

08/2255

12 August 2008

Your Ref:

Our Ref: 1796-001

Suzy McShane
Graham Seabrook Partnership
The Studio Barn
Bury Farm Courtyard
Pednor Road
Chesham
Buckinghamshire HP5 2JU

Contact: Michael Ibbeson
Email: michael.ibbeson@structa.co.uk
Direct Dial: 07976 025 806

Dear Suzy

**3 Anson Walk, Moor Park
Flood Risk Assessment**

Thank you for your letter of 21 July 2008. We understand that proposed development at the above site has been questioned on the grounds of flood risk, in particular relating to the construction of a basement, and its potential local effect on groundwater. You have asked that we investigate pertinent published data relating to the site and provide a Flood Risk Assessment.

Published mapping for the area shows no watercourses in the immediate vicinity of the site. Reference to Environment Agency Flood mapping data indicates that the site does not lie within an indicative flood plain.

The 1:50000 British Geological Survey (BGS) England and Wales Sheet 255 (Beaconsfield) indicated the site to be underlain by London Clay (stiff bluish grey clay), underlain by the Reading Beds (mottled clay) in turn underlain by Upper Chalk of the Cretaceous period. This in turn is underlain by the Middle and Lower Chalk.

Clay is considered a non-aquifer, that is to say it does not store or transmit significant volumes of groundwater. Chalk is considered a major aquifer, that is to say it is capable of storing and transmitting significant volumes of ground water.

The generalised vertical section on the BGS map does not pass near the site and it is therefore not possible to verify the thickness of the various strata underlying the site from this source. We have therefore applied to BGS for borehole records in the vicinity of the site. The BGS hold records for two wells excavated near the site, one at the Mount Vernon Sanatorium from 1903, and one at Northwood vicarage in Ruislip dated 1877. Copies of the records obtained are enclosed for reference.

The well excavated at Mount Vernon Sanatorium, to the south west of the site, indicates gravel sand and clay to 10 feet below ground level (bgl), with clay to 31 feet bgl, overlying clay and stones to 69

Continued.../

Structa LLP
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STRUCTA
consulting engineers

Registered in England and Wales No. OC308316
Offices in Hemel Hempstead, Swindon and Warwickshire
Registered Office: Able House, Figtree Hill, Hemel Hempstead, Herts HP2 5XH

feet bgl. The well excavated at Northwood Vicarage indicates clay to 31 feet bgl overlying sand. Observing these well excavation records with the BGS map shows that the Mount Vernon Sanatorium coincides with an area of Glacial Sand and Gravel overlying the London Clay, and that the Northwood Vicarage site lies at the edge of the London Clay, where this will prove a thin mantle over the Reading Beds. In each case, clay is proven to 31 feet, with overlying gravel sand and clay only occurring at Mount Vernon Sanatorium. Interpolating these records, and observing the BGS map, it appears that a significant thickness of London Clay should be present from near surface on the subject site.

The well excavated at Mount Vernon Sanatorium indicates a standing groundwater level of 182 feet bgl within the chalk.

In the absence of detailed site investigation, it is not possible to determine with 100% confidence the near surface lithology. However, the published geology indicates that the likely near surface lithology will consist of clay to approximately 10 metres, with groundwater at depth within the underlying chalk at approximately 55 metres bgl. As the clay is classified a non-aquifer, the movement of groundwater through the site within the depth of a normal basement (that is less than 4 metres depth) is likely to be insignificant.

On the basis of the available published information therefore, the flood risk associated with the construction of the proposed development, including a basement, is considered negligible.

We trust you find the above in order. Should you have any queries, or if you require any further information, please do not hesitate to contact us.

Yours sincerely
For and on behalf of Structa LLP

A handwritten signature in black ink, appearing to be 'MI', with a long horizontal flourish extending to the right.

Michael Ibbeson

Encs.

