

NRA - ANGLIAN 273

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Scott Wilson Kirkpatrick
CONSULTING ENGINEERS



NATIONAL RIVERS AUTHORITY
ANGLIAN REGION
RIVER WISSEY HYDROMETRIC SCHEME
DRILLING CONTRACT - FACTUAL REPORT

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Job No: AAXEP
Draft: Final
Date: March 1995

NATIONAL RIVERS AUTHORITY

ANGLIAN REGION

RIVER WISSEY HYDROMETRIC SCHEME - DRILLING CONTRACT

FACTUAL REPORT

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NATIONAL RIVERS AUTHORITY

ANGLIAN REGION

RIVER WISSEY HYDROMETRIC SCHEME - DRILLING CONTRACT

FACTUAL REPORT

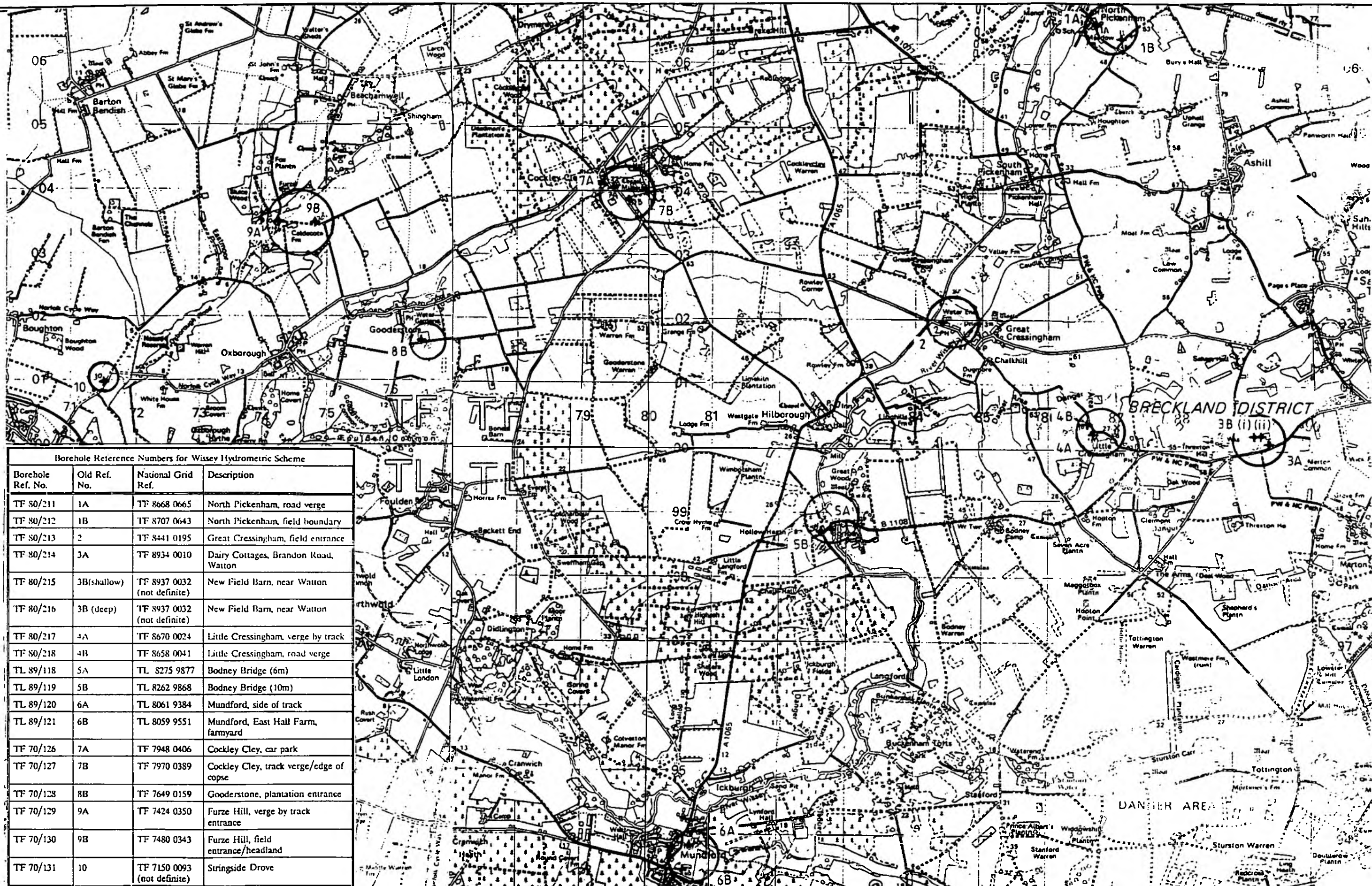
1. INTRODUCTION

The location of the contract works (see Figure A) was the catchment area of the River Wissey, a tributary of the Great Ouse, in south west Norfolk.

This report details the site works supervised by Scott Wilson Kirkpatrick on behalf of the National Rivers Authority (NRA), Anglian Region.

The works comprised the drilling of 18 No observation boreholes and installation of standpipes in each hole to enhance the groundwater resource monitoring network within the Chalk aquifer and overlying Drift. Sixteen of the boreholes were scheduled as "shallow", not exceeding 20m depth, completed either in the Drift or underlying Chalk aquifer. The two remaining "deep" holes were scheduled to be 30m deep, ending in "Firm" chalk (defined as being unweathered, stable without the need for borehole casing, and producing good water flow).

The drilling operations, which were undertaken by Soils Engineering, the NRA Term Drilling Contractor, began on 23 January 1995 and were completed on 6 March 1995.



RIVER WISSEY HYDROMETRIC SCHEME — BOREHOLE LOCATIONS

Figure A

Scale APPROX 1:50 000

Drawn	Approved	Revised
	JR	
Date	Date	Date

Scott Wilson Kirkpatrick
CONSULTING ENGINEERS

SITE WORK AND NOTES

2

2. SITE WORKS

2.1 Factual Account of the Works

Table 1 schedules the progress of the works in diary form. Within a day of site works commencing a decision was made to increase the length of the gravel filter zone from 1.0m to 1.35m. This was to further safeguard the geotextile filter wrap around the standpipe slots from possible blockage caused by the top and bottom bentonite/cement seals. The change applied to all holes including TF 80/215 which had already been backfilled, but which had to be redrilled due to problems which occurred during withdrawal of the 150mmØ casing.

Under the terms of the contract, all water/slurry was to be stored on site until the fines had sufficiently settled to allow clear water to be pumped into a nearby drain. Each of the two "deep" boreholes had a skip into which all the arisings were emptied and allowed to settle out. For the remaining holes a cheaper option was the use of a trailer mounted container, capable of being towed by the contractor's pick-up. Arisings were emptied directly into this which was itself emptied into a third skip at the site store at the end of each day. This method proved very successful despite the time taken to empty the "baler" into the container every time, and the time to unload it each day.

To ensure that the boreholes would respond quickly to any change in groundwater levels, two Falling Head permeability tests were performed in each borehole. The first test was performed within the 150mmØ casing during drilling, and the second was within the 50mmØ standpipe after borehole completion. Approximately 14 of the second tests gave a better performance than the first. Also, approximately half of the 36 tests indicated excellent hydraulic connection, often making it impossible to fill the hole with water up to ground level.

No services belonging to public utilities or private parties were encountered during the investigations.

The surveyors employed to provide levels of the headworks spent a couple of days on site near the contract end. They arrived on site having done no background work to establish benchmark locations and levels. These were determined once on-site by referencing various Ordnance Survey extracts held on site by Scott Wilson Kirkpatrick.

The contract period was programmed for 24 working days. Eventual finish date was the 6 March 1995, an over-run of 7 working days. Of these seven days, 3½ have been deemed to have been "unavoidable" due to the driller falling ill (1 day total) and four boreholes being extended beyond their scheduled depths (2½ days total). The remaining 3½ days over-run were, in our opinion, avoidable and were due to: worn equipment and lack of a chisel; the driller's vehicle being taken for a service (without prior notification); but primarily due to the driller's insistence on finishing very early on site most days.

Of the landowners/points of contact with whom we were in contact during the works, all were satisfied and no complaints were received.

During the contract all boreholes apart from four were drilled at the NRA preferred locations. The four that were moved were TF 80/211, 80/214, 70/131 and TL 89/119, and their final locations are indicated in Section 3 of this report.

The scheduled borehole depths were governed by the anticipated depth to the Chalk aquifer and ensuring that the standpipe did not dry up during the summer months. Four boreholes, TF 80/211, 218, TL 89/120 and TF 70/128, were eventually drilled deeper by 9.5m, 6m, 23m and 3m respectively because the above conditions were not initially met.

TF 80/211 encountered Boulder Clay (dry) within 2.5m of ground level and this continued to 17.5m depth. After being left overnight the hole squeezed to within approximately 4.0m of ground level. After discussions with the NRA, drilling was halted and the standpipe was installed with its tip at 4.0m.

TF 80/218 similarly passed through a little drift and then Boulder Clay until chalk and free flowing groundwater conditions were encountered at 18m. The standpipe tip was then placed at this depth.

TL 89/120 likewise went beyond its scheduled depth although this time the hole was near to a buried alluvial channel which after 29m had only yielded fine to medium sand. After discussions with the NRA the drilling was halted and the standpipe installed at 29m depth.

With TF 70/128 water entry was not evident by the 10m scheduled depth despite being 6.5m into the chalk. Having been instructed to continue until the hole was approximately 4.0m below the water table, drilling was halted for the day at 13.0m. By the next morning water had risen in the hole to its equilibrium level of 8m below ground level. After clearing the borehole of settled chalk fines and at the same time removing water, the water flow into the hole was proved fast enough to mirror possible groundwater level changes, and so the standpipe was installed at 13m depth.

As already mentioned, borehole TF 80/215 had to be redrilled. This was because the bentonite/cement pellets were poured into the hole too quickly, and as a result they jammed in the gap between the 50mmØ and 150mmØ casings, where they began to swell due to reaction with the water present. This problem was avoided on subsequent boreholes by adding the pellets at a much slower rate.

Only one borehole location TF 80/212 required any work to create a level working platform for the drilling rig. It had initially been envisaged that a scaffold platform or a mound built from hardcore would be needed, but after no objection from the landowner, the small embankment was excavated (and later restored) to create a level surface.

TABLE 1: PROGRESS OF THE WORKS

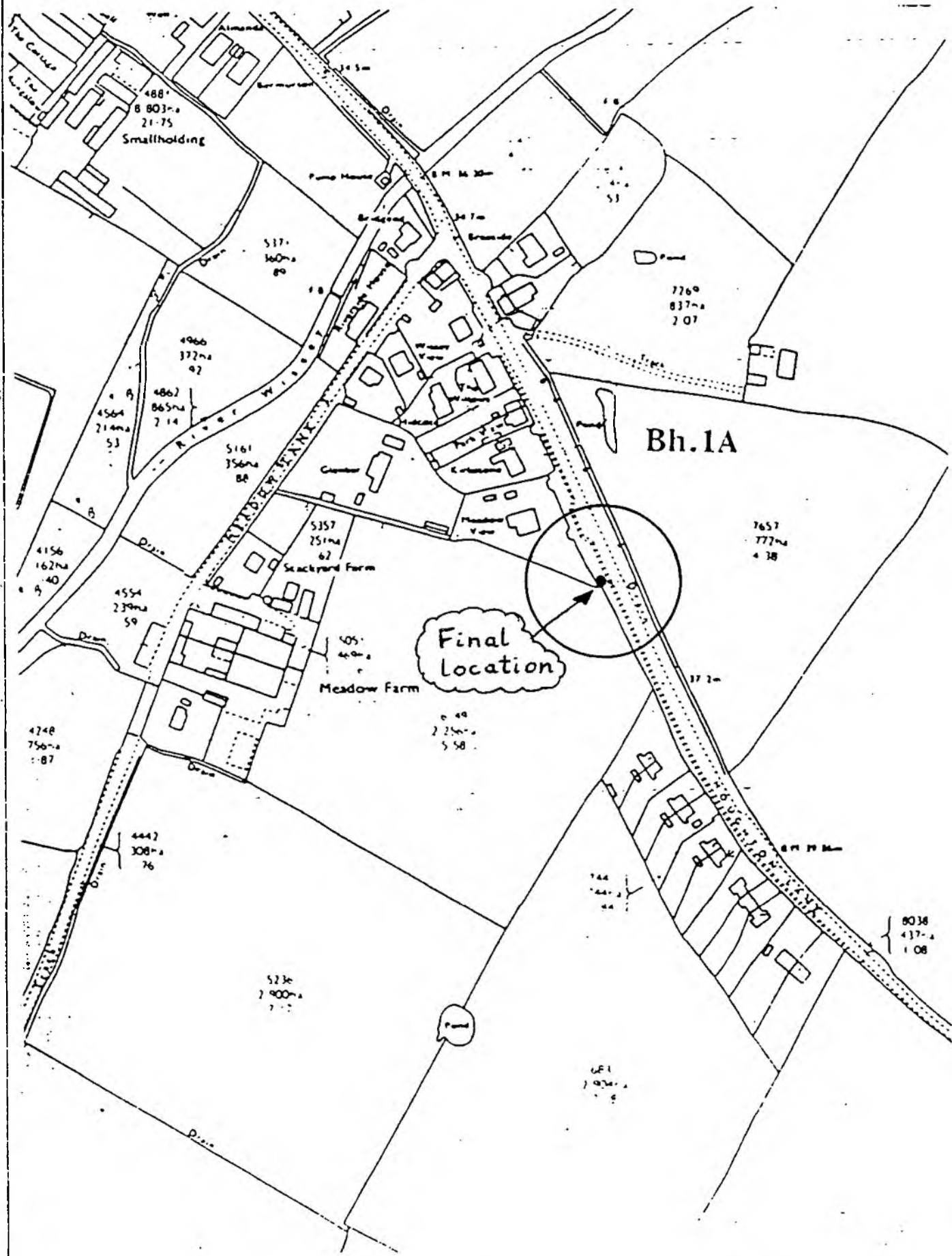
<u>DATE (1995)</u>	<u>WORK DONE</u>
January 23, 24	TF 80/215
25, 26, 27, 30	TF 80/216
30, 31, February 1	TF 80/214
February 1, 2	TF 80/217
2, 3, 6	TF 80/218
(3	Headworks at TF 80/214. One Driller ill.)
7	Re-drilled TF 80/215
7, 8	TF 80/213
8, 9	TF 80/211
9, 10, 13	TF 80/212
13, 14	TF 70/126
14, 15	TF 70/127
16	Headworks at TF 80/211, 215, 216. One Driller ill.
17, 20	TF 70/128
20, 22	TF 70/129 (Half day lost due to lack of chisel.)
(21	Drillers not on site due to reported vehicle breakdown.)
22, 23	TF 70/130
23	TF 70/131
24	TL 89/121
(24	Drillers' vehicle taken to be serviced.)
27, 28, March 1	TL 89/120
(28	Headworks at TF 80/214, 215, 216.)
March 2	TL 89/119
2, 3	TL 89/118
3, 6	Headworks generally

2.2 Notes Concerning Logs and Results

- where materials of granular nature were encountered in the boreholes, the description of their "compactness", is that of the driller.
- Where "Times" are recorded on the borehole logs, 14.2 means 14:20 hrs.
- Data sheets recording Falling Head permeability test results (Section 5) for tests performed in the 50mmØ standpipe, have used the length of response zone of 1.35m. This is the length of the gravel zone only and ignores the fact that the slotted pipe is only 1.0m long and that there is also a 0.15m depth of less permeable sand filter, making up the overall filter.

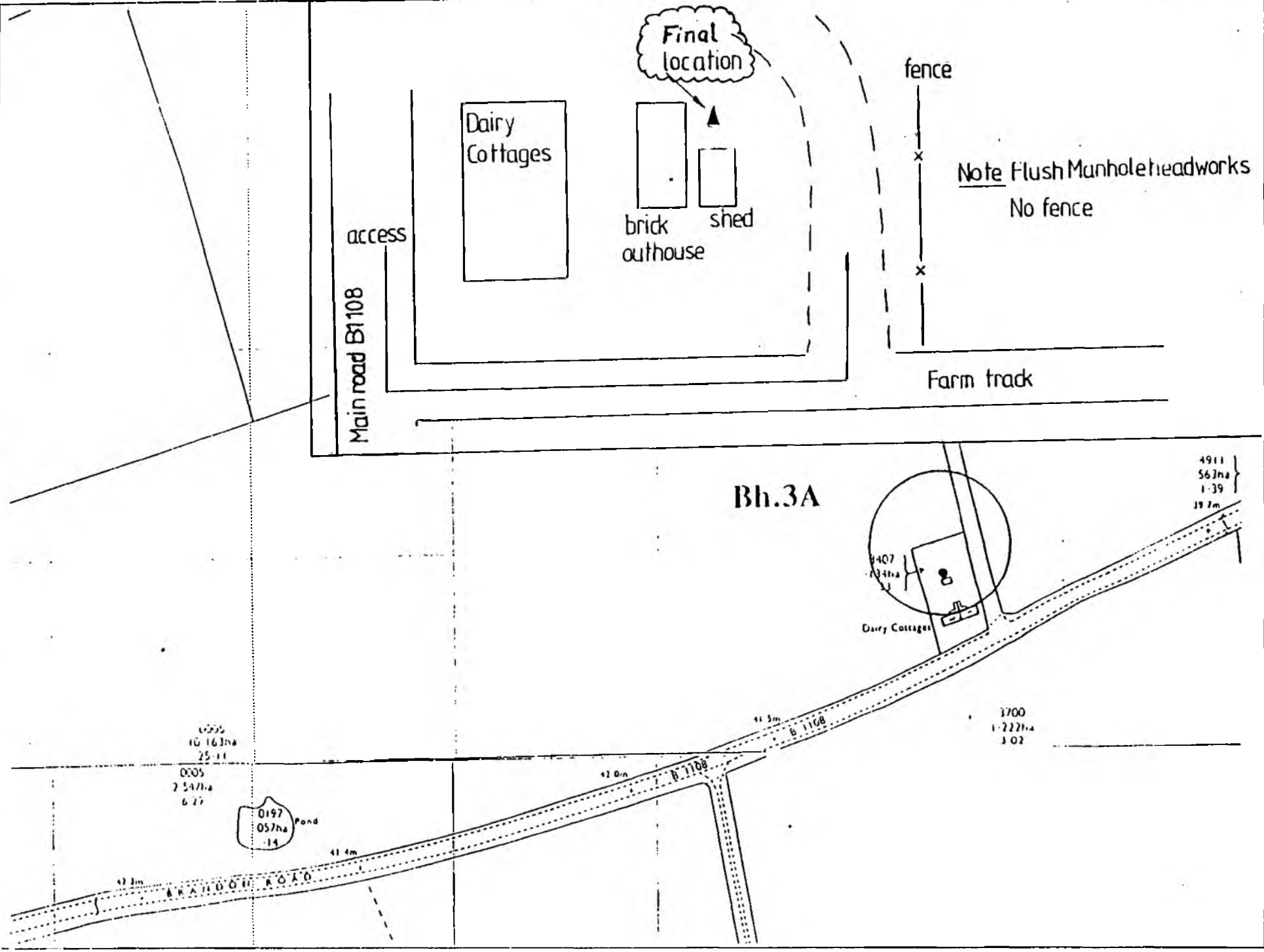
BOREHOLE LOCATIONS

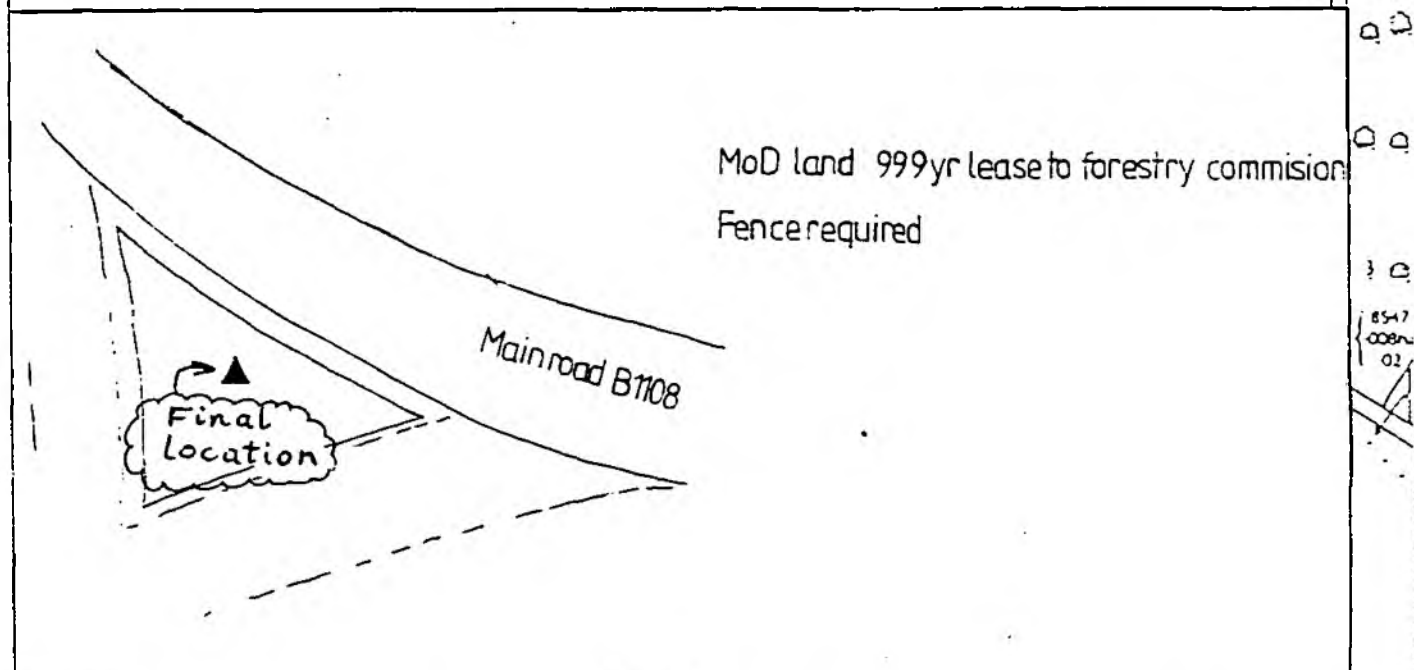
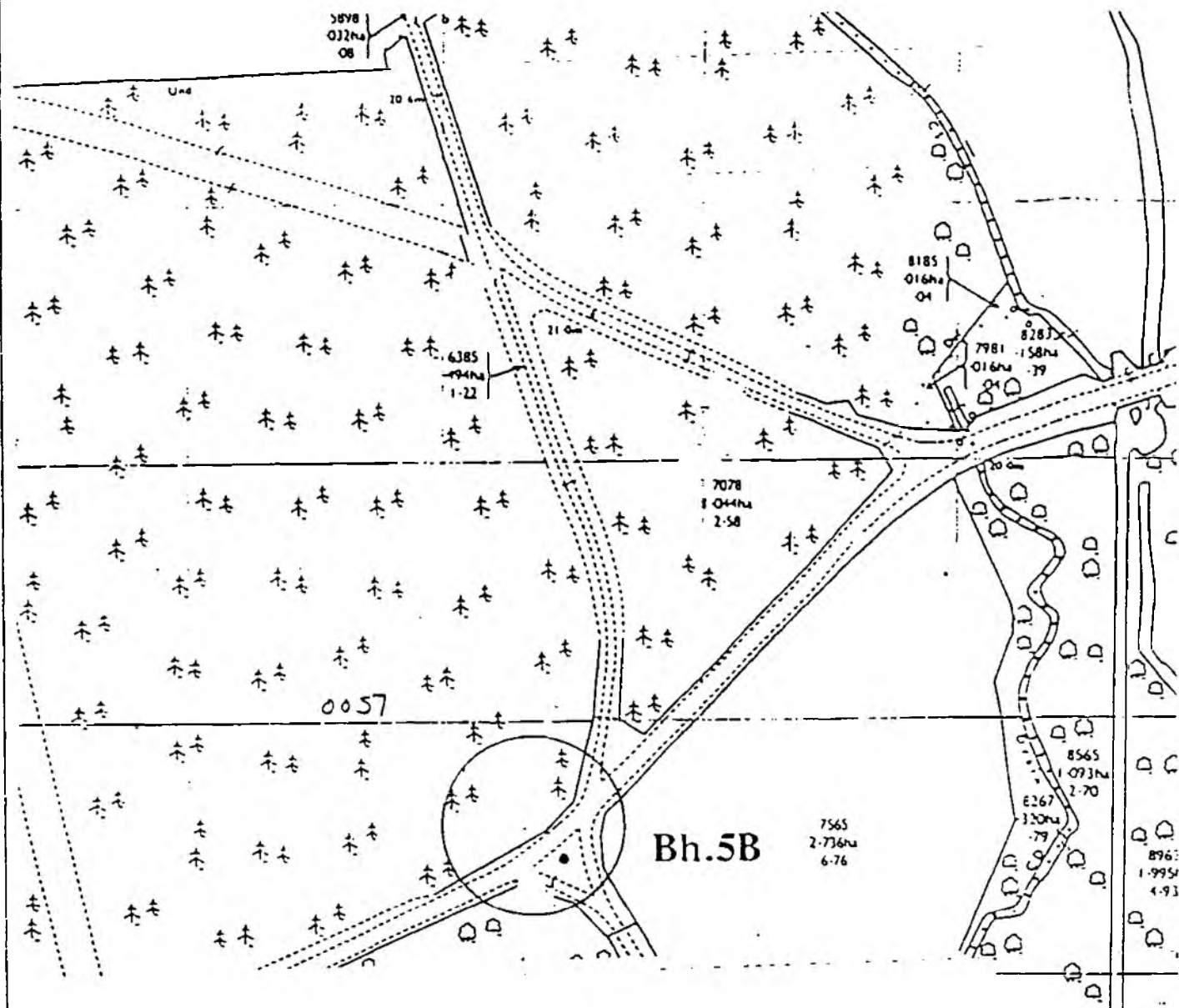
3



Location TF 8668 0665		File No AAXEP/1A	Scott Wilson Kirkpatrick CONSULTING ENGINEERS
Scale 1:2500 APPROX.	Date NOV. 94	Lot No 1A	
		TF80/211	

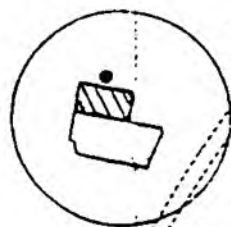
Location TF 8934 0007		File No AAXEP/3A
Scale 1:2500 APPROX.	Date NOV. 94	Lot No 3A TF80/24
Scott Wilson Kirkpatrick CONSULTING ENGINEERS		



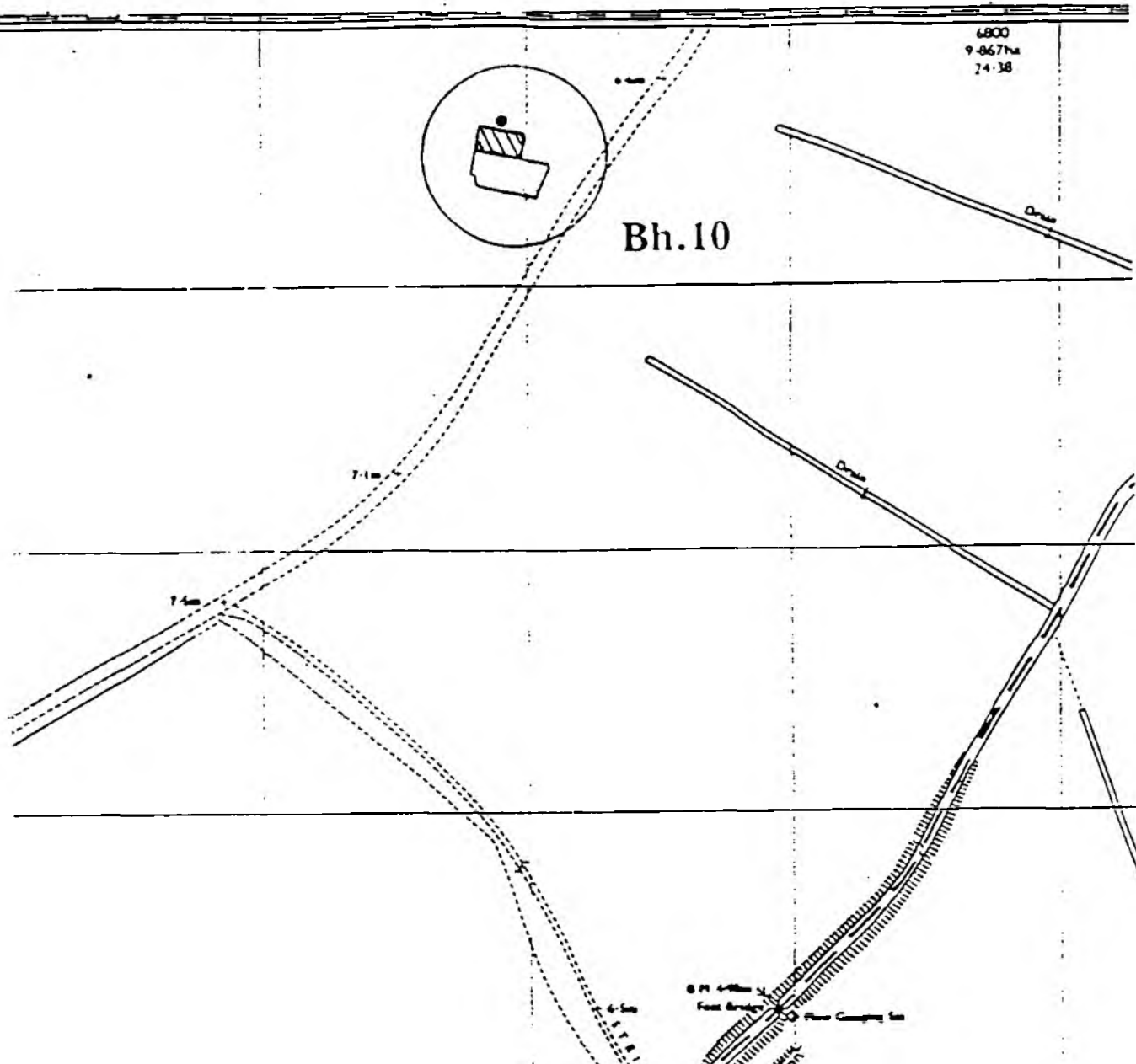


Location TF 8262 9868		File No AAXEP/5B	Scott Wilson Kirkpatrick CONSULTING ENGINEERS
Scale 1:2500 APPROX.	Date NOV. 94	Lot No 5B TL89/119	

6800
9-867ha
24-38



Bh.10



Final location

10m

brick outhouse

fence required

overhead electricity cable

access

Road

Location

TF 7150 0093

File No

AAXEP/10

Scale

1:2500 APPROX.

