Mineral Safeguarding & Development Assessment

Land to East of Stratford Road, Hockley Heath, Warwickshire

1. Background

1.1 At the request of Real Christmas Trees Limited, Greenfield Environmental have been commissioned to undertake a mineral safeguarding and development assessment for a *potential strategic growth location within the emerging draft South Warwickshire Local Plan (SWLP),* the location of which is shown in Figure 1.

1.2 The proposed development lies just to the south of the village of Hockley Heath off Stratford Road (A3400) (see Figure 1), which is located within an identified minerals safeguarding area as shown in the South Warwickshire Local Plan: Preferred Options Consultation Interactive Map. The mineral safeguarding extent is shown in Figure 2.

1.3 The purpose of Warwickshire Minerals Safeguarding Areas is to ensure developments do not needlessly sterilise mineral resources. This report outlines the effect of the proposed development of the underlying mineral resource as per Policy MCS5 of the Warwickshire Minerals Local Plan adopted in July 2022.

2. Site Description

2.1 The triangular area of land adjacent to Stratford Road, lies just to the south of Hockley Heath, the northern site boundary lying around 200m from the village centre. The land is currently in use as a commercial tree plantation for 'Christmas tree' conifers and is bounded by Stratford-Upon-Avon Canal along the eastern edge of the site and Stratford Road (A3400) along the west. The southern boundary of the site is formed of Warf Lane, and a number of residential properties are present in the southwestern corner of the site. Residential properties and Hockley Heath Social Club are also situated immediately adjacent to the northern boundary of the site.

2.2 The site has an area of approximately 49.03 acres/ 198,400m^2 (19.84ha) and appears generally level at around ~140mAOD.

3. Published Geological Information

3.1 A review of the published geological maps of the area, which are given on the British Geological Survey (BGS) "open geology of Britain viewer" indicates that the Mercia Mudstone Group of Triassic age, is covered by glacial drift across the entirety of the proposed development site. The published drift map showing the extent of the superficial deposits across the site is shown in Figure 2 alongside the mapped extent of the Arden Sandstone formation, a member of the Mercia Mudstone Group.

3.2 The Mercia Mudstone is a regionally widespread unit, described as a red brown structureless mudstone and siltstones which has the occurrence of industrially important gypsum horizons and nodules in some parts of the UK.

3.3 Glacial till deposits are mapped to be present across the whole of the site. These deposits are normally characterised by the presence of thick clays and silts that contain minor sand and gravels. In the immediate vicinity of the site there are areas of mapped glaciofluvial deposits as shown in Figure 3.

3.4 The general geological stratigraphy of the area shown in Table 1 below:

Table 1 General Stratigraphy of the Hockley Heath Area

Drift	
Holocene	Alluvium
Pleistocene	Glaciofluvial Deposits
Bedrock	
Triassic	Mercia Mudstone - Arden Sandstone Formation

3.5 Published borehole logs available on the BGS GeoIndex, suggests that the drift deposits in the proposed area of development are formed of substantial deposits of glacial boulder clay overlying some river terrace sands and gravels (Appendix 1).

3.6 A published log from the adjacent Stratford-Upon-Avon Canal (SP17SE/116) recorded the thickness of the proven sand and gravel deposit to be 20cm and described the material as" slightly clayey" indicating a significant fines content of the material. The base of the deposit was proven in the BGS borehole with 4.15m of Mercia Mudstone recorded beneath the sand and gravel deposit.

3.7 Seven published boreholes around the Hockley Heath Social Club are also shown on the BGS GeoIndex. This collection of boreholes lies around 100m north of the site boundary. The collection of boreholes prove the presence of a sand and gravel deposit that are covered by a deposit of glacial boulder clay that ranges from 1.9m in borehole SP17SE159 to 2.6m in boreholes SP17SE164 and SP17SE162 (Appendix 1).

3.8 All boreholes were terminated in the sand and gravel deposits at around 3.40m to 4.40m depth, and consequently none proved the Mercia Mudstone bedrock. Therefore, the thickness of sand and gravel deposits across this area cannot be determined fully.

4. Mineral Safeguarding Area

4.1 Within the emerging South Warwickshire Local Plan, the site is located entirely in a zone of Mineral Safeguarding as presented in the Preferred Options Consultation Interactive Map. This area is highlighted in Figure 2 alongside the Strategic Growth Location to which the site is assigned.

4.2 However, the assignment of mineral safeguarding is usually a county council level issue and thus a review of the Warwickshire County Council website and adopted Minerals Local Plan indicates that the site appears to be located within the building stone mineral safeguarding area and only the southwestern corner is within the sand and gravel designation, as shown in Figure 4. Therefore, at County Council level, the bedrock Arden Sandstone across the site is the deposit that is held under Mineral Safeguarding.

