

APPENDIX 7

BGS BOREHOLE LOGS

MAU Sand and Gravel Borehole Log Form

British Geological Survey

Quarry Chryd

River Division

SJ 34 NE 42

QR 3810 4926

Block

Surface level

O.D. 25m.

LOG

Geological Classification	Lithology	Thickness		Depth	
		m	ft	m	ft
	Soil			0.3	
	Hard Boulder clay	0.3	-	37.0	
	Running sand.	37.6	-	51m	
	Cobbles.	51m	-	51.3m	
	Cobbles + Gravel.	51.3m	-	52m	
	Boulder clay	53m	-	58.2m	
	Gravel.	58.2m	-	59.6	
Bedrock?	Red silt.	59.6		60.5m	

British Geological Survey
BOREHOLE RECORD SHEET

ST 34 NE / USA

3761 4835
British Geological Survey

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD. MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637										BOREHOLE No.1	
Job No.: 2688 Location: WREXHAM INDUSTRIAL ESTATE										Sheet 1 of 2	
Client: VERNARD AND PARTNERS										Scale: 1:50 Diam. & Boring Type 150MM SEA	
Description of Strata	Reduced Level	Legend	Thickness (m)	Depth (m)	Samples		N Value	Apparent Cohesion kN/m ²	Angle of Shear	Daily Progress Water Levels Remarks	
	Ground Level				from	to	Type				
Clay FILL.	100.232		0.30	0.30						(13-4-84) 2 hours to dig trial pit to 1.00m	
Stiff, light brown/grey mottled, silty, slightly sandy CLAY with flecks of coal.					0.50	0.60	D ₁				
					0.50	0.60	B ₁				
					1.00	1.45	U ₁				
	99.372		0.90	1.20							
Very stiff, medium brown, slightly sandy, silty, fissured CLAY with a little fine gravel (slightly laminated). The fissures are mainly vertical and are present as a thin veining of fine, grey, silty clay with fine rootlets.					1.50		D ₂			DMY (14-4-84) DMY 19-4 a.m. 20-4 p.m. 2.15-4 p.m. 2.00-2.45 18-4 a.m. 0.0-2.30 0.0-2.5 17-4 p.m. 17-4 2.40 0.0 3.05 (1.30 p.m.)	
From 4.00m occasional pockets of fine sand.					2.00	2.45	U ₂				
4.00 to 4.45m stiff only.					2.45		D ₃				
					3.00	3.45	U ₃				
					3.45		D ₄				
					4.00	4.45	U ₄				
					4.45		D ₅			16-4 p.m. 0.0 4.50	
					5.00	5.45	U ₅			16-4 noon 0.0 5.20	
					5.45		D ₆				
					5.75	6.00	D ₇			16-4 .m. 0.0 5.90	
					6.50	6.95	U ₆				
					7.25	7.45	D ₈				
					8.00	8.45	U ₇				
					8.45		D ₉				
					8.75	9.00	D ₁₀				
					9.50	9.95	U ₈				
Stiff only at 9.95m	90.532		(8.80)	10.00	9.95		D ₁₁				
Borehole incomplete @ 10.00m.											

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

ST 34 NE / 45A

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD. MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637										BOREHOLE No.1	
Job No.: 2688 Location: WREXHAM INDUSTRIAL ESTATE										Sheet 2 of 2	
Client: VERNARD AND PARTNERS										Scale: 1:50 Diam. & Boring Type 150mm S&A	
Description of Strata	Reduced Level	Legend	Thick- ness (m)	Depth (m)	Samples			Z Value	Apparent Conc KN/m ²	° degrees	Daily Progress Water Levels Remarks
					from	to	Type				
Ground Level	90.532										
Stiff, brown, very silty CLAY.	90.335	X	9.00	10.20	10.25	10.50	D ₂				(14-4-84) Slight water entries at 10.20m.
Turn to stiff, brown, laminated clayey silt with pockets of sand	90.125	X	0.20	10.40							
Firm to stiff, brown, very silty slightly sandy, slightly gravelly, laminated CLAY.		X			11.00	11.45	U ₉				
		X			11.45		D ₃				
		X			11.75	12.05	D ₄				
		X			12.30		W ₁				
		X			12.50	12.95	U ₁₀				15-4 (24) 13.0 12.7 Dry
Stiff from 12.50m		X									(15-4-84)
		X			13.50	13.80	D ₁₅				
		X			14.00	14.45	U ₁₁				
sandy at 14.45m.		X			14.45		D ₁₆				
		X			14.75	15.00	D ₁₇				
		X			15.50	15.95	U ₁₂				15-4 16.2 15.3
		X			16.25	16.50	D ₁₈				
		X			16.50	17.45	U ₁₃				
Very stiff at 17.00m		X									
	82.932	X	7.20	17.60	17.60	18.05	P, T ₈				F 16.8 17.6
Very dense, reddish brown, s. clayey, gravelly, medium SAND.	82.435	X	0.50	18.10							
Borehole complete @ 18.10m.											

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

ST 34 NE 458

British Geological Survey

3365 4975

British Geological Survey

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD. MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637										BOREHOLE No. 2											
Job No.: 2688 Location: HIREHAM INDUSTRIAL ESTATE Client: VEVARD AND PARTNERS										Sheet 1 of 2											
Description of Strata										Reduced Level	Legend	Thick- ness (m)	Depth (m)	Samples		N Value	Apparent Cohesion kN/m ²	Angle of shear	Daily Progress Water Levels Remarks		
Ground Level										100.569				from	to	Type					
Stiff, clayey soil and brick FILL												0.40	0.40	0.45	0.55	D ₁					
Stiff, brown, CLAY with brick fragments										99.969		0.20	0.60	0.45	0.55	B ₁					2 hours to dig trial pit.
Stiff, light brown mottled, silty, sandy CLAY with coal										99.369		0.60	1.20	1.00	1.45	U ₁					
Stiff, medium brown, slightly sandy, silty, fissured CLAY with some fine gravel.														1.45		D ₂					
The fissures and mainly vertical and are present as a thin veining of firm, grey, silty clay, with fine rootlets.														2.00	2.45	U ₂	105	18			
Clay is very stiff from 2.00m and contains small pockets of fine sand.														2.45		D ₃					
From 4.00m stiff to very stiff.														3.00	3.45	U ₃					
														3.45		D ₄					
														4.00	4.45	U ₄					
														4.45		D ₅					
														5.00	5.45	U ₅					
														5.80	6.00	D ₆					
														6.50	6.95	U ₆					
														7.25	7.45	D ₇					
														8.00	8.45	U ₇					
														8.70	8.90	D ₈					
														9.50	9.45	U ₈					
Stiff from 9.50m, fissuring is not evident; colour is brown only.										90.569		(8.80)	10.00								
Borehole incomplete @ 10.00m																					

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD, MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637											BOREHOLE No.2	
Job No.: 2688 Location: WREXHAM INDUSTRIAL ESTATE											Sheet 2 of 2	
Client: VERYARD AND PARTNERS											Scale: 1:50 Diam. & Boring Type 150mm S&A	
Description of Strata	Reduced Level	Legend	Thick-ness (m)	Depth (m)	Samples			N Value	Apparent Cohesion kN/m ²	Dip degrees	Daily Progress Water Levels Remarks	
					from	to	Type					
Stiff, brown, silty CLAY.	90.319	[Symbol]	4.05	10.25	10.25	10.45	D ₉				(19-4-84) DM	
Thin, brown, very silty, sandy CLAY with thin layers and lenses of silt and fine sand.		[Symbol]									(20-4-84) U.L. @ 2M. - 565m	
		[Symbol]			12.00	12.45	U ₉					
	87.569	[Symbol]	2.75	13.00	13.00	13.20	D ₁₀					
Thin to stiff, brown, slightly sandy, very silty, laminated CLAY with some fine gravel.		[Symbol]			13.50	13.95	U ₁₀					
Stiff from 12.50m.		[Symbol]			14.25	14.45	D ₁₁					
		[Symbol]			15.00	15.45	U ₁₁					
	85.119	[Symbol]	(2.45)	15.45								
Borehole complete @ 15.45m.											1 1/2 hours to backfill borehole and trial pits.	

