FORM No. R.C. 443

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: FISHER SCHEME, TUNNEL

GEOLOGICAL PLAN: G557 SURVEY PLAN: SA29868 2/3

DATES (a) DRILLED: Jan - Mar. 1964 (b) WATER TABLE:

METHOD: J.J. DIAMETER: NX, 6X, AXT

SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to N. of Creek.

POSITION	CO-ORDINATES:	E:	N:	HOLE No.
	ON LINE: PY68-75	BEARING: 000° 00'	AT CH:	5909
	AT STN: PY68	BEARING: 114° 24'	DIST: 223'	FILE No.
LEVEL.	SURFACE	COLLAR	WATER TABLE	
	3696			
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 1 OF 15 SHEETS
	VERT./~~HOR./INC~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
0			6x				Brown			0-76'2" Dolerite talus and scree. Boulders up to 8" in diameter with occasional recovery of dolerite clay (as at 16.0'). Material generally weathered. High core loss probably represents dolerite clay.
5										
10										
15										
20										
25										
30										
35										Scree and Talus.
40										
45										
50										
55										
60										
65										Dolerite sampled by C. Brooks - Monash Uni 25 6 76
70										
75							Grey			76'2" - 100.0' Dark grey - black fine-medium grained fresh dolerite, joints virtually absent. Rock becomes much coarser at 86.5' - 87.5' where plagioclase laths are visible to the naked eye.
80										
85										Fresh dolerite with decomposed joint zones.
90		17"				3				88' Rock weathered along joints. 90.5" - 94' Sub-vertical joint with decomposed rock along plane where calcite has been deposited subsequently.
95						2				98'-99' Sub-vertical joint with calcite.
100										

Lip 16

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: FISHER SCHEME; TUNNEL

GEOLOGICAL PLAN: G557 SURVEY PLAN:

DATES (a) DRILLED: Jan/Feb/Mar 1964. (b) WATER TABLE:

METHOD: D.D. DIAMETER: Nx, Bx, AXT.

SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment & N. of Creek.

POSITION	CO-ORDINATES:	E:	N:	HOLE No.
	ON LINE: By 68-75	BEARING: 000° 00'	AT CH:	5909
	AT STN:	BEARING: 114° 24'	DIST: 223'	FILE No.
LEVEL.	SURFACE	COLLAR	WATER TABLE	
	3696			
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 2 OF 15 SHEETS
	VERT. ~~HOR./INC.~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
100'			Bx				Grey			100'–179' Dark grey – black medium & fine grained dolerite with tight or filled joints dipping at low angle but badly weathered sub-vertical joints with calcite or zeolite deposited along them.
105'		Lge to 15", much less often jointed.				2				103'–108' Weathered joint.
110'						2				114' Quartz veins dipping at 80°
115'										
120'						4				
125'						4				124'–125'6" Broken decomposed dolerite
130'						1				130'–133' Broken dolerite occasionally decomposed.
135'		5'–6"				5				137' Strong development of euhedral pyrites in black fine grained dolerite.
140'										
145'										
150'		Lge to 32" except where jointed				1				Fresh dolerite with decomposed joint zones.
155'										155' Decomposition along joint – decomposed residue of large rhomb-shaped mineral & 3/8" diameter dolomite?
160'		3'–4"								159–164' Rock broken along joints with hydrated Fe and carbonate
165'		Lge to 15"				1				
170'		Max 8"				4				
175'		Lge to 2'–0"					Nil			
180'		Fragmented Core								179'–189'4" Strong vertical jointing producing decomposed and much broken rock. $CaCO_3$ deposited along jts and slickensides shows some movement along these planes.
185'										
190'		Lge to 6"					Brown-Grey			189'4"–210'6" Fresh dark grey – black medium & fine grained dolerite showing major decomposition along steep joints and minor decomposition along shallow joints
195'		Max 2'9"				3	Nil			
200'										

FORM No. H.E. 443

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT
LOCATION: FISHER SCHEME, TUNNEL
GEOLOGICAL PLAN: GS 57 SURVEY PLAN:
DATES (a) DRILLED: Jan/Feb/Mar 1964 (b) WATER TABLE:
METHOD: D.D. DIAMETER: NX, BX, AXT.
SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to N. of creek.