Date

NOV. 94

Lot No

10
TF 70/131

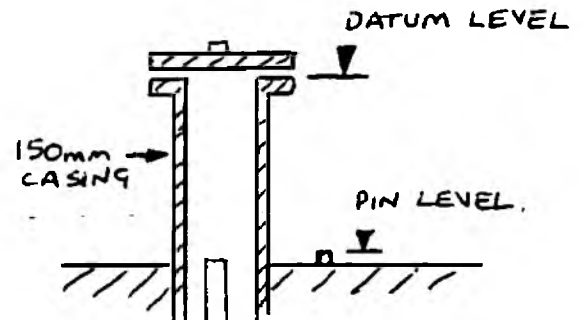
Scott Wilson Kirkpatrick
CONSULTING ENGINEERS

BOREHOLE LOGS

4

BOREHOLE DATUM LEVELS

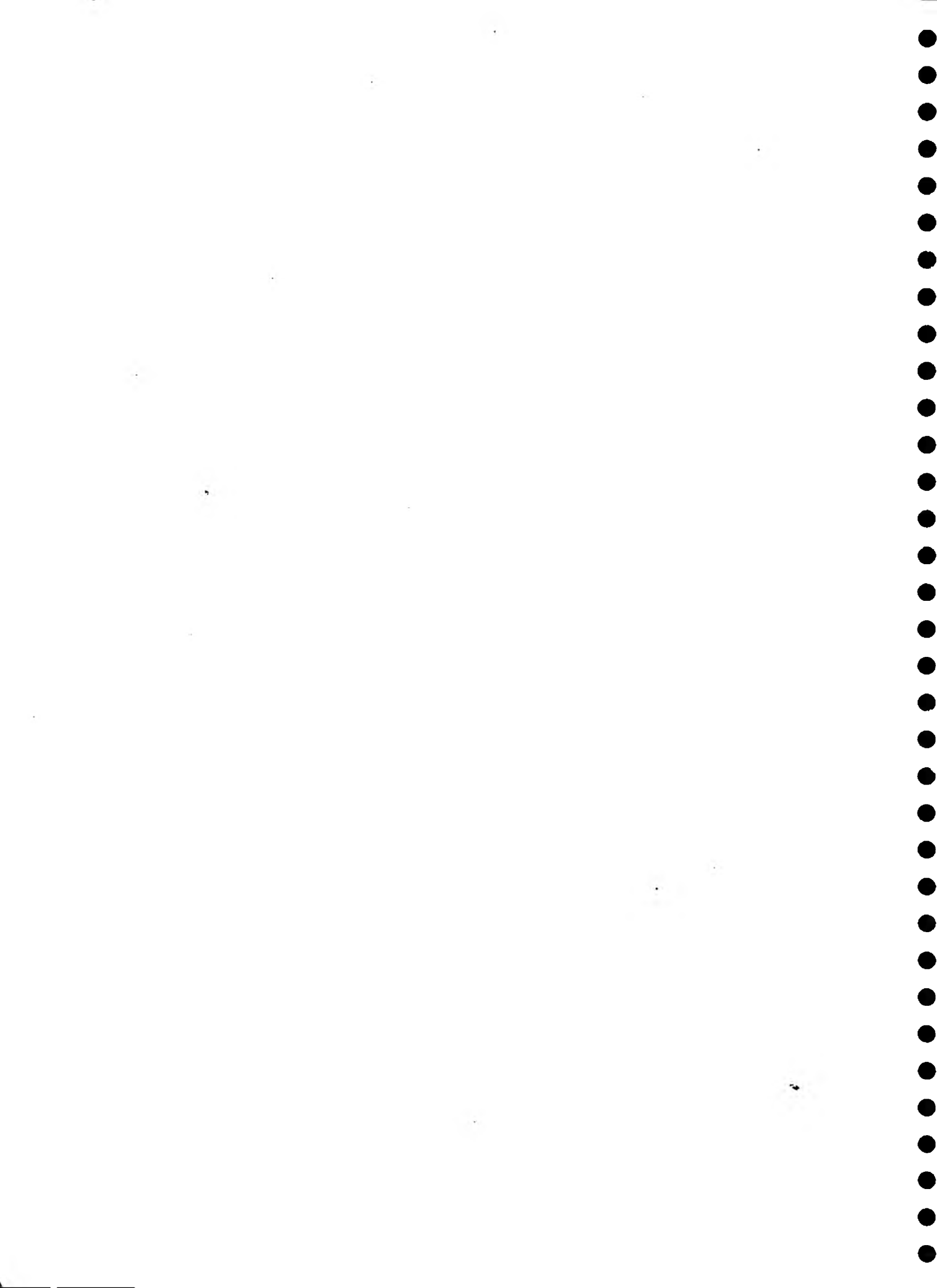
<u>Borehole Ref</u>	<u>Datum [and pin] levels (mOD). (See figure).</u>
TF 80/211	36.665 [36.425]
TF 80/212	49.822
TF 80/213	33.596
TF 80/214	39.912[39.450]
TF 80/215	39.359[38.889]
TF 80/216	39.259[38.795]
TF 80/217	28.782
TF 80/218	31.661[31.471]
TL 89/118	20.276
TL 89/119	22.118
TL 89/120	13.475
TL 89/121	20.208
TF 70/126	24.541
TF 70/127	35.158
TF 70/128	20.102
TF 70/129	9.942
TF 70/130	10.859
TF 70/131	7.988



ADDITIONAL WATER LEVELS (See also Borehole logs)




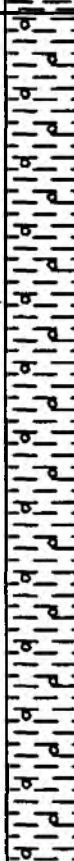
<u>Date :</u>	<u>31/1/95</u>	<u>1/2/95</u>	<u>3/2/95</u>	<u>10/3/95</u>
TF 80/211				0.46
TF 80/212				11.48
TF 80/213				6.17
TF 80/214			5.77	5.06
TF 80/215				4.36
TF 80/216	5.10	5.05		4.33
TF 80/217				1.70
TF 80/218				5.91
TL 89/118				0.62
TL 89/119				2.97
TL 89/120				0.83
TL 89/121				5.77
TF 70/126				2.68
TF 70/127				12.46
TF 70/128				7.88
TF 70/129				1.87
TF 70/130				2.37
TF 70/131				2.07

(Note : Readings are metres depth below existing GL.)



BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/211		
JEN Project No	A	A	X	E	P	0	4	2	S			B
Contractor Soils Engineering						Ground Level (m) 36.82			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geo logy	Inst- ry- ment Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)		
						(0.40)	Topsoil	
				36.42		0.40		
				36.12		(0.30) 0.70	Loose orangey yellow clayey SAND and angular GRAVEL.	
1.00-1.10	D				(1.70)	Firm grey and orange mottled CLAY.		
2.00-2.10	D			34.42		2.40		
3.00-3.10	D						Firm dark grey CLAY with many sand to coarse gravel sized chalk fragments.	
4.00-4.10	D							
5.00-5.10	D							
6.00-6.10	D							
7.00-7.10	D							
							at 5.5m — becoming stiff	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
8/2/95	11.25	0.6			0.60						Headworks pit dug first to check for services. Seepage at unknown depth in stiff clay. Hole contracted up to 4.0m by a.m. 9/2/95.
8/2/95	11.40	0.6			0.60						
8/2/95	15.10	17.5	3.0	150	17.5						
9/2/95	13.15	4.0			0.55						
15/2/95	13.50	4.0			0.35						
16/2/95	a.m.	4.0			0.43						
10/2/95	09.15	4.0			0.40						

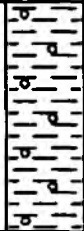
All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D					Stiff dark grey CLAY with many sand to coarse gravel sized chalk fragments.		
9.00-9.10	D					at 9.0m becoming very stiff		
10.00-10.10	D					(15.10)		
11.00-11.10	D							
12.00-12.10	D							
13.00-13.10	D							
14.00-14.10	D							
15.00-15.10	D					at 15.0m becoming very stiff / hard with up to cobble sized chalk fragments and rare flints.		

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/211		
JEN Project No	A	A	X	E	P	0	4	2	S			B
Contractor Soils Engineering					Ground Level (m) 36.82			Co-Ordinates 0				



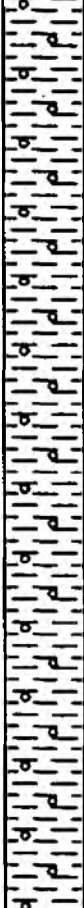
SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
16.00-16.10	D					Very stiff dark grey CLAY with many sand to cobble sized chalk fragments and rare flints.		
17.00-17.10	D				19.32		17.50	
END OF BOREHOLE								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
8/2/95	11.25	0.6			0.60						Headworks pit dug first to check for services. Seepage at unknown depth in stiff clay. Hole contracted up to 4.0m by a.m. 9/2/95.
8/2/95	11.40	0.6			0.60						
8/2/95	15.10	17.5	3.0	150	17.5						
9/2/95	13.15	4.0			0.55						
15/2/95	13.50	4.0			0.35						
16/2/95	a.m.	4.0			0.43						
10/2/95	09.15	4.0			0.40						

All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/212	
JEN Project No		A A X E P 0 4 2 S B				Date 9-2-95		Sheet 1 of 3			
Contractor Soils Engineering					Ground Level (m) 48.98			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
1.00-1.10	D					(0.40)	Topsoil	
				48.58		0.40		
						(1.40)	Loose orangey brown fine to coarse SAND with a little gravel.	
				47.18		1.80		
2.00-2.10	D			46.98		(0.20)	Brownish white fine sandy CLAY with many chalk fragments.	
							Off white CHALK recovered as soft to firm clay with many chalk fragments and rare cobble sized flints.	
3.00-3.10	D							
4.00-4.10	D						at 4.2m --- becoming less weathered	
5.00-5.10	D							
6.00-6.10	D							
7.00-7.10	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
9/2/95	13.30	0									2 No falling head permeability tests carried out.
9/2/95	14.45	12.5	1.50	150	12.50						
9/2/95	15.00	12.5	1.50	150	12.50						
10/2/95	12.35	20.0			12.90						
13/2/95	09.15	20.0			12.50						
15/2/95	08.30	20.0			12.15						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME								BOREHOLE No TF80/212				
JEN Project No	A	A	X	E	P	0	4			2	S	B
Contractor Soils Engineering						Ground Level (m) 48.98		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D						Off white CHALK recovered as soft to firm clay with many chalk fragments and rare cobble sized flints.	
9.00-9.10	D							
10.00-10.10	D							
11.00-11.10	D				(18.50)			
12.00-12.10	D							
14.00-14.10	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
9/2/95	13.30	0									2 No falling head permeability tests carried out.
9/2/95	14.45	12.5	1.50	150	12.50						
9/2/95	15.00	12.5	1.50	150	12.50						
10/2/95	12.35	20.0			12.90						
13/2/95	09.15	20.0			12.50						
15/2/95	08.30	20.0			12.15						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/212		
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 9-2-95	Sheet 3 of 3
Contractor Soils Engineering						Ground Level (m) 48.98		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Insty- ment/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)		
16.00-16.10	D					Off white CHALK recovered as soft to firm clay with many chalk fragments and rare cobble sized flints.		
17.00-17.10	D							
19.00-19.10	D							
20.00-20.10	D							
			28.48		20.50	END OF BOREHOLE		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
9/2/95	13.30	0									2 No falling head permeability tests carried out.
9/2/95	14.45	12.5	1.50	150	12.50						
9/2/95	15.00	12.5	1.50	150	12.50						
10/2/95	12.35	20.0			12.90						
13/2/95	09.15	20.0			12.50						
15/2/95	08.30	20.0			12.15						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

SAMPLES & TESTS			Water	STRATA			Geology	Industry / Environment
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
						(0.40)	Dark brown topsoil	
1.00-1.10	D			32.44		0.40		
						(1.40)	Loose brownish orange fine to coarse SAND with a little fine to coarse flint gravel.	
				31.04		1.80		
2.00-2.10	D					(0.50)	Brownish orange very sandy CLAY with some up to coarse gravel sized chalk fragments and occasional cobble sized flints.	
				30.54		2.30		
3.00-3.10	D						CHALK recovered as firm white CLAY with many up to coarse gravel sized chalk fragments and occasional cobble sized flints.	
4.00-4.10	D							
5.00-5.10	D							
6.00-6.10	D							
						(8.20)	at 6.5m --- becoming soft CLAY	
7.00-7.10	D							

Form A1

BOREHOLE LOG





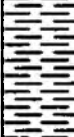

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/213	
JEN Project No		A A X E P 0 4 2 S B						Date 7-2-95		Sheet 2 of 2	
Contractor Soils Engineering						Ground Level (m) 32.84		Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D						CHALK recovered as low to medium dense up to coarse gravel sized fragments and occasional cobble sized flints.	
9.00-9.10	D							
			22.34		10.50			
END OF BOREHOLE								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
7/2/95	13.15	7.00	1.5	150	7.00						2 No falling head permeability tests carried out.
7/2/95	13.35	7.00	1.5	150	6.56						
7/2/95	14.15	10.50	1.5	150	6.55						
8/2/95	9.00	10.00	1.5	150	6.55						
8/2/95	10.00	10.00			6.55						
All dimensions in metres Scale 1:50			Client National Rivers Authority			Method Cable Percussion			Logged By AF GILLEARD		

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/214				
JEN Project No	A	A	X	E	P	0	4	2	S			B	Date	30-1-95
Contractor Soils Engineering					Ground Level (m) 40.01					Co-Ordinates 0				


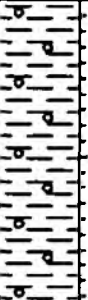
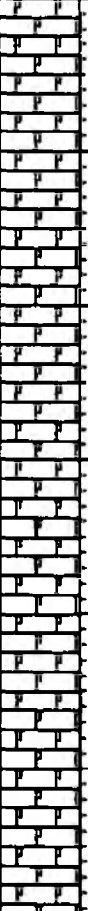
SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
1.00-1.10	D			39.31		(0.70) 0.70	TOPSOIL / MADE GROUND (Bricks)	
				38.31		(1.00) 1.70	Firm buff and orangey brown slightly sandy CLAY with some fine to coarse gravel sized chalk fragments.	
2.00-2.10	D					(6.20)	Stiff brownish grey and brownish orange CLAY / reworked CHALK?	
3.00-3.10	D						Becoming with interbedded layers of orangey fine SAND	
4.00-4.10	D							
5.00-5.10	D							
6.00-6.10	D							
7.00-7.10	D							
						32.11	7.90	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
30/1/95	12.15	4.00	2.8	150	4.00						2 No falling head permeability tests carried out. Possible perched water leaking through casing caused water level on a.m. 31/1/95.
30/1/95	12.30	4.00	2.8	150	2.60						
30/1/95	15.00	10.00	9.0	150	10.00				5.7	6.0	
30/1/95	15.15	10.00	9.0	150	7.80						
30/1/95	16.00	15.00	15.0	150	11.20						
31/1/95	8.15	15.00	15.0	150	2.20						
31/1/95	14.30	30.50	18.0	150	7.21						
1/2/95	8.15	30.50	18.0	150	5.80						
2/2/95	15.15	30.00			5.80						

All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME							BOREHOLE No TF80/214					
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 30-1-95	Sheet 2 of 4
Contractor Soils Engineering						Ground Level (m) 40.01		Co-Ordinates 0				


SAMPLES & TESTS			Water	STRATA			Geo logy	Insty- ment Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		
8.00-8.10	D					(2.10)	Stiff grey brown CLAY with coarse sand to coarse gravel sized chalk fragments and rare up to cobble sized flints. — with interbedded layers of orangey fine SAND	
9.00-9.10	D							
10.00-10.10	D			30.01	10.00	White CHALK recovered as soft clay containing chalk fragments.		
11.00-11.10	D						Occasional flints recovered up to cobble size.	
12.00-12.10	D							
13.00-13.10	D							
14.00-14.10	D							
15.00-15.10	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
30/1/95	12.15	4.00	2.8	150	4.00						2 No falling head permeability tests carried out. Possible perched water leaking through casing caused water level on a.m. 31/1/95.
30/1/95	12.30	4.00	2.8	150	2.60						
30/1/95	15.00	10.00	9.0	150	10.00				5.7	6.0	
30/1/95	15.15	10.00	9.0	150	7.80						
30/1/95	16.00	15.00	15.0	150	11.20						
31/1/95	8.15	15.00	15.0	150	2.20						
31/1/95	14.30	30.50	18.0	150	7.21						
1/2/95	8.15	30.50	18.0	150	5.80						
2/2/95	15.15	30.00			5.80						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME								BOREHOLE No TF80/214				
JEN Project No	A	A	X	E	P	0	4			2	S	B
Contractor Soils Engineering						Ground Level (m) 40.01		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument	Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)			
16.00-16.10	D					(20.50)	White CHALK recovered as soft clay containing chalk fragments and occasional cobble sized flints.		
17.00-17.10	D								
18.00-18.10	D								
19.00-19.10	D								
20.00-20.10	D								
21.00-21.10	D								
22.00-22.10	D								
23.00-23.10	D								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
30/1/95	12.15	4.00	2.8	150	4.00				5.7	6.0	2 No falling head permeability tests carried out. Possible perched water leaking through casing caused water level on a.m. 31/1/95.
30/1/95	12.30	4.00	2.8	150	2.60						
30/1/95	15.00	10.00	9.0	150	10.00						
30/1/95	15.15	10.00	9.0	150	7.80						
30/1/95	16.00	15.00	15.0	150	11.20						
31/1/95	8.15	15.00	15.0	150	2.20						
31/1/95	14.30	30.50	18.0	150	7.21						
1/2/95	8.15	30.50	18.0	150	5.80						
2/2/95	15.15	30.00			5.80						

All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/214			
JEN Project No		A	A	X	E	P	0	4	2	S	B	Date 30-1-95	Sheet 4 of 4
Contractor Soils Engineering						Ground Level (m) 40.01			Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geo logy	Insty-ment	Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)			
24.00-24.10	D					White CHALK recovered as soft clay containing chalk fragments and occasional cobble sized flints.			
25.00-25.10	D								
26.00-26.10	D								
27.00-27.10	D								
28.00-28.10	D								
29.00-29.10	D								
30.00-30.10	D								
				9.51		30.50			
END OF BOREHOLE									

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
30/1/95	12.15	4.00	2.8	150	4.00						2 No falling head permeability tests carried out. Possible perched water leaking through casing caused water level on a.m. 31/1/95.
30/1/95	12.30	4.00	2.8	150	2.60						
30/1/95	15.00	10.00	9.0	150	10.00						
30/1/95	15.15	10.00	9.0	150	7.80						
30/1/95	16.00	15.00	15.0	150	11.20						
31/1/95	8.15	15.00	15.0	150	2.20						
31/1/95	14.30	30.50	18.0	150	7.21						
1/2/95	8.15	30.50	18.0	150	5.80						
2/2/95	15.15	30.00			5.80						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME								BOREHOLE No TF80/215				
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 23-1-95	Sheet 1 of 2
Contractor Soils Engineering						Ground Level (m) 39.51		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA				Geo log	Instru- ment Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
				39.41		(0.10)	TOPSOIL		
				39.11		(0.30)	Loose dark brown SAND with some gravel and roots.		
1.00-1.10	D					(1.70)	Loose orangey brown fine to medium SAND with a little fine flint gravel.		
2.10-2.20	D			37.41		2.10	Stiff yellowish brown CLAY with much fine to medium gravel sized chalk fragments and a little angular to subrounded fine to medium flint gravel.		
2.70-2.80	D					(1.90)	at 2.7m becoming orange streaked with a little fine sand.		
4.00-4.10	D			35.51		4.00	Loose yellowish white fine to medium SAND.		
4.80-4.90	D			34.81		4.70	Loose orangey yellow fine to coarse SAND with a little fine subrounded gravel.		
6.00-6.10	D			33.51		6.00	Loose orangey yellow fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL.		
7.00-7.10	D			32.51		7.00	Loose orangey yellow fine to medium SAND with a little fine gravel.		
						(1.50)			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
23/1/95	13.10	7.5	7.5	150	6.10						2 No falling head permeability tests carried out. Piezometer installed at 8.0m. Hole re-drilled on 07/02/95.
23/1/95	14.40	7.5	7.5	150	5.57				2.1	8.0	
24/1/95	a.m.	7.5	7.5	150	5.20						
24/1/95	p.m.	8.0			5.20						
25/1/95	a.m.	8.0			5.20						
25/1/95	p.m.	8.0			5.15						
26/1/95	a.m.	8.0			5.15						
16/2/95	p.m.	8.0			4.65						
30/1/95	a.m.	8.0			5.00						
All dimensions in metres Scale 1:50			Client National Rivers Authority			Method Cable Percussion			Logged By AF GILLEARD		



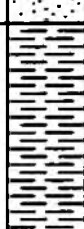

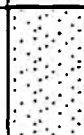
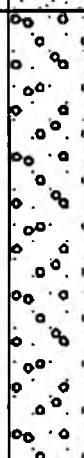
Project RIVER WISSEY - HYDROMETRIC SCHEME											BOREHOLE No	
JEN Project No											TF80/215	
A A X E P 0 4 2 S B											Date 23-1-95	
Contractor Soils Engineering											Ground Level (m) 39.51	
											Co-Ordinates 0	

SAMPLES & TESTS			Water	STRATA				Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION		
				31.01		8.50	Loose orangey yellow fine to medium SAND with a little fine gravel		
							END OF BOREHOLE		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
23/1/95	13.10	7.5	7.5	150	6.10						2 No falling head permeability tests carried out. Piezometer installed at 8.0m. Hole re-drilled on 07/02/95.
23/1/95	14.40	7.5	7.5	150	5.57				2.1	8.0	
24/1/95	a.m.	7.5	7.5	150	5.20						
24/1/95	p.m.	8.0			5.20						
25/1/95	a.m.	8.0			5.20						
25/1/95	p.m.	8.0			5.15						
26/1/95	a.m.	8.0			5.15						
16/2/95	p.m.	8.0			4.65						
30/1/95	a.m.	8.0			5.00						
All dimensions in metres Scale 1:50			Client National Rivers Authority			Method Cable Percussion			Logged By AF GILLEARD		

BOREHOLE LOG




Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/216				
JEN Project No	A	A	X	E	P	0	4	2	S			B	Date	25-1-95
Contractor Soils Engineering					Ground Level (m) 39.41					Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument	Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)			
				39.31		(0.10) 10	TOPSOIL		
				39.01		(0.30) 40	Loose dark brown SAND with some gravel and roots.		
1.00-1.10	D					(1.70)	Loose orangey brown fine to coarse SAND with a little fine to coarse flint gravel.		
2.00-2.10	D			37.31		2.10			
3.00-3.10	D					(1.50)	Stiff brownish grey mottled orange CLAY with a little fine to medium chalk gravel and a little fine to coarse sand.		
				35.81		3.60	at 3.3m — with rare coarse flint gravel.		
4.00-4.10	D					(0.50)	Soft yellow white occasionally orangey light brown CLAY with much fine sand.		
				35.31		4.10	Yellowish white fine SAND.		
5.00-5.10	D					(0.90)			
				34.41		5.00	Loose yellowish orange fine to coarse SAND and fine to coarse subangular to subrounded GRAVEL of flint and chalk.		
6.00-6.10	D					(3.50)			
7.00-7.10	D								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
25/1/95	10.55	9.4	8.85	150	9.40				5.0	5.5	Chalk fines settled overnight hence the 26/1 hole depth. 2 no. falling head permeability tests carried out.
25/1/95	11.25	9.4	8.85	150	5.80						
25/1/95	14.20	17.0	11.85	150	6.80						
26/1/95	8.45	12.1	11.85	150	5.90						
27/1/95	8.45	19.0	11.85	150	5.80						
27/1/95	13.45	28.5	15.5	150	5.20						
27/1/95	15.30	30.0	15.5	150	5.20						
30/1/95	9.15	30.0			5.26						
16/2/95	pm	30.0			4.70						
All dimensions in metres Scale 1:50			Client National Rivers Authority			Method Cable Percussion			Logged By AF GILLEARD		

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/216	
JEN Project No		A A X E P 0 4 2 S B						Date 25-1-95		Sheet 2 of 4	
Contractor Soils Engineering						Ground Level (m) 39.41		Co-Ordinates 0			


SAMPLES & TESTS			Water	STRATA			Geology	Instrument
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D		1	30.91		8.50	Loose yellowish orange fine to coarse SAND and fine to coarse subangular to subrounded GRAVEL of flint and chalk.	
9.00-9.10	D			30.01		(0.90) 9.40	Stiff white grey occasionally stained orange CLAY with much fine sand to medium gravel sized chalk fragments and stiff grey clay.	
10.00-10.10	D		1				White CHALK recovered as soft white clay containing up to cobble sized chalk fragments.	
11.00-11.10	D							
12.00-12.10	D							
13.00-13.10	D							
14.00-14.10	D							
15.00-15.10	D						From 14.0m with rare coarse flint gravel.	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
25/1/95	10.55	9.4	8.85	150	9.40				5.0	5.5	Chalk fines settled overnight hence the 26/1 hole depth. 2 no. falling head permeability tests carried out.
25/1/95	11.25	9.4	8.85	150	5.80						
25/1/95	14.20	17.0	11.85	150	6.80						
26/1/95	8.45	12.1	11.85	150	5.90						
27/1/95	8.45	19.0	11.85	150	5.80						
27/1/95	13.45	28.5	15.5	150	5.20						
27/1/95	15.30	30.0	15.5	150	5.20						
30/1/95	9.15	30.0			5.26						
16/2/95	pm	30.0			4.70						

