



West Winch Housing Access Road

Environmental Statement Chapter 12: Preliminary Risk Assessment: Appendix E: Exploratory Hole Logs

Author: Norfolk Partnership Laboratory

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1 Introduction

- 1.1.1 This document contains exploratory hole records which are produced from a surveyor's observations of soil and rock core extracted from the ground and typically include locality and lithological descriptions with depth and thickness. This document has been produced by Norfolk Partnership Laboratory and some users may not be able to access all technical details. If you require this document in a more accessible format please contact westwinchhar@norfolk.gov.uk.



TF 61 NW 1305
 526
 97. 1705
 1" 145

Ref. No. LJ 13

British Geological Survey

British Geological Survey

British Geological Survey







TECHNICAL SERVICES DEPARTMENT
 W. & C. French (Construction) Ltd
 01-504 4444

BORING RECORD

Location *Kings Lytt*
 Client
 Ground Level

Diameter of Boring *5 1/2"*

Borehole No. *121*
 Date *3rd May 1972*
 Depth of Lining Tubes *11+ft*

| Description | D. Level | Leg-end | Sample | Depth | Thickness | S.P. or Vane Test | Depth to Water below ground level |
|---|----------|---|--------|--------|--------------|-------------------|-----------------------------------|
| Topsoil | |  | 01 | 0 | 1'-5" | | |
| Fine red-brown silty SAND | |  | 02 | 1'-6" | 1'-0" | | |
| Fine brown & grey very clayey SAND with seams of soft grey clay | |  | 03 | 2'-6" | 4'-6" | | |
| Soft blue-grey CLAY with seams (1/8" - 1/4") of fine red-brown silty sand | |  | 04 | 7'-0" | 4'-0" | | |
| | |  | 05 | 11'-0" | pene-treated | | |
| | |  | 06 | 3-35m | | | |

L2 beds

Seepage

Water rose to 8'-6"

17 10 1972

Scale: *1 1/2" to 5 ft* | Tube Sample | Standard Penetration Test | Water Sample | Fig. No. *21*
 O Disturbed Sample + Vane Test (shear strength in $\frac{lb}{sq. ft.}$)

Date 7.5.68

TF 61 NW / 109

6365 1786

145

| Description | Reduced Level: ft. | Legend | Sample | Depth ft. in. | Thickness ft. in. | Standard Penetration test | |
|---|--------------------|-------------------|-----------------|----------------|--------------------|-------------------------------|------------------|
| | | | | | | Depth and Penetration ft. in. | No. of Blows (N) |
| Ground Level (Ft. above N.D.) Brown slightly clayey and silty fine and medium SAND with some gravel. (Made Ground) Loose dark grey very silty fine SAND with occasional fine gravel. Probably Lower Greensand (Sandringham Sands) Iron pyrites. → Stiff grey silty CLAY with shells and shell fragments. (Kimmeridge Clay) Hard and shaly. | | | | 0 0 | 3 0 | | |
| | | | 1 | 3 0 | | | |
| | | | 2 | (0 91m) | 4 6 | 12 2 | |
| | | | 3 | | 7 0 | | |
| | | | 4 | 10 0 (3 0m) | 8 0 | 12 1 | |
| | | | 5 | | | | |
| | | | 6 | | 15 0 penetrated | | |
| | | | 8 | | 17 6 | | |
| | | | 7 | | | 12 13 | |
| | | | 9 | | | 20 6 12 16 | |
| | | 10 | | 25 0 (4.6m) | | | |
| | | END OF BOREHOLE | | | | | |
| Water Level Observations. | | | | | | | |
| Date | Time | Depth of Borehole | Depth of Casing | Depth to Water | | | |
| 7.5.68 | 1300 | 20' 0" | 18' 0" | 13' 0" | | | |
| 7.5.68 | 1330 | 20' 0" | 18' 0" | 11' 0" | | | |
| Note Water encountered at 10' 6" during boring. | | | | | | | |

Scale 1 in. = 5 ft.