POSITION	CO-ORDINATES:	E:	N:	HOLE No.
	ON LINE: By 68-75	BEARING: 000°00'	AT CH:	5909
	AT STN:	BEARING: 114°24'	DIST: 223'	FILE No.
LEVEL.	SURFACE	COLLAR	WATER TABLE	
	3696			
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 3 OF 15 SHEETS
	VERT/~~HOR/INC~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
200'			BX.		1		Nil			199'6"–201' Decomposed dolerite along joint.
205'		Max. 29"								
210'										210'6"–219' Decomposed dolerite along long vertical joint producing broken rock from 215'–219'.
215'		Fragmented to 3"								
220'										219'–274' Light to dark grey medium grained dolerite reasonably fresh where not jointed. More decomposition now seen along shallower (50–60°) joints, rock perhaps broken up where decomposed.
225'										
230'		Lengths up to 27"								230' Quartz vein at 80°.
235'										
240'						2				238'–242' Decomposed dolerite along vertical joint, rock broken up in part.
245'										245'6"–250' Decomposed dolerite along joints at 50°–60°.
250'						2				250'6"–252'9" Broken core due to decomposition along vertical and shallower joints.
255'		Up to 13" but also fragmented.								253'–255' Dolerite decomposed along vertical joint but core length up to 10".
260'						2				
265'						3				264'–268'6" Limonite along sub-vertical joint.
270'										267'–269' Core broken up due to vertical and oblique joints, little amount decomposition, some joints fresh.
275'										271'6" and 273'6" Badly decomposed joints.
280'		Good fresh cores ± 31"								274'–294' Good fresh, light to dark grey medium grained dolerite, little jointed with some slight decomposition along joints.
285'										284'. Decomposed joint.
290'										
295'		± 12"								294'–312'6" Fresh (except near joints) light to dark grey medium grained moderately to well jointed dolerite with most of joints showing decomposition.
300'										

Fresh dolerite with decomposed joints.

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: FISHER SCHEME TUNNEL

GEOLOGICAL PLAN: GS57 SURVEY PLAN:

DATES (a) DRILLED: 24/25/26/Mar 1964. (b) WATER TABLE:

METHOD: D.D. DIAMETER: NX, BX, AXT

SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment & N. of creek.

POSITION

CO-ORDINATES:	E:	N:	HOLE No.
ON LINE: Ay 68-75	BEARING: 000° 00'	AT CH:	5909
AT STN:	BEARING: 111° 24'	DIST: 223'	FILE No.

LEVEL.

SURFACE	COLLAR	WATER TABLE
3696		

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT. ~~HOR.~~ ~~INC.~~	90°	

SHEET 4 OF 15 SHEETS

Max. 1" generally 3-4" or fragmented.

± 32"

± 12" very variable often almost broken up.

Good fresh core ± 24" getting worse below.

± 12" fragmented often jointed

308' Decomposition along vertical joints.

310½"-311'3" Rock entirely decomposed to dolerite clay.

312'6"-347' Fresh, light-dark grey medium grained dolerite in good core lengths, slightly decomposed along joints.

338'-340'9" Completely fragmented rock, but not decomposed.

344'-347' Strong decomposition along joints.

347'-376'8" Light-dark grey strongly jointed dolerite with much decomposition along planes. Core generally in short lengths and occasionally ground up.

Fresh Jointed Dolerite grading into badly decomposed material.

363'-367' Broken and somewhat decomposed core.

369' Slickensides along decomposed joint.

376'8"-375' Fresh dolerite with max. core length 32". Good unjointed rock grades down into weathered jointed rock.

375'-449'4" Weathered and decomposed medium grained light to dark grey dolerite. Steeply dipping sub-vertical joints and oblique joints produce broken rock. Core often ground-up and/or fragmented. Dolerite clay fraction not recovered.

395' Hole caved badly during subsequent drilling.