Exact site _____ in parish of TQ 0772 9193 } (A rough sketch or a tracing from a map is very desirable)

Level of ground surface above sea-level (O.D.) 340 ft. If well starts below ground surface, state how far _____ ft.

Shaft _____ ft., diameter _____ ft. Bore _____ ft. Diameter of bore: at top _____ ins.; at bottom _____ ins.

Details of permanent lining tubes (internal diameters preferred) 10 ft x 15 ins.; 116 ft x 12 ins., 2 ft into chalk; 202 x 10 ins, to top.

TQ 09/66

Water struck at depths of (feet) _____

Rest-level of water ^{below} top of well 182 feet. Suction at _____ feet. Yield on _____ hours' test _____ days'

2,500 gallons per hour (with pump of capacity _____ g.p.h.); depressing water level to _____ feet below top. Time of recovery _____ hrs. Amount normally pumped daily _____ g.p.h. for _____ hours.

Quality (attach copy of analysis if available) _____

Sunk by Duke & Ockendon for Mr. _____ Date of well 1903.

Information from Duke & Ockendon.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS		DEPTH	
		Feet.	Inches.	Feet.	Inches.
<u>Drift 10 ft</u>	<u>Gravel sand and clay</u>	<u>10</u>	<u>-</u>	<u>10</u>	<u>-</u>
<u>L.C. 59 ft.</u>	<u>Clay</u>	<u>21</u>	<u>-</u>	<u>31</u>	<u>-</u>
<u>London Clay</u>	<u>Clay and stones</u>	<u>38</u>	<u>-</u>	<u>69</u>	<u>-</u>
	<u>Clay</u>	<u>22</u>	<u>-</u>	<u>91</u>	<u>-</u>
<u>R.B. 48 ft.</u>	<u>Sand</u>	<u>7</u>	<u>-</u>	<u>98</u>	<u>-</u>
<u>Reading Beds</u>	<u>Sandstone</u>	<u>3</u>	<u>-</u>	<u>101</u>	<u>-</u>
<u>26 ft.</u>	<u>Hard sandstone</u>	<u>9</u>	<u>-</u>	<u>110</u>	<u>-</u>
	<u>Sand and gravel (pebbles?)</u>	<u>7</u>	<u>-</u>	<u>117</u>	<u>-</u>
<u>UPPER & MIDDLE CHALK</u>	<u>Chalk and flints</u>	<u>333</u>	<u>-</u>	<u>450</u>	<u>-</u>

The composition of the Reading Beds is unusual, and perhaps some of the lowest bed of clay may belong to this series.

PUBLISHED IN
"SUMMARY OF PROGRESS FOR 1906"
p. 163.