● Disturbed Sample



Bulk Sample

 Tube or Core Sample
(Length to scale)

△ Water Sample

NORTH RUNCTON "A" BH
 I.G.S. 1974

i) Location: Rectory Lane, North Runcton, Norfolk BH 'A'
 TF 6404 1624
 Surface level + 53ft O.D.

iv) Geological sequence:

| | Thickness in metres | Depth in metres |
|-------------------|------------------------|--------------------|
| Glacial Deposits | 8.87 | 8.87 |
| Sandringham Sands | 0.38 | 9.25 |
| Kimmeridge Clay | 91.19 | 102.44 |
| Amphill Clay | 4.37 | 106.71 |
| Final Depth | | 106.71 |

The full Kimmeridge Clay sequence for the Wash area is present (i.e. the unconformity at the base of the Sandringham Sands has not removed any substantial part of the clay), and both the Upper Kimmeridge Clay (equivalent to the Blackstone of Dorset) and the lower Kimmeridge Clay (equivalent to the Nannocardioceras Beds of Dorset) groups of oil shale-rich bands are present.

The Upper Kimmeridge Clay oil shale-rich band, together with its diagnostic fossil Saccocoma, was encountered from 23.14m to 26.46m, a total of 3.32m of strata which contain 1.56m of oil shale. Within this band most of the oil shale seams are concentrated between 23.14m and 25.58m, a total of 2.44m of strata which contain 1.43m of oil shale.

The Lower Kimmeridge Clay oil shale-rich band, with its diagnostic fauna of Nannocardioceras, and Sutneria rebholzi, was encountered from 45.50m to 51.95m, a total of 6.45m of strata which contain 1.98m of oil shale. Within the band the thickest oil shale seams occur between 47.95m and 51.95m, 4.00m of strata containing 1.43m of oil shale.

Oil shale-rich bands occur at a number of other levels within the Kimmeridge Clay, but are too thin to be of interest.

SEE OIL SHALE RESOURCES IN GT BRITAIN
 FEB 1979 (K90245)

Holst Soil Engineering Limited

Borehole No.

5

Contract No. F.3423

BOREHOLE LOG

TF 61NW/257

Location Kings Lynn

Sheet 2 of 2

Client Eastern Road Construction Unit

Chainage 220

Method of Boring Percussion

Ground Level 4.29 m.A.O.D.

Diameter of Borehole 204mm

Date 29 - 30.6.76

| 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 |
|--|--------|----------------------|----------------|--------------------------|----------------------|-------------|----------------|
| Very hard dark grey silty shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | | | | | 11.40 | 104 | |
| | | | | 3.00 | 11.50-11.90 11.90 | 127 | 29/6 |
| conjectured Very stiff silty shaly CLAY with white shell fragments (Kimmeridge Clay) | | 13.50 | -9.21 | 2.00 | 13.20-13.60 13.60 | 84 | |
| | | | | 3.00 | 14.50-15.00 15.20 | 76 | |
| | | | | 3.00 | 16.00-16.50 16.80 | 81 | |
| | | | | 3.00 | 17.50-18.00 18.00 | 87 | 30/6 |
| | | | | 3.00 | 19.55 | 103 | 1/7 |
| | | 20.00 | -15.71 | | | | |

Type of Sample

 Is S.P.T. Undisturbed

 Ic. C.P.T. Vane

 O Jar Water

 Bulk Piezometer

Remarks (Observations of Ground Water etc.)

See sheet 1

Holst Soil Engineering Limited

Borehole No.

5

 TF 61 NW/257
 6336/1811

 Contract No. F.3423
 Location Kings Lynn
 Client Eastern Road Construction Unit
 Method of Boring percussion
 Diameter of Borehole 204mm