FORM No. M.E. 443

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: FISHER SCHEME, TUNNEL

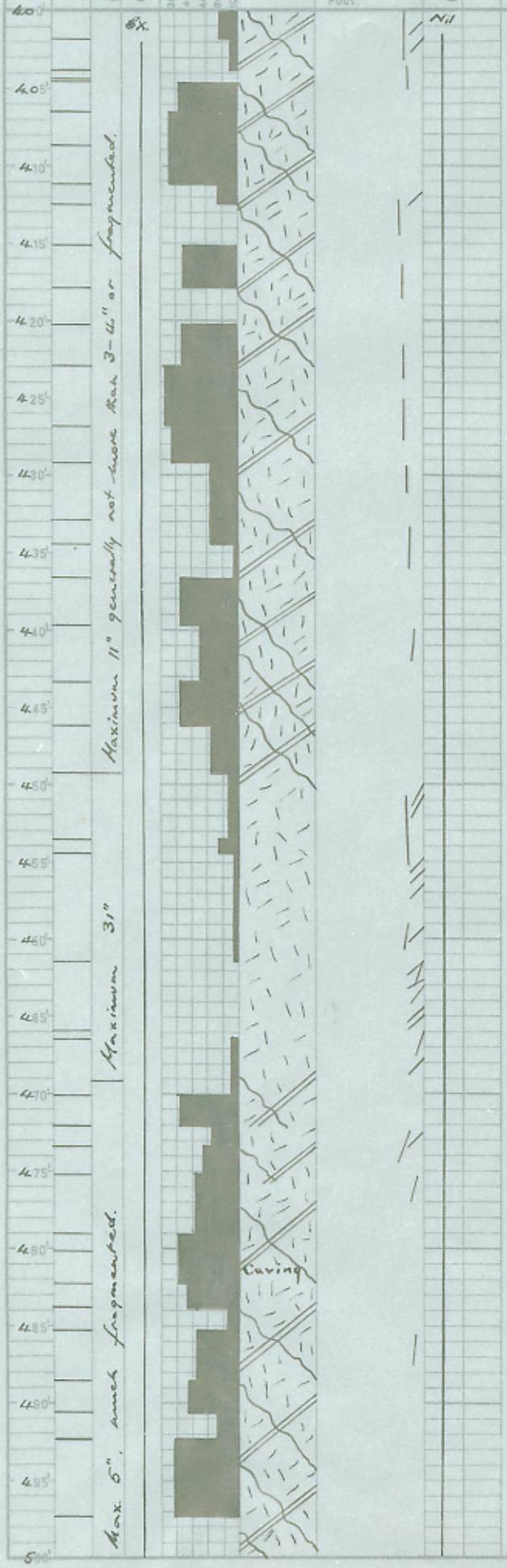
GEOLOGICAL PLAN: G557 SURVEY PLAN:

DATES (a) DRILLED: Jan/Feb/Mar 1964 (b) WATER TABLE:

METHOD: D.D. DIAMETER: NX, 6X, AXT

SITE REMARKS: Dolerite forms slope on tunnel line at base of escarpment S.W. of creek.

POSITION	CO-ORDINATES:	E:	N:	HOLE No. 5909
	ON LINE: Fy 68-75	BEARING: 000°00'	AT CH:	
	AT STN:	BEARING: 114°24'	DIST: 223'	FILE No.
LEVEL.	SURFACE	COLLAR	WATER TABLE	
	3696			
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 5 OF 15 SHEETS
	VERT/~~HORIZ~~	90°		



402'-3' Calcite and dolomite(?) filling joint, very decomposed.
404'6"-411' Broken rock, joints difficult to see.

Fresh Dolerite with decomposed fault Zones.

449'4"-470' Fresh, light to dark grey dolerite with strong joints along which decomposition is proceeding. Core not broken up as before.
450'6"-455' Strong vertical joint with thick dolerite clay along it.

461'3" Calcite filled joint, decomposed

470'-543'9" Weakened, and/or decomposed, well jointed, dolerite giving broken or ground up core. Decomposition proceeding from joints Dolerite clay present in places.
472'3" Carbonate along 50° joint.

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: FISHER SCHEME. TUNNEL.

GEOLOGICAL PLAN: GS 57 SURVEY PLAN:

DATES (a) DRILLED: Jan/Feb/Mar 1964 (b) WATER TABLE:

METHOD: DD DIAMETER: Nx, Bx, AXT

SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to N. of creek.

POSITION	CO-ORDINATES:	E:	N:	HOLE No.
	ON LINE: Py 68–75	BEARING: 000° 00′	AT CH:	5909
	AT STN:	BEARING: 111° 24′	DIST: 223′	FILE No
LEVEL.	SURFACE	COLLAR	WATER TABLE	
	3696′			
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 6 OF 15 SHEETS
	VERT. ~~HOR.~~ ~~INC.~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY %	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
500′			Bx				Nil			
505′										
510′										
515′										
520′										
525′										
530′										530′ Thick seam dolerite clay along joint. 532′7″ Calcite along joints.
535′										
540′										541′1″–545′9″ Dolerite clay, slickensided and perhaps brecciated with fresher dolerite below in which joints show decomposed chlorite and a blue clayey mineral. 545′9″–568′ Fresher, light to dark grey, medium grained, dolerite with strong joints and zones in which the core is fragmented. Decomposition has proceeded to dolerite clay in places. 554′ Sub vertical joints in two directions at right angles. Joints dipping at 80° 1½″ apart.
545′										
550′										
555′										
560′										
565′										
570′										568′–598′ Severely decomposed dolerite with strong joints filled with calcite. Core much broken up, dolerite clay occasionally present but generally lost.
575′										
580′										
585′										
590′										
595′										
600′										598′–618′11″ See over.