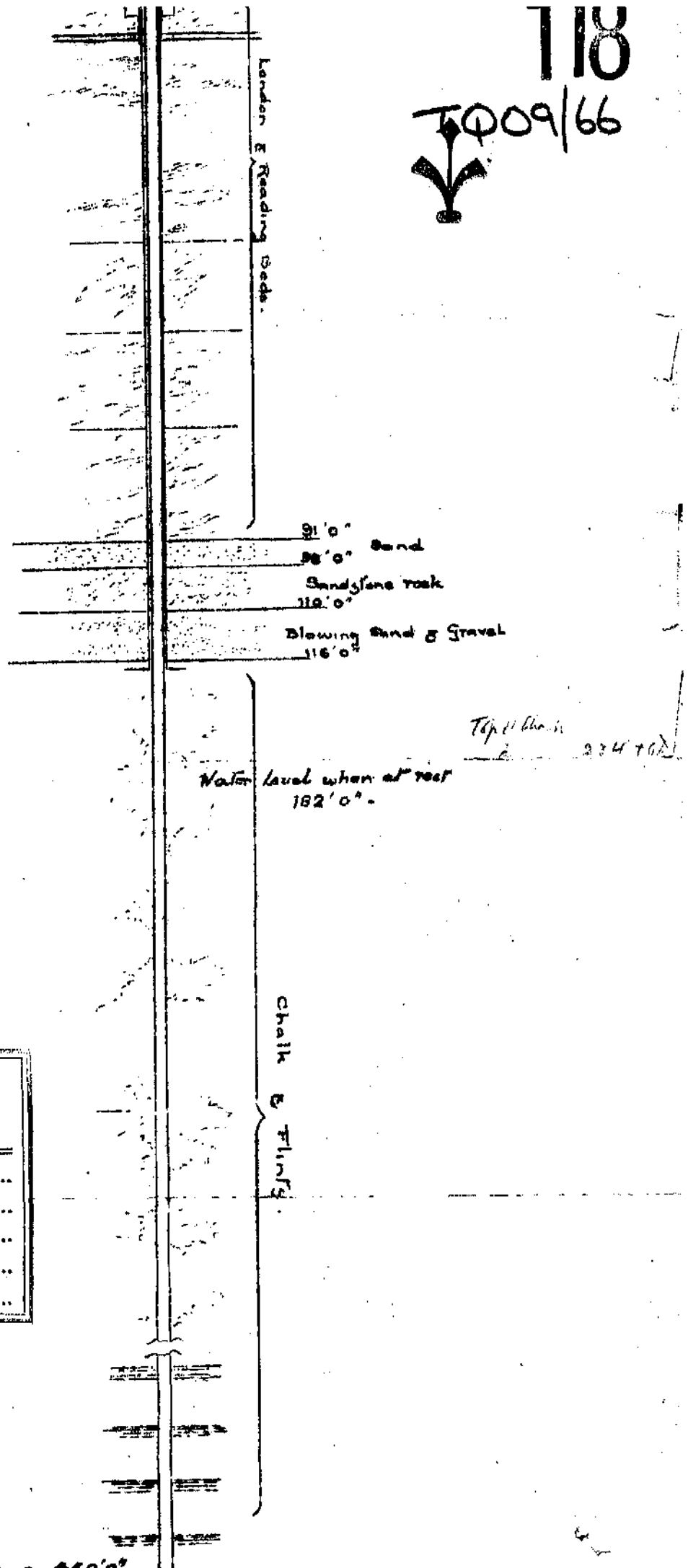
Duke

Dimond WC/C 7 2 98
Inaccessible and believed to be dry.
Inf from Harefield Pumping Test file (WE/255)

Nov. 1956
REA.

118

TOP 09/66



DUKE & OCKENDEN,
ENGINEERS,
LITTLEHAMPTON.

Drawing No. 969

Title Section of Boring
at Northwood

For

Date June 22/03

TOTAL DEPTH 450'0"

2
11255. 6" ~~W. 19 2~~
E & OCKENDEN, Consulting & Mechanical Engineers STQ 09/66
for Water Supplies.

TELEGRAMS: "DANDO," LITTLEHAMPTON.
"DUGOUT," LONDON.
TELEPHONE: No. 6 LITTLEHAMPTON.
No. 948 (Hop) LONDON.

CODES USED: A B C & LIESERA.

LONDON OFFICES & SHOWROOMS:
126, SOUTHWARK STREET, S.E.

HYDRO-GEOLOGISTS.

ARTESIAN BORED TUBE WELLS.
SINKINGS OF ANY SIZE.
SPECIALLY DESIGNED CAISSONS.

STEAM, GAS, & OIL ENGINES.
PUMPS, AND PUMPING MACHINERY.
WINDMILLS, RESERVOIRS.
PIPES, FITTINGS, VALVES.

HEAD OFFICE & WORKS:

Ferry Wharf,
LITTLEHAMPTON,
SUSSEX.

300 C.D.

Contractors to the WAR OFFICE.

July 14th, 1902.

Gentlemen;-

RUSSIA

Enclosed we beg to hand you section of boring we have just carried out at Mount Vernon Sanatorium, Northwood as premised. The yield is 2,500 gallons an hour.

