

SE40 NW 337

<h1 style="margin: 0;">Norwest Holst Soil Engineering Ltd.</h1>							Borehole No 3		
<h2 style="margin: 0;">BOREHOLE LOG</h2>									
Contract No. F6894 Location Houghton Main Colliery Client National Coal Board Method of Boring Percussion Diameter of Borehole 150mm							Sheet 2 of 2 Chainage Ground Level 33.7 m.A.O.D. Date 15/3/86 and 26/3/86		
Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress		
SANDSTONE as above Grey, fresh, fine to medium grained SANDSTONE with occasional layers with black laminations Strong. Sub horizontal and occasional diagonal joints, medium spaced, weathered brown, fairly tight, fairly rough Sub vertical joint 13.50m to 13.75m, vertical joint 16.15m to 16.60m		10.05	23.7		TCR SCR				
12.45m to 12.60m, frequent black micaceous laminations, fissile, weak					95 82	70%	-		
					85 77	72%	-		
					15.60		-		
Bituminous COAL (Shafton Seam)		16.60	17.1		96 20	20%	-		
Grey MUDSTONE with plant fossils. Very weak (Seat earth)		18.15	15.6		18.30		-		
		19.00	14.7		50 29	0%	-		
Borehole complete					19.00		-		
Type of Sample Is S.P.T. Undisturbed Ic. C.P.T. Vane O Jar Water ● Bulk Piezometer		Remarks (Observations of Ground Water etc.) Loss of water flush at 11.00m Water levels are subject to seasonal or tidal variations and should not be taken as constant							

SE40 NW 338

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG

Contract No. F6894
 Location: Houghton Main Colliery
 Client: National Coal Board
 Method of Boring: Percussion
 Diameter of Borehole: 150mm

4209 0595
 Sheet 1 of 1
 Chainage:
 Ground Level: 32.2 m.A.O.D.
 Date: 16/3/86

Borehole No
4

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D. %	Daily Progress
MADE GROUND: Ash, burnt red grey and cream mudstone, some clay, bricks		2.00	30.2		0.55 c 1.55	"7" "22"	
Stiff orange brown and grey mottled silty CLAY with iron rich mudstone nodules and occasional mudstone gravel		3.80	28.4		2.55 c 3.55	(31) (49)	
Grey highly weathered MUDSTONE, partly decomposed to brown silty clay, interbedded with fine grained sandstone with black partings.		7.10	25.1		4.55 c 6.00	"97" "99"	
Grey thinly laminated moderately weathered fine grained SANDSTONE		8.10	24.1		7.30 c 8.00	91 for 150mm 79* for 150mm	
Borehole complete							

Type of Sample

Is S.P.T. Undisturbed

Ic. C.P.T. Vane

O Jar Water

● Bulk Piezometer

Remarks (Observations of Ground Water etc.) () U100 blows
 * seating blows only

No water encountered during drilling

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 339

Norwest Holst Soil Engineering Ltd.

Borehole No **5**

Contract No. F6894 **BOREHOLE LOG** 4208 0598

Location.....Houghton Main Colliery Sheet 1 of 1

Client.....National Coal Board Chainage.....

Method of Boring.....Percussion Ground Level 31.3 m.A.O.D.

Diameter of Borehole.....150mm Date 15/3/86

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.O.D.%	Daily Progress
MADE GROUND: Silty sandy clay with rootlets, sandstone gravel, black ash, broken brick		2.30	29.0		0.55 c 1.55 c	"8" "14"	-
MADE GROUND: Grey brown, dark brown orange brown and grey, silty sandy clay with occasional iron rich mudstone nodules		2.90	28.4		2.65 (31)		-
Stiff orange brown and grey mottled fine sandy silty CLAY with occasional sandstone and iron rich mudstone gravel. Peaty root remains near top		5.70	25.6		3.80 (39)		-
Grey highly weathered MUDSTONE partly decomposed to stiff silty clay		6.30	25.0		5.55 (48)		-
Brown and grey thinly laminated highly weathered slightly micaceous fine grained SANDSTONE		7.10	24.2		6.50	"77"	-
Yellow brown slightly to moderately weathered fine to medium grained SANDSTONE		7.70	23.6		7.35	50 for 75mm	-
Borehole complete							-

Type of Sample

S.P.T. Undisturbed

C.P.T. Vane

Jar Water

Bulk Piezometer

Remarks (Observations of Ground Water etc.) {} U100 blows

No water encountered during drilling

Chiselling sandstone - 1 hr.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 340

Norwest Holst Soil Engineering Ltd.