All dimensions in metres Scale 1:50		Client National Rivers Authority		Method Cable Percussion		Logged By AF GILLEARD	
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/216		
JEN Project No	A	A	X	E	P	0	4	2	S			B
Contractor Soils Engineering						Ground Level (m) 39.41			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
16.00-16.10	D					White CHALK recovered as soft white clay containing up to cobble sized chalk fragments and rare coarse flint gravel.		
17.00-17.10	D							
18.00-18.10	D							
19.00-19.10	D					From 19.0m — recovering more flint cobbles.		
20.00-20.10	D							
21.00-21.10	D							
22.00-22.10	D							
23.00-23.10	D					Becoming — recovered as firm CLAY.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
25/1/95	10.55	9.4	8.85	150	9.40				5.0	5.5	Chalk fines settled overnight hence the 26/1 hole depth. 2 no. falling head permeability tests carried out.
25/1/95	11.25	9.4	8.85	150	5.80						
25/1/95	14.20	17.0	11.85	150	6.80						
26/1/95	8.45	12.1	11.85	150	5.90						
27/1/95	8.45	19.0	11.85	150	5.80						
27/1/95	13.45	28.5	15.5	150	5.20						
27/1/95	15.30	30.0	15.5	150	5.20						
30/1/95	9.15	30.0			5.26						
16/2/95	pm	30.0			4.70						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME							BOREHOLE No TF80/216					
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 25-1-95	Sheet 4 of 4
Contractor Soils Engineering						Ground Level (m) 39.41		Co-Ordinates 0				


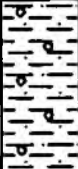
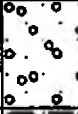



SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
24.00-24.10	D						White CHALK recovered as firm white clay containing up to cobble sized chalk fragments and occasional flint cobbles.	
25.00-25.10	D							
26.00-26.10	D							
27.00-27.10	D							
28.00-28.10	D							
29.00-29.10	D							
29.90-30.00	D			9.41		30.00	END OF BOREHOLE	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
25/1/95	10.55	9.4	8.85	150	9.40				5.0	5.5	Chalk fines settled overnight hence the 26/1 hole depth, 2 no. falling head permeability tests carried out.
25/1/95	11.25	9.4	8.85	150	5.80						
25/1/95	14.20	17.0	11.85	150	6.80						
26/1/95	8.45	12.1	11.85	150	5.90						
27/1/95	8.45	19.0	11.85	150	5.80						
27/1/95	13.45	28.5	15.5	150	5.20						
27/1/95	15.30	30.0	15.5	150	5.20						
30/1/95	9.15	30.0			5.26						
16/2/95	pm	30.0			4.70						
All dimensions in metres Scale 1:50			Client National Rivers Authority			Method Cable Percussion			Logged By AF GILLEARD		

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/217		
JEN Project No	A	A	X	E	P	0	4	2	S			B
Contractor Soils Engineering						Ground Level (m) 27.96			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geo logy	Instru-ment Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		
1.00-1.10	D			27.80		(0.16)16	TOPSOIL	
						(1.14)	Dark brown sandy very gravelly CLAY.	
2.00-2.10	D			26.66		1.30	Medium dense orangey brown very sandy fine to coarse subangular to angular flint GRAVEL with occasional cobbles.	
						(0.70)		
3.00-3.10	D			25.96		(0.02)00	Stiff brownish white very sandy CLAY.	
				25.90		2.06 (1.04)	Medium dense orangey light brown very sandy fine to coarse recovered angular GRAVEL.	
4.00-4.10	D			24.86		3.10 (3.40)	White CHALK (not firm) recovered as firm white clay with many chalk fragments and rare flint gravel.	
5.00-5.10	D							
				21.46		6.50	END OF BOREHOLE	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
1/2/95	13.30	1.5			1.50				1.5	2.5	2 No falling head permeability tests carried out.
1/2/95	13.50	1.5			1.50				3.5	4.5	
2/2/95	8.15	6.5	4.5	150	1.45						
2/2/95	15.15	6.0			1.83						
3/2/95	11.20	6.0			1.80						
6/2/95	15.45	6.0			1.82						

All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME							BOREHOLE No TF80/218					
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 2-2-95	Sheet 1 of 3
Contractor Soils Engineering						Ground Level (m) 31.86			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
1.00-1.10	D		↓	31.66		(0.28) 20	TOPSOIL	
				31.46		(0.20) 40	Dark brown sandy gravelly CLAY.	
							Stiff grey mottled orange CLAY with some sand to coarse gravel sized chalk fragments.	
2.00-2.10	D		↓			(3.80)		
3.00-3.10	D						Becoming — dark grey and very stiff.	
4.30-4.40	D			27.66		4.20	White CHALK recovered as soft clay with chalk fragments.	
5.00-5.10	D		↓			(0.80)		
				26.86		5.00	Very stiff dark grey CLAY with some sand to rounded coarse gravel sized chalk fragments.	
6.00-6.10	D		↓					
7.00-7.10	D							
						(6.00)	Becoming — up to cobble sized chalk fragments.	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
2/2/95	12.00	4.3	1.5	150	4.30						Water sealed out at 5.0m. Scheduled depth 8.5m. Very slight seepage at 11.0m. Hole re-drilled at 8 inch dia to 10.5m, 6 inch to 13.5m. 2 No falling head permeability tests carried out. Very fast inflow from 18m.
2/2/95	12.20	4.3	1.5	150	3.57						
2/2/95	14.00	9.0	5.3	150	dry						
3/2/95	09.00	9.0	5.3	150	dry						
6/2/95	12.45	10.0	13.5	150	18.00						
6/2/95	13.05	10.0	13.5	150	6.7						
6/2/95	15.00	17.8			6.15						
7/2/95	08.45	17.8			6.17						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

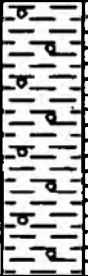
Project RIVER WISSEY - HYDROMETRIC SCHEME								BOREHOLE No TF80/218				
JEN Project No	A	A	X	E	P	0	4			2	S	B
Contractor Soils Engineering						Ground Level (m) 31.86			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D					Very stiff dark grey CLAY with some sand to cobble gravel sized chalk fragments.		
9.00-9.10	D							
10.00-10.10	D							
11.00-11.10	D		20.86		11.00	White CHALK recovered as very soft clay.		
			20.36		(0.50) 11.50			
12.00-12.10	D					Very stiff dark grey CLAY with some sand to cobble sized chalk fragments.		
13.00-13.10	D							
14.00-14.10	D							
15.00-15.10	D				(6.30)			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
2/2/95	12.00	4.3	1.5	150	4.30						Water sealed out at 5.0m. Scheduled depth 8.5m. Very slight seepage at 11.0m. Hole re-drilled at 8 inch dia to 10.5m, 6 inch to 13.5m. 2 No falling head permeability tests carried out. Very fast inflow from 18m.
2/2/95	12.20	4.3	1.5	150	3.57						
2/2/95	14.00	9.0	5.3	150	dry						
3/2/95	09.00	9.0	5.3	150	dry						
6/2/95	12.45	10.0	13.5	150	18.00						
6/2/95	13.05	10.0	13.5	150	6.7						
6/2/95	15.00	17.8			6.15						
7/2/95	08.45	17.8			6.17						
All dimensions in metres Scale 1:50			Client National Rivers Authority			Method Cable Percussion			Logged By AF GILLEARD		

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF80/218			
JEN Project No		A	A	X	E	P	0	4	2	S	B	Date 2-2-95	Sheet 3 of 3
Contractor Soils Engineering						Ground Level (m) 31.86			Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
16.00-16.10	D						Very stiff dark grey CLAY with some sand to cobble sized chalk fragments.	
17.00-17.10	D							
17.90-18.00	D		↓	14.06 13.86	 P T	17.80 (0.20) 18.00	CHALK	
END OF BOREHOLE								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
2/2/95	12.00	4.3	1.5	150	4.30						Water sealed out at 5.0m. Scheduled depth 8.5m. Very slight seepage at 11.0m. Hole re-drilled at 8 inch dia to 10.5m, 6 inch to 13.5m. 2 No falling head permeability tests carried out. Very fast inflow from 18m.
2/2/95	12.20	4.3	1.5	150	3.57						
2/2/95	14.00	9.0	5.3	150	dry						
3/2/95	09.00	9.0	5.3	150	dry						
6/2/95	12.45	10.0	13.5	150	18.00						
6/2/95	13.05	10.0	13.5	150	6.7						
6/2/95	15.00	17.8			6.15						
7/2/95	08.45	17.8			6.17						

All dimensions in metres
Scale 1:50


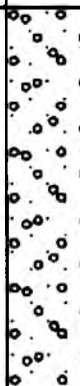
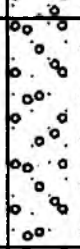
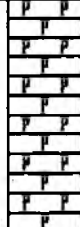
Client **National Rivers Authority**

Method **Cable Percussion**

Logged By **AF GILLEARD**

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME								BOREHOLE No TL89/118				
JEN Project No	A	A	X	E	P	0	4			2	S	B
Contractor Soils Engineering						Ground Level (m) 19.48			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Insty- ment Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)		
1.00-1.10	D			18.58		0.90	Loose brown sandy topsoil.	
							Dense orange SAND and GRAVEL.	
2.00-2.10	D				(2.60)			
3.00-3.10	D							
4.00-4.10	D			15.98		3.50	Dense grey SAND and GRAVEL.	
5.00-5.10	D					(1.50)		
6.00-6.10	D		14.48		5.00	White CHALK recovered as soft white clay.		
					(1.50)			
			12.98		6.50			
							END OF BOREHOLE	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
2/3/95	p.m.	1.5	1.5	150	1.50						2 No falling head permeability tests carried out. Drillers' descriptions.
2/3/95	+20	1.5	1.5	150	1.50						
2/3/95	p.m.	6.5	1.5	150	3.40						

All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By R McDANIEL (driller)
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TL89/119			
JEN Project No		A	A	X	E	P	0	4	2	S	B	Date 2-3-95	Sheet 1 of 2
Contractor Soils Engineering						Ground Level (m) 21.32			Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
						(0.50)	Loose brown sandy topsoil.	
				20.82		0.50	Loose orange medium SAND.	
1.00-1.10	D							
2.00-2.10	D					(3.50)		
3.00-3.10	D							
				17.32		4.00	Brownish white CHALK recovered as chalk fragments in soft clay.	
4.00-4.10	D							
5.00-5.10	D					(3.00)		
6.00-6.10	D							
				14.32		7.00	White CHALK recovered as chalk fragments in firm clay with flints.	
7.00-7.10	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
2/3/95	a.m.	4.5	4.50	150	4.50						2 No falling head permeability tests carried out. Drillers' descriptions.
2/3/95	+20	4.5	4.50	150	4.45						
2/3/95	a.m.	10.5	9.00	150	4.50						
10/3/95	10.00	10.0			2.97						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By R McDANIEL (driller)
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TL89/119			
JEN Project No		A	A	X	E	P	0	4	2			S	B
Contractor Soils Engineering					Ground Level (m) 21.32			Co-Ordinates 0					

SAMPLES & TESTS			Water	STRATA			DESCRIPTION	Geo logy	Insty- ment	Back fill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)				
8.00-8.10	D					(3.50)	White CHALK recovered as chalk fragments in firm clay with flints.			
9.00-9.10	D									
				10.82		10.50				
END OF BOREHOLE										

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
2/3/95	a.m.	4.5	4.50	150	4.50						2 No falling head permeability tests carried out. Drillers' descriptions.
2/3/95	+20	4.5	4.50	150	4.50						
2/3/95	a.m.	10.5	9.00	150	4.50						
10/3/95	10.00	10.0			2.97						
All dimensions in metres Scale 1:50			Client National Rivers Authority			Method Cable Percussion			Logged By R McDANIEL (driller)		

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME							BOREHOLE No TL89/120					
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 27-1-95	Sheet 1 of 4
Contractor Soils Engineering						Ground Level (m) 12.70		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Insty- ment Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)		
						(0.40)	TOPSOIL	
				12.30		0.40		
1.00-1.10	D					(4.10)	Loose orangey brown fine to coarse SAND with some coarse angular flint gravel.	
2.00-2.10	D						at 1.7m — becoming fine to coarse SAND with some fine to medium gravel.	
3.00-3.10	D							
4.00-4.10	D							
				8.20		4.50		
5.00-5.10	D					(3.70)	Loose yellowish brown fine SAND.	
7.00-7.10	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
27/2/95	09.35				150						Fine sand settled out overnight hence hole depth 28/2 a.m. 2 No falling head permeability tests carried out. Scheduled depth 6m.
27/2/95	0 mins	2.00	1.9		150				1.5	1.9	
27/2/95	+20	2.00	1.9		150				9.5	9.5	
27/2/95	14.00	16.00	13.5		150						
28/2/95	09.10	9.00	13.5		150						
28/2/95	10.15	20.00	19.5		150						
1/3/95	a.m.	20.00	19.5		150						
1/3/95	12.00	29.00	29.0		150						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
				4.50		8.20	Loose yellowish brown fine SAND.	
8.50-8.60	D				 (1.60)		Loose grey very fine sandy SILT.	
				2.90		9.80		
10.00-10.10	D			2.70		10.00	Very stiff grey CLAY.	
11.00-11.10	D						Dense orange brown fine to medium SAND.	
12.50-12.60	D							
14.00-14.10	D							
15.50-15.60	D							

Form A1

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TL89/120			
JEN Project No		A	A	X	E	P	0	4	2	S	B	Date 27-1-95	Sheet 3 of 4
Contractor Soils Engineering							Ground Level (m) 12.70			Co-Ordinates 0			

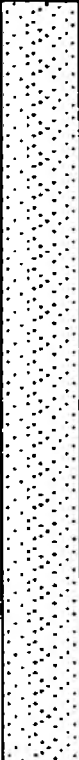

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
16.50-16.60	D				(19.00)	Dense orange brown fine to medium SAND.		
18.00-18.10	D							
19.50-19.60	D							
21.50-21.60	D							
22.50-22.60	D							
23.50-23.60	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
27/2/95	09.35			150							Fine sand settled out overnight hence hole depth 28/2 a.m. 2 No falling head permeability tests carried out. Scheduled depth 6m.
27/2/95	0 mins	2.00	1.9	150	2.00				1.5	1.9	
27/2/95	+ 20	2.00	1.9	150	1.90				9.5	9.5	
27/2/95	14.00	16.00	13.5	150	6.00						
28/2/95	09.10	9.00	13.5	150	1.00						
28/2/95	10.15	20.00	19.5	150	2.00						
1/3/95	a.m.	20.00	19.5	150	2.50						
1/3/95	12.00	29.00	29.0	150	10.00						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TL89/120	
JEN Project No		A A X E P 0 4 2 S B						Date 27-1-95		Sheet 4 of 4	
Contractor Soils Engineering						Ground Level (m) 12.70		Co-Ordinates 0			



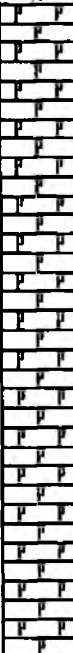
SAMPLES & TESTS			Water	STRATA			Geology	Insty- ment Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)			DESCRIPTION
24.50-24.60	D					Dense orange brown fine to medium SAND.			
25.50-25.60	D								
26.50-26.60	D								
27.50-27.60	D								
28.50-28.60	D								
				-16.30		29.00			
END OF BOREHOLE									

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
27/2/95	09.35			150							Fine sand settled out overnight hence hole depth 28/2 a.m. 2 No falling head permeability tests carried out. Scheduled depth 6m.
27/2/95	0 mins	2.00	1.9	150	2.00				1.5	1.9	
27/2/95	+20	2.00	1.9	150	1.90				9.5	9.5	
27/2/95	14.00	16.00	13.5	150	6.00						
28/2/95	09.10	9.00	13.5	150	1.00						
28/2/95	10.15	20.00	19.5	150	2.00						
1/3/95	a.m.	20.00	19.5	150	2.50						
1/3/95	12.00	29.00	29.0	150	10.00						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME							BOREHOLE No TL89/121					
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 24-2-95	Sheet 1 of 2
Contractor Soils Engineering						Ground Level (m) 19.41		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
1.00-1.10	D			19.11		(0.30) 0.30	TOPSOIL	
						(0.80)	Dense orangey brown fine to medium SAND with a little fine gravel.	
				18.31		1.10		
2.00-2.10	D					(0.90)	Dense brownish white very clayey SAND with much fine to coarse flint gravel and some chalk fragments.	
				17.41		2.00		
						(8.50)	White CHALK recovered as up to cobble sized medium dense fragments in a matrix of soft to firm white clay.	
3.00-3.10	D							
4.00-4.10	D							
5.00-5.10	D							
6.00-6.10	D							
7.00-7.10	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
24/2/95	09.10	0									2 No falling head permeability tests carried out.
24/2/95	09.45	6.7	1.5	150	6.70						
24/2/95	10.05	6.7	1.5	150	6.30						
24/2/95	10.35	10.5	1.5	150	6.40						
27/2/95	14.25	10.0			6.20						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TL89/121		
JEN Project No	A	A	X	E	P	0	4	2	S			B
Contractor Soils Engineering					Ground Level (m) 19.41			Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D						White CHALK recovered as up to cobble sized medium dense fragments in a matrix of soft to firm white clay.	
9.00-9.10	D							
				8.91		10.50		
END OF BOREHOLE								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
24/2/95	09.10	0									2 No falling head permeability tests carried out.
24/2/95	09.45	6.7	1.5	150	6.70						
24/2/95	10.05	6.7	1.5	150	6.30						
24/2/95	10.35	10.5	1.5	150	6.40						
27/2/95	14.25	10.0			6.20						

All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF70/126	
JEN Project No		A A X E P 0 4 2 S B				Date 13-2-95		Sheet 1 of 2			
Contractor Soils Engineering						Ground Level (m) 23.73		Co-Ordinates 0			













SAMPLES & TESTS			Water	STRATA			Geology	Instrument	Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)			
1.00-1.10	D			23.23		(0.50)	Dark brown TOPSOIL		
						0.50	Soft olive brown silty CLAY with many sand to medium gravel sized chalk fragments		
				22.43		1.30	Off white CHALK recovered as up to cobble sized fragments in a matrix of firm off white clay.		
2.00-2.10	D								
3.00-3.10	D								
4.00-4.10	D								
5.00-5.10	D								
6.00-6.10	D					(9.20)	From 6.0m — becoming recovered up to cobble sized CHALK fragments with a little clay and rare flint cobbles.		
7.00-7.10	D								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
13/2/95	12.05	2.9			2.90						2 No falling head permeability tests carried out.
13/2/95	12.25	2.9			2.80						
13/2/95	14.25	10.5	6.15	150	2.80						
13/2/95	15.00	10.0			2.79						
14/2/95	12.00	10.0			2.81						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME							BOREHOLE No TF70/126					
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 13-2-95	Sheet 2 of 2
Contractor Soils Engineering						Ground Level (m) 23.73			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D					Off white CHALK recovered as up to cobble sized fragments with a little clay and rare flint cobbles.		
9.00-9.10	D							
10.00-10.10	D							
								
								
								
								
								
								
								
			13.23		10.50	END OF BOREHOLE		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
13/2/95	12.05	2.9			2.90						2 No falling head permeability tests carried out.
13/2/95	12.25	2.9			2.80						
13/2/95	14.25	10.5	6.15	150	2.80						
13/2/95	15.00	10.0			2.79						
14/2/95	12.00	10.0			2.81						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF70/127		
JEN Project No		A A X E P 0 4 2 S B						Date 14-2-95				Sheet 1 of 3
Contractor Soils Engineering					Ground Level (m) 34.36			Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Insty- ment Result
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)		
1.00-1.10	D					(0.50)	Dark brown TOPSOIL	
				33.86		0.50		
						(0.50)	Loose brown fine to coarse SAND.	
				33.36		1.00		
2.00-2.10	D					(1.20)	White brown slightly clayey fine to coarse SAND with much fine to coarse gravel of flint and chalk.	
				32.16		2.20		
3.00-3.10	D						Off white CHALK recovered as up to cobble sized fragments in a matrix of firm white clay with occasional up to cobble sized flints.	
4.00-4.10	D							
5.00-5.10	D							
6.00-6.10	D							
7.00-7.10	D							
							at 4.2m --- matrix of soft white clay.	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
14/2/95	13.45	11.20	1.5	150	dry				7.00	13.00	2 No falling head permeability tests carried out.
14/2/95	14.30	12.70	1.5	150	12.70						
14/2/95	14.50	12.70	1.5	150	12.70						
14/2/95	15.30	14.00	1.5	150	12.70						
15/2/95	a.m.	14.00	1.5	150	12.70						
15/2/95	p.m.	20.00			12.63						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

SAMPLES & TESTS			Water	STRATA			Geology	Industry- ment/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
9.00-9.10	D				(18.30)	Off white CHALK recovered as up to cobble sized fragments in a matrix of firm white clay with occasional up to cobble sized flints.		
10.00-10.10	D							
12.00-12.10	D							
14.00-14.10	D							
15.00-15.10	D							

Form A1

BOREHOLE LOG




Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF70/127		
JEN Project No	A	A	X	E	P	0	4	2	S	B	Date 14-2-95	Sheet 3 of 3
Contractor Soils Engineering						Ground Level (m) 34.36		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
17.00-17.10	D					Firm off white CHALK.		
19.00-19.10	D							
				13.86		20.50		
						END OF BOREHOLE		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
14/2/95	13.45	11.20	1.5	150	dry				7.00	13.00	2 No falling head permeability tests carried out.
14/2/95	14.30	12.70	1.5	150	12.70						
14/2/95	14.50	12.70	1.5	150	12.70						
14/2/95	15.30	14.00	1.5	150	12.70						
15/2/95	a.m.	14.00	1.5	150	12.70						
15/2/95	p.m.	20.00			12.63						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

SAMPLES & TESTS			Water	STRATA			Geology	Inventory Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
1.00-1.10	D			18.85		(0.40) 0.40	TOPSOIL	
				18.45		(0.40) 0.80	Firm greenish orangey brown CLAY with a little fine to coarse sand.	
				15.75		3.50	Stiff to very stiff brownish yellow silty CLAY.	
2.00-2.10	D				(2.70)	at 2.0m --- becoming mottled orange brown, grey and brownish yellow.		
3.00-3.10	D							
4.00-4.10	D							
5.00-5.10	D					White CHALK with some orange staining, recovered as sand to coarse gravel sized fragments with a little soft white clay.		
6.00-6.10	D							
						at 8.0m (approx) --- becoming recovered as stiff clay with many chalk fragments.		

All dimensions in metres Scale 1:50	Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF70/128			
JEN Project No		A	A	X	E	P	0	4	2	S	B	Date 17-2-95	Sheet 2 of 2
Contractor Soils Engineering						Ground Level (m) 19.25			Co-Ordinates 0				







SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D				(9.50)	White CHALK with some orange staining, recovered as stiff clay with many chalk fragments.		
10.00-10.10	D							
11.00-11.10	D							
12.90-13.00	D			6.25		13.00		
END OF BOREHOLE								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
17/2/95	11.00	0.0							6.00	13.00	Water entry not evident due to added water. 2 No falling head permeability tests carried out. Hole scheduled as 10m.
17/2/95	15.00	13.0									
20/2/95	09.15	13.0			8.00						
21/2/95	13.30	12.5			8.18						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF70/129			
JEN Project No		A A X E P 0 4 2 S B						Date 20-2-95				Sheet 1 of 1	
Contractor Soils Engineering						Ground Level (m) 9.12				Co-Ordinates 0			

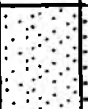


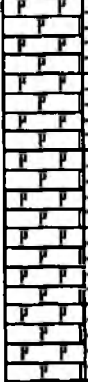


SAMPLES & TESTS			Water	STRATA			Geology	Insty- ment Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
0.50-0.60	D			8.82		(0.30) (1.30)	TOPSOIL	
						(0.90)	Orangey brown and yellowish brown fine to coarse SAND with much fine to coarse gravel of flint and chalk.	
1.50-1.60	D			7.92		1.20	Off white CHALK, recovered as fine sand to coarse gravel sized fragments and some firm white clay.	
2.50-2.60	D							
3.50-3.60	D							
5.00-5.10	D					(5.30)	at 4.0m recovered as high density gravel to cobble sized fragments.	
				2.62		6.50	END OF BOREHOLE	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
20/2/95	12.15	0.0									Water sealed out at 1.3m. 2 No falling head permeability tests carried out. Chisel used to advance from 4.5 to 6.5 in 33 minutes. Clay cutter used from 4.0 to 4.5 in 30 minutes.
20/2/95	12.25	2.00			2.00						
20/2/95	12.40	2.00			1.90						
20/2/95	13.30	4.50	1.3	150	dry						
21/2/95	08.45	4.50	1.3	150	2.27						
22/2/95	09.00	4.5	1.3	150	2.10						
22/2/95	12.30	6.5			1.89						
27/2/95	14.45	6.5			1.92						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method cable Percussion	Logged By AF GILLEARD
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BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF70/130	
JEN Project No		A A X E P 0 4 2 S B						Date 22-2-95			
Contractor Soils Engineering					Ground Level (m) 10.02			Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
1.00-1.10	D			9.62		(0.40) 0.40	TOPSOIL	
				8.92		(0.70) 1.10	Loose orangey brown fine to coarse SAND.	
2.00-2.10	D			7.72		(1.20) 2.30	Loose whitish brown clayey fine to coarse SAND with some fine to coarse gravel of flint and chalk.	
				6.52		(1.20) 3.50	Firm whitish brown fine sandy CLAY with some fine to coarse gravel of flint and chalk.	
4.00-4.10	D					(5.00)	Medium dense off white CHALK recovered as fine gravel to cobble sized fragments.	
6.00-6.10	D							
7.50-7.60	D						at 7.5m — some chalk fragments have black / dark brown coating.	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
22/2/95	13.10	0.00									2 No falling head permeability tests carried out.
22/2/95	13.25	2.80			2.80						
22/2/95	13.45	2.80			2.52						
22/2/95	15.15	8.50	7.90	150	6.00						
23/2/95	09.40	8.00			2.50						
27/2/95	14.45	8.00			2.53						

All dimensions in metres Scale 1:50		Client National Rivers Authority		Method Cable Percussion		Logged By AF GILLEARD	
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






BOREHOLE LOG

SAMPLES & TESTS			Water	STRATA			Geo log	Industry- ment/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
				1.52	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">P</div> <div style="border: 1px solid black; padding: 2px;">P</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">P</div> <div style="border: 1px solid black; padding: 2px;">P</div> </div> <div style="border: 1px solid black; padding: 2px;">P</div>	8.50	Medium dense off white CHALK recovered as fine gravel to cobble sized fragments.	
							END OF BOREHOLE	

Form A1

BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME										BOREHOLE No TF70/131	
JEN Project No		A A X E P 0 4 2 S B						Date 23-2-95		Sheet 1 of 2	
Contractor Soils Engineering						Ground Level (m) 7.22		Co-Ordinates 0			