Yours faithfully,

Duke Ockenden

Published in Ann. of Progress.
1873 not

The Geological Survey,
Jermyn Street, S.W.

The Analysis of Water is not published

6" Wels. 43 SE/E

Date Book



9th July, 1903.

Ref. No. 1357.

RESULT of ANALYSIS of a Sample of WATER.

Received from Messrs. Duke & Ockenden, on a/c F. Wheeler, Esq., F.R.I.B.A.

On the 30th June

Marked From new well at Mount Vernon Sanatorium, Northwood.

	Grains per Gallon
Total Dissolved Matter.	31.36
Loss on Incineration of Residue.. . . .	1.82
Chlorine in Chlorides.. . . .	2.15
(Equal to Chloride of Sodium)	3.54
Nitrogen in Nitrates	inappreciable
(Equal to Nitric Acid).	----
Free (actual or saline) Ammonia001
Albuminoid (organic) Ammonia001
Oxygen absorbed by Oxidisable Organic Matter, &c., from a solution of Permanganate of Potash at a temperature of 80° Fahrenheit -	
In 15 minutes002
In 4 hours005
Phosphoric Acid	traces
Appearance in 2 feet tube	slightly turbid

The Dissolved Matter consists of:-

	Grains per Gallon.
Carbonate of Lime	16.12
Sulphate of Lime	3.40
Sulphate of Magnesia	5.88
Sulphate of Soda	1.64
Chloride of Sodium	3.54
Soluble Silica, &c., &c.,78
	<u>31.36</u>
Total Hardness	23½ degrees = 336 p.p.m.
Hardness after Boiling	8 degrees

Duke Bank

This water is of a high degree of purity. It may, if desired, be softened by lime treatment to about 8 degrees, or still further by soda treatment; a properly constructed plant being necessary in either case. As far as drinking purposes are concerned, however, there is no need to interfere with the natural condition of the water. Its slight turbidity will no doubt disappear on continued pumping.

(Signed) Bernard Dyer.

Doc
EADK



TRADE MARK

DUKE & OCKENDEN Ltd., Consulting & Mechanical Engineers for Water Supplies

TELEGRAMS: DANDO, LITTLEHAMPTON
"DUOOUT," LONDON.
TELEPHONES: NO. 6, LITTLEHAMPTON,
NO. 2521 (RUP) LONDON,
NO. 5498 (CIRO) LONDON.
COOFS USED: ABC & LIEBERS.

HYDRO-GEOLOGISTS.

ARTESIAN BORED TUBE WELLS.

MINERAL CORES PRODUCED BY "DANDO-ROTARY"

"DANDO" ELECTRICALLY-DRIVEN PUMPS.

"DANDO" IMPROVED AIR-LIFT

"DANDO" SELF-REGULATING WINDMILLS

"DANDO" PATENT DIAPHRAGM PUMPS.

"DANDO" SAND STRAINERS.

PETROL, OIL AND GAS ENGINES.

PUMPING MACHINERY ON HIRE
FOR EMERGENCY.

TQ09/66



PARIS, 1900.



BRIGHTON.



DOVER.



PETERBORO



CRYSTAL PALACE.

Wharfe
FERRY WHARF,
LITTLEHAMPTON.

AGENTS TO:
ADMIRALTY,
WAR OFFICE,
INDIA OFFICE,
INDIA OFFICE,
INDIA OFFICE.

PLEASE REPLY TO
LONDON OFFICE.

Offices and Showrooms:

126, Southwark St., LONDON, S.E.

ALL CORRESPONDENCE MUST BE REFERRED TO THE GENERAL MANAGER AT LONDON.

November 18th, 1911.

Dear Sir,

In reply to your letter of this morning we beg
to say that the following is our record of the Mount Vernon
boring, Northwood.

OTD 340

Boring by Duke & Ockenden Ltd. 1903.