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD. MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637										BOREHOLE No.3	
Job No: <u>2688</u> Location: <u>WREXHAM INDUSTRIAL ESTATE</u>										Sheet 1 of 2	
Client: <u>VERYARD AND PARTNERS</u>										Scale: 1:50 Diam. & Boring Type 150MM S&A	
Description of Strata	Reduced Level	Legend	Thick-ness (m)	Depth (m)	Samples		Type	N Value	Apparent Cohesion kN/m ²	Dip degrees	Daily Progress Water Levels Remarks
					from	to					
Grey, clayey, sandy soil <u>FILL</u> with brick fragments.	100.574										(30-4-84) 2 1/2 hrs to dig THAL Pit
Stiff brown clay <u>FILL</u>	99.874		0.70	0.70	0.40	0.50	D ₁				
Firm, brown, shaley clay <u>FILL</u> with brick, slate and some coal.	99.774		0.10	0.80			B ₁				
	99.374		0.40	1.20	1.00		U ₁				
Stiff, light brown, silty clay with brick. <u>FILL</u> .	98.574		0.80	2.00	1.50	2.30	Bag U ₂				
					1.80	2.00	D ₂		76	0	
Very stiff, brown, slightly sandy, silty, fissured <u>CLAY</u> with some fine gravel. (slightly laminated)					3.00	3.45	U ₄				
The fissures are mainly vertical and are present as a thin veining of firm, grey silty clay with fine rootlets.					3.45		D ₃				
					4.00	4.45	U ₅				
					4.45		D ₄				
From 5.00m the clay contains occ. thin laminations and lenses of light brown, fine sand.					5.00	5.45	U ₆				
From 5.60m the fissures are not apparent, the clay is very silty and pronouncedly laminated.					5.60	5.80	D ₅				
	94.074		1.50	6.50	6.50	6.95	U ₇				1-5 a.m. 5.5 6.50
Firm to stiff, brown, very silty, laminated <u>CLAY</u> with layers and lenses of silt and fine sand.					7.20	7.40	D ₆				D.M. (1-5-84) U.L. @ a.m. 6.50m.
Clay is soft from 7.20m.	92.574		1.50	8.00	8.00	8.45	U ₈				
Very soft, brown, clayey <u>SILT</u> with some fine sand containing thin sand bands and pockets of clay.					9.50		B ₂				
	90.574		(2.00)	10.00	10.00	10.45	U ₉				
Borehole complete @ 10.00m.											

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

STRATA SURVEYS LTD.,

BOREHOLE
No. 3

Sheet 1 of 2

Scale: 1:50

Diam. & Boring Type
150mm S&A

Description of Strata	Reduced Level	Legend	Thick-ness (m)	Depth (m)	Samples			N Value	Apparent Cohesion kN/m ²	Daily Progress Water Levels Remarks
					to	Type				
Very soft, brown, clayey SILT.	90.574	X X X X	2.20	10.20						(1-5-84)
Fine to stiff, brown, silty, sandy CLAY with a little fine to medium gravel.		-0-X			10.45		D ₇			
		X			10.75	10.95	D ₈			
		X			11.50	11.95	U ₁₀			
		X			12.20	12.40	D ₉			
		X			13.00	13.45	U ₁₁			
		X			13.75	13.95	D ₁₀			
		X			14.50	14.95	D ₁₂			
		X								
		X								
		X								
13.75 to 14.70 clay is fine.										
From 14.70 clay is stiff.	85.574	-0-	(4.80)	15.00	15.00		D ₁₁			

ST 34 NE / 450

British Geological Survey

British Geological Survey

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD, MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637										BOREHOLE No. 4	
Job No.: 2688 Location: WREXHAM INDUSTRIAL ESTATE. Client: VERYARD AND PARTNERS										Sheet 1 of 2	
Description of Strata										Scale: 1:50 Diam. & Boring Type 150mm SCA	
Description of Strata	Reduced Level	Legend	Thick- ness (m)	Depth (m)	Samples			N Value	Apparent Cohesion kN/m ²	Daily Progress Water Levels Remarks	
					From	To	Type				
Light brown, silty clay with brick and concrete fragments. <u>FILL</u> .	99.585		0.70	0.70	0.50 0.50	0.60 0.60	D ₁ B ₁			(15-4-84) 2 1/2 hrs to dig trial pit. 1 Cast iron cap in cement.	
Very stiff, brown, slightly sandy, silty, fissured <u>CLAY</u> with a little fine gravel. (finely laminated)					1.00 1.45	1.45	U ₁ D ₂	141		14-5 noon. 0.0 - 1.21m	
The fissures are mainly vertical and are present as a thin veining of fine grey silty clay with rootlets.					2.00 2.45	2.45	U ₂ D ₃			1-5 p.m. 20-4 p.m. 0.0 - 2.52 (16-4-84)	
					3.00 3.45	3.45	U ₃ D ₄	160	13		
					4.00 4.45	4.45	U ₄ D ₅			Cement and bentonite mix.	
At 5.00m clay is stiff to v. stiff.					5.00 5.45	5.45	U ₅ D ₆	170	0		
					5.75 6.00	6.00	D ₇				
					6.50 6.95	6.95	U ₆			20-4 a.m. 0.0 - 6.85 0.0 - bentonite balls	
From 7.50m the clay is firm.					7.50 7.75	7.75	D ₈			18-4 p.m. 0.0 - 7.35 17-4 a.m. 0.0 - 7.65	
					8.00 8.45	8.45	U ₇	60	0	18-4 p.m. 0.0 - 8.30 18-4 a.m. 0.0 - 8.60 8 1/2m in 20 min.	
Very thin, pale grey, fine sand bands present from 8.00m.	91.485		8.10	8.20	9.00 9.20	9.30	D ₉ U ₈			17-4 p.m. 0.0 - 9.20 0.0 - 9.50	
Firm, brown, very silty, <u>CLAY</u> with thin bands of silt and fine sand.	90.785		0.70	9.50	9.50 9.50	NIL 10.00	U ₈ B ₂				
Very soft, brown, sandy <u>SILT</u> bands and pockets of clay and sand.	90.285		0.50	10.00						Sand.	
Borehole complete @ 10.00m.											

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

British Geological Survey

STRATA SURVEYS LTD.,

HOLMES CHAPEL ROAD,

MIDDLEWICH, CHESHIRE.