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
1.00-1.10	D					(0.60)	TOPSOIL	
				6.62		0.60		
2.00-2.10	D					(1.80)	Firm orangey brown sandy CLAY with a little fine to medium flint gravel.	
				4.82		2.40		
3.00-3.10	D					(0.40)	Firm brownish yellow sandy CLAY with fine to coarse (mostly chalk) gravel.	
				4.42		2.80		
4.00-4.10	D					(0.50)	Firm brownish yellow fine sandy CLAY.	
				3.92		3.30		
5.00-5.10	D						Off white CHALK recovered as firm friable clay.	
6.00-6.10	D					(5.20)	Becoming recovered as firm brownish yellow clay with sand to cobble sized brownish yellow chalk fragments. Some fragments have orange and dark brown coating / surface staining.	
7.00-7.10	D							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
23/2/95	10.15	0.00									Initial water strike sealed out. 2 No falling head permeability tests carried out.
23/2/95	10.35	4.00			4.00						
23/2/95	10.55	4.00			2.90						
23/2/95	13.00	8.50	7.50	150	5.20						
23/2/95	15.00	7.80			1.39						
27/2/95	14.45	7.80			2.35						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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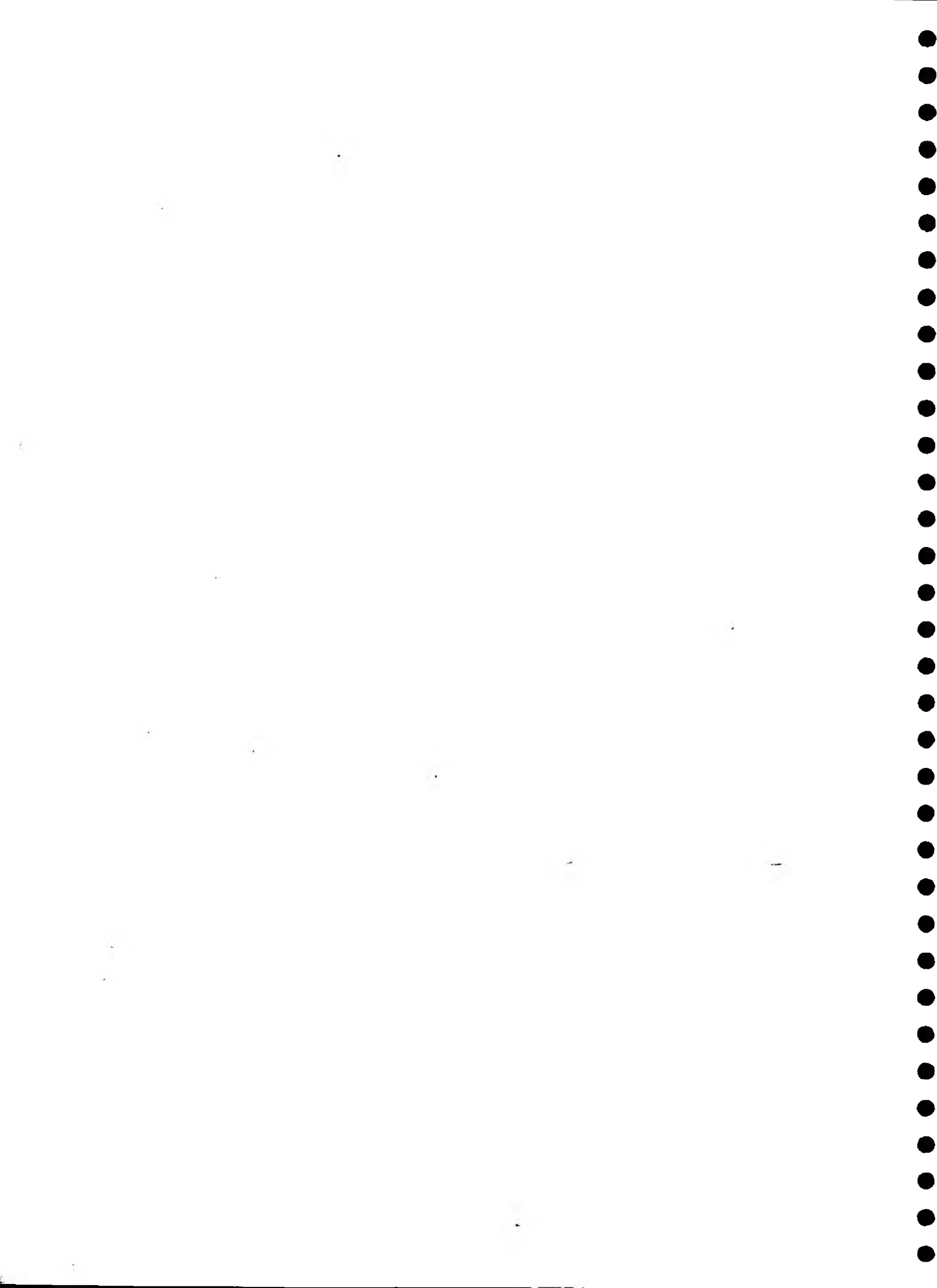
BOREHOLE LOG

Project RIVER WISSEY - HYDROMETRIC SCHEME								BOREHOLE No TF70/131				
JEN Project No	A	A	X	E	P	0	4			2	S	B
Contractor Soils Engineering						Ground Level (m) 7.22		Co-Ordinates 0				

SAMPLES & TESTS			Water	STRATA			Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
8.00-8.10	D			<div><div>P</div><div>P</div><div>P</div><div>P</div></div>		8.50	Off white CHALK recovered as firm brownish yellow clay with sand to cobble sized brownish yellow chalk fragments. Some fragments have orange and dark brown coating / surface staining.	
							END OF BOREHOLE	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing	Casing Dia	Water Dpt	From	To	Hours	From	To	
23/2/95	10.15	0.00									Initial water strike sealed out. 2 No falling head permeability tests carried out.
23/2/95	10.35	4.00			4.00						
23/2/95	10.55	4.00			2.90						
23/2/95	13.00	8.50	7.50	150	5.20						
23/2/95	15.00	7.80			1.39						
27/2/95	14.45	7.80			2.35						

All dimensions in metres Scale 1:50		Client National Rivers Authority	Method Cable Percussion	Logged By AF GILLEARD
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FALLING HEAD TEST RESULTS

5

SUMMARY OF FALLING HEAD PERMEABILITY TESTS

<u>Borehole Ref</u>	<u>Permeability in Borehole (m/sec)</u>	<u>Permeability in Standpipe (m/sec)</u>
TF 80/211	1.10 E-6	1.26 E-5
TF 80/212	**	4.03 E-4
TF 80/213	**	4.03 E-4
TF 80/214	8.20 E-6	4.66 E-5
TF 80/215	6.00 E-7	**
TF 80/216	7.00 E-7	4.40 E-6
TF 80/217	4.00 E-7	5.20 E-6
TF 80/218	1.89 E-5	2.69 E-4
TL 89/118	1.90 E-6	3.55 E-4
TL 89/119	2.40 E-5	1.27 E-4
TL 89/120	3.10 E-6	2.5 E-6
TL 89/121	1.11 E-5	6.67 E-5
TF 70/126	**	1.61 E-4
TF 70/127	**	4.87 E-5
TF 70/128	5.00 E-7	5.20 E-6
TF 70/129	3.27 E-4	2.69 E-4
TF 70/130	3.00 E-7	2.69 E-4
TF 70/131	8.00 E-7	6.30 E-6

** = Very high permeability. Could not raise water level
in borehole /standpipe above equilibrium water table level.

Site RIVER WISSEY (NORTH PICKENHAM)

Client NATIONAL RIVERS AUTHORITY

Date 09/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 4.00 m

Depth to equilibrium watertable, b : 0.55 m Measured

Height of casing above ground level, c : 0.00 m

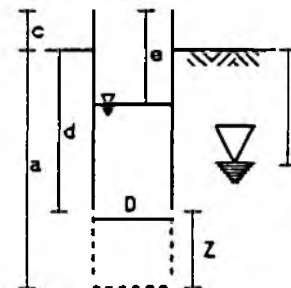
Depth of casing below ground level, d : 3.00 m

Length of response zone, Z : 1.00 m

Diameter of response zone, D : 0.15 m

Intake factor, F : 2.4205

(From Condition D of fig. 7 BS5930:1981)



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

Plot log $\frac{H_t}{H_0}$ v t *-----*

then

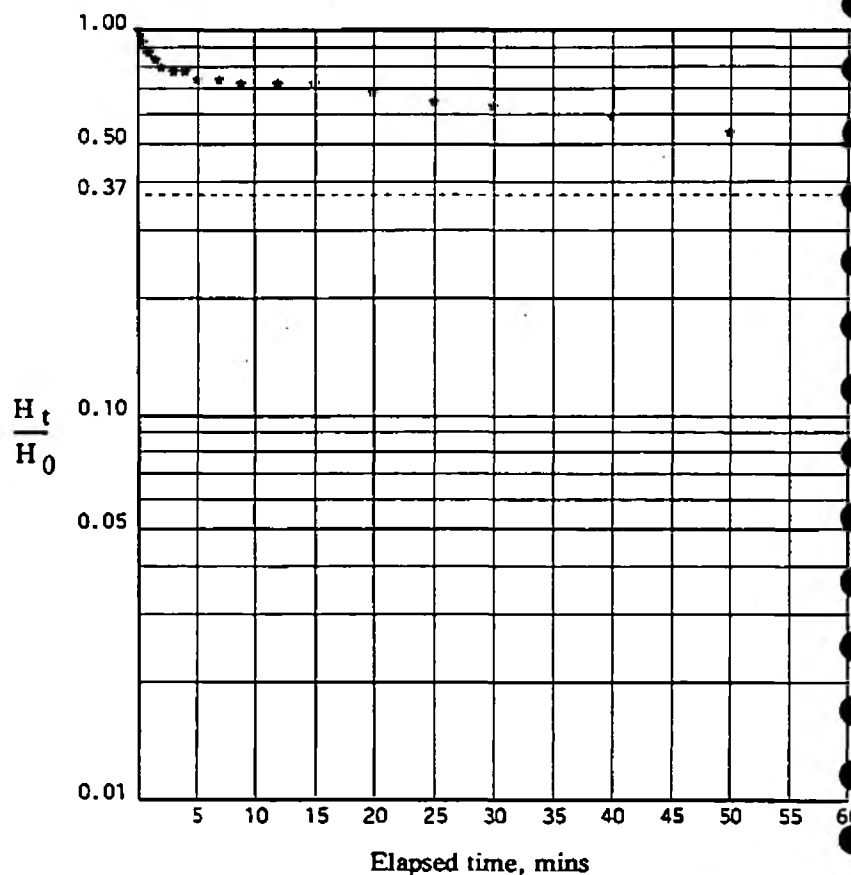
$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 1.10E-6 \text{ m/sec}$$

Soil Type at test level

Firm grey clay with chalk fragments and flint

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.01	0.54	1.000
0.33	0.03	0.52	0.963
0.50	0.05	0.50	0.926
0.75	0.07	0.48	0.889
1.00	0.08	0.47	0.870
1.50	0.10	0.45	0.833
2.00	0.12	0.43	0.796
3.00	0.13	0.42	0.778
4.00	0.13	0.42	0.778
5.00	0.15	0.40	0.741
7.00	0.15	0.40	0.741
9.00	0.16	0.39	0.722
12.00	0.16	0.39	0.722
15.00	0.16	0.39	0.722
20.00	0.18	0.37	0.685
25.00	0.20	0.35	0.648
30.00	0.21	0.34	0.630
40.00	0.23	0.32	0.593
50.00	0.26	0.29	0.537
60.00	0.28	0.27	0.500



REMARKS:

5226

In-Situ Permeability Test

Bh No

Fig No

TF80/211

1A

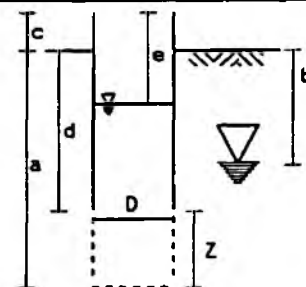
Site RIVER WISSEY (NORTH PICKENHAM)

Client NATIONAL RIVERS AUTHORITY

Date 09/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 4.00 m
 Depth to equilibrium watertable, b : 0.55 m Measured
 Height of casing above ground level, c : 0.85 m
 Depth of casing below ground level, d : 2.80 m
 Length of response zone, Z : 3.00 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 5.8134
 (From Figure 8, Note 5, BS5930:1981)



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

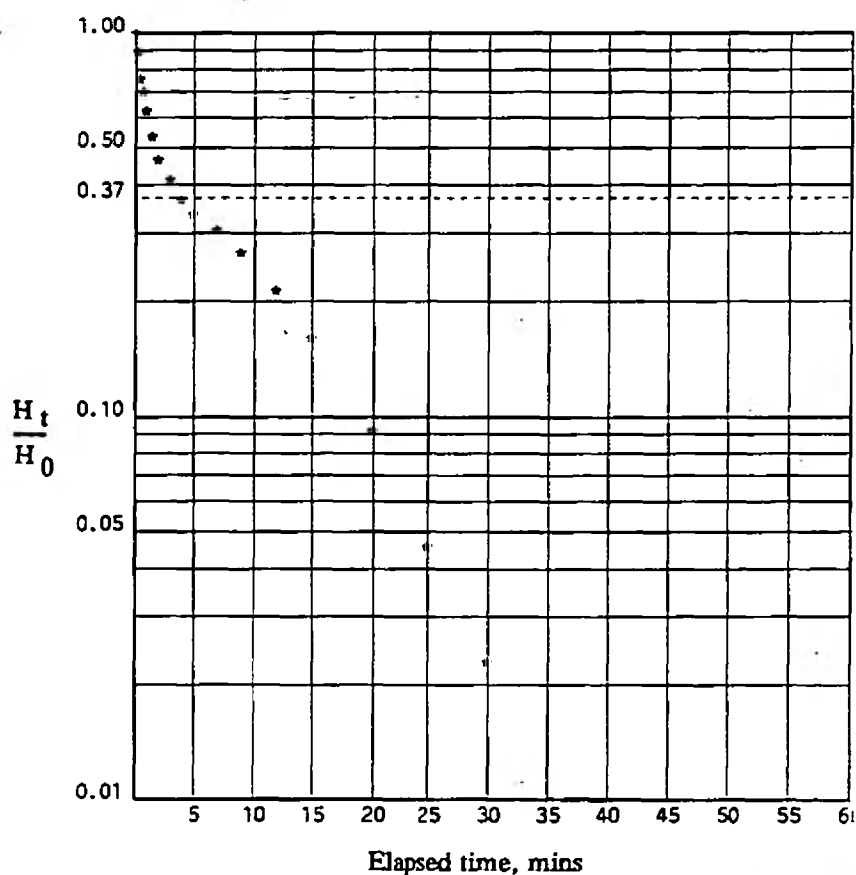
$$k = \frac{A}{60FT} \text{ m/sec}$$

Soil Type at test level

Soft mottled sandy clay with gravel to 2.6m, firm
 clay with chalk fragments and flints to 4.0m

$$k = 1.26E-5 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, a m	Head of water, H m	Ht/Ho
0.16	0.09	1.31	1.000
0.33	0.23	1.17	0.893
0.50	0.41	0.99	0.756
0.75	0.48	0.92	0.702
1.00	0.58	0.82	0.626
1.50	0.70	0.70	0.534
2.00	0.79	0.61	0.466
3.00	0.86	0.54	0.412
4.00	0.92	0.48	0.366
5.00	0.96	0.44	0.336
7.00	1.00	0.40	0.305
9.00	1.05	0.35	0.267
12.00	1.12	0.28	0.214
15.00	1.19	0.21	0.160
20.00	1.28	0.12	0.092
25.00	1.34	0.06	0.046
30.00	1.37	0.03	0.023
40.00	1.40	0.00	0.000
50.00	1.40	0.00	0.000
60.00	1.40	0.00	0.000



REMARKS:

6225

In-Situ Permeability Test

Bh No

Fig No

TF80/211

1A

Site RIVER WISSEY (NORTH PICKENHAM)

Client NATIONAL RIVERS AUTHORITY

Date 10/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 20.50 m

Depth to equilibrium watertable, b : 12.50 m Measured

Height of casing above ground level, c : 0.00 m

Depth of casing below ground level, d : 1.50 m

Length of response zone, Z : 8.00 m

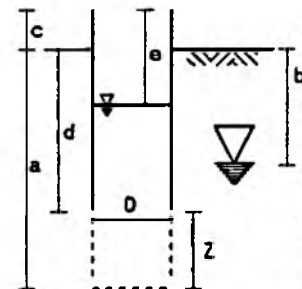
Diameter of response zone, D : 0.15 m

Intake factor, F : 10.7639

(From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Firm white putty chalk and rock chalk with large flints



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

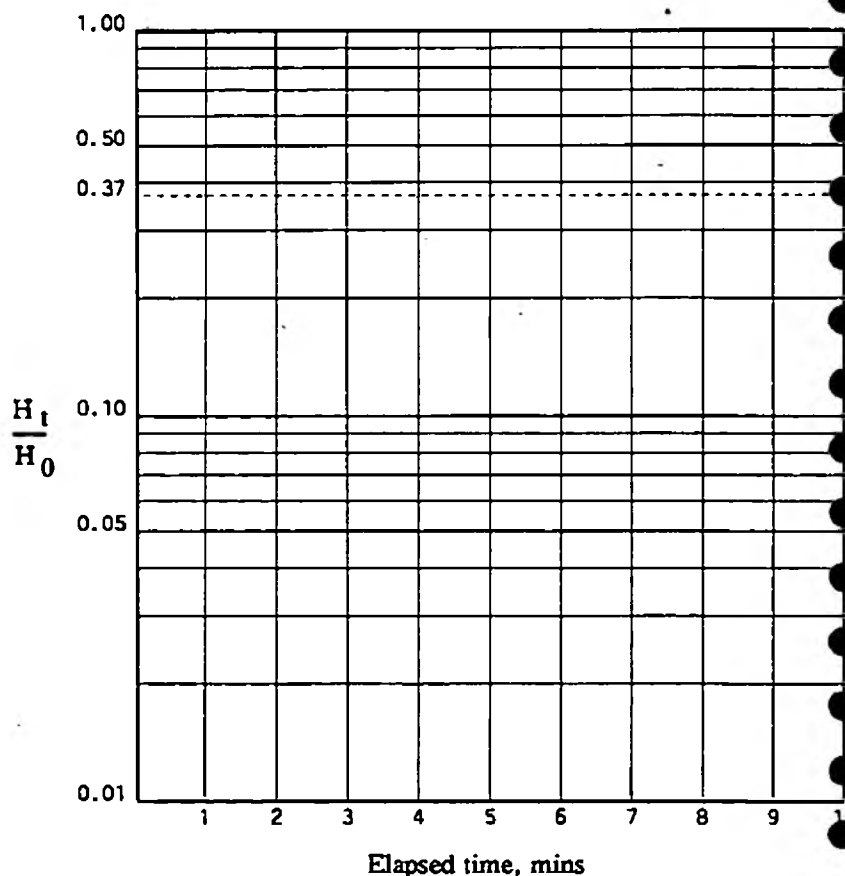
Plot $\log \frac{H_t}{H_0}$ v t

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

k = m/sec

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	12.45	0.05	1.000
0.33	12.50	0.00	0.000
0.50	12.50	0.00	0.000
0.75	12.50	0.00	0.000
1.00	12.50	0.00	0.000



REMARKS: Could not raise water level above 12.45m due to flow rate

6226

In-Situ Permeability Test

Bh No

TF80/212

Fig No

18

Site RIVER WISSEY (NORTH PICKENHAM)

Client NATIONAL RIVERS AUTHORITY

Date 13/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 19.80 m

Depth to equilibrium watertable, b : 12.50 m Measured

Height of casing above ground level, c : 0.00 m

Depth of casing below ground level, d : 18.65 m

Length of response zone, Z : 1.35 m

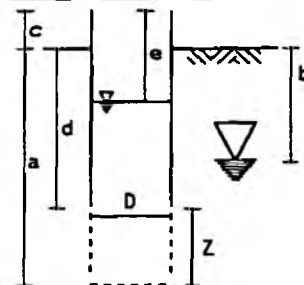
Diameter of response zone, D : 0.15 m

Intake factor, F : 3.3187

(From Figure 8, Note 5, BS5930:1981)

Soil Type at test level

Firm white putty chalk and rock chalk with large flints



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

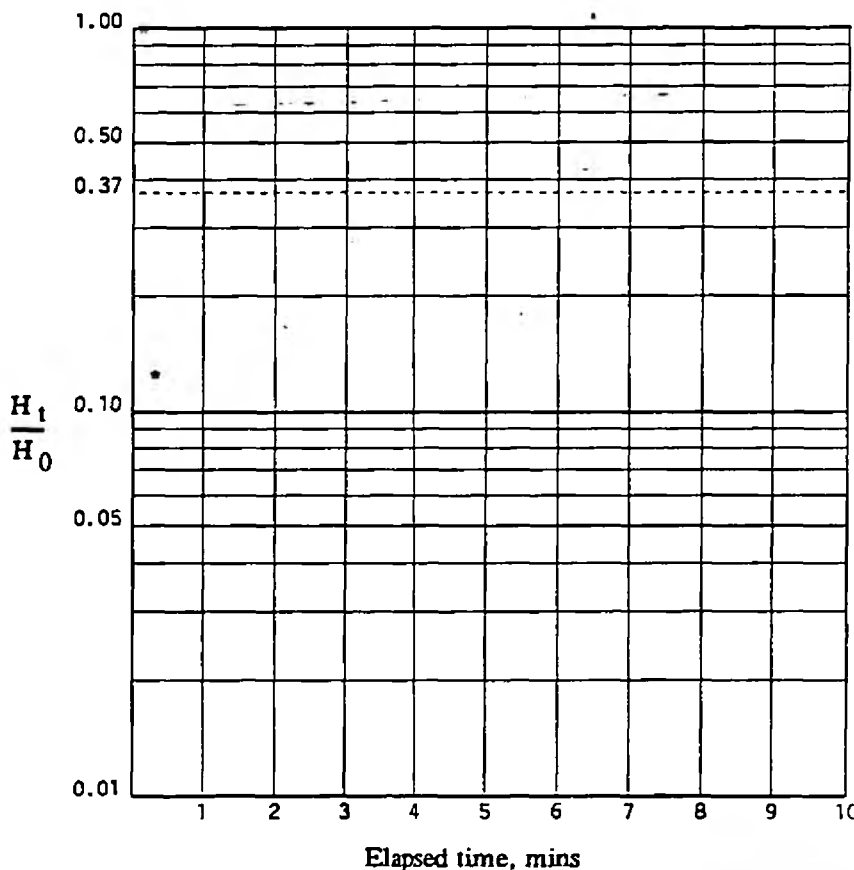
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 4.03E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	12.10	0.40	1.000
0.33	12.45	0.05	0.125
0.50	12.50	0.00	0.000
0.75	12.50	0.00	0.000
1.00	12.50	0.00	0.000



REMARKS: Could not raise water above 12.1m due to flow rate

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/212

1B

Site RIVER WISSEY (LITTLE CRESSINGHAM)

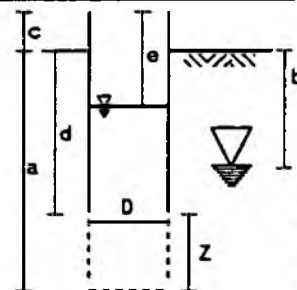
Client NATIONAL RIVERS AUTHORITY

Date 07/02/95 Type of Test Falling Head

Level
m00

Depth of borehole during test, a : 10.50 m
 Depth to equilibrium watertable, b : 6.56 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 1.50 m
 Length of response zone, Z : 4.00 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 6.3197
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level
 Firm white rock chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

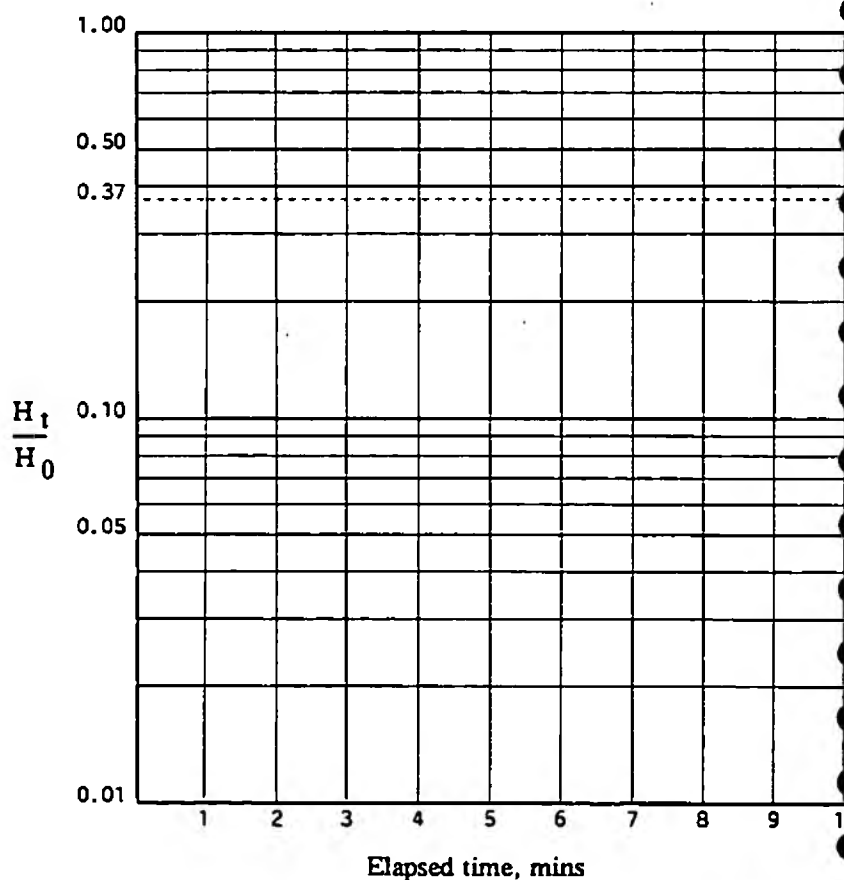
Plot log $\frac{H_t}{H_0}$ v t *-----*

then H_0

$$k = \frac{A}{60FT} \text{ m/sec}$$

k = m/sec

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	6.56	0.00	1.000
0.33	6.56	0.00	1.000
0.50	6.56	0.00	1.000
0.75	6.56	0.00	1.000
1.00	6.56	0.00	1.000
1.50	6.56	0.00	1.000



REMARKS: Could not raise water level above 6.56m due to flow rate

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/213

2

Site RIVER WISSEY (GREAT CRESSINGHAM)

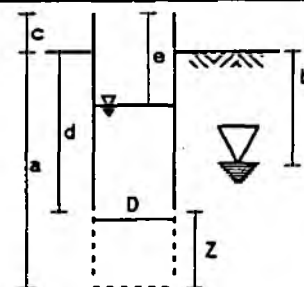
Client NATIONAL RIVERS AUTHORITY

Date 08/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 9.80 m
 Depth to equilibrium watertable, b : 6.55 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 8.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level
 Firm white rock chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

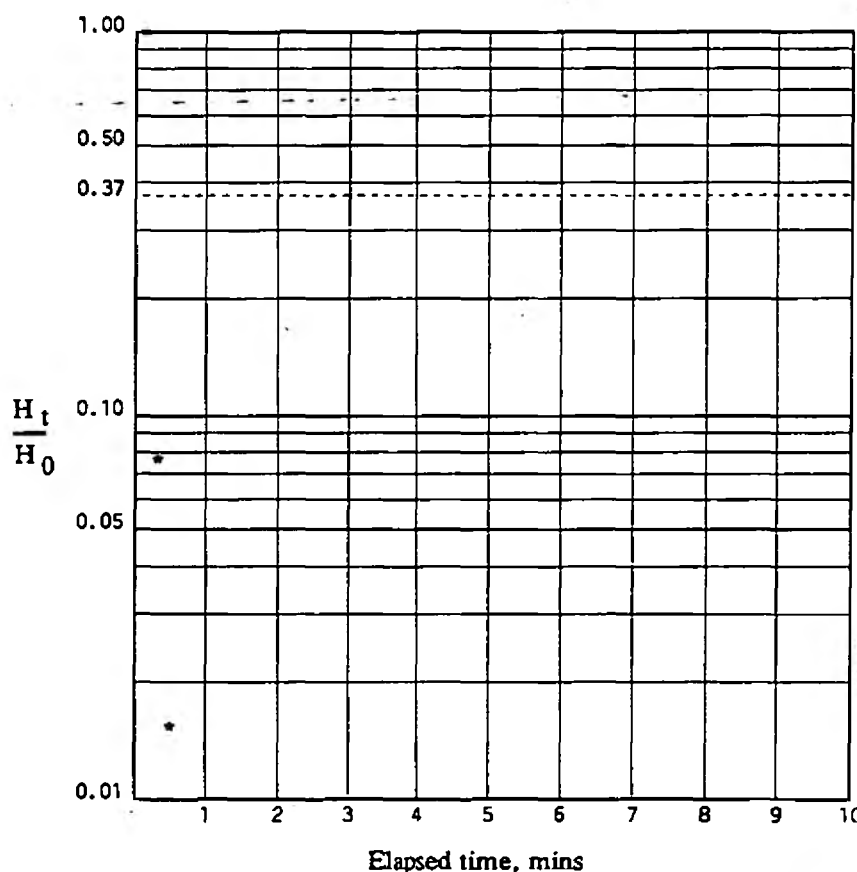
Plot log $\frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 4.03E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	5.90	0.65	1.000
0.33	6.50	0.05	0.077
0.50	6.54	0.01	0.015
0.75	6.55	0.00	0.000
1.00	6.55	0.00	0.000
1.50	6.55	0.00	0.000