London Clay & Reading Beds.....	91	feet.
Sand.....	19	"
Blowing Sand & Gravel.....	6	"
Chalk & Flints.....	334	"
Total	450	feet.

340
182
158

Tested at 400 feet:- Yield 1500 gallons per hour,
exhausting the well.

340
182
158

Tested again at 450 feet :- Yield 2500 per hour.

Standing W.L. 182 feet below surface.

Analyst's report satisfactory.

Lining Tube. 12" to 118 feet. 10" to 204 feet.

We take it this is all the data you need.

Yours faithfully,

For DUKE & OCKENDEN, LTD

A.H.Noble Esq.
The Geological Survey & Museum.
Wernyn St. S. W.

[Handwritten signature]

Hardness 25
reduced to 4
obtained from Engineer
by A.H.Noble
15,000 gals per day
pumped.

RECORD OF WELL (SHAFT OR BORE)

MIDDY 4 SE
 11' 11" S.
 255
 Ref. 118

At Mount Vernon Sanatorium
 Town or Village Northwood County Middlesex Six-inch quarter sheet 118
 Exact site _____
 _____ in parish of TQ 0772 9193 (A rough sketch map or a tracing from a map is very desirable)
 Level of ground surface above sea-level (O.D.) 340 ft. If well starts below ground surface, state how far _____ ft.
 Shaft _____ ft., diameter _____ ft. Bore _____ ft. Diameter of bore: at top _____ ins.; at bottom _____ ins.
 Details of permanent lining tubes (internal diameters preferred) 10 ft x 15 ins.; 116 ft x 12 ins. 2 ft into chalk; 202 x 10 ins. to top.
 Water struck at depths of (feet) _____ TQ 09/66
 Rest-level of water ^{below} top of well 182 feet. Suction at _____ feet. Yield on _____ hours' test 2,500 gallons per hour (with pump of capacity _____ g.p.h.); depressing water level to _____ feet below top. Time of recovery _____ hrs. Amount normally pumped daily _____ g.p.h. for _____ hours.
 Quality (attach copy of analysis if available) _____
 Sunk by Duke & Deharden for Mr. _____ Date of well 1903.
 Information from Duke & Deharden

	GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS		DEPTH	
			Feet.	Inches.	Feet.	Inches.
	Drift 10 ft	Gravel sand and clay	10	—	10	—
L.C. 59 ft	London Clay	Clay	21	—	31	—
		Clay and stones	38	—	69	—
		Clay	22	—	91	—
R.B. 48 ft	Reading Beds	Sand	7	—	98	—
	26 ft	Sandstone	3	—	101	—
		Hard sandstone	9	—	110	—
		Sand and gravel (pebbles?)	7	—	117	—
UPPER & MIDDLE CHALK		Chalk and flints	333	—	450	—

The composition of the Reading Beds is unusual, and perhaps some of the lowest bed of clay may belong to this series.

