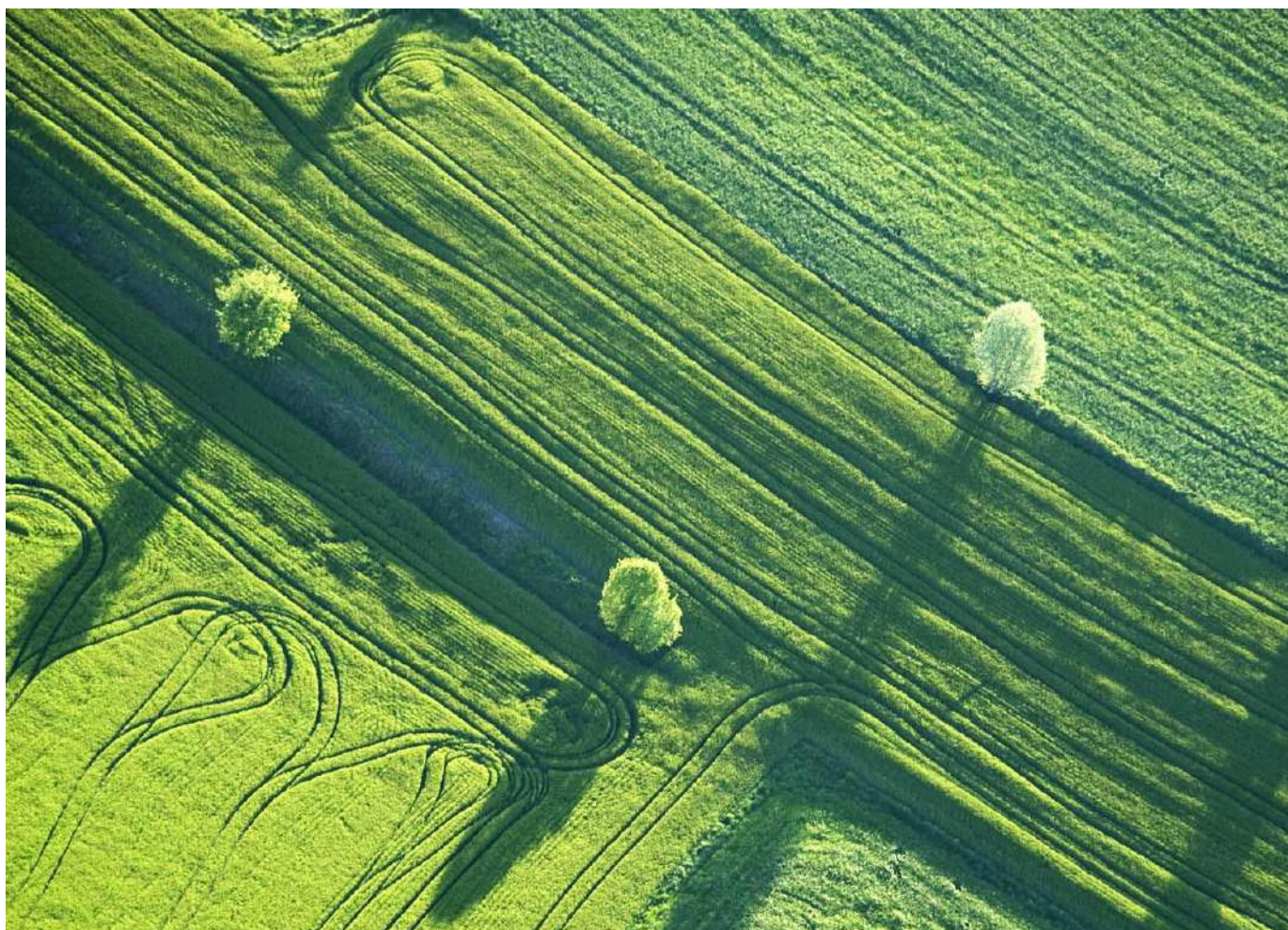


Appendix C



Monaghan Mushrooms Limited

Storrington Road, Thakeham

Geo-environmental and Geotechnical Investigation

305276-R03 (00)

RSK GENERAL NOTES

Project No.: 305276

Title: Geo-environmental and Geotechnical Investigation: Storrington Road, Thakeham, RH20 3DY

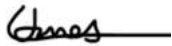
Client: Monaghan Mushrooms Limited

Date: January 2023

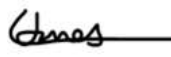
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Status: R03 (00)

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Revision control sheet				
Revision ref.	Date	Reason for revision	Amended by:	Approved by:
Rev 00	Jan 2023	Final	n/a	see above

RSK Environment Limited (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd. No part of this report may be copied or duplicated without the express permission of RSK and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

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EXECUTIVE SUMMARY

Commissioning and purpose of assessment	RSK Environment Limited (RSK) was commissioned by Alder King on behalf of Monaghan Mushrooms Limited to carry out a geo-environmental and geotechnical investigation of the land at Storrington Road, Thakeham, RH20 3DY, grid reference TQ 10291 17117. The works are being undertaken to provide an assessment of the environmental risks and liabilities associated with site ownership or redevelopment. Currently we understand that a residential development is being considered for the site..
DESK-BASED ASSESSMENT	
Site description and proposed development	The site occupies an area of 30.1 hectares and currently comprises a series of buildings and access roads associated with mushroom production. The remaining area appears to comprise a series of fields, demarcated by hedgerows and wooded borders. RSK understands that the site in question is being considered for development for residential use. At the time of preparing this report, no proposed development plans were available.
History of site and surrounding area	The site was formerly occupied by a collection of nurseries central to the site dating from 1938 to 2006, with several phases of construction and demolition. From 1961 demolition of several nursery buildings and construction of new agricultural buildings occurred in the southeast corner of site with several tanks and an electricity substation shown. The west of the site comprised a collection of structures, including a former sewage works dating from 1978 to 2021. Potential sources of contamination identified on site include the former sewage works, an array of demolition rubble, refuse abandoned vehicles and old fuel storage tanks. The site is currently disused but until relatively recently was used for mushroom production and office buildings to the east. The remainder of the site is derelict, comprising empty fields, abandoned farmhouse structure and waste mounds.
Geology and environmental setting	Historical BGS borehole data suggests the Site is underlain by bedrock deposits of the Fittleworth Member, comprising sandstone and mudstone with the Hythe Formation in the northeast corner of the site, comprising sandstone. No superficial deposits are noted to be beneath the site. There is also likely to be made ground associated with former development and demolition of historic structures on site. A commercial groundwater abstraction licensed for spray irrigation is located on site. The nearest off site groundwater abstraction is 434 m west of the site at Smock Alley at West Chiltington boreholes 1 for a potable water supply. The Envirocheck report indicates that the site lies within Zone III and Zone II of a groundwater Source Protection Zone (SPZ) for the potable abstraction 434 m west of the site.
Initial conceptual site model (CSM) and preliminary risk assessment (PRA)	Potentially complete contaminant linkages identified with a risk estimate of moderate to low or above include: • future site users – residential users [oral, dermal and inhalation exposure with impacted soil, soil vapour and dust/fibres, ingestion of home-grown produce, inhalation of vapours from groundwater and / or NAPL if present] • future adjacent site users – residential, public open space users [migration of contamination via dust/fibre deposition, vapour or groundwater migration combined with inhalation]

	• future buildings and services [direct contact with contaminated soils or groundwater and chemical attack] • groundwater in secondary A aquifer/ source protection zone within Fittleworth Member bedrock deposits [leaching from soils/ percolation to aquifer/ lateral migration of dissolved phase/ NAPL etc.] • groundwater within underlying Principal aquifer (Hythe Formation) , non-potable abstraction on site, potable abstraction 400m west of site- [leaching from soils/ percolation to aquifer/ lateral migration of dissolved phase/ NAPL etc.] • future site users – residential users [migration and ingress of ground gases (including radon) into buildings, build-up in confined spaces and explosion/ asphyxiation].
INTRUSIVE INVESTIGATION & ASSESSMENT	
SI scope	The SI comprised 14 No. window sample boreholes were drilled to a maximum depth of 5.45 m bgl and five locations were installed with combined gas and groundwater monitoring wells. 23 no. trial pits were excavated in the external areas of site using tracked machine to a maximum depth of 3.10 m bgl. Nine hand excavated trial pits were completed internally within the existing buildings to a maximum depth of 1.05 m bgl.
SI factual findings	The ground investigation encountered a strata sequence comprising Topsoil and/or Made Ground of over the Fittleworth Member. Perched groundwater within the made ground was only encountered within TP11 at 0.50 m bgl. Groundwater water observed within TP9 at the base of the trial pit at 2.8 bgl. No other groundwater strikes were encountered during the intrusive investigation. Two groundwater and three ground gas monitoring visits were undertaken to date and encountered groundwater levels between 3.17 m and 4.45 m bgl. Potential asbestos containing material was encountered across the site at the surface and was also observed within the structures of the farmhouse buildings. Potential asbestos containing material was observed within the made ground at locations TP14, WS2, and TPI6. Visual and olfactory evidence of potential hydrocarbon contamination was also encountered at TP4, WS3, WS4, and WS6,
Refined conceptual site model and geo-environmental assessment	Based on the results of the site investigation and GQRA, the contaminant linkages that have been identified to be potentially complete (relevant contaminant linkages) and to require further action are: • risk to future site users from oral, dermal and inhalation exposure with contaminants in the made ground (PAHs and asbestos) • chemical attack on potable water supply pipes Based on the current understanding of the conceptual site model and the assessment undertaken, the site has been classified as CS1 with respect to methane and carbon dioxide. Considering the foregoing and in accordance with BS8485, ground gas protective measures are not considered necessary within proposed buildings in the eastern half of the site, however consideration with regard to basic radon precautions for the western half need to be allowed for at this stage.

	The investigation undertaken to date has incorporated an appropriate number of ground gas monitoring visits, the data is considered reliable, and spatially representative of the site. It is also noted that 1 round was completed during low and falling atmospheric pressure (<1000 mb) indicating that possible worst-case conditions have been present during monitoring. However, it is recommended that a further 3no monitoring visits are undertaken in order to confirm the Characteristic Situation 1 classification. It is considered likely that residential development of the site would require remedial action to render the development suitable for the proposed residential with gardens end use. Within proposed garden/soft landscaping, it is proposed that where there is made ground (due to asbestos and polyaromatic hydrocarbon compound contamination) the incorporation of a clean cover of 600 mm/450 mm respectively is allowed for. Such a clean cover system comprising verified topsoil and subsoil would not necessitate soil removal off site, for example if it were site levels were raised to accommodate the thickness. Allowance should also be made for site arisings to be incorporated beneath any such cover system. A separate Remediation Strategy will need to be produced (including a discovery strategy for any isolated unknown contamination encountered during demolition/site preparation works), and agreed with the statutory authorities.
Geotechnical assessment	The key findings of the initial geotechnical assessment are as follows: • Low rise housing may be founded upon lightly reinforced conventional strip foundations within the majority of the northern half of the site, whilst over the remainder there is a need to allow for piling at this stage. The possibility of an alternative to piling (i.e lightly reinforced strip foundations upon ground improved soils) is to be assessed further; • The use of ground floor slabs is considered unsuitable due to the presence of soft natural soils, such that it is recommended that floor slabs are suspended; • An ACEC Classification of AC-2 with a Design Sulphate Class of DS-2 can be utilised on the site; and • It is anticipated that a foundation works risk assessment report will be required for the development.
Recommendations including issues for further assessment	The following recommendations are made for further assessment of the site to investigate the risks identified above and to address remaining uncertainties: • Deep boreholes for piled foundation design • Radon class in western half of site to be re-assessed
<i>The information given in this summary is necessarily incomplete and is provided for initial briefing purposes only. The summary must not be used as a substitute for the full text of the report.</i>	

1 INTRODUCTION

1.1 Commissioning

RSK Environment Limited (RSK) was commissioned by Alder King on behalf of Monaghan Mushrooms Limited to carry out a geo-environmental and geotechnical investigation of the land at Storrington Road, Thakeham, RH20 3DY. The project was carried out to an agreed brief as set out in RSK's proposal (Ref. 305276 T02 (00), dated 21st July 2022).

RSK's service constraints are shown in [Appendix A](#).

The works are being undertaken to provide an assessment of the environmental risks and liabilities associated with site ownership or redevelopment. Currently we understand that a residential development is being considered for the site.

1.2 Objectives

The objective of the work is:

- to identify any land contamination and/or geotechnical constraints to the proposed development and to support discharge of relevant planning conditions and relevant building control requirements
- to identify the need for any additional investigation or remediation works to demonstrate that the site is suitable for its proposed use
- to evaluate potential client environment liabilities as part of the due diligence process for acquisition/ disposal
- to inform land asset management.

1.3 Scope of works

The scope of this assessment has been developed in accordance with relevant British Standards and authoritative technical guidance as referenced through the report. The assessment of the contamination status of the site is in line with the technical approach presented in Land Contamination Risk Management (LCRM) (Environment Agency, 2021) – which supersedes CLR11 Model Procedures for Land Contamination – and in general accordance with BS 10175: 2011 + A2 2017 (BSI, 2017). It is also compliant with relevant planning policy and guidance.

The scope of the intrusive investigation has been designed in line with the recommendations of BS5930:2015+A1:2020 Code of practice for ground investigations (BSI, 2020), which maintains compliance with BS EN 1997-1 and 1997-2 and their related standards. It has also been developed in general accordance with BS 10175: 2011 + A2 2017.

A brief summary of relevant legislation and policy relating to land contamination is given in [Appendix B](#).

The scope of works for the assessment has included the following:

Desk Study:

- review of the history of development on the site and surroundings, including a study of archival Ordnance Survey mapping, unexploded ordinance records (UXO) and other sources of historical information as appropriate, e.g. local archives, trade directories and planning records
- assessment of local geology, hydrogeology and hydrology
- the identification of potential geological hazards, including radon
- review of relevant information held by appropriate statutory authorities, e.g. the local Environmental Health Department and the Environment Agency, obtained in the form of an environmental database report (Envirocheck or GroundSure Report) and through direct contact where appropriate
- review of any previous site investigation reports made available
- completion of a site reconnaissance survey to assess the visual condition of the site
- development of an initial conceptual site model (CSM) of contamination on the site identifying possible pollutant linkages
- preliminary consideration of geotechnical constraints and hazards
- an assessment of the environmental risks and liabilities associated with site ownership or redevelopment
- identification of the need for further action, e.g. intrusive investigations, if any.

Intrusive Investigation

- design and implementation of an intrusive investigation, in situ testing, soil sampling, laboratory geo-environmental and geotechnical testing, groundwater and ground gas monitoring of installed boreholes
- interpretation of data to develop a refined conceptual site model (CSM)
- generic quantitative risk assessment (GQRA) of relevant contaminant linkages
- interpretation of ground conditions and geotechnical data to provide preliminary recommendations with respect to foundations and infrastructure design
- preparation of this factual and/or interpretative report.

1.4 Existing reports and information

The following reports detailing previous works at the site were made available for review:

- a 'Pre-Demolition' Asbestos Survey, Asbestos Survey Consultants, ref 13/009/RD, dated 07/04/2014.
- Soakaway Testing, Albury S.I. Ltd, ref 09/8845/C/NAM/Io dated 27/05/2010.

The following information and drawings were provided to RSK by the client for review:

- Borehole Sample Analysis of water abstraction in 2016.

- Water Abstraction Licence for Thakeham Mushrooms Ltd ref 25/097/R01. Issued 04/05/2016 (original issue 03/02/1966)
- Topographic Survey ref 3756, by CCS Land Survey Services, dated 02/04/2012
- Site Layout Plan ref TH-008, by Monaghan Engineering and Construction Services Ltd, dated 12/11/2015
- Site Layout Plan ref TH-000, by Monaghan Engineering and Construction Services Ltd, dated 21/04/2016
- Site Layout Plan ref TH-006 Buildings Retained, by Monaghan Engineering and Construction Services Ltd, dated 25/11/2017
- Site Layout Plan ref TH-006 Buildings and Hard Surfaces Demolished, by Monaghan Engineering and Construction Services Ltd, dated 25/11/2017
- Site Layout Plan ref TH-006 Buildings not included in Asbestos Survey 2014, by Monaghan Engineering and Construction Services Ltd, dated 25/11/2017
- Annotated version of Site Layout Plan ref TH-008 showing water settlement, sump & holding tank locations on site, by Monaghan, dated 14/09/2022

1.5 Limitations

This report is subject to the RSK service constraints given in [Appendix A](#) and limitations that may be described through this document.

2 SITE DETAILS

2.1 Site location

Site location details are presented in **Table 1** and a site location plan is provided on [Figure 1](#).

Table 1 Site location details

Site name	Storrington Road, Thakeham
Full site address and postcode	Storrington Road, Thakeham, RH20 3DY
National Grid reference (centre of site)	TQ 10291 17117

2.2 Site description

The site boundary and current site layout are shown on [Figure 2](#). The site covers an area of circa 30.1 hectares. It is currently occupied by a series of buildings and access roads associated with mushroom production.

2.3 Surrounding land uses

The site is located in Thakeham, within a predominantly residential setting. Immediate surrounding land uses are described in **Table 2**.

Table 2 Surrounding land uses

North	Residential/Agricultural (Thakeham Village)
East	Agricultural (green fields) / sports pitches
South	Residential/Commercial (Abingworth Village)
West	Agricultural/forested land (Greyhound Brewery (380m))

2.4 Development plans

We understand that the site in question is being considered for development for residential use.

At the time of preparing this report, no proposed development plans are available.

No details of the proposed ground levels have been provided therefore for the purpose of this report it has been assumed that the current levels will remain unchanged.

3 DESK-BASED ASSESSMENT

The desktop study was designed generally to meet the objectives of a preliminary (phase 1) investigation, as defined by BS 10175:2011 + A2 2017 (BSI, 2017) and this assessment relates to LCRM Stage 1, Tier 1 preliminary risk assessment. The "vicinity" of the site for the purposes of this report is defined as locations situated within an approximate 250 m radius of the site, although certain sources and/ or sensitive targets further than 250 m may also have been considered.

The study aims principally to identify and assess the potential risks and liabilities associated with contamination of the ground, on and in the vicinity of the site. While this includes consideration of current operations and housekeeping on the site, the report does not constitute a comprehensive environmental audit of the site, as covered under ISO 14001.

3.1 Site history

3.1.1 Historical development record

The development history of the site and surrounding area based upon assessment of historical plans and records is detailed in **Table 3**. The historical maps reviewed are shown within the environmental database report in [Appendix C](#).

Table 3 Summary of historical development

Date from	Date to	Historical Land Use (on-site)	Area of site
1938	2006	Chesswood nursery	Central/eastern boundary
1961	2006	Demolition of several nursery buildings and construction of new agricultural buildings with several tanks and an electricity substation in the southeast corner of site	SE corner
1978	2021	Sewage works including filter beds and tanks	Western field area
1982	2006	Covered and raised reservoir	Northeast
1991		Some further demolition of agricultural/nursey buildings in southeast corner, adjacent to tanks	
2000	Present	Electrical substations 4no.	Central
2006	Present	Old House farm	Central

Date from	Date to	Historical Land Use (off-site)	Distance (m) and orientation
1879	Present	Townhouse farm	100 m NE
1938	2006	Rushfield nursery	100 m S
1938	1978	High Bar nursery	250 m S
1974	2006	Sludge Beds	190 m N
1974	1993	Refuse Tip	210 m N
1982	2021	Pump house (now labelled stream house)	Adjacent to southern site boundary
Relevant information sources: Historical OS maps ☒ Town plans ☒ Information from the Local Planning Authority ☐ Aerial photography ☒ Additional information provided by Envirocheck reports ☒ Previous reports ☐			
<i>Note: Reference to published historical maps provides invaluable information regarding the land use history of the site, but historical evidence may be incomplete for the period pre-dating the first edition and between successive maps.</i>			

Historical maps have identified that the site has been largely used for agricultural purposes for the last 142 years. Tree nurseries have populated the site for the majority of the time, with several phases of construction and demolition. The maps have highlighted a sewage works on site dating 1978 to 2021. The structure of these works still remains on site and can be seen on Google Earth. In addition, 4no. electrical substations are situated in the centre of the site.

Between 2006 and 2021 some structures to the east of the sewage farm appear to have been demolished, and the reservoir in the north of the site is no longer present.