REMARKS: Could not raise water level above 5.9m due to flow rate

6226

In-Situ Permeability Test

Bh No

TF80/213

Fig No

2

Site RIVER WISSEY (NORTH PICKENHAM)

Client NATIONAL RIVERS AUTHORITY

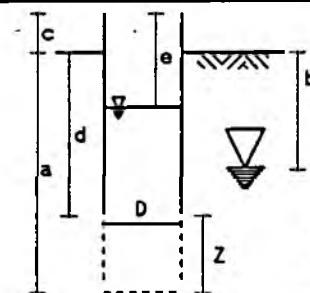
Date 31/01/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 30.50 m
 Depth to equilibrium watertable, b : 6.53 m Assumed
 Height of casing above ground level, c : 0.10 m
 Depth of casing below ground level, d : 18.00 m
 Length of response zone, Z : 12.50 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 15.3517
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Firm white putty chalk and rock chalk with flints



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

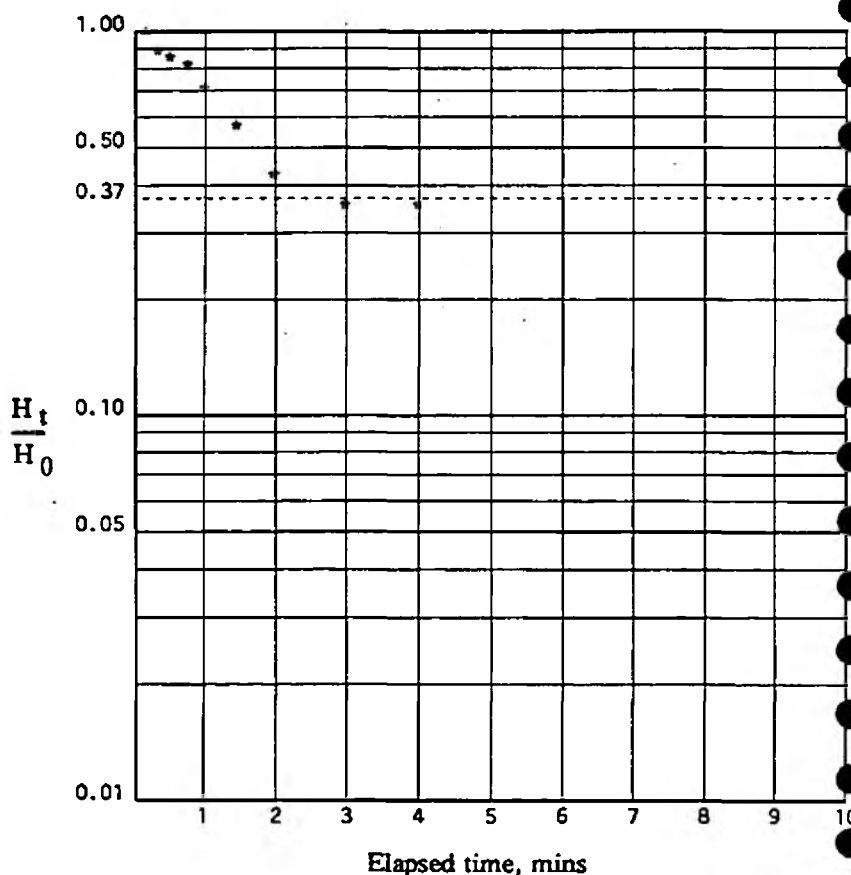
Plot log $\frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 8.20E-6 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, a m	Head of water, H m	Ht/Ho
0.16	6.35	0.28	1.000
0.33	6.38	0.25	0.893
0.50	6.39	0.24	0.857
0.75	6.40	0.23	0.821
1.00	6.43	0.20	0.714
1.50	6.47	0.16	0.571
2.00	6.51	0.12	0.429
3.00	6.53	0.10	0.357
4.00	6.53	0.10	0.357



REMARKS: Could not raise water level above 6m with water supply on site. After 4 minutes water began to rise to 6.24m at 25 minutes due to water leaking in through casing joints

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/214

3A

Site RIVER WISSEY (WATTON)

Client NATIONAL RIVERS AUTHORITY

Date 01/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 30.00 m

Depth to equilibrium watertable, b : 6.53 m Assumed

Height of casing above ground level, c : 0.80 m

Depth of casing below ground level, d : 28.65 m

Length of response zone, Z : 1.35 m

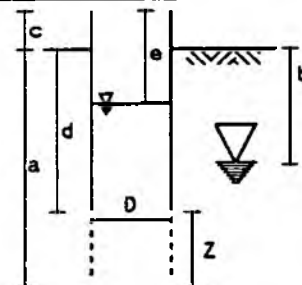
Diameter of response zone, D : 0.15 m

Intake factor, F : 3.3187

(From Figure 8, Note 5, BS5930:1981)

Soil Type at test level

Firm white putty chalk and rock chalk with flints



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

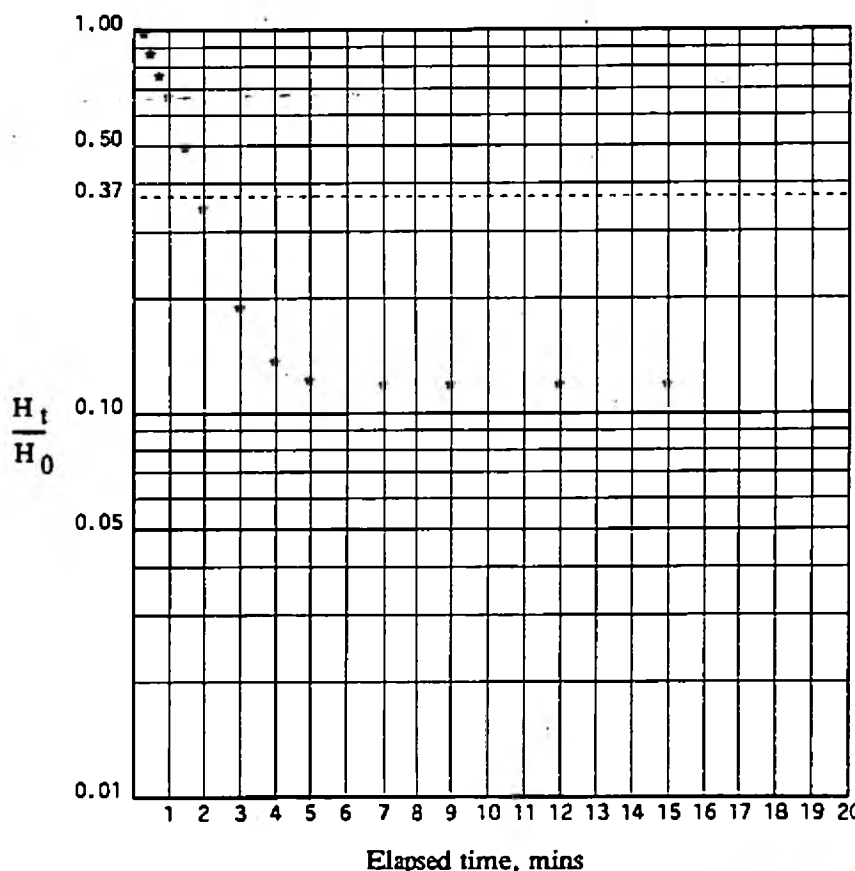
Plot log $\frac{H_t}{H_0}$ v t *-----*

then H_0

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 4.66E-5 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, a m	Head of water, H m	Ht/Ho
0.16	0.50	6.83	1.000
0.33	0.65	6.68	0.978
0.50	1.40	5.93	0.868
0.75	2.15	5.18	0.758
1.00	2.75	4.58	0.671
1.50	3.95	3.38	0.495
2.00	4.98	2.35	0.344
3.00	6.04	1.29	0.189
4.00	6.40	0.93	0.136
5.00	6.50	0.83	0.122
7.00	6.52	0.81	0.119
9.00	6.52	0.81	0.119
12.00	6.52	0.81	0.119
15.00	6.52	0.81	0.119



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/214

3A

Site RIVER WISSEY (WATTON)

Client NATIONAL RIVERS AUTHORITY

Date 24/01/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 8.00 m

Depth to equilibrium watertable, b : 5.20 m Measured

Height of casing above ground level, c : -0.25 m

Depth of casing below ground level, d : 7.90 m

Length of response zone, Z : 0.10 m

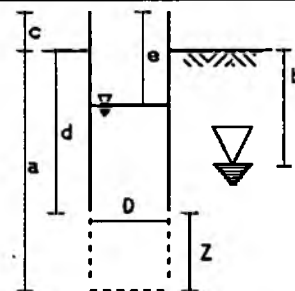
Diameter of response zone, D : 0.15 m

Intake factor, F : 1.0051

(From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Loose orange fine sand and small gravel



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

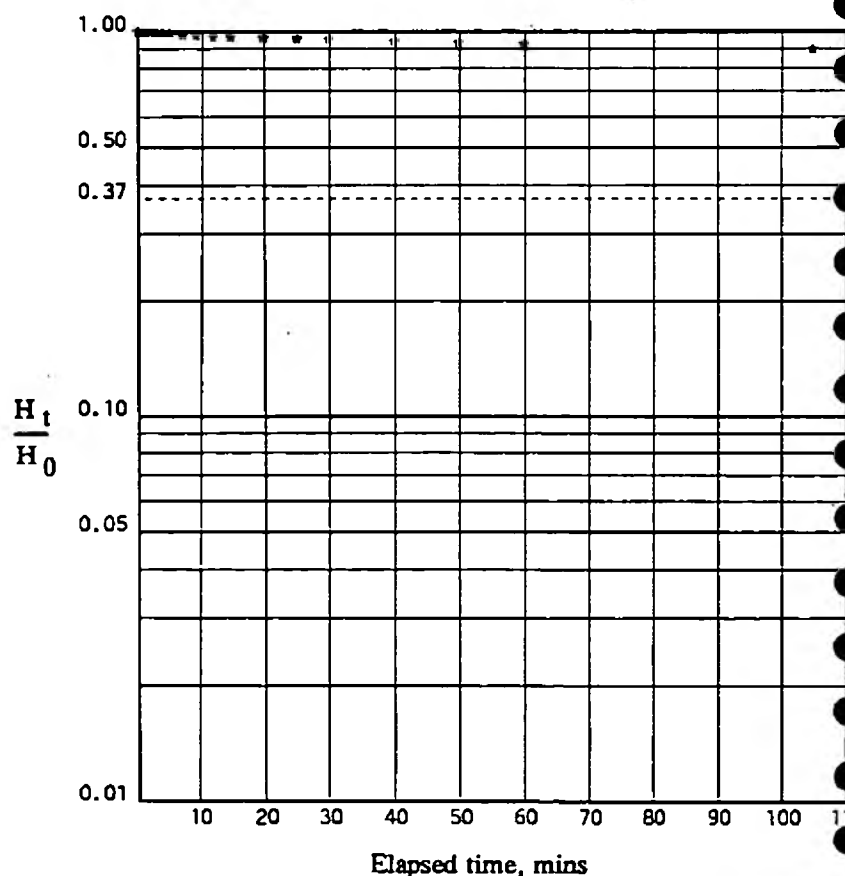
Plot $\log \frac{H_t}{H_0}$ v t

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 6.00E-7 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.00	4.95	1.001
0.33	0.01	4.94	0.999
0.50	0.01	4.94	0.999
0.75	0.02	4.94	0.999
1.00	0.02	4.93	0.997
1.50	0.02	4.93	0.997
2.00	0.02	4.93	0.997
3.00	0.04	4.92	0.995
4.00	0.06	4.89	0.989
5.00	0.08	4.87	0.985
7.00	0.11	4.84	0.979
9.00	0.13	4.82	0.975
12.00	0.16	4.79	0.968
15.00	0.18	4.77	0.964
20.00	0.20	4.75	0.960
25.00	0.22	4.73	0.956
30.00	0.24	4.71	0.952
40.00	0.29	4.67	0.944
50.00	0.33	4.63	0.936
60.00	0.37	4.59	0.928
105.00	0.50	4.45	0.900



REMARKS: Sand settled, from water already in hole, during test, after test, hole depth was 7.0m

6226

In-Situ Permeability Test

Bh No

TF80/215

Fig No

3B(1)A



SOILS ENGINEERING LIMITED, NEWARK ROAD, PETERBOROUGH.

Tel: (0733) 68153/4

SOILS ENGINEERING LIMITED, NEWARK ROAD, PETERBOROUGH. Tel: (0733) 68153/4

Site RIVER WISSEY (WATTON)

Client NATIONAL RIVERS AUTHORITY

Date 27/01/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 30.00 m

Depth to equilibrium watertable, b : 5.80 m Measured

Height of casing above ground level, c : 0.60 m

Depth of casing below ground level, d : 16.00 m

Length of response zone, Z : 14.00 m

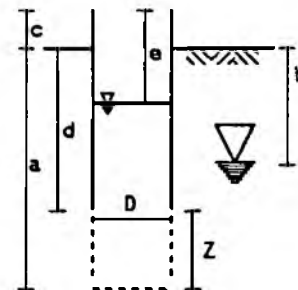
Diameter of response zone, D : 0.15 m

Intake factor, F : 16.8213

(From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Firm white putty chalk and rock chalk with flints



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

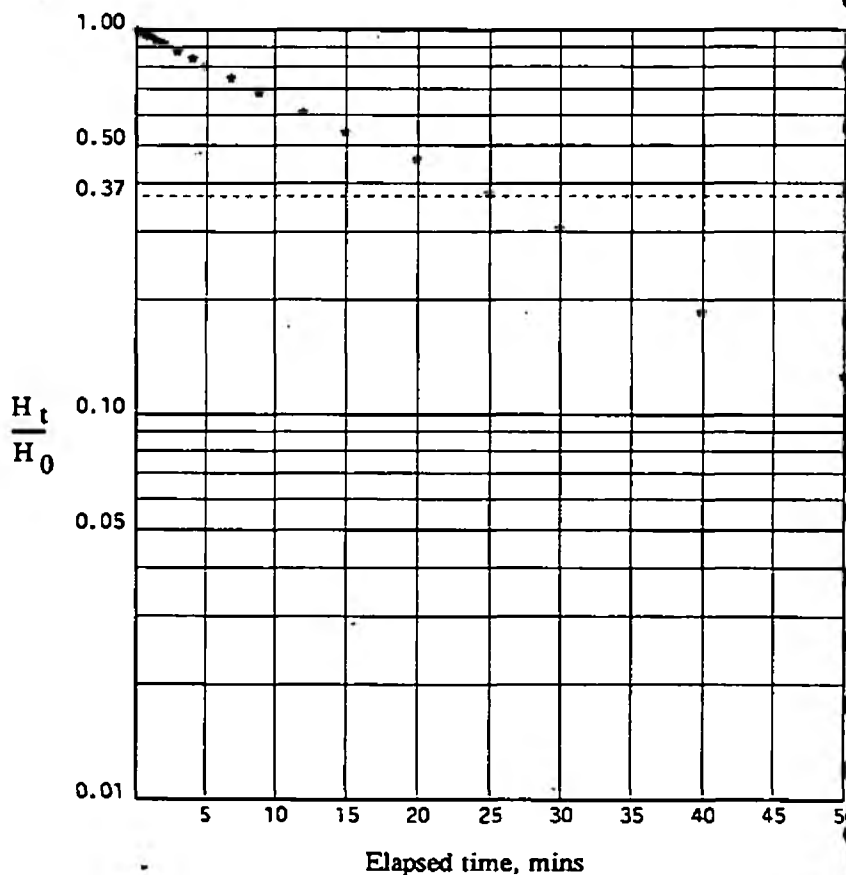
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 7.00E-7 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.04	6.36	1.000
0.33	0.10	6.30	0.991
0.50	0.14	6.26	0.984
0.75	0.23	6.17	0.970
1.00	0.29	6.11	0.961
1.50	0.43	5.97	0.939
2.00	0.55	5.85	0.920
3.00	0.81	5.59	0.879
4.00	1.05	5.35	0.841
5.00	1.28	5.12	0.805
7.00	1.65	4.75	0.747
9.00	2.03	4.37	0.687
12.00	2.52	3.88	0.610
15.00	2.95	3.45	0.542
20.00	3.46	2.94	0.462
25.00	4.00	2.40	0.377
30.00	4.46	1.94	0.305
40.00	5.22	1.18	0.186
50.00	5.60	0.80	0.126



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/216

38(II)

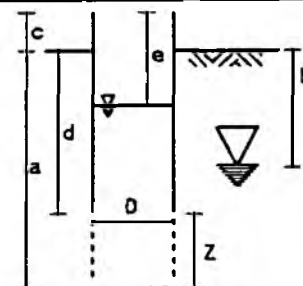
Site RIVER WISSEY (WATTON)

Client NATIONAL RIVERS AUTHORITY

Date 30/01/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 29.30 m
 Depth to equilibrium watertable, b : 5.80 m Measured
 Height of casing above ground level, c : 0.35 m
 Depth of casing below ground level, d : 28.15 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

Plot log $\frac{H_t}{H_0}$ v t *-----*

then

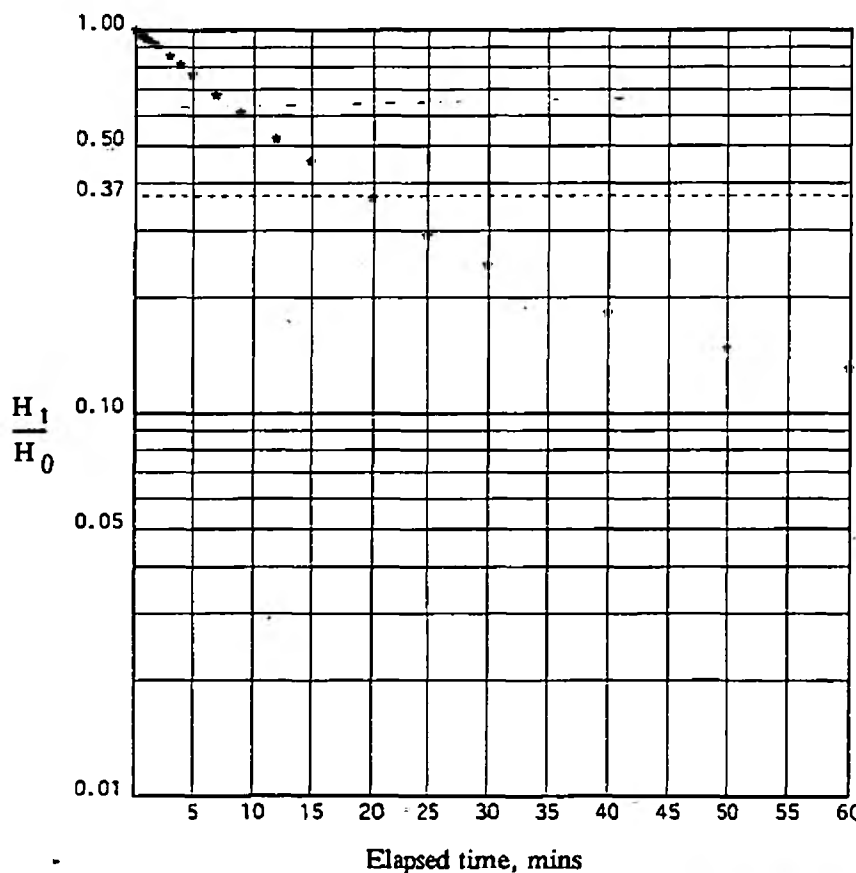
$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 4.40E-6 \text{ m/sec}$$

Soil Type at test level

Firm white putty chalk and rock chalk with flints

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.11	6.04	1.000
0.33	0.19	5.96	0.987
0.50	0.28	5.87	0.972
0.75	0.34	5.81	0.962
1.00	0.44	5.71	0.945
1.50	0.57	5.58	0.924
2.00	0.69	5.46	0.904
3.00	0.99	5.16	0.854
4.00	1.25	4.90	0.811
5.00	1.52	4.63	0.767
7.00	2.05	4.10	0.679
9.00	2.46	3.69	0.611
12.00	2.99	3.16	0.523
15.00	3.39	2.76	0.457
20.00	3.94	2.21	0.366
25.00	4.39	1.76	0.291
30.00	4.68	1.47	0.243
40.00	5.05	1.10	0.182
50.00	5.26	0.89	0.147
60.00	5.36	0.79	0.131



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/216

38(II)

Site RIVER WISSEY (LITTLE CRESSINGHAM)

Client NATIONAL RIVERS AUTHORITY

Date 01/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 6.50 m

Depth to equilibrium watertable, b : 1.50 m Measured

Height of casing above ground level, c : 0.00 m

Depth of casing below ground level, d : 4.50 m

Length of response zone, Z : 2.00 m

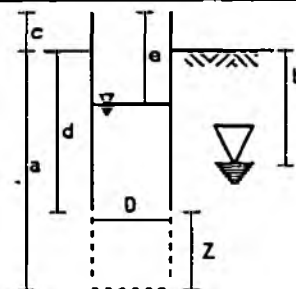
Diameter of response zone, D : 0.15 m

Intake factor, F : 3.8256

(From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Firm white putty chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

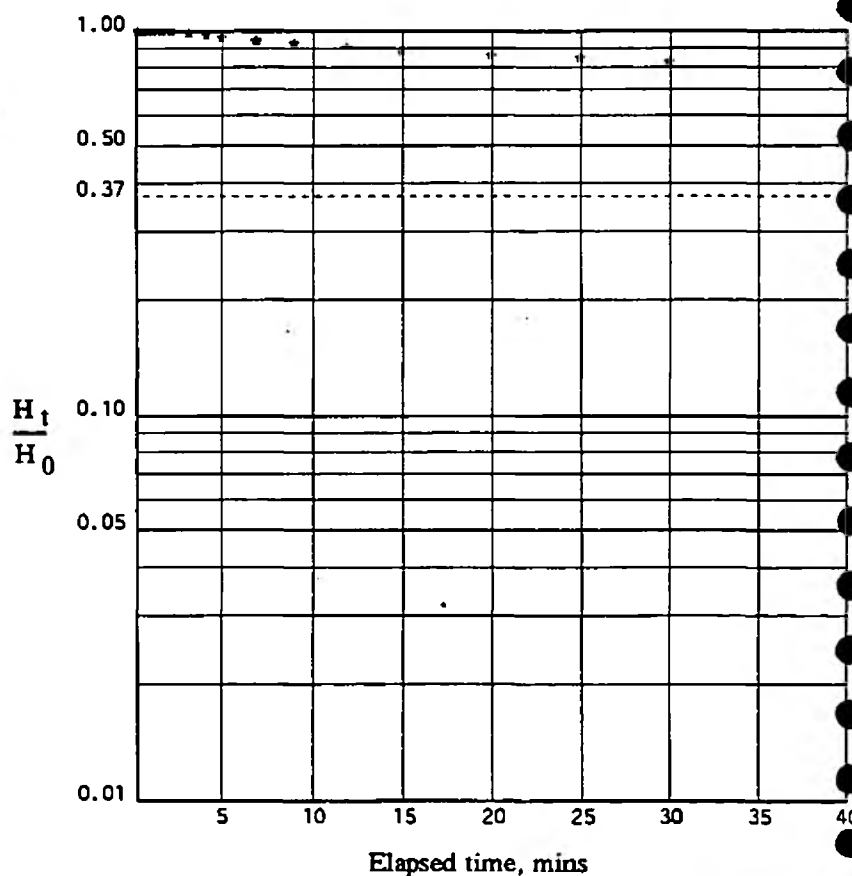
Plot log $\frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 4.00E-7 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.00	1.50	1.000
0.33	0.00	1.50	1.000
0.50	0.00	1.50	1.000
0.75	0.00	1.50	1.000
1.00	0.00	1.50	1.000
1.50	0.00	1.50	1.000
2.00	0.00	1.50	1.000
3.00	0.02	1.48	0.987
4.00	0.04	1.46	0.973
5.00	0.06	1.44	0.960
7.00	0.09	1.41	0.940
9.00	0.11	1.39	0.927
12.00	0.14	1.36	0.907
15.00	0.17	1.33	0.887
20.00	0.21	1.29	0.860
25.00	0.23	1.27	0.847
30.00	0.26	1.24	0.827
40.00	0.30	1.20	0.800



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/217

4A



Site RIVER WISSEY (LITTLE CRESSINGHAM)

Client NATIONAL RIVERS AUTHORITY

Date 02/02/95

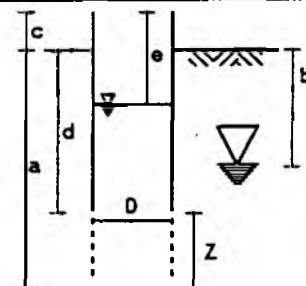
Type of Test Falling Head

Level
m00

Depth of borehole during test, a : 6.00 m
 Depth to equilibrium watertable, b : 1.45 m Measured
 Height of casing above ground level, c : 0.10 m
 Depth of casing below ground level, d : 4.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m

Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level
 Firm white putty chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

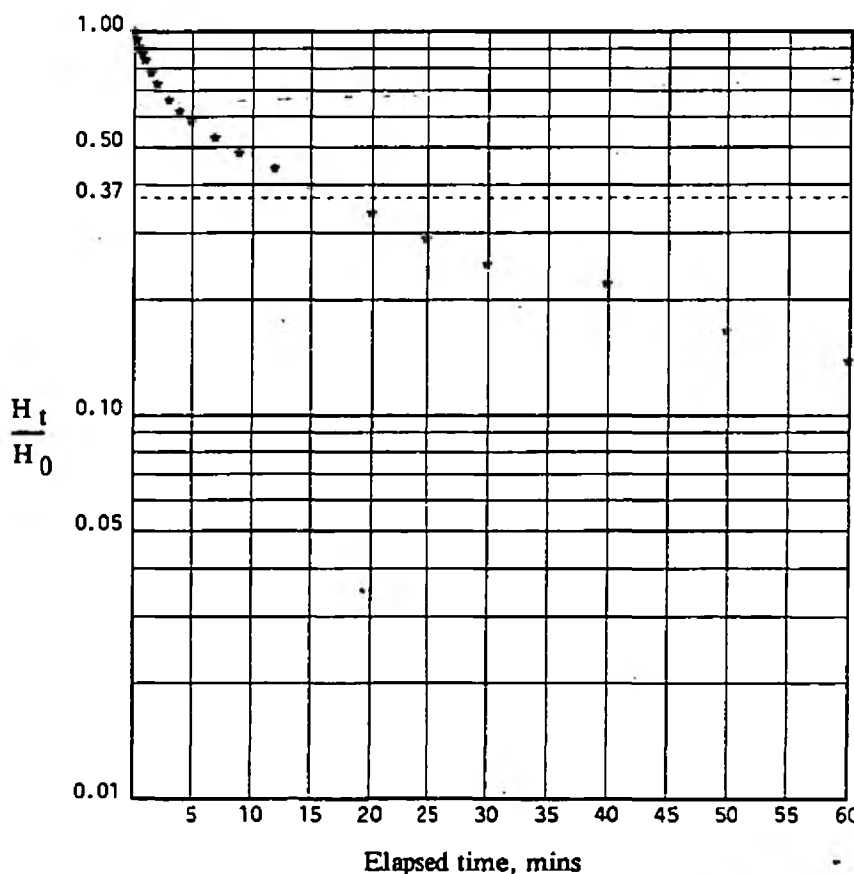
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 5.20E-6 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.10	1.45	1.000
0.33	0.17	1.38	0.952
0.50	0.23	1.32	0.910
0.75	0.28	1.27	0.876
1.00	0.33	1.22	0.841
1.50	0.42	1.13	0.779
2.00	0.49	1.06	0.731
3.00	0.59	0.96	0.662
4.00	0.65	0.90	0.621
5.00	0.70	0.85	0.586
7.00	0.78	0.77	0.531
9.00	0.85	0.70	0.483
12.00	0.91	0.64	0.441
15.00	0.97	0.58	0.400
20.00	1.06	0.49	0.338
25.00	1.13	0.42	0.290
30.00	1.19	0.36	0.248
40.00	1.23	0.32	0.221
50.00	1.31	0.24	0.166
60.00	1.35	0.20	0.138