Max. 17″ with fragmented zones

Max. 6″ often fragmented.

* 13″ Occasional recoveries up to 4″, usually ±2″

Decomposed dolerite with occasional fresher zones.

FORM No. M.E. 443

DRILLING RECORD

AREA: Mersey Forth Power Development.

LOCATION: Fisher Scheme. Tunnel.

GEOLOGICAL PLAN: GS.57 SURVEY PLAN:

DATES (a) DRILLED: Jan–March 1964 (b) WATER TABLE:

METHOD: D.D DIAMETER: Nx, Bx, AxT

SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to north of creek.

POSITION				HOLE No.
	CO-ORDINATES:	E:	N:	5909
	ON LINE: Ty 63-75	BEARING: 000° 00'	AT CH.	
	AT STN:	BEARING: 114° 24'	DIST: 223'	FILE No.
LEVEL.	SURFACE	COLLAR	WATER TABLE	
	3696			
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 7 OF 15 SHEETS
	VERT./~~HOR./INC.~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY %	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
600'			Bx							598'-618'11" Fresh, light to dark grey, medium grained dolerite with joints along which decomposition has occurred. Joints may be calcite-filled.
605'										
610'		± 13"								612'-614' Thick dolerite clay along joint, turning below to decomposed dolerite and broken core.
615'										
620'										618'11"-635'2" Strongly jointed dolerite often fragmented with decomposed joints. Calcite often seen along jts.
625'		Max 7" often fragmented								625'8" Two directions of movement seen along two sets of vertical jts. (Slickensides vertical and 45°).
630'										
635'										635'2"-657' Fresh, light to dark grey medium grained strongly jointed dolerite with slight decomposition along jts. Rock becomes fine grained below.
640'										Fresh dolerite with decomp-osed zones becoming thorough-ly decomp-osed below.
645'		± 13"								637'-638' Slickensides on joint planes, pyroxenes breaking down & chlorite seen joint.
650'										643'-650' Crystalline calcite? in cavities.
655'							N/L			
660'										657'-688' Dark greeny-grey, often and altered / dolerite, strongly jointed and often broken up. Slickensides and historic surfaces seen. Carbonate? filled cavities may be seen along joints. Freshen between 664'-8'
665'										
670'							Grey			668'-676' Dolerite badly decomposed altho' still forms sticks except where fragmented 668'-71'
675'										676'-688' Fresher dolerite but joints still show decomposition
680'										
685'		± 9" occasionally fragmented, usually 2-6"								686' Vertical joints shallow.
690'							Brown-Grey			688'-705'4" Light to dark grey, medium grained dolerite, showing slight overall decomposition and major decomposition along some joints with altered zones.
695'										696'-698' Thoroughly decomposed
700'										

FORM No. R.E. 443

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT.

LOCATION: FISHER SCHEME TUNNEL.

GEOLOGICAL PLAN: G557 SURVEY PLAN:

DATES (a) DRILLED: Jan - March 1964. (b) WATER TABLE:

METHOD: D.D. DIAMETER: NX, BX, AXT.

SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to north of Creek.

POSITION	CO-ORDINATES:	E:	N:	HOLE No.
	ON LINE: Ty 68-75	BEARING: 000° 00'	AT CH:	5909
	AT STN:	BEARING: 111° 24'	DIST: 223'	FILE No.
LEVEL.	SURFACE	COLLAR	WATER TABLE	
	3696			SHEET 8 OF 15 SHEETS
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	
	VERT. / ~~HOR.~~ / ~~INC.~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
700'										700'-705'4" Badly decomposed dolerite grading down into jointed and broken rock.
705'		+ 9"				6				705'4" - 712'6" Light to dark grey medium grained well jointed dolerite. Near vertical joints tight, sub-horizontal joints weathered & slight extend.
710'		+ 16"								712'6" - 731' Decomposed dolerite with occasional fresher pieces. But also altered.
715'							Grey			
720'		+ 3" often								
725'				lost 2"						
730'		+ 13" often					Brown			
735'										731' - 740' Fresh, light to dark grey medium grained dolerite showing occasionally slightly weathered joints.
740'		+ 15"								740' - 749'8" Dolerite in shorter lengths with some decomposition & alteration along the joints.
745'		7'2" often fragmented.								
750'							Grey			749'8" - 820'5" Fresh, light & dark grey medium grained dolerite showing strong vertical joints perhaps with slight weathering.
755'										Decomposed Dolerite becoming fresh below.
760'										
765'				lost 1"						
770'							N/L			
775'		Maximum 23" very good core.					Grey			
780'							N/L			
785'										
790'							Grey			
795'										
800'										

FORM No. H.E. 443

DRILLING RECORD

AREA: Mersey Forth Power Development.
LOCATION: Fisher Scheme Tunnel
GEOLOGICAL PLAN: 6357 SURVEY PLAN:
DATES (a) DRILLED: Jan-March 1964. (b) WATER TABLE:
METHOD: D.D. DIAMETER: NX, BX, AXT.
SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to north of Creek.