Telephone: Middlewich (STD 0606 84) 4637

BOREHOLE No.4

Sheet 2 of 2

Scale: 1:50

Diam. & Boring Type

150M S & A

Job No.: 2688

Location: WREXHAM INDUSTRIAL ESTATE

Client: VERYARD AND PARTNERS

Description of Strata	Reduced Level	Legend	Thick-ness	Depth	Samples			N Value	Apparent Cohesion kN/m ²	Dip degrees	Daily Progress Water Levels Remarks
					from	to	Type				
Very soft, brown, sandy SILT	90.285	X X X X	0.70	10.20	10.20	10.50	D ₀				(16-4-84)
firm, brown, silty, sandy CLAY with fine gravel.		X X X X			11.00	11.45	U ₉				← bentonite balls
From 11.75 the clay is firm to stiff and laminated.		X X X X			11.75	12.00	D ₁₁				
From 12.95m the clay is stiff.		X X X X			12.50	12.95	U ₁₀				
12.25m the clay contains lenses of brown sand.		X X X X			13.25	13.50	D ₁₂				← clay backfill.
		X X X X			14.00	14.45	U ₁₁				
		X X X X			14.75	15.00	D ₁₃				Borehole dry on completion.
Borehole complete @ 15.00m.	85.285	X X X X	(4.80)	15.00							4 1/2 hours to install piezometer 17-4-84

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

5034 NE 145E

7763 492.3

British Geological Survey

British Geological Survey

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD, MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637										BOREHOLE No. 5	
Job No.: 2688 Location: WREXHAM INDUSTRIAL ESTATE										Sheet 1 of 2	
Client: VERRYARD AND PARTNERS.										Scale: 1:60 Diam. & Boring Type 150mm SEA	
Description of Strata	Reduced Level	Legend	Thick-ness (m)	Depth (m)	Samples			N Value	Apparent Cohesion kN/m ²	ϕ degrees	Daily Progress Water Levels Remarks
					from	to	Type				
Topsoil with roots and brick.	100.520	XXXX	0.20	0.20							(17-4-84) 2 hours to dig final pit.
Firm, mottled grey/brown, silty, sand CLAY with coal flecks.	99.920	XX	0.40	0.60	0.45 0.45	0.55 0.55	D ₁ D ₂				
Very stiff, brown, slightly sandy, silty fissured CLAY with a little fine gravel. (highly laminated)		XX			1.00	1.45	U ₁		196	0	
		XX			1.45		D ₂				
		XX			2.00	2.45	U ₂				
		XX			2.45		D ₃				
		XX			3.00	3.45	U ₃		99	0	
		XX			3.45		D ₄				
		XX			4.00	4.45	U ₄				
		XX			5.00	5.45	U ₅		184	0	
		XX			5.75	5.95	D ₅				
		XX			6.50	6.95	U ₆				
The fissures are present as veins of firm, grey, silty clay with rootlets.		XX			7.25	7.45	D ₆				
		XX			8.00	8.45	U ₇		165	0	
		XX			8.75	8.95	D ₇				
		XX			9.50	9.95	U ₈		67	0	
At 8.00m fissures are less frequent and contain sand.		XX									
From 8.40m the clay is very silty and contains many thin bands and lenses of silt and light brown, fine sand.		XX									
Clay is firm from 9.50m.		XX									
	90.520	XX	0.40	10.00							
Borehole incomplete @ 10.00 m.											

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

SS 34 NE/45E

British Geological Survey

British Geological Survey

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD, MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637							BOREHOLE No. 5			
Job No.: <u>2688</u> Location: <u>WREXHAM INDUSTRIAL ESTATE</u>							Sheet <u>2</u> of <u>2</u>			
Client: <u>VERYARD AND PARTNERS.</u>							Scale: <u>1:50</u> Diam. & Boring Type <u>150mm S&A</u>			
Description of Strata	Reduced Level (m)	Legend	Thick- ness (m)	Depth (m)	Samples			N Value	Apparent Cohesion kN/m ²	Daily Progress Water Levels Remarks
					From	to	Type			
Ground Level	90.520									
From 10.20m the clay is stiff.		X			10.20	10.40	D ₈			(18-4-84)
From 11.00m the clay is firm to stiff.		X			11.00	11.45	U ₉			
From 11.75m very fine sand and silt bands/lenses.		X			11.75	11.95	D ₉			
From 12.95m clay is stiff.		X			12.50	12.95	U ₁₀			
		X			13.25	13.45	D ₁₀			Day
		X			14.00	14.45	U ₁₁			(19-4-84) Day
		X			14.80	15.00	D ₁₁			
Borehole complete @ 15.00m	90.120		(14.40)	15.00						Day on completion

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test

PROJECT : WREXHAM INDUSTRIAL ESTATE

LOCATION: PHASES 3 & 4

GROUND LEVEL:

British Geological Survey

TYPE OF BORING: Percussion Rig

SCALE OF LOG : 1:25

SJ 34 NE / 59

3697439

British Geological Survey

DIA. OF CASING : 154 mm to metres
mm to metres

DATE DRILLED 26.01.83

REDUCED LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB. TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS				
			TYPE	DEPTH (Metres)	C kN/sqm	ϕ		PERCENT.				
								10	20	30	40	
		MADE GROUND - Dark brown clay, traces of topsoil, stiff										
	1.00		D U 75	0.50								
		CLAY - Dark brown, smooth, stiff	D	1.00								
			D U 75	1.50								
			D	2.00								
			D U 75	2.50								
			D U 75	3.00								
	3.50	Brown with streaks of grey silt	D	3.50								
			D	4.00								
			D U 75	4.50								
	5.00		D	5.00								

GROUND WATER

Encountered at						
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 13.

PROJECT : WREXHAM INDUSTRIAL ESTATE

LOCATION: PHASES 3 & 4

GROUND LEVEL:

British Geological Survey

TYPE OF BORING: Percussion Rig

SCALE OF LOG : 1:25

DIA. OF CASING : 154 mm to metres

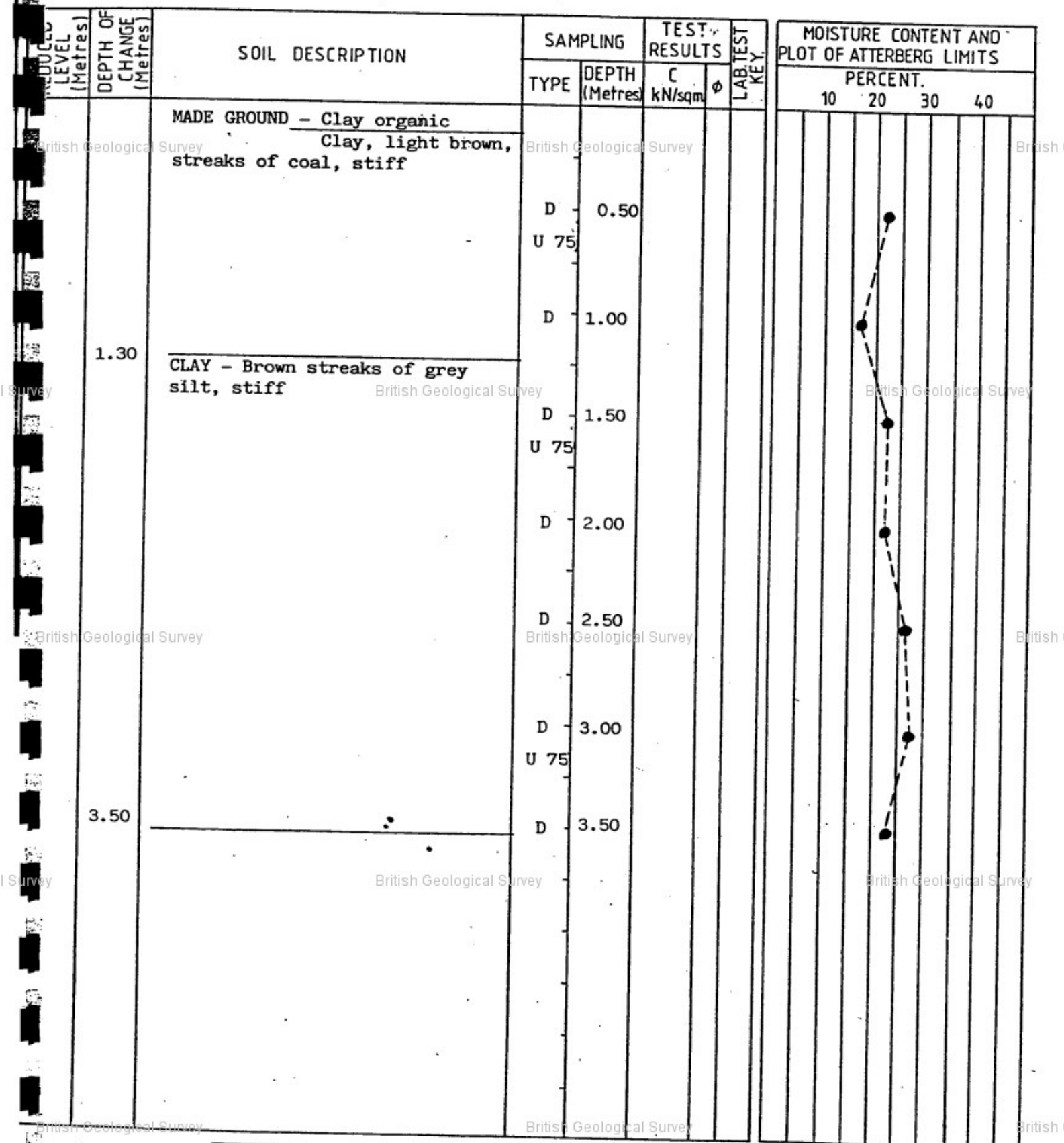
mm to metres

DATE DRILLED 24.01.83

SJ 34NE/60

3699 4938

British Geological Survey



GROUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 14.

PROJECT : WREXHAM INDUSTRIAL ESTATE
LOCATION : PHASES 3 & 4

SJ 34 NE / 61

3702 4938

GROUND LEVEL : British Geological Survey

DIA. OF CASING : 154 mm to metres
mm to metres

TYPE OF BORING : Percussion Rig

SCALE OF LOG : 1 : 25

DATE DRILLED 19.01.83

REDUCED LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB. TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS			
			TYPE	DEPTH (Metres)	C kN/sqm	ϕ		PERCENT.			
								10	20	30	40
	0.10	MADE GROUND - Clay organic									
		Clay brown pebbles to 25 mm, firm									
	0.70	CLAY - Brown, silty streaks of grey silt, stiff	D	0.50							
			D	1.00							
			D	1.50							
			U 75								
			D	2.00							
	2.30		D	2.30							
	2.50	Brown, very sandy, saturated, soft	D	2.50							
		Brown with streaks of grey silt, stiff	D	3.00							
			U 75								
			D	3.50							
			D	4.00							
			D	4.50							
			U 75								
	5.00		D	5.00							

PUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1
Borehole No 15.

PROJECT : WREXHAM INDUSTRIAL ESTATE

LOCATION: PHASES 3 & 4

GROUND LEVEL:

TYPE OF BORING: Percussion Rig

SCALE OF LOG : 1:25

ST 34NE/62

3696 4934

DIA. OF CASING : 154 mm to metres
mm to metres

DATE DRILLED 27.01.83

SOIL DESCRIPTION

SAMPLING

TEST RESULTS

LAB. TEST KEY

MOISTURE CONTENT AND
PLOT OF ATTERBERG LIMITS

PERCENT.

10 20 30 40

MADE GROUND - Clay dark brown,
traces of topsoil in top 600 mm,
stiff

British Geological Survey

D 0.50

U 75

D 1.00

1.50

British Geological Survey

CLAY - Dark brown, streaks of grey
silt, very stiff

D 1.50

U 75

D 2.00

D 2.50

British Geological Survey

D 3.00

U 75

3.70

Brown streaks of grey silt
and thin lenses of brown silt,
very stiff

D 3.50

D 4.00

D 4.50

U 75

5.00

D 5.00

British Geological Survey

GROUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 16.

PROJECT : WREXHAM INDUSTRIAL ESTATE

LOCATION: PHASES 3 & 4

GROUND LEVEL:

British Geological Survey

TYPE OF BORING: Percussion Rig

SCALE OF LOG : 1:25

SJ JUNE/63

309 4933

British Geological Survey

DIA. OF CASING : 154 mm to metres
mm to metres

DATE DRILLED 21.01.83

REDUCED LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB. TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS			
			TYPE	DEPTH (Metres)	C kN/sqm	ϕ		PERCENT.			
								10	20	30	40
	0.10	MADE GROUND - Clay organic Clay light brown, streaks of coal, stiff									
	1.00	CLAY - Brown, silty with streaks of grey silt, stiff									
			D	0.50							
			D	1.00							
			D	1.50							
			N 23								
			D	2.00							
			D	2.50							
			D	3.00							
			D	3.50							
			N 19								
	4.00		D	4.00							

GROUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 17.

PROJECT : WREXHAM INDUSTRIAL ESTATE
LOCATION : PHASES 3 & 4

GROUND LEVEL :

British Geological Survey

TYPE OF BORING : Percussion Rig

SCALE OF LOG : 1:25

37014933
DIA. OF CASING : 154 mm to metres
mm to metres

DATE DRILLED 18.01.83

SOIL DESCRIPTION

SAMPLING

TEST RESULTS

LAB. TEST KEY

MOISTURE CONTENT AND
PLOT OF ATTERBERG LIMITS

PERCENT.

10 20 30 40

0.10

MADE GROUND - Clay organic
Clay, brown silty
firm to stiff

British Geological Survey

British Geological Survey

D 0.50

U 75

D 1.00

British Geological Survey

British Geological Survey

1.50

CLAY - Brown, silty, with streaks
of grey silt, stiff

D 1.50

U 75

D 2.00

U 75 2.20

D 2.50

British Geological Survey

British Geological Survey

2.70

Brown, silty, stiff

D 2.70

D 3.00

U 75

3.50

D 3.50

British Geological Survey

British Geological Survey

GROUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 18.