4207 0600

Contract No. F6994

Location Houghton Main Colliery

Client National Coal Board

Method of Boring Percussion

Diameter of Borehole 150mm

BOREHOLE LOG

Sheet 1 of 1

Chainage

Ground Level 30.3 m.A.O.D.

Date 14/3/86

Borehole No

6

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.O.D.%	Daily Progress
MADE GROUND: Black ash, silt, clay, some gravel, broken bricks, Sulphurous smell					0.55 c	"7"	-
		2.30	28.0		1.55 c	"12"	-
MADE GROUND: Soft and very soft damp grey brown very silty fine sandy clay with mudstone and carbonaceous mudstone gravel, Layers of brown and grey mottled silty sandy clay					2.55 c (29) 3.00 NR (37)		-
		4.00	26.3		4.00 (59)		-
MADE GROUND: Loose brown fragmented fine to medium grained sandstone					4.70 c	"7"	-
		6.30	24.0				-
Firm to stiff dark brown silty, sandy in places, CLAY with occasional black carbonaceous mudstone laminations and some sandstone subangular gravel					6.55 (87)		-
		7.00	23.3				-
Grey, weathered to yellow brown, thinly laminated to thinly bedded slightly micaceous fine to medium grained SANDSTONE					7.50 c	"76"	-
		8.00	22.3		8.00	83* for 140mm	-
Borehole complete							-

Type of Sample

Is S.P.T. **■** Undisturbed

Ic. C.P.T. **×** Vane

O Jar **Δ** Water

● Bulk **■** Piezometer

Remarks (Observations of Ground Water etc.)

() 100 blows

No water encountered during drilling

Chiselling sandstone - 1 hr.

NR no recovery

* seating blows only

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 341

Norwest Holst Soil Engineering Ltd.

Borehole No **7**

BOREHOLE LOG

Contract No. F6894 Location Houghton Main Colliery Sheet 1 of 2

Client National Coal Board Chainage 4207 0601

Method of Boring Percussion to 7.50m rotary to 15.50m Ground Level 30.3 m.A.O.D.

Diameter of Borehole 150mm to 7.50m, 105mm to 15.50m Date 14/3/86 and 28/3/86

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
MADE GROUND: Black ash, coal, clay, coarse gravel including burnt sandstone					0.55 c 1.55 c	"5" "6"	-
		2.20	28.1				-
MADE GROUND: Firm brown and grey mottled silty CLAY with green brown mottling in places. Soft pockets with peaty roots near top. Pockets of grey fine to medium sand					2.55 (24) 3.55 (39)		-
		3.70	26.6				-
MADE GROUND: Very loose fragmented brown fine to medium grained sandstone					4.25 c	"2"	-
		4.70	25.6				-
Stiff grey brown very silty CLAY with some subangular to subrounded sandstone gravel					5.00 (72)		-
		5.00	24.3				-
Grey, weathered to yellow brown, fine to medium grained SANDSTONE					6.20 c	89 for 150mm	-
		7.10	23.2				-
Grey, fresh, fine to medium grained SANDSTONE with occasional layers with black laminations Strong Sub horizontal and occasional diagonal joints, closely to medium spaced, weathered brown, fairly tight, fairly rough. 9.35m to 9.80m and 10.15m to 10.30m highly weathered, partly disintegrated, very weak					7.20 c 7.50 TCR SCR 100 97 9.00	83 for 150mm 83%	-
							-

Type of Sample

Is S.P.T. Undisturbed

Ic C.P.T. Vane

O Jar Water

● Bulk Piezometer

Remarks (Observations of Ground Water etc.) () U100 blows

No water encountered during percussion drilling

Chiselling sandstone from 7.10m to 7.50m - $\frac{1}{2}$ hr.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE 40 NW

341

Norwest Holst Soil Engineering Ltd.

Borehole No

7

Contract No. F6894

BOREHOLE LOG

Location Houghton Main Colliery

Client National Coal Board

Sheet 2 of 2

Chainage

Method of Boring Percussion to 7.50m rotary to 15.50m

Ground Level 30.3 m.A.O.D.

