

**U741 – Marriott’s Park, Taverham, Broadland Norfolk**  
**Flooding and drainage note**  
**For M Scott Properties Ltd**  
**March 2020**

**Introduction**

This note provides an overview of flooding and drainage in support of the proposed residential led development of a site in Taverham, Norfolk. The note draws on desktop information, the results of an initial intrusive site investigation, a topographical survey, site visit, and a meeting with Anglian Water.

**Flooding**

The site lies in Flood Zone 1 and is therefore not considered to be at risk of flooding from a main river or other significantly sized watercourse.

The surface water flood map (see extract below) shows a route of predominantly low risk floodwater in the south of the site.



Surface water flood map, from Gov.UK, 12/03/20 © Crown copyright and database rights 2020 Ordnance Survey 100047325

The band of floodwater broadly follows the line of a ‘dry valley’ and is likely the result of overland flow (during larger storms) shed from the urban area to the south of the site. The floodwater is also likely to comprise rural runoff generated from within the site itself. The direction of flow is broadly north-east towards Breck Farm, then south-east towards Marriott’s Way. Marriott’s Way is flanked by drainage ditches which will help to convey the water to the watercourse/drain which goes on to flow through Drayton (downstream/south-east of the site).



The surface water flood route will be accounted for through the masterplanning exercise when space will be left to enable water to pass through the site without increasing on or off site flooding. However rather than simply avoiding/managing the existing floodwater, development of the site offers the opportunity to help reduce downstream flooding. This is particularly relevant as Drayton is identified as a Critical Drainage Area (CDA) on Figure 4 of the Norfolk County Council (NCC) Surface Water Management Plan (SWMP).

There is an opportunity to provide attenuation for urban runoff which flows onto the site from beyond its boundaries. The nature and scope of such attenuation would be subject to later stage investigations at the planning stages. However practical, landscaped features (shallow depressions) which trap and hold water (allowing dispersion through evaporation and infiltration) would seem appropriate.

### **Surface water management**

Early investigations have determined suitable infiltration rates for at least part of the site (see appended report). Geological mapping suggests a broadly consistent geology across the site and the testing is likely to be representative of the site wide rates. In the event that more extensive testing demonstrates that a site wide infiltration drainage solution is not appropriate then those areas of the site will be drained via a restricted discharge to the Marriott's Way ditch/watercourse. The maximum rate would be limited to the mean annual greenfield runoff rate.

Regardless of the means of disposal, sufficient on-site storage will be provided in order to manage the 1 in 100 annual probability storm including 40 % climate change allowance.

Sufficient treatment for runoff will be provided in line with the guidance provided in The SuDS Manual (CIRIA report C753).

### **Wastewater**

Anglian Water (AW) owns and maintains the wastewater network serving Taverham. There are a number of public foul water sewers in the vicinity of the site servicing the adjacent development.

Historic correspondence with AW stated that a direct connection to the public wastewater system, in its current form, is likely to have a detrimental effect on the network. This is unsurprising considering the scale of development proposed and corresponding wastewater generated.

The new connection charging rules updated the way in which sewerage providers charge for new connections to their wastewater network. Under the new charging regime each development pays a per connection charge. The funds raised under the new regime are pooled (by AW) and used for carrying out improvements to the wastewater network to cater for growth in the region. The new charging regime helps to remove the variability in sewerage connection charges via the Section 98 process by effectively spreading the cost of improvements throughout a provider's region. This in turn helps to improve site viability by removing what would have previously been classed as an abnormal cost.



The new charging regime means that required improvements (mitigation) in order to accept wastewater from the proposed development into the AW network will be funded and provided by AW.

The strategy for connecting the site to the surrounding adopted wastewater network was discussed with AW at a meeting in 2019. A phased connection strategy with parcels being connected to different points on the surrounding network is supported by AW. This phased approach (a minimum of three points of connection is envisaged) will allow for development flows to be suitably distributed across the existing network (avoiding a single point load from the strategic site).

The proposed development is in the catchment of Whitlingham Trowse Water Recycling Centre (WRC), which is reported to have available capacity to treat the flows arising from the proposed development.

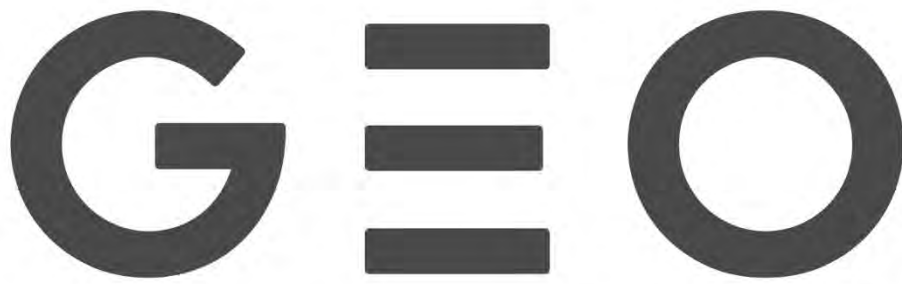
### **Conclusion**

During the preparation of this note we have not identified any notable flood risk constraints which would prevent the site from being developed in line with current advice on flood risk and development.

Development of the site offers an opportunity to help reduce off-site flooding in a Critical Drainage Area.

### **Appended information**

Phase 2 Ground Investigation



## GEOSPHERE ENVIRONMENTAL

REPORT NUMBER: 3921,GI/GROUND/CS,SG,TP/21.06.19/V1

SITE: Land off Fir Covert Road, Taverham, Norfolk, NR8  
6HL

DATE: 21/06/2019



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**Limit of Reliance:**

This report is based on the site findings at the time of the associated walkover/site investigation works and information provided by the client at the time of writing. Should site conditions alter or development proposals alter, a reassessment of the enclosed findings should be undertaken. Refer to Appendix 1 for full details of report limitations.

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**REVISION RECORD**

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## Executive Summary

Project Description	<p>Geosphere Environmental Ltd was commissioned by M Scott Properties Limited, to undertake a Phase 2 Site Investigation at Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.</p> <p>At the time this report was prepared, it was understood that the proposed development comprised of residential properties with associated soft landscaped areas including private gardens and car parking facilities.</p>
Site Location / Description	<p>The site was located at Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL situated approximately 1.5km to the north of the town centre of Taverham and may be located by National Grid Reference (NGR) TG 16031 15569.</p>
Previous Investigation	<p>The site formed part of a Phase 1 Desk Study undertaken by Geosphere Environmental Ltd, reference 3551,EC,AR,DS/DESK/LT,GF/28-11-18/V1 dated 28 November 2018. The findings of the report indicated potential sources of contamination to include Made Ground associated with hardstanding tracks onsite; a strip of which exists in the north of the site, as well as the potential for Made Ground from offsite developments located beyond the eastern site boundary. Other sources have been discounted due to their relevance to the investigation site.</p>
Site Works	<p>Site works were carried out between 11 February 2019 and 22 May 2019 and comprised of the formation of twenty four windowless sampling boreholes, installation of seven 50mm ground gas monitoring wells, soil infiltration testing within seven machine excavated trial pits, four dynamic probe tests, single hand dug trial pit <b>and associated</b> soil logging, sampling and in situ strength testing.</p>
Ground Conditions	<p>The ground conditions were recorded to be consistent across the site, comprising of nominal amounts of Topsoil overlying superficial deposits of Sheringham Cliff Formation (Sand and Gravel). Groundwater level was encountered within WS203a and WS205a only during the intrusive works. The groundwater strikes were consistent with the thicknesses of clay and therefore the groundwater in these locations is considered to be perched.</p>
Gas Monitoring	<p>The results of the ground gas monitoring show no methane generation within soils, and limited generation of carbon dioxide. No significant gas flow was detected within the wells across the site. Based upon guidance given in CIRIA C665, the site is considered to fall within the NHBC green category for low-rise housing with underfloor voids, which requires no special protection measures.</p>
Laboratory Results	<p>Laboratory analysis identified no concentrations of contaminants which were above guidance threshold values for a residential development with plant uptake.</p>

<p>Advanced Conceptual Model</p>	<p>Based upon the results of chemical analysis, a very low risk exists for the site and therefore the site may be developed without the need for remediation.</p>
<p>Geotechnical Considerations</p>	<p>A minimum foundation depth of 0.75 is applicable within proven granular soils, however borehole location WS204a, encountered a significant thickness of cohesive soils at approximate formation depths and therefore a minimum foundation depth of 1.0mbgl is applicable. Foundations in this area should also be designed to the requirements of NHBC guidance, given the presence of trees.</p> <p>Recommendations for soil infiltration and roadway design are provided within the relevant sections as these vary across the testing locations.</p>
<p>This Executive Summary only provides a summary of the site data and its assessment. It does not provide a definitive engineering analysis and is for guidance only. It is recommended that the reader reviews the report in its entirety and any material referenced therein.</p>	

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## 1. INTRODUCTION

Geosphere Environmental Ltd was commissioned by the Client, M Scott Properties Limited, to undertake a Phase 2 Ground Investigation for a proposed residential development at Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

It was understood that the site is to be developed into an undisclosed number of residential dwellings with associated soft landscaping and car parking.

**The primary objectives of this ground investigation were to:**

- Assess the ground conditions at the site;
- Assess the potential risk to human health and the environment based upon the findings of the investigation.

**These were achieved by:**

- Undertaking an intrusive investigation of the site, based upon the proposed development layout and the scope agreed with the client;
- Logging and sampling the soils on the site and noting any visual or olfactory evidence of contamination;
- Undertaking laboratory chemical analysis of selected soil to assess the soil quality and suitability for the garden areas and assess the likely risks to receptors;
- Installing monitoring wells for ground gas concentration measurements and groundwater level monitoring;
- Creating a Conceptual Site Model and defining suitable remedial/mitigating and verification actions where necessary.

A Proposed Development Plan, Drawing ref. 3710,GI,SK/003/Rev 0 is provided within Appendix 3.

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## 2. SITE SETTINGS

The subject site was situated in Taverham, adjacent and to the south of the A1270 Northern Distributer Road and adjacent to the east of Fir Covert Road. The site may be located by National Grid Reference (NGR) TG 16031 15569.

At the time of this investigation, the site comprised of an irregularly shaped parcel of agricultural land used for livestock grazing purposes. The site generally sloped downwards to the north by approximately 5.0m, sited at approximately 35.0mAOD to 40.0mAOD.

The site boundary was formed to the west by a mix of wooden close-board and metal chain-link fencing approximately 2.0m in height, beyond which was residential property associated with Fir Covert Road. A small section of boundary, to the south, was formed by wooden post and metal wire fencing, beyond which was a soil bund and Fir Covert Road, respectively. The southern site boundary was formed by a line of trees, the majority of which were noted as coniferous. The eastern site boundary was open and undeveloped across agricultural land. The northern site boundary was formed by a wooden post and wire fence, beyond which was a newly planted embankment to the A1270.

Two circular depressions were noted centrally, indicated to depict former tree locations. A towable feed trailer was present towards the north of the site. A line of trees was noted centrally to the site, transecting from east to west, whilst a large number of coniferous trees were noted in the south east of the site.

A Site Location Plan and Site Plan is included within Appendix 3, as Drawing references 3710,GI,SK/001/Rev 0 and 3710,GI,SK/002/Rev 0 respectively.

Photographic records are presented in Appendix 10 of this report.

### 3. PREVIOUS REPORTS

A Phase 1 Desk Study was undertaken by Geosphere Environmental Ltd, reference 3551,EC,AR,DS/DESK/LT,GF/28-11-18/V1 dated 28 November 2018, which incorporated the subject site and a larger area of land to the east.

The following summary of findings for the above report has been focussed to include those aspects specific to the site area only, and has been disseminated from the above referenced report.

The geological map indicated the site to be underlain predominantly by superficial deposits of the Sheringham Cliffs Formation which comprises of sand and gravel. The superficial deposits were underlain by Chalk Bedrock Formations.

The information about the former uses of the site, indicated that the site has remained agricultural over the historical period studied.

Based upon the findings of the desk study and comparing this to the subject site layout, no significant sources of contamination were noted to exist, however the report recommended undertaking intrusive-based investigation to obtain samples from across the site to assess the general soil quality for use in the proposed residential development.

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## 4. SITE WORKS

### 4.1 Methodology

This site investigation was carried out in accordance with the practices set out in BS 10175: 2011+A1: 2013, (ref. R.6) and BS 5930: 2015 (ref. R.7).

Initially, the location of exploratory holes has been planned, where possible, to give as good as coverage within budgetary constraints whilst targeting any locations highlighted in the desk study and / or site walkover. Further and subsequent intrusive investigation was based upon a site investigation sketch provided by ASD Engineering, reference 1394/GEN001, dated 18 April 2019, targeting specific locations required for engineering assessment.

All exploratory hole locations have been incorporated into an exploratory hole location plan, Drawing reference 3921,GI /004/Rev 0, provided within Appendix 3.

The infiltration testing was undertaken in accordance with the requirements of BRE365:2016 (ref. R.3), which requires a total of three tests to be undertaken, in rapid succession, within each trial pit location over a 24 hour period.

### 4.2 Scope

Site works were carried out between 11 February and 22 May 2019 and comprised of the following:

- Excavation of twenty-four exploratory holes (WS01 – WS19 and WS201, WS202, WS203a, WS204a WS205a and WS206), using Windowless Sampling techniques, extended to depths ranging from 3.0m and 6.0mbgl;
- Installation of seven combined ground gas and groundwater monitoring wells within selected boreholes;
- Six subsequent ground gas and groundwater monitoring visits;
- Excavation of seven machine excavated trial pits (SK01 to SK06 and TP201), together with BRE365 infiltration testing, extending to depths ranging from 1.9m and 2.2mbgl;
- Undertaking of four dynamic probe tests (DP02, DP03, DP05 and DP07) adjacent to their respective Window Sampler locations, extended to a depth of 5.0mbgl;
- Excavation of a single hand dug trial pit (CBR201) to a depth of 0.7mbgl;
- Associated soil logging, sampling and in-situ testing.

### 4.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally confirms the anticipated geology as interpreted from the British Geological Survey (BGS) digital mapping, at a scale of 1:50,000.

The sequence and indicative thickness of strata are provided in Table 1 below:

**Table 1 - Ground Conditions**

Strata	Depth Encountered (mbgl)		Strata Thickness (m)	Composition
	From	To		
Topsoil.	0.0	0.25 to 0.70	0.25 to 0.70	ALL EXPLORATORY HOLES Dark brown fine to coarse sand with varying amounts of fine subangular flint gravel.
Sand and Gravel (Sheringham Cliffs Formation).	0.25 to 0.70	3.00 to 6.00	Unproven	ALL EXPLORATORY HOLES Orangish brown to light brown fine to coarse sand with varying amounts of fine and medium subangular to sub- rounded flint gravel and shell fragments.  WS203A, WAS204A AND WS205A With varying thicknesses of yellowish, orangish and greyish brown clay between 1.05m and 4.05mbgl.

#### 4.4 Groundwater

Groundwater level was encountered within WS203a and WS205a only, during the intrusive works. The groundwater strikes were consistent with the thicknesses of clay and therefore the groundwater in these locations is considered to be perched. A summary of groundwater inflows is presented within Table 2, below:

**Table 2 - Level of Groundwater Encountered**

Windowless Sampler Borehole Number	Depth of Water (mbgl)	Depth to clay soils (mbgl)	Total water column of perched groundwater (m)
WS203a	2.70	3.50	0.80
WS205a	2.50	2.85	0.35
	3.85	3.90	0.05

#### 4.5 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of gross contamination was encountered during the ground investigation.



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## 5. LABORATORY TESTING

### 5.1 Methodology

Representative disturbed were taken at the depths shown on the exploratory hole records and dispatched to the laboratory. The exploratory hole logs are included in Appendix 5.

Samples were collected for environmental purposes in amber glass jars and 1kg plastic tubs and kept in a cool box with cooling aid.

Geotechnical samples were recovered in plastic bulk bags and sealed to prevent moisture loss.

### 5.2 Environmental Testing Suite

#### 5.2.1 Quality Control

The environmental laboratory used (Derwentside Environmental Testing Ltd) was an accredited laboratory by the United Kingdom Accreditation Service (UKAS), and at least 50% of individual parameters are from methods pending accreditation to the Environment Agency Monitoring Certification Scheme (MCERTS) for the range of analyses undertaken as part of this investigation. The MCERTS performance standard for the chemical testing of soil is an application of ISO 17025: 2005, specifically for the chemical testing of soil.

#### 5.2.2 Environmental Testing Suite – Soils

The suite of chemical analyses has been based upon the findings of the desk study and site walkover, the conceptual model and observations onsite. The chemical analyses were carried out on seven samples of soil. The nature of the analyses is detailed below:

- Metals screen - arsenic, cadmium, chromium, lead, mercury, selenium, boron (water soluble), beryllium, copper, nickel, vanadium and zinc;
- Organic screen – extractable petroleum hydrocarbons (EPH) and polyaromatic hydrocarbons (PAH) – USEPA 16 suite; monohydric phenols;
- Inorganics screen - cyanide (total), sulphate (water soluble);
- Others - pH, organic matter, asbestos.

A copy of the laboratory test results is included in Appendix 8.

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### 5.3 Geotechnical Testing

The geotechnical testing has been chosen based upon the soils encountered during the site investigation and was undertaken in accordance with BS 1377 at a UKAS accredited laboratory.

The following tests were undertaken:

- Determination of California Bearing Ratio (including soaked method);
- pH and soluble sulphate testing of soils and groundwater.

A copy of the laboratory test results is included in Appendix 9.

## 6. MONITORING

Combined ground gas and groundwater monitoring wells were installed within six of the exploratory holes. Details of their construction are provided with the exploratory hole logs within Appendix 6.

A summary of the findings has been provided in Table 3 below. The full ground gas and groundwater datasets can be found within Appendix 7.

### 6.1 Ground Gas

Ground gas monitoring was undertaken by a suitably qualified environmental consultant, using a GFM436 landfill gas analyser and a MultiRae Lite Photo-ionisation detector (PID). The main determinants recorded were methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>), VOCs as well as flow.

Ground gas monitoring was carried out in accordance with current guidance (ref. R.14). Six consecutive monitoring visits were undertaken over a period of time between 20 February 2019 and 22 March 2019, including falling barometric pressure conditions.

The results of ground gas monitoring are included in Appendix 7 and a summary is presented in Table 3 below:

Table 3 - Ground Gas Monitoring Results Summary								
Location	Typical Concentration					Flow Rate (l/hr)	VOC (ppm)	Atmospheric Pressure (mb)
	Methane (CH <sub>4</sub> )	Carbon Dioxide (CO <sub>2</sub> ) [% v/v]		Oxygen (O <sub>2</sub> ) [% v/v]				
	[% v/v]	(Max.)	(Min.)	(Max.)	(Min.)			
WS01	<0.1	0.3	0.1	20.5	20.2	-0.5	0	997 - 1030
WS06	<0.1	0.9	0.3	20.3	19.6	-0.6	0	997 - 1030
WS08	<0.1	1.0	0.6	20.2	19.4	-0.4	0	997 - 1031
WS11	<0.1	1.2	0.3	20.3	19.1	-0.6	0	997 - 1032
WS13	<0.1	2.0	0.3	20.1	17.6	-0.6	0	997 - 1032
WS17	<0.1	1.2	0.4	20.0	19.4	-0.6	0	997 - 1032

### 6.2 Groundwater

The measured groundwater levels were recorded using a dip meter and the results of monitoring are presented in Table 4 overleaf:

**Table 4 – Groundwater Monitoring Results**

Monitoring Well	Depth of Monitoring Well (mbgl)	Groundwater Encountered at (mbgl)					
		Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
		20/02/19	24/02/19	01/03/19	08/03/19	15/03/19	21/03/19
WS01	2.94	n/m	Dry	Dry	Dry	Dry	Dry
WS06	3.05	Dry	Dry	Dry	Dry	Dry	Dry
WS08	3.81	Dry	Dry	Dry	Dry	Dry	Dry
WS11	3.96	Dry	Dry	Dry	Dry	Dry	Dry
WS13	3.06	Dry	Dry	Dry	Dry	Dry	Dry
WS17	3.05	Dry	Dry	Dry	Dry	Dry	Dry

Notes:

Dry - no groundwater encountered

n/m – not measured

0 - well filled with water

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## 7. RISK ASSESSMENT

### 7.1 Risk to Human Health

#### 7.1.1 Methodology

The current guidance requires that a conceptual model be formulated, based upon the findings of the research. The conceptual model is limited at this stage to the identification and assessment of potential 'hazards', identified or suspected from the results of the research; the potential 'receptors' that may be affected and the anticipated 'pathways' to those receptors. The findings are summarised in the following subsections.

The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification;
- Hazard Assessment;
- Risk Estimation;
- Risk Evaluation.

#### 7.1.2 Soil Quality Screening Values

The results of the soil analyses have been compared to soil quality screening values where deemed applicable, such as:

- The LQM/CIEH S4ULs for Human Health Risk Assessment, (ref. R.25);
- Defra/CL:AIRE Final C4SLs, (ref. R.24).

Where the concentrations reported by the laboratory analysis (and thus determined onsite) are at or below the respective screening concentrations, they are considered not to pose a risk and are removed from further consideration, unless otherwise stated in the following sections.

Based upon details of the proposed development, the screening values used in this assessment has considered residential end use with plant uptake and a Soil Organic Matter content of 1.0%.

## 7.2 Soil Quality

Concentrations of analytes tested within soil samples existed below residential with plant uptake screening values, a summary of which can be observed in Table 5 overleaf:

Table 5 - Summary of Soil Analyses and Comparison with Current Screening Values

Analyte	Analyte Concentration Range (mg/kg)		Screening Value (mg/kg) for Land Use	Number of Elevated Concentrations
	Minimum	Maximum	Residential Without Plant Uptake (1% SOM Assumed)	
Arsenic	4	7	37	None elevated
Boron	<1	<1	290	None elevated
Cadmium	<0.2	<0.2	17	None elevated
Chromium	5	8	910	None elevated
Copper	<4	5	2400	None elevated
Lead	4	17	82-210	None elevated
Mercury	<1	<1	1.2	None elevated
Nickel	<3	7	180	None elevated
Selenium	<3	<3	250	None elevated
Zinc	11	31	3700	None elevated
Asbestos	Asbestos is considered a risk if any positive identification is made. None reported within laboratory results.			
Total PAHs	<1.6	<1.6	Nominal value of 50mg/kg*	None elevated
Napthalene	<0.1	<0.1	2.3	None elevated
Acenaphthene	<0.1	<0.1	210	None elevated
Acenaphthylene	<0.1	<0.1	170	None elevated
Flourene	<0.1	<0.1	170	None elevated
Phenanthrene	<0.1	<0.1	95	None elevated
Anthracene	<0.1	<0.1	2400	None elevated
Fluoranthene	<0.1	0.12	280	None elevated
Pyrene	<0.1	<0.1	620	None elevated
Benzo [a] anthracene	<0.1	<0.1	7.2	None elevated
Chrysene	<0.1	<0.1	15	None elevated
Benzo [b] fluoranthene	<0.1	0.15	2.6	None elevated
Benzo [k] fluoranthene	<0.1	<0.1	77	None elevated
Benzo [a] pyrene	<0.1	<0.1	2.2	None elevated
Indeno [1,2,3 cd] pyrene	<0.1	<0.1	27	None elevated
Dibenz [a,h] anthracene	<0.1	<0.1	0.24	None elevated
Benzo [g,h,i] perylene	<0.1	<0.1	320	None elevated

\*Where total values exceed the nominal threshold, individual congener, compound or equivalent carbon chain group screening values are assessed further where necessary.



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### 7.2.1 Risk Mitigation

Risks to humans include construction workers, site neighbours and end users of the site. Theoretically, exposure to contaminants can take the form of direct contact with the skin, consumption of contaminants through transfer of contaminants to the food chain, or the inhalation of contaminants through wind-blown soils or vapours.

Results of chemical analysis indicated none of the samples tested to exhibit any elevated contaminants over threshold levels compared with screening values, therefore the risk is considered to be very low and may be removed from further consideration.

The investigation covered an extensive area of the site however, a risk of contamination elsewhere onsite remains. A discovery strategy should be implemented throughout the development of the site and any suspected contaminants subject to assessment by a suitably qualified and experience geo-environmental engineer. This may comprise of additional soil sampling and chemical analysis to quantify its suitability onsite and potential for remediation.

To reduce the risks of exposure and transfer of contaminants during construction, short term mitigations measures should be adhered to and, where applicable, be incorporated into the development Construction Phase Health and Safety Plan or similar document.

### 7.2.2 Asbestos

Results of asbestos screening did not indicate the presence of asbestos within Topsoil. However, it is recommended that localised discovery strategies are in place for asbestos, should it be discovered within soils during the construction phase. **See 'Additional Information'** section at the end of this report for further information.

If during the construction phase of the development any potential asbestos containing material is discovered within the soils then these should be left in situ, and temporarily fenced off, until its identification and removal/treatment had been established. Works in the immediate areas of the suspected asbestos should cease during this period, until a suitably qualified and authorised person has given permission for works to continue.

### 7.3 Ground Gas

The results of the soil gas monitoring have been compared with current guidance (refs. R.14 or R.15).

The results show negligible methane generation within soils, and limited generation of carbon dioxide. No significant gas flow was detected within the wells across the site.

On the basis of the recorded methane concentration a gas screening value of  $<0.01 I_{CH_4}/hr$  has been calculated. Similarly, on the basis of the recorded carbon dioxide concentrations a gas screening value of  $<0.01 I_{CO_2}/hr$  has been calculated.

Based upon guidance given in CIRIA C665, the proposed development is considered to represent a Situation B – Low rise housing with a ventilated underfloor void. Based upon the results of gas monitoring, the site falls within a Green category under the NHBC traffic light system, which requires no special gas protection measures.

#### 7.4 Risk to Controlled Waters

Concentrations of contaminants within the soil samples tested were below the respective screening concentrations, therefore, it is considered that there is a very low to negligible risk to controlled waters, hence groundwater analysis was not undertaken during the investigation.

#### 7.5 Risk to Plants

A review of the commonly occurring phytotoxic chemicals boron, copper, nickel and zinc, has been undertaken based upon the now superseded ICRCL guidance. Although the ICRCL trigger threshold levels have been withdrawn, there are no equivalent guidance values for phytotoxicity.

Concentrations of metals were recorded at concentrations below the thresholds considered to have phytotoxic effects.

#### 7.6 Risk to Services - Pipes

A comparison of the laboratory results has been made against the Contaminated Land Assessment Guidance, published by Water UK (ref. R.11). Note, the full range of thresholds given in this guidance have not specifically been tested for.

While no specific protection is envisaged, it is advised that the UK Water Industry Research Guidance (ref. R.11) is adopted and consultation with the local water company is sought prior to laying any services.

#### 7.7 Advanced Conceptual Site Model

Following the findings of the site investigation, the Preliminary Conceptual Site Model for the site has been reviewed and the conclusions are presented in Table 6 overleaf:

Table 6 – Advanced Conceptual Site Model

Sources	PATHWAYS:					RECEPTORS:						Risk Rating	Comments	
	Root Uptake	Direct Contact	Ingestion	Respiration	Gas Accumulation	Plants	End Users	Structures (Concrete)	Services/Utilities	Construction Workers	Controlled Waters (GW)			
Hazardous ground gasses.	N	N	N	U	U	N	Mi	N	N	N	N	LR/NR	The site falls within a Green category under the NHBC traffic light system, which requires no special gas protection measures.	
Legend: See Comparison of Consequence Against Probability within Appendix 4 for Key to Legend.	Probability:					Consequence (Severity):						Risk Rating:		
	Negligible (N)					Negligible (N)						Very High Risk		VH
	Unlikely (U)					Mild (Mi)						High Risk		HR
	Likely (L)					Moderate (Mo)						Medium Risk		MR
	Highly Likely (HL)					Severe (S)						Low Risk		LR
											Negligible Risk		NR	

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## 8. GEOTECHNICAL CONSIDERATIONS

### 8.1 Proposed Development

It is understood that the proposed development of the site is to comprise of a number of residential plots, including associated private gardens and vehicle parking, access roads, private driveways and infrastructure.

It has not been detailed as to the number of storeys each residential structure will comprise of, however, it has been assumed these will range from two to three-storeys.

Based upon the above, vertical loadings have been assumed to range from 70kN/m<sup>2</sup> and 100kN/m<sup>2</sup>.

### 8.2 Summary of Ground Conditions

Ground conditions were recorded to be consistent across the site, comprising of nominal amounts of Topsoil overlying superficial deposits of Sheringham Cliffs Formation (Sand and Gravel). Bedrock Chalk was not encountered within any of the exploratory Window Sampler Boreholes during the investigation.

Groundwater seepages were encountered within exploratory holes WS203a and WS205a, at depths ranging between 2.5mbgl and 3.85mbgl, respectively. These were consistent with the presence of cohesive strata.

### 8.3 Foundations

#### 8.3.1 Ground Desiccation

Where soils are identified as being non-plastic, they are generally regarded as not having volume change potential and therefore not likely to induce any ground movements associated with changing soil moisture conditions. These soils include granular soils of the Sheringham Cliffs Formation.

Based upon the details of the soils encountered, the soils were largely granular and therefore the risk of desiccation is considered to be negligible. In accordance with NHBC guidance, a minimum foundation depth of 0.75mbgl is applicable.