3.1.2 Unexploded ordnance

A review of publicly available unexploded ordnance (UXO) risk maps indicates that the site is located in an area with low potential for wartime bombs to be present (Zetica, 2022).

3.2 Information from environmental database report

Relevant environmental permits and incidents detailed within the environmental database report (see [Appendix C](#)) are summarised below in **Table 4**.

Table 4 Summary of environmental permits, landfills and incidents

Data type	Entries on-site	Entries <250 m from site	Entries >250 m from site of relevance	Details
Agency and hydrological				

Data type	Entries on-site	Entries <250 m from site	Entries >250 m from site of relevance	Details
Environmental permits – incorporating Integrated Pollution Prevention and Control, Integrated Pollution Controls, Local Authority Integrated Pollution Prevention and Control	1	-	-	Monaghan Mushrooms T/A Thakeham Mushrooms Storrington Road, Thakeham, West Sussex, RH20 3DY Horsham District Council, Environmental Health Department. Local Authority Pollution Prevention and Control PG6/30 Production of compost for mushrooms Permit reference: EPR2 Status: Permitted
Enforcement and prohibition notices	-	-	-	-
Pollution incidents to controlled waters, Prosecutions relating to controlled waters, Substantiated pollution incident register, Water Industry Act referrals	2	2	-	<u>Pollution Incidents to controlled waters:</u> Rear of Fir Tree Lane, West Chillington (77m E of site) on 8th March 1994. Pollutant: Organic Wastes Note: River Is Blue/Grey In Colour And Smells Level Risen; Horticultural Ramble Down Lane (123 m W of site) on 22nd January 1996. Pollutant: Organic Wastes Note: Brown Sludge In River <u>Prosecutions relating to controlled waters:</u> Chesswood Nurseries Site, Thakeham, RH20 (on site) on 3rd December 2001. Prosecution: Allowing compost effluent to enter a tributary of the River Chilt. <u>Substantiated pollution incident register:</u> On site, 4th July 2017 - Water Impact: Category 2 - Significant Incident. Pollutant agricultural materials and wastes.

Data type	Entries on-site	Entries <250 m from site	Entries >250 m from site of relevance	Details
Discharge consents	-	3	11	Nearest discharge consent located 159 m south east of site at domestic property for discharge of other matter – surface water
Registered radioactive substances	-	-	-	-
Landfill and waste				
Active landfills	-	-	-	-
Historic / closed landfills	-	1	-	Dukes Hill, Thakeham, located 179 m north east of site. Active between 1988 and 1990 for inert & industrial waste.
Other waste management licences	-	-	-	-
Potentially in-filled land (pit, quarry, pond, marsh, river, stream, dock etc)	-	-	-	-
Hazardous substances/ industrial land uses				
Control of Major Accident Hazards (COMAH) sites	-	-	-	-
Explosives sites, Notification of Installations Handling Hazardous Substances (NIHHS), Planning hazardous substance consents/ enforcements	-	-	-	-
Contaminated land Part 2A register entries and notices	-	-	-	-
Contemporary trade directory entries	4	2	-	On site: The Magic Log Co Ltd, Samson Services, Extra Mile Logistics. Thakeham cooling services Ltd. Coal & Smokeless Fuel Merchants & Distributors (169 m SE) Oven Rescue, 30, Chestnut Drive, Thakeham, Pulborough (243 m SE)

Data type	Entries on-site	Entries <250 m from site	Entries >250 m from site of relevance	Details
Fuel station entries	-	-	-	-
<i>Note: Entries have only been included within the table where they are located within a 250 m radius of the site or, where they fall outside of this radius but are considered to comprise a significant entry.</i>				

3.3 Information from regulatory authorities

3.3.1 Planning records

Planning records held by the Local Authority Planning Department pertaining to the site and relevant to the current assessment are summarised in **Table 5**.

Table 5 Planning information

Year	Details and application reference no.	Part of site
2019	Ref No. DC/19/0350 Alteration of an existing access, associate engineering operations and landscaping	Monaghan Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY
2015	Ref No. DC/15/2417 Erection of pump house and associated covered water storage tank	Monaghan Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY
2014	Ref No. DISC/14/0221 Discharge of conditions 2, 3, 5, 11, 12, 13, 15 and 23 on DC/12/0841	Thakeham Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY
2012	Ref No. DC/12/1028 Change of use of building from Fuel Store Building (DC/10/0860) to Tray and Crate Storage and Filling involving external alterations to the building	Sussex Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY
2012	Ref No. DC/12/0841 Demolition of existing growing rooms and surrounding ancillary buildings, removal of compost production on site. Erection of new growing rooms (farms) required for the cultivation of mushrooms, a replacement office building, staff cafeteria, pack house building, ancillary plant structures and provision of open space and landscaped areas (including re-directed footpaths). Refurbishment and extension of existing production and package buildings including alterations to entrance of the site.	Sussex Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY

Year	Details and application reference no.	Part of site
2011	Ref No. DC/11/1236 Prior notification relating to the installation of solar panels onto the roofs of buildings on the Chesswood site	Sussex Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY
2010	Ref No. DC/10/1316 Erection of new bunkers (1,697 sq metres) with aerated floors which will reduce odours, a replacement Gypsum and material store (2,800 sq metres), pasteurising tunnels (1,840.5 sq metres) and growing rooms (16,698.5 square metres) required for the cultivation of mushrooms, open space and landscaped areas (Including footpaths)	Sussex Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY
2010	Ref No. DC/10/0860 Fuel storage building	Sussex Mushrooms, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY
2004	Ref No. DC/04/0348 Change of use to coach storage and maintenance	Heveco Mushrooms Ltd, Storrington Road, Thakeham, Pulborough, West Sussex, RH20 3DY

3.3.2 Local Authority environmental health department information

The Environmental Health Department of Horsham District Council has been contacted for records of contamination in connection with the site

We are awaiting a response and an addendum letter will be issued once the information is received.

3.3.3 Water Resources Licence to Abstract Water

RSK have been provided with a copy of the Environment Agency "Full Licence to Abstract Water" for Thakeham Mushrooms Ltd, Licence Serial No 25/097/R01 issued 04 May 2016, expiry 31 March 2028. The point of abstraction is Borehole B at National Grid Reference TQ 10179 16931 to the south of the site, by means of abstraction from a borehole not exceeding 67.1 m in depth and 300 mm in diameter with a submersible pump. The purpose of abstraction is for agriculture other than spray irrigation at a rate not exceeding 40 m³ per hour.

The original abstraction licence was issued on 03 February 1966 ref 10/41/314302.

Borehole records provided by the client show that the borehole extended to a depth of 72 m. Made ground was encountered to a depth of 0.8m, underlain by stiff yellow brown clay, to a depth of 2 m bgl. This was underlain by yellow grey sandstones/ hard grey sandy clay with mudstone bands, and hard grey silty sandstone to depths of 48m bgl (possibly comprising the Hythe Formation. This was underlain by grey hard silty clay to the base of the borehole at 72 m bgl.

The borehole records indicate that the well was installed with ca 10 m of plain 225 mm casing, and 55 m of slotted 225 mm casing, with a pumped cement seal installed from 0.4 m bgl to 6 mbgl. This indicates that the response zone of the well is predominantly within the yellow grey sandstones/ hard grey sandy clay with mudstone bands, and hard grey silty sandstone, thought to comprise the Hythe Formation. Resting groundwater level within the borehole was recorded at depths of typically 11 m to 12 m bgl.

3.4 Site geology

3.4.1 Anticipated geological sequence

Published records (British Geological Survey, 2022) for the area and available historical borehole logs indicate the geology of the site to be characterised by the succession recorded in **Table 6**. There are 3 publicly available BGS historical boreholes located on or within 250 m of the site, a selection of which are presented in [Appendix D](#).

Table 6 Site geology

Strata	Description	Estimated thickness	Permeability
Fittleworth Member	Glauconitic sandy clays and clayey sands: orange-brown where weathered; bright green where unweathered.	Ca 2 to 60 m	Permeable
Hythe Formation (possibly outcropping in the north east corner)	Fine to medium grained, sparsely glauconitic sands, sandstones and silts, locally pebbly, with calcareous or siliceous cement in beds or lenses in some areas.	Ca 18 to 100 m	Permeable
Relevant information sources: BGS Geoindex BGS borehole logs Previous SI reports			

As discussed in Section 3.3.3, borehole records for the abstraction well installed at the site were provided by the client and show that the borehole extended to a depth of 72 m. Made ground was encountered to a depth of 0.8 m, underlain by stiff yellow brown clay, to a depth of 2 m bgl. This was underlain by yellow grey sandstones/ hard grey sandy clay with mudstone bands, and hard grey silty sandstone to depths of 48 m bgl (possibly comprising the Hythe Formation). This was underlain by grey hard silty clay to the base of the borehole at 72 m bgl.

With reference to the historical data there have clearly been some/several phases of construction and demolition on the site and therefore the presence of made ground should be expected.

3.4.2 Radon

The environmental database report obtained by RSK prior to December 2022 indicated that the site was not located within an 'Affected Area'. An 'Affected Area' is one with 1% or more homes above the radon Action Level of 200 Bq m⁻³.

However, the UK radon map as produced by UK Health Security Agency and the British Geological Survey was updated in December 2022 and this now indicates that the western half of the site has a risk of ingress of radon into structures and therefore basic protection measures are potentially necessary subject to a site specific re-assessment.

3.5 Mining and quarrying

No evidence has identified any mining and quarrying, past and present, within 500 m of the site.

3.6 Hydrogeology

A summary of the hydrogeological setting of the site, with respect to the anticipated geological sequence set out in Section 3.4 is presented below in **Table 7**.

Table 7 Summary of hydrogeological setting

Condition	Description
Aquifer characteristics	The site is underlain by bedrock aquifers which comprise a Secondary A aquifer relating to the Fittleworth Member and a Principal aquifer within the Hythe Formation. The presence of the cohesive fraction of the Fittleworth Member would be expected to restrict vertical and lateral migration of groundwater (and therefore mobile contamination, if present). However, where more granular material within the Fittleworth Member is present or the Hythe Formation is present, vertical and lateral migration of groundwater (and therefore mobile contamination, if present) would be considered to be a potentially higher risk.
Depth to groundwater and flow	The anticipated depth to the groundwater table is in the order of 1.80 m below ground level estimated from historic borehole log data. Shallow groundwater in the site area is anticipated to flow in a northeast-southwest direction, down the topography and with direction of flow of the River Store. It is also likely that shallow water may be present in any made ground deposits present on-site. The piezometric surface in the deeper aquifer is anticipated to be at approximately 0 AOD (some 50 m bgl), however resting groundwater levels within the abstraction well on site (which is thought to be installed with a response zone within the Hythe Formation) is indicated by records provided by the client to be at ca. 11- 12 m bgl. The regional direction of groundwater flow is expected to be to the southwest in line with local topography.
Rising groundwater levels	BGS groundwater flooding susceptibility: Potential for groundwater flooding of property situated below ground level as well as at the surface.
Groundwater recharge/attenuation	The site has a combined coverage of hardstanding, buildings and unsurfaced ground. Therefore, there be some limit to infiltration into ground and groundwater recharge, except where SUDS are present. Where unsurfaced ground is present direct drainage to ground will be occurring.

Condition	Description
Licensed groundwater abstractions	For details of the existing borehole abstraction on the site please see Section 3.3.3. The nearest off site groundwater abstraction is 434 m west of the site at Smock Alley at West Chiltonington boreholes 1 for a potable water supply. The borehole log from this abstraction (publicly available via the BGS) indicates that the perforated section of this well is installed within the underlying Hythe Formation, which at the borehole location is underlain by a significant thickness (ca 35 m) of the Fittleworth beds.
Source protection zones	The Envirocheck report indicates that the site lies within Zone III and Zone II of a groundwater Source Protection Zone (SPZ) for the potable abstraction 434 m west of the site. Groundwater within the Hythe Formation is likely to be in hydraulic continuity with the potable abstraction.

3.7 Hydrology

Table 8 Summary of hydrology in site area

Condition	Description
Surface watercourses / features	There is a small pond like feature within north-eastern area of the site, and a number of drains present in lower elevation areas of site to the southwest. The nearest identified surface watercourse is the Lancing Brook, located approximately 400 m to the north east of the site.
Surface water abstractions	There are no surface water abstractions identified by the environmental database, within a 1 km radius of the site.
Site drainage	Evidence from Google Earth and aerial photography of the site indicates that a ditch/stream formerly crossed the centre of the site east to west. This feature appears to have been infilled or culverted beneath the site.
Preliminary flood risk assessment	The indicative floodplain map for the area, shows that the site does not lie within a floodplain of a surface water feature. The risk of surface water flooding each year has been assessed by the EA as low risk. A flood risk assessment (FRA) is outside the scope of this report. There is a risk of groundwater flooding on-site. BGS groundwater flooding susceptibility states there is potential for groundwater flooding of property situated below ground level as well as at the surface, due to rising groundwater levels.

3.8 Sensitive land uses

Table 9 provides a summary of any environmentally sensitive areas identified within 250 m of the site based on the environmental database report.

Table 9 Environmentally sensitive areas

Feature	Present within 250 m of site?	Details	Likely pathways from site?
International designations – Ramsar wetland, Special Area of Conservation (SAC), Special Protection Area (SPA)	No	-	n/a
National designations – Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), ancient woodland	No	-	n/a
Local designations – Local Nature Reserve, Site of Importance for Nature Conservation (SINC)	No	-	n/a
Nearest high sensitivity development, e.g., residential	n/a	-	n/a

4 SITE RECONNAISSANCE FINDINGS

A site reconnaissance survey was completed on 18th August 2022 by RSK. The characteristics of the site observed during the walkover and from current Ordnance Survey maps are summarised in **Table 10**. There was no access to most buildings on site, with exception to the offices and western farm building. Access was limited to the far north-western areas of field due to 1 m to 2 m high grasses and overgrown shrubs and weeds.

A site plan is provided in [Figure 2](#) with photographic records included in [Appendix F](#) detailing the main features identified below.

Whilst the walkover summary includes consideration of current operations and housekeeping on the site as potential sources of contamination, it does not constitute a comprehensive environmental audit of the site, as covered under ISO 14001.

Table 10 Site reconnaissance findings

Feature	Description
Physical characteristics	
Access constraints	Far north-eastern fields were inaccessible due to high grasses and overgrown shrubs. There was limited access to buildings.
Site topography	The Site is essentially level, sloping gradually to the south-west. There were steep gradient differences between the eastern edge of the site and the adjacent offsite road and within the eastern soft landscaping area and edge of the former growing house in the east of the site.
Surface cover	Surface cover is approximately 40% hard landscaping and 60% soft landscaping. The hard landscaping includes former mushroom production farm buildings, concrete and asphalt paving and public right of way and other structures. The soft landscaping includes straw and grass fields, grass areas and trees and vegetation. Some areas were inaccessible, and other area of crushed concrete had been deposited on top of soft landscaping areas.
Site drainage	There are many drain covers, drainage channels, drainage gullies, and soakaways located throughout the site on the hardstanding areas. There were not outfalls to surface watercourses observed There was stagnant water within observed open concrete infiltration tank in the west of the site. The site walkover was conducted during heavy rain. Large puddles formed as would be expected but no waterlogging or flooding was observed.
Surface water	Although not observed during the walkover, mapping indicates that a small pond like feature is present within the north-eastern area of the site, and a number of drains present in lower elevation areas of site to the south-west.
Trees and hedges	The Site contains a mixture of mature and young trees which bordered the fields onsite. Tree lines are found to border the far north, north-east and south-west of the site. A small woodland area/tree line also runs north to south across the western area of the site towards the marked sewage

Feature	Description
	works. These trees surround the most northern field of the site entirely. There was a substantial number of shrubs and overgrown vegetation in the north and west of the site.
Invasive species	Based upon the walkover survey, obvious evidence of Japanese Knotweed or other invasive species has not been identified on-site. However, it should be noted that a detailed survey of the possible presence or absence of invasive species is outside of the scope of investigation and consideration should be given to commissioning a specialist survey, as necessary.
Existing buildings on-site	The Site contains 15 derelict former mushroom production farm buildings. The buildings usages include: Office buildings, storage, workshops, former tipping, packing, recycling, dispatch buildings, former peat shed, refrigerators, boiler rooms. The Site contains the remnants of former buildings/structures, demolished down to ground in the centre of the western area of the site There was no evidence observed of gas protection measures in buildings.
Retaining walls and adjacent buildings on or close to site boundary	There are no such structures on or close to the site boundary There is a two-storey residential building on the northern boundary approximately 50m from site boundary.
Basements on-site	No evidence of existing or infilled basements was observed.
Made ground, earthworks and quarrying	Crushed concrete is located in the north-western area of the site.
Potentially unstable slopes on or close to site	None observed.
Buried and overhead services present	There are several manhole covers on-site. Overhead services were noted too. It is to be noted that there is no electricity onsite due to vandalism.
Environmental characteristics	
Underground/above ground storage tanks and pipework	There is a significant number of pipes leading to ground in the southern area of the site. There is also a number of oil, gas and cooling tanks located around the site adjacent to the buildings.
Potentially hazardous materials storage and use	There are connected and disused gas and oil tanks located throughout the site. There are also large piles of concrete blocks, timber and refuse in the centre and western areas of the site.
Asbestos-containing materials	Corrugated concrete and crushed concrete which may contain asbestos was observed on site. A detailed survey of the buildings would be required to confirm the presence or otherwise of asbestos-containing materials.
Waste storage	Recycling bins were observed in farm buildings in the west of the site.

Feature	Description
Fly-tipping	Evidence of possible fly-tipping was noted in the centre of the site, west of the former peat shed and within the crush concrete west of the Public Right of Way (PRoW) in the centre of the site.
Electricity sub-stations/ transformers	There are existing sub-stations located in the east and centre of the site.
Evidence of possible land contamination on-site	Oil leakage was not observed on site but there was evidence of derelict tipped over tanks which could potentially have previously leaked oil. There is also evidence of a sewage works on site. The surrounding areas are overgrown, and access was limited.
Potential off-site sources of ground contamination	Not observed.

Potentially significant land contamination or geotechnical issues arising from the survey are summarised below:

- a number of oil, gas and cooling tanks located around the site adjacent to the buildings
- large piles of concrete blocks, timber and refuse in the centre and western areas of the site
- corrugated concrete and crushed concrete which may contain asbestos was observed on site
- fly-tipping was noted in the centre of the site
- derelict tipped over tanks which could potentially have previously leaked oil
- existing sub-stations located in the east and centre of the site
- evidence of sewage works on site.

5 PRELIMINARY GEOTECHNICAL CONSTRAINTS

5.1 Design class

BS EN 1997-1 defines three different Geotechnical Categories that structures may fall into, which are summarised as follows:

- Category 1: Small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations; with negligible risk
- Category 2: Conventional types of structure and foundation with no exceptional risk or difficult ground or loading conditions
- Category 3: Structures or part of structures, which fall outside limits of Geotechnical Categories 1 and 2. Examples include very large or unusual structures; structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions; structures in highly seismic areas; structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.

Based on the information provided above on the proposed development and in view of the anticipated ground conditions, a Geotechnical Category of Category 1 has been assumed for the purposes of designing the geotechnical investigation. This should be reviewed at all stages of the investigation and revised where necessary.

5.2 Preliminary geotechnical hazards assessment

A summary of commonly occurring geotechnical hazards associated with the anticipated geology outlined in Section 3.4 above is given in **Table 11** together with an assessment of whether the site may be affected by each of the stated hazards.