5. Potential for Mineral Development

5.1 The potential for a viable building stone deposit is highly unlikely as published BGS logs in the surrounding area indicated that the bedrock across the area is formed of green/grey to brown stiff clay material that is typical of the Mercia Mudstone. No bedded sandstone units of the Arden Sandstone have been recorded. If this material exists at depth, the volume of overlying glacial till, terrace deposits and bedrock clays that would require stripping would be substantial and therefore render the extraction non-viable.

5.2 The potential for workable spreads of sand and gravel mineral across the site area are also uncertain due to the variability in the thicknesses of 0.2m in borehole SP17SE/116 to over 2.5m recorded in SP17SE159. The quality of the deposits is also an important factor as alluvium and glaciofluvial deposits in this area are generally known to comprise silty sand and gravel that would require significant washing and processing to produce an aggregate material. Due to the variable nature of the material processing losses may be as high as 10% which significantly reduces the potential saleable yield of mineral available.

5.3 The location of the site is also an important factor to assess when considering the mineral potential of a site as the southwest corner of the site which is assigned sand and gravel safeguarding status is covered by existing housing. Any adjacent areas that are assigned as safeguarding areas would not be able to be worked due to close proximity to residential properties.

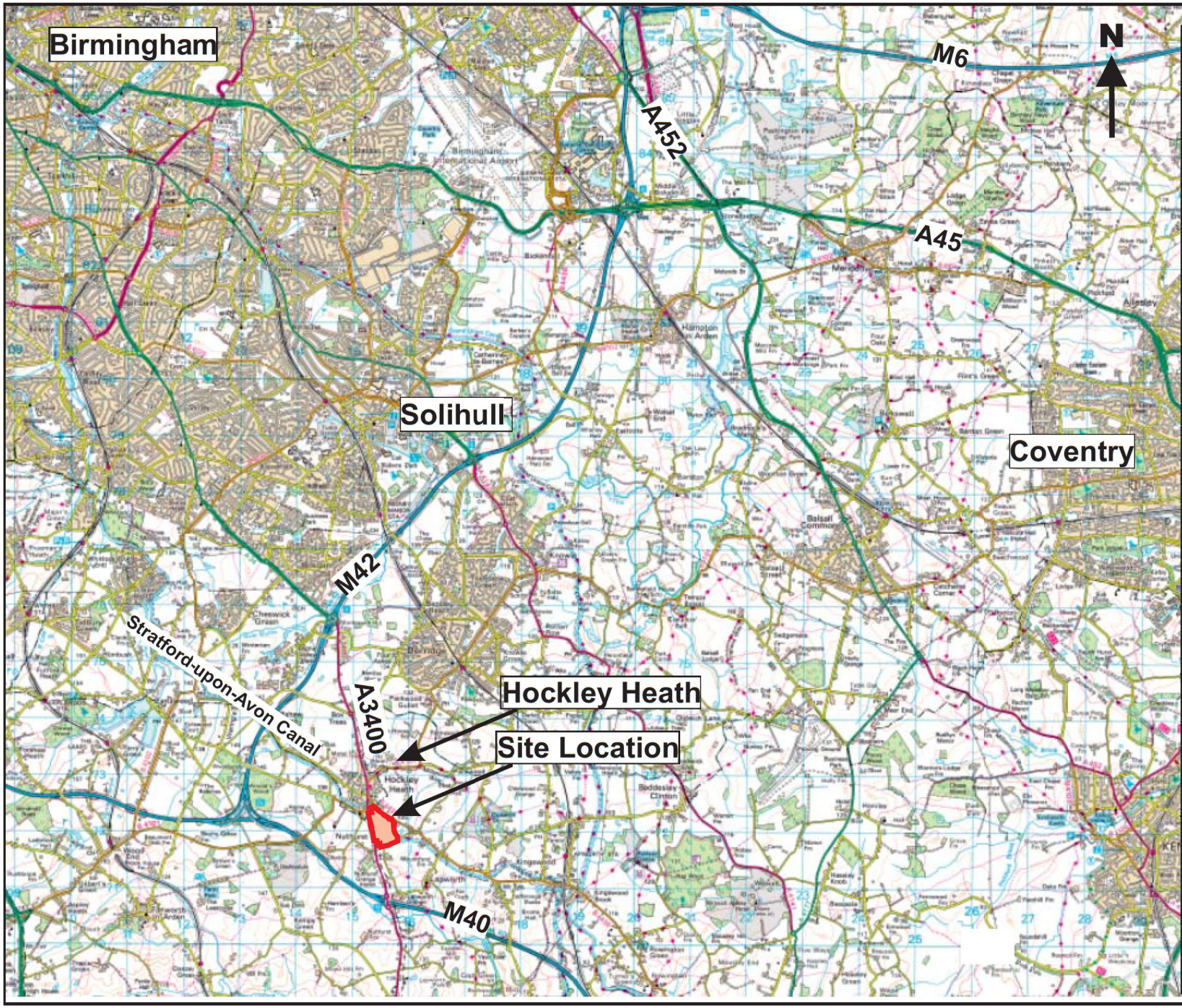
5.4 The working of mineral at the site would require dewatering as most of the mineral lies below the water table (see boreholes in Appendix 1). The depths of dewatering that would be required in order to extract any Arden Sandstone at depth would be great and as the Stratford-Upon-Avon Canal is located immediately to the east of the site, this scale of dewatering could potentially impact this important feature, rendering extraction unviable.