Thicknesses of clay were encountered within the Sheringham Cliffs Formation at a number of borehole locations (WS203a, WS204a and WS205a), which is likely to represent a localised occurrence rather than being site-wide. Nevertheless, the clay soils in this area should be regarded as high plasticity and high- volume change potential, in accordance with the NHBC guidance. Therefore, a minimum foundation depth of 1.0mbgl is applicable.

Small thicknesses of clay were encountered within WS3a and WS5a, which is not likely to affect the heave potential of the soils, however the thickness of cohesive soils proven within WS204a (1.8m) shall require foundations to be extended to depth. Furthermore, in the presence of trees, foundations should be designed to the requirements of the guidance provided within NHBC Chapter 4.2 (ref. R.22) for example,

based upon the guidance and the presence of adjacent trees (assumed to be Pine), to achieve a minimum foundation depth, foundations should be located at least 7.0m from the nearest tree.

Where foundations cross granular and cohesive strata a nominal amount of reinforcement should be incorporated into their design to account for differential settlement.

It is noted that the above is not applicable in the case of the adoption of a raft or piled foundation. Whilst the NHBC guidance provides outline advice for the stated foundation design, it is recommended that advice from a professional structural engineer is sought.

### 8.3.2 Foundation Options

The site and ground conditions are considered suitable for the adoption of a conventional spread foundation bearing within the underlying Sheringham Cliffs Formation (Sand and Gravel).

A Nett Allowable Bearing Pressure (NABP) of 130kN/m<sup>2</sup> would be considered appropriate within the Sheringham Cliffs Formation soils, based upon the results of in situ testing, although care should be taken in the vicinity of WS16 and WS205a, where less dense soils were proven to exist. The NABP is the allowable increase in vertical strength, above existing overburden pressure, which may be calculated on the basis of a soil density of 22kN/m<sup>3</sup>.

At the above NABP, settlements are unlikely to exceed in the region of 25mm. Settlements in granular soils are likely to be immediate, whereas cohesive soils will exhibit a small amount of immediate settlement together with a larger amount of consolidation settlement, which will occur over a prolonged period of time. In the presence of the less dense soils around WS16 and WS205a, localised ground improvement, i.e. vibro-compaction, may be adopted for the purposes of increasing bearing capacities. It is recommended that a specialist contractor is consulted should this be required.

A minimum foundation depth of 0.75mbgl is considered appropriate based upon the following provisions:

- Where cohesive soils were proven to exist (WS203a, WS204a and WS205a), localised deepening of foundations shall be required (minimum 1.0mbgl) and will need designing in accordance with NHBC **Chapter 4.2 "Building near Trees"**, (ref. R.22). A number of potentially moderate water demand trees exist adjacent to the above areas and the soils are of high-volume change potential;
- Should foundations extend beyond 2.5m due to the influence of trees, an alternative foundation solution should be adopted, i.e. piles.

Should piles be adopted, it is recommended that the design of piles be undertaken by an experienced and competent professional, who will reflect their own experience and expertise on the design of piles.

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### 8.3.3 Tree Planting

To achieve the minimum depth for foundations, tree planting must not exist within an area smaller than 0.2 x the mature height of the tree species. Where cohesive soils are proven, this will increase to 1.0 x the mature height of the tree species.

It is recommended that any future tree planting, which may form part of the proposed development, be undertaken in accordance with the guidelines laid out in the NHBC Standard Chapter 4.2 (ref. R.22).

### 8.3.4 Excavations, Temporary Works and Groundwater Ingress

All excavations within the Sheringham Cliffs Formation must be assumed to be subject to short term instability and stabilisation methods should be adopted for all excavations within the strata.

Excavations below the water table are likely to be problematic without positive groundwater control, although groundwater was only proven within WS203a and WS205a and was considered as being perched atop partings of clay. It is likely that, should the clay be penetrated the groundwater will dissipate into the underlying granular strata. Localised small-scale dewatering in these areas may nevertheless be required.

Where personnel access is required to any excavation, its stability should be assessed by a suitably qualified and experienced responsible person. For general guidance it is recommended that where access is required to excavations greater than 1.2m depth, they should be fully supported or side slopes battered back to a safe angle of repose.

Further guidance may be obtained from CIRIA **document 97, 'Trenching Practice'** (ref. R.12).

## 8.4 Floor Slabs

It is considered that suspended or ground bearing floor slabs may be constructed onto the Sheringham Cliffs Formation.

If adopting ground bearing floors, formations should be adequately proof-rolled and any soft / loose or otherwise unsuitable materials excavated and replaced with a suitable engineered fill.

Differential movement between the floor slab and structural walls and across the floor slab itself, should be anticipated. It is therefore recommended that ground bearing floors are fully debonded from structural load bearing walls and suitably reinforced top and bottom to enable spanning of soft spots.

The detailing of services through or beneath ground bearing floors should incorporate flexible connections and enhanced falls where appropriate.

**Further guidance is provided within NHBC Chapter 5, 'Ground floors and substructure', (ref. R.23).**



## 8.5 Pavement Design

Roadway pavements are proposed for the site and they are likely to be constructed on a subgrade of Sheringham Cliffs Formation (Sand and Gravel).

Based upon the description of soils and in reference to Table 5.1 of the Highways Agency's, 'Design Manual for Roads and Bridges, Volume 7, Interim advice note Design Guidance for Road Pavement Foundations Draft HD 25' (ref. R.19), an estimated CBR of 20% should be assumed.

A total of five laboratory-based California Bearing Ratio tests were undertaken on the subgrade soils at a depth of 0.5m and 0.6m, three of which were undertaken using the soaked method, at locations considered representative of the site as a whole. The results are provided within Appendix 9 and summarised in Table 7, below:

Table 7 – CBR Compaction (%)		
Test Location	Method	Laboratory CBR (%)
SK01	UNSOAKED	50 - 86
	SOAKED	30 - 36
SK06	UNSOAKED	29 - 31
	SOAKED	25
TP201	SOAKED	13 - 15

It is recommended that once the site has been graded to the appropriate pavement formation level, it is inspected and, if necessary, in situ CBR testing be conducted on the subgrade to confirm the appropriate pavement design, (i.e. to determine the subbase and capping thickness). In addition to which, the formation should be proof-rolled and any soft/loose pockets encountered should be excavated and replaced with well compacted granular fill prior to pavement construction. Requirements for the design of road pavements are given in the Highways Agency, 'Design Manual for Roads and Bridges, Volume 7. Interim advice note 'Design Guidance for Road Pavement Foundations Draft HD 25', (ref. R.19).

## 8.6 Soakaway Design

Planning policy, together with the support of The Environment Agency, recommend the maximum practical use of Sustainable Urban Drainage Systems, (SuDS), within proposals for new developments. There is a requirement that SuDS be installed, where appropriate, in order to limit the amount of surface runoff entering drainage systems and to return surface water into the ground to follow its natural drainage path.

Further guidance, including details of SUDS methods, is provided within CIRIA Report C753 'The SuDS Manual', 2015 (ref. R.16). CIRIA 687 entitled 'Planning for SUDS – Making it Happen', published in 2010 (ref. R.17), states that the Flood and Water Management Act 2010 aims to encourage Local Authorities to be responsible for the approval and eventual adoption of SuDS, although adoption of roadways which

include permeable paving is often rejected.

Soakaway testing was undertaken in seven locations at the site and was undertaken in accordance with the guidance provided within BRE Digest **365 'Soakaway Design'**, 2016 (ref. R.3). A summary of the infiltration rates is presented in Table 8 below, and provided in full within Appendix 6:

Table 8 – Infiltration Testing Results (m/s)			
Location	Test 1	Test 2	Test 3
SK1	2.54 x10 <sup>-5</sup>	2.08 x10 <sup>-5</sup>	1.82 x10 <sup>-5</sup>
SK2	2.56 x10 <sup>-6</sup>	2.43 x10 <sup>-6</sup>	1.64 x10 <sup>-6</sup>
SK3	9.01 x10 <sup>-5</sup>	9.38 x10 <sup>-5</sup>	6.01 x10 <sup>-5</sup>
SK4	6.11 x10 <sup>-5</sup>	4.49 x10 <sup>-5</sup>	1.24 x10 <sup>-5</sup>
SK5	5.41 x10 <sup>-6</sup>	1.87 x10 <sup>-6</sup>	3.94 x10 <sup>-6</sup>
SK6	1.85 x10 <sup>-5</sup>	1.70 x10 <sup>-5</sup>	1.89 x10 <sup>-5</sup>
TP201	6.44 x 10 <sup>-5</sup>	3.36 x 10 <sup>-5</sup>	4.36 x 10 <sup>-5</sup>

Based upon the results of the infiltration testing, it is recommended that any infiltration infrastructure is designed to the most conservative rate proven around the associated test location.

It is recommended that liaison with the relevant regulatory bodies and third parties (i.e. the LPA, The Environment Agency, Anglian Water) is undertaken at an early stage to ensure any surface water drainage proposals are approved.

### 8.7 Buried Concrete

The results of chemical tests indicate a sulphate concentration in the soils of between <10mg/l and 260mg/l as a 2:1 water/soil extract with pH values in the range of 5.3 and 7.2.

In consideration of the current usage of the site, it is recommended that 'greenfield **conditions**' be assumed for the purposes of assessing the aggressive chemical environment for concrete classification (ACEC class). The strata encountered is considered to be largely permeable, therefore the classifications relating to 'mobile **groundwater**' have been applied in this instance.

Based upon the above a Design Sulphate, (DS), class of DS-1 is considered applicable across much of the site. An accompanying ACEC classification of AC-1 is also considered applicable, based upon the pH values of the majority of samples.

Further guidance relating to the above classifications is provided within BRE Special Digest 1, (ref. R.2).

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## 9. CONCLUSIONS AND RECOMMENDATIONS

Geosphere Environmental Ltd was commissioned by M Scott Properties Limited, to undertake a Phase 2 Site Investigation at Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

At the time this report was prepared, it was understood that the proposed development comprised of residential properties with associated soft landscaped areas including private gardens and car parking facilities.

The site formed part of a Phase 1 Desk Study undertaken by Geosphere Environmental Ltd, reference 3551,EC,AR,DS/DESK/LT,GF/28-11-18/V1 dated 28 November 2018. The findings of the report indicated potential sources of contamination to include Made Ground associated with hardstanding tracks onsite; a strip of which exists in the north of the site, as well as the potential for Made Ground from offsite developments located beyond the eastern site boundary. Other sources have been discounted, due to their irrelevance to the investigation site.

Site works were carried out between 11 February 2019 and 22 May 2019 and comprised of the formation of twenty four windowless sampling boreholes, installation of seven 50mm ground gas monitoring wells, soil infiltration testing within seven machine excavated trial pits, four dynamic probe tests, single hand-dug trial pit and associated soil logging, sampling and in situ strength testing.

The ground conditions were recorded to be consistent across the site, comprising of nominal amounts of Topsoil overlying superficial deposits of Sheringham Cliffs Formation (Sand and Gravel). Groundwater level was encountered within WS203a and WS205a only, during the intrusive works. The groundwater strikes were consistent with the thicknesses of clay and therefore the groundwater in these locations is considered to be perched.

Based upon guidance given in CIRIA C665, the site is considered to fall within the NHBC green category for low-rise housing with underfloor voids, which requires no special protection measures.

Laboratory analysis identified no concentrations of contaminants which were above guidance threshold values for a residential development with plant uptake. Based upon the results of chemical analysis, a very low risk exists for the site and therefore the site may be developed without the need for remediation.

A minimum foundation depth of 0.75 is applicable within proven granular soils, however borehole location WS204a, encountered a significant thickness of cohesive soils at approximate formation depths and therefore a minimum foundation depth of 1.0mbgl is applicable. Foundations in this area should also be designed to the requirements of NHBC guidance, given the presence of trees.

Recommendations for soil infiltration and roadway design are provided within the relevant sections as these vary across the testing locations.

# APPENDICES

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## Appendix 1 – Report Limitations and Conditions

### General Limitations and Exceptions

This report was prepared solely for our Client for the stated purposes only and is not intended to be relied on by any other party or for any other use. No extended duty of care to any third party is implied or offered.

Geosphere Environmental Ltd does not purport to provide specialist legal advice.

The Executive Summary, Conclusions and Recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon until considered in the context of the whole report.

Interpretations and recommendations contained in the report represent our professional opinions, which were arrived at in accordance with currently accepted industry practices at the time of reporting and based upon current legislation in force at that time.

### Environmental and Geotechnical Reporting (including Phase 1, Phase 2 and Site Walkovers) Limitations and Exceptions

The comments given in this report and the options expressed herein, are based upon the readily available information collated for the report and an assessment based upon the current guidance which for Phase 1 / Phase 2 report is primarily the Contaminated Land Research (CLR) Report and notable, CLR report 3, **‘Documentary research on industrial sites’**.

The report has been prepared in relation to the proposed end use and should another end use be intended, reassessment may be required.

No warranty is given as to the possibility of future changes in the condition of the site.

The opinions expressed cannot be absolute due to the limitation of time and resources imposed by the agreed brief.

With regards to any aspect of land contamination referred to, this is limited to those aspects specifically stated and necessarily qualified. No liability shall be accepted for other aspects which may be the result of gradual or sudden pollution incidents, past or present land uses and the potential for associated contamination migration.

Any Desk Study Report / data has been produced largely from the information purchased from The Landmark Information Group. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. The information purchased has been assumed to be correct and free from errors. However, there is the possibility that some data may be missing from the report including (but not limited to) unrecorded land uses both onsite and offsite or unrecorded pollution events. No attempt has been made to verify the information.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed onsite, between and subsequent to the various map surveys provided.

Any site walkover undertaken is a snapshot of the site recording the visually evident conditions at the time of the walkover in the areas readily accessible. It is possible that after the walkover, the site was altered (for example by fly-tipping or groundworks) or before the walkover, the site conditions changed removing evidence of potentially contaminative features (such as oil tanks removed).

Any intrusive works only cover a tiny proportion of the site. Where exploratory holes are positioned by Geosphere Environmental Limited, they are located to give as good a coverage of the site as possible and to target features / proposed land use where applicable whilst allowing for areas that cannot be accessed, Client requested locations and other site / time / budget constraints. Whilst assumptions may have been drawn between exploratory holes on the ground conditions and / or extent or otherwise of any contamination, this is for guidance only and no liability can be accepted on its accuracy.

Foundation design is outside of the remit of Geosphere Environmental Limited unless specifically stated and it is recommended that the services of foundation design specialists are sought as required. Any foundation appraisal contained within the report is limited to foundation optioneering.

Any conceptual site model is based upon the information available at the time of conducting this assessment and is an interpretive assessment of the conditions at the site. Redevelopment and / or further investigation of the site may reveal additional information and therefore alter the conceptual site model and the report conclusions.

Any infiltration testing results are considered to be representative of the ground conditions at the locations tested and at the time of testing. As well as lateral variation in ground conditions, seasonal changes in ground water level may affect the results.

Any post-fieldwork monitoring (including ground gas / groundwater) is a snapshot of the conditions at the time of monitoring.

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## Appendix 2 – References

- R.1.** CLR 11, 'Model Procedures for the Management of Contaminated Land: Risk Assessment Procedure', DoE 2004.
- R.2.** BRE Special Digest 1, 'Concrete in Aggressive Ground, 2005.
- R.3.** BRE Digest 365, 'Soakaway Design', 2016.
- R.4.** The Environmental Protection Act, Part IIA, Section 78, 1990.
- R.5.** Environment Act 1995, Section 57, DoE 1995.
- R.6.** British Standards Institute: BS 10175 'Investigation of Potentially Contaminated Sites', Code of Practice, BSI 2011+A2:2017.
- R.7.** British Standards Institute: BS 5930 'Code of Practice for Ground Investigations', 2015.
- R.8.** Asbestos: The Survey Guide, HSG 264, 2<sup>nd</sup> Edition, 2012.
- R.9.** CL:AIRE 'Guidance on Comparing Soil Contamination Data with a Critical Concentration', The Chartered Institute of Environmental Health, May 2008.
- R.10.** EIC/AGS/CL:AIRE. Soil Generic Assessment Criteria for Human Health Risk Assessment. Contaminated Land: Applications in Real Environments, London, UK, January 2010.
- R.11.** Contaminated Land Assessment Guidance Protocols, Published by agreement between Water UK and the Home Builders Federation, Published by Water UK, January 2014.
- R.12.** UKWIR 'Guidance for the Selection of Water Supply Pipes to be Used in Brownfield Sites, August 2010.
- R.13.** CIRIA Report 97 (Second Edition) 'Trenching Practice', 2001.
- R.14.** CIRIA Reports 149 to 152, 'Methane and Associated Hazards to Construction', 1995.
- R.15.** CIRIA Report C665, 'Assessing Risks Posed by Hazardous Ground Gases to Buildings', 2007.
- R.16.** CIRIA Report C753, 'The SuDS Manual', 2015.
- R.17.** CIRIA Report C687, 'Planning for SuDS – Making it Happen, 2010.
- R.18.** Environment Agency. Performance Standard for Laboratories Undertaking Chemical Testing on Soil, Version 4, March 2012.
- R.19.** Highways Agency, 'Design Manual for Roads and Bridges, Volume 7. Pavement Design and Maintenance: Foundations HD 25/94.
- R.20.** Interim Advice Note 73/06, Revision 1, Design Guidance for Road Pavement Foundations, 2009.
- R.21.** Road Foundation Design for Major UK Highways, Version 1.0, Transport Research Laboratories, 2006.
- R.22.** National House-Building Council, Standards, Chapter 4.2, 2018 'Building Near Trees'.

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- R.23.** National House-Building Council, Standards, Chapter 5, 2018 '**Ground Floors and Substructures**'.
  - R.24.** SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report (Revision 2), Contaminated Land: Applications in Real Environments (CL:AIRE) September 2014. Appendix H – Lead.
  - R.25.** Land Quality Press, The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015.
  - R.26.** The Environment Agency, Technical Guidance WM3, '**Waste Classification: Guidance on the Classification and Assessment of Waste**' 1<sup>st</sup> Edition, May 2015 (V1.1 – May 2018).
  - R.27.** National Roads Authority, Manual of Contract Documents for Highway Works, Volume 1, '**Specification for Highways Works, Series 600, 'Earthworks', Amendment February 2016.**
  - R.28.** British Standards Institute, BS 8485, '**Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings**', 2015.



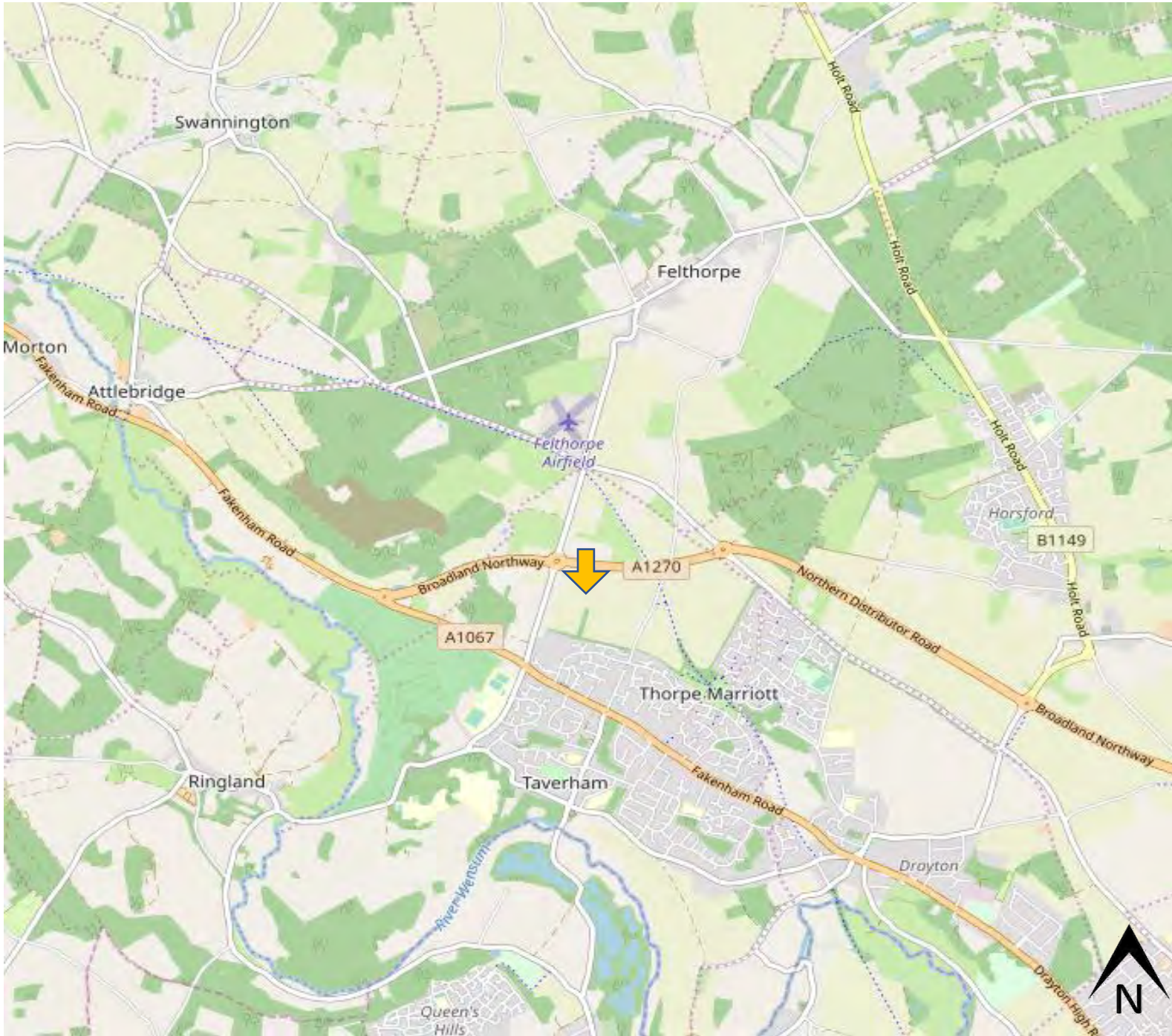
## **Appendix 3 – Drawings**

Site Location Plan – Drawing ref. 3921,GI,SK/001/Rev 0

Site Plan – Drawing ref. 3921,GI,SK/002/Rev 0

Proposed Development Plan – Drawing ref. 3921,GI,SK/003/Rev 0

Exploratory Hole Location Plan – Drawing ref. 3921,GI,SK/004/Rev 0



LEGEND



Site Location

SOURCE

[© OpenStreetMap contributors](#)

PROJECT

Land off Fir Covert Road, Taverham, Norfolk,  
NR8 6HL

TITLE

Site Location Plan

DRAWING NUMBER

3710,GI,SK/001/Rev 0

SCALE

As marked

DATE

01/02/2019

DRAWN BY

CS

CHECKED BY

SG



GEOSPHERE ENVIRONMENTAL

LEGEND

— Site boundary

SOURCE

[Brown & Co](#)

PROJECT

Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL

TITLE

Site Plan

DRAWING NUMBER

3921, GI / 002 / Rev0

SCALE

As marked

DATE

01/02/2019

DRAWN BY

CS

CHECKED BY

SG





LEGEND

SOURCE

[Brown and Co](#)

PROJECT

Land off Fir Covert Road, Taverham, Norfolk,  
NR8 6HL

TITLE

Proposed Development Plan

DRAWING NUMBER

3921,GI/003/Rev0

SCALE

As marked

DATE

01/02/2019

DRAWN BY

CS







CHECKED BY

SG





## LEGEND

-  Site boundary
-  Window Sample
-  Monitoring Well
-  Soakage Pit
-  Hand Dug Pit
- 

## SOURCE

© [OpenStreetMap contributors](#)

## PROJECT

Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL

## TITLE

Exploratory Hole Location Plan

## DRAWING NUMBER

3921, GI / 004 / Rev0

## SCALE

As marked

## DATE

10/06/2019

## DRAWN BY

CS

## CHECKED BY

SG



## Appendix 4 – Comparison of Consequences Against Probability

		Consequence (Severity of Linkage)			
		Severe (S)	Moderate (Mo)	Mild (Mi)	Negligible (N)
Probability (Likelihood of linkage from)	Highly Likely (HL)	Very High Risk (VH)	High Risk (HR)	Moderate Risk (MR)	Moderate/Low Risk (MR-LR)
	Likely (L)	High Risk (HR)	Moderate Risk (MR)	Moderate/Low Risk (MR-LR)	Low Risk (LR)
	Unlikely (U)	Moderate Risk (MR)	Moderate/Low Risk (MR-LR)	Low Risk (LR)	Negligible Risk (NR)
	Negligible (N)	Moderate/Low Risk (MR-LR)	Low Risk (LR)	Negligible Risk (NR)	Negligible Risk (NR)

This table is to provide reference information in conjunction with the GEL Conceptual Model attached within the Hazard Risk Assessment section of this report, Table 1 – Conceptual Model.

### Very High Risk (VH)

- There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is happening currently.
- Urgent investigation and remediation are likely to be required and advised.

### High Risk (HR)

- Harm is likely to arise to a designated receptor from an identified hazard.
- Urgent investigation is required and remedial works are likely necessary in both the short to long term.

### Moderate Risk (MR)

- It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.
- Investigation is required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.

### Low Risk (LR)

- It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. Limited investigation recommended.

### Negligible Risk (NR)

- There is a minimal possibility that harm could arise to a receptor. In the event of such harm being realised it is high likely to not be severe. Investigation not deemed necessary.