Diameter of Borehole 150mm to 7.50m, 105mm to 15.50m

Date 14/3/86 and 28/3/86

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
Grey, fresh, fine to medium grained SANDSTONE with occasional layers with black laminations					TCR SCR		
Strong Subhorizontal and occasional diagonal joints, closely to medium spaced, weathered brown, fairly tight, fairly rough. 9.35m to 9.80m and 10.15m to 10.30m, highly weathered, partly disintegrated, very weak.					100 82	51%	
Vertical joint, slightly weathered, 10.60m to 10.80m					12.00		
Grey fissile MUDSTONE, thinly laminated with siltstone. Very weak		13.40	16.9		94 83	72%	
Bituminous COAL, occasional pyrite on cleat (Shaften Seam)		14.00	16.3		13.80		
Grey MUDSTONE, Weak		15.30	15.0		88 9	0%	
Borehole complete		15.50	14.8		15.50		

Type of Sample

- Is S.P.T. Undisturbed
 Ic. C.P.T. Vane
 O Jar Water
 ● Bulk Piezometer

Remarks (Observations of Ground Water etc.)

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE 40 NW 342

Norwest Holst Soil Engineering Ltd.

Borehole No
8

Contract No. F6894
Location Houghton Main Colliery
Client National Coal Board
Method of Boring Percussion to 7.50m, rotary to 13.00m
Diameter of Borehole 150mm to 7.50mm, 105mm to 13.00m

4206 0598
Sheet 1 of 2
Chainage
Ground Level 30.3 m.A.O.D.
Date 17/3/86 and 27/3/86

BOREHOLE LOG

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
MADE GROUND: Black ash, sandstone, mudstone fragments, coal, occasional burnt sandstone					0.55 c 1.55 c 2.55 c	"16" "5" "9"	-
MADE GROUND: Firm brown, grey and black silty sandy clay with gravel and concrete fragments.		3.20	27.1		3.60 (31)		-
Stiff yellow brown and grey very sandy silty CLAY with sandstone lithorelicts		4.20	26.1		4.55 (49)		-
Brown and grey thinly bedded highly weathered fine to medium grained SANDSTONE with thin layers of fine sandy mudstone		4.80	25.5		5.55 c	"72"	-
Brown and grey thinly bedded slightly to moderately weathered SANDSTONE		6.70	23.6		7.00 c	"82"	-
Grey, fresh, fine to medium grained SANDSTONE with occasional layers with black cross lamination at approximately 20° Strong Sub horizontal and 20° - 30° joints, closely to medium spaced slightly weathered brown, fairly tight, fairly rough. 9.40m to 9.60m, frequent black laminations moderately weathered, fissile, weak.		7.50	22.8		7.50 TCR SCR 85 67 57%		-

Type of Sample

S.P.T. Undisturbed

C.P.T. Vane

Jar Water

Bulk Piezometer

Remarks (Observations of Ground Water etc.) () 1100 blows

No water encountered during drilling
Chiselling sandstone - 1 hr.

Water levels are subject to seasonal or tidal variations and should not be taken as constant.

SE40NW 342

Norwest Holst Soil Engineering Ltd.

Borehole No
8

Contract No. F6894
Location Houghton Main Colliery
Client National Coal Board

Sheet 2 of 2
Chainage
Ground Level 30.3 m.A.O.D.
Date 17/3/86 and 27/3/86

Method of Boring Percussion to 7.50m, rotary to 13.00m
Diameter of Borehole 150mm to 7.50mm, 105mm to 13.00m

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
SANDSTONE, as above		10.20	20.1				
Grey MUDSTONE, thinly laminated with siltstone. Very weak	+++++				10.50		
	+++++	11.00	18.7		TCR SCR		
Bituminous COAL with occasional pyrite on cleat (Shafton Seam)					96 16 0%		
		12.80	17.5				
Dark grey MUDSTONE with occasional plant fossils Very weak (Seat earth)		13.00	17.3		13.00		
Borehole complete							

Type of Sample

Is S.P.T. Undisturbed

Ic. C.P.T. X Vane

O Jar Δ Water

● Bulk Piezometer

Remarks (Observations of Ground Water etc.)

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40 NW 1343

Norwest Holst Soil Engineering Ltd.

Borehole No **8A**

BOREHOLE LOG

Contract No. F6894

Location Houghton Main Colliery

Client National Coal Board

Method of Boring Percussion

Diameter of Borehole 150mm

Sheet 1 of 1

Chainage

Ground Level 30.4 m.A.O.D.