PROJECT : WREXHAM INDUSTRIAL ESTATE

LOCATION: PAHSES 3 & 4

GROUND LEVEL: British Geological Survey

TYPE OF BORING: Percussion Rig

SCALE OF LOG : 1:25

ST 24 NE / 65

3695 4928

DIA. OF CASING : 154 mm to metres
mm to metres

DATE DRILLED 28.01.83

REDUCED LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB. TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS PERCENT.				
			TYPE	DEPTH (Metres)	C kN/sqm	ϕ		10	20	30	40	
		MADE GROUND - Clay, dark brown traces of grey clay, sandy stiff										
			D	0.50								
			U 75									
			D	1.00								
	1.40	CLAY - Brown with streaks of grey silt with thin slightly sandy layers, firm	D	1.50								
			U 75									
			D	2.00								
			D	2.50								
			D	3.00								
			U 75									
			D	3.50								
	4.00		D	4.00								

GROUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 19

PROJECT : WREXHAM INDUSTRIAL ESTATE

LOCATION: PHASES 3 & 4

GROUND LEVEL:

British Geological Survey

TYPE OF BORING: Percussion Rig

SCALE OF LOG : 1:25

SJ 34 NE /66

3697 4928

British Geological Survey

DIA. OF CASING : 154 mm to metres
mm to metres

DATE DRILLED 21.01.83

REDUCED LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB. TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS PERCENT.				
			TYPE	DEPTH (Metres)	C kN/sqm	ϕ		10	20	30	40	
	0.10	TOPSOIL - Clayey										
		CLAY - Brown silty stiff										
			D	0.50								
			D	1.00								
			D	1.50								
	1.60	Brown sandy stiff	N	13								
	2.00	Brown with streaks of grey silt, stiff	D	2.00								
			D	2.50								
			D	3.00								
			N	17								
			D	3.50								
			D	4.00								
			D	4.50								
			N	20								
	5.00		D	5.00								

GROUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 20.

PROJECT : WREXHAM INDUSTRIAL ESTATE

LOCATION : PHASES 3 & 4

GROUND LEVEL :

British Geological Survey

TYPE OF BORING : Percussion Rig

SCALE OF LOG : 1:25

DIA. OF CASING : 154 mm to metres

mm to metres

DATE DRILLED 17.01.83 - 3.50

18.01.83

SJ 34 NE / 67

3700 4927

SOIL DESCRIPTION

SAMPLING

TEST RESULTS

LAB. TEST KEY

MOISTURE CONTENT AND
PLOT OF ATTERBERG LIMITS

PERCENT.

10 20 30 40

0.10

TOPSOIL - Clayey

CLAY - Light chocolate brown,
silty, firm

1.10

Brown with streaks of
grey silt

4.50

Brown with thin layers
of sandy silt

5.00

British Geological Survey

D 0.50

U 75

D 1.00

D 1.50

U 75

D 2.00

D 2.50

British Geological Survey

D 3.00

U 75

D 3.50

U 75

D 4.00

D 4.50

U 75

D 5.00

British Geological Survey

GROUND WATER

Encountered at	NIL					
Casing at						
Quantity (est)						
Final Level						

SHEET 1 OF 1

Borehole No 21.

PROJECT :

PROPOSED SEWERLINE

LOCATION :

WREXHAM INDUSTRIAL ESTATE

GROUND LEVEL :

TYPE OF BORING : Shell & Auger

SCALE OF LOG : 1:50

SJ34 NE/68

3723 4918

DIA. OF CASING : 154 mm to metres

mm to metres

DATE DRILLED 01.12.81 - 3.00

02.12.81 - 8.00

DEPTH OF LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS			
			TYPE	DEPTH (Metres)	C kN/sqm	ϕ		PERCENT.			
								10	20	30	40
	0.70	FILL - Clay, brown with streaks of black topsoil, soft	D	4.50							
			U 100	1.00							
		CLAY - Brown with streaks of grey silt generally firm but with soft to firm layers or lenses	D	1.50							
			U 100	2.00							
			D	2.50							
			D	3.00							
			U 100	3.50							
	3.80	SILT - Brown, clayey, with pebbles and gravel to 20 mm, moist, very soft	D	4.00							
			D	4.50							
			U 100	5.00							
	5.50	SAND - Brown, traces of coal, fine grained, saturated, very loose, (in running condition)	D	5.50							
			D	6.00							
			N 2	6.50							
			D	7.00							
			D	7.50							
			N 4	8.00							
			D	8.50							
			D	9.00							
			N 2	9.50							
			D	10.00							

GROUND WATER

Encountered at	4.80					
Casing at	4.40					
Quantity (est)	Moderate rate of inflow					
Final Level						

SHEET 1 OF 2

Borehole No 22.

SJ 34 NE / 68

DIA. OF CASING : 154 mm to metres

mm to metres

DATE DRILLED 03.12.81

British Geological Survey

Encountered at						
Casing at						
Quantity (est)						
Final Level						

Borehole No 22.

GROUND LEVEL: 114.6 O.D. 34.90
 NOMINAL B.H. DIA.: 6" 0.15
 DATE OF BORING: 4 to 14-11-50

DEN. 29 SW/4
BOREHOLE No. W.59A.
 3781 5009

GROUNDWATER LEVEL	DATE	SAMPLE DEPTH	DEPTH	R.L.	DESCRIPTION OF STRATA
					Fill
1.52			0.9'	113.8	010500/1
5.0'	10-11-50		0.23	34.69	
3.05					Very stiff blue-brown mottled silty clay
10.0'	11-11-50				
4.57					
15.0'	9-11-50				
			5.49	29.44	Stiff brown sandy silty clay
			18.0'	96.6	
			7.01	27.92	Very stiff brown laminated silty clay
			23.0'	91.6	
			9.15	85.48	Firm brown sandy silty clay, with layers of brown medium sand
			31.0'	83.6	
			11.58	73.35	Brown medium fine sand with thin layers of firm brown silty clay
			38.0'	76.6	
14.02			14.02	20.91	Firm brown silty clay with layers of brown medium-fine sand
46.0'	8-11-50		46.0'	68.6	
					15.24
					50.0'
					Strata Continued

REMARKS:

SAMPLES
 ■ Undisturbed
 ● Disturbed

SCALE:
 3" to 1'-0"

BRITISH CELANESE LTD.
 WREXHAM TRADING ESTATE
 FUTURE DEVELOPMENT AREA

SOILS No.
 S/435
 DRWG. No.
 S/R/1189

GEORGE WIMPEY & CO. LTD., CENTRAL LABORATORY, SOUTHALL.

GROUND LEVEL: 114.6 00 34.0 22
 NOMINAL B.H. DIA.: 6" 0.15"
 DATE OF BORING: 4 to 14.11.50

DEN 29 SW/4
BOREHOLE No. W.59A.
 Contd.

GROUNDWATER LEVEL	DATE	SAMPLE DEPTH	R.M.	DEPTH	R.L.	DESCRIPTION OF STRATA
				50.0'	5.24	
						Firm brown silty clay with layers of brown medium-fine sand
		17.83-18.29 58.6' to 60.0'		19.81 65.0'	15.12 49.6	
		21.34 70.0'		21.64 71.0'	13.29 43.6	Brown fine silty sand
		22.40-22.84 73.6' to 75.0'				Very stiff brown laminated sandy silty clay
				26.19 81.0'	10.24 33.6	
						Brown fine silty sand & fine gravel
		28.96 95.0'		30.18 99.0'	4.75 16.6	
		30.94-31.39 101.6' to 103.0'		31.39 103.0'	3.54 11.6	Stiff brown sandy silty clay

REMARKS: Boring by percussion rig to 103.0'.
 Water under artesian pressure encountered
 between 65' & 71' and 81' & 88' caused water to rise
 inside borehole casing to 15' & then to 5' below G.L.