Table 11 Summary of preliminary geotechnical risks that may affect site

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Sudden lateral changes in ground conditions	☒	☐	Likely to affect ground engineering and foundation design and construction
Shrinkable clay soils	☒	☐	Design to NHBC Standards Chapter 4 or similar

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Highly compressible and low bearing capacity soils, (including peat and soft clay)	☒	☐	Likely to affect ground engineering and foundation design and construction
Silt-rich soils susceptible to rapid loss of strength in wet conditions	☒	☐	Likely to affect ground engineering and foundation design and construction
Running sand at and below water table	☒	☐	Likely to affect ground engineering and foundation design and construction
Karstic dissolution features (including 'swallow holes' in Chalk terrain)	☐	☒	May affect ground engineering and foundation design and construction – refer to Section 4.1.2
Evaporite dissolution features and/or subsidence	☐	☒	May affect ground engineering and foundation design and construction
Ground subject to or at risk from landslides	☐	☒	Likely to require special stabilisation measures
Ground subject to periglacial valley cambering with gulls possibly present	☒	☒	Likely to affect ground engineering and foundation design and construction
Ground subject to or at risk from coastal or river erosion	☐	☒	Likely to require special protection/stabilisation measures
High groundwater table (including waterlogged ground)	☒	☐	May affect temporary and permanent works
Rising groundwater table due to diminishing abstraction in urban area	☐	☒	May affect deep foundations, basements and tunnels
Geological faults, fissures and breaklines	☐	☒	May affect ground engineering and foundation design and construction
Underground mining, including shafts and adits (e.g., coal, mineral)	☐	☒	Likely to require further assessment including potentially special stabilisation measures
Effects of extreme temperature (e.g., cold)	☐	☒	Likely to affect ground engineering and foundation design and construction

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
stores or brick kilns/furnaces)			
Existing sub-structures (e.g., tunnels, foundations, basements, and adjacent sub-structures)	☒	☐	Likely to affect ground engineering and foundation design and construction
Filled and made ground (including embankments, infilled ponds and quarries)	☒	☐	Likely to affect ground engineering and foundation design and construction
Adverse ground chemistry (including expansive slags and weathering of sulphides to sulphates)	☐	☒	May affect ground engineering and foundation design and construction
Site topography	☐	☒	May affect ground engineering and foundation design and construction
Note: Seismicity is not included in the above table as this is not normally a design consideration in the UK.			

The environmental database report and the British Geological Survey, National Geoscience Information Service has stated that although they may be present, there is very low risk of landslides, hazards associated with shrinking/swelling of clay ground and hazards associated with running sands. Made ground is expected on site due to the site's history of redevelopment, and evidence of debris identified on the site walkover survey.

6 INITIAL CONCEPTUAL SITE MODEL

In the UK land contamination is assessed using a risk-based approach taking account of the magnitude (severity of the hazard) and likelihood (probability) of occurrence. A 'receptor' is something that could be adversely affected by contamination (e.g. people, an ecological system, property or a water body). A 'pathway' is a route or means by which a receptor is or could be exposed to or affected by a contaminant. A 'contaminant source' is a hazard but it can only pose a risk to a receptor where a pathway is present. The relationship between sources, pathways and receptors are referred to as a conceptual site model. A risk can only be released where a contaminant source, pathway and receptor are all in place, referred to as a 'pollutant linkage'.

In line with LCRM (Environment Agency, 2021) and BS 10175: 2011 + A2 2017 (BSI, 2017), RSK has used information in the preceding sections to identify hazards (sources of contaminants), receptors that may be impacted and plausible linking pathways. Where all three are present this is termed a potentially complete contaminant linkage and a qualitative risk estimation is made.

6.1 Potential soil, soil vapour and groundwater linkages

6.1.1 Potential sources of contamination

Potential sources of soil and groundwater contamination identified from current activities and the history of the site and surrounding area are presented in **Table 12**. Ground gas sources are addressed in the next section.

Table 12 Potential sources of soil and groundwater contamination

Potential sources	Contaminants of concern
On-site	
Made ground (i.e. fill material)	Unknown fill material but potentially including brick, ash and clinker and containing toxic and phytotoxic metals, inorganics, polycyclic aromatic hydrocarbons (PAHs), asbestos
Former sewage works (1978-2021)	Ammoniacal nitrogen, chloride, coliforms and e-coli (faecal coliforms), toxic and phytotoxic metals, inorganics, polycyclic aromatic hydrocarbons (PAHs), asbestos, petroleum hydrocarbons
Nurseries and mushroom farming	Herbicides, pesticides, fungicides, formaldehyde, Petroleum hydrocarbons (petrol/diesel), fertilisers
Old oil/gas tanks	Petroleum hydrocarbons, chlorinated solvents, toxic and phytotoxic metals
Electrical substations	Polychlorinated Biphenyls (PCBs)
Abandoned vehicles	Petroleum hydrocarbons (petrol/diesel), chlorinated solvents, toxic and phytotoxic metals

Potential sources	Contaminants of concern
Fly tipping refuse	Inert/ commercial/ industrial/ municipal waste. Landfill leachate including ammoniacal nitrogen, chloride
Off-site	
Pump House (adjacent south)	Toxic and phytotoxic metals, inorganics, polycyclic aromatic hydrocarbons (PAHs), asbestos, petroleum hydrocarbons
Nurseries (100 m & 250 m south)	Petroleum hydrocarbons (petrol/diesel), fertilisers and pesticides
Sludge Beds (190 m north)	Ammoniacal nitrogen, chloride, coliforms and e-coli (faecal coliforms), toxic and phytotoxic metals, inorganics, polycyclic aromatic hydrocarbons (PAHs), asbestos, petroleum hydrocarbons
Refuse Tip (210 m north)	Unknown fill material but potentially including brick, ash and clinker and containing toxic and phytotoxic metals, inorganics, polycyclic aromatic hydrocarbons (PAHs), asbestos

There is potential for LNAPL sources to be situated within the ground on-site due to the presence of abandoned vehicles and disused oil and gas storage tanks.

6.1.2 Sensitive receptors and linking exposure/ migration pathways

Sensitive receptors identified at or in the vicinity of the site that could be affected by the potential sources identified above comprise:

- future site users – residential users [oral, dermal and inhalation exposure with impacted soil, soil vapour and dust/fibres, ingestion of home-grown produce, inhalation of vapours from groundwater and / or NAPL if present]
- future adjacent site users – residential, public open space users [migration of contamination via dust/fibre deposition, vapour or groundwater migration combined with inhalation]
- future buildings and services [direct contact with contaminated soils or groundwater and chemical attack]
- future vegetation [direct contact with contaminated soils or groundwater and root uptake leading to phytotoxicity]
- groundwater in Secondary A aquifer within Fittleworth Member bedrock deposits; nearby drains; groundwater within the principal aquifer within the Hythe Formation, non-potable abstraction on site, potable abstraction and SPZ [leaching from soils/ percolation to aquifer/ lateral migration of dissolved phase/ NAPL etc.].

Potential linking pathways are shown in brackets for each item above.

Please note that construction workers and future maintenance workers have not been identified in the conceptual model as receptors because risks are considered to be managed through health and safety procedures according to the CDM Regulations.

Ecological receptors are only considered within the conceptual model in the context of statutory protected sites.

6.2 Potential ground gas linkages

6.2.1 Ground gas generation potential

Potential ground gas sources identified for the site and surrounding are shown in **Table 13**.

Table 13 Potential ground gas sources

Potential sources	Indicative ground gas generation potential (CIEH, 2008)	Additional information
On-site		
Made ground with low degradable organic content (e.g. up to 5% organic material and no easily degradable waste).	Very low	BGS geology viewer has not mapped made ground on-site. However, it is expected likely to be present as a result of historical development at the site.
Sewage sludge	Moderate	The south western area of the site has a former sewage works. There is potential for sewage sludge to be present in the ground.
Fly tipping and refuse	Low	Potential for buried refuse on-site as mound of fly tipping debris and refuse were found at the centre of the site during the walkover.
Radon	Moderate	Updated UK Radon Atlas (December 2022) has identified the western half as potentially requiring basic protection against radon, subject to a site-specific re-assessment
Off-site		
Sludge Beds (190 m north)	Low	-
Refuse Tip (210 m north)	Moderate	The site accepted inert, industrial waste between 1988 and 1990.

Given the anticipated ground conditions set out above, significant potential sources of ground gas generation have been identified associated with the former sewage works and potential presence of sewage sludge and an offsite historical landfill 210 m north of the site, as well as the potential for basic protection from radon in the western half.

6.2.2 Preferential pathways for ground gas migration

Credible preferential pathways potentially connecting the source and receptor through vertical and lateral migration are:

- geology of the Fittleworth member if found to be relatively permeable
- building foundations, piled foundations and vibro-stone columns
- construction joints and cracks within building structure
- utility routes and service penetrations into buildings.

6.2.3 Sensitive receptors and linking pathways

Sensitive receptors identified at or in the vicinity of the site that could be affected by the potential ground gas sources identified above comprise:

- future site users – residential users [migration and ingress of ground gases into buildings, build-up in confined spaces and explosion/ asphyxiation]
- adjacent site users – residential users [migration and ingress of ground gases into buildings, build-up in confined spaces and explosion/ asphyxiation]
- future buildings and services [migration and ingress of ground gases into buildings, build-up in confined spaces and explosion].

The assessment has identified receptors to include building structures and current/ proposed end-users.

Construction workers have not been identified as receptors for the purposes of this assessment. Risks may still be present to construction workers especially where works include the entry into excavations within the ground. Construction workers should undertake appropriate risk assessments and risks should be managed through health and safety procedures and the use of PPE.

6.3 Preliminary risk assessment

The preliminary risk assessment findings and potentially complete contaminant linkages are shown in **Table 14** overleaf. The risk classification based on the combination of hazard consequence and probability using a risk matrix from CIRIA C552 (Rudland et al., 2001), a summary of which is included in Appendix G. This relates to Tier 1 preliminary risk assessment in LCRM (Environment Agency, 2021).

Table 14 Risk estimation for potentially complete contaminant linkages

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Potential risk	Justification
On-site sources						
Former sewage works and potential buried sewage Sludge Made ground (i.e. fill material) Nurseries and mushroom farming	Future Users	Ingestion of contaminated soil and dust	Likely	Medium	Moderate	Ground investigation required.
	Adjacent Site Users	Inhalation of contaminated dust and potential vapours	Low Likelihood	Medium	Moderate / Low	
	Vegetation	Uptake of phytotoxic COPCs	Low Likelihood	Minor	Low	Ground investigation required.
	Water supply pipes	Direct contact and permeation	Low Likelihood	Medium	Moderate / Low	Water supply pipelines are likely to have been laid in a designated trench with “clean” backfill, and therefore there is considered to be a low likelihood that any potential contaminants would be in contact with the water supply pipes. Ground investigation required.
	Groundwater within underlying secondary A aquifer (Fittleworth beds) and nearby drains/shallow surface watercourses	Leaching from soils and subsequent vertical and lateral migration of potential COPCs	Low Likelihood	Medium	Moderate / Low	Potential for soil contaminates to leach into the shallow groundwater within the secondary A aquifer.
	Groundwater within underlying Principal aquifer (Hythe Formation) , non-potable	Leaching from soils and subsequent vertical and lateral migration of potential COPCs	Low Likelihood	Medium	Moderate / Low	Site is expected to be underlain by the Fittleworth Beds which, if found to comprise predominantly cohesive material, may restrict contamination migration to the Principal Aquifer within the Hythe Formation.

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Potential risk	Justification
	abstraction on site, potable abstraction 400m west of site					However, it should be noted that BGS records indicate that the Fittleworth Beds may be absent in northern areas of the site.
	Future Users (residents) / Adjacent site users / Buildings	Migration and accumulation of ground gas	Low Likelihood	Severe	Moderate	Presence of sewage sludge and the condition of the sewage works is unknown. Potential for Ground gas accumulation if buried waste is present.
Fly tipping/refuse, abandoned vehicles/fuel tanks and demolition rubble	Future Users	Ingestion of contaminated soil and dust Inhalation of contaminated dust and potential vapours	Likely	Medium	Moderate	As identified by the site reconnaissance walkover, several piles of refuse and evidence of potential fly-tipping were observed. Potential for further buried waste on-site should not be discounted.
	Adjacent Site Users		Unlikely	Medium	Low	
	Vegetation	Uptake of phytotoxic COPCs	Likely	Minor	Low	Potential for localised contamination to be present based on walkover findings, however severity is likely to be minor so considered risk is to be low.
	Water supply pipes	Direct contact and permeation	Low Likelihood	Medium	Moderate / Low	Water supply pipelines are likely to have been laid in a designated trench with “clean” backfill, and therefore there is considered to be a low likelihood that any potential contaminants would be in contact with the water supply pipes.
	Groundwater within underlying secondary A aquifer	Leaching from soils and subsequent vertical and lateral migration of potential COPCs	Low Likelihood	Medium	Moderate / Low	Potential for soil contaminants to leach into the shallow groundwater within the secondary A aquifer.
	Groundwater within underlying Principal aquifer	Leaching from soils and subsequent vertical and	Low Likelihood	Medium	Moderate / Low	Site is expected to be underlain by the Fittleworth Beds which, if found to comprise predominantly cohesive material may restrict

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Potential risk	Justification
	(Hythe Formation) , non-potable abstraction on site, potable abstraction 400m west of site	lateral migration of potential COPCs				contamination migration to the Principal Aquifer within the Hythe Formation. However, it should be noted that BGS records indicate that the Fittleworth Beds may be absent in northern areas of the site.
	Future Users (residents) / Adjacent site users / Buildings	Migration and accumulation of ground gas	Unlikely	Severe	Low	Unlikely to be a significant source of ground gases.
Electrical Substations	Future Users	Ingestion of contaminated soil and dust	Low Likelihood	Medium	Moderate / Low	There is a low likelihood that PCBs may have migrated into soils.
	Adjacent Site Users	Inhalation of contaminated dust and potential vapours	Unlikely	Medium	Low	Given that PCBs have very low mobility it is unlikely that any contaminates will migrate to adjacent site users.
	Water supply pipes	Direct contact and permeation	Unlikely	Medium	Low	Given that PCBs have very low mobility it is unlikely that any contaminates will migrate to water supply pipes.
	Groundwater within underlying secondary A aquifer	Leaching from soils and subsequent vertical and lateral migration of potential COPCs	Unlikely	Medium	Low	Given that PCBs have very low mobility it is unlikely that any contaminates will migrate to the groundwater.
Electrical Substations	Groundwater within underlying Principal aquifer (Hythe Formation), non-potable abstraction on site, potable abstraction 400m west of site	Leaching from soils and subsequent vertical and lateral migration of potential COPCs	Unlikely	Medium	Low	Site is expected to be underlain by the Fittleworth Beds which, if found to comprise predominantly cohesive material may restrict contamination migration to the Principal Aquifer within the Hythe Formation. However, it should be noted that BGS records indicate that the Fittleworth Beds may be absent in northern areas of the site.

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Potential risk	Justification
Radon (western half)	Site Users	Vertical and lateral migration	Low Likelihood	Medium	Moderate	The radon classification has only been updated in December 2022 and therefore as the western half of the site potentially requires basic protection measures to be put in place, a site-specific re-assessment is recommended
Off-site Sources						
Pump House (adjacent south)	Site Users	Vertical and lateral migration	Unlikely	Medium	Low	There is the low likelihood that contaminates may have migrated onto site.
			Unlikely	Medium	Low	
Nurseries (100 m & 250 m south)	Site Users	Vertical and lateral migration	Unlikely	Medium	Low	Given distance to site and low likelihood of a significant sources, risks are considered to be low.
			Unlikely	Medium	Low	
Sludge Beds (190 m north)	Site Users	Inhalation of vapours associated with groundwater impacted by volatile substances	Unlikely	Medium	Very Low	Given distance to site and low likelihood of a significant sources, risks are considered to be low.
	Site Users/ building	Migration and accumulation of ground gas	Unlikely	Severe	Low	Given distance to site and low likelihood of a significant sources, risks are considered to be low.
Refuse Tip (210 m north)	Site Users	Inhalation of vapours associated with groundwater impacted by volatile substances	Unlikely	Medium	Low	Given distance to site and low likelihood of a significant sources, risks are considered to be low.
	Site Users/ building	Migration and accumulation of ground gas	Low Likelihood	Severe	Moderate	Given the uncertainty regarding the degree of ground gas production at this potential source, risks are considered to be moderate at this stage.

Risk matrix		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very low	Very low

Potentially complete contaminant linkages with a potential risk of moderate or higher identified in **Table 14** comprise:

- future site users – residential users [oral, dermal and inhalation exposure with impacted soil, soil vapour and dust/fibres, ingestion of home-grown produce, inhalation of vapours from groundwater and / or NAPL if present]
- future adjacent site users – residential, public open space users [migration of contamination via dust/fibre deposition, vapour or groundwater migration combined with inhalation]
- future buildings and services [direct contact with contaminated soils or groundwater and chemical attack]
- groundwater in secondary A aquifer within Fittleworth Member [leaching from soils/ percolation to aquifer/ lateral migration of dissolved phase/ NAPL etc.]
- groundwater within underlying Principal aquifer (Hythe Formation), non-potable abstraction on site, potable abstraction 400m west of site- [leaching from soils/ percolation to aquifer/ lateral migration of dissolved phase/ NAPL etc.]
- future site users – residential users [migration and ingress of ground gases into buildings, build-up in confined spaces and explosion/ asphyxiation].

These potentially complete contaminant linkages need to be assessed further through appropriate site investigation to target the identified sources of potential contamination and assess the feasibility of identified pathways.

6.4 Data gaps and uncertainties

Key data gaps and uncertainties identified in the CSM at desk study stage include:

- access not available to certain parts of site due to overgrown vegetation. Particularly surrounding the former sewage works
- identified geological succession across the site
- chemical testing of soil and groundwater
- ground gas monitoring results
- groundwater depth and flow direction are conceptual at this stage
- no development plans or information regarding the site's future use has been provided.

7 SITE INVESTIGATION STRATEGY & METHODOLOGY

7.1 Introduction

At the time of this report, RSK has carried out intrusive investigation works on 22nd – 23rd and 27th September 2022 and return monitoring visits on 4th and 13th October 2022.

Based on further correspondence with the client after the initial intrusive works, an additional intrusive phase of investigation was undertaken on 27th October – 1st November and 9th – 18th November 2022 and return monitoring visits between 23rd November and 7th December 2022.

7.2 Objectives

The specific objectives of the investigation were as follows:

- to establish the ground conditions underlying the site including the extent and thickness of any made ground
- to investigate specific potential sources of contamination identified in initial CSM
- to determine groundwater depth and flow direction
- to assess geotechnical properties of soils
- to address data gaps identified in section 6.4.

7.3 Selection of investigation methods

The techniques adopted for the investigation were chosen with consideration of the objectives and site constraints, which are described below:

- window sample drilling was chosen based on the requirement for manoeuvrability around site, proposed drill depth of 5.00 m bgl or refusal, requirement for in-situ geotechnical data, and installation of monitoring wells
- 8-tonne tracked mechanical excavator to excavate trial pits across the site
- hand excavated trial pits within the existing buildings

Prior to conducting intrusive works, utility service plans were obtained and buried service clearance undertaken in line with RSK's health and safety procedures. Copies of statutory service records obtained by RSK as part of the agreed scope of works are contained in Appendix E.

7.4 Investigation strategy

The ground investigation was carried out using intrusive ground investigation techniques in general accordance with the recommendations of BS5930:2015+A1:2020, which maintains compliance with BS EN 1997-1 and 1997-2 and their related standards. Whilst every attempt was made to record full details of the strata encountered in the boreholes,

techniques of hole formation and sampling will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

The investigation strategy involved targeted boreholes and trial pits with the selected locations based upon the information provided by the client and obtained in the desk study.

The constraints to the investigation were as follows:

- stockpiles of demolition rubble and derelict building structures prevented access to certain areas of the site
- due to delays with utility clearance, TP1 and TP7 were not completed.

Exploratory hole locations were proposed to avoid known service locations and buried service clearance was undertaken in line with RSK's health and safety procedures. The locations were positioned across the site and in targeted areas of suspected potential contamination, to obtain good coverage with the most relevant data.

Details of the September investigation locations, installations and rationale are presented in **Table 15**. 16No. machine excavated trial pits were dug to a maximum depth of 3.00 m bgl before being backfilled with arisings. Window sample boreholes were drilled to a maximum depth of 5.00 m bgl or refusal and each was installed with a gas / groundwater monitoring well.

Details of the November investigation locations, installations and rationale are presented in **Table 16**. 18No. machine excavated trial pits were dug to a maximum depth of 2.50 m bgl before being backfilled with arisings. 10No. hand excavated trial pits were dug to a maximum depth of 1.20 m bgl before being backfilled with arisings. Window sample boreholes were drilled to a maximum depth of 5.00 m bgl or refusal and each was installed with a groundwater monitoring well.

An exploratory hole location plan showing all exploratory hole locations from both investigations is shown on [Figure 2](#).