POSITION
CO-ORDINATES: E: N:
ON LINE: Ty 68-75 BEARING: 000° 00' AT CH:
AT STN: BEARING: 114° 24' DIST: 223'

LEVEL
SURFACE: 3696 COLLAR: WATER TABLE:

INCL.
HOLE DRILLED: VERT./~~HOR./INC.~~ ANGLE FROM HORIZONTAL: 90° DIRECTION:

HOLE No. 5909
FILE No.
SHEET 9 OF 15 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
80										
805							Grey			
810				lost 1"						811'-812' Weathered and decomp-osed vertical joint.
815										
820							N/Z			
825		23"				Sub-vertical joints closely spaced.				820'5"-833'10" Fresh, medium to coarse grained dolerite showing strong sub-vertical joints, closely spaced. Rock above this zone is comparatively fine-grained.
830										
835										833'10"-838'6" Medium grained dolerite finer in texture than above.
840							Grey.			838'6"-841'6" Strongly decomposed joint often fragmented. Texture becomes coarser gradually until at 841'6" there is a marked contact with finer grained dolerite below. Coarse and fine grained Dolerite, often decomp-osed.
845		Maximum								841'6"-857'8" Fine-medium grained fresh, jointed, dolerite occasion-ally decomposed along joint planes.
850										849' Decomposed joint.
855										
860		± 27"								857'8"-867'4" Fresh, medium to coarse grained jointed dolerite with occasional weathering and decomposition along joint lines.
865										
870										867'4"-892'11" Medium to fine grained fresh jointed dolerite with occasional decomposed joints.
875										
880										
885		7-8" often ± 19"					Clear			
890										892'11"-911' Strongly decomposed dolerite - decomposition complete in occasionally confined to joint planes. Rock maybe fragmented Carbonate (or zeolite?) seen in jts.
895										
900										

FORM No. H.E. 443

DRILLING RECORD

AREA: Mersey Forth Power Development

LOCATION: Fisher Scheme TUNNEL.

GEOLOGICAL PLAN: GS57 SURVEY PLAN:

DATES (a) DRILLED: Jan-March 1964. (b) WATER TABLE:

METHOD: D. D. DIAMETER: NX, BX, AXT

SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to north of Creek.

POSITION

CO-ORDINATES:	E:	N:
ON LINE: AY 68-75	BEARING: 000°00'	AT CH:
AT STN:	BEARING: 114° 24'	DIST.: 223'

LEVEL.

SURFACE	COLLAR	WATER TABLE
3696'		

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT/~~HOR~~/~~INC~~	90°	

HOLE No. 5909

FILE No.

SHEET 10 OF 15 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
900'										
905'		10" often fragmented								
910'										911'-920'9" Decomposed and altered dolerite. Most of rock altered to chlorite and has subsequently decomposed in part. Decomposed rock easily broken up. Rock brecciated in part suggesting alteration proceeded along fault planes. Strong joints in places.
915'		10"								
920'				lost 3"	Altered.		Clear.			920'9"-930' fine-medium grained dolerite with slight alteration and decomposition along joints. Rock reasonably fresh.
925'		8"								
930'										930'-957' Decomposed brecciated dolerite suggesting decomposition of altered dolerite. Occasional sub-vertical joints seen. Rock often fragmented.
935'										
940'							N/R			
945'		6" usually fragmented.								
950'										Decomp-osed, Altered and occas-ionally fresh Dolerite.
955'										957'-965'6" Chloritized dolerite, alteration proceeding along jts and outwards. Rock often decomposed due to chlorite.
960'		10"			Altered					
965'										965'6"-1014' Medium grained light & dark grey dolerite, well jointed. Rock fresh, joints slightly weathered.
970'										
975'										
980'										
985'		14" usually 8"								
990'										
995'										
1000'										