SAMPLES
 ■ Undisturbed
 ● Disturbed

SCALE:
 3' to 1'-0"

BRITISH CELANESE LTD.

WREXHAM TRADING ESTATE
 FUTURE DEVELOPMENT AREA

SOILS No.
 S/435

DRWG. No.
 S/R/1189

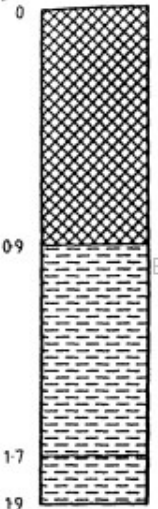
GEORGE WIMPEY & CO. LTD., CENTRAL LABORATORY, SOUTHALL.

ST 34 NE / 45

British Geological Survey

3759 4936

DEPTH (m) TP 10
below g.l.



MADE GROUND
Medium dense light brown silty SAND with roots and brick rubble

100 mm Concrete Slab at 0.8 m

light brown slightly sandy CLAY
 $S = 90 \text{ kN/m}^2$

Dead Electrical cables at 1.4 m

Very stiff fissured red/brown CLAY with grey inclusions
 $S = 120 \text{ kN/m}^2$

END

L
3760 4930

TP 7



MADE GROUND
Red brick rubble with brown CLAY

MADE GROUND
Concrete and brick rubble in very soft to firm red/brown CLAY
 $S = 20 - 60 \text{ kN/m}^2$

Firm to stiff red/brown CLAY with rootlets and grey inclusions
 $S = 80 \text{ kN/m}^2$

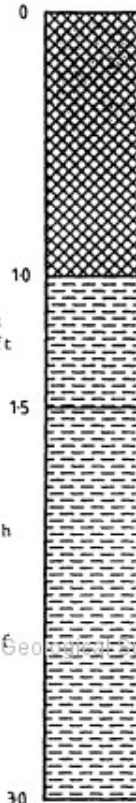
Becoming very stiff with depth
 $S = 120 \text{ kN/m}^2$

END

British Geological Survey

3762 4928

TP 3



MADE GROUND
Soft to firm brown sandy CLAY with gravel and cobbles
 $S = 40 \text{ kN/m}^2$

Firm to stiff red/brown slightly sandy silty CLAY
 $S = 80 \text{ kN/m}^2$

Stiff fissured red/brown CLAY with grey inclusions
 $S = 110 \text{ kN/m}^2$

Becoming very stiff with depth
 $S = 120 \text{ kN/m}^2$

END

G

3765 4926

TP 2



MADE GROUND
Soft red/grey CLAY with roots, gravel and concrete and brick rubble
 $S = 25 \text{ kN/m}^2$

Water traces at 1.0 m

Black stained lenses

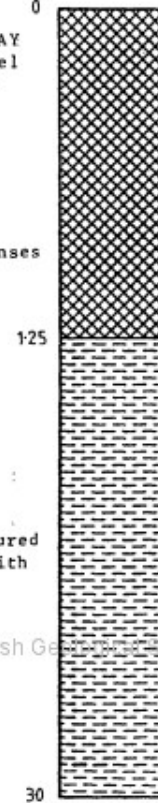
Very stiff fissured red/brown CLAY with grey inclusions
 $S = 120 \text{ kN/m}^2$
 $N = 15$

END

British Geological Survey

3770 4924

TP 9



MADE GROUND
Firm red/grey CLAY with roots, gravel and brick rubble and black stained lenses
 $S = 55 \text{ kN/m}^2$

Variable strength - lenses firm, to, firm to stiff

Very stiff fissured red/brown CLAY with grey inclusions
 $S = 120 \text{ kN/m}^2$

END

British Geological Survey

Notes		Revisions		Project				Veryard and Partners Consulting Engineers					
Trial pits excavated on 6 & 9		No	Date	Details		WREXHAM ALUMINIUM INGOT PLANT				☐ Cardiff 0222 562354 ☐ Carmarthen 0267 6977+7056 ☒ Rossett 0244 571444 ☐ Coleraine 0265 51434 M			
April 1984						Title							
Weather: warm and dry						TRIAL PIT LOGS							
S value denotes insitu undrained shear strength as measured by hand shear vane.													

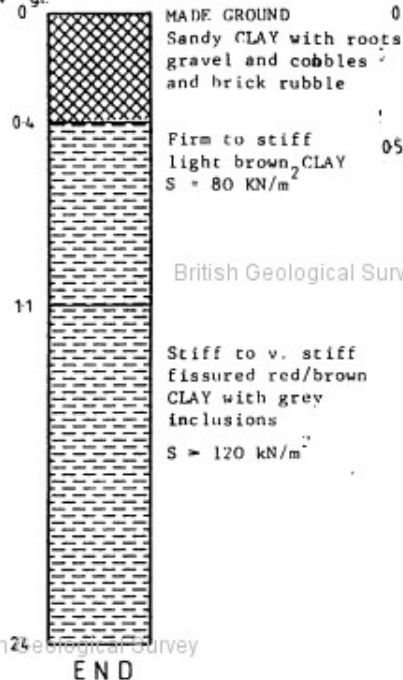
ST 34 NE / 45

British Geological Survey

3752 4931

DEPTH (m) TP 11

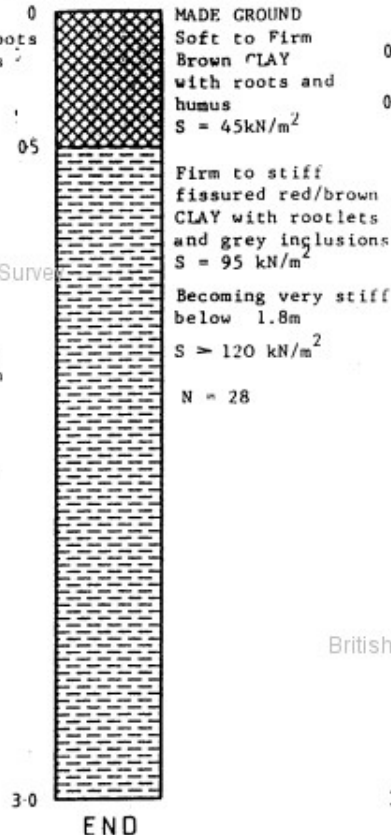
below 0 gl.