BOREHOLE LOG

 Sheet 2 of 2
 Chainage 220
 Ground Level 4.29 m.A.O.D.
 Date 29 - 30.6.76

| 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 |
|---|--------|----------------------|----------------|--------------------------|---------------------|-------------|----------------|
| Stony TOPSOIL | | 0.30 | 3.99 | Nil | 0.40 | | |
| MADEGROUND:- Brown, very silty CLAY | | 0.80 | 3.49 | | 1.00 | | |
| MADEGROUND:- Sand and gravel (drainage bed for existing embankment) | | 1.00 | 3.29 | Nil | 1.30 | | |
| Stiff, becoming very stiff, grey silty CLAY with white shells (Kimmeridge Clay) | | | | Nil | 2.10 | | |
| | | | | | 2.45 | | |
| | | | | | 3.45 | | |
| | | | | 3.00 | 3.80 | | |
| | | | | | 4.70 | | |
| | | | | 3.00 | 5.20 | | |
| | | | | | 5.65 | | |
| | | | | 3.00 | 6.40 | | |
| | | | | | 6.85 | | |
| | | 7.50 | -3.21 | | 7.50 | | |
| Hard dark grey, silty, shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | | | | 3.00 | 8.00 | | |
| | | | | | 8.45 | | |
| | | | | | 9.25 | | |
| | | 9.25 | -4.95 | | 9.30 | | |
| Very hard dark grey silty, shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | | | | 3.00 | No recovery | | |

Type of Sample

- S.P.T. Undisturbed
 C.P.T. Vane
 Jar Water
 Bulk Piezometer

Remarks (Observations of Ground Water etc.)

Groundwater seepage at 0.80m depth, no casing
 Groundwater seepage sealed at 1.50m depth with casing
 Groundwater struck at 12.35m depth, casing depth 3.00m
 Standing water level at 1.30m depth, casing depth 3.00m

Holst Soil Engineering Limited

Borehole No.

7

BOREHOLE LOG

Contract No. E. 3423

 Location Kings Lynn

 Client Eastern Road Construction Unit

 Method of Boring Per percussion

 Diameter of Borehole 204mm

 Sheet 1 of 2

 Chainage 245

 Ground Level 4.74 m.A.O.D.

 Date 28-30.6.76

 TFGINW/259
6340.1811

| 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 |
|--|--------|----------------------|----------------|--------------------------|---------------------|--------------|----------------|
| MADEGROUND: - Sandy flint gravel | | 0.80 | 3.94 | | | | |
| Stiff, becoming very stiff, blue-grey laminated, silty CLAY with white shell fragments (Kimmeridge Clay) | | | | 1.00 | 1.00 | | |
| | | | | | 1.50 | | |
| | | | | 2.00 | 2.05 | | |
| | | | | | 2.50 | | |
| | | | | 3.00 | 3.00 | | |
| | | | | | 3.45 | | |
| | | | | 4.10 | 4.15 | | |
| | | | | | 4.60 | | |
| | | | | 4.50 | 5.05 | | |
| | | | | | 5.50 | | |
| Hard dark grey silty shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | | 9.30 | 4.56 | | | | |
| | | | | 4.50 | 9.50 | | |
| | | | | | 9.65 | | |
| | | | | | 10.10 | | |

28/6

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 added to assist boring to 9.50m depth
 Water struck at 9.50m depth, casing depth 4.50m
 Standing water level at 2.30m depth, casing depth 4.50m
 Standpipe inserted to 12.00m

Holst Soil Engineering Limited

Borehole No.

10

 Contract No. F. 3423
 Location Kings Lynn
 Client Eastern Road Construction Unit
 Method of Boring Percussion
 Diameter of Borehole 204mm

BOREHOLE LOG

 TFG 1 NW / 262
 6250-1397
 Sheet 1 of 1
 Chainage 140*
 Ground Level 5.25 m.A.O.D.
 Date 6.2.76

| 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 | |
|---|--------|----------------------|----------------|--------------------------|--|--------------|----------------|--|
| MADEGROUND:- Silty stony SAND with occasional roots and pockets of silty sandy stony clay | | 1.50 | 3.75 | Nil | 0.40 0.80 | | | |
| | | 1.50 | 3.75 | 1.50 | 1.30 1.50 1.70 | | | |
| Firm, grey, silty CLAY Stiff, grey silty laminated CLAY (Kimmeridge Clay) | | 2.20 | 3.15 | | 2.20 2.50 2.90 3.40 3.50 3.60 3.70 | | | |
| | | 3.50 | | 3.50 | 4.20 4.40 4.60 | | | |
| | | 3.50 | | 3.50 | 5.10 5.30 5.50 | | | |
| | | 6.00 | -0.75 | 6.00 | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | |
|--|---|
| Type of Sample Is S.P.T. <input type="checkbox"/> Undisturbed Ic. C.P.T. <input checked="" type="checkbox"/> Vane survey O Jar <input checked="" type="checkbox"/> Water ● Bulk <input checked="" type="checkbox"/> Piezometer | Remarks (Observations of Ground Water etc.) Water struck at 3.60m depth, casing depth 3.50m After 20 mins water level at 3.60m depth Water level at 5.70m depth, casing depth 3.50m Water level at 2.40m depth, no casing * Chainage from roundabout outside channel connection to old A47 |
|--|---|