Table 15 Exploratory hole and monitoring well location rationale – September investigation

Investigation type	Number	Designation	Monitoring well installation	Rationale examples below
Boreholes by window sampling methods	5	WS1 to WS5	Gas/ groundwater	To determine the contamination and geotechnical status of the ground beneath the site and to install groundwater monitoring wells.
Trial-pits excavated by mechanical excavator	16	TP2 to TP6; TP8 to 16	n/a	To accurately log the upper strata in targeted and non-targeted locations beneath the site, principally in areas of suspected potential contamination.

Investigation type	Number	Designation	Monitoring well installation	Rationale examples below
				Collect samples from the shallow made ground soils.

Table 16 Exploratory hole and monitoring well location rationale – November investigation

Investigation type	Number	Designation	Monitoring well installation	Rationale examples below
Boreholes by window sampling methods	13	WS6 – WS15 & BHA1 – BHA3	Gas/ groundwater	To further assess the contamination and geotechnical status of the ground beneath the site and existing buildings and to install monitoring wells.
Trial-pits excavated by mechanical excavator	18	TP17 – TP24 & TPA1 – TPA11	n/a	To further assess the contamination and geotechnical status of the ground beneath the site
Trial pits excavated by hand	10	TPi1 – TPi10	n/a	To determine the contamination status of the ground beneath the existing buildings.

7.4.1 Implementation of investigation works

The exploratory holes were logged by an engineer in general accordance with the recommendations of BS5930:2015+A1:2020 (which incorporates the requirements of BS EN ISO 14688-1, 14688-2 and 14689-1).

The monitoring well construction and associated response zones are detailed on the exploratory hole records in [Appendix H](#).

The soil sampling and analysis strategy was designed to characterise each encountered soil strata, permit an assessment of the potential contaminant linkages identified and investigate the geotechnical characteristics. In addition, samples were taken to allow for geo-environmental and geotechnical testing to be undertaken.

Soils collected for laboratory analysis were placed in a variety of containers appropriate to the anticipated testing suite required. They were dispatched to the laboratory in cool boxes under chain of custody documentation. Samples were stored in accordance with the RSK quality procedures to maintain sample integrity and preservation and to minimise the chance of cross contamination.

Selected samples were placed in polythene bags for headspace screening with a photo-ionisation detector (PID) fitted with a 10.6 eV bulb. The PID screening results are presented on the exploratory hole records.

7.5 Monitoring programme

7.5.1 Ground gas monitoring

In line with the initial CSM, response, zones were installed to target the sources or pathways as detailed in **Table 14**.

Three monitoring rounds have been undertaken to provide data to support refining of the CSM. The number of monitoring rounds undertaken is in general accordance with the decision matrix presented as Figure 6 of BS8576 for a very low source generation potential and low sensitivity development.

A calibrated infrared gas meter was used to measure gas flow, concentrations of carbon dioxide (CO₂), methane (CH₄) and oxygen (O₂) in percentage by volume, while hydrogen sulphide (H₂S) and carbon monoxide (CO) were recorded in parts per million.

Initial and steady state concentrations were recorded. In addition, during the first monitoring round, all wells were screened with a PID to establish if there are any interferences and cross-sensitivity of other hydrocarbons with the infrared gas meter

The atmospheric pressure before and during monitoring, together with the weather conditions, were recorded. The monitoring included periods of falling atmospheric pressures and after/during rainfall.

All ground gas monitoring results together with the temporal conditions are contained within [Appendix I](#). Equipment calibration certificates are available on request.

7.5.2 Groundwater monitoring and sampling

Two rounds of groundwater monitoring were undertaken on a weekly basis on 4th and 13th October 2022 with three combined ground gas and groundwater rounds being undertaken between 23rd November and 7th December 2022.

One round of groundwater sampling was carried out in the September investigation on 13th October 2022 and two additional groundwater samples were collected during the November investigation on 23rd November and 6th December 2022. The monitoring records, including dates, are shown in [Appendix I](#).

Development of the monitoring wells following installation was undertaken comprising the removal of three well volumes using a disposable bailer.

Depths to groundwater were recorded using an electronic interface probe.

Groundwater samples were retrieved using a United States Environment Protection Agency (USEPA) approved low-flow purging and sampling methodology. Details of the low-flow sampling procedure are set out in [Appendix G](#). Water samples were dispatched to the laboratory in cool boxes under chain of custody documentation.

7.6 Laboratory testing

Laboratory testing was undertaken at a UKAS accredited laboratory with ISO17025 and MCERTS accredited test methods were specified where applicable for contamination testing and as shown in the laboratory test certificates appended.

7.6.1 Chemical analysis of soil samples

The soil sampling strategy was designed to characterise made ground and/or natural strata typically within the upper 1.0 m of the ground profile whilst also characterising deeper strata and the potential for contaminant migration from relevant sources identified within the preliminary CSM.

The programme of chemical tests undertaken on soil samples obtained from the intrusive investigation is presented in **Table 17** with the laboratory testing results contained in [Appendix J](#).

Table 17 Summary of chemical testing of soil samples

Stratum	Tests undertaken	No. of tests
Topsoil	Asbestos screening and ID	20
	Speciated PAH-16MS	9
	Standard Metals Suite (Soil) As, Cd, Cr, Cu, Hg, Pb, Ni, Se, Zn., ,	13
	Cr hexavalent	5
	TPH CWG (spec.TPH),	4
	VOCs	4
	TOC	4
	Organochlorine and organophosphorus pesticides, Herbicides	1
	Leachable metals	1
Made ground	Asbestos screening and ID	21
	Speciated PAH-16MS	20
	Standard Metals Suite (Soil) As, Cd, Cr, Cu, Hg, Pb, Ni, Se, Zn., ,	21
	Cr hexavalent	8
	TPH CWG (spec.TPH),	5
	pH	5
	TOC	4
	Cyanide total and cyanide free, Sulphate, Sulphide, Ammoniacal Nitrogen as N, Nitrate, Phosphates, Total coliforms and e-coli (faecal coliforms)	5
	Leachable metals	4
	Bulk asbestos ID	2
	VOCs	4
Fittleworth Member	Asbestos screening and ID	6
	Speciated PAH-16MS.	9

Stratum	Tests undertaken	No. of tests
	Standard Metals Suite (Soil) As, Cd, Cr, , Cu, Hg, Pb, Ni, Se, Zn.	6
	Cr hexavalent	8
	TPHCWG (spec.TPH),	12
	TOC	2
	PCBs	1
	VOCs	2

7.6.2 Geotechnical analysis of soils

Where appropriate disturbed, bulk and undisturbed soil samples were taken for geotechnical classification testing with the depth and nature of samples detailed within the exploratory hole records.

Where appropriate, testing was undertaken in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes or, where superseded, by the relevant part of BS EN ISO 17892:2014 Geotechnical investigation and testing - Laboratory Testing of Soil. Tests carried out in order to classify the concrete class required on-site have been undertaken following the procedures within BRE SD1:2005.

The programme of geotechnical tests undertaken on samples obtained from the intrusive investigation is presented in **Table 18**.

Table 18 Summary of geotechnical testing undertaken

Strata	Tests undertaken	No. of tests
Fittleworth Member	Moisture content %	45
	Liquid/ plastic limits	30
	Sieve analysis	30
	BRE Suite	13

7.6.3 Chemical analysis of groundwater

Groundwater and surface water samples were collected in containers appropriate to the anticipated testing suite required. The containers were filled to capacity and placed in a cool box to minimise volatilisation.

Chemical testing undertaken on water samples obtained during the monitoring programme is presented in **Table 19** with the laboratory testing results contained in [Appendix K](#).

Table 19 Summary of chemical testing of water samples

Sample type	Tests undertaken	No. of tests
Groundwater	Speciated PAH-16MS, TPH CWG (spec.TPH), Formaldehyde (Water)	5

	Ammoniacal Nitrogen as NH ₄ , Standard, free cyanide, Cr VI, Nitrate, OCP suite, Opp suite, Sulphate, Sulphide, total cyanide, triazine herbicides, VOCs	2
	Formaldehydes and Fungicides	2
	Metals suite	3
	Total dissolved solids	1

8 SITE INVESTIGATION FACTUAL FINDINGS

The results of the intrusive investigation and subsequent geo-environmental and geotechnical laboratory analysis undertaken are detailed below.

8.1 Ground conditions encountered

The descriptions of the strata encountered, notes regarding visual or olfactory evidence of contamination, list of samples taken, field observations of soil and groundwater, in-situ testing and details of monitoring well installations are included on the exploratory hole records presented in [Appendix H](#).

The exploratory holes revealed that the site is underlain by a variable thickness of topsoil and made ground over clayey sands (the Fittleworth Member). This appears to confirm the stratigraphical succession described within the preliminary CSM.

Table 20 General succession of strata encountered

Stratum	Exploratory holes encountered	Depth to top of stratum m bgl	Proven thickness (m)
Topsoil	WS1, WS4-WS15, BHA1, TP2, TP3, TP5, TP8, TP9, TP13, TP13, TP16-TP19, TP21, TP24, TPA1-TPA5, TPA7-TPA11	GL	0.10 – 0.45 (0.28 average)
Concrete	BHA2-BHA4, TPA6, TPi1-TPi10	GL	0.10-0.20
Made ground	WS1-WS4, WS6, BHA2-BHA4, TP3, TP4, TP6, TP10-TP12, TP14, TP15, TP20, TP22, TP23, TPA6, TPi1-TPi10	GL – 0.20	0.30 – 1.50 (0.42 average)
Fittleworth Member - Cohesive	WS1, WS3-WS5, WS7-WS11, WS14, WS15, BHA1-BHA3, TP2-TP4, TP6, TP9, TP12-TP14, TP16-TP18, TP20, TP22-TP24, TPA2, TPA4-TPA7, TPA10, TPi1-TPi5, TPi8, TPi9,	0.20 – 1.50	0.80 - >4.95*
Fittleworth Member – Granular	WS1, WS4-WS6, WS8-WS15, BHA1, BHA2, BHA4, TP2-TP8, TP10, TP12-TP15, TP17, TP19, TP21, TPA1, TPA3, TPA7-TPA11, TPi7, TPi10	0.10 – 4.40	>4.05*
Notes * full thickness not proven			

8.1.1 Topsoil

Topsoil was encountered within 33no. exploratory hole locations to depths of between 0.20 m and 0.45 m bgl and generally comprised of dark brown soft slightly gravelly sandy clay with frequent rootlets and organic material. Sand is fine to medium. Gravel is subangular to subrounded fine to medium flint.

8.1.2 Made ground

Made Ground was encountered within 29no. exploratory hole locations to depths of between 0.30 m and 1.5 m bgl and generally comprised of dark to light brown, black, and greyish brown slightly clayey gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse flint with occasional fine fragments of brick, glass, ash, clinker, concrete, asphalt, mortar and plastics and frequent rootlets and rare timber.

Within TP4 between 0.25 m and 0.40 m bgl reworked chalk was recovered as structureless white mottled dark grey and black clayey subangular to subrounded fine to medium chalk gravel with ash, clinker and glass fragments.

8.1.3 Fittleworth Member

The Fittleworth Member was encountered beneath the Topsoil / Made Ground at a depth of between 0.20 m and 1.50 m bgl. The base of the Fittleworth Member was not proven in any of the exploratory locations but was encountered to a maximum depth of 5.45 m bgl. Based on the site descriptions and in-situ tests carried out, this layer can be described as blueish, greyish, yellowish, and orangish brown mottled grey sandy clay or clayey sand. Sand is fine to coarse with occasional organic material. Sandstone gravels were encountered within the Fittleworth Member in WS5, and below 2.30 m bgl in TP13.

The soils of the Fittleworth Member are predominantly cohesive near surface in the central east, southeast and southwest of the site, with predominantly granular soils in the northern half of the site as shown in [Figure 2](#).

A summary of the in-situ and laboratory test results recorded in the stratum are presented in **Table 21**.

Table 21 Summary of in-situ and laboratory test results for Fittleworth Member

Soil parameters		Cohesive / Granular	Value	Reference
Grading (%)	Gravel	-	0.0 – 3.6	Appendix L
	Sand		40.4 – 68.8	
	Silt & clay		30.1 – 70.9	
Moisture content (%)		Cohesive	17.2 - 31	
		Granular	17.8 – 31.5	
Modified moisture content (%)		Cohesive	17 - 32	-
		Granular	20 - 32	
Liquid limit (%)		Cohesive	31 - 61	Appendix L

Soil parameters	Cohesive / Granular	Value	Reference
	Granular	36 - 47	
Plasticity limit (%)	Cohesive	17 - 24	
	Granular	17 - 23	
Plasticity index (%)	Cohesive	13 - 37	
	Granular	15 - 30	
Modified plasticity index (%)	Cohesive	12.74 – 37	-
	Granular	12.87 - 30	
Plasticity term	Cohesive	Low – High	
	Granular	Intermediate	
Volume change potential	Cohesive	Low - Medium	
	Granular	Low - Medium	
Consistency Term	Cohesive	Soft – Very stiff	Appendix H
Density term	Granular	Loose – Very dense	
SPT 'N' values	Cohesive	0 - 73	
	Granular	2 - 72	

8.1.4 Visual/olfactory evidence of soil contamination

Potential asbestos containing material was observed at locations TP14, WS2 and TPi6.

Hydrocarbon and chemical odours and black staining were observed at locations TP4, TP15, WS3, WS4, WS6, TPi1 and TPi7. A summary of the PID readings collected from these locations is presented below in **Table 22**. In addition, low levels of PID readings were identified within WS8, WS10 and WS14.

Table 22 PID readings

Location	Depth	PID reading
TP4	0.10	0.1
	0.30	0.0
	1.70	0.0
	2.20	162.0
TP15	0.65	0.3
WS3	2.50	205.1
	3.50	215.9
	4.50	39.6
	4.80	0.0

WS4	2.70	24.9
	3.50	0.5
	3.80	3.8
WS6	3.10	3.8
	3.80	5.4
WS8	4.80	0.5
WS10	4.70	0.3
WS14	2.40	0.6
WS15	2.40	0.1

8.2 Groundwater and surface water

8.2.1 Groundwater encountered during intrusive works

Perched groundwater within the made ground was only encountered within TP11 at 0.50 m bgl. Groundwater was observed within TP9 at the base of the trial pit at 2.8 bgl. No other groundwater strikes were encountered during the intrusive investigation.

8.2.2 Groundwater encountered during monitoring

Rest groundwater levels recorded during the monitoring programme are summarised in **Table 23** based on the data provided in [Appendix I](#).

Table 23 Summary of groundwater monitoring results

Monitoring well	Date	Response zone stratum	Depth to water (m bgl)	Depth to base of borehole (m bgl)
WS1	04/10/22	1.00 – 4.00	3.70	3.86
WS3		1.00 – 5.00	4.45	4.92
WS4		1.00 – 4.00	3.17	3.87
WS5		1.00 – 3.50	Dry	3.53
WS1	13/10/22	1.00 – 4.00	3.67	3.87
WS3		1.00 – 5.00	3.66	4.93
WS4		1.00 – 4.00	3.22	3.86
WS5		1.00 – 3.50	Dry	3.51
WS1	23/11/22	1.00 – 4.00	1.22	3.9
WS3		1.00 – 5.00	2.05	4.89
WS4		1.00 – 4.00	0.70	3.86
WS5		1.00 – 3.50	1.75	3.55

Monitoring well	Date	Response zone stratum	Depth to water (m bgl)	Depth to base of borehole (m bgl)
WS6		1.00 - 4.00	1.76	4.00
WS8		1.00 – 5.00	2.49	4.50
WS9		1.00 – 5.00	0.70	4.92
WS10		1.00 – 5.00	0.60	4.89
WS11		1.00 – 5.00	1.08	4.79
WS12		1.00 – 3.50	1.70	3.60
WS13		1.00 – 2.00	0.05	2.00
WS14		1.00 – 2.60	0	2.87
WS1	28/11/22	1.00 – 4.00	0.97	3.9
WS3		1.00 – 5.00	1.09	4.96
WS4		1.00 – 4.00	0.67	3.84
WS5		1.00 – 3.50	1.35	4.51
WS6		1.00 - 4.00	1.41	3.96
WS8		1.00 – 5.00	1.76	4.70
WS9		1.00 – 5.00	0.82	4.90
WS10		1.00 – 5.00	0.40	4.97
WS11		1.00 – 5.00	0.90	4.76
WS12		1.00 – 3.50	0.97	3.59
WS13		1.00 – 2.00	0.15	2.00
WS14		1.00 – 2.60	0	2.87
WS1	07/12/22	1.00 – 4.00	1.54	3.85
WS3		1.00 – 5.00	1.94	3.04
WS4		1.00 – 4.00	1.42	3.86
WS5		1.00 – 3.50	2.14	3.55
WS6		1.00 - 4.00	2.25	3.94
WS8		1.00 – 5.00	2.62	4.47
WS9		1.00 – 5.00	1.08	4.87
WS10		1.00 – 5.00	1.54	3.98
WS11		1.00 – 5.00	1.45	3.96
WS12		1.00 – 3.50	2.77	3.61
WS13		1.00 – 2.00	0.26	1.98

Monitoring well	Date	Response zone stratum	Depth to water (m bgl)	Depth to base of borehole (m bgl)
WS14		1.00 – 2.60	0.10	2.85
BHA1		1.00 – 3.00	1.39	2.04

The findings are considered to potentially reflect the groundwater table in the Fittleworth Member.

It should be noted that groundwater levels might fluctuate for a number of reasons including seasonal variations. It is worth noting that the monitoring round carried out on the 23rd November was conducted after a week of intense heavy rainfall. This is reflected in the monitoring results, where higher groundwater levels can be observed. On-going monitoring would be required to establish both the full range of conditions and any trends in groundwater levels.

8.2.3 Visual/olfactory evidence of groundwater contamination

No visual evidence of groundwater contamination however PID readings of 71.4 ppm in WS3 were encountered during monitoring. In addition, PID readings identified 0.3 ppm in WS4 and 0.1 ppm in WS5.

8.3 Chemical laboratory results

The soil testing results are presented in [Appendix J](#).

8.4 Geotechnical laboratory results

The results of the geotechnical testing are discussed in Section 10 and presented in [Appendix L](#).

8.5 Ground gas monitoring

The results of the ground gas monitoring and testing carried out are given in [Appendix I](#) and discussed in section 9.

9 GEO-ENVIRONMENTAL ASSESSMENT

9.1 Refinement of initial CSM

Hydrocarbon odours and black staining have been observed at locations TP4, WS3 and WS4.

The Hythe Formation was not encountered during the site investigation.

The preliminary risk assessment highlighted the possibility of potential contamination associated with the former sewage works in the east of the site. However no visual or olfactory evidence of contamination was encountered in these areas during the intrusive investigation.

Where encountered, made ground was proven to depths of between 0.30 m and 1.5 m bgl and therefore is considered unlikely to represent a significant source of hazardous ground gases.

Potential contamination associated with potential asbestos containing material (ACM) at the surface (and within many of the building structures) was detailed in the preliminary risk assessment and the asbestos survey report undertaken by Asbestos Survey Consultants. Potential ACMs were encountered at several exploratory locations in the east and centre of the site. The laboratory results have confirmed that the suspected materials comprise asbestos cement, containing chrysotile. A quantification was additionally requested following the positive identification of ACM.

9.2 Linkages for assessment

As described in LCRM (Environment Agency, 2021), there are two stages of quantitative risk assessment (QRA), Tier 2 generic (GQRA) and Tier 3 detailed (DQRA). The GQRA comprises the comparison of soil, groundwater, soil gas and / or ground gas results with generic assessment criteria (GAC) that are appropriate to the linkage being assessed. This comparison can be undertaken directly against the laboratory results or following statistical analysis depending upon the sampling procedure that was adopted. This assessment relates to LCRM Stage 1, Tier 2 generic quantitative risk assessment

Following the refinement of the CSM, the potentially complete contaminant linkages that require further assessment and the methodology of assessment are presented in **Table 24**.

Table 24 Linkages for GQRA

Potentially relevant contaminant linkage	Assessment method
Human health and phytotoxic-related linkages	
H1. Oral, dermal and inhalation exposure with impacted soil, soil vapour and dust by future residents	Human health GAC in Appendix M for a proposed residential end use with home-grown produce since the proposed end use is assumed to include residential gardens.