## Appendix 5 – Exploratory Hole Logs

### Windowless Sample Hole Logs

(WS1 to WS19 / WS201, WS202, WS203a, WS204a, WS205a and WS206)

### Soakage Test Pit Logs

(SK1 to SK6 and TP201)

### Dynamic Probe Logs

(DP2, DP3, DP5 and DP7)

### Hand dug Trial Pit Logs

(CBR201)

<b>CLIENT: M Scott Properties Ltd</b>			<b>PROJECT: Land off Fir Covert Road</b>				<b>GROUND LEVEL m</b>			<b>HOLE No. WS01</b>														
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m				Grid Reference:			SHEET 1 OF 1													
						DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI															
Date/Time and Depth	Depth of Casing	Depth of Water	Piez.	Strata			Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing				Additional Tests and Notes					
				Description of Strata	Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>		

Date/Time and Depth	Depth of Casing	Depth of Water	Piez.	Description of Strata	Leg	Reduced Level	Depth	SPT 'N' Value	Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>	Additional Tests and Notes	
				TOPSOIL (Dark brown slightly gravelly fine to coarse SAND)			0.00	10 20 30 40	0												Borehole remained dry and stable upon completion
				Medium dense orangish brown slightly gravelly fine to coarse SAND. Gravel is fine subangular flint. (SHERINGHAM CLIFFS FORMATION)	[Stippled with circles]		0.30		0.20-0.30	ES	1										
							1.10-1.20	C	2	24 34 57	19										
				Medium dense light brown fine and medium SAND. (SHERINGHAM CLIFFS FORMATION)	[Stippled]		1.80														
							2	C		34 45 55	19										
					[Stippled]		3.00														
							3	C		56 67 77	27										
					[Stippled]		4.00														
									4	C		23 35 67	21								Borehole completed at 4.0m
									5												

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

\*WATER Standing water level    Water strikes    PIEZOMETER  
 DEPTH All depths, level and thicknesses in metres

**UPPER SEAL**    **RESPONSE ZONE**    **LOWER SEAL**   
**SAMPLE AND TEST KEY**  
 D Small disturbed sample    S Standard penetration test    Blows SPT blows for each 75mm increment  
 B Bulk disturbed sample    C Cone penetration test    N = SPT N value (blows after seating)  
 U Undisturbed sample    K Permeability test    N\*120 = Total blows/penetration including seating  
 P Piston sample      
 J Disturbed jar sample      
 ES Environmental soil sample    <425 Sample % passing 425 micron sieve  
 W Water Sample

**Geosphere Environmental**  
 Unit 11 Brightwell Barns  
 Ipswich



<b>PROJECT No</b> 3921,GI	<b>SHEET</b> 1 OF 1	<b>HOLE No.</b> WS01
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


<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS04</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 3.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes		
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brown slightly gravelly fine to coarse SAND. Gravel of fine subangular flint)		0.00						0											Borehole remained dry and stable upon completion
				Dense orangish brown gravelly fine to coarse SAND. Gravel is fine subangular flint. (SHERINGHAM CLIFFS FORMATION)		0.40						0.10-0.20	ES	1									
												0.60-0.80	ES	2									
				Medium dense becoming dense light brown fine to coarse SAND. (SHERINGHAM CLIFFS FORMATION)		2.00						1	C		4 5 7 11 12 13	43							
												2	C		4 4 7 7 7 7	28							
						3.00						3	C		7 8 9 1 12 12	34							Borehole completed at 3.0m
												4											
												5											

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19

\*WATER  Standing water level  Water strikes

PIEZOMETER  Upper seal  Response zone  Lower seal 

SAMPLE AND TEST KEY  
D Small disturbed sample  
B Bulk disturbed sample  
U Undisturbed sample  
P Piston sample  
J Disturbed jar sample  
ES Environmental soil sample  
W Water Sample

S Standard penetration test  
C Cone penetration test  
K Permeability test

Blows SPT blows for each 75mm increment  
SPT N (35) Undisturbed sample blow count  
N = SPT N value (blows after seating)  
N\*120 = Total blows/penetration including seating  
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

 Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI

SHEET  
1 OF 1

HOLE No.  
WS04

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19

<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS06</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 3.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>
				TOPSOIL (Dark brown gravelly fine to coarse SAND. Gravel is fine and medium subangular flint)		0.00					0											Borehole remained dry and stable upon completion
				Medium dense orangish brown gravelly fine to coarse SAND. Gravel is fine subangular flint. (SHERINGHAM CLIFFS FORMATION)	o	0.35					0.20-0.30	ES	1									
				Medium dense light brown fine to coarse SAND. (SHERINGHAM CLIFFS FORMATION)	o	1.30					1			3 3 4 5 5 5	19							
						3.00					2			3 4 4 5 6 7	22							Borehole completed at 3.0m
											3			4 6 7 8 7 9	31							
											4											
											5											

<p>*WATER  Standing water level</p> <p> Water strikes</p>	<p>PIEZOMETER </p>	<p>Upper seal </p> <p>Response zone </p> <p>Lower seal </p>	<p>SAMPLE AND TEST KEY</p> <p>D Small disturbed sample</p> <p>B Bulk disturbed sample</p> <p>U Undisturbed sample</p> <p>P Piston sample</p> <p>J Disturbed jar sample</p> <p>ES Environmental soil sample</p> <p>W Water Sample</p>	<p>S Standard penetration test</p> <p>C Cone penetration test</p> <p>K Permeability test</p>	<p>Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count</p> <p>SPT N N = SPT N value (blows after seating)</p> <p>N*120 = Total blows/penetration including seating</p> <p>&lt;425 Sample % passing 425 micron sieve</p>	<p>Geosphere Environmental Unit 11 Brightwell Barns Ipswich</p>	<p>PROJECT No 3921,GI</p> <p>SHEET 1 OF 1</p> <p>HOLE No. WS06</p>
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DEPTH All depths, level and thicknesses in metres

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS08</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes		
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brown slightly gravelly fine to coarse SAND. Gravel is fine and medium flint)		0.00						0											Borehole remained dry and stable upon completion
				Medium dense orangish brown gravelly fine to coarse SAND. Gravel is fine and medium subangular flint. (SHERINGHAM CLIFFS FORMATION)		0.45						0.50-0.60	ES 1	1									
				Medium dense light brown fine and medium SAND. (SHERINGHAM CLIFFS FORMATION)		1.20						1			23 34 34	14							
				Loose becoming medium dense light brown gravelly fine to coarse SAND. Gravel is fine subangular and subrounded flint. (SHERINGHAM CLIFFS FORMATION)		2.10						1.70-1.80	ES 2	2									
						2.10						2			32 33 34	13							
												3			21 22 22	8							
						4.00						4			56 48 88	28							Borehole completed at 4.0m

<p>*WATER  Standing water level  PIEZOMETER</p> <p> Water strikes</p>	<p> Upper seal</p> <p> Response zone</p> <p> Lower seal</p>	<p><b>SAMPLE AND TEST KEY</b></p> <p>D Small disturbed sample</p> <p>B Bulk disturbed sample</p> <p>U Undisturbed sample</p> <p>P Piston sample</p> <p>J Disturbed jar sample</p> <p>ES Environmental soil sample</p> <p>W Water Sample</p>	<p><b>S</b> Standard penetration test</p> <p><b>C</b> Cone penetration test</p> <p><b>K</b> Permeability test</p>	<p><b>Blows</b> SPT blows for each 75mm increment (35) Undisturbed sample blow count</p> <p><b>SPT N</b> N = SPT N value (blows after seating)</p> <p><b>N*120</b> = Total blows/penetration including seating</p> <p><b>&lt;425</b> Sample % passing 425 micron sieve</p>		<p>Geosphere Environmental Unit 11 Brightwell Barns Ipswich</p>	<p><b>PROJECT No</b> 3921,GI</p> <p><b>SHEET</b> 1 OF 1</p> <p><b>HOLE No.</b> WS08</p>
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DEPTH All depths, level and thicknesses in metres

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

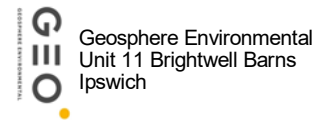
CLIENT: M Scott Properties Ltd			PROJECT: Land off Fir Covert Road				GROUND LEVEL m				HOLE No. WS09											
LOGGED BY: CS		CHECKED BY: SG		EXCAVATION METHOD: Windowless sampler				Grid Reference:				SHEET 1 OF 1										
FIELDWORK BY: DRILLT		DATE:		Uncased to 4.0 m				DATES 12/02/2019 - 12/02/2019				PROJECT NO. 3921,GI										
TEMPLATE REF: GEL AGS BH BETA		Additional Tests and Notes																				
Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Leg	Strata				Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing				Additional Tests and Notes
						Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>	
				TOPSOIL (Dark brown fine and medium SAND)		0.00															Borehole remained dry and stable upon completion	
				Dense greyish brown slightly gravelly fine to coarse SAND. Gravel is fine subrounded flint. (SHERINGHAM CLIFFS FORMATION)		0.30																
				0.90 Becomes orangish brown																		
				Firm orange brown sandy CLAY. (SHERINGHAM CLIFFS FORMATION)		1.80																
				Medium dense orangish brown gravelly fine to coarse SAND. Gravel is fine subangular flint and shell fragments. (SHERINGHAM CLIFFS FORMATION)		2.00																
																					Borehole completed at 4.0m	

\*WATER Standing water level PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY: D Small disturbed sample, B Bulk disturbed sample, U Undisturbed sample, P Piston sample, J Disturbed jar sample, ES Environmental soil sample, W Water Sample

S Standard penetration test, C Cone penetration test, K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count, N = SPT N value (blows after seating), N\*120 = Total blows/penetration including seating, <425 Sample % passing 425 micron sieve



PROJECT No  
3921,GI  
SHEET  
1 OF 1  
HOLE No.  
WS09


<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS10</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>
				TOPSOIL (Dark brown slightly gravelly fine to coarse SAND. Gravel is fine and medium subangular flint)		0.00						0										Borehole remained dry and stable upon completion
				Brownish grey becoming orange brown slightly gravelly fine and medium SAND. Gravel is fine subangular flint. (SHERINGHAM CLIFFS FORMATION)		0.35						0.10-0.20	ES	1								
				2.00 Becomes fine to coarse SAND.								1			3 3 5 6 6 5	22						
				2.60 Becomes fine and medium SAND.								2			3 5 5 4 5 6	20						
												3			4 4 4 4 4 5	17						
						4.00						4			2 2 2 2 3 4	11						Borehole completed at 4.0m

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	(35) Undisturbed sample blow count	N = SPT N value (blows after seating)
			Lower seal	P Piston sample	J Disturbed jar sample	K Permeability test	N*120 = Total blows/penetration including seating	<425 Sample % passing 425 micron sieve
				ES Environmental soil sample	W Water Sample			

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No	3921,GI
SHEET	1 OF 1
HOLE No.	WS10

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

CLIENT: M Scott Properties Ltd			PROJECT: Land off Fir Covert Road			GROUND LEVEL m			HOLE No. WS11												
LOGGED BY: CS		CHECKED BY: SG		EXCAVATION METHOD: Windowless sampler			Grid Reference:			SHEET 1 OF 1											
FIELDWORK BY: DRILLT		DATE:		Uncased to 3.0 m			DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI											
TEMPLATE REF: GEL AGS BH BETA		Additional Tests and Notes																			
Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing					Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>
				TOPSOIL (Dark brown fine and medium SAND)		0.00					0										Borehole remained dry and stable upon completion
				Medium dense becoming dense brownish grey slightly gravelly fine to coarse SAND. Gravel is fine and medium subrounded flint. (SHERINGHAM CLIFFS FORMATION)	○	0.35					0.60-0.70	ES 1									
				1.50 Becomes orange brown	○						1		23 44 43	15							
					○						2		34 46 66	22							
					○	3.00					3		59 910 1012	41							Borehole completed at 3.0m
					○						4										
					○						5										

\*WATER Standing water level PIEZOMETER

Upper seal  
 Response zone  
 Lower seal

**SAMPLE AND TEST KEY**

D Small disturbed sample  
B Bulk disturbed sample  
U Undisturbed sample  
P Piston sample  
J Disturbed jar sample  
ES Environmental soil sample  
W Water Sample

S Standard penetration test  
C Cone penetration test  
K Permeability test

Blows SPT blows for each 75mm increment  
SPT N (35) Undisturbed sample blow count  
N = SPT N value (blows after seating)  
N\*120 = Total blows/penetration including seating  
<425 Sample % passing 425 micron sieve



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI  
SHEET  
1 OF 1  
HOLE No.  
WS11

DEPTH All depths, level and thicknesses in metres

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS12</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brown gravelly fine to coarse SAND. Gravel is fine and medium subangular flint)		0.00					0										Borehole remained dry and stable upon completion	
				Medium dense orangish brown fine to coarse SAND and GRAVEL. Gravel is fine and medium subangular flint and shell fragments. (SHERINGHAM CLIFFS FORMATION)	b	0.70					0.20-0.50	ES	1									
				Medium dense orangish brown fine and medium SAND. (SHERINGHAM CLIFFS FORMATION)	b	1.20					1											
				2.10 Becomes light brown.							1.50-1.60	ES	2									
											2											
											3											
											4											
						4.00															Borehole completed at 4.0m	

<p>*WATER  Standing water level  Water strikes</p>	<p>PIEZOMETER </p>	<p>Upper seal  Response zone  Lower seal </p>	<p>SAMPLE AND TEST KEY D Small disturbed sample B Bulk disturbed sample U Undisturbed sample P Piston sample J Disturbed jar sample ES Environmental soil sample W Water Sample</p>	<p>S Standard penetration test C Cone penetration test K Permeability test</p>	<p>Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating &lt;425 Sample % passing 425 micron sieve</p>	 Geosphere Environmental Unit 11 Brightwell Barns Ipswich	PROJECT No 3921,GI SHEET 1 OF 1 HOLE No. WS12
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DEPTH All depths, level and thicknesses in metres


<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>		<b>GROUND LEVEL m</b>		<b>HOLE No. WS13</b>	
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m		Grid Reference:	
				DATES 12/02/2019 - 12/02/2019		PROJECT NO. 3921,GI	

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brown fine to coarse SAND)		0.00					0											Borehole remained dry and stable upon completion
				Medium dense orangish brown slightly gravelly fine to coarse SAND. Gravel is fine and medium subangular flint. (SHERINGHAM CLIFFS FORMATION)		0.45					1		4 5 6 6 5 6	23								
				Medium dense orangish brown fine to coarse SAND and GRAVEL. Gravel is fine subangular flint and shells. (SHERINGHAM CLIFFS FORMATION)		2.50					2		4 3 3 3 4 4	14								
				Medium dense light brown fine to coarse SAND. (SHERINGHAM CLIFFS FORMATION)		3.10					3		4 4 4 4 5 5	18								
						4.00					4		5 5 5 7 7 9	28								

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
∇	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	(35) Undisturbed sample blow count	N = SPT N value (blows after seating)
			Lower seal	P Piston sample	J Disturbed jar sample	K Permeability test	N*120 = Total blows/penetration including seating	<425 Sample % passing 425 micron sieve
				ES Environmental soil sample	W Water Sample			

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No	3921,GI
SHEET	1 OF 1
HOLE No.	WS13




<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>		<b>GROUND LEVEL m</b>		<b>HOLE No. WS14</b>	
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 3.0 m		Grid Reference:	
				DATES 12/02/2019 - 12/02/2019		PROJECT NO. 3921,GI	

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>
				TOPSOIL (Dark brown slightly gravelly SAND)		0.00					0	ES	1									Borehole remained dry and stable upon completion
				Medium dense becoming loose orangish brown gravelly fine to coarse SAND. Gravel is fine and medium subangular flint. (SHERINGHAM CLIFFS FORMATION)	○	0.50					1			3 3 3 3 6 6	18							
											2			2 3 2 3 3 2	10							
						3.00					3			3 4 2 3 2 2	9							Borehole completed at 3.0m

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
▽	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	(35) Undisturbed sample blow count	N = SPT N value (blows after seating)
			Lower seal	P Piston sample	U Undisturbed sample	K Permeability test	N*120 = Total blows/penetration including seating	<425 Sample % passing 425 micron sieve
				J Disturbed jar sample	ES Environmental soil sample			
				W Water Sample				

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No	3921,GI
SHEET	1 OF 1
HOLE No.	WS14


<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS15</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes			
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>	
				TOPSOIL (Dark brown slightly gravelly fine and medium SAND)		0.00					0	0.10-0.20	ES	1										Borehole remained dry and stable upon completion
				Medium dense becoming dense orangish brown fine to coarse SAND and GRAVEL. Gravel is fine and medium subangular flint. (SHERINGHAM CLIFFS FORMATION)		0.50																		
				1.00 Becomes fine subangular flint.								1			4 8 5 5 6 7		23							
												1.50-1.60	ES	2										
												2			3 5 5 5 6 6		22							
												3			5 4 5 5 5 6		21							
				3.20 Becomes light brown.								4			5 4 7 11 10 12		40							Borehole completed at 4.0m

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	(35) Undisturbed sample blow count	N = SPT N value (blows after seating)
			Lower seal	P Piston sample	J Disturbed jar sample	K Permeability test	N*120 = Total blows/penetration including seating	<425 Sample % passing 425 micron sieve
				ES Environmental soil sample	W Water Sample			

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI

SHEET  
1 OF 1

HOLE No.  
WS15

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

CLIENT: M Scott Properties Ltd				PROJECT: Land off Fir Covert Road				GROUND LEVEL m				HOLE No. WS16									
LOGGED BY: CS		CHECKED BY: SG		EXCAVATION METHOD: Windowless sampler				Grid Reference:				SHEET 1 OF 1									
FIELDWORK BY: DRILLT		DATE:		Uncased to 4.0 m				DATES 12/02/2019 - 12/02/2019				PROJECT NO. 3921,GI									
TEMPLATE REF: GEL AGS BH BETA																					
Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing				Additional Tests and Notes		
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %		PL %	LL %
				TOPSOIL (Dark brown slightly gravelly fine to coarse SAND)		0.00					0										Borehole remained dry and stable upon completion
				Medium dense becoming loose orangish brown slightly gravelly fine to coarse SAND. Gravel is fine subangular flint. (SHERINGHAM CLIFFS FORMATION)		0.55					1		4 5 7 7 6 7	27							
											2		3 2 2 2 3 2	9							
											3		1 2 1 2 1 2	6							
						4.00					4		2 1 1 1 1 2	5							Borehole completed at 4.0m
											5										

\*WATER Standing water level PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY  
 D Small disturbed sample  
 B Bulk disturbed sample  
 U Undisturbed sample  
 P Piston sample  
 J Disturbed jar sample  
 ES Environmental soil sample  
 W Water Sample

S Standard penetration test  
 C Cone penetration test  
 K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count  
 N = SPT N value (blows after seating)  
 N\*120 = Total blows/penetration including seating  
 <425 Sample % passing 425 micron sieve

Geosphere Environmental  
 Unit 11 Brightwell Barns  
 Ipswich

PROJECT No  
 3921,GI  
 SHEET  
 1 OF 1  
 HOLE No.  
 WS16

DEPTH All depths, level and thicknesses in metres


<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS17</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>	
				TOPSOIL (Dark brown fine and medium SAND)		0.00					0										Borehole remained dry and stable upon completion
				Medium dense orangish brown slightly gravelly fine to coarse SAND. Gravel is fine subangular to subrounded flint. (SHERINGHAM CLIFFS FORMATION)		0.50					1		3 4 5 5 6 7	23							
				Medium dense becoming dense light brown fine to coarse SAND. (SHERINGHAM CLIFFS FORMATION)		2.40					2		4 4 5 5 4 5	19							
						4.00					3		3 4 4 4 4 5	17							
											4		7 9 8 10 10 10	38							Borehole completed at 4.0m
											5										

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	N	(35) Undisturbed sample blow count
			Lower seal	P Piston sample	J Disturbed jar sample	K Permeability test	N*120	= SPT N value (blows after seating)
				ES Environmental soil sample	ES Environmental soil sample			including seating
				W Water Sample	W Water Sample			N*120 = Total blows/penetration including seating
								Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI  
SHEET  
1 OF 1  
HOLE No.  
WS17

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>			<b>GROUND LEVEL m</b>			<b>HOLE No. WS18</b>		
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 3.0 m			Grid Reference:			SHEET 1 OF 1
							DATES 12/02/2019 - 12/02/2019			PROJECT NO. 3921,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes		
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brown fine and medium SAND)		0.00	0	10	20	30	40	0	ES	1									Borehole remained dry and stable upon completion
				Medium dense orangish brown fine and medium SAND. (SHERINGHAM CLIFFS FORMATION)		0.45	0.20-0.30					1		3 4 6 7 8 9	30								
				Medium dense light brown fine and medium SAND. (SHERINGHAM CLIFFS FORMATION)		2.30						2		5 5 6 5 6 7	24								
						3.00						3		3 3 5 4 5 6	20								Borehole completed at 3.0m
												4											
												5											

<p>*WATER  Standing water level</p> <p> Water strikes</p>	<p>PIEZOMETER </p> <p>Upper seal </p> <p>Response zone </p> <p>Lower seal </p>	<p>SAMPLE AND TEST KEY</p> <p>D Small disturbed sample</p> <p>B Bulk disturbed sample</p> <p>U Undisturbed sample</p> <p>P Piston sample</p> <p>J Disturbed jar sample</p> <p>ES Environmental soil sample</p> <p>W Water Sample</p>	<p>S Standard penetration test</p> <p>C Cone penetration test</p> <p>K Permeability test</p>	<p>Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count</p> <p>SPT N N = SPT N value (blows after seating)</p> <p>N*120 = Total blows/penetration including seating</p> <p>&lt;425 Sample % passing 425 micron sieve</p>	<p>Geosphere Environmental Unit 11 Brightwell Barns Ipswich</p>	<p>PROJECT No 3921,GI</p> <p>SHEET 1 OF 1</p> <p>HOLE No. WS18</p>
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DEPTH All depths, level and thicknesses in metres


<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>		<b>GROUND LEVEL m</b>		<b>HOLE No. WS19</b>	
LOGGED BY: CS FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE:		EXCAVATION METHOD: Windowless sampler Uncased to 3.0 m		Grid Reference:	
				DATES 12/02/2019 - 12/02/2019		PROJECT NO. 3921,GI	

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes		
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %		r Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brown fine and medium SAND)		0.00					0												Borehole remained dry and stable upon completion
				Medium dense orangish brown fine and medium SAND. (SHERINGHAM CLIFFS FORMATION)		0.30					1		4 5 6 5 6 5	22									
				Medium dense light brown fine and medium SAND. (SHERINGHAM CLIFFS FORMATION)		2.20					2		3 3 2 6 4 5	17									
						3.00					3		2 5 4 4 4 4	16									Borehole completed at 3.0m

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
	Water strikes		Response zone		B Bulk disturbed sample	C Cone penetration test	SPT N	(35) Undisturbed sample blow count
			Lower seal		U Undisturbed sample	K Permeability test		N = SPT N value (blows after seating)
					P Piston sample			N*120 = Total blows/penetration including seating
					J Disturbed jar sample			<425 Sample % passing 425 micron sieve
					ES Environmental soil sample			
					W Water Sample			

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI  
SHEET  
1 OF 1  
HOLE No.  
WS19


<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>		<b>GROUND LEVEL m</b>		<b>HOLE No. WS201</b>	
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE: 24/05/2019		EXCAVATION METHOD: Windowless sampler Uncased to 6.0 m		Grid Reference:	
				DATES 15/05/2019 - 15/05/2019		SHEET 1 OF 1	
						PROJECT NO. 3921,GI	

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brownish grey organic silty fine SAND with frequent fine roots and rare coarse roots)		0.00				0												Borehole remained dry and stable upon completion
				Dark reddish brown silty fine SAND (SHERINGHAM CLIFFS FORMATION)	X	0.25				0.15	J	1										
				0.90 Becoming dark orangish brown mottled with depth	X					0.35	J	2										
					X					0.90	D	1	3 5 5 6 6 6	23								
					X					1.50	D	2										
				2.50 With occasional rounded gravel of flint and pale yellowish brown fine to coarse sand	X					2			3 3 4 4 5 6	19								
					X					2.50	D	3										
				3.40 Becoming a slightly saturated medium to coarse SAND with rare cobbles of flint and fine gravel of quartzite	X					3			5 8 11 14 17 8	63*								
					X					3.50	D	4										
				5.55 Becoming pale grey with depth	X					4			5 6 6 8 10 11	35								
					X					4.60	D	5										
					X					5			6 7 7 9 9 11	36								
					X					5.70	D	6										
					X					6.00			8 8 8 10 12 11	41								Borehole completed at 6.0m

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
∇	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	(35) Undisturbed sample blow count	N = SPT N value (blows after seating)
			Lower seal	J Disturbed jar sample	ES Environmental soil sample	K Permeability test	N*120 = Total blows/penetration including seating	<425 Sample % passing 425 micron sieve
				W Water Sample				

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI  
SHEET  
1 OF 1  
HOLE No.  
WS201

<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>		<b>GROUND LEVEL m</b>		<b>HOLE No. WS202</b>	
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE: 24/05/2019		EXCAVATION METHOD: Windowless sampler Uncased to 6.0 m		Grid Reference:	
				DATES 15/05/2019 - 15/05/2019		SHEET 1 OF 1	
						PROJECT NO. 3921,GI	

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brownish grey slightly desiccated organic silty fine SAND with frequent fine roots and rare coarse roots)		0.00					0											Borehole remained dry and stable upon completion
				Dark orangish brown fine SAND (SHERINGHAM CLIFFS FORMATION)		0.35					0.10	J	1									
				1.10 Becoming yellowish brown mottled with depth							0.40	J	2									
											0.90	1 D	1	4 4 6 6 6 6	24							
				2.10 Becoming medium to coarse SAND with pale yellowish brown mottling and rare gravel of angular rounded flint with depth							1.85	2 D	2	3 3 3 5 4 6	18							
											2.30	D	3									
				3.10 Becoming slightly saturated							3			4 5 4 6 6 5	21							
											3.60	D	4									
				4.50 Becoming pale yellow brown with depth							4			3 3 4 3 4 3	14							
											4.50	D	5									
				5.40 - 5.60 Black with iron cemented siltstone gravel							5			3 2 2 3 2 3	10							
											5.45	D	6									
						6.00					6			3 3 2 3 3 4	12							Borehole completed at 6.0m

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19

\*WATER Standing water level PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY  
D Small disturbed sample  
B Bulk disturbed sample  
U Undisturbed sample  
P Piston sample  
J Disturbed jar sample  
ES Environmental soil sample  
W Water Sample

S Standard penetration test  
C Cone penetration test  
K Permeability test

Blows SPT blows for each 75mm increment  
SPT N (35) Undisturbed sample blow count  
N = SPT N value (blows after seating)  
N\*120 = Total blows/penetration including seating  
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI  
SHEET  
1 OF 1  
HOLE No.  
WS202




**CLIENT: M Scott Properties Ltd**      **PROJECT: Land off Fir Covert Road**      **GROUND LEVEL m**      **HOLE No. WS203a**  
 LOGGED BY: SG      CHECKED BY: SG      EXCAVATION METHOD: Windowless sampler      Grid Reference:      SHEET 1 OF 1  
 FIELDWORK BY: GEL      DATE: 24/05/2019      115mm cased from 0.0 to 3.0m      DATES 22/05/2019 - 22/05/2019      PROJECT NO. 3921,GI  
 TEMPLATE REF: GEL AGS BH BETA

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brownish grey slightly desiccated organic silty fine SAND with frequent fine roots and rare coarse roots)		0.00																
				Dark yellowish brown silty fine SAND with rare fine roots (SHERINGHAM CLIFFS FORMATION)	X	0.40																
				1.50 Slightly saturated with occasional speckling with depth	X																	
				2.00 Becoming saturated and slightly clayey with depth	X																	
		2.70		2.70 Becoming very saturated with depth	X																	Seepage inflow of water at 2.7m
				Dark yellowish brown CLAY (SHERINGHAM CLIFFS FORMATION)	X	3.50																
				Dark yellowish brown silty fine SAND with rare fine roots (SHERINGHAM CLIFFS FORMATION)	X	3.60																
				3.60 Becoming a medium SAND with occasional coarse sand and rare gravel of coarse rinded flint	X																	
				4.50 Becoming light yellowish brown and gravel no longer present with depth	X	4.95																

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
	Water strikes		Response zone	AND	B Bulk disturbed sample	C Cone penetration test	SPT N	(35) Undisturbed sample blow count
			Lower seal	TEST	U Undisturbed sample	K Permeability test		N = SPT N value (blows after seating)
				KEY	P Piston sample			N*120 = Total blows/penetration including seating
					J Disturbed jar sample			<425 Sample % passing 425 micron sieve
					ES Environmental soil sample			
					W Water Sample			

DEPTH All depths, level and thicknesses in metres



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

PROJECT No  
3921,GI  
SHEET  
1 OF 1  
HOLE No.  
WS203a

GEL AGS BH BETA 3921.GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

CLIENT: M Scott Properties Ltd				PROJECT: Land off Fir Covert Road				GROUND LEVEL m				HOLE No. WS204a												
LOGGED BY: SG		CHECKED BY: SG		EXCAVATION METHOD: Windowless sampler				Grid Reference:				SHEET 1 OF 1												
FIELDWORK BY: GEL		DATE: 24/05/2019		115mm cased from 0.0 to 4.0m				DATES 22/05/2019 - 22/05/2019				PROJECT NO. 3921.GI												
TEMPLATE REF: GEL AGS BH BETA																								
Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata			Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes		
					Leg	Reduced Level	Depth	SPT 'N' Value				Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>	
				TOPSOIL (Dark brownish grey slightly desiccated organic silty fine SAND with frequent fine roots and rare coarse roots)			0.00																Borehole remained dry and stable upon completion	
				Yellowish brown silty fine SAND with rare gravel of coarse rinded flint (SHERINGHAM CLIFFS FORMATION)	X		0.35																	
				Dark orangish brown slightly sandy CLAY. Sand is fine (SHERINGHAM CLIFFS FORMATION)	X		1.05					0.85-1.00	D	1	11 34 44	15								
				Dark orangish brown slightly clayey fine SAND (SHERINGHAM CLIFFS FORMATION)	X		1.65																	
				Pale greyish brown closely fissured CLAY with rare decayed fine roots and rare orange brown streaks (SHERINGHAM CLIFFS FORMATION) 2.15 - 2.20 With a pocket of silty fine sand	X		1.85					1.85-2.00	D	2	44 54 44	17								
				Pale greyish brown/dark orangish brown mottled fine and medium SAND with occasional coarse sand and rare gravel of rounded chalk and flint (SHERINGHAM CLIFFS FORMATION) 2.85 Becoming dark orange brown laminated at base 3.00 Mottling no longer present 3.20 Gravel no longer present	X		2.85					2.85-3.00	D	3	46 45 55	19								
				4.00 Becoming dark yellowish brown 4.20 Rare shell fragments present with depth	X							3.85-4.00	D	4	45 56 77	25								
				4.70 Occasional black speckling present with depth	X																			
				5.00 Rare gravel of coarse angular rinded flint and quartz present with depth	X							4.85-5.00	D	5	46 56 78	26								
							6.05																	Borehole completed at 6.05m

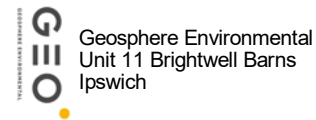
\*WATER Standing water level  
 Water strikes  
 PIEZOMETER

Upper seal  
 Response zone  
 Lower seal

SAMPLE AND TEST KEY  
 D Small disturbed sample  
 B Bulk disturbed sample  
 U Undisturbed sample  
 P Piston sample  
 J Disturbed jar sample  
 ES Environmental soil sample  
 W Water Sample

S Standard penetration test  
 C Cone penetration test  
 K Permeability test

Blows SPT N  
 SPT N = SPT N value (blows after seating)  
 N\*120 = Total blows/penetration including seating  
 <425 Sample % passing 425 micron sieve



PROJECT No  
3921.GI  
SHEET  
1 OF 1  
HOLE No.  
WS204a

DEPTH All depths, level and thicknesses in metres

<b>CLIENT: M Scott Properties Ltd</b>		<b>PROJECT: Land off Fir Covert Road</b>		<b>GROUND LEVEL m</b>		<b>HOLE No. WS205a</b>	
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA		CHECKED BY: SG DATE: 24/05/2019		EXCAVATION METHOD: Windowless sampler 115mm cased from 0.0 to 3.0m		Grid Reference:	
				DATES 22/05/2019 - 22/05/2019		PROJECT NO. 3921,GI	