6. Conclusions

6.1 Due to the uncertainty regarding the presence of any potential workable "mineral", together with the thick layer of proven overlying boulder clay and other processing difficulties, it is considered that any mineral development on the site will be uneconomical, with the potential costs of a development far outweighing any potential mineral value if any mineral were to be present.

B.G. Donaghey B.Sc., M.Sc., FGS
for **Greenfield** Environmental
13th August 2025

FIGURES



Site Location

0m 1km 2km

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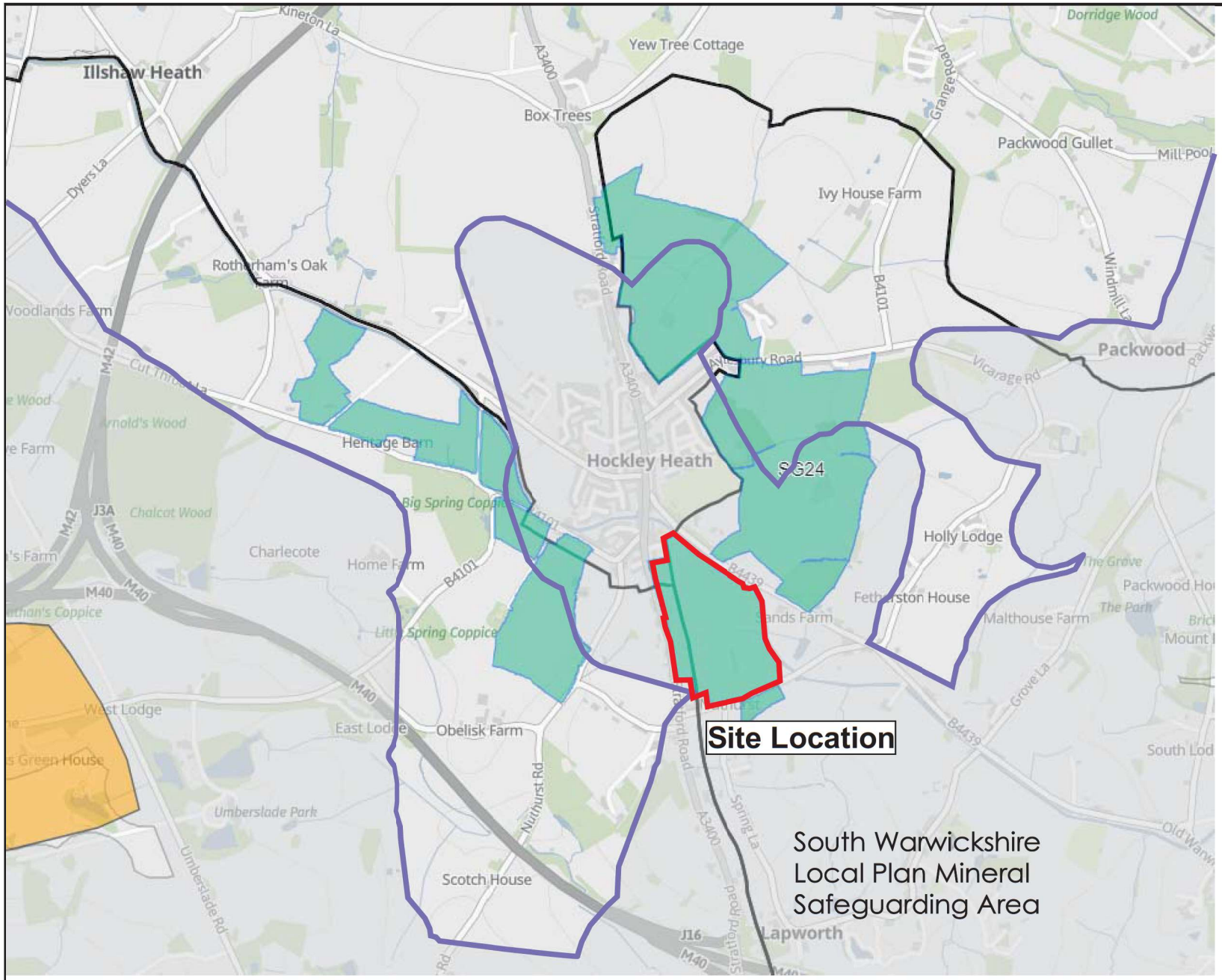
Figure 1
Location Plan

Project
Mineral Assessment

Site
Land South of Hockley Heath, Warwickshire

Project No.	Scale
TTO/HKH/100	nts

Greenfield enviro



Source: South Warwickshire Local Plan: Preferred Options Consultation Interactive Map