Potentially relevant contaminant linkage	Assessment method
H2. Inhalation exposure of future residents to asbestos fibres	Qualitative assessment based on the asbestos minerals present, their form, concentration, location and the nature of the proposed development.
H3. Organic contaminants permeating potable water supply pipes	Comparison of soil data to GAC in Appendix N for plastic water supply pipes using UKWIR (2010) guidance.
H4. Inhalation exposure of future residents to vapour from groundwater	GrAC in Appendix M for groundwater based on indoor air inhalation exposure to contaminants in the vapour-phase allowing for a consideration of a capillary fringe.
Controlled waters-related linkages	
W1. Leaching of soil contaminants and dissolved phase migration to wider secondary aquifer	Comparison of leachate data to the relevant GAC in Table 1 of Appendix O .
W2. Migration of dissolved phase contaminants to wider secondary aquifer, and nearby drains/shallow surface watercourses. Also groundwater within underlying Principal aquifer (Hythe Formation), non-potable abstraction on site, potable abstraction 400m west of site	Comparison of groundwater data to relevant GAC based on Environmental Quality Standard (EQS) and Drinking Water Standard (DWS) in Table 1 of Appendix O .
Ground gas-related linkages	
G1. Concentrations of methane and carbon dioxide in ground gas entering and accumulating in enclosed spaces or small rooms in new buildings, which could affect future site users. For methane this could create a potentially explosive atmosphere, while death by asphyxiation could result from carbon dioxide.	Borehole hazardous gas flow rates (Qhg) have been calculated using maximum (peak) methane and carbon dioxide concentrations and steady state flow rates in accordance with BS8485. This is subject to interpretation and use of professional judgement to designate the site or zones of the site characteristic situation by comparison to a Gas Screening Value (GSV) as appropriate and in line with the CSM. For applicable low-rise residential developments reference to NHBC guidance has also been considered.
Radon potential within western half of site	Based upon the updated UK radon map, allowance should be made for basic protection precautions in the western half of the site at this stage, however it is recommended that a new site-specific radon report is obtained as this potentially may remove the need.

9.3 Methodology and assessment of human health and phytotoxic-related linkages

9.3.1 H1. Oral, dermal and inhalation exposure with impacted soil by future occupants/site users

A soil organic matter (SOM) of 1% has been selected since laboratory results within the total organic carbon results range from 0.3 % and 2.2%. The soil screening output spreadsheet is presented as [Appendix P](#), and exceedance presented in **Table 25**.

Table 25 Soil exceedances of GAC – future residents

Location/depth (m bgl)	Strata	Determinand	GAC (mg/kg)	Concentration detected (mg/kg)
WS3 @ 0.4-0.5	Made Ground	Benzo(a)anthracene	7	7.22
		Benzo(b)fluoranthene	2.6	8.61
		Benzo(a)pyrene	5	6.92
		Dibenz(a,h)anthracene	0.24	0.97
WS3 @ 2.5- 2.6	Fittleworth Member	Aliphatic >EC8 - EC10	27	283
		Aliphatic >EC10 - EC12	130	356
		Aromatic >EC8 - EC10	30	38
		Aromatic >EC10 - EC12	80	186
		Aromatic >EC12 - EC16	140	235

Given the depth of the sample obtained from WS3 @ 2.5 m – 2.6 m, the exceedances of the petroleum hydrocarbon GAC in this soil sample are unlikely to pose a significant risk to end users of a residential development at the site. However, further assessment of risks associated with the inhalation of vapour associated with the observed petroleum hydrocarbon impact is undertaken in relation to vapour inhalation risks via a groundwater (dissolved phase) source, which is provided in Section 9.3.4.

With regards to testing of e coli & coliforms within the boreholes and trial pits surrounding the sludge beds, low levels total coliforms and faecal coliforms were encountered within TP9 and TP10. However, within WS1 total coliforms from both soil samples collected from this borehole are recorded as 21,077 cfu/g and >112,918 cfu/g respectfully indicating a presence of potential buried sewage sludge. The coliforms concentrations would not be

expected to pose a significant risk to human health assuming all sewage sludge is removed during decommissioning.

9.3.2 H2. Inhalation exposure of future occupants/site users to asbestos fibres

Visually identifiable asbestos containing materials (ACM) were observed within the made ground at exploratory location TP14, WS2 and TPi6, in the form of broken tile fragments. The samples taken of this material identified chrysotile cement bulk asbestos fibres in all three locations. In addition, asbestos chrysotile fibres in the made ground were encountered within made ground at WS2, WS3 and TP10 and amosite asbestos fibres were detected in TPi5. Asbestos quantifications of the chrysotile fibres within WS2, WS3 and TP10 indicated results of <0.001%, 0.002% and 0.001% respectively.

It should be noted that asbestos is in several of the buildings on site and asbestos fragments were noted to be at ground level. It should also be noted that asbestos contamination can be extremely localised, and it may not be possible to delineate asbestos contamination within the made ground.

No asbestos has been detected in any of the 20no samples of topsoil tested for an asbestos screen.

9.3.3 H3. Organic contaminants permeating potable water supply pipes

For initial assessment purposes, the results of the investigation have been compared with the GAC presented in [Appendix N](#) for this linkage, which are reproduced from *UKWIR Report 10/WM/03/21. Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites* (UKWIR, 2010).

The results indicate that a relevant linkage may exist associated with organic contaminants and therefore pollutant polyethylene (PE) and/or polyvinyl chloride (PVC) water supply pipes are expected to be unsuitable within areas where made ground or hydrocarbon impacted ground is present for use on the development unless remedial measures are implemented that mitigate the risk.

It should be noted that at the time of this investigation the future routes of water supply pipes had not been established, hence the investigation and sampling strategy may not be fully compliant with UKWIR recommendations. Consequently, a targeted investigation and specific sampling/analytical strategy may be required at a later date once the route(s) of the supply pipe(s) are known. In addition, it is recommended that the relevant water supply company be contacted at an early stage to confirm its requirements for assessment, which may not necessarily be the same as those recommended by UKWIR.

9.3.4 H5. Inhalation exposure of future residents to vapours from groundwater

Inhalation exposure from VOC within groundwater has initially been assessed through the direct comparison of groundwater data with the RSK GrAC presented in [Appendix M](#).

The GrAC for groundwater are based on indoor inhalation exposure to contaminants in the vapour-phase. Based on the refined conceptual model, a sand soil has been selected and a groundwater depth of 0.65 m.

The analytical results are below the GrAC indicating that the contaminant linkage is incomplete.

9.4 Methodology and assessment of controlled waters-related linkages

9.4.1 W1. Leaching of soil contaminants and dissolved phase migration to wider secondary aquifer (heavy metals)

4no soil samples of made ground and one sample of topsoil were tested for leachable concentrations of heavy metal contaminants. The results were compared against the lowest of freshwater EQS or DWS, with the results presented in [Appendix Q](#). No exceedances were detected, although of the EQS/DWS were detected, and with the exception of boron and zinc, no metals were detected above the laboratory method detection limits (LMDL). It should be noted that the LMDLs exceed the EQS/DWS for cadmium, copper, lead, and nickel.

9.4.2 W2. Migration of dissolved phase contaminants

The analytical results for groundwater samples have been assessed against the lowest of freshwater EQS values and DWS.

The groundwater results found to exceed the GAC presented in [Appendix Q](#) are summarised in **Table 26**.

Table 26 Summary of groundwater GQRA and GAC exceedances

Determinand	EQS (µg/l)	DWS (µg/l)	Exceedances (monitoring well and concentration µg/l)
Fluoranthene	0.0063	-	WS1 (0.07 µg/l), BHA1 (0.03µg/L)
Copper	2000	1	WS3 (14 µg/l), BHA1 (11 µg/L)
Nickel	4	20	WS3 (11 µg/l), BHA (11 µg/L)
Selenium	-	10	WS3 (71 µg/l)
Zinc	10.9	3000	WS3 (99 µg/l), BHA1 (25 µg/L)
Iron	1000	200	Abstraction well (703 µg/l)

Exceedances of EQS were detected for fluoranthene, nickel, zinc in samples from groundwater beneath the site. However, given the marginal nature of the exceedances detected, it is not considered that they pose a significant risk to surface waters in the vicinity of the site.

Exceedances of DWS were detected for copper and selenium, however given the marginal size of the exceedances it is not considered that these pose a significant risk to the Principal Aquifer within the Hythe Formation or the potable abstractions in the vicinity of the site.

Furthermore, the Fittleworth Member has been found to comprise a variable orange-brown mottled grey sandy clay or clayey sand. Based on the thickness of the Fittleworth Member encountered within the investigation, coupled with the relatively high degree of fine-grained material within this stratum, it is considered that risks to the Principal Aquifer within the Hythe Formation (and the potable abstraction located 434 m west of the site) can be considered as low.

The results of the sample obtained from the on-site commercial abstraction has also been screened against the lowest of the EQS/DWS. No exceedances were detected with the exception of iron which exceeds the DWS of 200 µg/L. However, given that iron is not a contaminant of concern within the CSM, this result is not considered to be of significant concern.

9.5 G1: Methodology and assessment of ground gas-related linkages

9.5.1 Appropriate guidance

The risks to development from ground gases have been assessed in accordance with BS8485:2015+A1:2019 (BS8485), which provides guidance on ground gas (methane and carbon dioxide) characterisation and hazard assessment, as well as providing a framework for the prescription of protection measures within new buildings.

The process involves characterising the gas hazard from combining the qualitative assessment of risk (using the CSM) with ground investigation data so that a 'characteristic situation' (CS) can be derived for the site or zones within the site. Characteristic situations range from CS1 to CS6, the higher the CS, the higher the hazard potential. Gas protection measures within new buildings can be prescribed using a point scoring system, taking into consideration the CS and the proposed building type.

BS8485 indicates that the gas hazard can be characterised using the following methods:

- an empirical semi-quantitative approach using gas monitoring data to determine the 'characteristic situation' of the site (or zones of the site) and subsequent protective measures (Wilson and Card approach).
- an empirical semi-quantitative approach using TOC data to determine the 'characteristic situation' of the site (or zones of the site) and subsequent protective measures (CL:AIRE RB17 approach)
- detailed quantitative assessment methodologies

For the purpose of this assessment, the empirical semi-quantitative approach above has been used to characterise the gas hazard and provide advice on the protective measures likely to be required within new buildings at the site.

9.5.2 Summary of the refined CSM for ground gas

In the assessment of risks and selection of appropriate mitigation measures, BS8485 highlights the importance of the conceptual model. In summary, potential sources of ground gas within influencing distance of the site identified in section 6.2 comprise:

- Sewage sludge;

- Fly tipping and refuse;
- Sludge beds (190 m north); and,
- Refuse tip (210 m north)
- Naturally occurring radon (western half of site)

This assessment has been undertaken to assess risks to building structures and proposed end users. The assessment has not taken into consideration the health and safety of construction workers. Risks may still be present to construction workers especially where works include the entry into excavations within the ground. Construction workers should undertake appropriate risk assessments and risks should be managed through health and safety procedures and safe systems of work.

The risk assessment has been undertaken based on the current understanding of the CSM.

9.5.3 Empirical semi-quantitative approach using borehole monitoring data (Wilson and Card approach, BS8485)

9.5.3.1 Background

The empirical semi quantitative approach using gas monitoring data requires the designation of a gas screening value (GSV) for the entire site or zones within the site, which informs the hazard potential and associated prescribed ground gas protection measures within new buildings (where necessary). BS8485 defines the GSV as the *'flow rate (l/hr) of a specific hazardous gas **representative of a site or zone**, derived from assessment of borehole concentration and flow rate measurements and taking account of all other influencing factors, in accordance with a conceptual site model'*.

BS8485 Section 6.3.1 outlines the process for developing a GSV for the site or a zone as follows:

- borehole hazardous gas flow rate (Q_{hg}) is calculated for each borehole standpipe for each monitoring event. The borehole hazardous gas flow rate is defined in BS8485 as the *'flow rate of a specific hazardous gas, either methane or carbon dioxide, from a borehole standpipe'*. The Q_{hg} is calculated from individual borehole measurements of total gas flow and the concentration of the specific hazardous gas. BS8485 states in Section 6.3.4 that the **maximum** gas concentration recorded during the monitoring event should be used, together with **steady-state** values of gas flows
- the reliability of the measured gas flow rates and concentrations are assessed taking into account borehole construction
- decisions are made about how to deal with any temporal or spatial shortages in the data
- judgements are made about what GSV to designate for use for design purposes taking all relevant information and the conceptual site model into account.

Once the Q_{hg} has been calculated for methane and carbon dioxide, individual borehole measurements are compared to the thresholds presented in Table 2 of BS8485 which inform the CS that directly relates to each individual measurement. Taking into account

the site data (i.e. borehole gas concentration and flow rate to calculate the Q_{hg}) and all other influencing factors in accordance with the CSM, a decision can then be made regarding the GSV that is considered to be representative of the site or a zone within it.

Typical threshold concentrations of methane (1% v/v) and carbon dioxide (5% v/v), and flow rates (>70 l/h), are also considered when designating the GSV for the site or zone, which in turn dictates the hazard potential and CS. It is important to note that the site or zone characteristic GSV and maximum concentration or flow thresholds are guideline values and not absolute. The thresholds may be exceeded in certain circumstances, if the CSM indicates it is safe to do so.

9.5.3.2 *Designation of a GSV for the site or zone*

The results of the ground gas monitoring and testing undertaken, alongside site conditions at the time of monitoring, are given in [Appendix I](#).

Consideration has been given to the presence of flooded or partially flooded response zones at the time of monitoring with details of fully or partially flooded response zones detailed in [Appendix I](#).

For the purposes of the current ground gas risk assessment, data from entirely flooded response zones has not been included in the risk assessment.

A summary of the maximum recorded concentrations per borehole (or minimum for oxygen) is presented in **Table 27** overleaf. This table also presents details of the response zone, maximum recorded initial and steady state flow rates and minimum recorded depth to water across all monitoring rounds.

The range of atmospheric pressure over the 3 monitoring rounds completed was 985-1020 mbar and this was recorded to be low and falling at the time of one round.

Table 27 Summary of ground gas monitoring results – all data

Exploratory position ID	Response zone top (mbgl)	Response zone base (mbgl)	Response zone geological unit	No. of monitoring rounds	Peak CH ₄ max. (%/vol)	Steady-state CH ₄ max. (%/vol)	Peak CO ₂ max. (%/vol)	Steady-state CO ₂ max. (%/vol)	Oxygen min. (%/vol)	Peak gas flow max. (l/hr)	Steady-state gas flow max. (l/hr)	Depth to water min. (m)	Depth to water max. (m)	Atm. pressure min. (mb)	Atm pressure max. (mb)
BHA1	1.00	3.00	FM	1	0.3	0.3	3.2	3.2	17.1	0	0	1.39	1.39	1020	1020
WS1	1.00	4.00	FM	3	0.3	0.3	3.1	2.6	11.9	0	0	0.97	1.54	991	1020
WS3	1.00	5.00	FM	3	0.2	0.2	5.8	5.7	1.7	0.2	0.2	1.09	2.05	987	1018
WS4	1.00	4.00	FM	3	0.3	0.3	7.2	7.2	3.4	0	0	0.67	1.42	989	1019
WS5	1.00	3.50	FM	3	0.3	0.2	6.8	6.7	9.8	0	0	1.35	2.14	987	1017
WS6	1.00	4.00	FM	3	0.3	0.2	4.1	4.1	8.7	0	0	1.41	2.25	988	1016
WS8	1.00	5.00	FM	3	0.3	0.3	3	3	16.8	0	0	1.76	2.62	988	1017
WS9	1.00	5.00	FM	3	0.5	0.2	2.8	2.7	18.7	0	0	0.7	1.08	991	1018
WS10	1.00	5.00	FM	3	0.3	0.3	3.5	3.5	8.6	1.8	0.2	0.4	1.54	990	1020
WS11	1.00	5.00	FM	3	0.2	0.2	3	3	17.2	0	0	0.9	1.45	990	1020
WS12	1.00	3.50	FM	3	0.3	0.2	4.3	4.3	14.8	0	0	0.97	2.77	985	1016
WS13	1.00	2.00	FM	3	0.3	0.3	1.4	1.3	10.5	1.9	1.9	0	0.26	985	1015
FM = Fittleworth Member															

9.5.3.3 Summary of borehole hazardous gas flow rates

Borehole hazardous gas flow rates (Q_{hg}) have been calculated for each borehole standpipe, for each monitoring round and are presented, alongside two 'worst case' checks in [Appendix R](#) comprising a probable 'worst case' and potential 'worst case' from the available monitoring data. Within this data, gas concentrations exceeding the thresholds presented in Table 2 of BS8485 are identified, alongside the CS that could be associated with each individual borehole monitoring event.

Gas concentration for CO₂ exceeded the 5% in monitoring rounds 2 and 3 in WS3, recording peak concentrations at 5.6%v/v and 5.8%v/v and steady state CO₂ concentrations at 5.5% v/v and 5.7 % v/v. CO₂ concentrations exceeded the 5% threshold in monitoring round 1 in WS4, with a peak and steady-state CO₂ concentration recording of 7.2% v/v, and in monitoring round 3 in WS5 with a peak CO₂ recording of 6.8%v/v and a steady-state recording 6.7% v/v. Despite the CO₂ exceedances, the GSV values indicates a very low hazard potential.

It should also be noted that visual/olfactory evidence of petroleum hydrocarbon impact was observed in WS3 and WS4, with WS5 located in proximity to these areas. It is possible that the source of the detected levels of CO₂ is the degradation of petroleum hydrocarbons within groundwater in the wells. The degradation process and volume of hydrocarbon is generally small and will result in small volumes of methane and carbon dioxide giving high gas concentrations in the well head space. This provides an additional line of evidence that the CO₂ concentrations detected are not of significant concern.

9.5.3.4 Worst case check

In accordance with BS8485, a 'worst case' Q_{hg} has been calculated per borehole by multiplying the maximum recorded flow from any monitoring round for that borehole by the maximum recorded methane or carbon dioxide concentration in that borehole. A further worst-case Q_{hg} check across all data collected is presented in [Appendix R](#) for the entire site (or zone), which has been calculated by multiplying the maximum recorded flow by the maximum recorded methane or carbon dioxide concentration.

9.5.3.5 Designation of site gas screening value (GSV)

Considering the calculated Q_{hg} , the CSM, monitoring conditions and response zone construction, **Table 28** presents the GSVs designated for the site.

Table 28 Summary of ground gas monitoring results

Hazardous gas	GSV (l/h)	Justification for the GSV
Methane	0.0006	Based on maximum methane concentration recorded in WS9 on 28/11/22 (0.3%v/v) and maximum flow rate of 0.2 l/hr
Carbon dioxide	0.0144	Based on maximum carbon dioxide concentration recorded in WS4 on 07/12/22 (7.2%v/v) and maximum flow rate of 0.2 l/hr

Based on the Q_{hg} , the maximum concentrations and flows recorded, the CSM and the method for determining the CS presented within Table 2 of BS8485, the site has been characterised as CS1 with respect to methane and carbon dioxide concentrations.

9.5.3.6 Data Limitations

It should be noted that there are inherent limitations in ground gas monitoring including spatial adequacy of monitoring locations, changes in groundwater levels, variation in temporal or atmospheric conditions and whether these have been adequately characterised by the scope of monitoring undertaken.

The investigation undertaken to date has incorporated an appropriate number of ground gas monitoring visits, the data is considered reliable, and spatially representative of the site. It is also noted that 1 round was completed during low and falling atmospheric pressure (<1000 mb) indicating that possible worst-case conditions have been present during monitoring. However, it is recommended that a further 3no monitoring visits are undertaken in order to confirm the Characteristic Situation 1 classification.

9.5.4 BS8485 recommended ground gas protection measures

Based on the current understanding of the conceptual site model and the assessment undertaken, the eastern half of the site has been classified as CS1, subject to confirmation by the additional recommended monitoring. Considering the foregoing and in accordance with BS8485, ground gas protective measures are not considered necessary within proposed buildings in this area. For the western half of the site, allowance should be made at this stage for basic protection precautions, however this may be reduced once a site-specific radon re-assessment has been undertaken.

9.5.5 Implications of ground improvement on foundation design

As detailed in section 11, foundation types potentially incorporating ground improvement may be considered for the development. Where such works may create preferential pathways for ground gas migration to the surface, this needs to be considered through the design process, such as through a foundation works risk assessment.