REMARKS:

In-Situ Permeability Test

Bh No

TF80/217

F1g No

4A

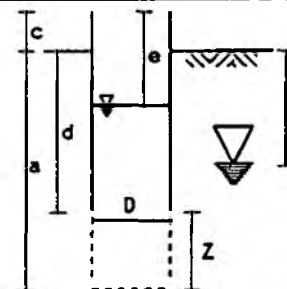
Site RIVER WISSEY (LITTLE CRESSINGHAM)

Client NATIONAL RIVERS AUTHORITY

Date 06/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 18.00 m
 Depth to equilibrium watertable, b : 6.15 m Measured
 Height of casing above ground level, c : 0.15 m
 Depth of casing below ground level, d : 13.50 m
 Length of response zone, Z : 4.50 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 6.9052
 (From Condition D of fig. 7 BS5930:1981)



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

Plot log $\frac{H_t}{H_0}$ v t *-----*

then

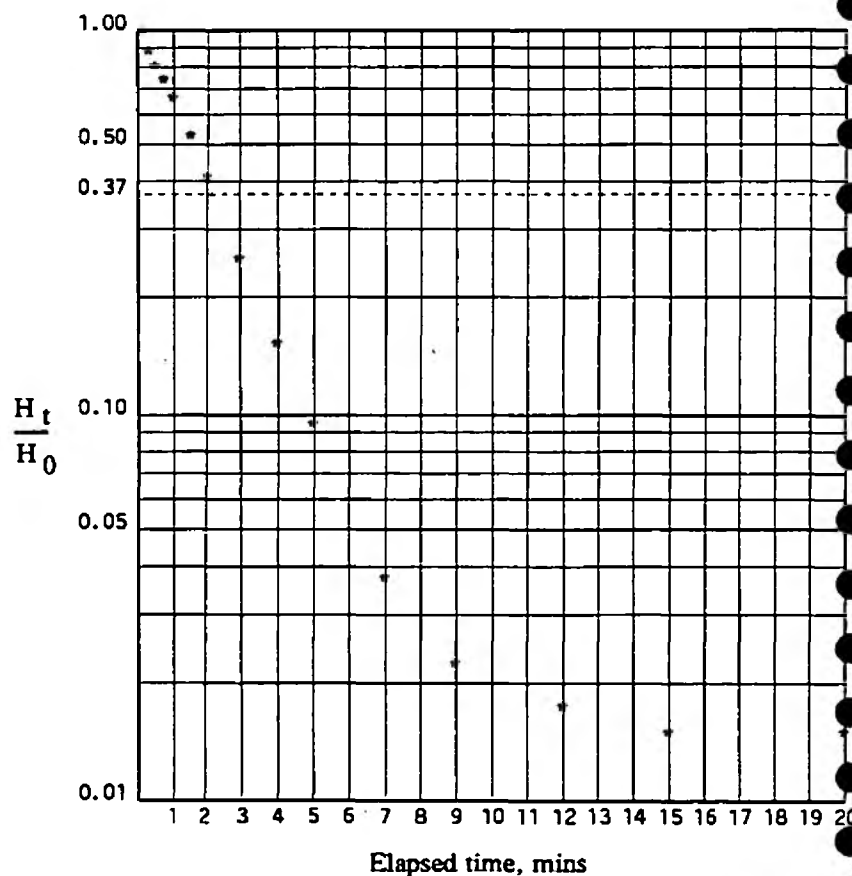
$$k = \frac{A}{60FT} \text{ m/sec}$$

Soil Type at test level

Stiff grey clay with chalk fragments to 17.8m and
 firm white putty chalk to 18.0m

$$k = 1.89E-5 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	2.30	4.00	1.000
0.33	2.75	3.55	0.888
0.50	3.06	3.24	0.810
0.75	3.32	2.98	0.745
1.00	3.63	2.67	0.668
1.50	4.18	2.12	0.530
2.00	4.65	1.65	0.413
3.00	5.29	1.01	0.253
4.00	5.69	0.61	0.153
5.00	5.92	0.38	0.095
7.00	6.15	0.15	0.038
9.00	6.21	0.09	0.023
12.00	6.23	0.07	0.018
15.00	6.24	0.06	0.015
20.00	6.24	0.06	0.015



REMARKS: Only managed to raise water level upto 2.30m with water supply on site

6226

In-Situ Permeability Test

Bh No

Fig No

TF80/218

48



Site RIVER WISSEY (LITTLE CRESSINGHAM)

Client NATIONAL RIVERS AUTHORITY

Date 06/02/95

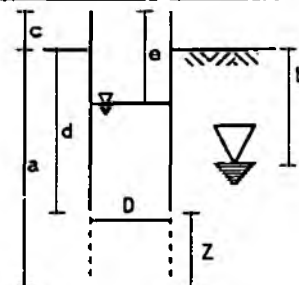
Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 18.00 m
 Depth to equilibrium watertable, b : 6.15 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 16.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level

Stiff grey clay with chalk fragments to 17.8m and
 firm white putty chalk to 18.0m



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

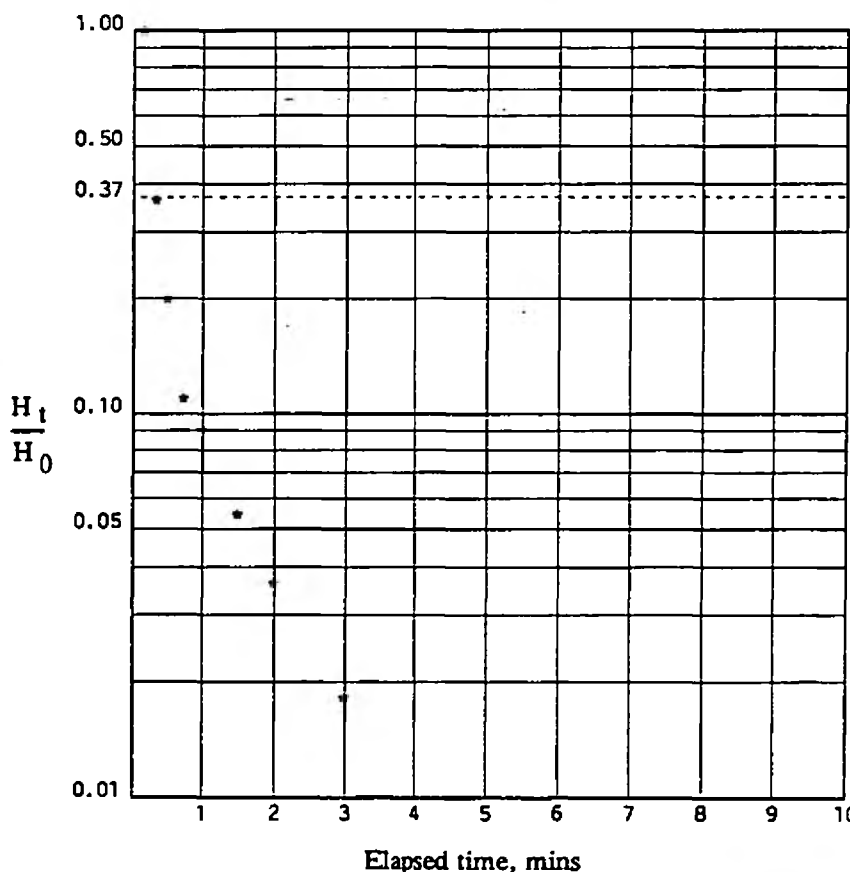
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 2.69E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	5.60	0.55	1.000
0.33	5.95	0.20	0.364
0.50	6.04	0.11	0.200
0.75	6.09	0.06	0.109
1.00	6.10	0.05	0.091
1.50	6.12	0.03	0.055
2.00	6.13	0.02	0.036
3.00	6.14	0.01	0.018
4.00	6.15	0.00	0.000
5.00	6.15	0.00	0.000
7.00	6.15	0.00	0.000



REMARKS: Could not raise water level above 5.6m due to flow rate

6226

In-Situ Permeability Test

Bh No

Ftg No

TF80/218

43

Site RIVER WISSEY (BODNEY BRIDGE)

Client NATIONAL RIVERS AUTHORITY

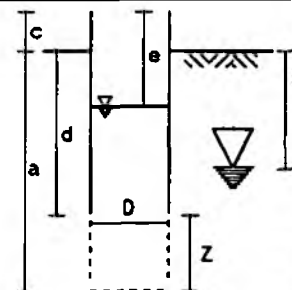
Date 02/03/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 6.50 m
 Depth to equilibrium watertable, b : 0.59 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 6.00 m
 Length of response zone, Z : 0.50 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 1.6372
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Soft white putty chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

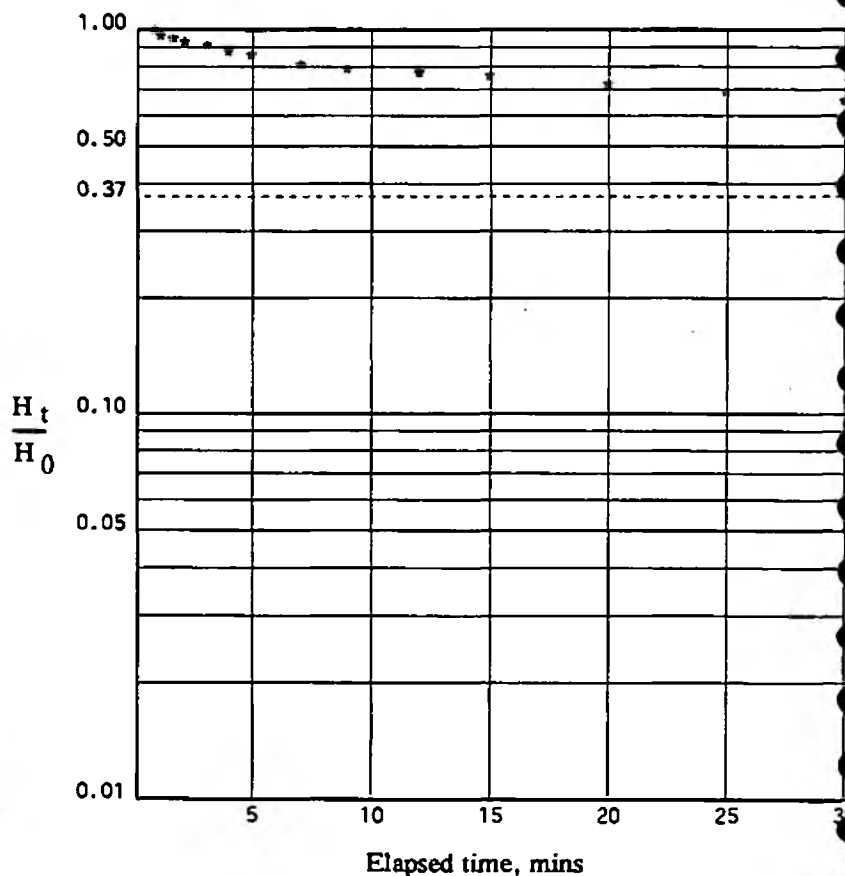
Plot log $\frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 1.90E-6 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.75	0.01	0.58	1.000
1.00	0.03	0.56	0.966
1.50	0.04	0.55	0.948
2.00	0.05	0.54	0.931
3.00	0.06	0.53	0.914
4.00	0.08	0.51	0.879
5.00	0.09	0.50	0.862
7.00	0.12	0.47	0.810
9.00	0.13	0.46	0.793
12.00	0.14	0.45	0.776
15.00	0.15	0.44	0.759
20.00	0.17	0.42	0.724
25.00	0.19	0.40	0.690
30.00	0.21	0.38	0.655



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TL89/118

5A



Site RIVER WISSEY (BODNEY BRIDGE)

Client NATIONAL RIVERS AUTHORITY

Date 02/03/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 6.50 m

Depth to equilibrium watertable, b : 0.59 m Measured

Height of casing above ground level, c : 0.00 m

Depth of casing below ground level, d : 4.65 m

Length of response zone, Z : 1.35 m

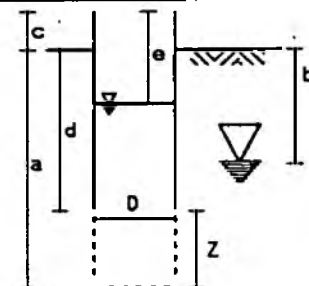
Diameter of response zone, D : 0.15 m

Intake factor, F : 3.3187

(From Figure 8, Note 5, BS5930:1981)

Soil Type at test level

Dense grey sand and gravel to 5.0m and soft white putty chalk to 6.5m



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

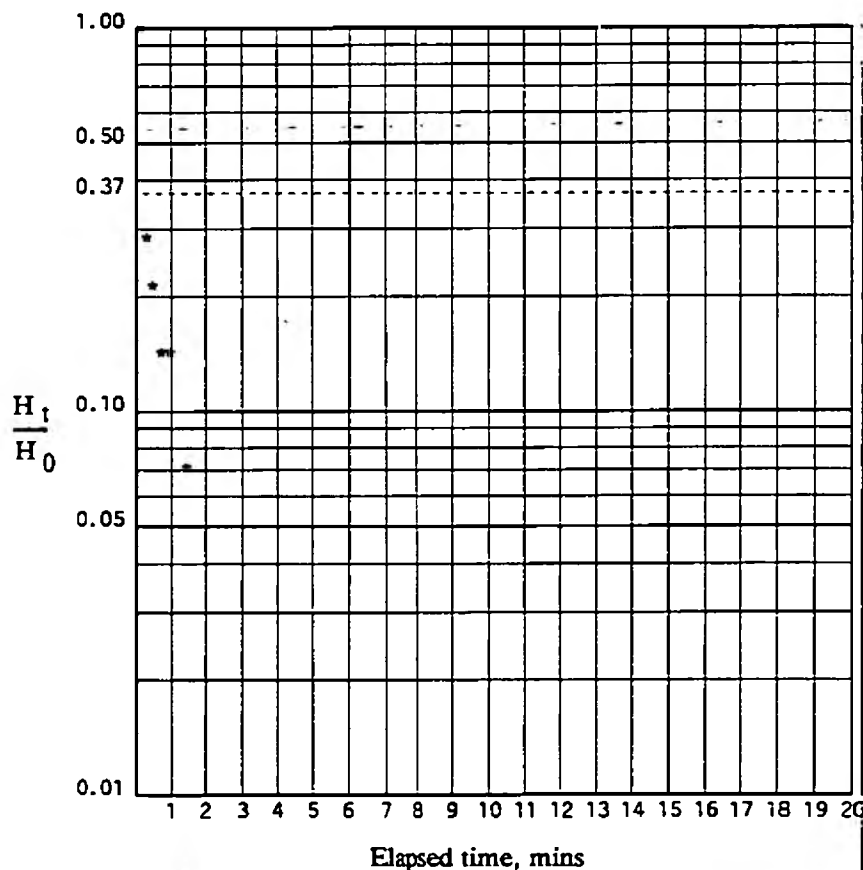
Plot log $\frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 3.55E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.45	0.14	1.000
0.33	0.55	0.04	0.286
0.50	0.56	0.03	0.214
0.75	0.57	0.02	0.143
1.00	0.57	0.02	0.143
1.50	0.58	0.01	0.071
2.00	0.59	0.00	0.000
3.00	0.59	0.00	0.000
4.00	0.59	0.00	0.000
5.00	0.59	0.00	0.000
7.00	0.59	0.00	0.000
9.00	0.59	0.00	0.000
12.00	0.59	0.00	0.000
15.00	0.59	0.00	0.000



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TL89/118

5A

Site RIVER WISSEY (BODNEY BRIDGE)

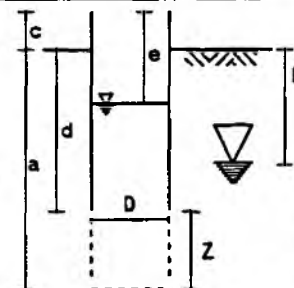
Client NATIONAL RIVERS AUTHORITY

Date 02/03/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 10.50 m
 Depth to equilibrium watertable, b : 3.14 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 9.00 m
 Length of response zone, Z : 1.50 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.1435
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

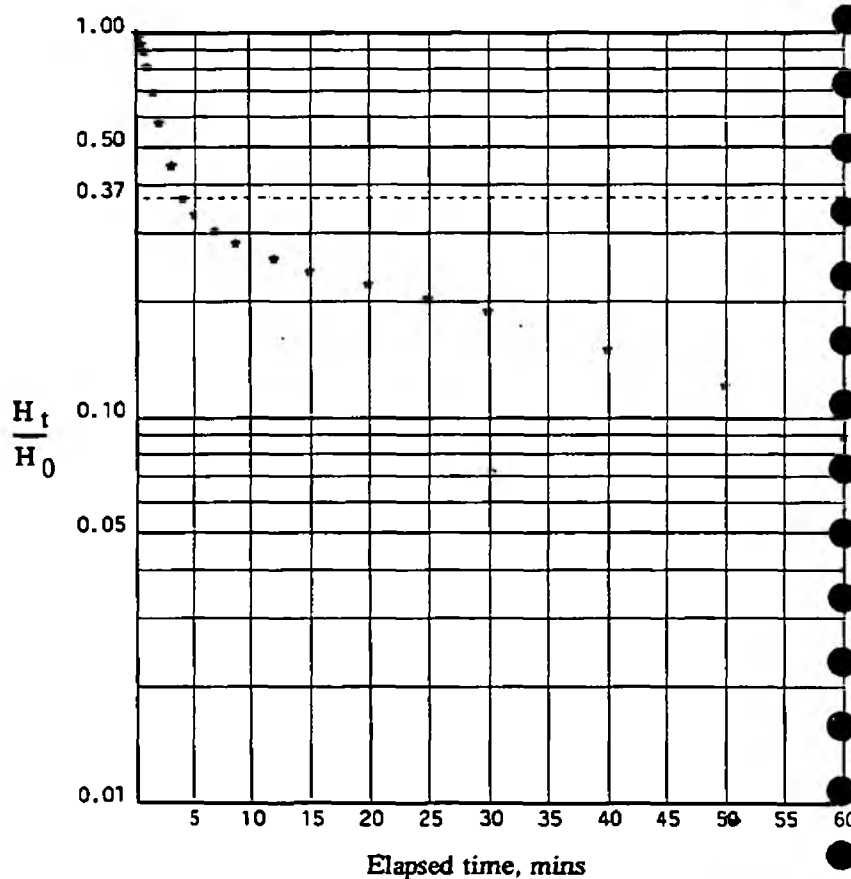
Plot log $\frac{H_t}{H_0}$ v t

then H_0

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 2.40E-5 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.34	2.80	1.000
0.33	0.41	2.73	0.975
0.50	0.52	2.62	0.936
0.75	0.64	2.50	0.893
1.00	0.87	2.27	0.811
1.50	1.19	1.95	0.696
2.00	1.52	1.62	0.579
3.00	1.89	1.25	0.446
4.00	2.11	1.03	0.368
5.00	2.20	0.94	0.336
7.00	2.29	0.85	0.304
9.00	2.35	0.79	0.282
12.00	2.42	0.72	0.257
15.00	2.47	0.67	0.239
20.00	2.52	0.62	0.221
25.00	2.57	0.57	0.204
30.00	2.61	0.53	0.189
40.00	2.72	0.42	0.150
50.00	2.80	0.34	0.121
60.00	2.89	0.25	0.089



REMARKS: Soft white putty chalk and rock chalk with flints

6226

In-Situ Permeability Test

Bh No

Fig No

TL89/119

58

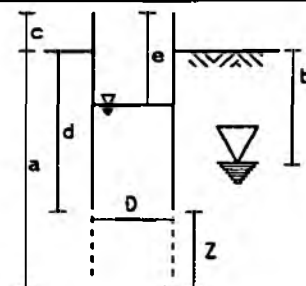
Site RIVER WISSEY (BODNEY BRIDGE)

Client NATIONAL RIVERS AUTHORITY

Date 02/03/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 10.00 m
 Depth to equilibrium watertable, b : 3.14 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 8.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

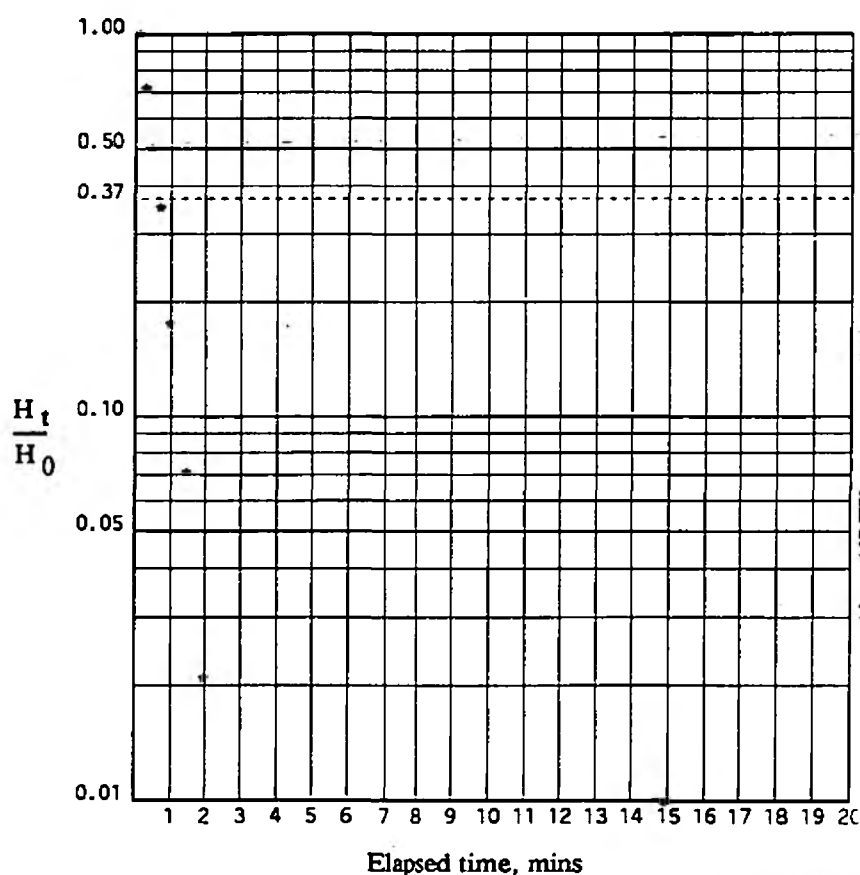
$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 1.27E-4 \text{ m/sec}$$

Soil Type at test level

Firm white putty chalk and rock chalk with flints

Elapsed time, t, mins	Depth to water, e, m	Head of water, H, m	Ht/Ho
0.16	0.75	2.39	1.000
0.33	1.42	1.72	0.720
0.50	1.94	1.20	0.502
0.75	2.30	0.84	0.351
1.00	2.72	0.42	0.176
1.50	2.97	0.17	0.071
2.00	3.09	0.05	0.021
3.00	3.14	0.00	0.000
4.00	3.14	0.00	0.000
5.00	3.14	0.00	0.000
7.00	3.14	0.00	0.000
9.00	3.14	0.00	0.000
12.00	3.14	0.00	0.000
15.00	3.14	0.00	0.000



REMARKS:

6226

In-Situ Permeability Test

Bh No

F1g No

TL89/119

5B

Site RIVER WISSEY (MUNDFORD)

Client NATIONAL RIVERS AUTHORITY

Date 01/03/95

Type of Test Falling Head

Level
m00

Depth of borehole during test, a : 29.00 m

Depth to equilibrium watertable, b : 0.70 m Measured

Height of casing above ground level, c : 0.00 m

Depth of casing below ground level, d : 29.00 m

Length of response zone, Z : 0.00 m

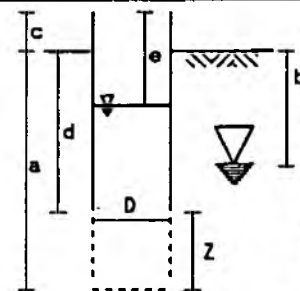
Diameter of response zone, D : 0.15 m

Intake factor, F : 0.4125

(From Condition B of fig. 7 BS5930:1991)

Soil Type at test level

Dense orange medium sand



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

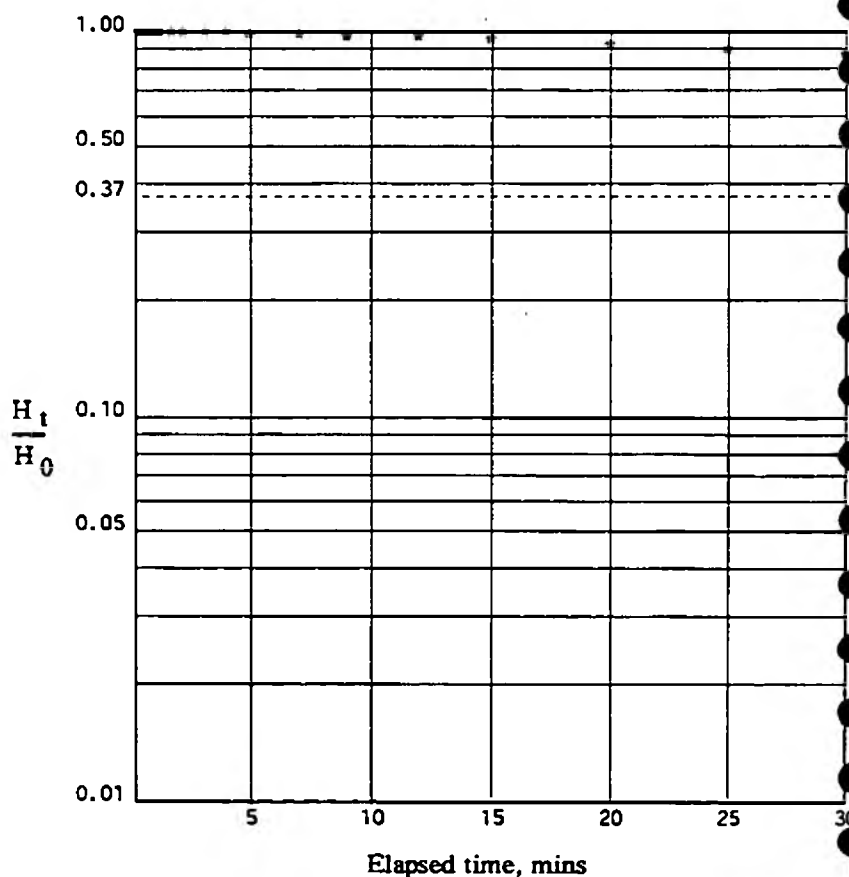
Plot log $\frac{H_t}{H_0}$ v t *-----*

then H_0

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 3.10E-6 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.01	0.69	1.000
0.33	0.01	0.69	1.000
0.50	0.01	0.69	1.000
0.75	0.01	0.69	1.000
1.00	0.01	0.69	1.000
1.50	0.01	0.69	1.000
2.00	0.01	0.69	1.000
3.00	0.01	0.69	1.000
4.00	0.01	0.69	1.000
5.00	0.02	0.68	0.986
7.00	0.02	0.68	0.986
9.00	0.03	0.67	0.971
12.00	0.03	0.67	0.971
15.00	0.04	0.66	0.957
20.00	0.06	0.64	0.928
25.00	0.08	0.62	0.899
30.00	0.10	0.60	0.870



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TL89/120

6A

Site RIVER WISSEY (MUNDFORD)

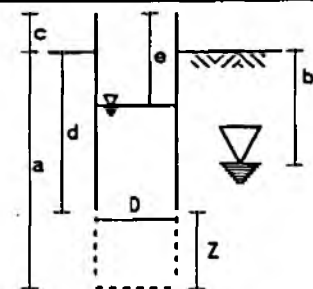
Client NATIONAL RIVERS AUTHORITY

Date 01/03/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 28.30 m
 Depth to equilibrium watertable, b : 0.70 m Measured
 Height of casing above ground level, c : 0.40 m
 Depth of casing below ground level, d : 27.15 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level
 Dense orange medium sand