FORM No. H.E. 443

DRILLING RECORD

AREA: MERSEY-FORTH POWER DEVELOPMENT.	POSITION — CO-ORDINATES: E:	N:	HOLE No. 5909
LOCATION: Fisher Scheme TUNNEL	ON LINE: RY 68-75 / BEARING: 000° 00'	AT CH.	
GEOLOGICAL PLAN: GS 57 SURVEY PLAN:	AT STN: / BEARING: 114° 24'	DIST: 223'	FILE No.
DATES (a) DRILLED: Jan-March 1964 (b) WATER TABLE:	LEVEL — SURFACE: 3696 / COLLAR:	WATER TABLE:	
METHOD: D. D. DIAMETER: NX, BX, AXT.			SHEET 11. OF 15 SHEETS
SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to north of Creek.	INCL. — HOLE DRILLED: VERT / ~~HOR~~ / ~~INC~~	ANGLE FROM HORIZONTAL: 90°	DIRECTION:

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1000'–1014'		Maximum 14"								
1014'–1024'		Usually 1-3"								1014'–1021'6" Light to dark grey medium grained dolerite showing strong vertical joints with slight decomposition. Core in short lengths or broken up.
		+ 14"								1021'6"–1024'5" Dolerite as above but not broken up.
1024'–1030'		3" to fragmented								1024'5"–1029' Light to dark grey medium grained dolerite with strong slightly decomposed joints and broken core.
1030'–1035'		+ 8"								1029'–1034' Dolerite as above but not broken up.
1035'–1037'		+ 4"								1034'–1036'6" Core somewhat broken up along joint plane.
1037'–1045'		+ 12"					NIL			1036'6"–1045' Light to dark grey medium grained dolerite with strong slightly decomposed joints. "
1045'–1071'		+ 19" Length 5			Altered / Altered					1045'–1133' Fresh, black, fine–medium grained dolerite, occasionally jointed with carbonate deposition – perhaps associated with alteration – along vertical joints. Occasional zones of alteration and small amounts of pyrites present. — Decomposed, Altered Dolerite becoming fresher below.
1071'–1086'		+ 26"								1072'–1078' Carbonate along joints with small amount of decomposition. 1076' Two vertical joints at right angles.
1086'–1100'		Lengths								

DRILLING RECORD

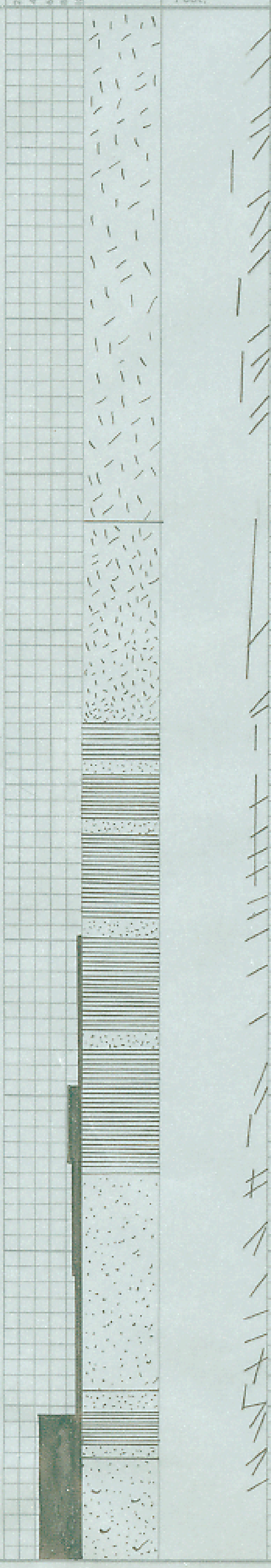
AREA: Mersey-Forth Power Development.	POSITION: CO-ORDINATES:	E:	N:
LOCATION: Fisher Scheme Tunnel.	ON LINE: A/68-75	BEARING: 000°00'	AT CH:
GEOLOGICAL PLAN: GS57 SURVEY PLAN:	AT STN:	BEARING: 114°24'	DIST: 223'
DATES (a) DRILLED: Jan-March 1964. (b) WATER TABLE:	LEVEL: SURFACE	COLLAR	WATER TABLE
METHOD: D.D. DIAMETER: NX, BX, AXT.	3696		
SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to north of creek	INCL.: HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
	VERT/~~HOR/INC~~	90°	

HOLE No. 5909

FILE No.

SHEET 12. OF 15 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1100 – 1200		Lengths ≯ 25" (1100–1145); ≯ 14" commonly 4–8" (1145–1200)					NIL			



1119'–1119'10" Core broken up.

1122'–1125' Altered zone along steep joint. Decomposed rock shows slickensiding.

1133'–1146' Zone of alteration (1135'–1144') passing into black, fine grained dolerite with 2" of brown/black glassy material at contact with underlying Permian beds.

Fresh or Altered Dolerite becoming glassy below.

1146'–1175' light grey to light brown siltstones (often trending to fine grained sandstones) with small sub-angular to sub-rounded pebbles of quartz and pellets of mudstone. Joints quite common, usually showing manganese.