Should foundation solutions or building design change within the design process, then this gas risk assessment and mitigation should be reviewed and where applicable updated.

9.6 Uncertainties and implications in refined CSM and GQRA

In accordance with good practice, data gaps and uncertainties in the refined CSM have been identified at this stage. These are summarised in **Table 29** along with the likely implications.

Table 29 Data gaps and uncertainties

Data gap/ uncertainty	Details	Implications
Deep borehole for piled foundation design	Deep boreholes are required in the southeast, west and far north of the site.	To provide further information for vibro or piled foundation design.

Data gap/ uncertainty	Details	Implications
Radon class in western half of site	Due to an update of the radon map in December 2022, further assessment is required	Allowance should be made at this stage for basic protection precautions in the western half, potentially being removed subject to a site-specific re-assessment

10 GEOTECHNICAL ASSESSMENT

10.1 Proposed development

We understand that the site in question is being considered for development for residential use. At the time of preparing this report, no proposed development plans are available.

At this stage no specific information relating to building loads has been provided and therefore a wall loading of 100 kN/m has been considered. It has been assumed the ground-bearing floor slabs will not be required and that beam and block flooring will be utilised.

10.2 Key geotechnical hazards / development constraints

The key risks identified from the available ground investigation data are discussed below:

- ***Shrinkable clay soils.***

The investigation encountered cohesive Fittleworth Member, with low to medium volume change potential.

- ***Silt-rich soils susceptible to rapid loss of strength in wet conditions.***

The cohesive portion of the Fittleworth Member with silt content generally variable.

- ***Sudden lateral changes in ground conditions***

The investigation encountered varying depths of made ground.

- ***Filled and made ground***

The investigation encountered a significant thickness of made ground across the site between 0.30 m to 0.90 m bgl.

10.3 Foundations

10.3.1 Foundation options

Based upon the ground conditions encountered upon the site, the foundation solution is complex.

In summary the northern half of the site is generally more granular and competent within the top 2-3 m than the southern half and therefore conventional lightly reinforced strip foundations placed beneath any made ground upon the natural sands and firm clays at a minimum depth of 0.90 m below the lower of final or existing ground level, are recommended. Such foundations may be designed upon an allowable net bearing pressure of 85 kN/m². In the vicinity of past, present or future trees/shrubs, foundations should be deepened in accordance with NHBC Chapter 4.2 based upon medium shrinkable soils.

In the southern half and also in 2 small areas to the west and extreme north (see [Figure 3](#)), it is considered the presence of soft clays to variable depths ranging from 1.50 m to >4.20 m, precludes the use of conventional strip foundations. It is therefore recommended that recourse to a piled solution is allowed for at this stage.

A potential alternative may be to use ground improvement techniques to allow for the adoption of lightly re-inforced strip foundations, however this option needs to be agreed with bodies such as NHBC (National House Building Council) or similar – and the suitability of the method agreed with a specialist contractor.

10.3.2 Strip/Spread foundations

The recommendations for the design and construction of spread foundations in relation to the ground conditions are set out in **Table 30**.

Table 30 Design and construction of spread foundations

Design/construction considerations	Design/construction recommendations
Founding stratum	Fittleworth Member (sand)
Depth	Foundations should be taken to a minimum depth of 0.90 m below the lower of final or existing ground level or to any greater depth required in respect of the special design considerations given below.
Special design considerations	
Shrinkable soils	Owing to the presence of shrinkable clay soils, foundations should be designed taking into account all the normal precautions, including minimum founding depths, to minimise the risk of future foundation movements in accordance with NHBC standards or similar. The findings of the ground investigation indicate that foundations should be designed for shrinkable soils of medium volume change potential.
Variable founding soils	Owing to the significant lateral and vertical variability of the founding strata, consideration should be given to incorporating appropriate reinforcement into the strip foundations to minimise the risk of future differential foundation movements.
Presumed bearing capacity	Strip foundations with a width of up to 1.25 m and constructed on the Fittleworth Member at a minimum depth of 0.90 m may be designed using a presumed bearing capacity of 85 kN/m ² . The presumed bearing capacity includes a partial factor on bearing resistance of 3 (fine soils) against bearing capacity failure. Total settlements associated with the presumed bearing pressure are anticipated to be less than 25 mm.
Construction considerations	All foundation excavations should be inspected, and any made ground and soft, organic or otherwise unsuitable materials removed and replaced with mass concrete. The proposed founding stratum is a relatively silt-rich soil, hence susceptible to rapid softening once exposed. Hence all foundation excavations should immediately be blinded with concrete, or the full foundation constructed.

10.3.3 Piled foundations

Recommendations for the construction of pile foundations in relation to the ground conditions are set out in **Table 31**. It is recommended that deep boreholes are undertaken to determine the strength profile of the soils at depth.

Table 31 Design and construction of piled foundations

Design/construction considerations	Design/construction recommendations
Pile type	The construction of both bored and driven piles is considered technically feasible at this site.
Possible constraints on choice of pile type	Given the close proximity of the site to a residential area it is considered possible that the vibration/noise associated with pile driving may not be acceptable. Given the contaminated nature of the made ground at the site it may not be cost effective to adopt bored piles at the site as disposal of arisings will be costly.
Temporary casing	Given the presence of groundwater, encountered during subsequent monitoring, over the full depth of the investigation bored piles will require temporary casing throughout their depth. Alternatively, the use of continuous-flight-auger (CFA) injected bored piles or driven piles usually overcomes this issue.
Soft superficial deposits	For the purpose of assessing preliminary pile capacities the made ground and soft clays have been presumed not to contribute to the load-carrying capacity for the piles. For following calculations, a negative skin friction of 10 kN/m ² should be considered within the soft clay stratum.
Man-made obstructions	Buried obstructions were not encountered during the ground investigation. However, if buried obstructions are encountered at construction stage, it will be necessary to either relocate the pile(s) or make allowance for removing the obstruction.
Hard strata	Thin 'rock' bands were not encountered during the investigation; however an allowance should be made for chiselling thin 'rock' bands (sandstone) at depth within the Fittleworth Member.
Special precautions relating to bored pile shafts and bases	Bored pile concrete should be cast as soon after completion of boring as possible and in any event the same day as boring. Prior to casting the base of the pile bore should be clean, otherwise a reduced safe working load will be required. Similarly, if the pile bore is left open the shaft walls may relax/soften, leading to a reduced safe working load.

It is recommended that the detailed advice of a specialist piling contractor be sought as to the most suitable type of pile for the prevailing ground conditions and as to their lengths and diameters to support the required design loads.

10.3.4 Foundation works risk assessment

It is anticipated that a foundation works risk assessment report will be required for the development because:

- the type of deep foundation proposed has the potential to create preferential pathways for migration of ground gas to surface or groundwater to depth
- the type of foundation proposed may create preferential pathways for migration of this to deeper aquifers

10.3.5 Floor slabs

Due to the variable thickness of made ground and presence of soft clays, ground-bearing floor slabs would not be appropriate and suspended floor slabs should be used.

10.4 Excavations for foundations and services

Generally, the trial pits remained stable during excavation which indicates that excavations may potentially remain stable in the short term (1-2 hours). However, there is a strong likelihood that where excavations are to remain open for longer periods, there will be collapse/instability and therefore consideration should be given to the use of trench support systems, particularly in the southern half.

Man entry into any excavations should not be undertaken without provision of suitable shoring and support and dewatering or suitable regrading and battering of side slopes to safe angles. Confined spaces protocols for the Health and Safety of personnel should always be used where man entry into excavations is to be undertaken as low oxygen conditions may be present.

10.5 Chemical attack on buried concrete

This assessment of the potential for chemical attack on buried concrete at the site is based on BRE Special Digest 1: Concrete in aggressive ground, which represents the most up-to-date guidance on this topic currently available in the UK.

The desk study and site reconnaissance indicate that, for the purposes of assessing the aggressive chemical environment of the site, the site should be considered as comprising brownfield ground likely to contain pyrite.

Based on testing results, **Table 32** gives the characteristic pH, water-soluble and total sulphate content values for soils from each of the geological units and groundwater encountered on-site. Groundwater is not considered within this assessment.

Table 32 Characteristic pH, water soluble sulphate and total sulphate values

Stratum	pH	Water Soluble Sulphate (mg/l)	Total Potential Sulphate (%)
Fittleworth Member	7.8 – 8.6	<10 - 170	<0.03 – 0.30

Based on the results above and following the steps outlined in the BRE guidance, the Design Sulphate Classes and Aggressive Chemical Environment for Concrete classifications are summarised in **Table 33**, on the basis of water-soluble sulphate and total potential sulphate, respectively.

Table 33 Concrete design class

Stratum	Ground water	Water Soluble Sulphate		Total Potential Sulphate	
		DS Class	AC Class	DS Class	AC Class
Fittleworth Member	Mobile	DS-2	AC-2	DS-2	AC-2

Based on the above it is recommended that ACEC Classification of AC-2 with a Design Sulphate Class of DS-2 is used.

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 Geo-environmental assessment

Based on the results of the site investigation and GQRA, the contaminant linkages that have been identified to be potentially complete (relevant contaminant linkages) and to require further action are:

- risk to future site users from oral, dermal and inhalation exposure with contaminants in the made ground (PAHs and asbestos)
- future service pipe - [direct contact with contaminated soils or groundwater and chemical attack]

The investigation has identified areas of made ground at the site (which appear to be located in south-eastern and central areas of the site which have been subject to historical phases of redevelopment) are present, which include asbestos and, locally PAH – impacted soils. However, it should also be noted that asbestos contamination can be extremely localised, and it may not be possible to delineate asbestos contamination within the made ground.

However, no asbestos has been detected in any of the 20no samples of topsoil tested for an asbestos screen, nor have any contaminants been detected in excess of generic assessment criteria within the topsoil samples tested. Therefore, on the basis of these results it is considered that the topsoil material present at the site is suitable for re-use within a residential with private gardens end use scenario.. The distribution of made ground and topsoil, as encountered during the site investigation, is shown in Figure 3.

Visual and olfactory evidence of petroleum hydrocarbon contamination has been encountered within TP4, WS3, WS4 and WS6. located in the southeast of the site. Historical mapping indicates the presence of historical tanks in this vicinity. Petroleum hydrocarbon concentrations above the GACs were identified in visually identifiable hydrocarbon impacted natural soils at WS3 from 2.50 m to 2.60 m bgl. Exceedances were detected for aliphatic fraction >EC8-EC10, >EC10- EC12; and aromatic fractions >EC8-EC10, >EC10-EC12, and >EC12-16. Given the depth of this sample (assuming basements are not proposed in this vicinity or site levels are otherwise not significantly reduced in this vicinity), these exceedances are considered unlikely to pose a significant risk to human health.

Low levels of total coliforms and faecal coliforms were encountered within TP9 and TP10. However, within WS1 total coliforms from both soil samples collected from this borehole are recorded as 21,077 cfu/g and >112,918 cfu/g respectfully indicating a presence of potential buried sewage sludge. However, given that coliforms would be expected to degrade significantly over time, the coliforms concentrations would not be expected to pose a significant risk to human health assuming all sewage sludge is removed during decommissioning.

A contaminant linkage to end users of a residential development is not considered to exist via vapour inhalation pathways.

A contaminant linkage to controlled waters is not considered to exist.

A relevant contaminant may exist associated with organic contaminants and therefore pollutant polyethylene (PE) and/or polyvinyl chloride (PVC) water supply pipes are expected to be unsuitable within areas where made ground or hydrocarbon impacted ground is present for use on the development unless remedial measures are implemented that mitigate the risk.

Based on the current understanding of the conceptual site model and the assessment undertaken, the site has been classified as CS1 with respect to methane and carbon dioxide. Considering the foregoing and in accordance with BS8485, ground gas protective measures are not considered necessary within proposed buildings in the eastern half of the site, however consideration with regard to basic radon precautions for the western half need to be allowed for at this stage.

The investigation undertaken to date has incorporated an appropriate number of ground gas monitoring visits, the data is considered reliable, and spatially representative of the site. It is also noted that 1 round was completed during low and falling atmospheric pressure (<1000 mb) indicating that possible worst-case conditions have been present during monitoring. However, it is recommended that a further 3no monitoring visits are undertaken in order to confirm the Characteristic Situation 1 classification.

It is considered likely that residential development of the site would require remedial action to render the development suitable for the proposed residential with gardens end use. Within proposed garden/soft landscaping, it is proposed that where there is made ground (due to asbestos and polyaromatic hydrocarbon compound contamination) the incorporation of a clean cover of 600 mm/450 mm respectively is allowed for. Such a clean cover system would not necessitate soil removal off site, for example if it were site levels were raised to accommodate the thickness. Allowance should also be made for site arisings to be incorporated beneath any such cover system.

A separate Remediation Strategy will need to be produced (including a discovery strategy for any isolated unknown contamination encountered during demolition/site preparation works) and agreed with the statutory authorities.

Disposal of excess soils for off site disposal will need further assessment for waste acceptance classification.

11.2 Geotechnical

The key findings of the initial geotechnical assessment are as follows:

- Low rise housing may be founded upon lightly reinforced conventional strip foundations within the majority of the northern half of the site, whilst over the remainder there is a need to allow for piling at this stage. The possibility of an alternative to piling (i.e lightly reinforced strip foundations upon ground improved soils) is to be assessed further;
- The use of ground floor slabs is considered unsuitable due to the presence of soft natural soils, such that it is recommended that floor slabs are suspended;

- An ACEC Classification of AC-2 with a Design Sulphate Class of DS 2 can be utilised on the site; and
- It is anticipated that a foundation works risk assessment report will be required for the development.

11.3 Recommendations

The following recommendations are made for further assessment of the site to investigate the risks identified above and to address remaining uncertainties:

- deep boreholes for piled foundation design.
- a further 3no ground gas monitoring visits are recommended to confirm the Characteristic Situation 1 classification
- radon requirements within the western half of the site.

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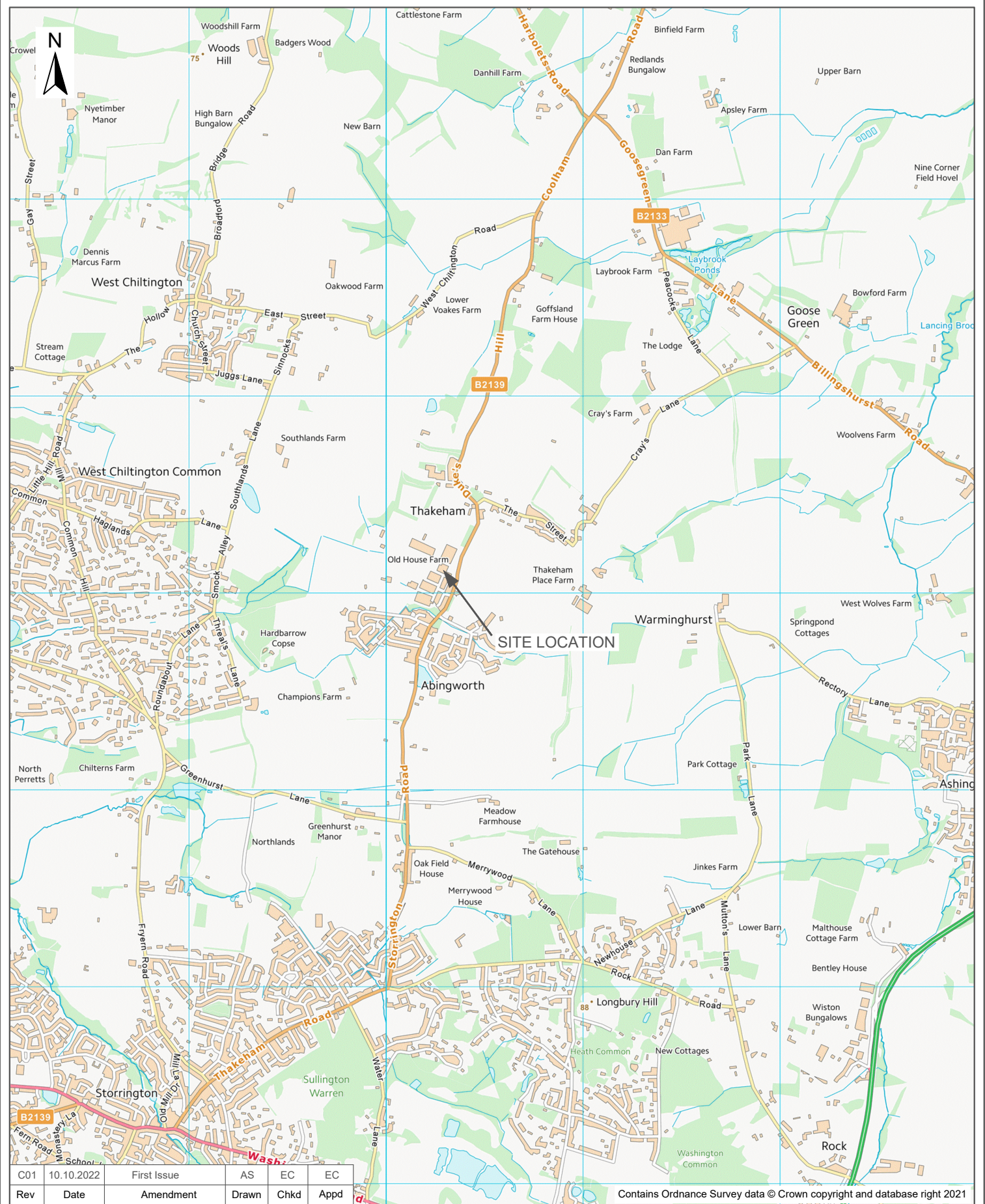
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FIGURES



FIGURE 1 SITE LOCATION PLAN



C01	10.10.2022	First Issue	AS	EC	EC
Rev	Date	Amendment	Drawn	Chkd	Appd

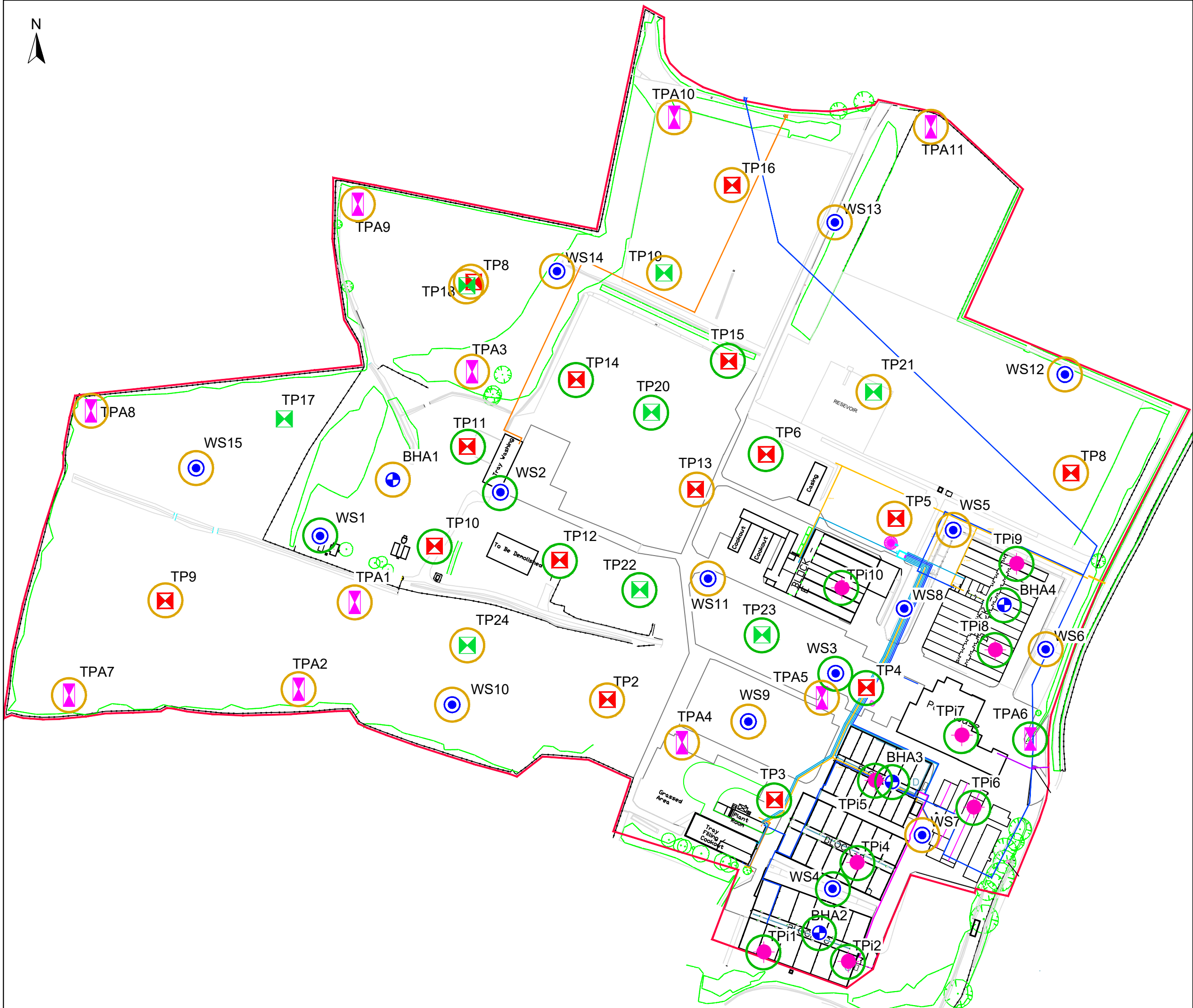
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Client Monagham Mushrooms Ltd	
Project Name Storrington Road, Thakeham	
Description Site Location Plan	
Dimension m	Size A4
Scale 1:25,000	Geolocation 510291,117117
Project ID 305276	Drawing no. 11101
Rev C01	File name 305276-ST-111-SS-D-C-11101-C01