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes	
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>
				TOPSOIL (Dark brownish grey slightly desiccated organic silty fine SAND with frequent fine roots and rare coarse roots)		0.00						0										
				Dark yellowish brown silty fine SAND (SHERINGHAM CLIFFS FORMATION)		0.40																
				0.70 Becoming light yellowish brown with rare gravel of coarse angular rinded flint								0.85-1.00	D 1	1	11 22 23	9						
				1.00 Becoming dark yellowish brown/light yellowish brown mottled with depth																		
				2.00 Becoming saturated with depth								1.85-2.00	D 2	2	22 34 46	17						
		2.50		2.45 Becoming dark orange/reddish brown																		Partial collapse to 2.4m upon completion Seepage inflow of water at 2.5m
				Dark orangish brown CLAY with pale grey partings and black specklings (SHERINGHAM CLIFFS FORMATION)		2.85						2.85-3.00	D 3	3	44 45 54	18						
				2.85 - 2.95 With a parting of dark orangish brown clay with pale grey partings and black speckling		2.95																
				Dark yellow brown silty fine SAND with interbedded clay parting and dark orangish brown parting of fine sand (SHERINGHAM CLIFFS FORMATION)																		
		3.85		3.20 Interbedded clay parting		3.90						3.85-4.00	D 4	4	56 57 79	28						
				3.30 - 3.35 With a dark orangish brown parting of fine sand		4.05																Seepage inflow of water at 3.85m
				Dark yellow brown CLAY (SHERINGHAM CLIFFS FORMATION)																		
				3.90 Interbedded clay parting																		
				Dark yellow brown silty medium and coarse SAND with rare shell fragments (SHERINGHAM CLIFFS FORMATION)																		
				4.05 Interbedded clay parting. Becoming a medium sand with occasional coarse sand and rare shell fragments with depth								4.85-5.00	D 5	5	66 56 67	24						
				5.20 Rare black speckling present with depth																		
						6.05																
																						Borehole completed at 6.05m

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment	Geosphere Environmental Unit 11 Brightwell Barns Ipswich	PROJECT No 3921,GI	SHEET 1 OF 1	HOLE No. WS205a
	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	SPT N	(35) Undisturbed sample blow count N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating				
			Lower seal	P Piston sample	U Undisturbed sample	K Permeability test	<425	Sample % passing 425 micron sieve				


DEPTH All depths, level and thicknesses in metres W Water Sample

**CLIENT: M Scott Properties Ltd**      **PROJECT: Land off Fir Covert Road**      **GROUND LEVEL m**      **HOLE No. WS206**  
 LOGGED BY: SG      CHECKED BY: SG      EXCAVATION METHOD: Windowless sampler      Grid Reference:      SHEET 1 OF 1  
 FIELDWORK BY: GEL      DATE: 24/05/2019      115mm cased from 0.0 to 5.0m      DATES 22/05/2019 - 22/05/2019      PROJECT NO. 3921,GI  
 TEMPLATE REF: GEL AGS BH BETA

Date/Time and Depth	Depth of Casing	Depth of Water	Piez.	Description of Strata	Strata		Graphical Representation				Sampling/In-Situ Testing				Laboratory Testing						Additional Tests and Notes		
					Leg	Reduced Level	Depth	SPT 'N' Value			Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	r Mg/m <sup>3</sup>		Cu kN/m <sup>2</sup>	
				TOPSOIL (Dark brownish grey slightly desiccated organic silty fine SAND with frequent fine roots and rare coarse roots)			0.00					0										Borehole remained dry and stable upon completion	
				Yellowish brown silty fine SAND with gravel of fine flint (SHERINGHAM CLIFFS FORMATION)	X		0.40																
				0.75 - 0.85 With a parting of fine to coarse rinded flint 0.85 Becoming dark orangish brown with rare reddish brown mottling	X							0.85-1.00	D	1	3 4 5 6 6 7	24							
				2.40 With frequent medium sand and becoming slightly saturated 2.60 With rare coarse sand	X							1.85-2.00	D	2	3 3 3 4 3 5	15							
				3.10 - 3.45 Becoming a fine to coarse sand	X							2.85-3.00	D	3	4 4 6 5 5 6	22							
				3.95 Becoming dark yellow brown	X							3.85-4.00	D	4	4 5 5 4 5 6	20							
				4.90 With rare gravel of coarse rinded flint 5.00 Becoming dark reddish brown mottled with occasional black speckling 5.10 No longer mottled	X							4.85-5.00	D	5	5 5 5 5 6 7	23							
							6.00					5.85-6.00	D	6	7 7 7 7 8 9	31						Borehole completed at 6.0m	

GEL AGS BH BETA 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

*WATER	Standing water level	PIEZOMETER	Upper seal	SAMPLE AND TEST KEY	D Small disturbed sample	S Standard penetration test	Blows	SPT blows for each 75mm increment
	Water strikes		Response zone	U Undisturbed sample	B Bulk disturbed sample	C Cone penetration test	SPT N	(35) Undisturbed sample blow count
			Lower seal	P Piston sample	U Undisturbed sample	K Permeability test		N = SPT N value (blows after seating)
				J Disturbed jar sample				N*120 = Total blows/penetration including seating
				ES Environmental soil sample				<425 Sample % passing 425 micron sieve
				W Water Sample				



Geosphere Environmental  
Unit 11 Brightwell Barns  
Ipswich

**PROJECT No**  
3921,GI

**SHEET**  
1 OF 1

**HOLE No.**  
WS206

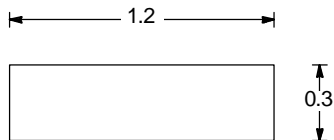


### TRIAL PIT LOG

Project <b>Land off Fir Covert Road</b>		Client <b>M Scott Properties Ltd</b>		TRIAL PIT No <b>SK1</b>
Job No <b>3921,GI</b>	Date <b>11-02-19</b> <b>11-02-19</b>	Ground Level (m)	Coordinates ( )	
Fieldwork By <b>DRILLT</b>		Logged By <b>CS</b>		Sheet <b>1 of 1</b>

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.40	TOPSOIL (Brown slightly gravelly fine to coarse SAND. Gravel is fine sunangular flint)				
0.40-2.00	Yellowish brown gravelly fine to coarse SAND. Gravel of fine to coarse sunangular to subrounded flint. (SHERINGHAM CLIFFS FORMATION)				
					Trial pit completed at 2.0m

GEL:AGS:TP BETA\_3921,GI FIR COVERT ROAD\_21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19



Shoring/Support:  
Stability:

All dimensions in metres Scale 1:20.83333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By <b>SG</b>
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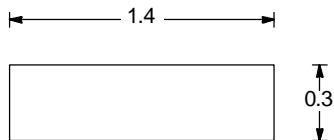


### TRIAL PIT LOG

Project <b>Land off Fir Covert Road</b>		Client <b>M Scott Properties Ltd</b>		TRIAL PIT No <b>SK2</b>
Job No <b>3921,GI</b>	Date <b>11-02-19 11-02-19</b>	Ground Level (m)	Coordinates ( )	
Fieldwork By <b>DRILLT</b>		Logged By <b>CS</b>		Sheet <b>1 of 1</b>

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.35	TOPSOIL (Dark brown fine to coarse SAND)				
0.35-2.00	Orangish brown slightly gravelly fine to coarse SAND. Gravel is fine subangular flint. (SHERINGHAM CLIFFS FORMATION)  1.30 Gravel becomes fine to medium.				
					Trial pit completed at 2.0m

GEL AGS TP BETA\_3921,GI FIR COVERT ROAD\_21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19



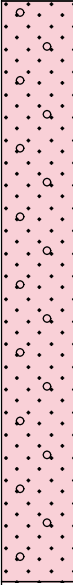
Shoring/Support:  
Stability:

All dimensions in metres Scale 1:20.83333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By <b>SG</b>
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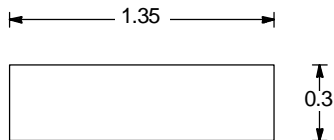


### TRIAL PIT LOG

Project <b>Land off Fir Covert Road</b>		Client <b>M Scott Properties Ltd</b>		TRIAL PIT No <b>SK3</b>
Job No <b>3921,GI</b>	Date <b>11-02-19</b> <b>11-02-19</b>	Ground Level (m)	Coordinates ( )	
Fieldwork By <b>DRILLT</b>		Logged By <b>CS</b>		Sheet <b>1 of 1</b>

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.40	TOPSOIL (Brown slightly gravelly fine to coarse SAND. Gravel of fine subangular flint)				
0.40-2.00	Orangish brown slightly gravelly fine to coarse SAND. Gravel is fine subangular flint. (SHERINGHAM CLIFFS FORMATION)				
					Trial pit completed at 2.0m

GEL AGS TP BETA\_3921,GI FIR COVERT ROAD\_21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19



Shoring/Support:  
Stability:

All dimensions in metres Scale 1:20.83333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By <b>SG</b>
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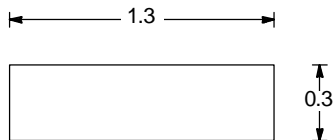


### TRIAL PIT LOG

Project <b>Land off Fir Covert Road</b>		Client <b>M Scott Properties Ltd</b>		TRIAL PIT No <b>SK4</b>
Job No <b>3921,GI</b>	Date <b>11-02-19</b> <b>11-02-19</b>	Ground Level (m)	Coordinates ( )	
Fieldwork By <b>DRILLT</b>		Logged By <b>CS</b>		Sheet <b>1 of 1</b>

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.35	TOPSOIL (Dark brown fine to coarse SAND)				
0.35-2.00	Orangish brown slightly gravelly fine to coarse SAND. Gravel of fine subangular to subrounded shell fragments with fine and medium subangular flint. (SHERINGHAM CLIFFS FORMATION)				
					Trial pit completed at 2.0m

GEL AGS TP BETA\_3921,GI FIR COVERT ROAD\_21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19



Shoring/Support:  
Stability:

All dimensions in metres Scale 1:20.83333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By <b>SG</b>
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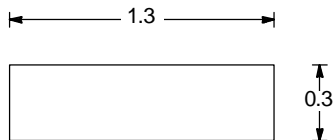


### TRIAL PIT LOG

Project <b>Land off Fir Covert Road</b>		Client <b>M Scott Properties Ltd</b>		TRIAL PIT No <b>SK5</b>
Job No <b>3921,GI</b>	Date <b>11-02-19</b> <b>11-02-19</b>	Ground Level (m)	Coordinates ( )	
Fieldwork By <b>DRILLT</b>		Logged By <b>CS</b>		Sheet <b>1 of 1</b>

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.40	TOPSOIL (Dark brown slightl gravelly fine to coarse SAND. Gravel is fine and medium subrounded flint)				
0.40-2.00	Orangish brown gravelly fine to coarse SAND. Gravel is fine and medium subangular flint. (SHERINGHAM CLIFFS FORMATION)				
					Trial pit completed at 2.0m

GEL AGS TP BETA\_3921,GI FIR COVERT ROAD\_21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19



Shoring/Support:  
Stability:

All dimensions in metres Scale 1:20.83333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By <b>SG</b>
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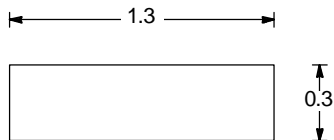


### TRIAL PIT LOG

Project <b>Land off Fir Covert Road</b>		Client <b>M Scott Properties Ltd</b>		TRIAL PIT No <b>SK6</b>
Job No <b>3921,GI</b>	Date <b>11-02-19</b> <b>11-02-19</b>	Ground Level (m)	Coordinates ( )	
Fieldwork By <b>DRILLT</b>		Logged By <b>CS</b>		Sheet <b>1 of 1</b>

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.40	TOPSOIL (Dark brown slightly gravelly fine to coarse SAND. Gravel of fine subangular to subrounded flint)				
0.40-2.00	Orangish brown slightly gravelly fine to coarse SAND. Gravel is fine and medium subangular to subrounded flint. (SHERINGHAM CLIFFS FORMATION)				
					Trial pit completed at 2.0m

GEL AGS TP BETA\_3921,GI FIR COVERT ROAD\_21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19



Shoring/Support:  
Stability:

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By <b>SG</b>
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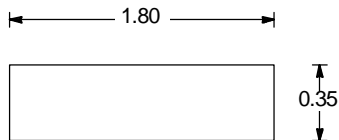


### TRIAL PIT LOG

Project Land off Fir Covert Road		Client M Scott Properties Ltd		TRIAL PIT No <b>TP201</b>
Job No 3921,GI	Date 15-05-19 15-05-19	Ground Level (m)	Coordinates ( )	
Fieldwork By GEL		Logged By SG		Sheet 1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.35	TOPSOIL (Dark grey slightly clayey fine SAND with frequent fine roots and occasional medium roots and subangular gravel of chert)				
0.35-2.20	Pale yellowish brown/orangish brown slightly silty fine SAND with frequent medium sand (SHERINGHAM CLIFFS FORMATION)				
					Trial pit completed at 2.2m. Infiltration testing undertaken

GEL:AGS:TP BETA\_3921,GI FIR COVERT ROAD\_21-05-19.GPJ GINT STD AGS 3\_1.GDT 10/6/19



Shoring/Support: None  
Stability: Stable

All dimensions in metres Scale 1:20.83333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By SG
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### DYNAMIC PROBE LOG

Project <b>Land off Fir Covert Road</b>				PROBE No <b>DP02</b>	
Job No <b>3921,GI</b>	Date <b>12-02-19 12-02-19</b>	Ground Level (m)	Coordinates:		
Contractor				Sheet <b>1 of 1</b>	

Depth (m)	Readings (blows/100mm)	Diagram (N100 Values)						Torque (Nm)	Remarks
		5	10	15	20	25	30		
1	1								
	2								
	3								
	4								
	5								
	6								
	5								
	5								
	4								
2	3								
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	8								
4	3								
	3								
	8								
	6								
	10								
	1								
	8								
	6								
5	4								

AGS3 DYNAMIC PROBE 3921,GI FIR COVERT ROAD, 21-05-19,GPJ GINT STD AGS 3, 1,GDT, 10/6/19

Hammer Wt (kg)	63.5		GENERAL REMARKS
Hammer Drop (mm)	750		
Cone Dia (mm)	50.5		
Cone Type	DPSH		
Damper			

All dimensions in metres Scale 1:34.375	Client <b>M Scott Properties Ltd</b>	Method/ Plant Used <b>Dynamic Probe sampling</b>	Logged By <b>CS</b>
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### DYNAMIC PROBE LOG

Project <b>Land off Fir Covert Road</b>				PROBE No <b>DP03</b>	
Job No <b>3921,GI</b>	Date <b>12-02-19 12-02-19</b>	Ground Level (m)	Coordinates:		
Contractor				Sheet <b>1 of 1</b>	

Depth (m)	Readings (blows/100mm)	Diagram (N100 Values)						Torque (Nm)	Remarks
		5	10	15	20	25	30		
0	1								
	2								
	2								
	3								
1	2								
	3								
	2								
	3								
	3								
	5								
2	4								
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AGS3 DYNAMIC PROBE 3921,GI FIR COVERT ROAD, 21-05-19.GPJ GINT STD AGS 3.1.GDT 10/6/19

Hammer Wt (kg)	63.5		GENERAL REMARKS
Hammer Drop (mm)	750		
Cone Dia (mm)	50.5		
Cone Type	DPSH		
Damper			

All dimensions in metres Scale 1:34.375	Client <b>M Scott Properties Ltd</b>	Method/ Plant Used <b>Dynamic Probe sampling</b>	Logged By <b>CS</b>
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### DYNAMIC PROBE LOG

Project <b>Land off Fir Covert Road</b>				PROBE No <b>DP05</b>	
Job No <b>3921,GI</b>	Date <b>12-02-19 12-02-19</b>	Ground Level (m)	Coordinates:		
Contractor				Sheet <b>1 of 1</b>	

Depth (m)	Readings (blows/100mm)	Diagram (N100 Values)						Torque (Nm)	Remarks
		5	10	15	20	25	30		
1	1								
	2								
	3								
	4								
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AGS3 DYNAMIC PROBE 3921,GI FIR COVERT ROAD, 21-05-19,GPJ GINT STD AGS 3, 1,GDT, 10/6/19

Hammer Wt (kg)	63.5	GENERAL REMARKS
Hammer Drop (mm)	750	
Cone Dia (mm)	50.5	
Cone Type	DPSH	
Damper		

All dimensions in metres Scale 1:34.375	Client <b>M Scott Properties Ltd</b>	Method/ Plant Used <b>Dynamic Probe sampling</b>	Logged By <b>CS</b>
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### DYNAMIC PROBE LOG

Project <b>Land off Fir Covert Road</b>				PROBE No <b>DP07</b>	
Job No <b>3921,GI</b>	Date <b>12-02-19 12-02-19</b>	Ground Level (m)	Coordinates:		
Contractor					Sheet <b>1 of 1</b>

Depth (m)	Readings (blows/100mm)	Diagram (N100 Values)						Torque (Nm)	Remarks
		5	10	15	20	25	30		
1	1								
	2								
	3								
	3								
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	12								

AGS3 DYNAMIC PROBE 3921,GI FIR COVERT ROAD, 21-05-19,GPJ GINT STD AGS 3, 1,GDT, 10/6/19

Hammer Wt (kg)	63.5		GENERAL REMARKS
Hammer Drop (mm)	750		
Cone Dia (mm)	50.5		
Cone Type	DPSH		
Damper			

All dimensions in metres Scale 1:34.375	Client <b>M Scott Properties Ltd</b>	Method/ Plant Used <b>Dynamic Probe sampling</b>	Logged By <b>CS</b>
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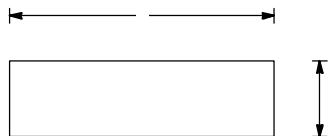


### TRIAL PIT LOG

Project <b>Land off Fir Covert Road</b>		Client <b>M Scott Properties Ltd</b>		TRIAL PIT No <b>CBR201</b>
Job No <b>3921,GI</b>	Date <b>15-05-19</b> <b>15-05-19</b>	Ground Level (m)	Coordinates ( )	
Fieldwork By <b>GEL</b>		Logged By <b>SG</b>		Sheet <b>1 of 1</b>

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.35	TOPSOIL (Dark brownish grey organic silty fine SAND with frequent fine roots and rare coarse roots)				
0.35-0.70	Dark orangish brown silty fine SAND (SHERINGHAM CLIFFS FORMATION)		0.50	1B	Trial pit completed at 0.7m.

GEL.AGS.TP.BETA.3921.GI.FIR.COVERT.ROAD.21-05-19.GPJ.GINT.STD.AGS.3.1.GDT.10/6/19



Shoring/Support: None  
Stability: Stable

All dimensions in metres Scale 1:8.33333333333333	Method Trial Pit/trench	Plant Used HAND	Checked By <b>SG</b>
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## **Appendix 6 – Infiltration Test Results**

Infiltration Test Results  
(SK1 to SK6 and TP201)

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0.0	1.35
0.5	1.37
1.0	1.41
2.0	1.45
3.0	1.49
4.0	1.53
5.0	1.56
6.0	1.60
7.0	1.63
8.0	1.65
9.0	1.67
10.0	1.69
11.0	1.71
12.0	1.72
14.0	1.77
15.0	1.78
16.0	1.79
17.0	1.80
18.0	1.81
19.0	1.82
20.0	1.83
21.0	1.84

Pit Size [m]		
Length	Width	Depth
1.20	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.838
$h_{25}$	[m]	1.513
$h_{75}-h_{25}$	[m]	0.325
time		
$t_{75}$	[s]	1260.00
$t_{25}$	[s]	225.00
$t_{75} - t_{25}$	[s]	1035.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.035
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.335
soil infiltration rate		
$f$	[m/s]	2.54E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

Trial Pit SK1

Run 1 of 3

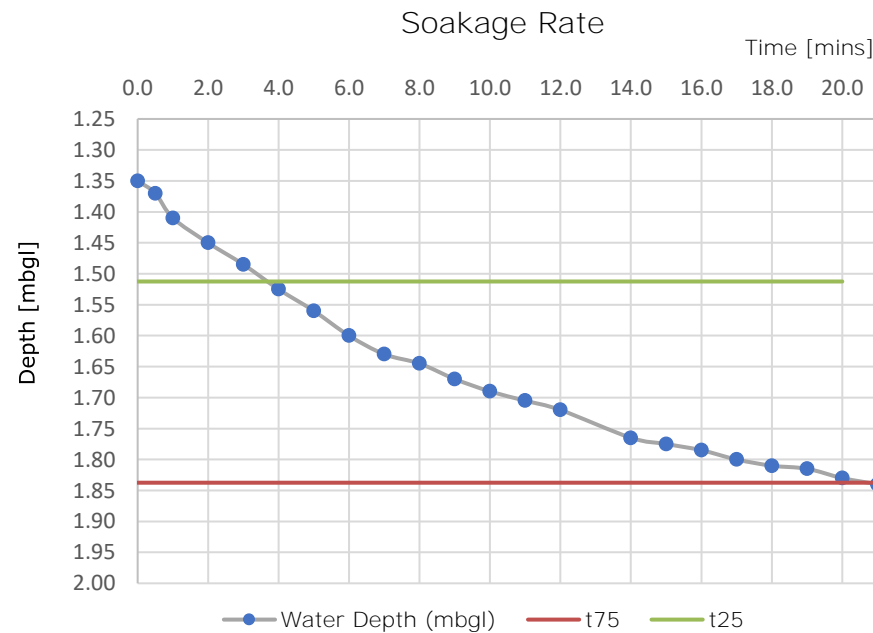
Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:

Calculated by JD

Checked by: SG



# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0.0	1.30
1.0	1.34
2.0	1.39
3.0	1.43
4.0	1.46
5.0	1.48
10.0	1.60
15.0	1.70
20.0	1.76
25.0	1.82
27.0	1.84

Pit Size [m]		
Length	Width	Depth
1.20	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.824
$h_{25}$	[m]	1.471
$h_{75}-h_{25}$	[m]	0.353
time		
$t_{75}$	[s]	1560.00
$t_{25}$	[s]	270.00
$t_{75} - t_{25}$	[s]	1290.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.038
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.418
soil infiltration rate		
$f$	[m/s]	2.08E-05

Effective volume adjusted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

Trial Pit SK1

Run 2 of 3

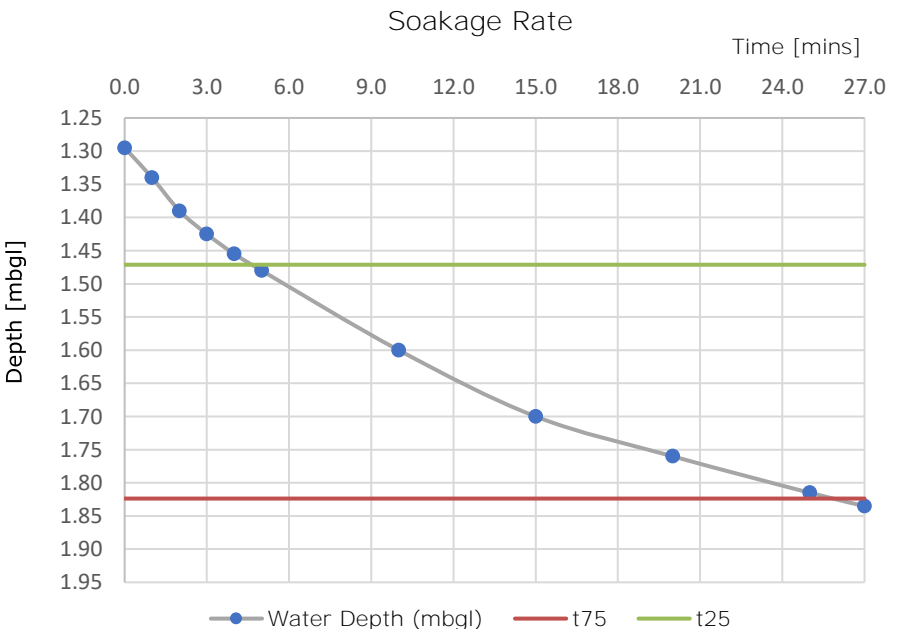
Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:

Calculated by JD

Checked by: SG



# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,G1

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0.0	1.30
0.5	1.32
1.0	1.35
2.0	1.38
3.0	1.41
4.0	1.44
5.0	1.47
15.0	1.66
20.0	1.73
25.0	1.79
30.0	1.83

Pit Size [m]		
Length	Width	Depth
1.20	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.825
$h_{25}$	[m]	1.475
$h_{75} - h_{25}$	[m]	0.350
time		
$t_{75}$	[s]	1800.00
$t_{25}$	[s]	330.00
$t_{75} - t_{25}$	[s]	1470.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.038
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.410
soil infiltration rate		
f	[m/s]	1.82E-05

Effective volume adjusted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

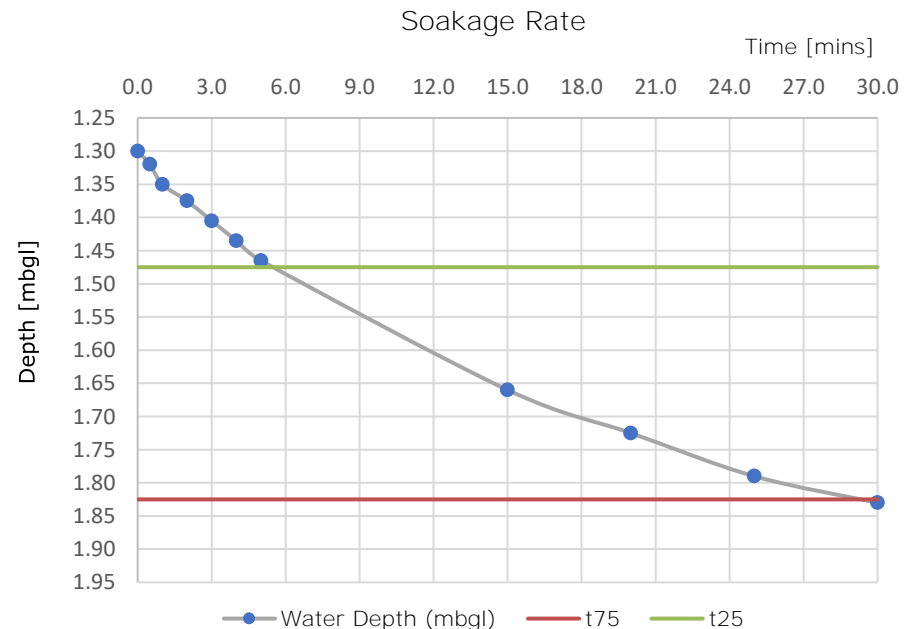
Trial Pit SK1

Run 3 of 3

Test Date 13/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.00
1	1.05
2	1.10
3	1.13
4	1.15
5	1.17
10	1.24
20	1.33
30	1.38
45	1.44
60	1.49
120	1.65
180	1.73
240	1.80

Pit Size [m]		
Length	Width	Depth
1.40	0.30	2.02

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.765
$h_{25}$	[m]	1.255
$h_{75}-h_{25}$	[m]	0.510
time		
$t_{75}$	[s]	12360.00
$t_{25}$	[s]	720.00
$t_{75} - t_{25}$	[s]	11640.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.064
effective area		
$ap_{50}$	[m <sup>2</sup> ]	2.154
soil infiltration rate		
$f$	[m/s]	2.56E-06

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with gravel to 0.4m bgl.

Trial Pit SK2

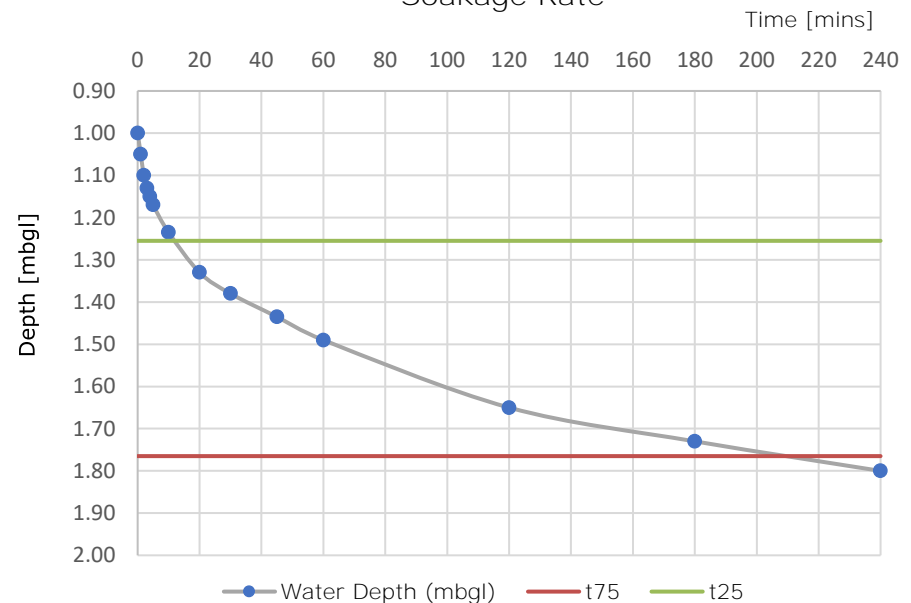
Run 1 of 3

Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:

Soakage Rate



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.19
1	1.22
2	1.25
3	1.27
4	1.29
5	1.29
10	1.34
15	1.36
20	1.38
45	1.45
65	1.50
120	1.59
180	1.74
210	1.79
222	1.810

Pit Size [m]		
Length	Width	Depth
1.40	0.30	2.02

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.813
$h_{25}$	[m]	1.398
$h_{75} - h_{25}$	[m]	0.415
time		
$t_{75}$	[s]	13320.00
$t_{25}$	[s]	1560.00
$t_{75} - t_{25}$	[s]	11760.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.052
effective area		
$a_{p50}$	[m <sup>2</sup> ]	1.831
soil infiltration rate		
f	[m/s]	2.43E-06

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with gravel to 0.4m bgl.