Site Location

South Warwickshire Local Plan Mineral Safeguarding Area

South Warwickshire Local Plan Strategic Growth Locations

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Figure 2 South Warwickshire Mineral Safeguarding Area

Project
Mineral Assessment

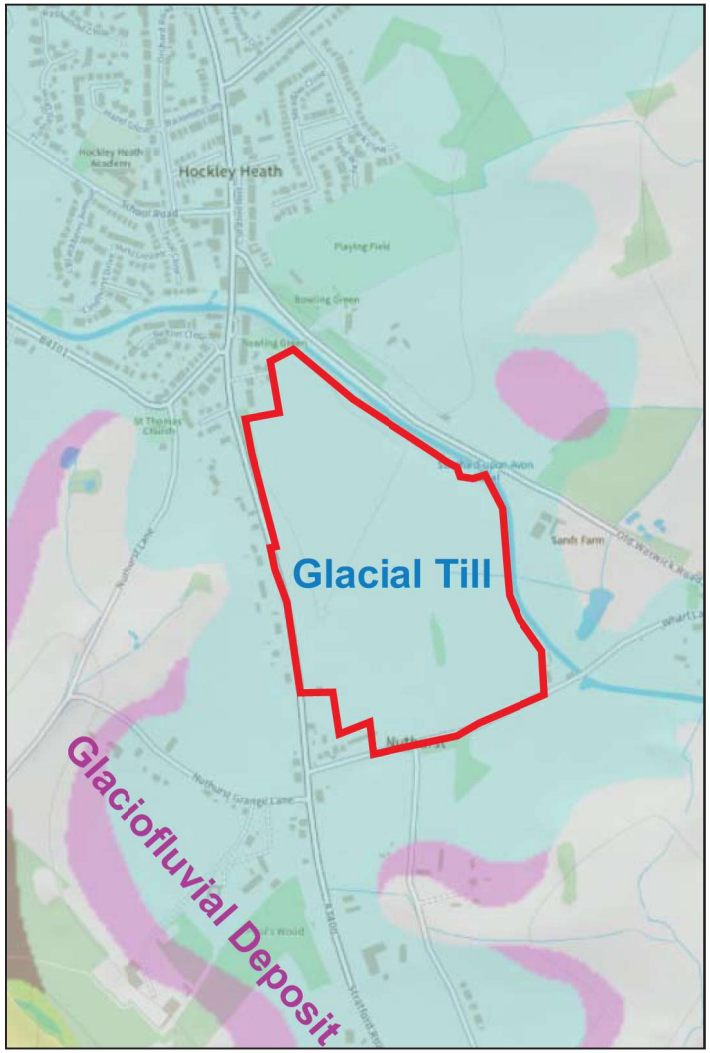
Site
Land South of Hockley Heath, Warwickshire

Project No.	Scale
TTO/HKH/100	nts

Greenfield enviro

Bedrock Geology

Superficial Geology



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Site Location

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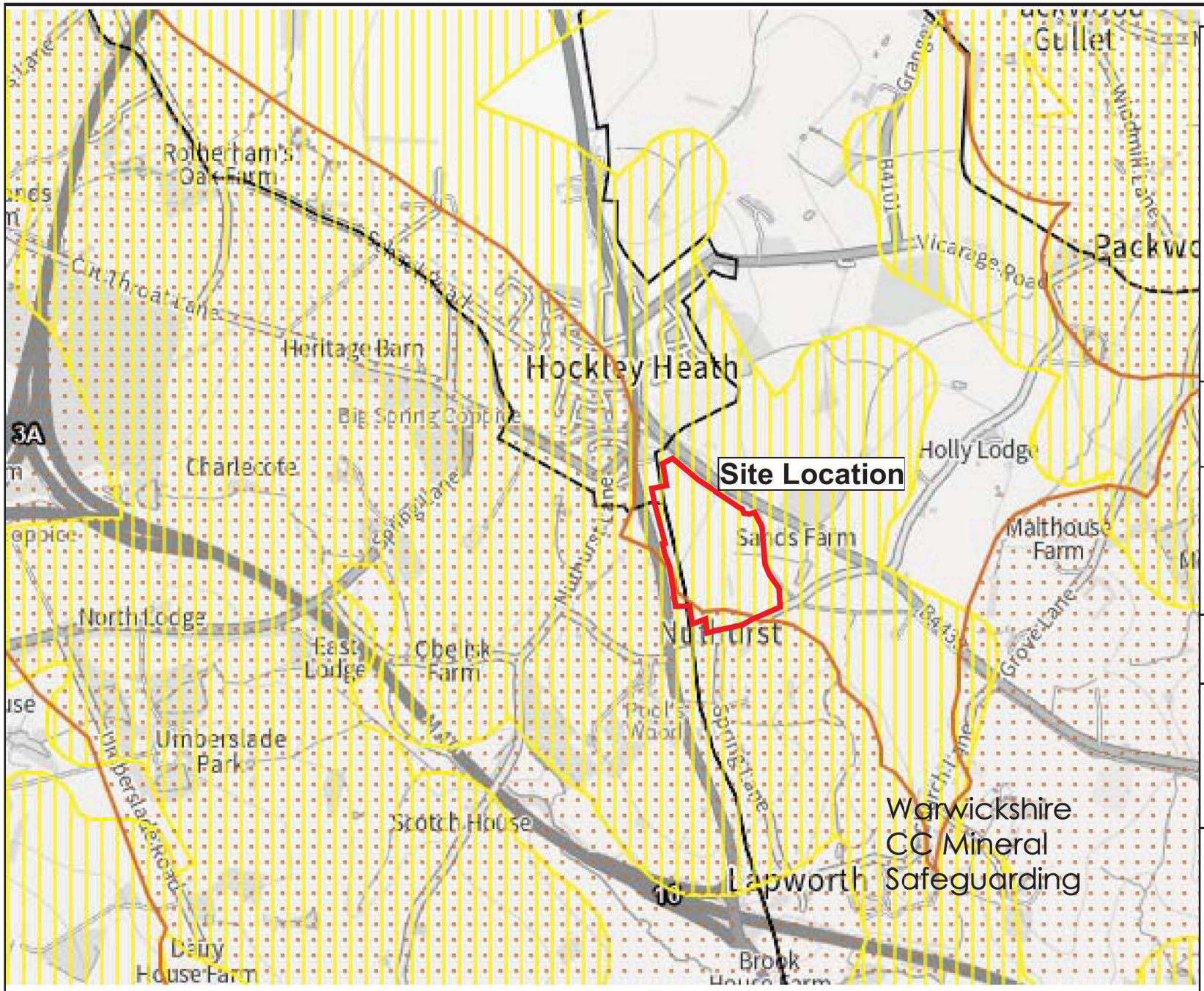
Figure 3
Published Geology