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

TF61NW 293

6387.1736

Ref. No. LJ 18



British Geological Survey

1" 145

BORING RECORD

TECHNICAL SERVICES DEPARTMENT
W. & C. French (Construction) Ltd
01-504 4444

Location **KIR8- LY77**
Client
Ground Level

Diameter of Boring **8 1/2"**

Borehole No. **109**
Date **27th April 1972**
Depth of Lining Tubes **104'**

*(Weather
Mn Bks)*
*Mn
Bks*

| Description | D. Level | Legend | Sample | Depth | Thick-ness | S.P. or Vane Test | Depth to Water below ground level |
|---|----------|--------|--------|--------|--------------------|-------------------|-----------------------------------|
| Topsoil | | | 01 | 0 | 1'-6" | | |
| Fine & med brown clayey SAND with some med. & coarse gravel | | | 02 | 1'-6" | 5'-6" | | Water added to assist boring |
| | | | 03 | 7'-0" | | | Borehole Dry |
| Soft dark gray silty CLAY with partings of fine silty sand | | | 04 | 10'-0" | 3'-0" paper-rafted | | Slightly seepage |
| | | | | 305m | | | |

Scale: 1 in. to 5 ft

Tube Sample
 Standard Penetration Test
 Water Sample
 Disturbed Sample
 + Vane Test (shear strength in $\frac{lb}{sq. ft.}$)

Fig. No. 9

TF 61 NW | 295

Ref. No. LJ 18

6392.1729

1" 145

FRENCH






TECHNICAL SERVICES DEPARTMENT
W. & C. French (Construction) Ltd
01-504 4444

Location Kings Lytch
Client
Ground Level

Diameter of Boring B17

BORING RECORD

Borehole No. 111
Date 27th April 1972
Depth of Lining Tubes 10ft

| Description | D. Level | Leg-end | Sample | Depth | Thickness | S.P. or Vane Test | Depth to Water below ground level |
|---|----------|---|--------|--------|------------|-------------------|-----------------------------------|
| Topsoil | |  | 01 | 0 | 1'-0" | | |
| Fine & med very clayey SAND with some gravel | |  | 02 | 1'-0" | 2'-0" | | |
| | |  | 03 | 3'-0" | | | |
| Fine light brown, becoming grey, silty very clayey SAND | |  | 04 | | 7'-0" | | Borehole Dry |
| | |  | 05 | | perforated | | |
| | | | | 10'-0" | | | |
| | | | | 3-05m | | | |

Scale: 1/17 to 5 ft

Tube Sample | Standard Penetration Test | Water Sample
 O Disturbed Sample + Vane Test (shear strength in $\frac{\text{lb}}{\text{sq. ft.}}$ or $\frac{\text{KN}}{\text{m}^2}$)

Fig. No.