Trial Pit SK2

Run 2 of 3

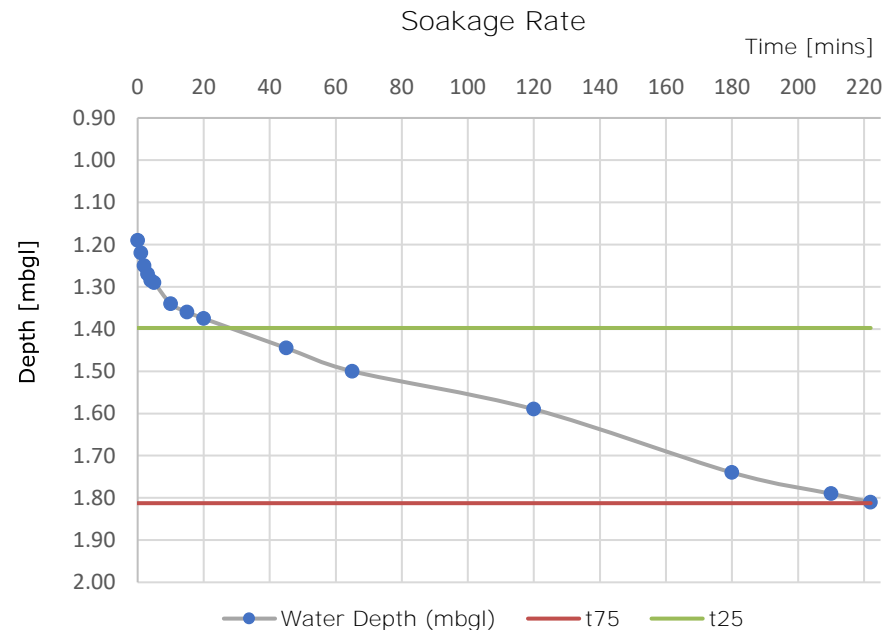
Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:

Calculated by JD

Checked by: SG



# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.00
1	1.06
2	1.10
3	1.12
4	1.14
5	1.17
10	1.25
15	1.29
55	1.41
102	1.50
150	1.56
300	1.74
325	1.77

Pit Size [m]		
Length	Width	Depth
1.40	0.30	2.02

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h <sub>75</sub>	[m]	1.765
h <sub>25</sub>	[m]	1.255
h <sub>75</sub> -h <sub>25</sub>	[m]	0.510
time		
t <sub>75</sub>	[s]	18900.00
t <sub>25</sub>	[s]	660.00
t <sub>75</sub> - t <sub>25</sub>	[s]	18240.00
effective volume		
V <sub>75-25</sub>	[m <sup>3</sup> ]	0.064
effective area		
ap <sub>50</sub>	[m <sup>2</sup> ]	2.154
soil infiltration rate		
f	[m/s]	1.64E-06

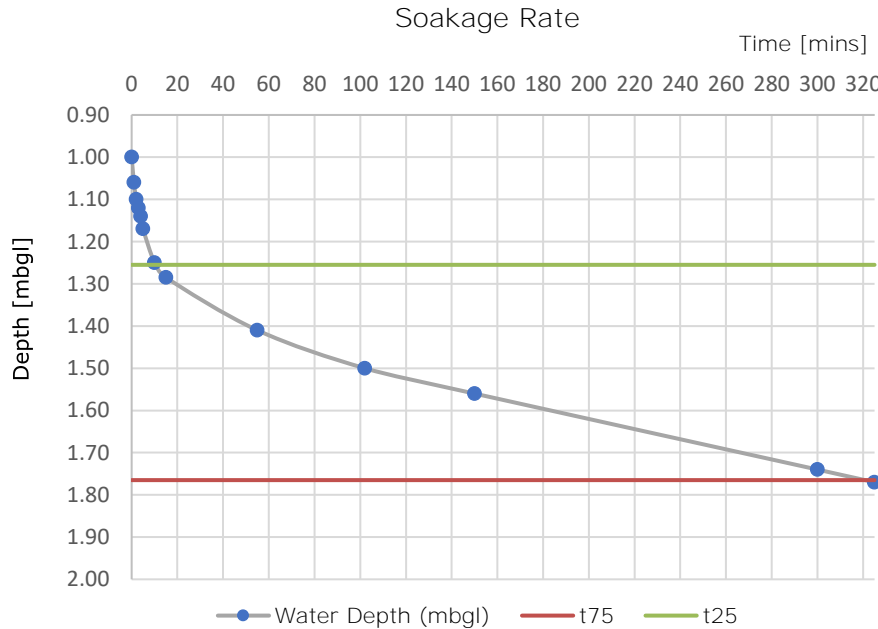
Effective volume adjusted by a factor of 0.3 to account for gravel backfill.

Backfilled with gravel to 0.4m bgl.

Trial Pit SK2  
 Run 3 of 3  
 Test Date 13/02/2019  
 Groundwater Encountered: N/A  
 Remarks:

Calculated by JD

Checked by: SG



# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,G1

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.14
0.5	1.24
1	1.34
2	1.43
3	1.54
4	1.63
5	1.70
6	1.77
7	1.84
8	1.88

Pit Size [m]		
Length	Width	Depth
1.35	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.785
$h_{25}$	[m]	1.355
$h_{75}-h_{25}$	[m]	0.430
time		
$t_{75}$	[s]	378.00
$t_{25}$	[s]	60.00
$t_{75} - t_{25}$	[s]	318.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.052
effective area		
$a_{p50}$	[m <sup>2</sup> ]	1.824
soil infiltration rate		
f	[m/s]	9.01E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

Trial Pit SK3

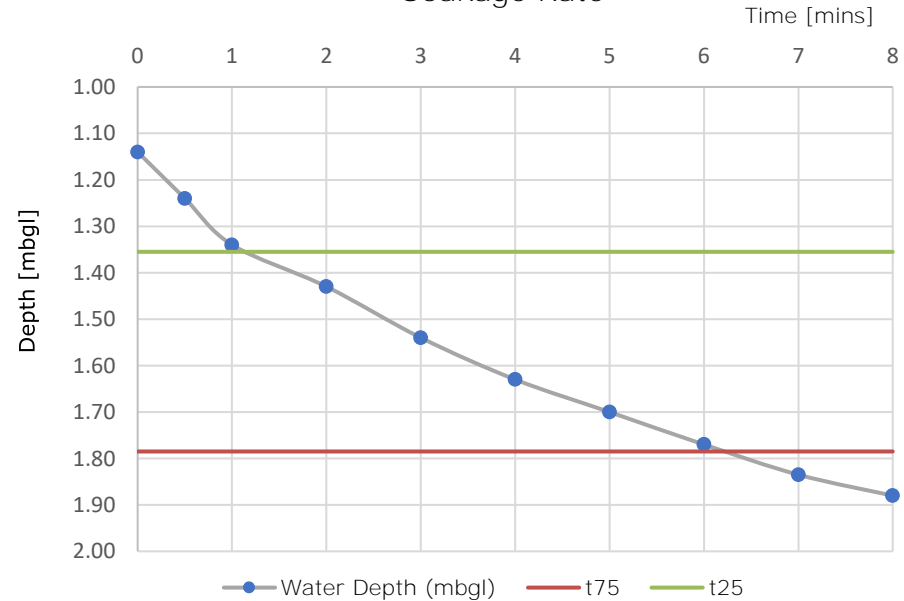
Run 1 of 3

Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:

Soakage Rate



Calculated by JD

Checked by: SG



# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.05
0.5	1.09
1	1.16
2	1.22
3	1.32
4	1.47
5	1.56
6	1.63
7	1.70
8	1.76
10	1.86

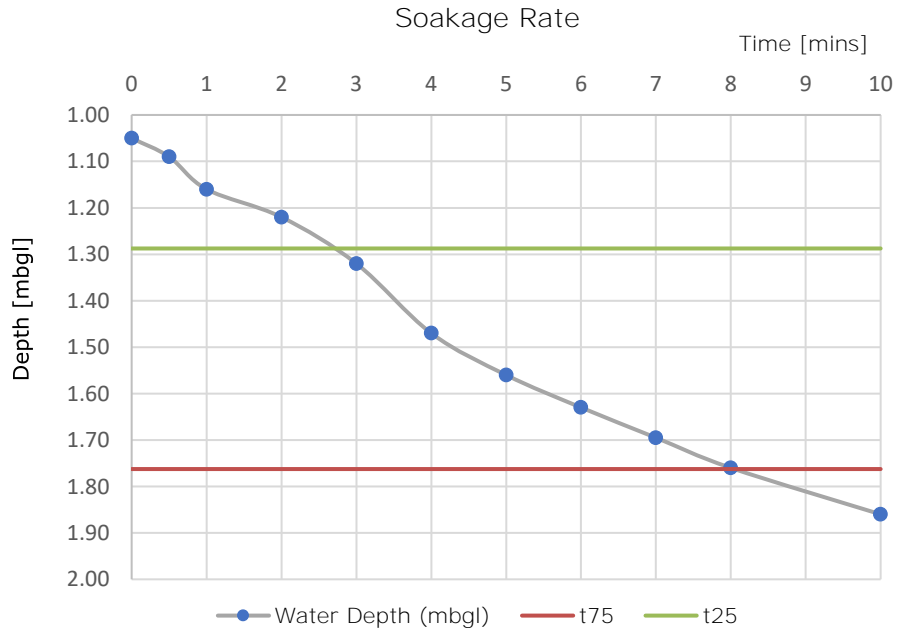
Pit Size [m]		
Length	Width	Depth
1.35	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.763
$h_{25}$	[m]	1.288
$h_{75}-h_{25}$	[m]	0.475
time		
$t_{75}$	[s]	480.00
$t_{25}$	[s]	168.00
$t_{75} - t_{25}$	[s]	312.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.058
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.973
soil infiltration rate		
$f$	[m/s]	9.38E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

Trial Pit SK3  
Run 2 of 3  
Test Date 12/02/2019  
Groundwater Encountered: N/A  
Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,G1

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.11
0.5	1.18
1	1.23
2	1.31
3	1.38
4	1.46
5	1.52
6	1.57
7	1.62
8	1.67
9	1.72
10	1.76
11	1.80
12	1.85

Pit Size [m]		
Length	Width	Depth
1.35	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.778
$h_{25}$	[m]	1.333
$h_{75} - h_{25}$	[m]	0.445
time		
$t_{75}$	[s]	624.00
$t_{25}$	[s]	144.00
$t_{75} - t_{25}$	[s]	480.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.054
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.874
soil infiltration rate		
f	[m/s]	6.01E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

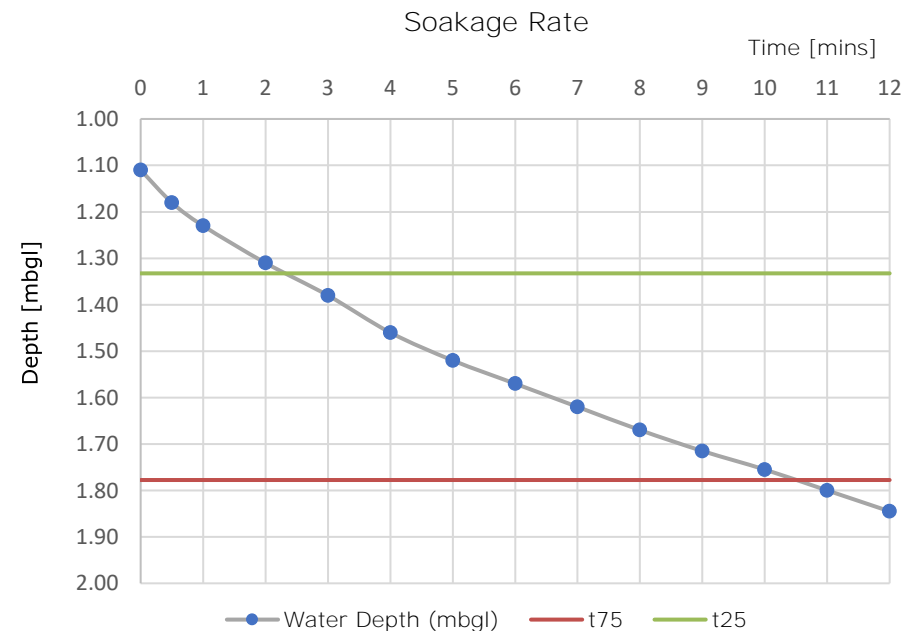
Trial Pit SK3

Run 3 of 3

Test Date 13/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,G1

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.19
0.5	1.26
1	1.31
2	1.42
3	1.50
4	1.55
5	1.61
6	1.65
7	1.69
8	1.72
9	1.76
10	1.79
11	1.82

Pit Size [m]		
Length	Width	Depth
1.30	0.30	1.97

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.775
$h_{25}$	[m]	1.385
$h_{75}-h_{25}$	[m]	0.390
time		
$t_{75}$	[s]	558.00
$t_{25}$	[s]	102.00
$t_{75} - t_{25}$	[s]	456.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.046
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.638
soil infiltration rate		
f	[m/s]	6.11E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

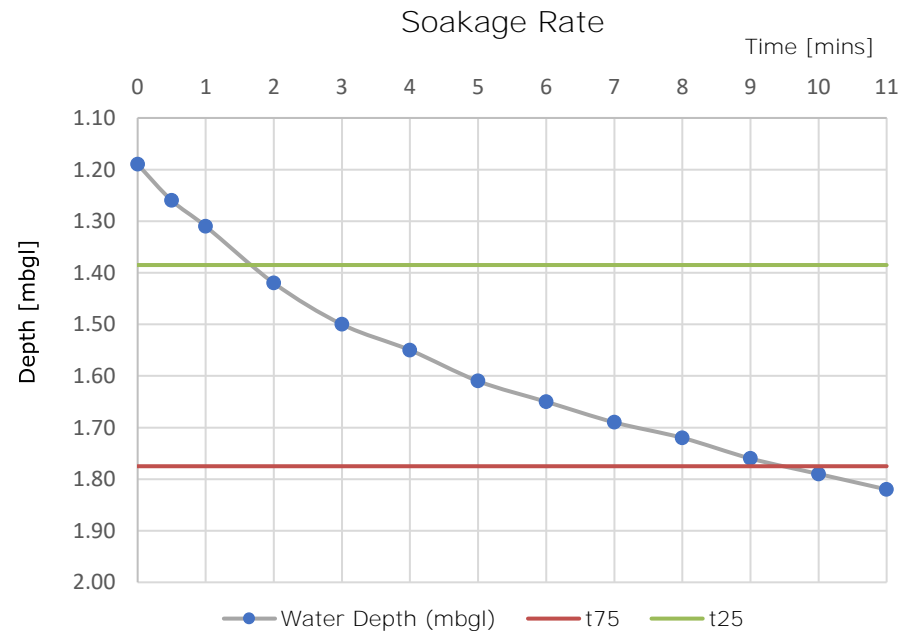
Trial Pit SK4

Run 1 of 3

Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.14
0.5	1.18
1	1.22
2	1.31
3	1.37
4	1.42
5	1.48
6	1.53
7	1.57
8	1.60
9	1.64
10	1.67
11	1.70
12	1.73
13	1.76

Pit Size [m]		
Length	Width	Depth
1.30	0.30	1.97

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h <sub>75</sub>	[m]	1.763
h <sub>25</sub>	[m]	1.348
h <sub>75</sub> -h <sub>25</sub>	[m]	0.415
time		
t <sub>75</sub>	[s]	780.00
t <sub>25</sub>	[s]	150.00
t <sub>75</sub> - t <sub>25</sub>	[s]	630.00
effective volume		
V <sub>75-25</sub>	[m <sup>3</sup> ]	0.049
effective area		
a <sub>p50</sub>	[m <sup>2</sup> ]	1.718
soil infiltration rate		
f	[m/s]	4.49E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

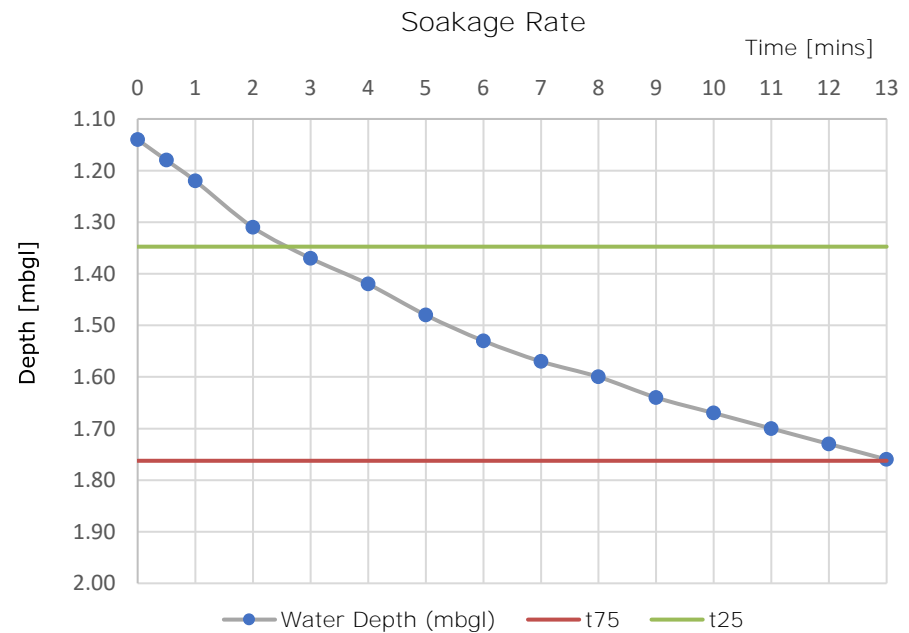
Trial Pit SK4

Run 2 of 3

Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.12
0.5	1.16
1	1.20
2	1.27
3	1.33
4	1.39
5	1.43
6	1.48
7	1.53
8	1.57
9	1.60
10	1.64
11	1.67
12	1.70
13	1.73
14	1.75
15	1.77

Pit Size [m]		
Length	Width	Depth
1.30	0.30	1.97

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h <sub>75</sub>	[m]	1.758
h <sub>25</sub>	[m]	1.333
h <sub>75</sub> -h <sub>25</sub>	[m]	0.425
time		
t <sub>75</sub>	[s]	870.00
t <sub>25</sub>	[s]	180.00
t <sub>75</sub> - t <sub>25</sub>	[s]	690.00
effective volume		
V <sub>75-25</sub>	[m <sup>3</sup> ]	0.050
effective area		
ap <sub>50</sub>	[m <sup>2</sup> ]	1.750
soil infiltration rate		
f	[m/s]	1.24E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

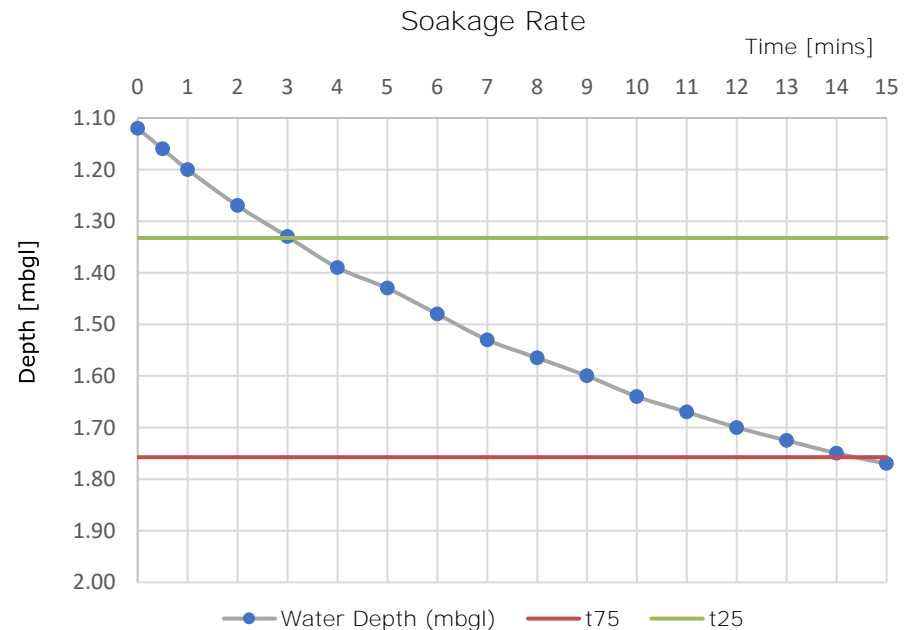
Trial Pit SK4

Run 3 of 3

Test Date 13/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.08
1	1.13
2	1.16
3	1.19
4	1.20
5	1.21
13	1.30
20	1.37
25	1.41
30	1.44
45	1.52
60	1.60
75	1.67
90	1.73
95	1.74
100	1.76
103	1.77

Pit Size [m]		
Length	Width	Depth
1.30	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h <sub>75</sub>	[m]	1.770
h <sub>25</sub>	[m]	1.310
h <sub>75</sub> -h <sub>25</sub>	[m]	0.460
time		
t <sub>75</sub>	[s]	6120.00
t <sub>25</sub>	[s]	780.00
t <sub>75</sub> - t <sub>25</sub>	[s]	5340.00
effective volume		
V <sub>75-25</sub>	[m <sup>3</sup> ]	0.054
effective area		
ap <sub>50</sub>	[m <sup>2</sup> ]	1.862
soil infiltration rate		
f	[m/s]	5.41E-06

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

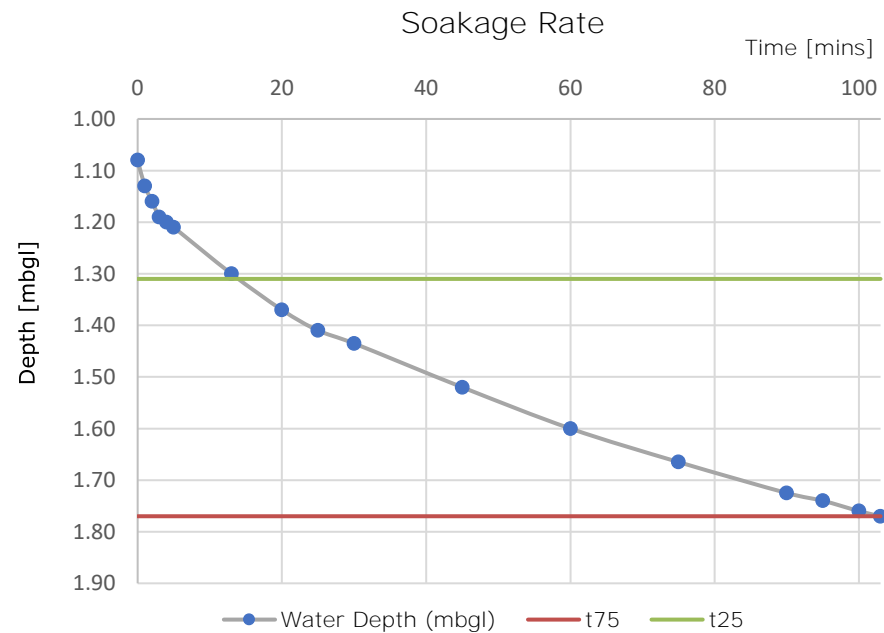
Trial Pit SK5

Run 1 of 3

Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.12
1	1.14
2	1.16
3	1.17
4	1.18
5	1.19
10	1.24
25	1.33
35	1.39
60	1.49
120	1.59
180	1.70
240	1.75
300	1.78

Pit Size [m]		
Length	Width	Depth
1.30	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.780
$h_{25}$	[m]	1.340
$h_{75}-h_{25}$	[m]	0.440
time		
$t_{75}$	[s]	16860.00
$t_{25}$	[s]	1560.00
$t_{75} - t_{25}$	[s]	15300.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.051
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.798
soil infiltration rate		
$f$	[m/s]	1.87E-06

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

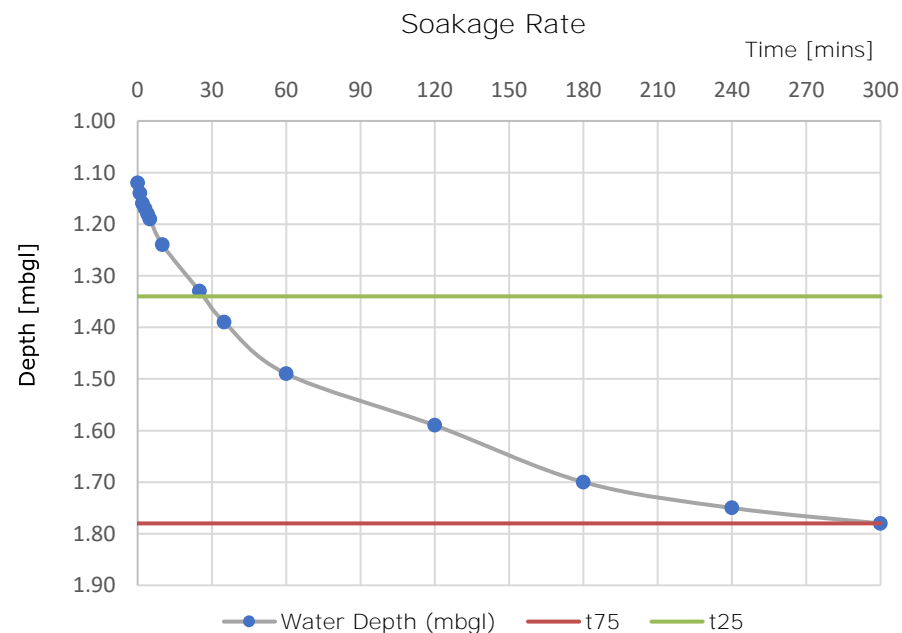
Trial Pit SK5

Run 2 of 3

Test Date 13/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.02
1	1.05
2	1.07
3	1.09
4	1.10
5	1.12
10	1.19
15	1.24
20	1.28
30	1.34
50	1.44
60	1.49
80	1.55
120	1.66
135	1.70
165	1.77

Pit Size [m]		
Length	Width	Depth
1.30	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.755
$h_{25}$	[m]	1.265
$h_{75} - h_{25}$	[m]	0.490
time		
$t_{75}$	[s]	9420.00
$t_{25}$	[s]	1020.00
$t_{75} - t_{25}$	[s]	8400.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.057
effective area		
$a_{p50}$	[m <sup>2</sup> ]	1.958
soil infiltration rate		
$f$	[m/s]	3.49E-06

Effective volume adjusted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

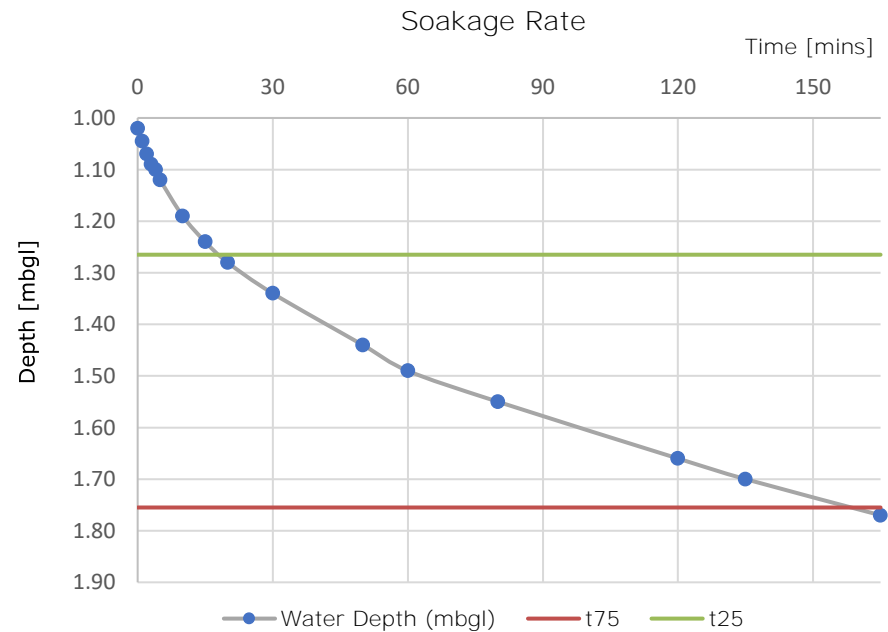
Trial Pit SK5

Run 3 of 3

Test Date 13/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG



# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.29
1	1.37
2	1.44
3	1.48
4	1.52
5	1.54
6	1.57
7	1.59
8	1.60
9	1.62
10	1.64
11	1.65
15	1.70
20	1.75
25	1.80
30	1.85

Pit Size [m]		
Length	Width	Depth
1.30	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.823
$h_{25}$	[m]	1.468
$h_{75} - h_{25}$	[m]	0.355
time		
$t_{75}$	[s]	1620.00
$t_{25}$	[s]	150.00
$t_{75} - t_{25}$	[s]	1470.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.042
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.526
soil infiltration rate		
$f$	[m/s]	1.85E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