Permian Sediments

1169'–1175' Banded siltstones and pseudobreccias due to discontinuous masses of mudstone within silt/sst.

1175'–1189' light brown fine-medium grained sandstones. Solution cavities down to 1183.' Sandstones ill-sorted with sub-angular to rounded fragments of quartz, quartzite, slate and mudstone.

1189'–1193'6" Badly sorted sandstones as above with interbedded banded mudstones showing limonite stained joints.

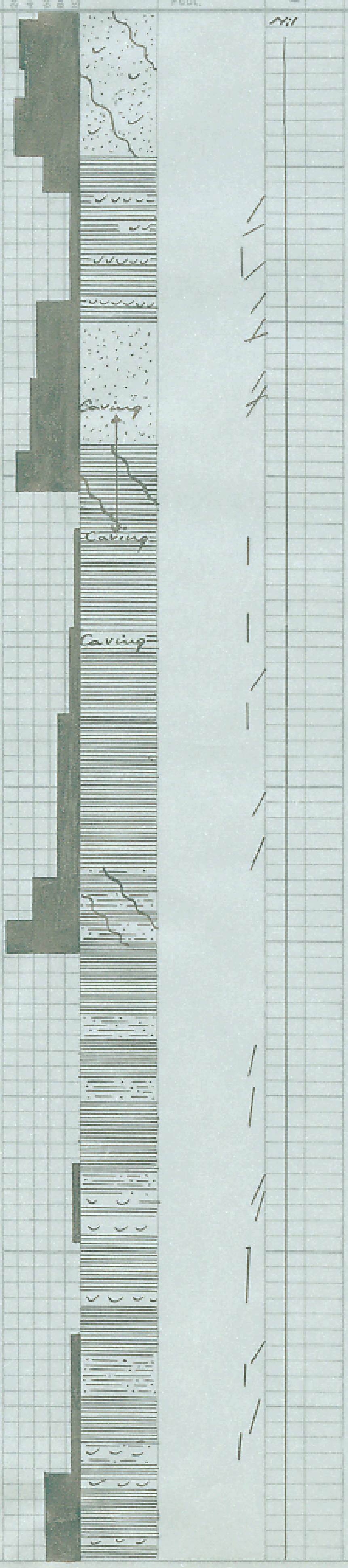
1193'6"–1209½" light grey sst. to light brown grits. Rounded to sub-angular fragments & occasional fossils seen.

FORM No. H.E. 443

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT	POSITION	CO-ORDINATES:	E:	N:	HOLE No. 5909
LOCATION: Fisher Scheme Tunnel		ON LINE: Py 68-75	BEARING: 000°00'	AT CH:	
GEOLOGICAL PLAN: GS 57 SURVEY PLAN:		AT STN:	BEARING: 114°24'	DIST: 223'	FILE No.
DATES (a) DRILLED: Jan. - June 1964 (b) WATER TABLE:	LEVEL	SURFACE	COLLAR	WATER TABLE	
METHOD: D.D. DIAMETER:		3696			
SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment to N. of creek.	INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 13 OF 15 SHEETS
		VERT/~~HOR/INC.~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1200'		Max. 4" mostly fragmented					Nil			
1205'										
1210'		Max. 11"								1209'2"–1220' Dominantly grey (with light brown banding) mudstones containing abundant Fenestellids and Stenoporids.
1215'										
1220'		Max. 6" usually 2-3"								1220'–1228' Light grey to light brown gritty sandstones with erratic fragments of qtz. and rock particles
1225'					Caving					
1230'		Fragmented								1228'–1233' Black uniform siltstones, much fragmented.
1235'					Caving					1233'–1255¼" Uniform black siltstones which break up easily on desiccation. Faint banding shows low angle bedding.
1240'					Caving					
1245'		> 24"								Permian Sediments
1250'										
1255'		Max. 8" generally 2-3"								1255'4"–1260'9" Ground up black mudstone – siltstone.
1260'										1260'9"–1299'6" Black banded mudstone, perhaps slightly calcareous, or siltstone grading into fossiliferous mudstones showing Spiriferids, bryozoans and indeterminate brachiopods. Silty layers developed at some horizons, many joints contain calcite and pyrite. Occasional erratic pebbles seen.
1265'										
1270'		Max. 10" generally 3–6"								
1275'										
1280'										
1285'										
1290'		Max 5" also fragmented								
1295'										
1300'										



FORM No. M.E. 443

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT
LOCATION: Fisher Scheme Tunnel
GEOLOGICAL PLAN: GS57 SURVEY PLAN:
DATES (a) DRILLED: Jan-June 1964. (b) WATER TABLE:
METHOD: D.D. DIAMETER:
SITE REMARKS: Dolerite talus slope on tunnel line at base of escarpment N. of creek.