11



TF 61NW)302
6381.1710

Ref. No. LJ 15

British Geological Survey

British Geological Survey

British Geological Survey

TECHNICAL SERVICES DEPARTMENT
W. & C. French (Construction) Ltd
01-504 4444

1" 145

BORING RECORD

Location Kings Luff
Client
Ground Level

Diameter of Boring Six

Borehole No. 115
Date 1st-27th May 1972
Depth of Lining Tubos 30ft

| Description | D. Level | Log-ond | Sample | Depth | Thick-ness | S.P. or Vano Test | Depth to Water below ground level |
|--|----------|---------|--------|-------|----------------|-------------------|-----------------------------------|
| Topsoil | | | | 0 1 | 0 | | |
| Soft brown very sandy CLAY | | | | 0 2 | 1'-0" 1'-9" | 1'-0" 0'-9" | |
| | | | | 0 3 | | | |
| Stiff light brown & light grey silty CLAY with chalk sand & fine med & coarse chalk flint & ironstone gravel | | | | 0 4 | | 14'-3" | Borehole Dry |
| | | | | 0 5 | | | |
| | | | | 0 6 | 16'-0" | | |
| Stiff dark grey CLAY with chalk sand & fine med & coarse chalk, flint & ironstone gravel | | | | 0 7 | | 11'-0" | |
| | | | | 0 8 | | | |
| | | | | 0 9 | 27'-0" | | Seepage |
| SANDSTONE | | | | 0 9 | 2'-0" | | Water rising to |
| Grey-green very sandy CLAY (sample soft) | | | | 0 10 | 29'-0" | | 24'-0" in 10 min |
| | | | | 0 10 | 31'-0" | | Water at 22'-0" |
| | | | | 9.45m | | | |

Boulders
Clay

Non
LZ
Bds

Scale:

| Tube Sample N Standard Penetration Test ▲ Water Sample
 O Disturbed Sample + Vane Test (shear strength in $\frac{\text{lb/qa. ft.}}{\text{sq. m.}}$)

Fig. No.



TF 61 NW | 304
6393.1718

Ref. No. LJ 18

British Geological Survey

TECHNICAL SERVICES DEPARTMENT
W. & C. French (Construction) Ltd
01-504 4444

British Geological Survey

1" 145

British Geological Survey

BORING RECORD

Location Kings Lytt
Client
Ground Level

Borehole No. 120
Date 3rd May 1972
Depth of Lining Tubes 10 ft

Diameter of Boring 8 1/2"

Mat
L2 bds

| Description | D. Level | Leg-end | Sam-ple | Depth | Thick-ness | S.P. or Vane Test | Depth to Water below ground level |
|---|----------|---------|---------|--------|------------|-------------------|--|
| Topsoil | | | 0 1 | 0 | 1'-6" | | |
| Fine brown silty SAND | | | 0 2 | | 4'-6" | | |
| Laminations (1/8" - 1/4") soft grey silty CLAY & fine grey & brown silty SAND ?L2 | | | 0 3 | 6'-0" | 4'-0" | | |
| Mat L2 bds Fine grey & brown very silty clayey SAND ?L2 | | | 0 4 | 10'-0" | 2'-6" | | Seepage |
| Dark grey-green very sandy CLAY (sample 'soft') ?N1 | | | 0 5 | 12'-6" | 2'-6" | | When pulling tubes water rose to 9'-0" |
| | | | | 15'-0" | 2'-6" | | |
| | | | | 4.57 | 10'-0" | | |

Scale: 1/17. to 5 ft

| Tube Sample N Standard Penetration Test ▲ Water Sample
 O Disturbed Sample + Vane Test (shear strength in $\frac{lb}{sq. ft.}$)

LOCATION: PROPOSED EXTENSION, COOL-STAK LTD, WEST WINCH, NORFOLK (TF 633152).

COMMENCED: 5.1.87

COMPLETED: 6.1.86

DIAMETER: 150mm

BOREHOLE No. 1

GROUNDWATER:

Struck i * ii TFG/NW/SS Standing iii iv (m. depth)

(see notes below)

| DEPTH (m) | DESCRIPTION | LEGEND | DEPTH (m) | REDUCED LEVEL | SAMPLE/TEST | DEPTH (m) | REMARKS |
|-----------|---|------------------|-----------|---------------|-----------------------------|--------------------------------------|---|
| 0 | GROUND LEVEL | | | ** | | | * Hole broken out beforehand to 0.70m - contained water |
| 0.00 | MADE GROUND - concrete | [Cross-hatch] | 0.00 | 99.70 | | | |
| 0.20 | MADE GROUND - gravelly sand | [Cross-hatch] | 0.20 | 99.50 | | | |
| 0.50 | MADE GROUND - loose grey-brown clayey silty sand with some gravel, brick & wood fragments | [Cross-hatch] | 0.50 | 99.20 | J1 B1 | 0.70 0.70-1.50 | |
| 1.80 | FIRM becoming STIFF dark grey friable silty CLAY with some compressed shells | [X marks] | 1.80 | 97.90 | CPT J2 U1 W1 J3 | 1.50 1.80 2.2- 2.50 2.65 | N = 10 25 blows |
| | (KIMMERIDGE CLAY) | [Vertical lines] | | | U2 | 3.00 | 30 blows |
| 3.50 | END OF BOREHOLE | | 3.50 | 96.20 | J4 CPT | 3.45 3.50 | N = 18 |