FIGURE 2 EXPLORATORY HOLE LOCATION PLAN



LEGEND

- Site boundary
- Trial Pit Location
- Window Sample Location
- Internal Boreholes with groundwater install
- External trial pit locations
- Supplements trial pits
- Internal trial Pitting
- Topsoil encountered at exploratory location
- Made ground encountered at exploratory location

C01	15.12.22	First Issue	AS	EC	EC
Rev	Date	Amendment	Drawn	Chkd	Appd

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Client

Monagham Mushrooms Ltd

Project Name

Storrington Road, Thakeham

Description

Exploratory Hole Location Plan

Project ID	Drawing no.	Revision
305276	22202	C01

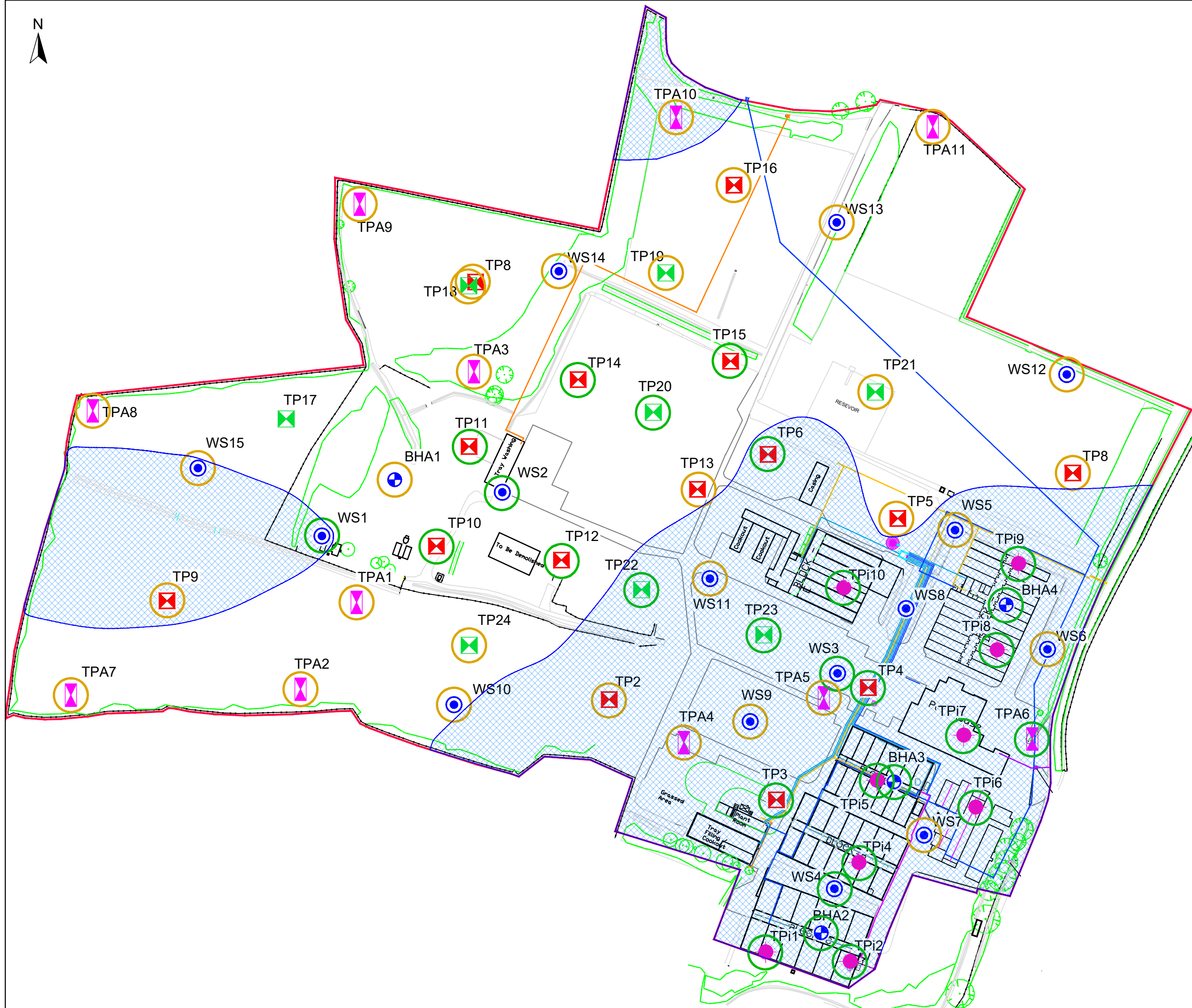
File name

305276-ST-222-SS-D-C-22202-C01

Dimensions	Scale	Size
m	1:2500	A3



FIGURE 3 FOUNDATION ZONING PLAN



LEGEND

- Site boundary
- Trial Pit Location
- Window Sample Location
- Internal Boreholes with groundwater install
- External trial pit locations
- Supplements trial pits
- Internal trial Pitting
- Topsoil encountered at exploratory location
- Made ground encountered at exploratory location
- Piled foundations area

C01	19.12.22	First Issue	BS	EC	EC
Rev	Date	Amendment	Drawn	Chkd	Appd

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Client

Monagham Mushrooms Ltd

Project Name

Storrington Road, Thakeham

Description

Piled Foundation Zone Plan

Project ID	Drawing no.	Revision
305276	24001	C01

File name

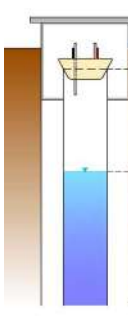
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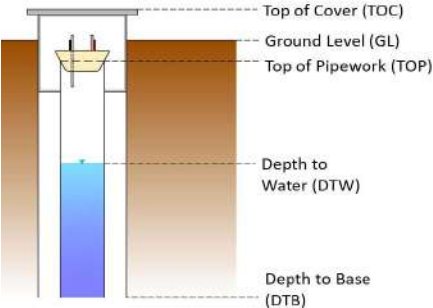
FIGURE 4 SPT V DEPTH PLOT

Appendix D

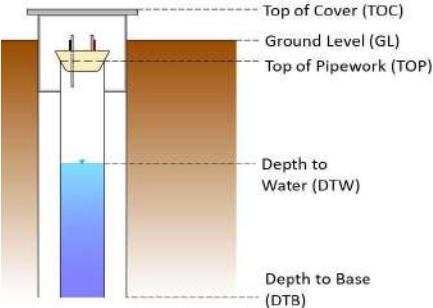
GAS MONITORING FIELD SHEET

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Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000				
First monitoring visit due to previous visits being waterlogged.			Weather:		Overcast		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:		Yes				
			Wind: NONE / LIGHT / MEDIUM / STRONG					Light					
			Tidal State: (if applicable) High / Low / Rising / Falling					NA					
			Exploratory Position ID:		BHA1	Monitoring Round Number:		1		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single	Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm/ 40mm / 50mm / Other (mm)			50			
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double						
Time Start (hh:mm)	09:50	09:58	1020	-0.02	Observations (e.g. on-site activities):								
Time End (hh:mm)	09:53	10:00											
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane (%/vol)	Carbon Dioxide (%/vol)	Oxygen (%/vol)	Carbon monoxide (ppm)	Hydrogen sulphide (ppm)	LEL (%)	PID (ppm)				
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)											
0	0	0	0.3	0.1	21.3	1	0		0				
5	0	15	0.3	3.2	19.3	1	0						
10	0	30	0.3	3.2	17.7	1	0		0.4				
15	0	60	0.3	3.2	17.1	1	0		0.4				
20	0	90											
25	0	120											
30	0	180											
40		240											
50		300											
60		360											
90		420											
120		480											
150		540											
180		600											
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.										
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION			Depth (from datum) to water (DTW): (m)		1.39	Time:		10:00:00		LNAPL Top (from datum) (m):			
			Depth (from datum) to well base (DTB): (m)		2.04	Purge Start:				DNAPL Top (from datum) (m):			
			Hole Purged: Yes / No		No	Purge End:				Water Observations:			
			Purge Volume: (litres)			Post-Purge (DTW) (m)							
				Post testing remarks: First monitoring visit due to previous visits being waterlogged.		Samples Taken: Yes / No		No					
						Sample Media: Gas/Water		N/A					
						Gas Cannister Start (mb)							
						Gas Cannister End (mb)							
				Gas Cannister Duration (mins)									
				Depth (from datum)	Sample Ref	Type (EW / G)	Container						
				Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
				Project Manager / Engineer:		James Lilley		Checked:					
				Contract Ref:		305276		Page number:					
TPF210 Issue 6													

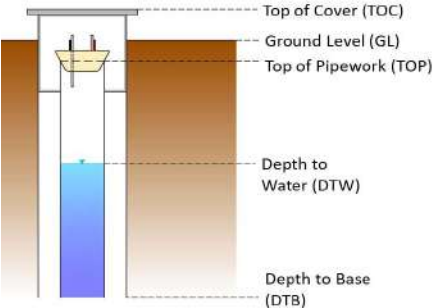
GAS MONITORING FIELD SHEET

Monitoring Date:	23/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0						
Pre-Testing Remarks:		Air Temperature: °C		11		Device:		GA5000			
		Weather:		Partly cloudy		Serial Number:		G505800			
		Ground Conditions:		Dry		Daily Check:					
		Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
		Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS1		Monitoring Round Number:		1		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double				
Time Start (hh:mm)	14:58	15:00	991	0	Observations (e.g. on-site activities):						
Time End (hh:mm)	14:58	15:02									
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID		
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)		
0	0	0	0.2	0.1	21.5	1	0		0		
5	0	15	0.2	1.3	21.1	0	0		0.1		
10	0	30	0.2	1.2	20.6	0	0		0.2		
15	0	60	0.2	0.8	20.9	0	0		0.2		
20	0	90	0.2	0.6	21.1	0	0		0.2		
25	0	120									
30	0	180									
40		240									
50		300									
60		360									
90		420									
120		480									
150		540									
180		600									
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.								
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.22	Time:		15:04:00		LNAPL Top (from datum) (m):		
		Depth (from datum) to well base (DTB): (m)		3.9	Purge Start:				DNAPL Top (from datum) (m):		
		Hole Purged: Yes / No		No	Purge End:				Water Observations:		
		Purge Volume: (litres)			Post-Purge (DTW) (m)						
				Post testing remarks:		Samples Taken: Yes / No		No			
						Sample Media: Gas/Water		N/A			
						Gas Cannister Start (mb)					
						Gas Cannister End (mb)					
						Gas Cannister Duration (mins)					
						Depth (from datum)	Sample Ref	Type (EW / G)	Container		
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
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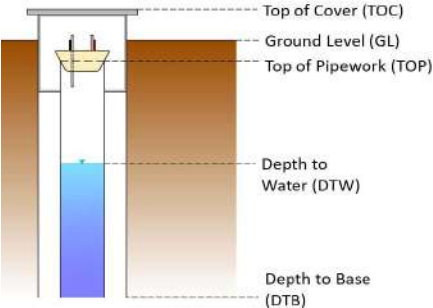
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0							
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000			
			Weather:		Partly cloudy dry		Serial Number:		G505800			
			Ground Conditions:		Dry		Daily Check:					
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
			Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS1		Monitoring Round Number:		2		Test Number:		2		
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50		
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double					
Time Start (hh:mm)	12:53	13:05	1006	0.03	Observations (e.g. on-site activities):							
Time End (hh:mm)	12:56	13:09										
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID			
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)			
0	0	0	0.2	0.2	21.3	1	0		0.2			
5	0	15	0.2	3.1	18	1	0		0.4			
10	0	30	0.2	2.7	11.9	1	0		0.4			
15	0	60	0.2	2.3	13.7	1	0		0.3			
20	0	90	0.2	1.9	14.9	1	0		0.3			
25	0	120	0.2	1.7	15.7	0	0		0.3			
30	0	180										
40		240										
50		300										
60		360										
90		420										
120		480										
150		540										
180		600										
Stage 1 gas flow - Peak (l/h)			0		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)			0									
STAGE 3 WATER LEVEL OBSERVATION			Depth (from datum) to water (DTW): (m)		0.97		Time:		13:09:00		LNAPL Top (from datum) (m):	
			Depth (from datum) to well base (DTB): (m)		4.89		Purge Start:				DNAPL Top (from datum) (m):	
			Hole Purged: Yes / No		No		Purge End:				Water Observations:	
			Purge Volume: (litres)				Post-Purge (DTW) (m)					
			Post testing remarks:		Samples Taken: Yes / No		No					
					Sample Media: Gas/Water		N/A					
					Gas Cannister Start (mb)							
					Gas Cannister End (mb)							
					Gas Cannister Duration (mins)							
					Depth (from datum)	Sample Ref	Type (EW / G)	Container				
			Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
			Project Manager / Engineer:		James Lilley		Checked:					
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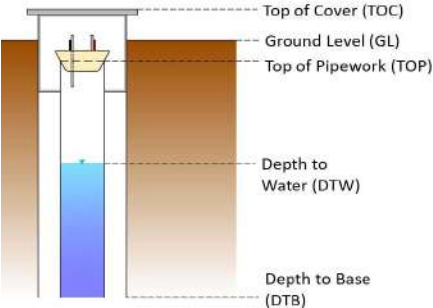
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Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000				
			Weather:		Overcast		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:		Yes				
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS1		Monitoring Round Number:		3		Test Number:		3			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		10:31		10:32		1020		0.03		Observations (e.g. on-site activities):			
Time End (hh:mm)		10:32		10:34									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.3		0.2		21.3			
5		0		15		0.3		3		18.8			
10		0		30		0.3		2.9		16.3			
15		0		60		0.3		2.6		16.5			
20		0		90									
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.54		Time:		10:34:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.85		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
								Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

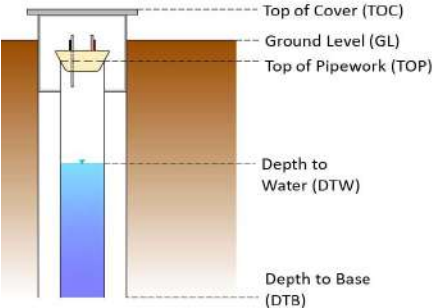
GAS MONITORING FIELD SHEET

Monitoring Date:	23/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0						
Pre-Testing Remarks:			Air Temperature: °C		11		Device:		GA5000		
			Weather:		Partly cloudy		Serial Number:		G505800		
			Ground Conditions:		Dry		Daily Check:				
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light				
			Tidal State: (if applicable) High / Low / Rising / Falling				NA				
Exploratory Position ID:		WS3		Monitoring Round Number:		1		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE	
Time Start (hh:mm)		11:55		12:01		987		30.03		Observations (e.g. on-site activities):	
Time End (hh:mm)		11:56		12:03							
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen	
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)	
0		0		0		0.1		0.1		21.2	
5		0		15		0.1		0.1		21.4	
10		0		30		0.1		0.1		21.3	
15		0		60		0.1		0.1		21.2	
20		0		90							
25		0		120							
30		0		180							
40				240							
50				300							
60				360							
90				420							
120				480							
150				540							
180				600							
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.					
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		2.05		Time:		12:05:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		4.89		Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No		Purge End:				Water Observations:	
		Purge Volume: (litres)				Post-Purge (DTW) (m)					
						Post testing remarks:		Samples Taken: Yes / No		No	
								Sample Media: Gas/Water		N/A	
								Gas Cannister Start (mb)			
								Gas Cannister End (mb)			
								Gas Cannister Duration (mins)			
		Depth (from datum)		Sample Ref		Type (EW / G)		Container			
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
		Contract Ref:		305276		Page number:					

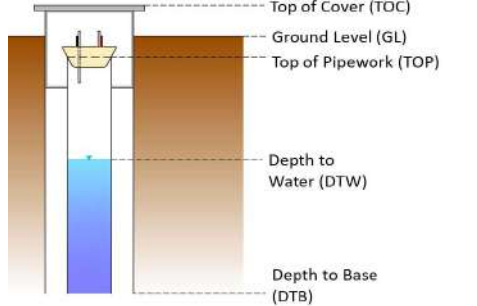
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0						
Pre-Testing Remarks:		Air Temperature: °C		8		Device:		GA5000			
		Weather:		Partly cloudy dry		Serial Number:		G505800			
		Ground Conditions:		Dry		Daily Check:					
		Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
		Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS3		Monitoring Round Number:		2		Test Number:		2	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double				
Time Start (hh:mm)	11:36	11:43	1016	-0.05	Observations (e.g. on-site activities):						
Time End (hh:mm)	11:39	11:45									
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID		
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)		
0	0	0	0.1	1.8	19	1	0		0.1		
5	0	15	0.1	5.6	10.1	1	0		4.3		
10	0	30	0.1	5.5	2.5	1	0		4.4		
15	0.1	60	0.1	5.5	2.3	1	0		5		
20	0.1	90									
25	0.2	120									
30	0.2	180									
40		240									
50		300									
60		360									
90		420									
120		480									
150		540									
180		600									
Stage 1 gas flow - Peak (l/h)	0.2		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.								
Stage 1 gas flow - Steady State (l/h)	0.2										
STAGE 3 WATER LEVEL OBSERVATION	Depth (from datum) to water (DTW): (m)		1.09	Time:	11:47:00	LNAPL Top (from datum) (m):					
	Depth (from datum) to well base (DTB): (m)		4.96	Purge Start:		DNAPL Top (from datum) (m):					
	Hole Purged: Yes / No		No	Purge End:		Water Observations:					
	Purge Volume: (litres)			Post-Purge (DTW) (m)							
			Post testing remarks:		Samples Taken: Yes / No		No				
					Sample Media: Gas/Water		N/A				
					Gas Cannister Start (mb)						
					Gas Cannister End (mb)						
					Gas Cannister Duration (mins)						
Depth (from datum)		Sample Ref	Type (EW / G)	Container							
			Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley		
			Project Manager / Engineer:		James Lilley		Checked:				
			Contract Ref:		305276		Page number:				

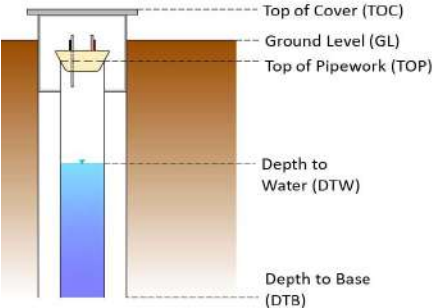
GAS MONITORING FIELD SHEET

Monitoring Date: 07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000				
			Weather:		Overcast		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:		Yes				
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS3		Monitoring Round Number:		1		Test Number:		3			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		12:21		12:22		1018		0.12		Observations (e.g. on-site activities):			
Time End (hh:mm)		12:22		12:24									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.2		0.2		21.1			
5		0		15		0.2		5.7		3.4			
10		0		30		0.2		5.8		1.8			
15		0		60		0.2		5.8		1.7			
20		0		90									
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.94		Time:		12:27:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.04		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
								Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