Trial Pit SK6

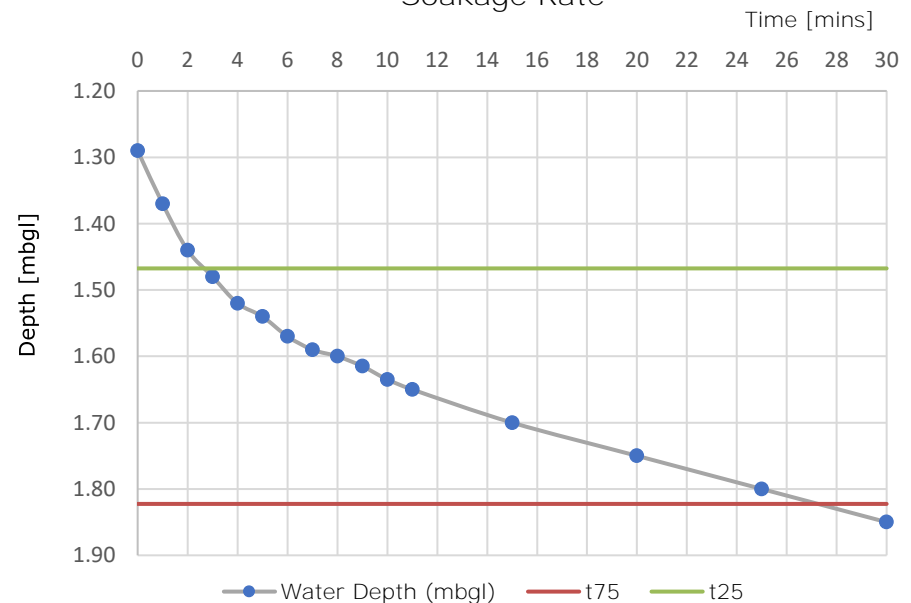
Run 1 of 3

Test Date 11/02/2019

Groundwater Encountered: N/A

Remarks:

Soakage Rate



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,G1

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.26
1	1.31
2	1.36
3	1.40
4	1.43
5	1.45
6	1.48
7	1.51
8	1.53
9	1.55
10	1.57
15	1.65
20	1.70
25	1.75
30	1.80
35	1.84

Pit Size [m]		
Length	Width	Depth
1.30	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.815
$h_{25}$	[m]	1.445
$h_{75}-h_{25}$	[m]	0.370
time		
$t_{75}$	[s]	1920.00
$t_{25}$	[s]	300.00
$t_{75} - t_{25}$	[s]	1620.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.043
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.574
soil infiltration rate		
$f$	[m/s]	1.70E-05

Effective volume adjausted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

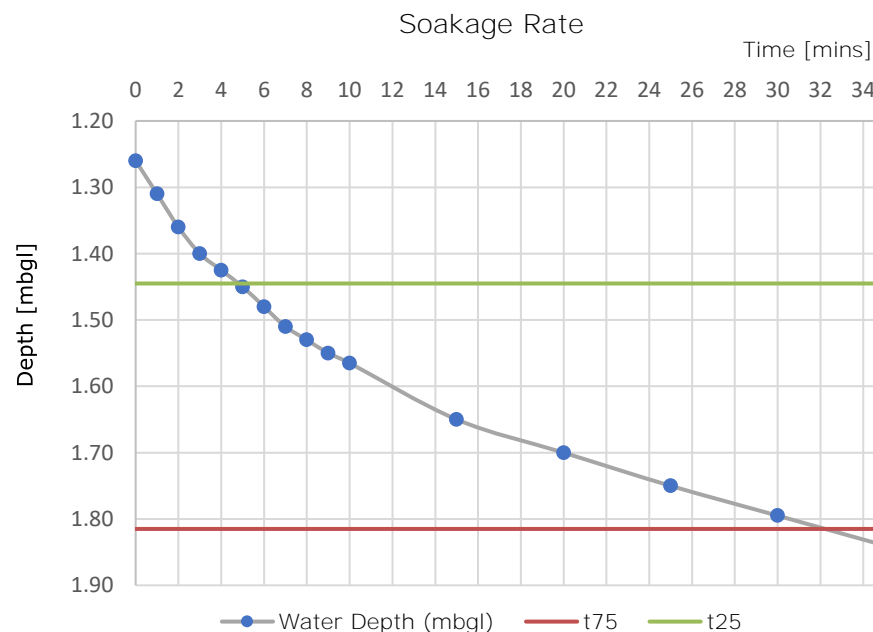
Trial Pit SK6

Run 2 of 3

Test Date 11/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 3921,GI

Date: 21/06/2019

Project Name: Land Off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

Time [min]	Depth to Water [mbgl]
0	1.15
1	1.25
2	1.31
3	1.36
4	1.41
5	1.43
6	1.46
7	1.48
8	1.51
9	1.54
10	1.55
15	1.66
20	1.70
25	1.76
30	1.80

Pit Size [m]		
Length	Width	Depth
1.30	0.30	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.788
$h_{25}$	[m]	1.363
$h_{75}-h_{25}$	[m]	0.425
time		
$t_{75}$	[s]	1680.00
$t_{25}$	[s]	180.00
$t_{75} - t_{25}$	[s]	1500.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.050
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.750
soil infiltration rate		
$f$	[m/s]	1.89E-05

Effective volume adjusted by a factor of 0.3 to account for gravel backfill.

Backfilled with 20mm gravel to 0.4m bgl.

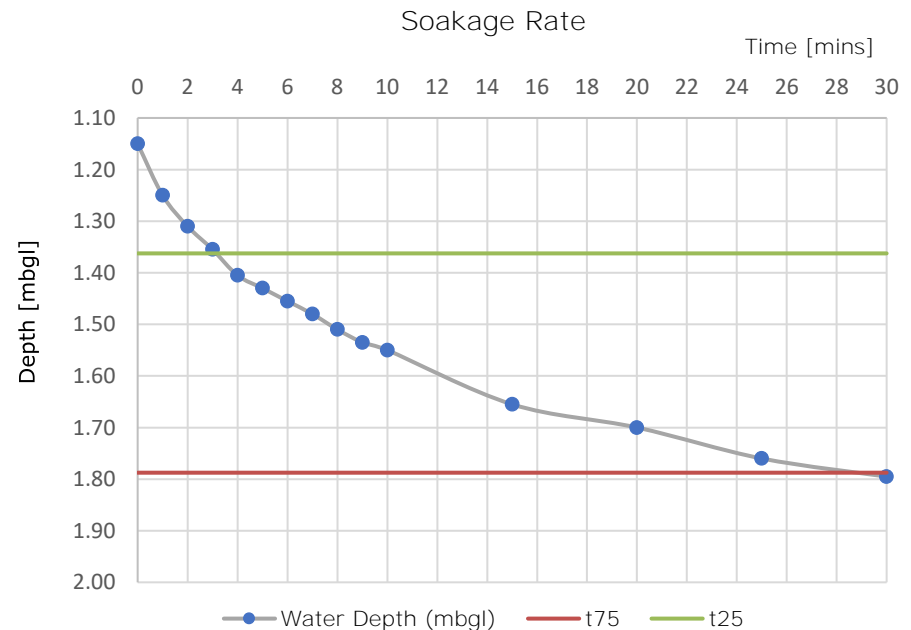
Trial Pit SK6

Run 3 of 3

Test Date 12/02/2019

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by: SG



# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365



Project Number: 3921,GI

Date: 21/06/2019

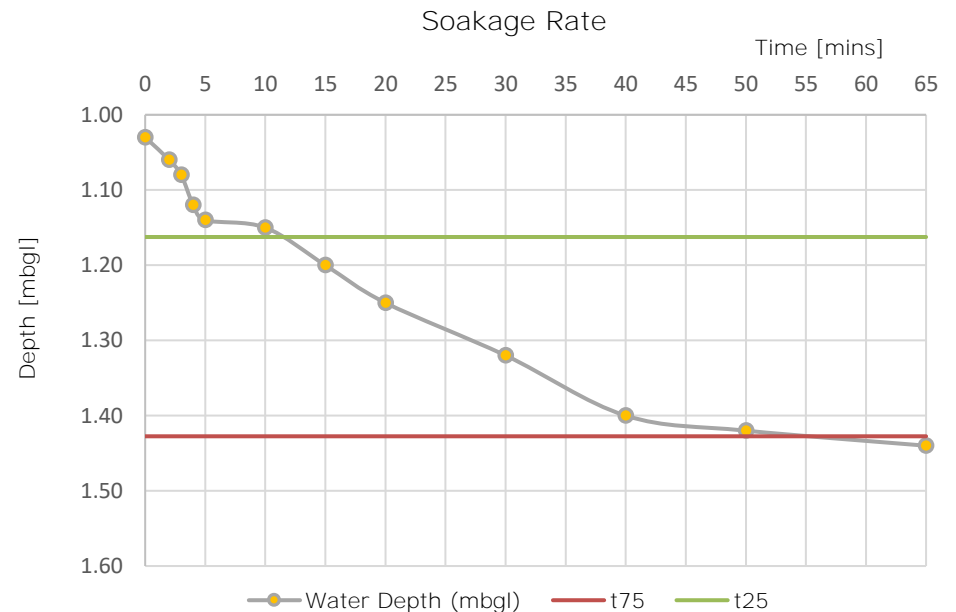
Project Name: Land at Fir Covert Road, Taverham

Time [min]	Depth to Water [mbgl]
0	1.03
2	1.06
3	1.08
4	1.12
5	1.14
10	1.15
15	1.20
20	1.25
30	1.32
40	1.40
50	1.42
65	1.44

Pit Size [m]		
Length	Width	Depth
1.80	0.35	1.56

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
$h_{75}$	[m]	1.428
$h_{25}$	[m]	1.163
$h_{75}-h_{25}$	[m]	0.265
time		
$t_{75}$	[s]	3510.00
$t_{25}$	[s]	702.00
$t_{75} - t_{25}$	[s]	2808.00
effective volume		
$V_{75-25}$	[m <sup>3</sup> ]	0.167
effective area		
$ap_{50}$	[m <sup>2</sup> ]	1.770
soil infiltration rate		
f	[m/s]	3.36E-05

Trial Pit: TP201  
 Run: 2 of 3  
 Test Date: 15/05/2019  
 Groundwater Encountered: N/A  
 Remarks:



Calculated by SG

Checked by: TP

# TRIAL PIT INFILTRATION TEST - BRE DIGEST 365



Project Number: 3921,GI

Date: 21/06/2019

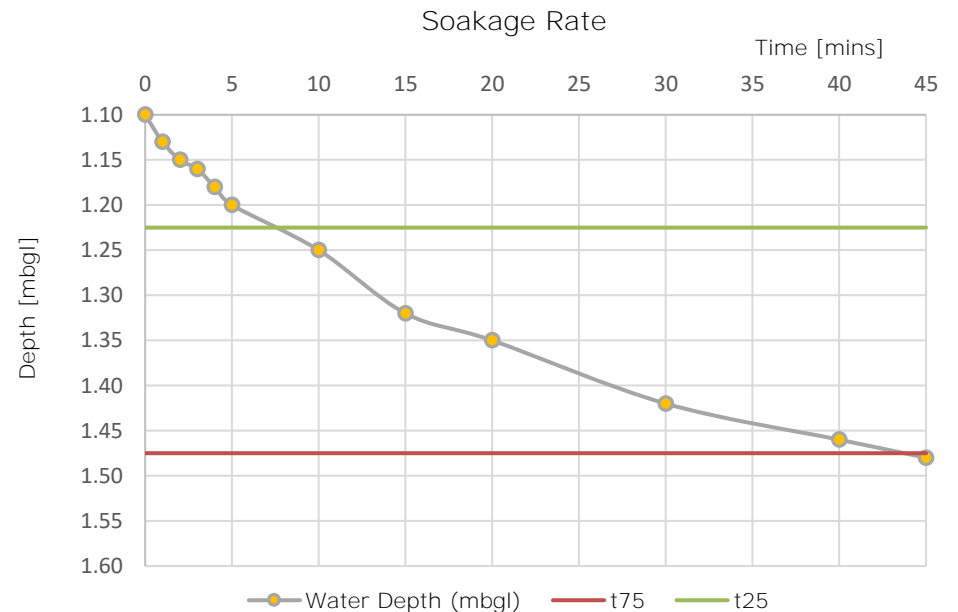
Project Name: Land at Fir Covert Road, Taverham

Time [min]	Depth to Water [mbgl]
0	1.10
1	1.13
2	1.15
3	1.16
4	1.18
5	1.20
10	1.25
15	1.32
20	1.35
30	1.42
40	1.46
45	1.48

Pit Size [m]		
Length	Width	Depth
2.20	0.35	1.60

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h <sub>75</sub>	[m]	1.475
h <sub>25</sub>	[m]	1.225
h <sub>75</sub> -h <sub>25</sub>	[m]	0.250
time		
t <sub>75</sub>	[s]	2610.00
t <sub>25</sub>	[s]	450.00
t <sub>75</sub> - t <sub>25</sub>	[s]	2160.00
effective volume		
V <sub>75-25</sub>	[m <sup>3</sup> ]	0.193
effective area		
a <sub>p50</sub>	[m <sup>2</sup> ]	2.045
soil infiltration rate		
f	[m/s]	4.36E-05

Trial Pit: TP201  
 Run: 3 of 3  
 Test Date: 15/06/2019  
 Groundwater Encountered: N/A  
 Remarks:



Calculated by SG

Checked by: TP

## **Appendix 7 – Gas and Groundwater Monitoring Data**

Ground Gas and Groundwater Monitoring  
(WS01, WS06, WS08, WS11, WS13, WS17)

# GROUND GAS AND GROUNDWATER MONITORING DATA



Project Number: 3710,SK

Project Name: Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

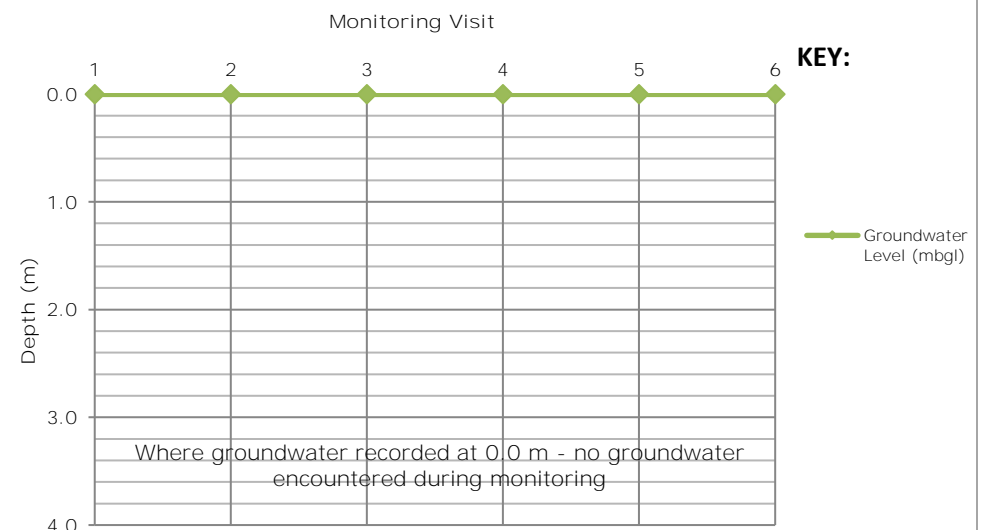
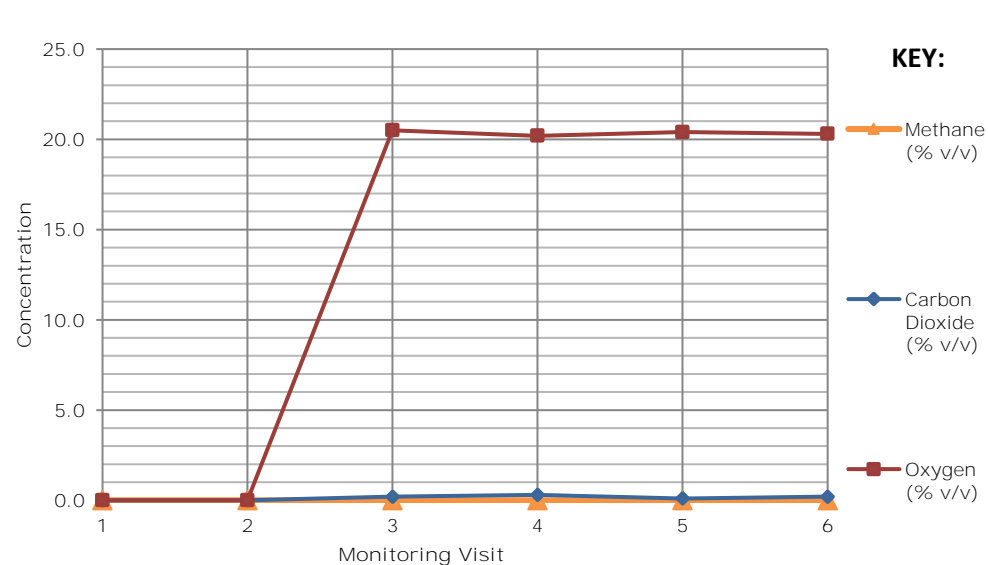
Date: 21/06/2019

Exploratory Hole Location		WS01										Date of Installation		12/02/2019	
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)		Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall	
1st visit	20/02/2019	1015	nm	nm	nm	nm	nm	nm	nm	nm	Dry	0.79	Cold, Overcast, Wet, Calm	Well vandalised	
2nd visit	24/02/2019	1030	<0.1	<2	nm	nm	nm	nm	nm	nm	Dry	2.94	Warm, Sunny, Dry, Calm	Installation of protective top-hat cover, replacement of bung and	
3rd visit	01/03/2019	1013	<0.1	<2	0.2	20.5	-0.3	0	0	0	Dry	2.94	Cool, Overcast, Damp, Breezy		
4th visit	08/03/2019	1005	<0.1	<2	0.3	20.2	-0.5	0	0	0	Dry	2.94	Cold, sunny, damp, breezy		
5th visit	15/03/2019	997	<0.1	<2	0.1	20.4	-0.1	0	0	0	Dry	2.94	Cool, sunny, dry, very windy		
6th visit	21/03/2019	1027	<0.1	<2	0.2	20.3	-0.4	0	0	0	Dry	2.94	Cool, cloudy, dry, calm		

Instruments Used: GFM436 gas analyser / PID MultiRAE lite

NOTE: n/a Not applicable  
nm Not measured

REMARKS:





# GROUND GAS AND GROUNDWATER MONITORING DATA



Project Number: 3710,SK

Project Name: Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

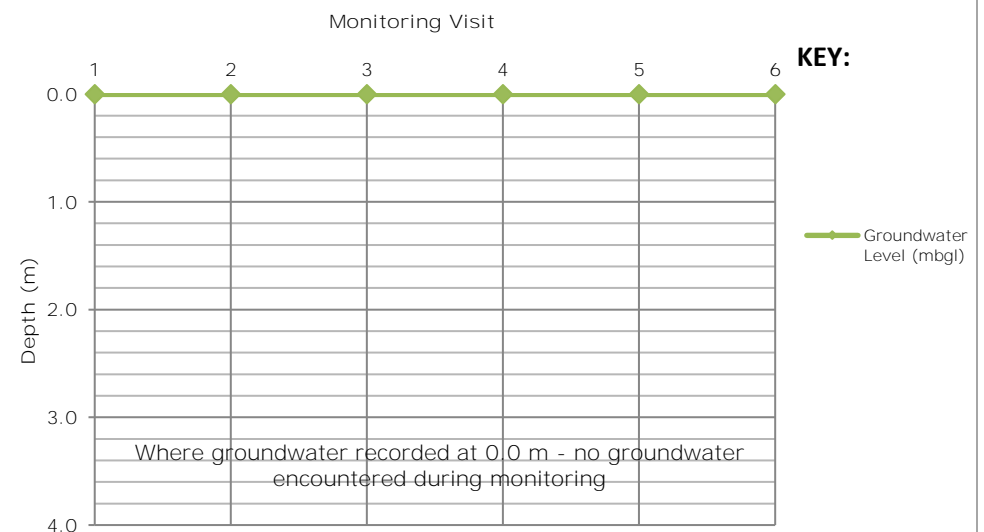
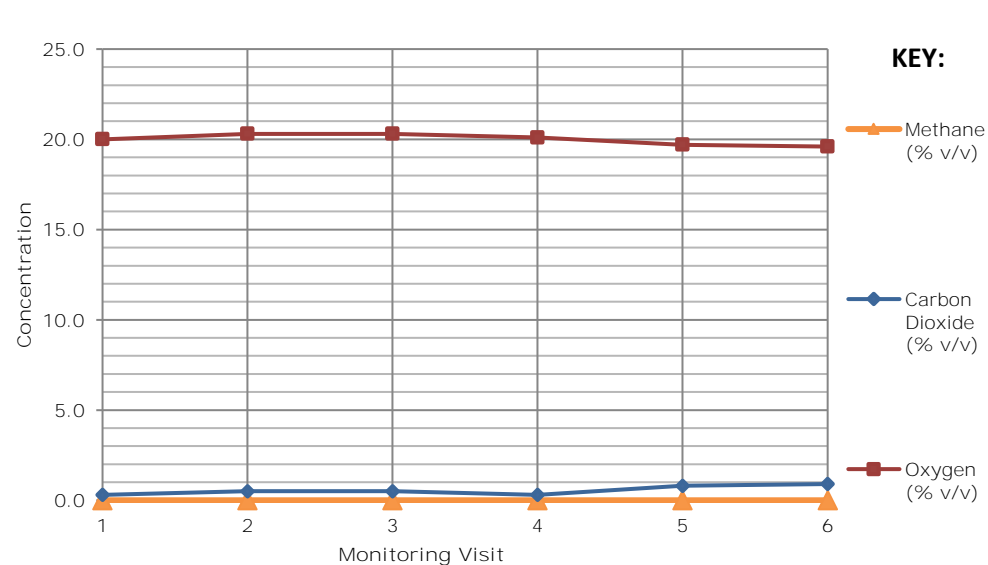
Date: 21/06/2019

Exploratory Hole Location		WS06										Date of Installation		12/02/2019	
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content		Carbon Dioxide	Oxygen	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall	
			(% v/v)	(% LFL)	(% v/v)	(% v/v)									
1st visit	20/02/2019	1015	<0.1	<2	0.3	20.0	0.0	0	0	0	Dry	2.93	Cool, Overcast, Dry, Windy		
2nd visit	24/02/2019	1030	<0.1	<2	0.5	20.3	-0.1	0	0	0	Dry	3.05	Warm, Sunny, Dry, Calm		
3rd visit	01/03/2019	1013	<0.1	<2	0.5	20.3	-0.1	0	0	0	Dry	3.05	Cool, Overcast, Damp, Breezy		
4th visit	08/03/2019	1005	<0.1	<2	0.3	20.1	-0.6	0	0	0	Dry	3.05	Cold, sunny, damp, breezy		
5th visit	15/03/2019	997	<0.1	<2	0.8	19.7	-0.3	0	0	0	Dry	3.05	Cool, sunny, dry, very windy		
6th visit	21/03/2019	1027	<0.1	<2	0.9	19.6	-0.4	0	0	0	Dry	3.05	Cool, cloudy, dry, calm		

Instruments Used: GFM436 gas analyser / PID MultiRAE lite

NOTE: n/a Not applicable  
nm Not measured

REMARKS:



# GROUND GAS AND GROUNDWATER MONITORING DATA



Project Number: 3710,SK

Project Name: Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

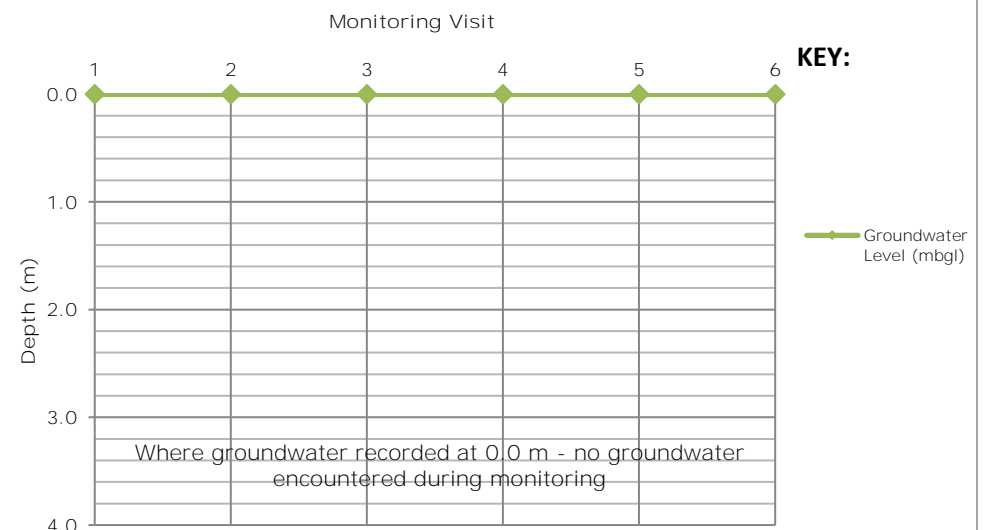
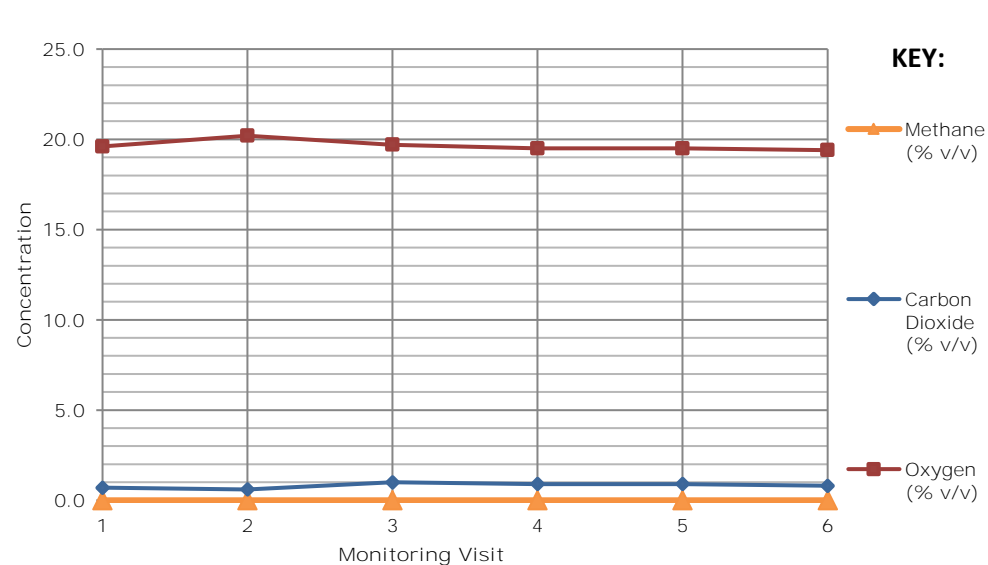
Date: 21/06/2019

Exploratory Hole Location		WS08										Date of Installation		12/02/2019	
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content		Carbon Dioxide	Oxygen	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall	
			(% v/v)	(% IFL)	(% v/v)	(% v/v)									
1st visit	20/02/2019	1015	<0.1	<2	0.7	19.6	0.0	0	0	0	Dry	3.81	Cold, Overcast, Wet, Calm		
2nd visit	24/02/2019	1031	<0.1	<2	0.6	20.2	-0.1	0	0	0	Dry	3.81	Warm, Sunny, Dry, Calm		
3rd visit	01/03/2019	1013	<0.1	<2	1.0	19.7	-0.1	0	0	0	Dry	3.81	Cool, Overcast, Damp, Breezy		
4th visit	08/03/2019	1005	<0.1	<2	0.9	19.5	-0.3	0	0	0	Dry	3.81	Cold, sunny, damp, breezy		
5th visit	15/03/2019	997	<0.1	<2	0.9	19.5	-0.1	0	0	0	Dry	3.81	Cool, sunny, dry, very windy		
6th visit	21/03/2019	1027	<0.1	<2	0.8	19.4	-0.4	0	0	0	Dry	3.81	Cool, cloudy, dry, calm		

Instruments Used: GFM436 gas analyser / PID MultiRAE lite

NOTE: n/a Not applicable  
nm Not measured

REMARKS:



# GROUND GAS AND GROUNDWATER MONITORING DATA



Project Number: 3710,SK

Project Name: Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

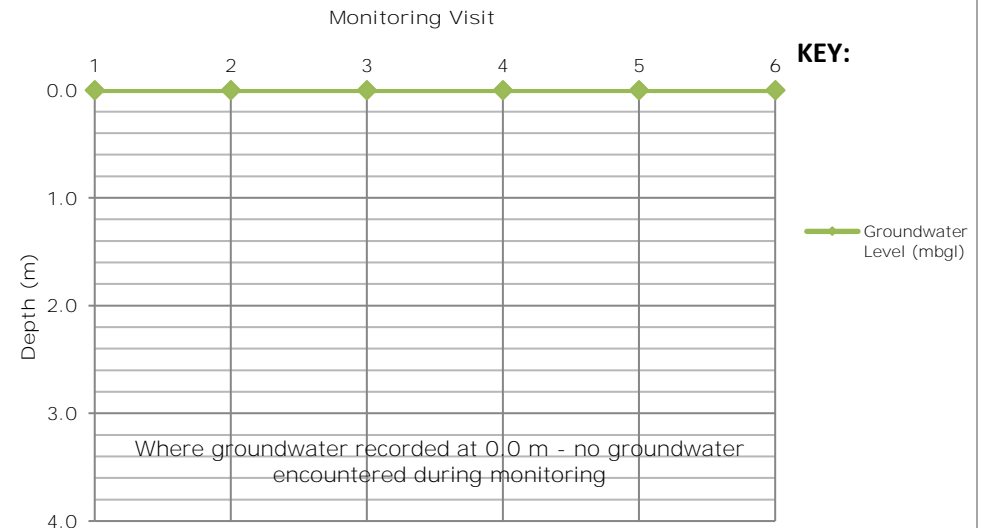
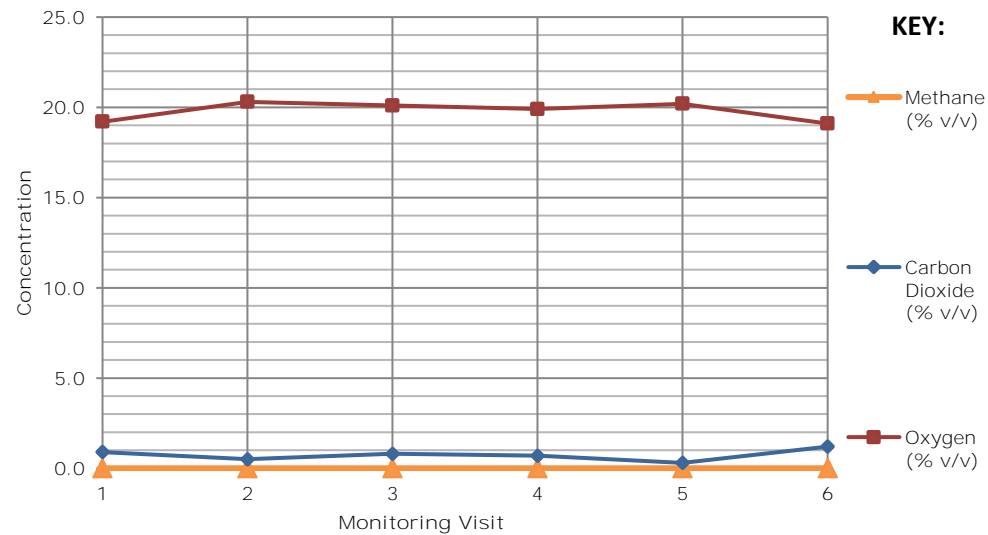
Date: 21/06/2019

