basalt boulders.	M	Fb		TOPSOIL
				1		CH	CLAY, red brown, high plasticity, angular fragments of basalt upto 100mm across	M	VSt	x x	RESIDUAL SOIL
				2		CH or MH	CLAY, mottled yellow brown, red brown, grey green, and dark grey, and ROCK (less than 5%), weathered basalt boulders		St to H	x x x x	EXTREMELY WEATHERED BASALT
				3							
				4		MH or ML	Clayey SILT, mainly yellow brown, some grey green and red brown, moderately quick dilatancy and ROCK (less than 5%) weathered basalt boulders		H	x x	SOME POLISHED AND SLICKENSIDED SURFACES
				5							

sketch

PIT STOPPED AT 5·9m – SLOW PROGRESS

LOOKING EAST



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. S4 (25/26)
sheet 1 of 1

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER location SPILLWAY

co-ordinates

R.L.

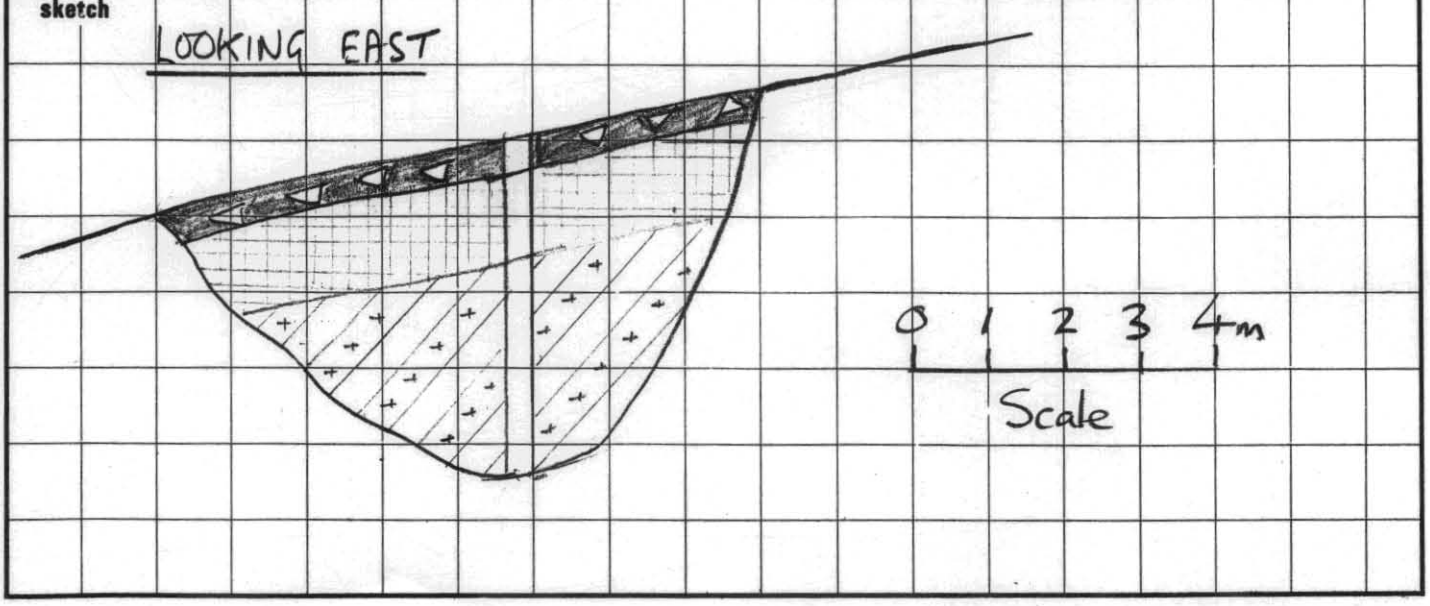
excavation dimensions 8 × 4·3 × 1m

exposure type Pit
equipment JCB 808, 1m bucket
operator Bill King (contractor)

pit commenced 20 Aug '80
pit completed 20 Aug '80
logged by ATM
checked by

penetration 1 2 3	support	water	notes samples, tests	metres R.L. / depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa (25 50 100 200 400)	structure, geology
	NONE	NONE	No seepage			CH	CLAY, brown, high plasticity, many roots, basalt boulders up to 300 mm across	M	Fb		TOPSOIL
				1		CH	CLAY, red brown, high plasticity		VSt	x x	RESIDUAL SOIL
				2		MH	Silty CLAY, mottled grey green, red brown, dark grey, slow to moderate dilatancy, vesicular structure		VSt to H	x x x	EXTREMELY WEATHERED BASALT
				3							
				4			PIT STOPPED AT REQUIRED DEPTH 4·3m				

sketch



TASMANIA DEPARTMENT OF MINES

5 cm

excavation no. S/5 (26/26)

sheet of

ENGINEERING LOG – EXCAVATION

project GUIDE RIVER DAMSITE

location HAMPSHIRE – Spillway

co-ordinates

R.L.

excavation dimensions 10·5 × 4·8 × 1m

exposure type Test Pit

equipment JCB 808

operator Bill King – contractor

pit commenced 20/8/80

pit completed 20/8/80

logged by WLM

checked by ATM

penetration 1 2 3	support	water	notes samples, tests	metres R.L.	metres depth	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetrometer kPa 25 50 100 200 400	structure, geology
	NONE	NONE					CH	CLAY brown, plastic, fern roots and fine roots	M	St		Topsoil
								ROCK and CLAY. On western end about 80% weathered and unweathered rock with fragmental brown clay (rock boulders up to 0·6m across) while on eastern end, ratio is about 60:40 In middle is U shaped zone of pink clay most with small spherical cavities, occasional small zones of clayey SAND.	M			Mainly deeply weathered, weathered and less weathered basalt. Occasional lenses of clayey sand included.
								PIT STOPPED AT 4·8m				

sketch