K

3757 4927

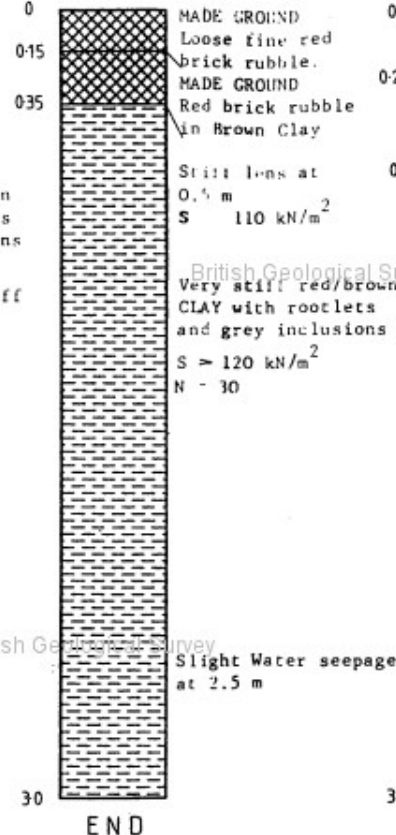
TP 6



British Geological Survey

3759 4924

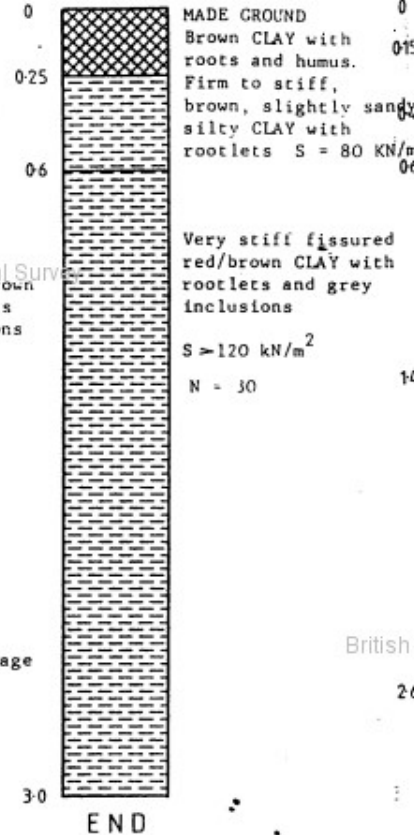
TP 5



F

3762 4922

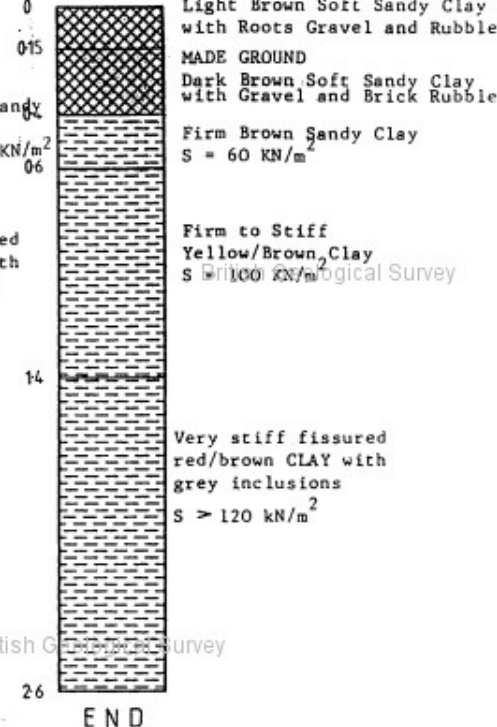
TP 1



British Geological Survey

3766 4919

TP 8



British Geological Survey

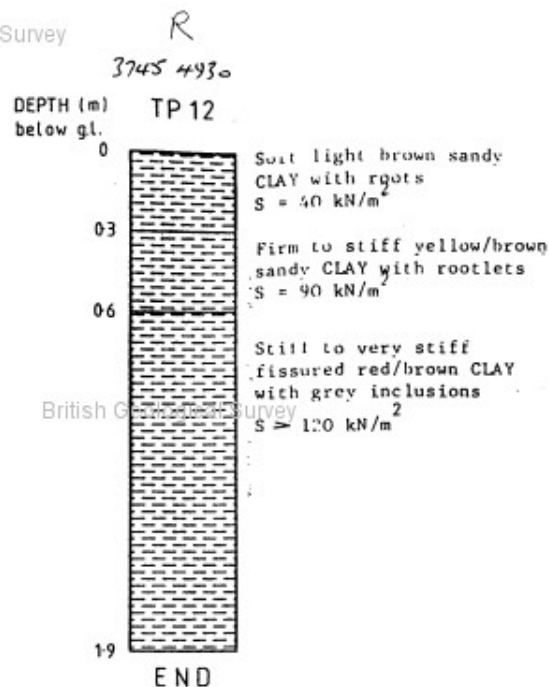
British Geological Survey

British Geological Survey

Notes	Revisions		Project		Veryard and Partners Consulting Engineers Cardiff 0222 562354 Carmarthen 0267 6977+7056 Rossétt 0244 571444 Coleraine 0265 51434				
	No	Date	WREXHAM ALUMINIUM INGOT PLANT						
	Details		Title						
			TRIAL PIT LOGS						
T la. pits excavated on				Scale	Date	Drawn	Checked	No.	Rev.
t & 9 April 1984.				1:200	APRIL 84	SW		18081	
Weather: warm and dry									
S value denotes insitu undrained shear strength as measured by hand shear vane.									

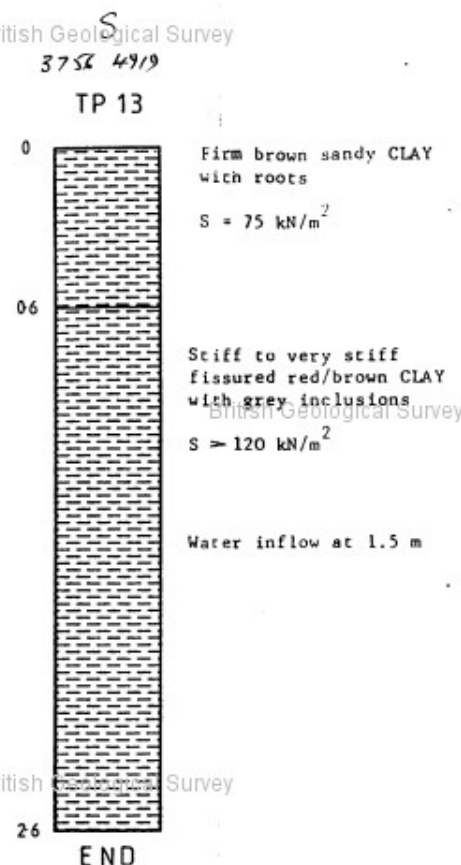
SJ 34 NE / 45

British Geological Survey



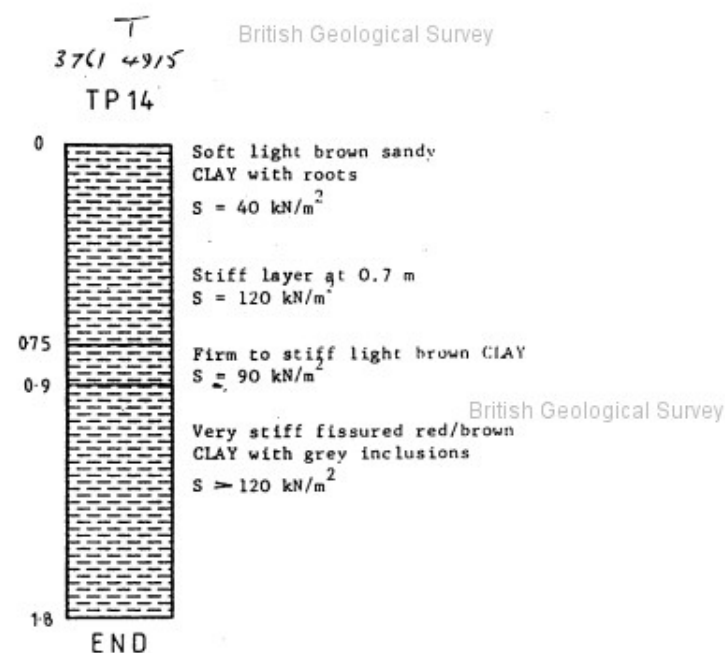
British Geological Survey

British Geological Survey



British Geological Survey

British Geological Survey



British Geological Survey

British Geological Survey

British Geological Survey

Notes		Revisions		Project		Veryard and Partners	
Trial pits excavated on 6 & 9 April 1984		No	Date	WREXHAM ALUMINIUM INGOT PLANT		Consulting Engineers	
Weather: warm and dry				Title		☐ Cardiff 0222 562354 ☐ Carmarthen 0267 6977+7056 ☒ Rossett 0244 571444 ☐ Coleraine 0265 51434	
S value denotes insitu undrained shear strength as measured by hand shear vane.				TRIAL PIT LOGS			
				Scale	Date	Drawn	Checked
				1:200	APRIL 84	SW	
				No.		Rev.	
				18081		SI/6	