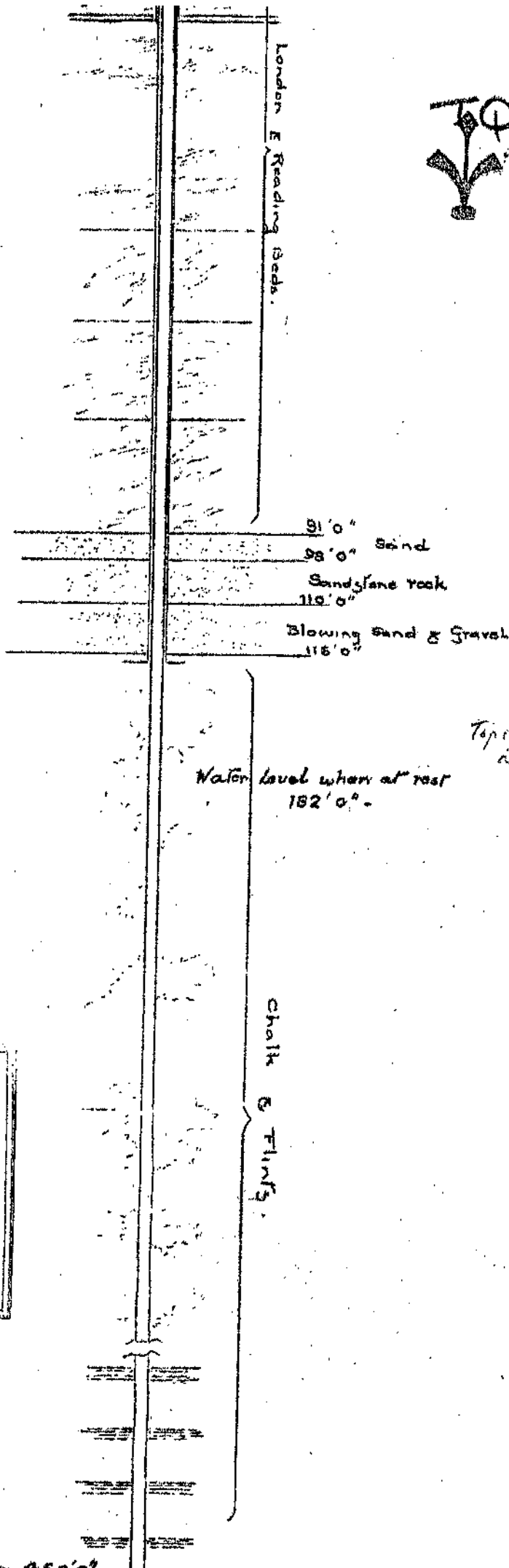
PUBLISHED IN
 "SUMMARY OF PROGRESS FOR 1906"
 p. 163.

Data Sunk

DINWAD WC/C 7.2.98

118

1009/66
↓



Top of chalk
234 feet

DUKE & OCKENDEN,
ENGINEERS,
LITTLEHAMPTON.

Drawing No. 469

Title Section of Boring
at Northwood

For

Date June 22, 1893

Surface level of ground *260* ft. above Ordnance Datum. Well or Bore commenced at *139* ft. below surface level of ground.

Sunk *260* ft., diameter *139* ft. Bored *139* ft.; diameter of boring: at top *139* in., at bottom *139* in.

Details of lining tubes (internal diameters preferred)

Water struck at depths of (feet) *TQ 0815 9189* *TQ 09/68*

Rest-level of water below top of well or bore *139* ft. Pumping level *139* ft. Time of recovery *139* hours.

Suction at *139* ft. depth. Yield: (i) on test *139* galls. per *139*, (ii) normal *139* galls. per *139*.

Quality (attach copy of analysis if available)

Made by *G. Isler & Co. Ltd.* for Mr. *C. Brown of Hatfield.* Date of boring *1877*

Information from *C. Brown of Hatfield.*

(For Survey use only) GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
	<u>Shaft throughout.</u> 9' water.				
	Mould	1	6	1	6
	Yellow clay	5	-	6	6
	Mixture of blue and yellow clay	4	-	10	6
Reading	Blue fire clay	5	-	15	6
Beds	Yellow sandy clay	4	-	19	6
	Yellow and red clay, very hard	12	-	31	6
	Greenish sand	5	6	37	-
	White sand	4	-	41	-
	Blue pebbles and sand	4	-	45	-
<i>U Chalk</i>	Chalk and flints	60	-	105	-

106 *1/1/57* *According to Geol. Surv. Map 1:255 this site is just near edge of London Clay*

Published in "London Memoir" II p. 154.

* *Site (cannot be seen in kitchen garden ca. 20 yd N.E. of house) pointed out to G.H.D. 21.6.44. The well it said to have been filled up many years ago & long before present incumbent came. Sur-level is at > 260' & depth at < 255, although site is about on the 250' contour of (some copies of) P.P. 1' sheet 106.*

Bank