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

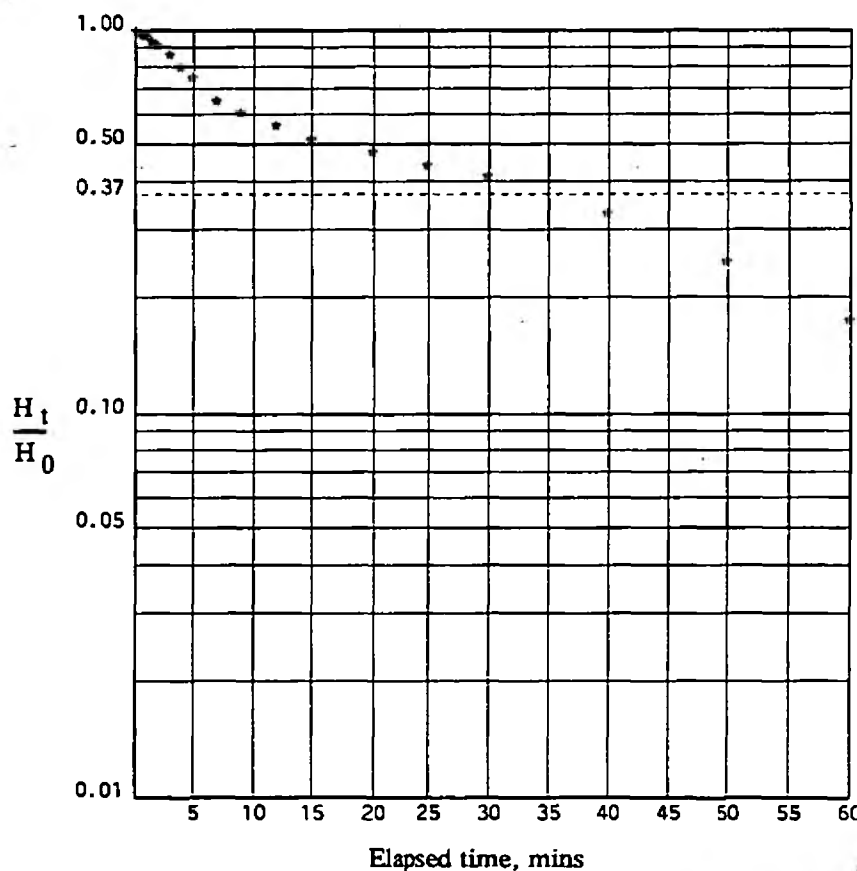
Plot $\log \frac{H_t}{H_0}$ v t

then $\frac{H_t}{H_0}$

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 2.5E-6 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.15	0.01	1.09	1.000
0.33	0.02	1.08	0.991
0.50	0.03	1.07	0.982
0.75	0.04	1.06	0.972
1.00	0.05	1.05	0.963
1.50	0.08	1.02	0.936
2.00	0.11	0.99	0.908
3.00	0.16	0.94	0.862
4.00	0.23	0.87	0.798
5.00	0.28	0.82	0.752
7.00	0.39	0.71	0.651
9.00	0.44	0.66	0.606
12.00	0.49	0.61	0.560
15.00	0.54	0.56	0.514
20.00	0.58	0.52	0.477
25.00	0.62	0.48	0.440
30.00	0.65	0.45	0.413
40.00	0.74	0.36	0.330
50.00	0.83	0.27	0.248
60.00	0.91	0.19	0.174



REMARKS:

6226

In-Situ Permeability Test

Bh No

TL89/120

Fig No

6A



Site RIVER WISSEY (MUNDFORD)

Client NATIONAL RIVERS AUTHORITY

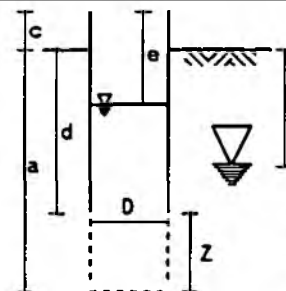
Date 24/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 10.50 m
 Depth to equilibrium watertable, b : 6.40 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 1.65 m
 Length of response zone, Z : 8.85 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 11.6556
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Firm white putty chalk and rock chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

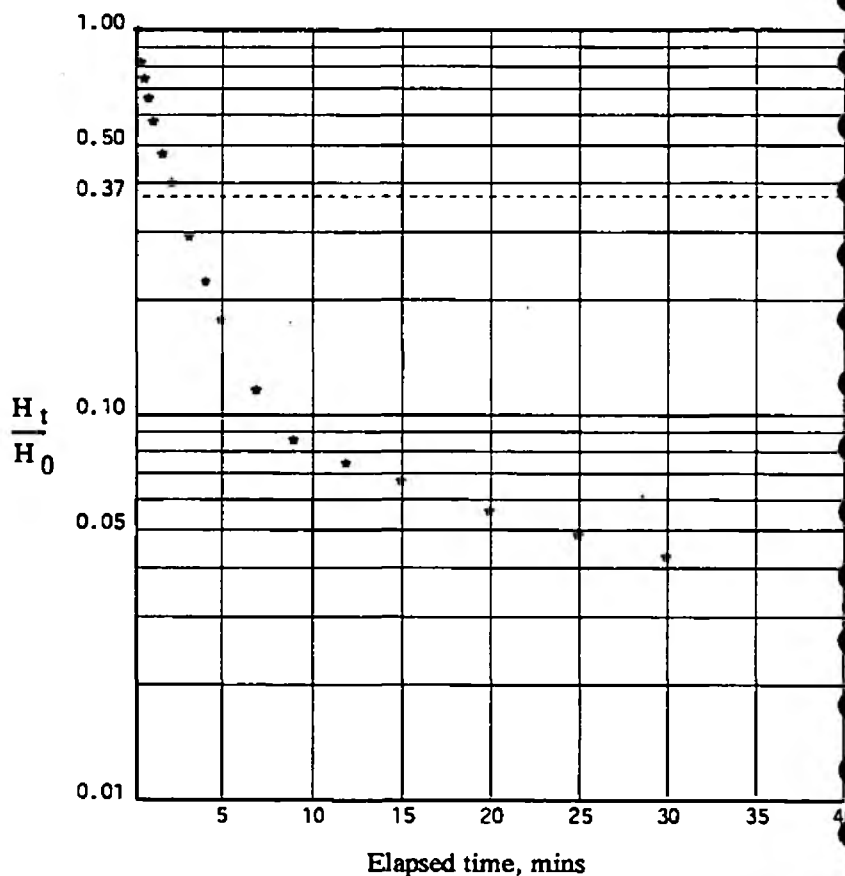
Plot $\log \frac{H_t}{H_0}$ v t

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 1.11E-5 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	1.04	5.36	1.000
0.33	2.00	4.40	0.821
0.50	2.40	4.00	0.746
0.75	2.85	3.55	0.662
1.00	3.30	3.10	0.578
1.50	3.85	2.55	0.476
2.00	4.25	2.15	0.401
3.00	4.83	1.57	0.293
4.00	5.20	1.20	0.224
5.00	5.45	0.95	0.177
7.00	5.78	0.62	0.116
9.00	5.94	0.46	0.086
12.00	6.00	0.40	0.075
15.00	6.04	0.36	0.067
20.00	6.10	0.30	0.056
25.00	6.14	0.26	0.049
30.00	6.17	0.23	0.043
40.00	6.20	0.20	0.037



REMARKS: Could not raise water level above 1.04m due to flow rate

6226

In-Situ Permeability Test

Bh No

Fig No

TL89/121

68

Site RIVER WISSEY (MUNDFORD)

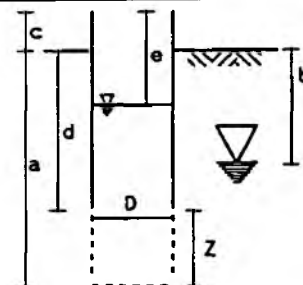
Client NATIONAL RIVERS AUTHORITY

Date 24/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 10.00 m
 Depth to equilibrium watertable, b : 6.40 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 8.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

Plot $\log \frac{H_t}{H_0}$ v t

then $\frac{H_t}{H_0}$

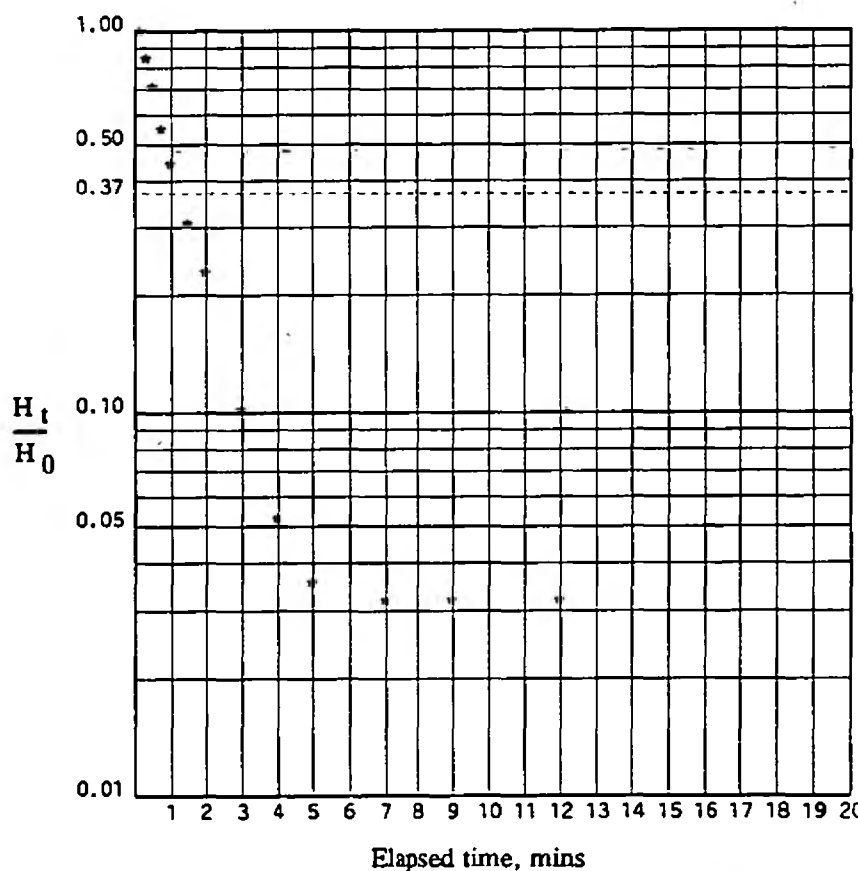
$$k = \frac{A}{60FT} \text{ m/sec}$$

Soil Type at test level

Firm white putty chalk and rock chalk

$$k = 6.67E-5 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	1.08	5.32	1.000
0.33	1.90	4.50	0.846
0.50	2.60	3.80	0.714
0.75	3.46	2.94	0.553
1.00	4.03	2.37	0.445
1.50	4.76	1.64	0.308
2.00	5.18	1.22	0.229
3.00	5.86	0.54	0.102
4.00	6.12	0.28	0.053
5.00	6.21	0.19	0.036
7.00	6.23	0.17	0.032
9.00	6.23	0.17	0.032
12.00	6.23	0.17	0.032



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TL89/121

6B

Site RIVER WISSEY (COCKLEY CLEY)

Client NATIONAL RIVERS AUTHORITY

Date 13/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 10.50 m

Depth to equilibrium watertable, b : 2.80 m Measured

Height of casing above ground level, c : 0.00 m

Depth of casing below ground level, d : 5.20 m

Length of response zone, Z : 4.30 m

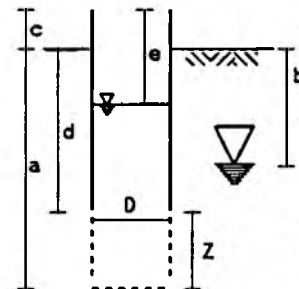
Diameter of response zone, D : 0.15 m

Intake factor, F : 6.6724

(From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Firm white putty chalk and rock chalk fragments



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

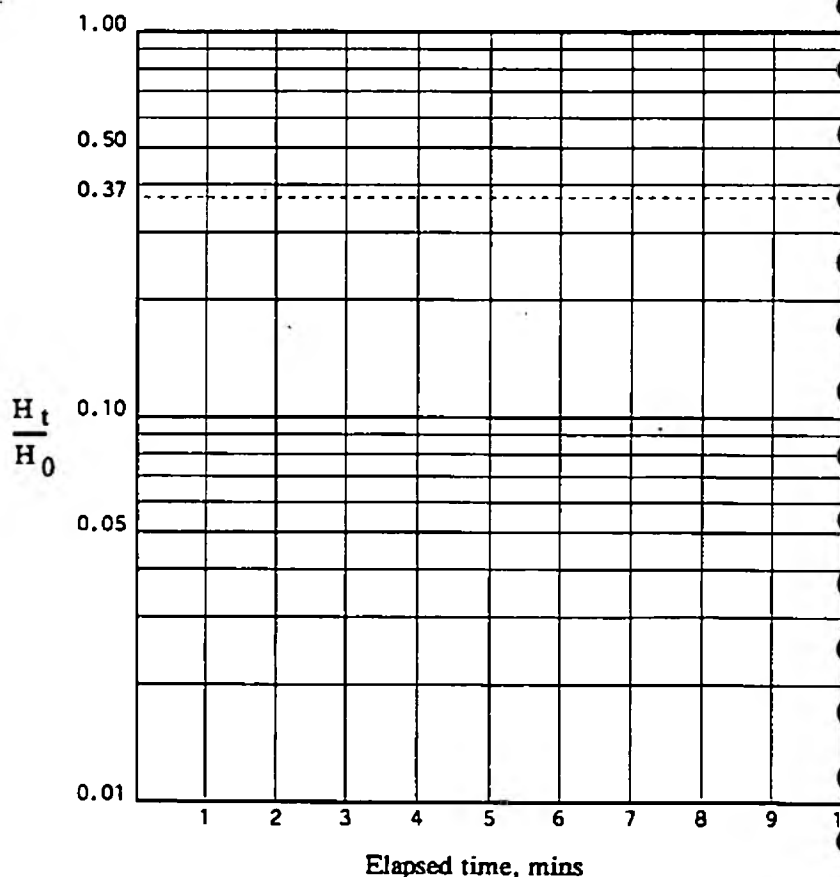
Plot log $\frac{H_t}{H_0}$ v t *.....*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

k = m/sec

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	2.80	0.00	1.000
0.33	2.80	0.00	1.000
0.50	2.80	0.00	1.000
0.75	2.80	0.00	1.000
1.00	2.80	0.00	1.000



REMARKS: Could not raise water level above 2.80m due to flow rate

6226

In-Situ Permeability Test

Bh No

Fig No

TF70/126

7A

Site RIVER WISSEY (COCKLEY CLEY)

Client NATIONAL RIVERS AUTHORITY

Date 13/02/95

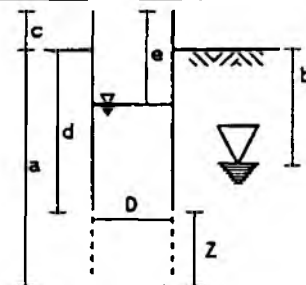
Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 10.00 m
 Depth to equilibrium watertable, b : 2.79 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 8.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level:

Firm white putty chalk and rock chalk fragments



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

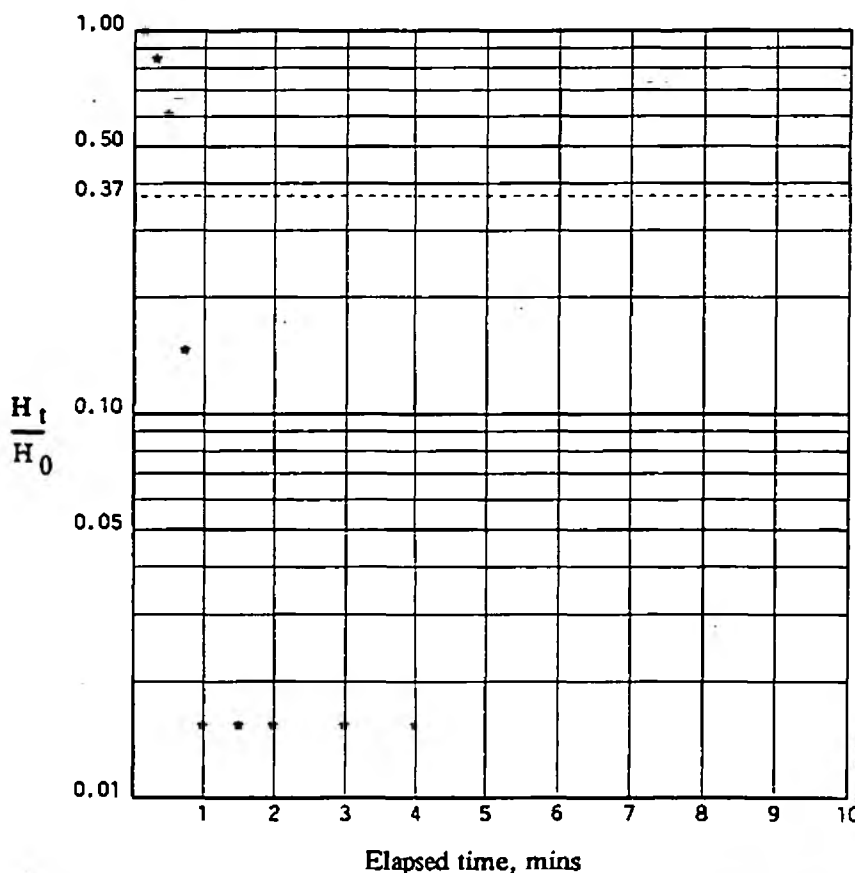
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 1.61E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	1.49	1.30	1.000
0.33	1.69	1.10	0.846
0.50	2.00	0.79	0.608
0.75	2.60	0.19	0.146
1.00	2.77	0.02	0.015
1.50	2.77	0.02	0.015
2.00	2.77	0.02	0.015
3.00	2.77	0.02	0.015
4.00	2.77	0.02	0.015



REMARKS: Could not raise water level above 1.49m due to flow rate

5225

In-Situ Permeability Test

Bh No

F1g No

TF70/126

7A

Site RIVER WISSEY (COCKLEY CLEY)

Client NATIONAL RIVERS AUTHORITY

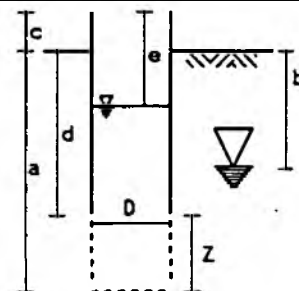
Date 15/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 20.50 m
 Depth to equilibrium watertable, b : 12.70 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 1.50 m
 Length of response zone, Z : 8.50 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 11.2901
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Dense white rock chalk with flints



PERMEABILITY(after Hvorslev 1951)

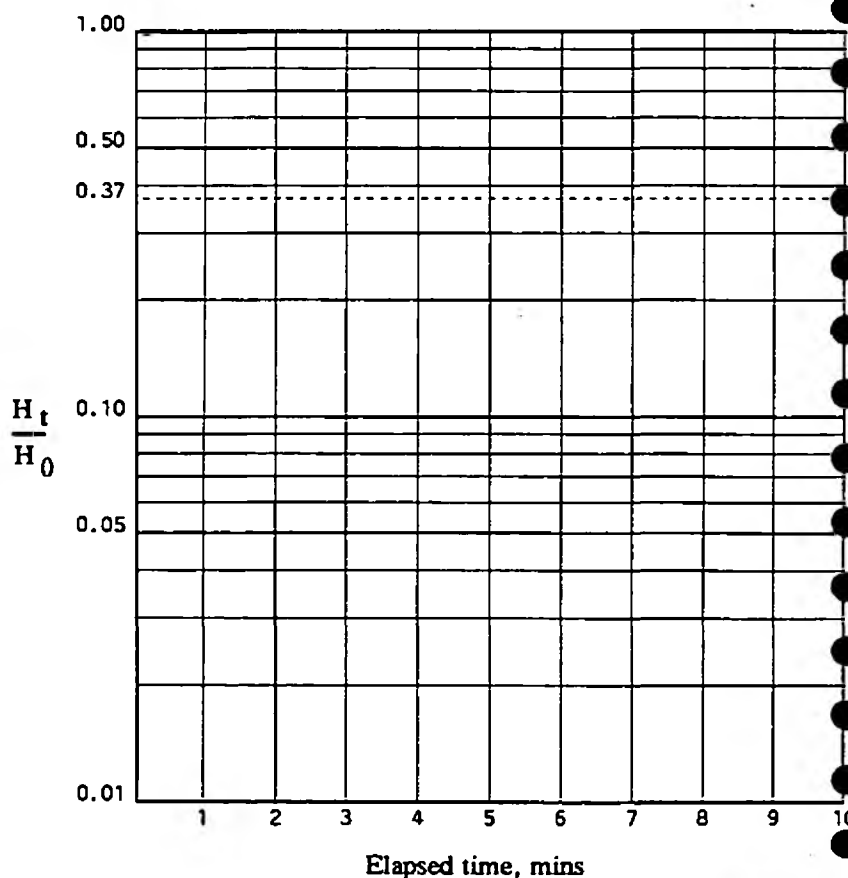
Basic Time Lag Approach

Plot $\log \frac{H_t}{H_0}$ v t -----
 then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$k =$ m/sec

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	12.00	0.70	1.000
0.33	12.70	0.00	0.000
0.50	12.70	0.00	0.000
0.75	12.70	0.00	0.000
1.00	12.70	0.00	0.000
1.50	12.70	0.00	0.000
2.00	12.70	0.00	0.000



REMARKS: Could not raise water level above 12.0m due to flow rate

6226

In-Situ Permeability Test

Bh No

Fig No

TF70/127

7B



Site RIVER WISSEY (COCKLEY CLEY)

Client NATIONAL RIVERS AUTHORITY

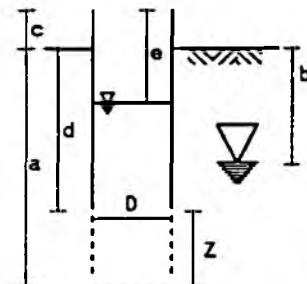
Date 15/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 20.00 m
 Depth to equilibrium watertable, b : 12.70 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 18.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level

Dense white rock chalk with flints



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

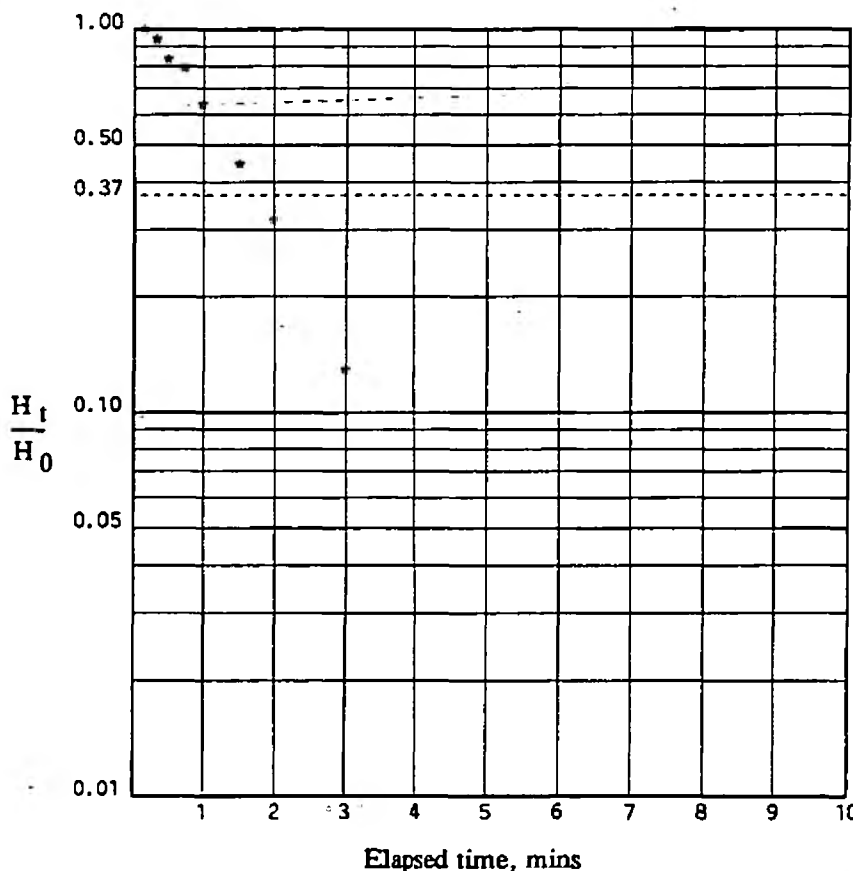
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 4.87E-5 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	1.10	11.60	1.000
0.33	1.80	10.90	0.940
0.50	3.00	9.70	0.836
0.75	3.51	9.19	0.792
1.00	5.30	7.40	0.638
1.50	7.52	5.18	0.447
2.00	9.00	3.70	0.319
3.00	11.20	1.50	0.129
4.00	12.70	0.00	0.000
5.00	12.70	0.00	0.000



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TF70/127

7B

Site RIVER WISSEY (GOODERSTONE)

Client NATIONAL RIVERS AUTHORITY

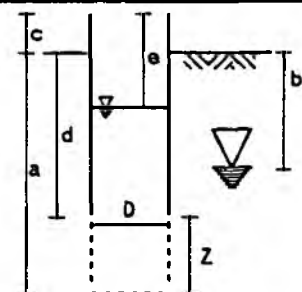
Date 20/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 13.00 m
 Depth to equilibrium watertable, b : 8.00 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 0.00 m
 Length of response zone, Z : 7.30 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 10.0185
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Dense white putty chalk and rock chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

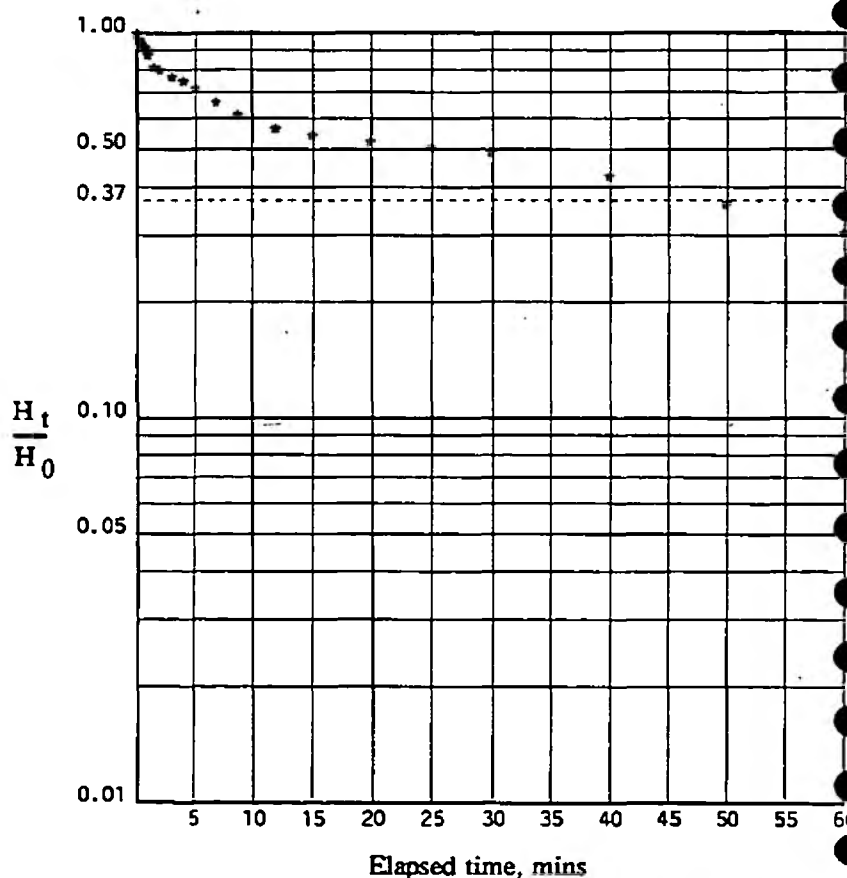
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 5.00E-7 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	5.70	2.30	1.000
0.33	5.79	2.21	0.961
0.50	5.84	2.16	0.939
0.75	5.89	2.11	0.917
1.00	5.99	2.01	0.874
1.50	6.13	1.87	0.813
2.00	6.16	1.84	0.800
3.00	6.24	1.76	0.765
4.00	6.28	1.72	0.748
5.00	6.35	1.65	0.717
7.00	6.48	1.52	0.661
9.00	6.59	1.41	0.613
12.00	6.70	1.30	0.565
15.00	6.75	1.25	0.543
20.00	6.80	1.20	0.522
25.00	6.84	1.16	0.504
30.00	6.87	1.13	0.491
40.00	7.02	0.98	0.426
50.00	7.17	0.83	0.361
60.00	7.30	0.70	0.304