POSITION: CO-ORDINATES: E: N: HOLE No. 5909
ON LINE: Ry 68-75 BEARING: 000° 00' AT CH:
AT STN: BEARING: 114° 24' DIST: 223' FILE No.
LEVEL: SURFACE COLLAR WATER TABLE
3696 ft
INCL.: HOLE DRILLED ANGLE FROM HORIZONTAL DIRECTION SHEET 14 OF 15 SHEETS
VERT/~~HOR~~ INC. 90°

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY %	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1300'		6-10" becoming fragmented					Nil			1299'6" – 1319' Fresh light & dark grey siltstone – fine sandstone becoming more muddy at some horizons. Bry zoans and occasional brachiopods are present, also many small quartz/quartzite pebbles. Siltstone becomes finer grained lower down and grades into fossiliferous mudstone.
1305'										
1310'		2-3" generally								
1315'										
1320'										1319' – 1324'6" Black – dark grey fine grained fossiliferous mudstones.
1325'		1-2" occasionally fragmented								1324'6" – 1328'2" Ground up pebble of glassy quartzite, probably an erratic.
1330'										1328'2" – 1334'6" dark grey, hard, fine grained sst – ground up.
1335'										1334'6" – 1344' Dark grey, fine grained sst – siltstone with occasional brachiopods and bryozoans. Rock occasionally jointed and well broken up, it passes down into dark grey – black fossiliferous mudstone.
1340'										
1345'		1-2"								1344' – 1378'9" Dark grey – black fossiliferous mudstone and siltstone. Joints almost absent, fossil not abundant. Thin sandstones present up to 1' thick. Permian Sediments.
1350'										
1355'		Maximum 10" generally 3-4"								
1360'										
1365'										
1370'										
1375'										
1380'										1378'9" – 1384'6" Fine-grained grey sandstones showing occasional brachiopods.
1385'										1384'6" – 1395'1" Black – dark grey mudstones and siltstones with occasional fossils.
1390'										
1395'										1395'1" – 1406' Fine medium grained ssts. with thin partings or beds of black mudstone. 1395'1" – 1396'7" Coarse sst
1400'										

FORM N3 H.E. 443

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: FISHER SCHEME TUNNEL.

GEOLOGICAL PLAN: G357 SURVEY PLAN:

DATES (a) DRILLED: Jan. – June '64, (b) WATER TABLE: March – April 1965.

METHOD: D.D. DIAMETER: NX, BX, AXT.

SITE REMARKS: Solcrete taken along tunnel line at base of escarpment to N. of creek.

POSITION

CO-ORDINATES:	E:	N:
ON LINE: A 68 – 75	BEARING: 300° 00'	AT CH:
AT STN:	BEARING: 114° 24'	DIST: 223'

LEVEL

SURFACE	COLLAR	WATER TABLE
3646		

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT. / ~~HOR.~~ / ~~INC.~~	90°	

HOLE No. 5909

FILE No.

SHEET 15 OF 15 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY %	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1400'							Nil			with subangular – rounded inclusions of quartz + quartzite.
1405'		Maximum 10" Generally 2 – 3"								1405'9" – 1405'10" Rounded pebbles of quartzite and decomposed white mudstone(?)
1410'										1405'10" – 1417'6" Interbedded grey – black mudstone, fine grained sst. and siltstone, often showing current bedding.
1415'										1414' Slump structure in mudstone.
1420'										1417'6" – 1422' Fine grained sst. with occasional bands of mudstone and erratic pebbles.
1425'										1422' – 1441'5" Black uniform mudstone and siltstone becoming banded with silty layers below. Silt layers show up current bedding.
1430'										
1435'										
1440'										
1445'		1 – 2"								1441'5" – 1475' Light to dark grey fine – medium grained sst. becoming darker below with the incoming of more mudstone. Dark layers in sst. composed predominantly of carbonaceous material and muscovite. Kinnaird Sediments.
1450'										
1455'										
1460'										
1465'										
1470'										1469'6" – 1470' Sst. becomes coarse – grained.
1475'										1476' – 1490' Interbedded black mudstone and grey siltstone, current and wedge bedding common. Joints sparse – very widely spaced.
1480'										
1485'										
1490'										1490' – 1498'9" Fine – medium grained light grey felspathic sst. showing occ. partings of black mudstone.
1495'										Hole abandoned 1498'9"
1500'										Logged by P.E. Rawlings 30.6.64 25.5.65.