Project
Mineral Assessment

Site
Land South of Hockley Heath, Warwickshire

Project No.	Scale
TTO/HKH/100	nts

Greenfield enviro



Source: https://www.warwickshire.gov.uk/minerals-local-plan-1

Site Location

Warwickshire CC Sand and Gravel Mineral Safeguarding

Warwickshire CC Building Stone Mineral Safeguarding

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Figure 4 Warwickshire County Council Safeguarding Areas

Project

Mineral Assessment

Site

Land South of Hockley Heath, Warwickshire

Project No.	Scale
TTO/HKH/100	nts

Greenfield enviro

APPENDIX

Norwest Holst Soil Engineering Ltd.

Borehole No. 8

BOREHOLE LOG

SP17SE/116

1552 7233

COMMERCIAL IN CONFIDENCE

Contract No. P8039
Location Stratford Canal North
Client B.W.B.
Method of Boring Percussion
Diameter of Borehole 150mm

Sheet ..... of .....
Chainage .....
Ground Level 140.93 m.A.O.D.
Date 10/8/88

Description of Strata	Depth Below G.L. (m)	O.D. Level (m)
TOPSOIL	0.60	140.3
Stiff brown mottled silty CLAY with gravel and occasional sand pockets		
Orange/brown slightly clayey SAND and GRAVEL	3.30	137.6
Firm brown silty CLAY (Completely weathered Keuper Marl) (Zone IVb)	3.50	137.4
Stiff brown and grey silty CLAY (completely weathered Keuper Marl) (Zone IVb)	4.00	136.9
Stiff grey/green silty CLAY (Completely weathered Keuper Marl) (Zone IVb)	4.30	136.6
Firm grey silty CLAY (Completely weathered Keuper Marl) (Zone IVb)	4.50	136.4
Weathered grey/green KEUPER MARL (Zone IVa-III)	5.50	135.4
	7.65	133.3

Legend

Casing Depth at Sampling

Sampling and Coring: 0.60 (54); 1.55 (68); 2.55 (78); 3.55 (82); 4.55 (40); 5.55 (200); 6.55; 7.55

"N"/R.Q.D.%: 89; 66 for 105mm

Daily Progress

Type of Sample

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

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

* seating blows only

Water struck at 5.30m, level rose after 20 minutes to 5.10m
Final standing level 5.20m

1 Concrete
2 Cement/bentonite grout
3 Bentonite seal
4 Filter sand

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

BOREHOLE LOG

BH 1

Sheet 1 of 1

APPLIED GEOLOGY
Talisman House
11 Talisman Square
KENILWORTH
CV8 1JB
Tel: 01926 851113 Fax: 01926 851394

Job No. AG515

Site : Stratatones Jaguar, Old Warwick Road, Rockley Heath
Client : Banner Homes Limited
Engineer : JNP Group

Method	Date	Drilling Crew	Logged By	Scale
Endrive Rig System.	11/12/06 - 11/12/06	Danetre (Paul Walsh)	GRS	1:25

Dia (mm): 110
Coord:
Ground Level m.:

Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	M/C %	Depth m.	Description of Strata	Legend
							Concrete with reinforcement (5mm).	
						0.40	Loose to medium dense brown clayey gravelly fine to coarse SAND. Gravel is angular fine to coarse brick and concrete. MADE GROUND	
	0.80	D		0PPM				
	1.00 - 1.45	SPT		9N				
						1.20	Variably firm and stiff to very stiff orange brown sandy CLAY. GLACIAL BOULDER CLAY	
	1.40	D						
	1.50	BP	▼	150			Becoming stiff.	
	1.80	D						
	2.00 - 2.45	SPT		17N		2.00	Medium dense brown clayey fine to medium SAND. Strong hydrocarbon odour. GLACIAL SAND AND GRAVEL	
	2.10	D	▽	85PPM				
						2.30	Medium dense orange brown clayey gravelly fine to medium SAND. Gravel is subrounded fine to coarse mixed lithology. GLACIAL SAND AND GRAVEL	
	2.80	D						
	3.00 - 3.45	SPT		47N			Becoming dense below 3.0m bgl.	
						3.45		

Remarks
1/ Hand dug service pit was excavated to 1.2m prior to commencing drilling.
2/ Boreholes was backfilled with arisings.
3/ Headspace tests undertaken using a MiniRae 2000 - (ppm) on all logs.

GROUNDWATER

Struck	Cased	20 mins	Sealed	Remarks
2.20		1.50		Seepage.

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BOREHOLE LOG

BH 2

Sheet 1 of 1

Job No. AG515

Site : Stratstones Jaguar, Old Warwick Road, Hockley Heath
Client : Banner Homes Limited
Engineer : JNP Group

Method	Date	Drilling Crew	Logged By	Scale
Endrive Rig System.	11/12/06 - 11/12/06	Danetre (Paul Walsh)	GRS	1:25

Dia (mm)	Coord	Ground Level m.
110		

Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	M/C %	Depth m.	Description of Strata	Legend
							Concrete reinforced (5mm).	
	0.40	D		0PPM		0.40	Brown gravelly fine to coarse SAND. Gravel is angular fine to coarse brick and concrete. Occasional whole brick. MADE GROUND	
						0.75	Grey slightly clayey gravelly fine to coarse SAND. Gravel is sub rounded fine to coarse mixed lithology. GLACIAL BOULDER CLAY	
	0.90	D		0PPM				
	1.00 - 1.45	SPT		7N		1.00	Soft orange brown mottled grey sandy CLAY. GLACIAL BOULDER CLAY	
	1.50	D						
	1.60	HP		125			Becoming stiff below 1.50m bgl.	
	1.90	D				1.90	Medium dense orange brown mottled red clayey fine to medium SAND. GLACIAL SAND AND GRAVEL	
	2.00 - 2.45	SPT		15N				
	2.50	D						
	2.80	D	▼					
	3.00 - 3.45	SPT	▽	9N			Becoming loose.	
	3.50	D						
	3.80	D						
	4.00 - 4.45	SPT		46N			Becoming very dense.	
						4.45		

Remarks
1/ Hand dug service pit excavated to 1.2m prior to commencing drilling.
2/ Borehole backfilled with arisings.
3/ Headspace tests undertaken using MiniRae 2000 - (ppm)

GROUNDWATER

Struck	Cased	20 mins	Sealed	Remarks
3.00		2.80		Seepage.

APPLIED GEOLOGY

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Job No. AG515

Site : Stratstones Jaguar, Old Warwick Road, Hockley Heath
Client : Banner Homes Limited
Engineer : JMP Group

BOREHOLE LOG

BH 3

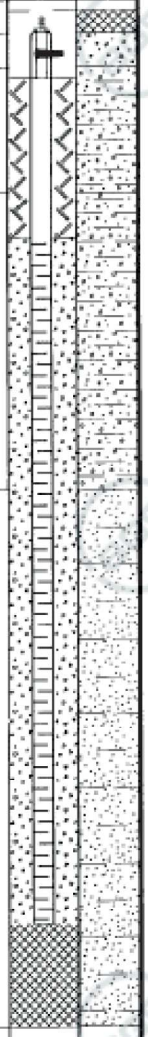
Sheet 1 of 1

Method	Date	Drilling Crew	Logged By	Scale
Endrive Rig System.	11/12/06 - 11/12/06	Danetre (Paul Walsh)	GRS	1:25

Dia (mm): 110
Coord:
Ground Level m.:

Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	Depth m.	Description of Strata
					0.10	Tarmac
					0.25	Concrete reinforced (through out 5mm).
						Firm dark grey sandy gravelly CLAY. Gravel is subrounded fine to coarse mixed lithology. GLACIAL BOULDER CLAY
	0.60	D		0.4PPM		
					0.80	Firm grey mottled brown sandy gravelly CLAY. Gravel is sub rounded fine to coarse mixed lithology. GLACIAL BOULDER CLAY
	1.00	D				
	1.00 - 1.45	SPT		14N		
	1.50	D				
	1.80	D				
	2.00 - 2.45	SPT		10N		
					2.10	Medium dense orange brown slightly clayey fine to medium SAND. Slight hydrocarbon odour. GLACIAL SAND AND GRAVEL
	2.50	D		1.0PPM		
	2.80	D				
	3.00 - 3.45	SPT		30N		Becoming medium dense to dense.
	3.50	D		4.0PPM		
	3.80	D				
	4.00 - 4.45	SPT		46N		Becoming dense from 4.0m bgl.
					4.45	

Inst | Legend



Remarks
1/ Hand dug service pit was excavated to 1.2m prior to commencing drilling.
2/ Probe installed, 0.0m - 1.0m plain piping, 1.0m - 4.0m slotted piping.
3/ Headspace tests undertaken using MiniRae 2000.