** reduced levels relative to site datum: Ex. DPC = +10,00m

GROUNDWATER NOTES

| | | | | |
|-----------------------------------|---|-----|-----------|--------------|
| J = Jar disturbed sample | SPT = Standard Penetration Test | Ref | Date/time | Casing depth |
| B = Bulk disturbed sample | CPT = Cone Penetration Test | i | | |
| U = 700mm dia. undisturbed sample | N = No. blows per 300mm penetration | ii | | |
| P = 100mm dia. piston sample | FHT = Falling Head Test (results elsewhere) | iii | | |
| W = Water sample | V = Vane test | iv | | |

May Gurney

May Gurney (Technical Services) Limited

TF61NW/1356

JOB No. 344072

LOCATION: PROPOSED EXTENSION, COOL-STAK LTD, WEST WINCH, NORFOLK (TF 633152).

COMMENCED: 6.1.87

COMPLETED: 6.1.87

DIAMETER: 150mm

BOREHOLE No. 2

GROUNDWATER: Struck i... overnight seepage

Standing iii... 1.20 iv... (m. depth)

| DEPTH (m) | DESCRIPTION | LEGEND | DEPTH (m) | REDUCED LEVEL | SAMPLE/TEST | DEPTH (m) | REMARKS |
|-----------|---|--------|-----------|---------------|-------------|-----------|--|
| 0 | GROUND LEVEL | | 0.00 | 99.80 | * | | Hole broken out beforehand to 0.40m |
| 0.15 | MADE GROUND - concrete | | 0.15 | 99.65 | J1 | 0.15 | |
| | MADE GROUND - sand over brick rubble & gravel | | | | B1 | 0.15-1.00 | |
| 1 | MADE GROUND - loose grey silty sand with some gravel | | 1.00 | 98.90 | CPT | 0.75 | N = 5 |
| | | | | | J2 | 1.00 | |
| | FIRM grey-brown sandy silty CLAY with much gravel | | 1.80 | 98.00 | CPT | 1.50 | N = 9 |
| | | | 1.90 | 97.90 | W1 | 1.70 | |
| | STIFF dark grey friable very silty CLAY with some compressed shells | | | | J3 | 1.80 | |
| | | | | | U1 | 2.20 | 18 blows |
| | ...becoming fissured with depth | | | | J4 | 2.65 | |
| | (KIMMERIDGE CLAY) | | | | U2 | 3.00 | 18 blows |
| | | | | | J5 | 3.45 | |
| | | | | | U3 | 4.50 | 30 blows, 50% recovery |
| | | | | | J6 | 4.95 | |
| | | | | | U4 | 6.00 | 30 blows |
| | ...becoming VERY STIFF with depth | | | | J7 | 6.45 | |
| | | | | | U5 | 7.50 | 44 blows |
| | | | | | J8 | 7.95 | |
| | | | | | U6 | 9.00 | 60 blows |
| | | | | | J9 | 9.45 | |
| 0 | END OF BOREHOLE | | 9.45 | 90.35 | | | * reduced level relative to site datum: Ex DPC = +10.00m |

| | |
|-----------------------------------|---|
| J = Jar disturbed sample | SPT = Standard Penetration Test |
| B = Bulk disturbed sample | CPT = Cone Penetration Test |
| U = 100mm dia. undisturbed sample | N = No. blows per 300mm penetration |
| P = 100mm dia. piston sample | FHT = Falling Head Test (results elsewhere) |
| W = Water sample | V = Vane test |

| GROUNDWATER NOTES | | |
|-------------------|-------------|--------------|
| Ref | Date/time | Casing depth |
| i | - | - |
| ii | - | - |
| iii | 7.1.87/1000 | 3.00m |
| iv | - | - |

Holst Soil Engineering Limited

Borehole No.