Exploratory Hole Location		WS11										Date of Installation		13/02/2019	
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content		Carbon Dioxide	Oxygen	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall	
			(% v/v)	(% IFL)	(% v/v)	(% v/v)									
1st visit	20/02/2019	1015	<0.1	<2	0.9	19.2	0.0	0	0	0	Dry	3.88	Cool, Overcast, Dry, Windy		
2nd visit	24/02/2019	1032	<0.1	<2	0.5	20.3	-0.3	0	0	0	Dry	3.96	Warm, Sunny, Dry, Calm		
3rd visit	01/03/2019	1014	<0.1	<2	0.8	20.1	-0.3	0	0	0	Dry	3.96	Cool, Overcast, Damp, Breezy		
4th visit	08/03/2019	1006	<0.1	<2	0.7	19.9	-0.6	0	0	0	Dry	3.96	Cold, sunny, damp, breezy		
5th visit	15/03/2019	997	<0.1	<2	0.3	20.2	-0.1	0	0	0	Dry	3.96	Cool, sunny, dry, very windy		
6th visit	21/03/2019	1027	<0.1	<2	1.2	19.1	-0.3	0	0	0	Dry	3.96	Cool, cloudy, dry, calm		

Instruments Used: GFM436 gas analyser / PID MultiRAE lite

NOTE: n/a Not applicable  
nm Not measured

REMARKS:



# GROUND GAS AND GROUNDWATER MONITORING DATA



Project Number: 3710,SK

Project Name: Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

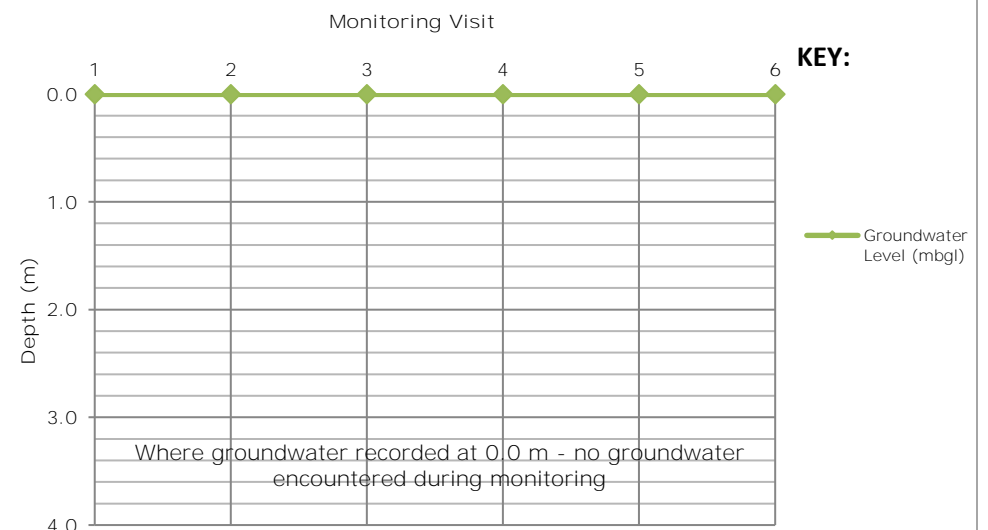
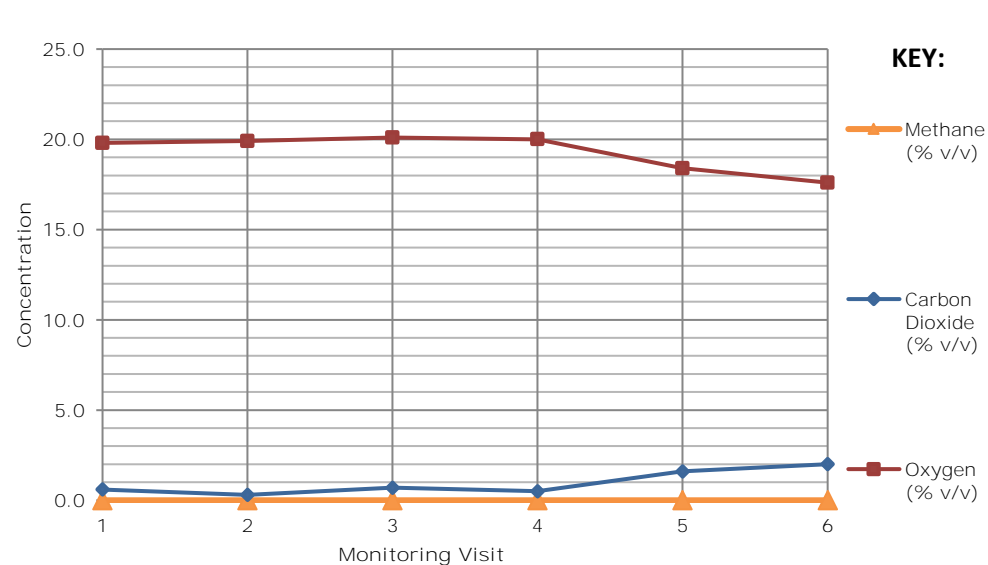
Date: 21/06/2019

Exploratory Hole Location		WS13										Date of Installation		13/02/2019	
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content		Carbon Dioxide	Oxygen	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall	
			(% v/v)	(% LEI)	(% v/v)	(% v/v)									
1st visit	20/02/2019	1015	<0.1	<2	0.6	19.8	0.0	0	0	0	Dry	3.02	Cool, Overcast, Dry, Windy		
2nd visit	24/02/2019	1032	<0.1	<2	0.3	19.9	-0.1	0	0	0	Dry	3.06	Warm, Sunny, Drty, Calm		
3rd visit	01/03/2019	1013	<0.1	<2	0.7	20.1	-0.4	0	0	0	Dry	3.05	Cool, Overcast, Damp, Breezy		
4th visit	08/03/2019	1004	<0.1	<2	0.5	20.0	-0.4	0	0	0	Dry	3.05	Cold, sunny, damp, breezy		
5th visit	15/03/2019	997	<0.1	<2	1.6	18.4	-0.4	0	0	0	Dry	3.05	Cool, sunny, dry, very windy		
6th visit	21/03/2019	1027	<0.1	<2	2.0	17.6	-0.6	0	0	0	Dry	3.05	Cool, cloudy, dry, calm		

Instruments Used: GFM436 gas analyser / PID MultiRAE lite

NOTE: n/a Not applicable  
nm Not measured

REMARKS:



# GROUND GAS AND GROUNDWATER MONITORING DATA



Project Number: 3710,SK

Project Name: Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

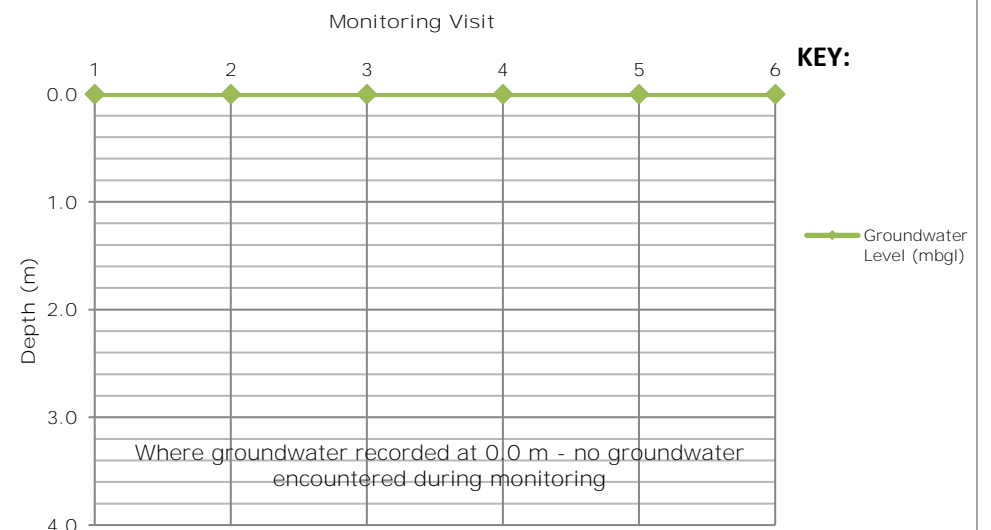
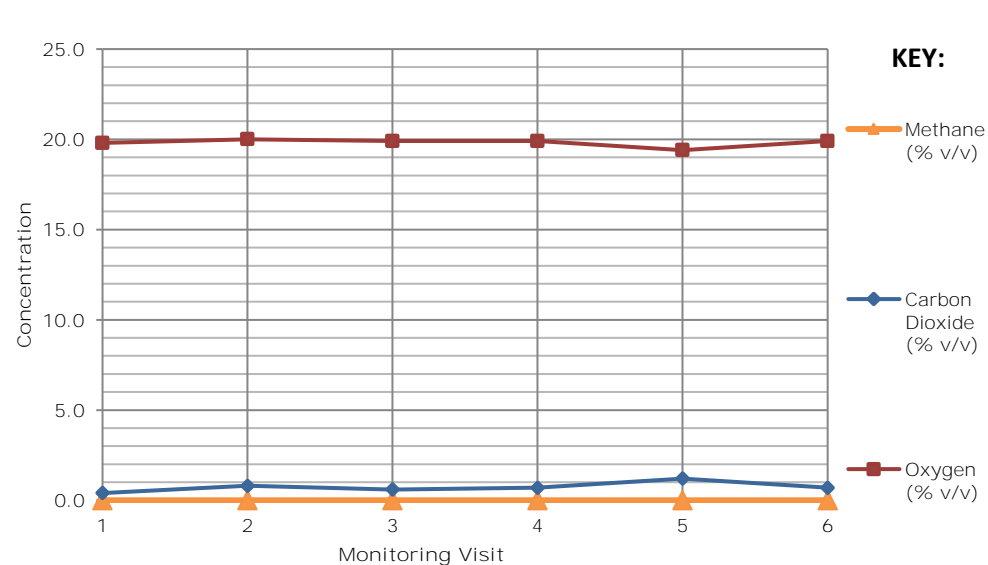
Date: 21/06/2019

Exploratory Hole Location		WS17										Date of Installation		13/02/2019	
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content		Carbon Dioxide	Oxygen	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall	
			(% v/v)	(% IFL)	(% v/v)	(% v/v)									
1st visit	20/02/2019	1015	<0.1	<2	0.4	19.8	0.0	0	0	0	Dry	2.93	Cool, Overcast, Dry, Windy		
2nd visit	24/02/2019	1032	<0.1	<2	0.8	20.0	-0.3	0	0	0	Dry	3.04	Warm, Sunny, Dry, Calm		
3rd visit	01/03/2019	1013	<0.1	<2	0.6	19.9	-0.3	0	0	0	Dry	3.05	Cool, Overcast, Damp, Breezy		
4th visit	08/03/2019	1006	<0.1	<2	0.7	19.9	-0.6	0	0	0	Dry	3.04	Cold, sunny, damp, breezy		
5th visit	15/03/2019	997	<0.1	<2	1.2	19.4	0.1	0	0	0	Dry	3.04	Cool, sunny, dry, very windy		
6th visit	21/03/2019	1027	<0.1	<2	0.7	19.9	-0.3	0	0	0	Dry	3.04	Cool, cloudy, dry, calm		

Instruments Used: GFM436 gas analyser / PID MultiRAE lite

NOTE: n/a Not applicable  
nm Not measured

REMARKS:



## **Appendix 8 – Environmental Laboratory Test Results**

19-02308.2

19-02415.2

19-06966.1



Carl Sullivan  
Geosphere Environmental Ltd  
Brightwell Barns  
Ipswich Road  
Brightwell  
Suffolk  
IP10 0BJ

DETS Ltd  
Unit 1  
Rose Lane Industrial Estate  
Rose Lane  
Lenham Heath  
Kent  
ME17 2JN  
t: 01622 850410

## DETS Report No: 19-02308

Site Reference: Taverham (NR8 6HL)

Project / Job Ref: 3921,GI

Order No: 3921,GI

Sample Receipt Date: 15/02/2019

Sample Scheduled Date: 19/02/2019

Report Issue Number: 2

Reporting Date: 17/06/2019

Authorised by:

A handwritten signature in black ink, appearing to read "Dave Ashworth".

Dave Ashworth  
Deputy Quality Manager

This report supersedes 19-02308, issue no.1.  
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DETS Ltd  
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Soil Analysis Certificate						
DETS Report No: 19-02308	Date Sampled	12/02/19	12/02/19	12/02/19	12/02/19	12/02/19
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Taverham (NR8 6HL)	TP / BH No	WS01	WS01	WS04	WS06	WS11
Project / Job Ref: 3921,GI	Additional Refs	ES1	ES2	ES1	ES1	ES1
Order No: 3921,GI	Depth (m)	0.20 - 0.30	1.10 - 1.20	0.10 - 0.20	0.20 - 0.30	0.20 - 0.50
Reporting Date: 17/06/2019	DETS Sample No	390906	390907	390908	390909	390911

Determinand	Unit	RL	Accreditation				
Asbestos Screen <sup>(S)</sup>	N/a	N/a	ISO17025	Not Detected			Not Detected Not Detected
pH	pH Units	N/a	MCERTS	7.4	7.3		6.4 6.4
Total Cyanide	mg/kg	< 2	NONE	< 2			< 2 < 2
Complex Cyanide	mg/kg	< 2	NONE	< 2			< 2 < 2
Free Cyanide	mg/kg	< 2	NONE	< 2			< 2 < 2
Total Sulphate as SO <sub>4</sub>	mg/kg	< 200	NONE		< 200		
Total Sulphate as SO <sub>4</sub>	%	< 0.02	NONE		< 0.02		
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	< 10	20		15 < 10
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	< 0.01	0.02		0.02 < 0.01
Organic Matter	%	< 0.1	MCERTS	1.1			1.6 1.4
Arsenic (As)	mg/kg	< 2	MCERTS	6		6	6 6
Barium (Ba)	mg/kg	< 5	NONE	9			10 16
Beryllium (Be)	mg/kg	< 0.5	NONE	< 0.5			< 0.5 < 0.5
W/S Boron	mg/kg	< 1	NONE	< 1		< 1	< 1 < 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2 < 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7		8	7 7
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			< 2 < 2
Copper (Cu)	mg/kg	< 4	MCERTS	4		< 4	< 4 < 4
Lead (Pb)	mg/kg	< 3	MCERTS	10		11	10 12
Mercury (Hg)	mg/kg	< 1	NONE	< 1		< 1	< 1 < 1
Molybdenum (Mo)	mg/kg	< 1	NONE	< 1			< 1 < 1
Nickel (Ni)	mg/kg	< 3	MCERTS	7		5	5 5
Selenium (Se)	mg/kg	< 3	NONE	< 3		< 3	< 3 < 3
Vanadium (V)	mg/kg	< 2	NONE	22			21 18
Zinc (Zn)	mg/kg	< 3	MCERTS	31		23	28 22
EPH (C10 - C40)	mg/kg	< 6	MCERTS	23			19 10

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C  
 Subcontracted analysis (S)





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Soil Analysis Certificate						
DETS Report No: 19-02308	Date Sampled	12/02/19	12/02/19	12/02/19	12/02/19	
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Taverham (NR8 6HL)	TP / BH No	WS13	WS14	WS14	WS17	
Project / Job Ref: 3921,GI	Additional Refs	ES1	ES1	ES2	ES1	
Order No: 3921,GI	Depth (m)	0.10 - 0.20	0.10 - 0.20	1.50 - 1.60	0.20 - 0.30	
Reporting Date: 17/06/2019	DETS Sample No	390912	390913	390914	390915	

Determinand	Unit	RL	Accreditation				
Asbestos Screen <sup>(S)</sup>	N/a	N/a	ISO17025	Not Detected			Not Detected
pH	pH Units	N/a	MCERTS	6.2		6.5	6.5
Total Cyanide	mg/kg	< 2	NONE	< 2			< 2
Complex Cyanide	mg/kg	< 2	NONE	< 2			< 2
Free Cyanide	mg/kg	< 2	NONE	< 2			< 2
Total Sulphate as SO <sub>4</sub>	mg/kg	< 200	NONE			< 200	
Total Sulphate as SO <sub>4</sub>	%	< 0.02	NONE			< 0.02	
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	< 10		< 10	< 10
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	< 0.01		< 0.01	< 0.01
Organic Matter	%	< 0.1	MCERTS	1.4			1.3
Arsenic (As)	mg/kg	< 2	MCERTS	5	7		5
Barium (Ba)	mg/kg	< 5	NONE	18			16
Beryllium (Be)	mg/kg	< 0.5	NONE	< 0.5			< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1		< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2		< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7	8		8
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			< 2
Copper (Cu)	mg/kg	< 4	MCERTS	< 4	< 4		< 4
Lead (Pb)	mg/kg	< 3	MCERTS	13	13		12
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1		< 1
Molybdenum (Mo)	mg/kg	< 1	NONE	< 1			< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	5	5		5
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3		< 3
Vanadium (V)	mg/kg	< 2	NONE	17			18
Zinc (Zn)	mg/kg	< 3	MCERTS	24	28		23
EPH (C10 - C40)	mg/kg	< 6	MCERTS	10			< 6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C  
 Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-02308	Date Sampled	12/02/19	12/02/19	12/02/19	12/02/19	12/02/19
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Taverham (NR8 6HL)	TP / BH No	WS01	WS06	WS11	WS13	WS17
Project / Job Ref: 3921,GI	Additional Refs	ES1	ES1	ES1	ES1	ES1
Order No: 3921,GI	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.20 - 0.50	0.10 - 0.20	0.20 - 0.30
Reporting Date: 17/06/2019	DETS Sample No	390906	390909	390911	390912	390915

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.12	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-02308	
Geosphere Environmental Ltd	
Site Reference: Taverham (NR8 6HL)	
Project / Job Ref: 3921,GI	
Order No: 3921,GI	
Reporting Date: 17/06/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
390906	WS01	ES1	0.20 - 0.30	7.8	Brown sand with vegetation
390907	WS01	ES2	1.10 - 1.20	7.7	Orange sand
390908	WS04	ES1	0.10 - 0.20	6.8	Brown sand with vegetation
390909	WS06	ES1	0.20 - 0.30	7.6	Brown sand with stones and vegetation
390911	WS11	ES1	0.20 - 0.50	6.7	Brown sand with vegetation
390912	WS13	ES1	0.10 - 0.20	8.5	Brown sand with vegetation
390913	WS14	ES1	0.10 - 0.20	10.7	Brown sand with vegetation
390914	WS14	ES2	1.50 - 1.60	7.3	Orange sand
390915	WS17	ES1	0.20 - 0.30	9.6	Brown sand with vegetation

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample <sup>I/S</sup>

Unsuitable Sample <sup>U/S</sup>



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No:	19-02308
Geosphere Environmental Ltd	
Site Reference:	Taverham (NR8 6HL)
Project / Job Ref:	3921,G1
Order No:	3921,G1
Reporting Date:	17/06/2019

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content: determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LOM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried  
 AR As Received



Carl Sullivan  
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## DETS Report No: 19-02415

Site Reference: Taverham (NR8 6HL)

Project / Job Ref: 3921,GI

Order No: 3921,GI

Sample Receipt Date: 20/02/2019

Sample Scheduled Date: 20/02/2019

Report Issue Number: 2

Reporting Date: 17/06/2019

Authorised by:

A handwritten signature in black ink, appearing to read "Dave Ashworth".

Dave Ashworth  
Deputy Quality Manager

This report supersedes 19-02415, issue no.1.  
Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



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Soil Analysis Certificate						
DETS Report No: 19-02415	Date Sampled	18/02/19				
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Taverham (NR8 6HL)	TP / BH No	WS07				
Project / Job Ref: 3921,GI	Additional Refs	None Supplied				
Order No: 3921,GI	Depth (m)	1.70 - 1.80				
Reporting Date: 17/06/2019	DETS Sample No	391305				

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	MCERTS	7.9			
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	< 10			
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	< 0.01			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C  
 Subcontracted analysis (S)



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-02415	
Geosphere Environmental Ltd	
Site Reference: Taverham (NR8 6HL)	
Project / Job Ref: 3921,GI	
Order No: 3921,GI	
Reporting Date: 17/06/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
391305	WS07	None Supplied	1.70 - 1.80	8.3	Orange sand

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample <sup>I/S</sup>

Unsuitable Sample <sup>U/S</sup>



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No:	19-02415
Geosphere Environmental Ltd	
Site Reference:	Taverham (NR8 6HL)
Project / Job Ref:	3921,G1
Order No:	3921,G1
Reporting Date:	17/06/2019

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content: determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LOM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried  
 AR As Received





Stephen Gilchrist  
Geosphere Environmental Ltd  
Brightwell Barns  
Ipswich Road  
Brightwell  
Suffolk  
IP10 0BJ

DETS Ltd  
Unit 1  
Rose Lane Industrial Estate  
Rose Lane  
Lenham Heath  
Kent  
ME17 2JN  
t: 01622 850410

## DETS Report No: 19-06966

Site Reference: Fir Covert Road, Taverham, Norwich

Project / Job Ref: 3921,GI

Order No: 3921,GI

Sample Receipt Date: 17/05/2019

Sample Scheduled Date: 17/05/2019

Report Issue Number: 1

Reporting Date: 24/05/2019

Authorised by:

A handwritten signature in black ink, appearing to read "Dave Ashworth".

Dave Ashworth  
Deputy Quality Manager

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



DETS Ltd  
 Unit 1, Rose Lane Industrial Estate  
 Rose Lane  
 Lenham Heath  
 Maidstone  
 Kent ME17 2JN  
 Tel : 01622 850410



Soil Analysis Certificate					
DETS Report No: 19-06966	Date Sampled	15/05/19	15/05/19	15/05/19	
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	
Site Reference: Fir Covert Road, Taverham, Norwich	TP / BH No	WS201	WS203	WS205	
Project / Job Ref: 3921,GI	Additional Refs	None Supplied	None Supplied	None Supplied	
Order No: 3921,GI	Depth (m)	0.15	0.10	0.10	
Reporting Date: 24/05/2019	DETS Sample No	409047	409048	409049	

Determinand	Unit	RL	Accreditation				
Asbestos Screen <sup>(S)</sup>	N/a	N/a	ISO17025	Not Detected			
pH	pH Units	N/a	MCERTS	6.6	6.7	6.7	
Total Cyanide	mg/kg	< 2	NONE	< 2			
Complex Cyanide	mg/kg	< 2	NONE	< 2			
Free Cyanide	mg/kg	< 2	NONE	< 2			
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	< 10			
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	< 0.01			
Organic Matter	%	< 0.1	MCERTS	3.6	1	1.9	
Arsenic (As)	mg/kg	< 2	MCERTS	5	4	7	
Barium (Ba)	mg/kg	< 5	NONE	9	10	8	
Beryllium (Be)	mg/kg	< 0.5	NONE	< 0.5	< 0.5	< 0.5	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	5	5	7	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	< 4	< 4	5	
Lead (Pb)	mg/kg	< 3	MCERTS	17	4	8	
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	
Molybdenum (Mo)	mg/kg	< 1	NONE	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	< 3	< 3	5	
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	
Vanadium (V)	mg/kg	< 2	NONE	15	13	19	
Zinc (Zn)	mg/kg	< 3	MCERTS	20	11	30	
EPH (C10 - C40)	mg/kg	< 6	MCERTS	28			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C  
 Subcontracted analysis (S)



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 Rose Lane  
 Lenham Heath  
 Maidstone  
 Kent ME17 2JN  
 Tel : 01622 850410



Soil Analysis Certificate - Speciated PAHs					
DETS Report No: 19-06966	Date Sampled	15/05/19			
Geosphere Environmental Ltd	Time Sampled	None Supplied			
Site Reference: Fir Covert Road, Taverham, Norwich	TP / BH No	WS201			
Project / Job Ref: 3921,GI	Additional Refs	None Supplied			
Order No: 3921,GI	Depth (m)	0.15			
Reporting Date: 24/05/2019	DETS Sample No	409047			

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



DETS Ltd  
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Rose Lane  
Lenham Heath  
Maidstone  
Kent ME17 2JN  
Tel : 01622 850410



Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-06966	
Geosphere Environmental Ltd	
Site Reference: Fir Covert Road, Taverham, Norwich	
Project / Job Ref: 3921,GI	
Order No: 3921,GI	
Reporting Date: 24/05/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
409047	WS201	None Supplied	0.15	9.5	Brown loamy sand with vegetation
409048	WS203	None Supplied	0.10	6.2	Brown loamy sand with vegetation
409049	WS205	None Supplied	0.10	6.6	Brown loamy sand with vegetation

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample <sup>U/S</sup>

Unsuitable Sample <sup>U/S</sup>

Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 19-06966	
Geosphere Environmental Ltd	
Site Reference: Fir Covert Road, Taverham, Norwich	
Project / Job Ref: 3921,GI	
Order No: 3921,GI	
Reporting Date: 24/05/2019	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content: determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCS	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried  
AR As Received

## **Appendix 9 – Geotechnical Laboratory Test Results**





**TEST REPORT**  
ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019



<b>Contract</b>	Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL		
<b>Serial No.</b>	34711		
<b>Client:</b>	<i>Soil Property Testing Ltd</i>		
Geosphere Environmental Ltd  Head Office Brightwell Barns Ipswich Road Brightwell Suffolk IP10 0BJ	15, 16, 18 Halcyon Court, St Margaret's Way, Stukeley Meadows, Huntingdon, Cambridgeshire, PE29 6DG  Tel: 01480 455579 Email: <a href="mailto:enquiries@soilpropertytesting.com">enquiries@soilpropertytesting.com</a> Website: <a href="http://www.soilpropertytesting.com">www.soilpropertytesting.com</a>		
<b>Samples Submitted By:</b> Geosphere Environmental Ltd	<b>Approved Signatories:</b>		
<b>Samples Labelled:</b> Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL	<input type="checkbox"/> <b>J.C. Garner B.Eng (Hons) FGS</b> Technical Director <input type="checkbox"/> <b>S.P. Townend FGS</b> Quality Manager <input type="checkbox"/> <b>W. Johnstone</b> Materials Lab Manager <input type="checkbox"/> <b>D. Sabnis</b> Operations Manager		
<b>Date Received:</b> 25/02/2019	<b>Samples Tested Between:</b> 25/02/2019 and 11/06/2019		
<b>Remarks:</b>	For the attention of Mr C Sullivan Your Reference No: 3921,G1		
<b>Notes:</b>	<ol style="list-style-type: none"><li>1 All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.</li><li>2 (a) UKAS - United Kingdom Accreditation Service (b) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation</li><li>3 Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.</li><li>4 This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.</li></ol>		



**TEST REPORT**  
 ISSUED BY SOIL PROPERTY TESTING LTD  
 DATE ISSUED: 11/06/2019



0998

<b>Contract</b>		Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL																			
<b>Serial No.</b>		34711					<b>Target Date</b>		11/03/2019												
<b>Scheduled By</b>		Geosphere Environmental Ltd																			
<b>SCHEDULE OF LABORATORY TESTS</b>																					
<b>Schedule Remarks</b>																					
Bore Hole No.	Type	Sample Ref.	Top Depth	CBR Test Inc. 2.5kg Recompaction										Sample Remarks							
				1	2	3	4	5	6	7	8	9	10								
SK01	B	1	0.50	1																	
SK06	B	1	0.50	1																	
<b>Totals</b>				2																	
										<b>End of Schedule</b>											





# TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019



0998

<b>Contract</b>	<b>Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL</b>
<b>Serial No.</b>	<b>34711</b>

## CALIFORNIA BEARING RATIO TEST

Borehole /Pit No.	Depth (m)	Sample		Description	Remarks
		Type	Reference		
SK01	0.50 - 0.60	B	1	Orangish brown gravelly fine to coarse SAND. Gravel is brown, black and white fine to coarse angular to subangular flint.	