PROJECT : PROPOSED SEWERLINE
LOCATION : WREXHAM INDUSTRIAL ESTATE

ST 34 NE / 69

3714 4706

GROUND LEVEL:

DIA. OF CASING : 154 mm to metres
mm to metres

TYPE OF BORING : Shell & Auger

DATE DRILLED 03.12.81 - 5.00 m
04.12.81

SCALE OF LOG : 1:50

SOIL LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB. TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS			
			TYPE	DEPTH (Metres)	C kN/sqm	φ		PERCENT.			
								10	20	30	40
	0.75	FILL - Brown clay with traces of tree roots	D	0.50							
		CLAY - Brown with streaks of grey silt and occasional pebbles to 10 mm. Firm to stiff	D	1.00							
			D	1.50							
			U 100	2.00							
			D	2.50							
			D	3.00							
			U 100	3.50							
			D	4.00							
	4.50	SILT - Brown with some fine grained sand, saturated, soft	D	4.50							
			U 100	5.00							
			D	5.50							
			D	6.00							
			D	6.50							
			N 1	7.00							
			D	7.50							
			N 1	8.00							
			D	8.50							
			D	9.00							
	9.50		N 4	9.50							

GROUND WATER

Encountered at	3.50			4.20	
Casing at					
Quantity (est)	Trace			Moderate rate of inflow	
Final Level					

SHEET 10F 1
Borehole No 23.

British Geological Survey

DIA. OF CASING : 154 mm to metres

mm to metres

07.12.81	5.00 m
08.12.81	5.00 m

07.12.81	5.00 m
08.12.81	5.00 m

British Geological Survey

British Geological Survey

British Geological Survey

Borehole No 24.

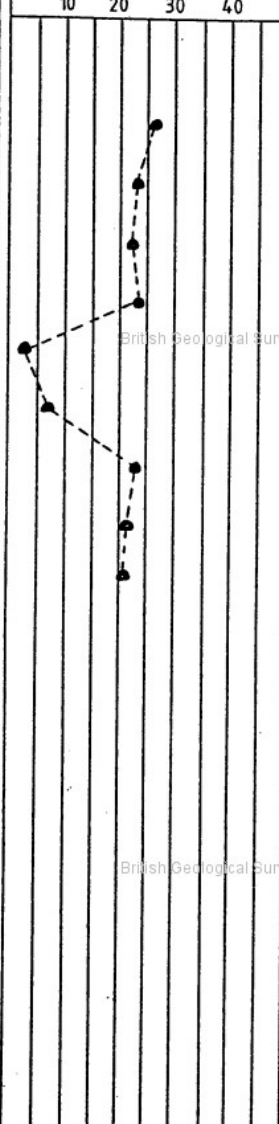
Borehole No 24.

PROJECT : PROPOSED SEWER LINE
LOCATION : WREXHAM INDUSTRIAL ESTATE
GROUND LEVEL :
TYPE OF BORING : Shell & Auger
SCALE OF LOG : 1:50

SJ 34 NE/71
3708 4880

DIA. OF CASING : 154 mm to metres
mm to metres
DATE DRILLED 09.12.81

SOIL LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS			
			TYPE	DEPTH (Metres)	C kN/sqm	φ		PERCENT.			
								10	20	30	40
	0.65	FILL - Concrete 650 mm on brown clay with small pieces of brick. Firm.	D	0.50							
			D	1.00							
	1.40	CLAY - Light brown, firm with softer silty layers	D	1.50							
	1.90	SILT - Light greyish brown saturated, soft	U	100							
			D	2.00							
	2.60	GRAVEL - No sand, rounded graded to 40 mm medium dense	D	2.50							
			D	3.00							
			D	3.50							
	4.00	SILT - Brown saturated, soft	D	4.00							
	4.60	CLAY - Brown, silty, stiff	D	4.50							
	5.00		U	100							
			D	5.00							



WATER

Encountered at	2.40					
Casing at	2.00					
Quantity (est)	Large rate of inflow					
Final Level						

SHEET 1 OF 1
Borehole No 25.

PROJECT : PROPOSED NEW SEWERLINE
LOCATION : WREXHAM INDUSTRIAL ESTATE
GROUND LEVEL :

TYPE OF BORING : Shell & Auger
SCALE OF LOG : 1:50

5734NE/72
3714 4866
DIA. OF CASING : 154 mm to metres
mm to metres
DATE DRILLED 04.12.81

DEPTH OF LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS			
			TYPE	DEPTH (Metres)	C kN/sqm	φ		PERCENT.			
								10	20	30	40
		CLAY - Grey, brown, sandy probably fill	D	0.50							
	0.80		U 100								
		CLAY - Brown, sandy. Firm	D	1.00							
	1.40										
		GRAVEL - Brown, clayey, graded to 25 mm. Saturated. Medium dense	D	1.50							
			N 10								
			D	2.00							
			D	2.50							
	2.70										
		CLAY - Brown with streaks of grey silt. Firm to stiff	D	3.00							
			U 100								
			D	3.50							
			D	4.00							
			D	4.50							
	5.00		U 100								
			D	5.00							

GROUND WATER

Encountered at	1.65					
Casing at	1.50					
Quantity (est)	Large rate of inflow					
Final Level						

SHEET 1 OF 1
Borehole No 26.

PROJECT : PROPOSED NEW SEWERLINE
LOCATION : WREXHAM INDUSTRIAL ESTATE
GROUND LEVEL :
TYPE OF BORING : Shell & Auger
SCALE OF LOG : 1:50

5534 NE/73
3718 4858
DIA. OF CASING : 154 mm to metres
mm to metres
DATE DRILLED 03.12.81

LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING		TEST RESULTS		LAB TEST KEY	MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS			
			TYPE	DEPTH (Metres)	C kN/sqm	ϕ		PERCENT.			
								10	20	30	40
		FILL - Brown, clay soft.	D	0.50							
0.95		CLAY - Brown, silty with a few pebbles to 25 mm firm. Gravelly at 1.40	D	1.00							
1.40			D	1.50							
1.70		GRAVEL - Brown, clayey graded to 20 mm saturated, loose to medium dense.	U	1.00							
			D	2.00							
			D	2.50							
2.98		CLAY - Brown, silty occasional pebbles, stiff	D	3.00							
			U	1.00							
			D	3.50							
			D	4.00							
4.40		Brown, silty with thin seams of sand. Stiff	D	4.50							
5.00			U	1.00							
			D	5.00							

GROUND WATER

Encountered at	1.70					
Casing at	1.50					
Quantity (est)	Large rate of inflow					
Final Level						

SHEET 1 OF 1
Borehole No 27