Date 13/3/86

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
MADE GROUND: Ash, mudstone and coal fragments, occasional burnt mudstone, firm clay					0.55	"5"	-
MADE GROUND: Firm brown and dark brown mottled silty sandy clay with occasional coal and burnt mudstone gravel.		2.30	28.1		1.55	"15"	-
Firm yellow brown and grey very sandy silty CLAY with some subangular sandstone gravel and with spots of black carbonaceous material and occasional coal. Some lenses and pockets of orange brown sand		2.50	27.9		2.55	(68)	-
		4.25	26.2		3.55	(81)	-
Yellow brown highly weathered fine to medium grained SANDSTONE					4.55	"105"	-
		6.40	24.0		5.55	"106"	-
Yellow brown moderately weathered fine to medium grained SANDSTONE		7.50	22.9		6.50	87 for 150mm	-
					7.25	52 for 75mm	-
Borehole complete							-

Type of Sample

Is S.P.T. Undisturbed

Ic. C.P.T. Vane

O Jar Water

● Bulk Piezometer

Remarks (Observations of Ground Water etc.) () U100 blows

No water encountered during drilling

Chiselling sandstone - 1 hr.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 344

Norwest Holst Soil Engineering Ltd.

Borehole No **9**

Contract No. F6894 **BOREHOLE LOG** 4206 0596

Location. Houghton Main Colliery **Sheet** 1 of 1

Client. National Coal Board **Chainage**

Method of Boring. Percussion **Ground Level.** 30.5 m.A.O.D.

Diameter of Borehole. 150mm **Date.** 12/3/86

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
MADE GROUND: Black ash, coal burnt sandstone and mudstone		1.50	29.0		0.55 c	"13"	-
Firm light brown very sandy silty CLAY with disseminated dark brown and black material and occasional sandstone gravel		2.60	27.9		1.55 (38)		-
Grey thickly laminated to thinly bedded highly weathered slightly micaceous fine to medium grained SANDSTONE		4.10	26.4		2.55 (69) 3.25 c	90 for 150mm	-
Grey slightly weathered fine to medium grained SANDSTONE		4.65	25.9		4.50 c	78* for 150mm	-
Borehole complete							-

Type of Sample

Is S.P.T. Undisturbed

Ic. C.P.T. Vane

O Jar Water

● Bulk Piezometer

Remarks (Observations of Ground Water etc.) () 110C blows
* seating blows only

No water encountered during drilling

Chiselling sandstone - 1 hr

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 345

Norwest Holst Soil Engineering Ltd.

Borehole No **10**

Contract No. F6894 **BOREHOLE LOG**

Location Houghton Main Colliery

Client National Coal Board

Method of Boring Percussion to 8.00 m rotary to 13.00m

Diameter of Borehole 150mm to 8.00m, 105mm to 13.00m

Sheet 1 of 2

Chainage

Ground Level 31.4 m.A.O.D.

Date 13/3/86 and 28/3/86

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
MADE GROUND: Black ash, coal carbonaceous mudstone, clay.		1.20	30.2		0.55 c	"13"	-
MADE GROUND: Stiff dark grey brown very silty sandy clay, pockets of orange brown, grey and dark brown mottled silty sandy clay, soft in places. Occasional coal and mudstone fine gravel		2.30	29.1		1.55 (29)		-
Stiff dark grey brown very silty sandy CLAY with small pockets of light grey and orange brown silty clay. Some sandstone gravel and cobbles		4.00	27.4		2.55 (48) 3.55 (69)		-
Yellow brown and brown highly weathered fine to medium grained SANDSTONE with layers of grey mudstone.		7.30	24.1		4.55 c 5.65 c	"69" "89"	-
Grey and yellow brown slightly weathered fine to medium grained SANDSTONE. Very closely to closely spaced sub horizontal joints		8.40	23.0		7.00 c 7.60 c 8.00	80 for 150mm 81* for 150mm	-
Grey, fresh, fine to medium grained SANDSTONE. Subhorizontal joints widely spaced, slightly weathered, brown, fairly tight. Vertical joint 10.70m to 10.85m					TCR SCR 100 97	90%	-

Type of Sample

Is S.P.T. Undisturbed

Ic. C.P.T. Vane

O Jar Water

● Bulk Piezometer

Remarks (Observations of Ground Water etc.) () U100 blows
*seating blows only

No water encountered during percussion drilling
Chiselling sandstone - 1/2 hr.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 345

Norwest Holst Soil Engineering Ltd.