### Specimen Preparation

Condition	Remoulded
Details	Recompacted with specified standard effort using 2.5kg rammer

Soaking Details	Not Soaked	
Period of Soaking		days
Time to Surface		days
Amount of Swell Recorded		mm
Initial Water Content		%

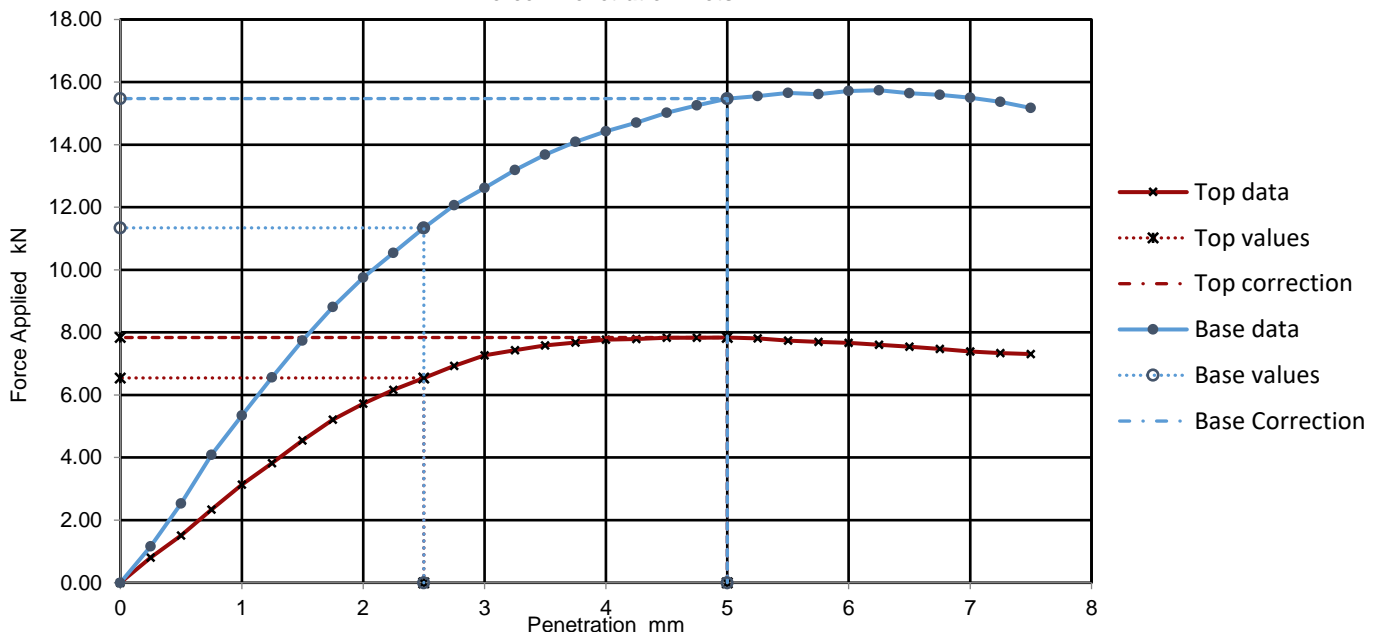
Material Retained on 20mm Sieve Removed	8.7	%
Initial Specimen Details:	Bulk Density	2.03 Mg/m <sup>3</sup>
	Dry Density	1.92 Mg/m <sup>3</sup>

Surcharge Applied	15	kg
-------------------	----	----

### Test Results

	Curve Correction	CBR Values (%)				Water Content (%)
		2.5mm	5.0mm	Highest	Mean*	
TOP	No	50	39	50		5.6
BASE	No	86	77	86		5.8

**Force v Penetration Plots**



Method of Preparation:	BS1377: Part1: 2016 & BS1377: Part 4: 1990: 7.2.4.4
Method of Test:	BS1377: Part 4: 1990: 7
Type of Sample Key	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT= Split Spoon Sample, C = Core Cutter
Comments:	*Only reported if the results from each end of the sample are within ±10% of the mean value. Note:- CBR Results are water content dependent - an increase in water content will result in a decrease of CBR value.
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C.



# TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019



0998

<b>Contract</b>	<b>Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL</b>
<b>Serial No.</b>	<b>34711</b>

## CALIFORNIA BEARING RATIO TEST

Borehole /Pit No.	Depth (m)	Sample		Description	Remarks
		Type	Reference		
SK06	0.50 - 0.60	B	1	Orangish brown gravelly fine to coarse SAND. Gravel is brown, black and white fine and medium angular to subangular flint.	

### Specimen Preparation

Condition	Remoulded
Details	Recompacted with specified standard effort using 2.5kg rammer

Soaking Details	Not Soaked	
Period of Soaking		days
Time to Surface		days
Amount of Swell Recorded		mm
Initial Water Content		%

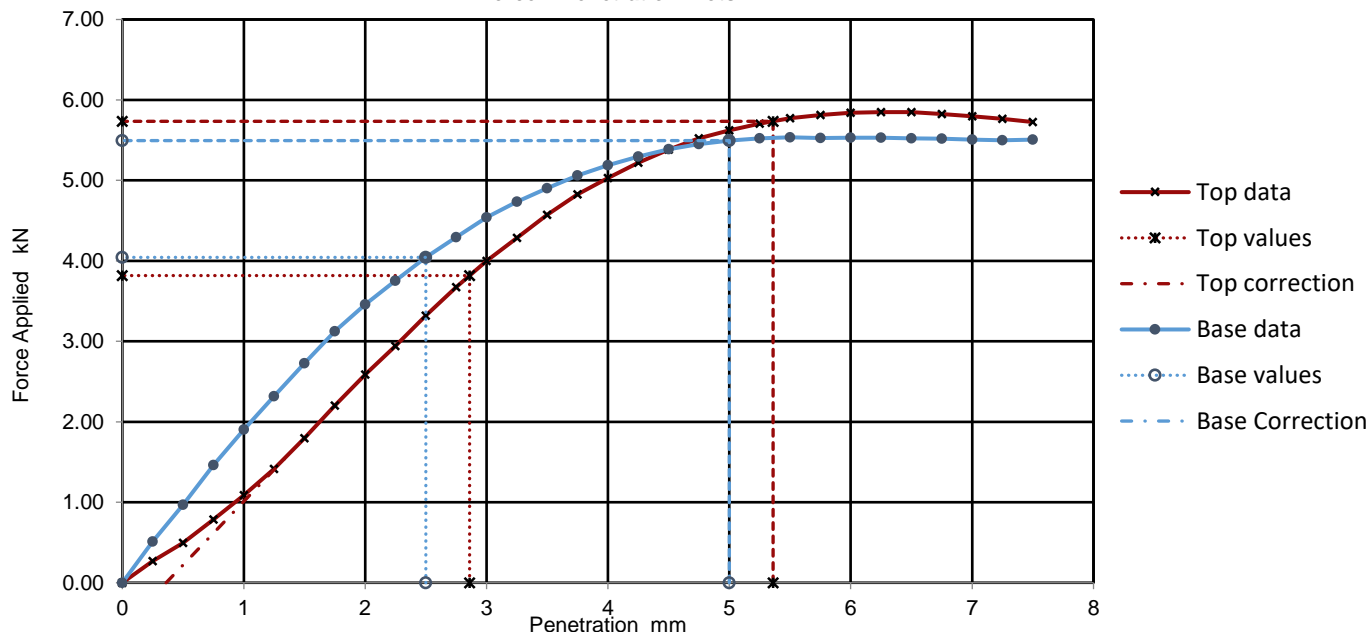
Material Retained on 20mm Sieve Removed	0.0	%
Initial Specimen Details:	Bulk Density	1.84 Mg/m <sup>3</sup>
	Dry Density	1.74 Mg/m <sup>3</sup>

Surcharge Applied	15	kg
-------------------	----	----

### Test Results

	Curve Correction	CBR Values (%)				Water Content (%)
		2.5mm	5.0mm	Highest	Mean*	
TOP	Yes	29	29	29	30	5.7
BASE	No	31	27	31		5.7

Force v Penetration Plots




Method of Preparation:	BS1377: Part1: 2016 & BS1377: Part 4: 1990: 7.2.4.4
Method of Test:	BS1377: Part 4: 1990: 7
Type of Sample Key	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT= Split Spoon Sample, C = Core Cutter
Comments:	*Only reported if the results from each end of the sample are within ±10% of the mean value. Note:- CBR Results are water content dependent - an increase in water content will result in a decrease of CBR value.
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C.



**TEST REPORT**  
ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019



<b>Contract</b>	<b>Taverham</b>
<b>Serial No.</b>	<b>34711-2</b>
<b>Client:</b> Geosphere Environmental Ltd  Head Office Brightwell Barns Ipswich Road Brightwell Suffolk IP10 0BJ	<b><i>Soil Property Testing Ltd</i></b>  <b>15, 16, 18 Halcyon Court, St Margaret's Way, Stukeley Meadows, Huntingdon, Cambridgeshire, PE29 6DG</b>  <b>Tel: 01480 455579</b> <b>Email: <a href="mailto:enquiries@soilpropertytesting.com">enquiries@soilpropertytesting.com</a></b> <b>Website: <a href="http://www.soilpropertytesting.com">www.soilpropertytesting.com</a></b>
<b>Samples Submitted By:</b> Geosphere Environmental Ltd  <b>Samples Labelled:</b> Taverham	<b>Approved Signatories:</b> <input checked="" type="checkbox"/> <b>J.C. Garner B.Eng (Hons) FGS</b> Technical Director <input type="checkbox"/> <b>S.P. Townend FGS</b> Quality Manager <input type="checkbox"/> <b>W. Johnstone</b> Materials Lab Manager <input type="checkbox"/> <b>D. Sabnis</b> Operations Manager 
<b>Date Received:</b> 13/05/2019	<b>Samples Tested Between:</b> 13/05/2019 and 11/06/2019
<b>Remarks:</b> For the attention of Stephen Gilchrist Your Reference No: 3921,G1	
<b>Notes:</b> <ol style="list-style-type: none"><li>1 All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.</li><li>2 (a) UKAS - United Kingdom Accreditation Service (b) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation</li><li>3 Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.</li><li>4 This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.</li></ol>	



**TEST REPORT**  
 ISSUED BY SOIL PROPERTY TESTING LTD  
 DATE ISSUED: 11/06/2019



0998

<b>Contract</b>		<b>Taverham</b>																			
<b>Serial No.</b>		<b>34711-2</b>										<b>Target Date</b>		<b>03/06/2019</b>							
<b>Scheduled By</b>		<b>Geosphere Environmental Ltd</b>																			
<b>SCHEDULE OF LABORATORY TESTS</b>																					
<b>Schedule Remarks</b>																					
Bore Hole No.	Type	Sample Ref.	Top Depth	California Bearing Ratio Test Sulphate Content/pH Value												Sample Remarks					
				1	2	3	4	5	6	7	8	9	10	11	12						
SK1	B	1	0.50	1																	
SK6	B	1	0.50	1																	
TP201	B	1	0.50	1																	
WS201	B	1	0.90		1																
WS201	D	2	1.50		1																
WS205	D	1	0.90		1																
WS205	D	2	1.85		1																
<b>Totals</b>				<b>3</b>	<b>4</b>																<b>End of Schedule</b>



# TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019



0998

<b>Contract</b>	<b>Taverham</b>
<b>Serial No.</b>	<b>34711-2</b>

## CALIFORNIA BEARING RATIO TEST

Borehole /Pit No.	Depth (m)	Sample		Description	Remarks
		Type	Reference		
SK1	0.50 - 0.60	B	1	Yellowish brown very gravelly fine to coarse SAND. Gravel is brown, black and white fine to coarse angular to subangular chert.	

### Specimen Preparation

Condition	Remoulded
Details	Recompacted with specified standard effort using 2.5kg rammer

Soaking Details	Soaked	
Period of Soaking	4	days
Time to Surface	1	days
Amount of Swell Recorded		mm
Initial Water Content	6.5	%

Material Retained on 20mm Sieve Removed	4.1	%
Initial Specimen Details:	Bulk Density	2.01 Mg/m <sup>3</sup>
	Dry Density	1.89 Mg/m <sup>3</sup>

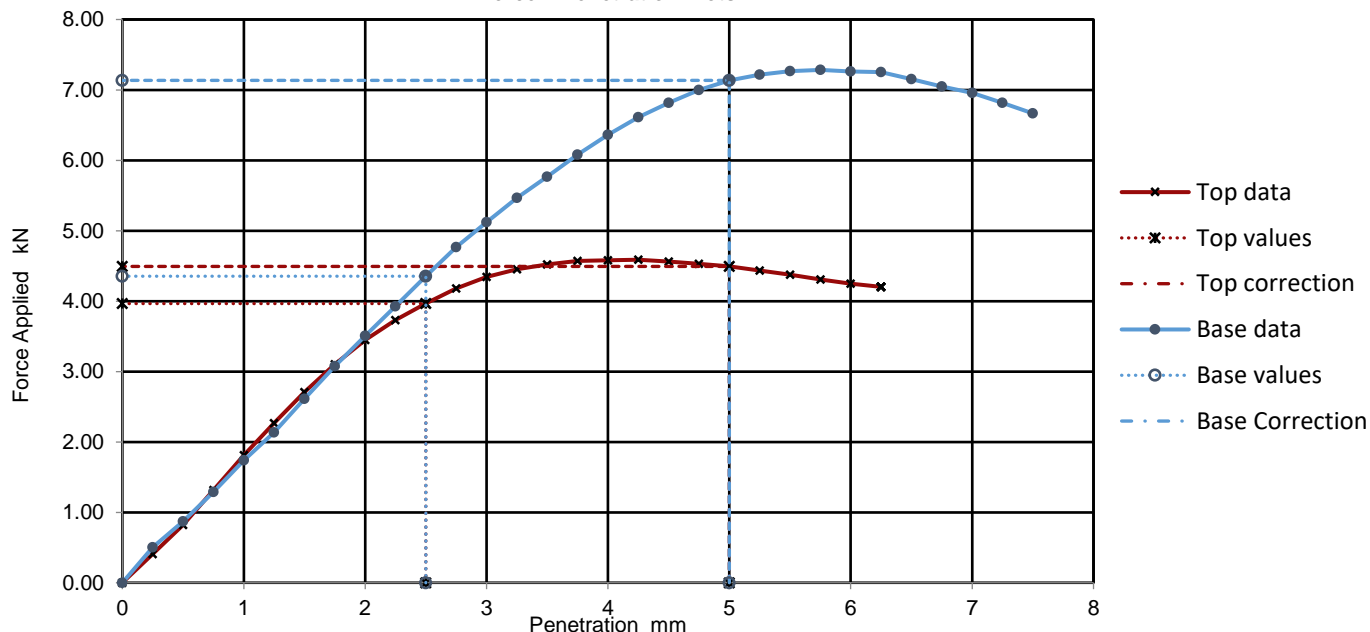
Surcharge Applied	15	kg
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### Test Results

	Curve Correction	CBR Values (%)			
		2.5mm	5.0mm	Highest	Mean*
TOP	No	30	22	30	33
BASE	No	33	36	36	

Water Content (%)
11.9
12.4

Force v Penetration Plots



Method of Preparation:	BS1377: Part1: 2016 & BS1377: Part 4: 1990: 7.2.4.4, 7.3
Method of Test:	BS1377: Part 4: 1990: 7
Type of Sample Key	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT= Split Spoon Sample, C = Core Cutter
Comments:	*Only reported if the results from each end of the sample are within ±10% of the mean value. Note:- CBR Results are water content dependent - an increase in water content will result in a decrease of CBR value.
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C.



# TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019



0998

<b>Contract</b>	<b>Taverham</b>
<b>Serial No.</b>	<b>34711-2</b>

## CALIFORNIA BEARING RATIO TEST

Borehole /Pit No.	Depth (m)	Sample		Description	Remarks
		Type	Reference		
SK6	0.50 - 0.60	B	1	Yellowish brown gravelly fine to coarse SAND with rare soft clayey lumps. Gravel is brown, black and white fine to coarse angular to subangular chert.	

### Specimen Preparation

Condition	Remoulded
Details	Recompacted with specified standard effort using 2.5kg rammer

Soaking Details	Soaked	
Period of Soaking	4	days
Time to Surface	1	days
Amount of Swell Recorded		mm
Initial Water Content	6.7	%

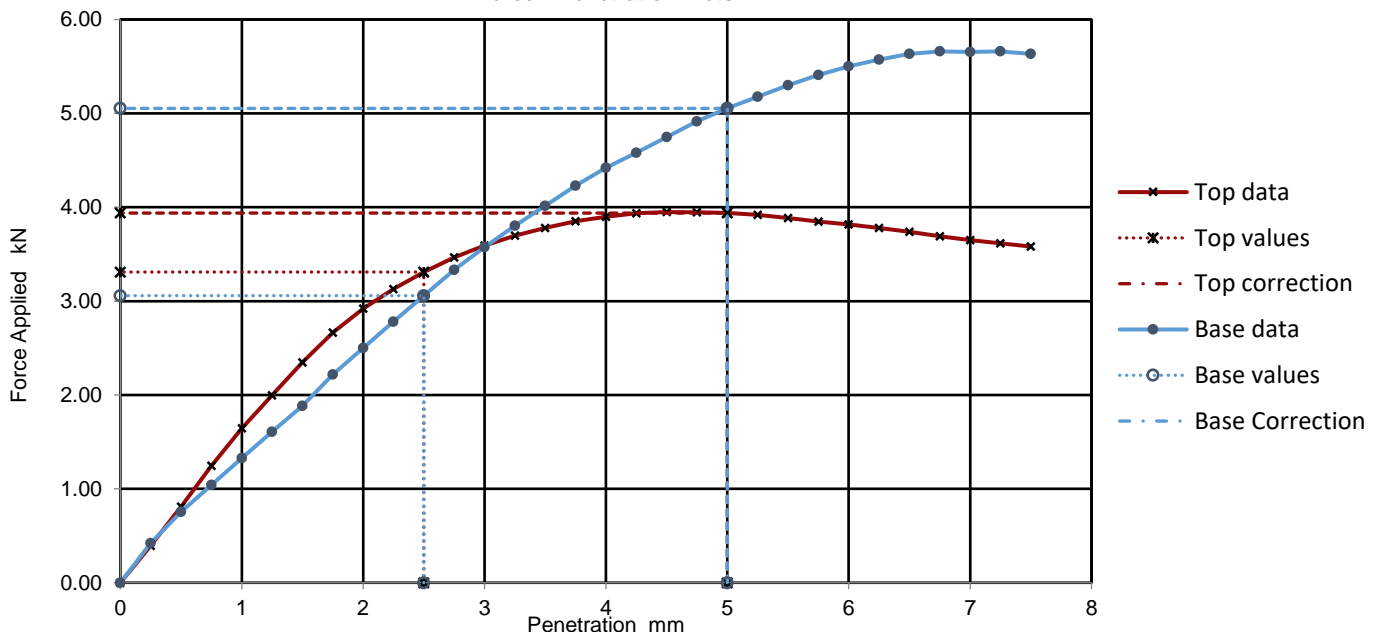
Material Retained on 20mm Sieve Removed	0.5	%
Initial Specimen Details:	Bulk Density	1.96 Mg/m <sup>3</sup>
	Dry Density	1.84 Mg/m <sup>3</sup>

Surcharge Applied	15	kg
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### Test Results

	Curve Correction	CBR Values (%)				Water Content (%)
		2.5mm	5.0mm	Highest	Mean*	
TOP	No	25	20	25	25	13.6
BASE	No	23	25	25		14.3

Force v Penetration Plots



Method of Preparation:	BS1377: Part1: 2016 & BS1377: Part 4: 1990: 7.2.4.4, 7.3
Method of Test:	BS1377: Part 4: 1990: 7
Type of Sample Key	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT= Split Spoon Sample, C = Core Cutter
Comments:	*Only reported if the results from each end of the sample are within ±10% of the mean value. Note:- CBR Results are water content dependent - an increase in water content will result in a decrease of CBR value.
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C.



# TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019



0998

<b>Contract</b>	<b>Taverham</b>
<b>Serial No.</b>	<b>34711-2</b>

## CALIFORNIA BEARING RATIO TEST

Borehole /Pit No.	Depth (m)	Sample		Description	Remarks
		Type	Reference		
TP201	0.50	B	1	Brown gravelly fine and medium SAND with rare soft clayey lumps. Gravel is brown, black and white fine to coarse angular to subangular chert.	

### Specimen Preparation

Condition	Remoulded
Details	Recompacted with specified standard effort using 2.5kg rammer

Soaking Details	Soaked	
Period of Soaking	4	days
Time to Surface	1	days
Amount of Swell Recorded		mm
Initial Water Content	6.5	%

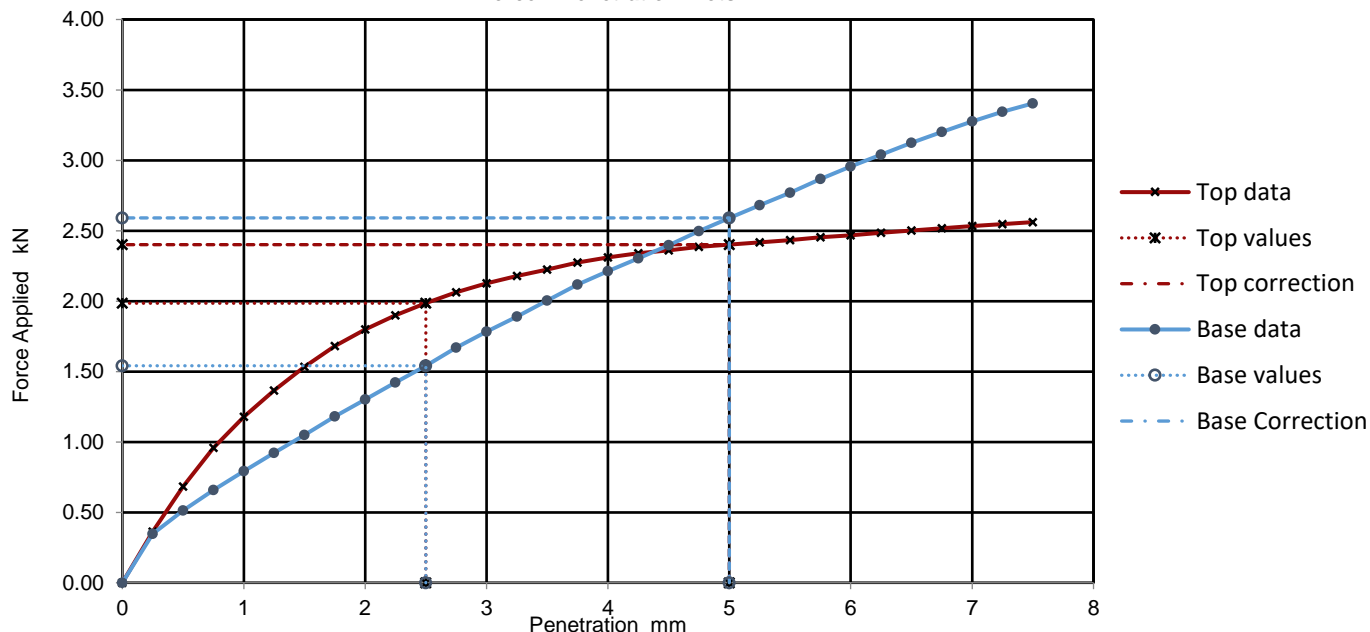
Material Retained on 20mm Sieve Removed	2.9	%
Initial Specimen Details:	Bulk Density	1.82 Mg/m <sup>3</sup>
	Dry Density	1.71 Mg/m <sup>3</sup>

Surcharge Applied	15	kg
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### Test Results

	Curve Correction	CBR Values (%)				Water Content (%)
		2.5mm	5.0mm	Highest	Mean*	
TOP	No	15	12	15	14	18.8
BASE	No	12	13	13		17.1

Force v Penetration Plots



Method of Preparation:	BS1377: Part1: 2016 & BS1377: Part 4: 1990: 7.2.4.4, 7.3
Method of Test:	BS1377: Part 4: 1990: 7
Type of Sample Key	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT= Split Spoon Sample, C = Core Cutter
Comments:	*Only reported if the results from each end of the sample are within ±10% of the mean value. Note:- CBR Results are water content dependent - an increase in water content will result in a decrease of CBR value.
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C.



# TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD  
DATE ISSUED: 11/06/2019

<b>Contract:</b>	<b>Taverham</b>
<b>Serial No:</b>	<b>34711-2</b>

## DETERMINATION OF THE SULPHATE CONTENT AND pH OF SOIL AND GROUNDWATER

Borehole / Pit No.	Depth (m)	Sample		Conc. of Soluble SO <sub>3</sub>		Calc'd Conc. Of SO <sub>4</sub> (g/L)	pH Value	% Sample Passing 2mm Sieve	Description	Remarks
		Type	Ref.	Water Soluble 2:1 (g/L)	Ground Water (g/L)					
WS201	0.90	B	1	0.11		0.14	6.1	100	Reddish yellow slightly clayey silty fine SAND with occasional light orangish brown mottling	
WS201	1.50	D	2	0.26		0.32	5.3	99	Reddish yellow and light orangish brown silty fine SAND with rare fine and medium gravel	
WS205	0.90	D	1	0.04		0.04	7.2	99	Reddish yellow and light orangish brown slightly clayey silty fine SAND with rare fine and medium gravel	
WS205	1.85	D	2	0.05		0.06	7.0	97	Reddish brown slightly clayey slightly gravelly silty fine SAND with occasional light orangish brown mottling. Gravel is white, brown and black fine and medium chert	

Method of Preparation: BS1377: Part 1: 2016: 8.5, BS1377: Part 3: 1990: 5.3 Soil/Water Extract, 5.4 Groundwater  
 Method of Test: BS1377: Part 3: 1990: 5.5  
 Type of Sample Key: U= Undisturbed, B= Bulk, D= Disturbed, J= Jar, W= Water, SPT= Split Spoon Sample, C= Core Cutter  
 Comments: **Test not UKAS accredited**  
 Remarks to Include: Sample disturbance, loss of moisture, variation from test procedure, location, and origin of test specimen within original sample. Oven drying temperature if not 105-110C.



## Appendix 10 – Photographs

3921,GI Photographs

Photograph 1



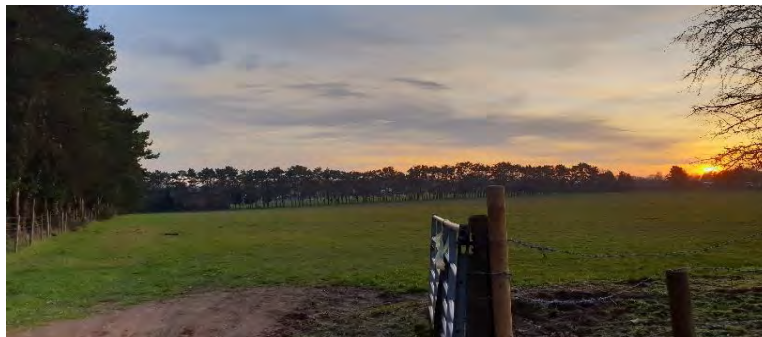
Photograph 2



Photograph 3



Photograph 4



**DESCRIPTION**

Photograph 1

Looking east across a section of the site, north

Photograph 2

Looking south east across a section of the site, north

Photograph 3

Looking north across a section of the site, south west

Photograph 4

Looking north across a section of the site, south east

**PROJECT**

Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL

**PROJECT NUMBER**

3921,GI

**TITLE**

Photographs at Fir Covert Road, Taverham

**DATE**

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Photograph 5



Photograph 6



**DESCRIPTION**

Photograph 5  
Looking west across a section of the site, south

Photograph 6  
Looking north west across a section of the site, middle

Photograph 7  
Looking north east at a section of the site, east

Photograph 7



Photograph 8



Photograph 8  
Trial Pit SK1

**PROJECT**  
Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL

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3921,GI

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Photograph 9



Photograph 10



DESCRIPTION

Photograph 9  
Trial Pit SK2

Photograph 10  
Trial Pit SK3

Photograph 11  
Trial Pit SK4

Photograph 11



Photograph 12



Photograph 12  
Trial Pit SK5

PROJECT

Land off Fir Covert Road, Taverham,  
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Photographs at Fir Covert Road,  
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Photograph 13



Photograph 14



**DESCRIPTION**

Photograph 13  
Trial Pit SK6

Photograph 14  
WS01

Photograph 15  
WS04

Photograph 15

Photograph 16

Photograph 16  
WS06



**PROJECT**

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Photograph 17



Photograph 18



**DESCRIPTION**

Photograph 17  
WS07

Photograph 18  
WS08

Photograph 19  
WS09

Photograph 19



Photograph 20



Photograph 20  
WS10

**PROJECT**

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Photograph 21



Photograph 22



**DESCRIPTION**  
 Photograph 21  
 WS11

Photograph 22  
 WS12

Photograph 23  
 WS13

Photograph 23



Photograph 24



Photograph 24  
 WS14

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Photograph 25



Photograph 26



Photograph 27



Photograph 28



**DESCRIPTION**

Photograph 25  
WS15

Photograph 26  
WS16

Photograph 27  
WS17

Photograph 28  
WS18

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Land off Fir Covert Road, Taverham,  
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