7

Contract No. F. 3423
 Location Kings Lynn
 Client Eastern Road Construction Unit
 Method of Boring Percussion
 Diameter of Borehole 204mm

BOREHOLE LOG

Sheet 2 of 2
 Chainage 245
 Ground Level 4.74 m.A.O.D.
 Date 28 - 30.6.76

| 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 |
|---|-----------|----------------------|----------------|--------------------------|---------------------|--------------|----------------|
| Hard dark grey silty shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | [Pattern] | 11.30 | -6.56 | 4.50 | 11.00 | 71 | |
| Very hard dark grey silty shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | [Pattern] | | | 4.50 | 12.00 | 88 | |
| | [Pattern] | | | 4.50 | 13.50 | 86 | |
| ----- conjectured ----- Hard dark grey silty shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | [Pattern] | 15.00 | -10.26 | 4.50 | 15.00 | 55 | |
| ----- conjectured ----- Very hard dark grey silty shaly CLAY with occasional white shell fragments (Kimmeridge Clay) | [Pattern] | 16.50 | -11.76 | 4.50 | 16.80 | 82 | |
| | [Pattern] | | | 4.50 | 17.35 | 82 | |
| | [Pattern] | | | | 18.20 | 71 | 29/6 |
| | [Pattern] | | | | 18.80 | 71 | |
| | [Pattern] | 20.00 | -15.26 | | | | 30/6 |

| | |
|--|---|
| <p style="text-align: center;">Type of Sample</p> <p>Is S.P.T. <input type="checkbox"/> Undisturbed</p> <p>Ic. C.P.T. <input checked="" type="checkbox"/> Vane</p> <p>O Jar <input type="checkbox"/> Water</p> <p>● Bulk <input type="checkbox"/> Piezometer</p> | <p>Remarks (Observations of Ground Water etc.)</p> <p>See sheet 1</p> |
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159/62

Norfolk 45 SWS/W

Wisbech (159) Sheet

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NAR VALLEY BOREHOLE, SETCH [TF 6377 1455] About 7.3 m above OD

| | Thickness m | Depth m |
|---|----------------|------------|
| PLEISTOCENE | | |
| Topsoil; gravelly organic sand | 0.20 | 0.20 |
| Cryoturbation bed; orange-brown sandy stony clay and clayey sand | 1.60 | 1.80 |
| Tottenham Gravel | | |
| Fine and medium-grained sand; gravelly in part with small flints, rare chalks and peat and clay fragments derived from underlying beds | 3.80 | 5.60 |
| Nar Valley Marine Clay | | |
| Medium grey clayey silt and silty clay; finely laminated in part; thin-shelled marine bivalves common as whole shells and as debris; becoming very shelly below 9.0 m with many large oysters | 3.70 | 9.30 |
| Nar Valley Freshwater Beds | | |
| Hard black reedy peat resting at 10.4 m on grey fine-grained sand and silt; becoming more silty with depth; junction with bed below not clear but possibly an unbroken passage | 8.20 | 17.50 |
| Varved clay; interlaminated dull reddishbrown clay and grey silt, becoming pebbly in lower part and passing down into | 4.50 | 22.00 |
| Till; stiff grey chalky-Jurassic boulder clay | 0.50 | 22.50 |

The Nar Valley has a complex glacial history of infill and partial re-excavation. The Nar Valley Beds have been determined as Hoxnian interglacial in age (Stevens, 1960), but it is clear that they are made up of two separate components, a lower freshwater series which was deposited at a time of relatively low sea level and a marine sequence laid down at a time of higher sea level. This borehole suggests that the freshwater beds may have been deposited shortly after the retreat of the chalky-Jurassic boulder clay ice and that the marine beds were laid down during a period of transgression and rising sea level in the subsequent interglacial period. The borehole confirmed the erosive nature of the contact of the Tottenham Gravel (storm beach gravels) across the Nar Valley Beds as suggested by the spoil material at the nearby Tottenham gravel pits [TF 635 118] (see also Auction Ground Borehole, March, pp. 18).

(73' - 11")

Abstracted from "Boreholes Report 1975/10"