REMARKS: Could not raise water level above 5.70m with the water supply on site

6226

In-Situ Permeability Test

Bh No

Fig No

TF70/128

8B

Site RIVER WISSEY (GOODERSTONE)

Client NATIONAL RIVERS AUTHORITY

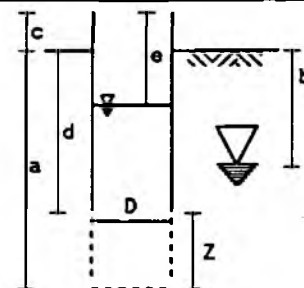
Date 20/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 12.50 m
 Depth to equilibrium watertable, b : 8.00 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 11.15 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level

Dense white rock chalk with some putty chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

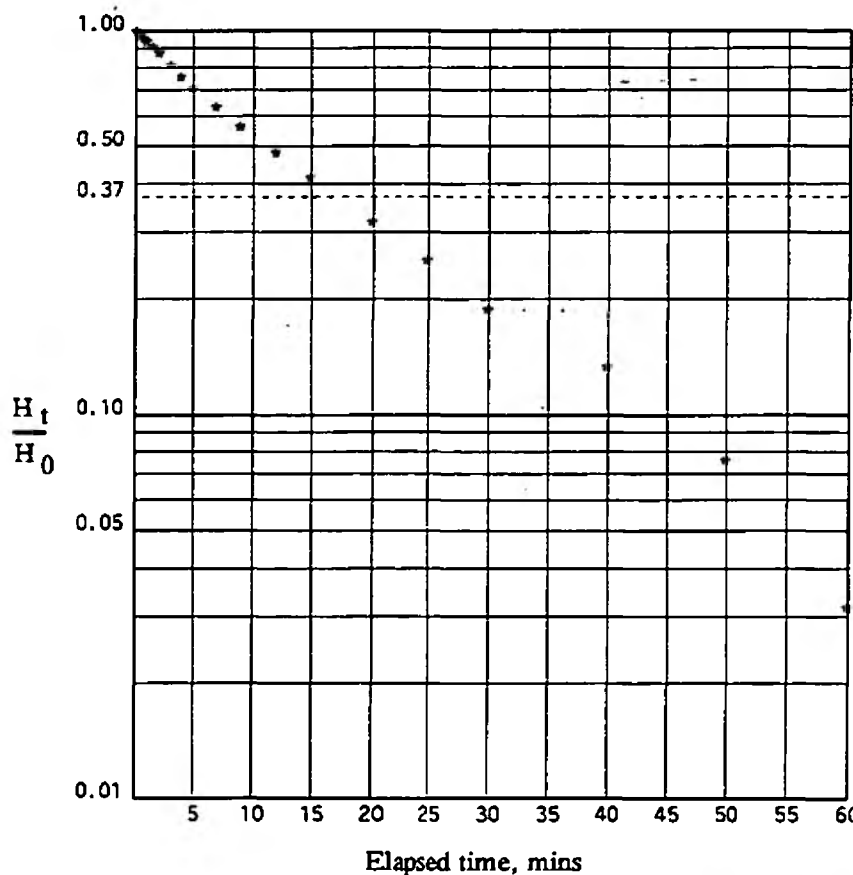
Plot log $\frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 5.20E-6 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.10	7.90	1.000
0.33	0.22	7.78	0.985
0.50	0.34	7.66	0.970
0.75	0.47	7.53	0.953
1.00	0.60	7.40	0.937
1.50	0.84	7.16	0.906
2.00	1.10	6.90	0.873
3.00	1.59	6.41	0.811
4.00	2.01	5.99	0.758
5.00	2.43	5.57	0.705
7.00	3.01	4.99	0.632
9.00	3.56	4.44	0.562
12.00	4.19	3.81	0.482
15.00	4.72	3.28	0.415
20.00	5.48	2.52	0.319
25.00	6.00	2.00	0.253
30.00	6.52	1.48	0.187
40.00	6.95	1.05	0.133
50.00	7.40	0.60	0.076
60.00	7.75	0.25	0.032



REMARKS:

6226

In-Situ Permeability Test

Bh No

TF70/128

Fig No

88

Site RIVER WISSEY (FURZE HILL)

Client NATIONAL RIVERS AUTHORITY

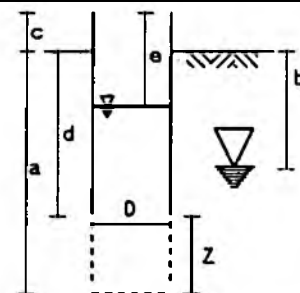
Date 22/02/95 Type of Test Falling Head

Level
m00

Depth of borehole during test, a : 6.50 m
 Depth to equilibrium watertable, b : 2.10 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 6.00 m
 Length of response zone, Z : 0.50 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 1.6372
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Dense white rock chalk



PERMEABILITY(after Hvorslev 1951)

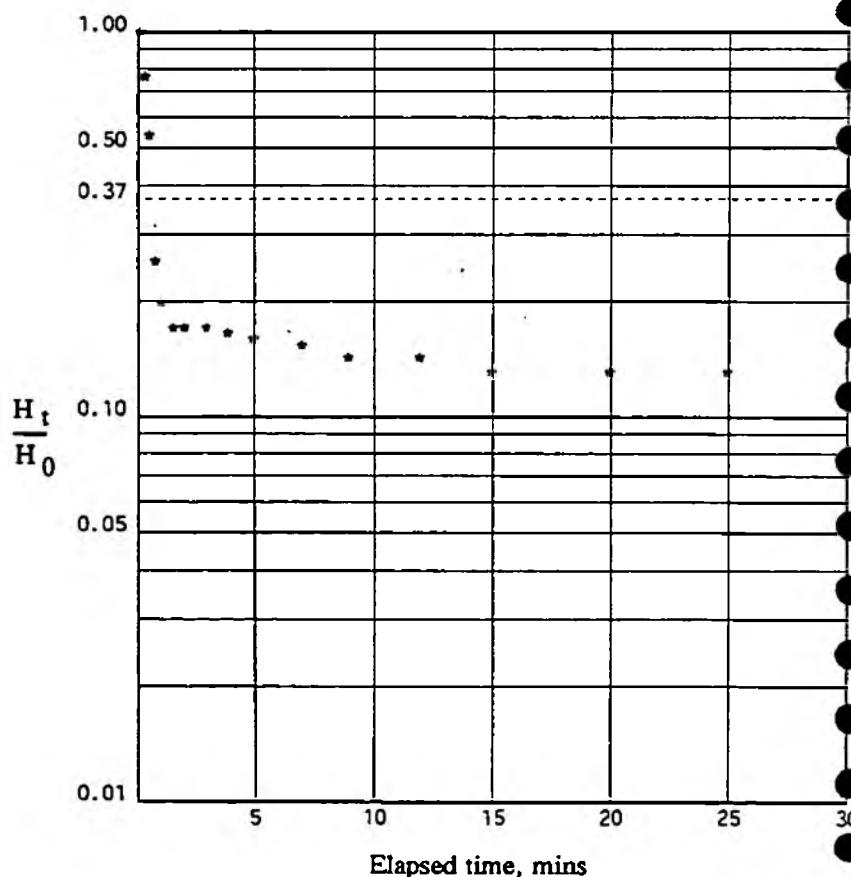
Basic Time Lag Approach

Plot $\log \frac{H_t}{H_0}$ v t
 then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 3.27E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.34	1.76	1.000
0.33	0.75	1.35	0.767
0.50	1.15	0.95	0.540
0.75	1.65	0.45	0.256
1.00	1.75	0.35	0.199
1.50	1.80	0.30	0.170
2.00	1.80	0.30	0.170
3.00	1.80	0.30	0.170
4.00	1.81	0.29	0.165
5.00	1.82	0.28	0.159
7.00	1.83	0.27	0.153
9.00	1.85	0.25	0.142
12.00	1.85	0.25	0.142
15.00	1.87	0.23	0.131
20.00	1.87	0.23	0.131
25.00	1.87	0.23	0.131



REMARKS:

6226

In-Situ Permeability Test

Bh No

- TF70/129

Fig No

9A



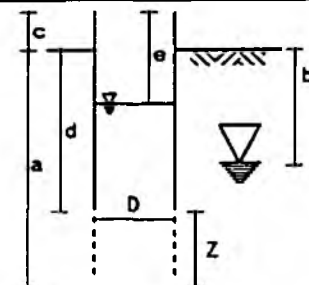
Site RIVER WISSEY (FURZE HILL)

Client NATIONAL RIVERS AUTHORITY

Date 22/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 6.00 m
 Depth to equilibrium watertable, b : 2.10 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 4.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

Plot log $\frac{H_t}{H_0}$ v t *-----*

then H_0

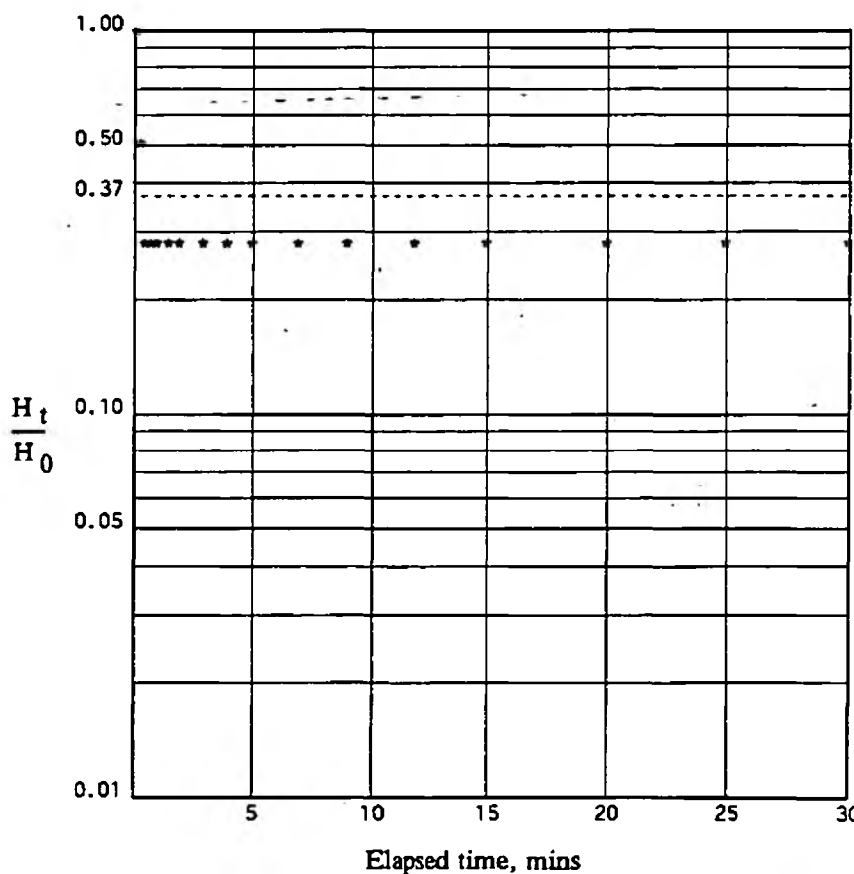
$$k = \frac{A}{60FT} \text{ m/sec}$$

Soil Type at test level

Dense white rock chalk

$$k = 2.69E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	1.35	0.75	1.000
0.33	1.72	0.38	0.507
0.50	1.89	0.21	0.280
0.75	1.89	0.21	0.280
1.00	1.89	0.21	0.280
1.50	1.89	0.21	0.280
2.00	1.89	0.21	0.280
3.00	1.89	0.21	0.280
4.00	1.89	0.21	0.280
5.00	1.89	0.21	0.280
7.00	1.89	0.21	0.280
9.00	1.89	0.21	0.280
12.00	1.89	0.21	0.280
15.00	1.89	0.21	0.280
20.00	1.89	0.21	0.280
25.00	1.89	0.21	0.280
30.00	1.89	0.21	0.280



REMARKS:

6226

In-Situ Permeability Test

Bh No

TF70/129

Fig No

9A

Site RIVER WISSEY (FURZE HILL)

Client NATIONAL RIVERS AUTHORITY

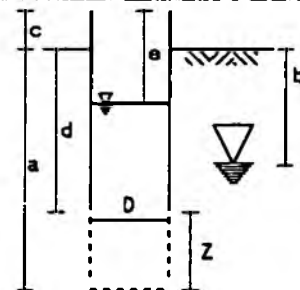
Date 22/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 8.50 m
 Depth to equilibrium watertable, b : 2.50 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 7.90 m
 Length of response zone, Z : 0.60 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 1.7997
 (From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Dense white rock chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

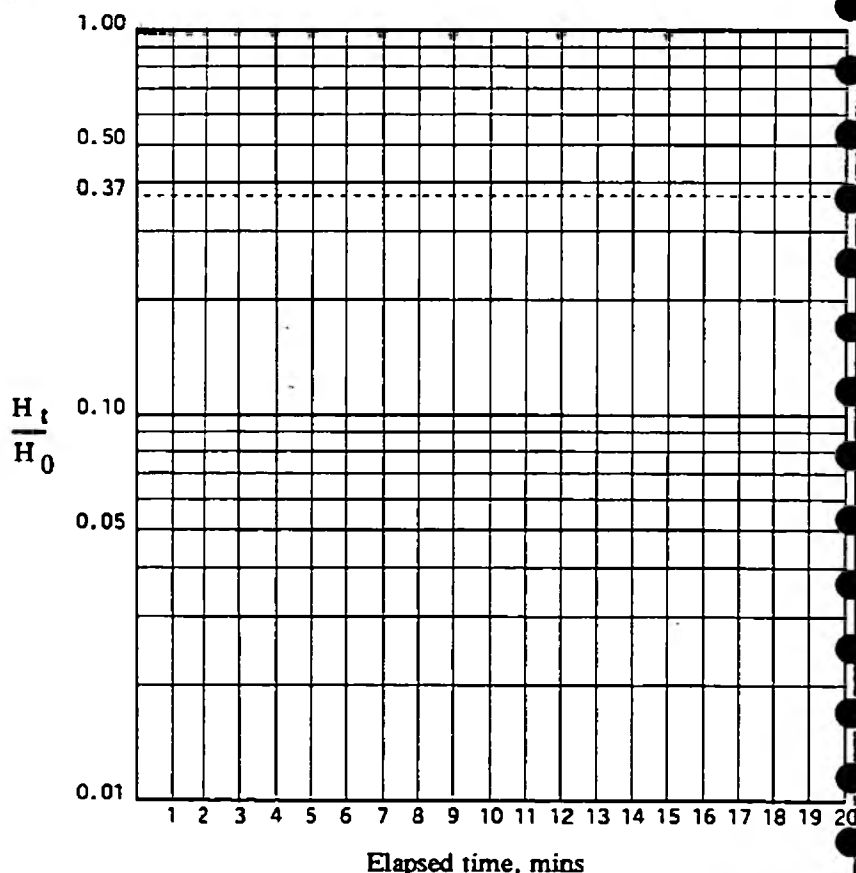
Plot log $\frac{H_t}{H_0}$ v t

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 3.00E-7 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.05	2.45	1.000
0.33	0.06	2.44	0.996
0.50	0.07	2.43	0.992
0.75	0.07	2.43	0.992
1.00	0.07	2.43	0.992
1.50	0.07	2.43	0.992
2.00	0.07	2.43	0.992
3.00	0.08	2.42	0.988
4.00	0.09	2.41	0.984
5.00	0.10	2.40	0.980
7.00	0.11	2.39	0.976
9.00	0.13	2.37	0.967
12.00	0.13	2.37	0.967
15.00	0.14	2.36	0.963



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

TF70/130

9B



Site RIVER WISSEY (FURZE HILL)

Client NATIONAL RIVERS AUTHORITY

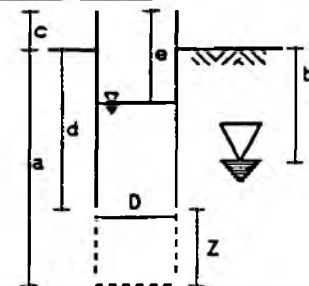
Date 23/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 8.00 m
 Depth to equilibrium watertable, b : 2.50 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 6.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level
 Dense white rock chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

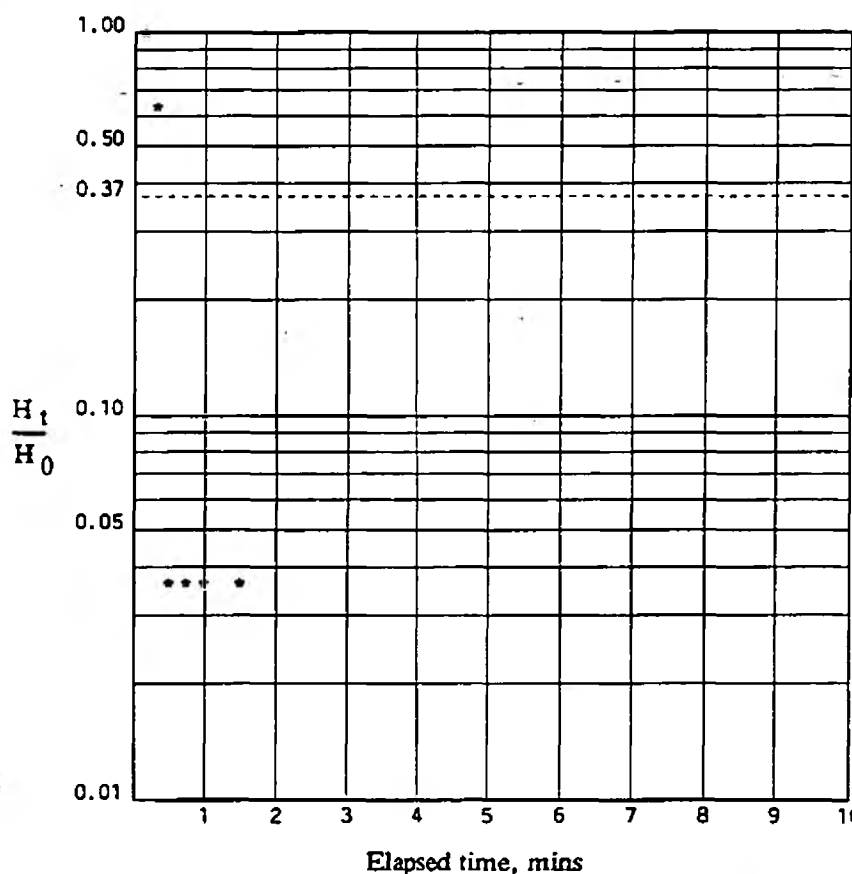
Plot $\log \frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 2.69E-4 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	1.95	0.55	1.000
0.33	2.15	0.35	0.636
0.50	2.48	0.02	0.036
0.75	2.48	0.02	0.036
1.00	2.48	0.02	0.036
1.50	2.48	0.02	0.036
2.00	2.50	0.00	0.000



REMARKS:

6226

In-Situ Permeability Test

Bh No

TF70/130

F1g No

9B

Site RIVER WISSEY (STRINGSIDE DROVE)

Client NATIONAL RIVERS AUTHORITY

Date 23/02/95

Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 8.50 m

Depth to equilibrium watertable, b : 2.35 m Measured

Height of casing above ground level, c : 0.00 m

Depth of casing below ground level, d : 7.50 m

Length of response zone, Z : 1.00 m

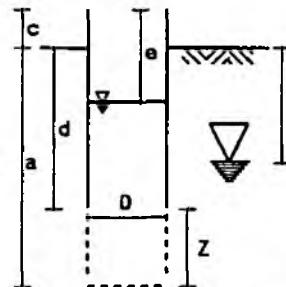
Diameter of response zone, D : 0.15 m

Intake factor, F : 2.4205

(From Condition D of fig. 7 BS5930:1981)

Soil Type at test level

Firm brown white putty chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

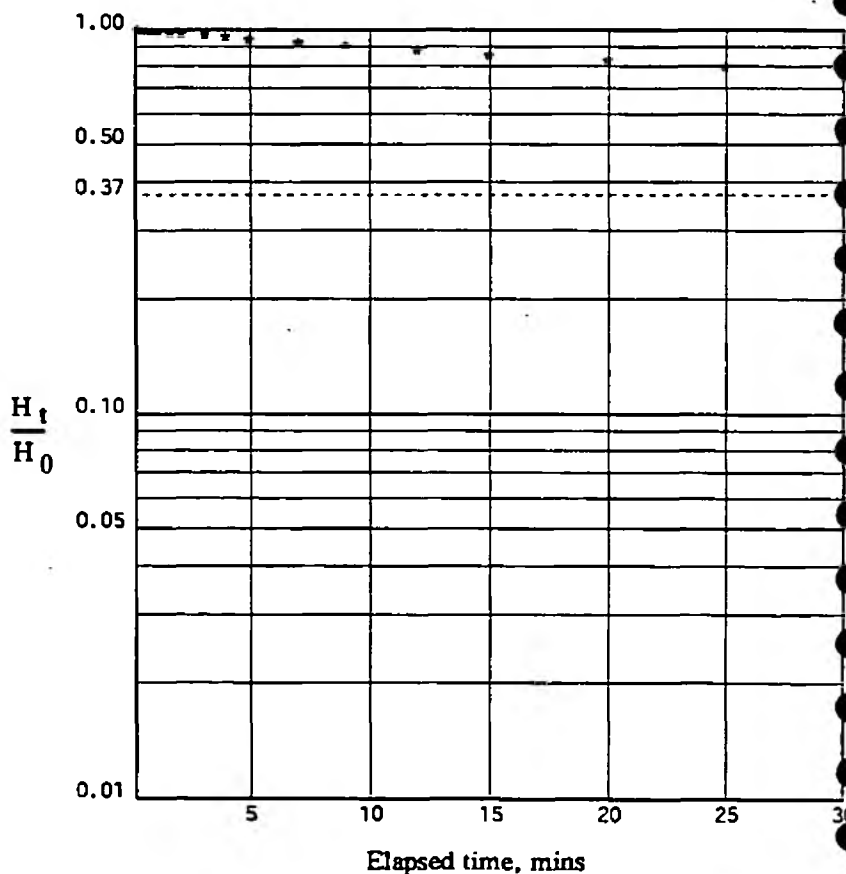
Plot log $\frac{H_t}{H_0}$ v t *-----*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 8.00E-7 \text{ m/sec}$$

Elapsed time, t mins.	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.01	2.34	1.000
0.33	0.02	2.33	0.996
0.50	0.03	2.32	0.991
0.75	0.04	2.31	0.987
1.00	0.05	2.30	0.983
1.50	0.06	2.29	0.979
2.00	0.07	2.28	0.974
3.00	0.09	2.26	0.966
4.00	0.11	2.24	0.957
5.00	0.15	2.20	0.940
7.00	0.19	2.16	0.923
9.00	0.23	2.12	0.906
12.00	0.29	2.06	0.880
15.00	0.35	2.00	0.855
20.00	0.41	1.94	0.829
25.00	0.48	1.87	0.799
30.00	0.50	1.85	0.791



REMARKS:

6226

In-Situ Permeability Test

Bh No

Fig No

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Site RIVER WISSEY (STRINGSIDE DROVE)

Client NATIONAL RIVERS AUTHORITY

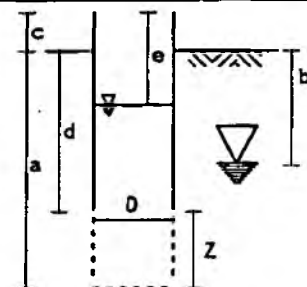
Date 23/02/95 Type of Test Falling Head

Level
mOD

Depth of borehole during test, a : 8.00 m
 Depth to equilibrium watertable, b : 0.63 m Measured
 Height of casing above ground level, c : 0.00 m
 Depth of casing below ground level, d : 6.65 m
 Length of response zone, Z : 1.35 m
 Diameter of response zone, D : 0.15 m
 Intake factor, F : 3.3187
 (From Figure 8, Note 5, BS5930:1981)

Soil Type at test level

Firm brown white putty chalk



PERMEABILITY(after Hvorslev 1951)

Basic Time Lag Approach

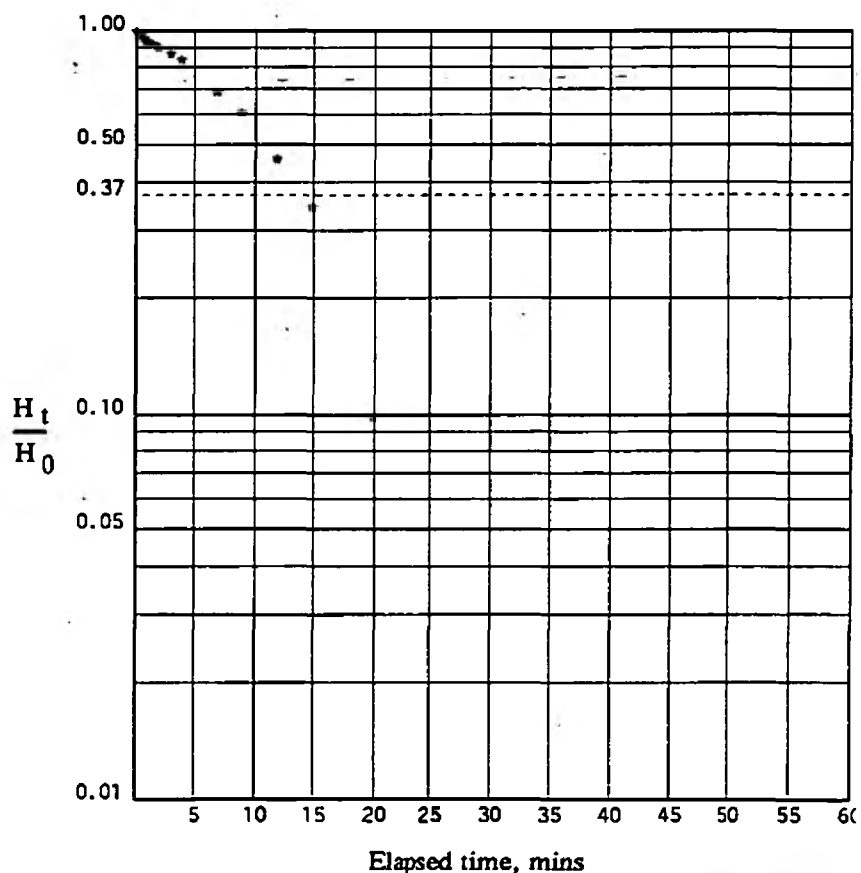
Plot log $\frac{H_t}{H_0}$ v t *.....*

then

$$k = \frac{A}{60FT} \text{ m/sec}$$

$$k = 6.30E-6 \text{ m/sec}$$

Elapsed time, t mins	Depth to water, e m	Head of water, H m	Ht/Ho
0.16	0.02	0.61	1.000
0.33	0.03	0.60	0.984
0.50	0.04	0.59	0.967
0.75	0.05	0.58	0.951
1.00	0.06	0.57	0.934
1.50	0.07	0.56	0.918
2.00	0.08	0.55	0.902
3.00	0.10	0.53	0.869
4.00	0.12	0.51	0.836
7.00	0.21	0.42	0.689
9.00	0.26	0.37	0.607
12.00	0.35	0.28	0.459
15.00	0.42	0.21	0.344
20.00	0.57	0.06	0.098
25.00	0.69	-0.06	-0.098
30.00	0.78	-0.15	-0.246
40.00	0.98	-0.35	-0.574
50.00	1.13	-0.50	-0.820
60.00	1.39	-0.76	-1.246



REMARKS:

6226

In-Situ Permeability Test

Bh No

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Fig No

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