Borehole No
10

Contract No. F6894
Location Houghton Main Colliery
Client National Coal Board

Sheet 2 of 2
Chainage
Ground Level 31.4 m.A.O.D.
Date 13/3/86 and 28/3/86

Method of Boring Percussion to 8.00m rotary to 13.00m
Diameter of Borehole 150mm to 8.00m, 105mm to 13.00m

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
Grey, fresh, fine to medium grained SANDSTONE. Sub horizontal joints widely spaced, slightly weathered, brown, fairly tight. Vertical joint 10.7Cm to 10.85m		10.85	20.6		TCR SCR		-
Grey MUDSTONE, thinly laminated with siltstone. Weak		11.60	19.8		11.00		-
Bituminous COAL, with occasional pyrite on cleat		12.95	18.5		90 13	0%	-
Grey MUDSTONE. Weak		13.00	18.4		13.00		-
Borehole complete							-

Type of Sample

S.P.T. Undisturbed

C.P.T. Vane

Jar Water

Bulk Piezometer

Remarks (Observations of Ground Water etc.)

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 346

Norwest Holst Soil Engineering Ltd.

Borehole No
11

Contract No. F6894
Location Houghton Main Colliery
Client National Coal Board
Method of Boring Percussion
Diameter of Borehole 150mm

BOREHOLE LOG

Sheet 1 of 1
 Chainage
 Ground Level 31.1 m.A.O.D.
 Date 17/3/86

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D. %	Daily Progress
MADE GROUND: Black ash, coal, mudstone and sandstone gravel, burnt mudstone, clay					0.55 c 1.55 c 2.55 c 3.60	"19" "5" "3" "16"	- - - - - -
Stiff grey brown with some grey mottling silty CLAY with occasional sandstone and mudstone fine gravel		4.00	27.1		c 4.55 (31)		- - -
Brown and grey, thickly laminated to thinly bedded highly weathered slightly micaceous fine to medium grained SANDSTONE with layers of grey mudstone		6.20	24.9		6.00 (68)		- -
Brown slightly to moderately weathered fine grained SANDSTONE		8.00	23.1		7.25 c 8.25 c	"90" 50 for 75mm	- -
Borehole complete		9.00	22.1				-

Type of Sample

Is S.P.T. Undisturbed

Ic C.P.T. Vane

O Jar Water

● Bulk Piezometer

Remarks (Observations of Ground Water etc.) () 1100 blows

No water encountered during drilling
 Chiselling sandstone - 1 1/2 hrs.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE40NW 347
4208 0596

Norwest Holst Soil Engineering Ltd.

Borehole No
11A

Contract No. F6894
Location Houghton Main Colliery
Client National Coal Board.

Method of Boring Percussion
Diameter of Borehole 150 mm

BOREHOLE LOG

Sheet 1 of 1
Chainage
Ground Level 31.3 m.A.O.D.
Date 13/3/85

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
MADE GROUND: Black ash, silty sandy clay, coal and red burnt mudstone fragments		2.25	29.1		0.55 c 1.55 c	"14" "20"	-
MADE GROUND: Stiff dark brown silty sandy clay with fragments of coal iron-rich mudstone and sandstone. Pockets of orange brown and grey silty clay.		3.30	28.0		2.55 (58)		-
Stiff dark brown, grey brown and grey mottled very silty slightly sandy CLAY with sandstone and mudstone gravel. Peaty roots near top		4.50	27.8		3.55 (89)		-
Brown and grey thinly laminated to thinly bedded highly weathered fine grained SANDSTONE with layers of grey mudstone		6.35	25.0		4.55 (97) 5.60 c	"84"	-
Grey slightly weathered fine to medium grained SANDSTONE.		7.65	23.7		6.55 c 7.50 c	80 for 150mm 50 for 62mm	-
Borehole complete.							-

Type of Sample

Is S.P.T. **■** Undisturbed

Ic C.P.T. **×** Vane

O Jar **Δ** Water

● Bulk **⊙** Piezometer

Remarks (Observations of Ground Water etc.) () U 100 blows

No water encountered during drilling

Chiselling sandstone from 6.35m to 7.65 - 1 hr

Water levels are subject to seasonal or tidal variations and should not be taken as constant