GROUNDWATER

Struck	Cased	20 mins	Sealed	Remarks
2.30		1.02		Seepage

APPLIED GEOLOGY
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BOREHOLE LOG

BH 4

Sheet 1 of 1

Job No. AG515

Site : Stratstones Jaguar, Old Warwick Road, Hockley Heath
Client : Banner Homes Limited
Engineer : JNP Group

Method	Date	Drilling Crew	Logged By	Scale
Endrive Rig System.	12/12/06 - 12/12/06	Danetre (Paul Walsh)	GRS	1:25

Dia (mm): 110
Coord:
Ground Level m.:

Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	Depth m.	Description of Strata
						Concrete reinforced (through out 5mm).
					0.15	
	0.30	D		13.9PPM		Brown Sand and Gravel. MADE GROUND
					0.50	
						Grey sandy gravelly CLAY. Gravel is subrounded fine to coarse mixed lithology. GLACIAL BOULDER CLAY
					0.80	
	0.90	D		38.8PPM		Soft brown mottled grey slightly sandy CLAY. Occasional bands of sand. Strong hydrocarbon odour and black staining. GLACIAL BOULDER CLAY
	1.00 - 1.45	SPT		8N		
	1.50	D		1230PPM		
	1.80	D		778PPM		
	2.00 - 2.45	SPT		12N		Becoming firm.
	2.20	D		2.3PPM	2.20	
						Firm brown grey sandy gravelly CLAY. Gravel is subrounded fine to coarse mixed lithology. Strong hydrocarbon odour and staining to 2.7m bgl. GLACIAL SAND AND GRAVEL
	2.50	D				
	2.80	D		4.9PPM		
	3.00 - 3.45	SPT		37N		Becoming very stiff.
					3.45	

Inst / Legend

Remarks
1/ Hand dug service pit excavated to 1.2m prior to commencing drilling.
2/ Probe installed, GL - 1.0m bgl plain piping, 1.0m - 3.0m bgl slotted piping.
3/ Headspace tests undertaken using a MiniRae 2000 - (ppm).

GROUNDWATER

Struck	Cased	20 mins	Sealed	Remarks
2.40		0.72		Seepage.

APPLIED GEOLOGY

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Job No. AG515

Site : Stratstones Jaguar, Old Warwick Road, Hockley Heath
Client : Banner Homes Limited
Engineer : JNP Group

BOREHOLE LOG

BH 5

Sheet 1 of 1

Method	Date	Drilling Crew	Logged By	Scale
Endrive Rig System.	12/12/06 - 12/12/06	Danetre (Paul Walsh)	GRS	1:25

Dia (mm) 110 | Coord | Ground Level m.

Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	Depth m.	Description of Strata	Inst	Legend
						Concrete reinforced (through out 5mm).		
	0.30	D		27.8PPM	0.20	Grey sandy gravelly ASH. Gravel is angular fine to coarse brick, concrete, clinker and occasional whole brick. MADE GROUND		
					0.40	Soft brown orange mottled grey sandy gravelly CLAY. Gravel is subrounded fine to coarse mixed lithology. Slight hydrocarbon odour and black staining between 1.6m to 2.4m. GLACIAL BOULDER CLAY		
	0.80	D		91.9PPM				
	1.00 - 1.45	SPT		8N				
	1.50	D		56.4PPM				
	1.50	HP		100		Becoming stiff.		
	1.60	HP		125				
	1.70	HP		150				
	1.80	D		56.0PPM				
	2.00 - 2.45	SPT		11N		Becoming firm.		
	2.50	D		127PPM				
					2.60	Very dense brown clayey gravelly fine to medium SAND. Gravel is subrounded fine to coarse mixed lithology. GLACIAL SAND AND GRAVEL		
	2.80	D						
	3.00 - 3.45	SPT		73N				
					3.45			

Remarks

1/ Hand dug service pit excavated to 1.2m prior to commencing drilling.

2/ Probe installed, GL - 1.0m bgl plaining piping, 1.0m - 3.0m bgl slotted piping.

3/ Headspace tests undertaken using MiniRae 2000 - (ppm)

GROUNDWATER

Struck	Cased	20 mins	Sealed	Remarks
2.80		0.86		Seepage.

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Job No. AG515

Site : Stratstones Jaguar, Old Warwick Road, Hockley Heath
Client : Barner Homes Limited
Engineer : JWP Group

BOREHOLE LOG

BH 6

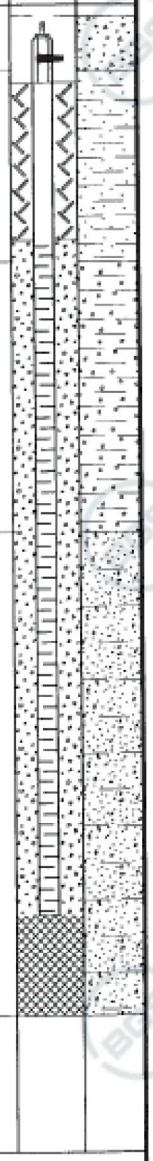
Sheet 1 of 1

Method	Date	Drilling Crew	Logged By	Scale
Endrive Rig System.	12/12/06 - 12/12/06	Ganetre (Paul Walsh)	GRS	1:25

Dia (mm): 110
Coord:
Ground Level m.:

Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	Depth m.	Description of Strata
						Concrete.
					0.25	Soft dark brown sandy CLAY. Strong hydrocarbon odour. GLACIAL BOULDER CLAY
	0.60	D		7.6PPM		
	1.00	D	▼	109PPM		
	1.00 - 1.45	SPT		8N	1.10	Soft orange brown mottled grey gravelly CLAY. Gravel is subrounded fine to coarse mixed lithology. Strong hydrocarbon odour and black staining. GLACIAL BOULDER CLAY
	1.50	D		245PPM		
	1.50	HP		150		Becoming stiff.
	1.60	HP		175		
	1.70	HP		175		
	1.80	D		128PPM		
	1.80	HP		165		
	2.00 - 2.45	SPT		7N		Becoming soft.
					2.30	Loose orange brown gravelly clayey fine to medium SAND. Gravel is subrounded fine to coarse mixed lithology. strong hydrocarbon odour. GLACIAL SAND AND GRAVEL
	2.50	D	▽	145PPM		
	2.90	D		138PPM		
	3.00 - 3.45	SPT		26N		Becoming medium dense.
	3.50	D		84.0PPM		
	3.80	D		24.2PPM		
	4.00 - 4.45	SPT		55N		Becoming very dense.
					4.45	

Inst | Legend



Remarks
1/ Hand dug service pit excavated to 1.2m prior to commencing drilling.
2/ Probe installed, GL - 1.0m bgl plain piping, 1.0m - 4.0m bgl slotted piping.
3/ Headspace tests undertaken using MiniRae 2000 - ppm.

GROUNDWATER

Struck	Cased	20 mins	Sealed	Remarks
2.50		0.95		Seepage

APPLIED GEOLOGY

Talisman House
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Job No. AG515

Site : Stratstones Jaguar, Old Warwick Road, Hockley Heath
Client : Banner Homes Limited
Engineer : JNP Group

BOREHOLE LOG

BH 7

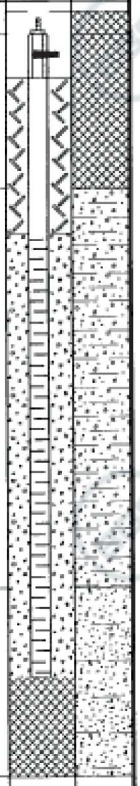
Sheet 1 of 1

Method	Date	Drilling Crew	Logged By	Scale
Endrive Rig System.	12/12/06 - 12/12/06	Danetre (Paul Walsh)	GRS	1:25

Dia (mm): 110 | Coord | Ground Level m.

Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	Depth m.	Description of Strata
					0.10	Tarmac.
						Black sandy gravelly ASH. Gravel is angular fine to coarse brick, concrete and clinker. MADE GROUND
	0.50	D		338PPM		
	0.80	D		163PPM	0.80	
	1.00 - 1.45	SPT		0N		Very soft brown orange mottled grey sandy gravelly CLAY. Gravel is subrounded fine to coarse mixed lithology. Strong hydrocarbon odour and black staining. GLACIAL BOULDER CLAY
	1.50	D	▼	145PPM		
	1.90	D		139PPM		
	2.00 - 2.45	SPT		4N		
	2.50	D		23PPM		
					2.60	
	2.80	D	▽	50PPM		Dense orange brown clayey gravelly fine to medium SAND. Gravel is subrounded fine to coarse mixed lithology. Strong hydrocarbon odour and black staining. GLACIAL SAND AND GRAVEL
	3.00 - 3.45	SPT		40N		
					3.45	

Inst | Legend



Remarks
1/ Hand dug service pit excavated to 1.2m prior to commencing drilling.
2/ Probe installed, GL - 1.0m bgl plain piping, 1.0m to 3.0m bgl slotted piping.
3/ Headspace tests undertaken using MiniRae 2000 - ppm.

GROUNDWATER

Struck	Cased	20 mins	Sealed	Remarks
2.80		1.57		Seepage.