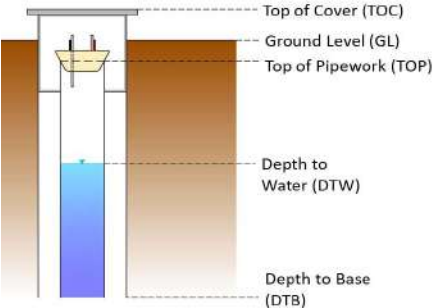
GAS MONITORING FIELD SHEET

Monitoring Date:		23/11/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0			
Pre-Testing Remarks:				Air Temperature: °C		11		Device:		GA5000			
				Weather:		Partly cloudy		Serial Number:		G505800			
				Ground Conditions:		Dry		Daily Check:					
				Wind: NONE / LIGHT / MEDIUM / STRONG						Light			
				Tidal State: (if applicable) High / Low / Rising / Falling						NA			
				Exploratory Position ID:		WS4		Monitoring Round Number:		1		Test Number:	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm/ 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		13:21		13:23		989		-0.07		Observations (e.g. on-site activities):			
Time End (hh:mm)		13:21		13:25									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.2		0.2		21.3			
5		0		15		0.2		5.5		15.4			
10		0		30		0.2		5.4		15.1			
15		0		60		0.2		5.1		15.3			
20		0		90									
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.									
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.7		Time:		13:04:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.86		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (ltrs)				Post-Purge (DTW) (m)							
				Post testing remarks:		Samples Taken: Yes / No		No					
						Sample Media: Gas/Water		N/A					
						Gas Cannister Start (mb)							
						Gas Cannister End (mb)							
						Gas Cannister Duration (mins)							
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
Contract Name:		Storrington Road, Thakeham				Data Collected By:		James Lilley					
Project Manager / Engineer:		James Lilley				Checked:							
Contract Ref:		305276				Page number:							
TPF210 Issue 6													

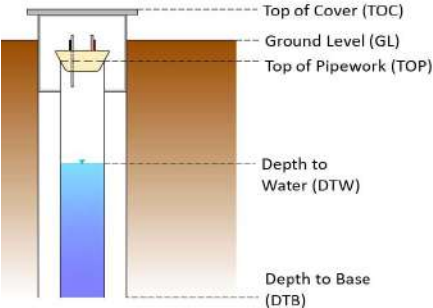
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0								
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000				
			Weather:		Partly cloudy dry		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:						
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS4		Monitoring Round Number:		2		Test Number:		2			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double						
Time Start (hh:mm)	11:47	11:56	1016	-0.05	Observations (e.g. on-site activities):								
Time End (hh:mm)	11:50	11:57											
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID				
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)				
0	0	0	0.1	4.4	19	0	0		0.5				
5	0	15	0.1	4.9	19	2	0		0.5				
10	0	30	0.1	5	19.1	2	0		0.6				
15	0	60	0.1	5	19.1	2	0		0.5				
20	0	90											
25	0	120											
30	0	180											
40		240											
50		300											
60		360											
90		420											
120		480											
150		540											
180		600											
Stage 1 gas flow - Peak (l/h)		0		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.									
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION			Depth (from datum) to water (DTW): (m)		0.67		Time:		12:00:00		LNAPL Top (from datum) (m):		
			Depth (from datum) to well base (DTB): (m)		3.84		Purge Start:				DNAPL Top (from datum) (m):		
			Hole Purged: Yes / No		No		Purge End:				Water Observations:		
			Purge Volume: (litres)				Post-Purge (DTW) (m)						
			Post testing remarks:		Samples Taken: Yes / No		No						
					Sample Media: Gas/Water		N/A						
					Gas Cannister Start (mb)								
					Gas Cannister End (mb)								
					Gas Cannister Duration (mins)								
			Depth (from datum)		Sample Ref		Type (EW / G)		Container				
			Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley				
			Project Manager / Engineer:		James Lilley		Checked:						
			Contract Ref:		305276		Page number:						

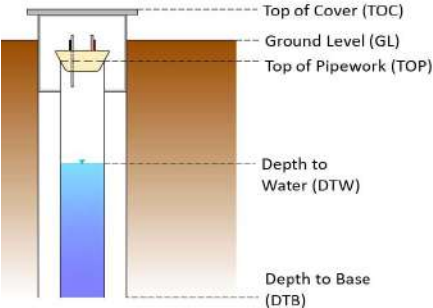
GAS MONITORING FIELD SHEET

Monitoring Date:	07/12/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0							
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000			
			Weather:		Overcast		Serial Number:		G505800			
			Ground Conditions:		Dry		Daily Check:		Yes			
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
			Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS4		Monitoring Round Number:		3		Test Number:		3		
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50		
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double					
Time Start (hh:mm)	11:23	11:25	1019	0.09	Observations (e.g. on-site activities):							
Time End (hh:mm)	11:25	11:26										
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID			
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)			
0	0	0	0.3	0.2	21.4	1	0		0			
5	0	15	0.3	7.1	12.5	0	0		0.2			
10	0	30	0.3	7.2	4	1	0		0.2			
15	0	60	0.3	7.2	3.5	1	0		0.2			
20	0	90	0.3	7.2	3.4	1	0		0.2			
25	0	120										
30	0	180										
40		240										
50		300										
60		360										
90		420										
120		480										
150		540										
180		600										
Stage 1 gas flow - Peak (l/h)		0		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.								
Stage 1 gas flow - Steady State (l/h)		0										
STAGE 3 WATER LEVEL OBSERVATION			Depth (from datum) to water (DTW): (m)		1.42		Time:		11:28:00		LNAPL Top (from datum) (m):	
			Depth (from datum) to well base (DTB): (m)		3.86		Purge Start:				DNAPL Top (from datum) (m):	
			Hole Purged: Yes / No		No		Purge End:				Water Observations:	
			Purge Volume: (litres)				Post-Purge (DTW) (m)					
			Post testing remarks:		Samples Taken: Yes / No		No					
					Sample Media: Gas/Water		N/A					
					Gas Cannister Start (mb)							
					Gas Cannister End (mb)							
					Gas Cannister Duration (mins)							
			Depth (from datum)		Sample Ref	Type (EW / G)	Container					
			Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
			Project Manager / Engineer:		James Lilley		Checked:					
			Contract Ref:		305276		Page number:					

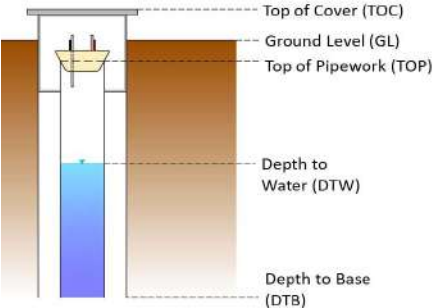
GAS MONITORING FIELD SHEET

Monitoring Date: 23/11/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		11		Device:		GA5000				
			Weather:		Partly cloudy		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:						
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS5		Monitoring Round Number:		1		Test Number:		1			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		11:26		11:30		987		38.55		Observations (e.g. on-site activities):			
Time End (hh:mm)		11:29		11:32									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.2		0.1		20.9			
5		0		15		0.2		0.1		21.5			
10		0		30		0.1		0.1		21.4			
15		0		60		0.1		0		21.3			
20		0		90									
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.75		Time:		11:26:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.55		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
						Gas Cannister Duration (mins)							
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

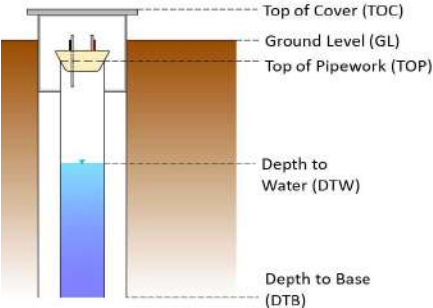
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0							
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000			
			Weather:		Partly cloudy dry		Serial Number:		G505800			
			Ground Conditions:		Dry		Daily Check:					
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
			Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS5		Monitoring Round Number:		2		Test Number:		2		
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50		
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double					
Time Start (hh:mm)	11:06	11:06	1004	0.1	Observations (e.g. on-site activities):							
Time End (hh:mm)	11:06	11:04										
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID			
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)			
0	0	0	0.2	0.1	20.6	0	0		0.1			
5	0	15	0.1	0.2	20	0	0		0			
10	0	30	0.1	0.3	19.9	0	0		0			
15	0	60	0.1	0.4	19.6	0	0					
20	0	90										
25	0	120										
30	0	180										
40		240										
50		300										
60		360										
90		420										
120		480										
150		540										
180		600										
Stage 1 gas flow - Peak (l/h)			0		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)			0									
STAGE 3 WATER LEVEL OBSERVATION			Depth (from datum) to water (DTW): (m)		1.35		Time:		11:21:00		LNAPL Top (from datum) (m):	
			Depth (from datum) to well base (DTB): (m)		3.51		Purge Start:				DNAPL Top (from datum) (m):	
			Hole Purged: Yes / No		No		Purge End:				Water Observations:	
			Purge Volume: (litres)				Post-Purge (DTW) (m)					
			Post testing remarks:		Samples Taken: Yes / No			No				
					Sample Media: Gas/Water			N/A				
					Gas Cannister Start (mb)							
					Gas Cannister End (mb)							
					Gas Cannister Duration (mins)							
			Depth (from datum)		Sample Ref		Type (EW / G)		Container			
			Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
			Project Manager / Engineer:		James Lilley		Checked:					
			Contract Ref:		305276		Page number:					

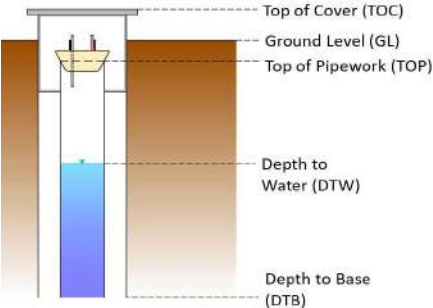
GAS MONITORING FIELD SHEET

Monitoring Date: 07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000				
			Weather:		Overcast		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:		Yes				
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS5		Monitoring Round Number:		3		Test Number:		1			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		12:54		12:55		1017		0.14		Observations (e.g. on-site activities):			
Time End (hh:mm)		12:55		12:57									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.3		0.2		21.5			
5		0		15		0.2		6.7		12.4			
10		0		30		0.2		6.7		10.3			
15		0		60		0.2		6.8		9.9			
20		0		90		0.2		6.8		9.8			
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		2.14		Time:		12:58:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.55		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
								Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

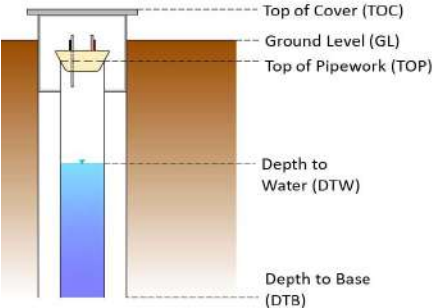
GAS MONITORING FIELD SHEET

Monitoring Date:	23/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0					
Pre-Testing Remarks:			Air Temperature: °C		11		Device:		GA5000	
			Weather:		Partly cloudy		Serial Number:		G505800	
			Ground Conditions:		Dry		Daily Check:			
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light			
			Tidal State: (if applicable) High / Low / Rising / Falling				NA			
Exploratory Position ID:		WS6	Monitoring Round Number:		1		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single	Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double			
Time Start (hh:mm)	12:58	13:00	988	0.03	Observations (e.g. on-site activities):					
Time End (hh:mm)	12:58	12:46								
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID	
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)	
0	0	0	0.2	0.1	21.4	8	0			
5	0	15	0.2	1.4	17.1	10	0			
10	0	30	0.2	1.8	15	7	0			
15	0	60	0.1	2.9	11.2	4	0		0.4	
20	0	90								
25	0	120								
30	0	180								
40		240								
50		300								
60		360								
90		420								
120		480								
150		540								
180		600								
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0								
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.76	Time:		12:34:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		4	Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No	Purge End:				Water Observations:	
		Purge Volume: (litres)			Post-Purge (DTW) (m)					
			Post testing remarks:		Samples Taken: Yes / No		No			
					Sample Media: Gas/Water		N/A			
					Gas Cannister Start (mb)					
					Gas Cannister End (mb)					
					Gas Cannister Duration (mins)					
					Depth (from datum)	Sample Ref	Type (EW / G)	Container		
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley		
		Project Manager / Engineer:		James Lilley		Checked:				
		Contract Ref:		305276		Page number:				

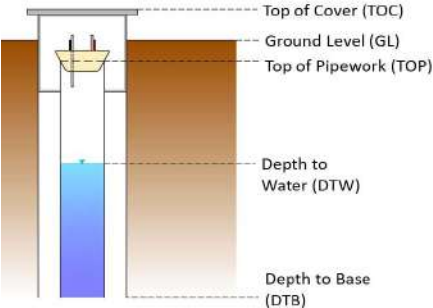
GAS MONITORING FIELD SHEET

Monitoring Date: 28/11/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000				
			Weather:		Partly cloudy dry		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:						
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS6		Monitoring Round Number:		2		Test Number:		2			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		14:13		14:15		1005		0		Observations (e.g. on-site activities):			
Time End (hh:mm)		14:16		14:17									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.3		2.3		20.5			
5		0		15		0.2		3.1		15.8			
10		0		30		0.2		3.5		9.4			
15		0		60		0.2		3.6		8.9			
20		0		90									
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.41		Time:		14:19:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.96		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
								Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

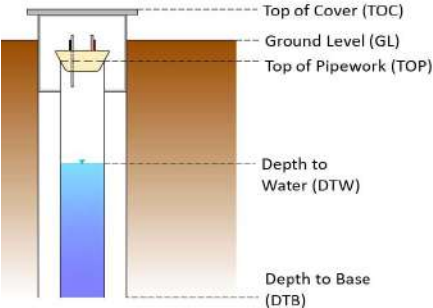
GAS MONITORING FIELD SHEET

Monitoring Date:	07/12/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0						
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000		
			Weather:		Overcast		Serial Number:		G505800		
			Ground Conditions:		Dry		Daily Check:		Yes		
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light				
			Tidal State: (if applicable) High / Low / Rising / Falling				NA				
Exploratory Position ID:		WS6		Monitoring Round Number:		3		Test Number:		3	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double				
	Time Start (hh:mm)	14:28	14:31	1016	0	Observations (e.g. on-site activities):					
Time End (hh:mm)	14:31	14:33									
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID		
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)		
0	0	0	0.2	0.2	21.6	3	0		0		
5	0	15	0.2	4.1	10.3	1	0		0.1		
10	0	30	0.2	4.1	8.9	1	0		0.1		
15	0	60	0.2	4.1	8.7	1	0		0.1		
20	0	90	0.2	4.1	8.7	1	0		0.1		
25	0	120									
30	0	180									
40		240									
50		300									
60		360									
90		420									
120		480									
150		540									
180		600									
Stage 1 gas flow - Peak (l/h)		0		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		2.25		Time:		14:37:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		3.94		Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No		Purge End:				Water Observations:	
		Purge Volume: (litres)				Post-Purge (DTW) (m)					
				Post testing remarks:		Samples Taken: Yes / No		No			
						Sample Media: Gas/Water		N/A			
						Gas Cannister Start (mb)					
						Gas Cannister End (mb)					
						Gas Cannister Duration (mins)					
						Depth (from datum)	Sample Ref	Type (EW / G)	Container		
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
		Contract Ref:		305276		Page number:					

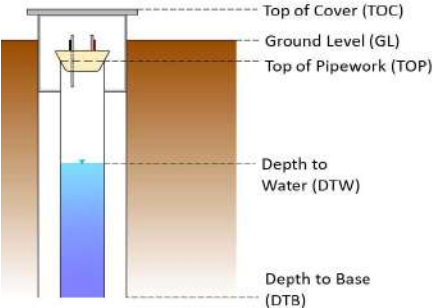
GAS MONITORING FIELD SHEET

Monitoring Date:	23/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0						
Pre-Testing Remarks:		Air Temperature: °C		11		Device:		GA5000			
		Weather:		Partly cloudy		Serial Number:		G505800			
		Ground Conditions:		Dry		Daily Check:					
		Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
		Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS8		Monitoring Round Number:		1		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double				
Time Start (hh:mm)	12:20	12:22	988	24.47	Observations (e.g. on-site activities):						
Time End (hh:mm)	12:21	12:24									
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID		
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)		
0	0	0	0.1	0.1	21.6	1	0		0.8		
5	0	15	0	2.9	20.8	1	0		0.8		
10	0	30	0.1	2.8	17.4	1	0		0.8		
15	0	60	0.1	2.8	17	1	0		0.8		
20	0	90									
25	0	120									
30	0	180									
40		240									
50		300									
60		360									
90		420									
120		480									
150		540									
180		600									
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.								
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		2.49	Time:	12:05:00	LNAPL Top (from datum) (m):				
		Depth (from datum) to well base (DTB): (m)		4.5	Purge Start:		DNAPL Top (from datum) (m):				
		Hole Purged: Yes / No		No	Purge End:		Water Observations:				
		Purge Volume: (litres)			Post-Purge (DTW) (m)						
			Post testing remarks:		Samples Taken: Yes / No		No				
					Sample Media: Gas/Water		N/A				
					Gas Cannister Start (mb)						
					Gas Cannister End (mb)						
					Gas Cannister Duration (mins)						
					Depth (from datum)	Sample Ref	Type (EW / G)	Container			
			Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley		
			Project Manager / Engineer:		James Lilley		Checked:				
			Contract Ref:		305276		Page number:				

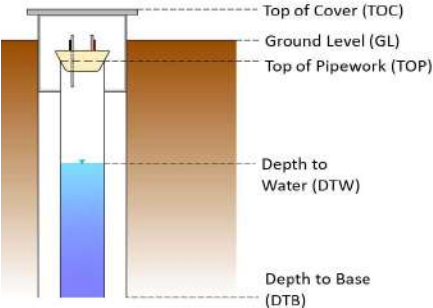
GAS MONITORING FIELD SHEET

Monitoring Date: 28/11/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000				
			Weather:		Partly cloudy dry		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:						
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS8		Monitoring Round Number:		2		Test Number:		2			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		11:32		11:32		1016		-0.05		Observations (e.g. on-site activities):			
Time End (hh:mm)		11:32		11:34									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		-0.1		0		0.1		0.3		20.1			
5		-0.1		15		0.1		2.2		19.2			
10		-0.1		30		0.1		2.2		18.6			
15		-0.1		60		0.1		2.2		18.6			
20		-0.1		90									
25		-0.1		120									
30		-0.1		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		-0.1				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		-0.1											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.76		Time:		11:34:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		4.7		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
								Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

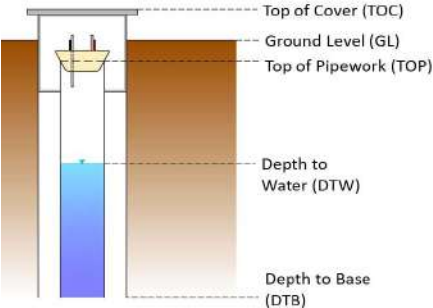
GAS MONITORING FIELD SHEET

Monitoring Date: 07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000				
			Weather:		Overcast		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:		Yes				
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS8		Monitoring Round Number:		3		Test Number:		1			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		12:36		12:39		1017		0.05		Observations (e.g. on-site activities):			
Time End (hh:mm)		12:39		12:41									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.3		0.2		21.3			
5		0		15		0.3		3		18.4			
10		0		30		0.3		3		17			
15		0		60		0.2		3		16.8			
20		0		90									
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		2.62		Time:		12:41:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		4.47		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
								Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

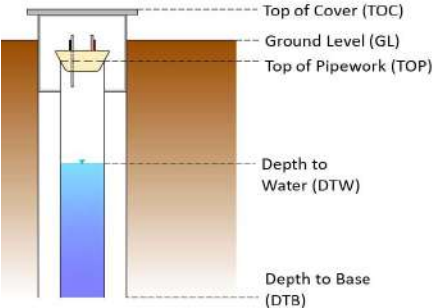
GAS MONITORING FIELD SHEET

Monitoring Date: 23/11/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		11		Device:		GA5000				
			Weather:		Partly cloudy		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:						
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS9		Monitoring Round Number:		1		Test Number:		1			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		15:24		15:23		991		-0.05		Observations (e.g. on-site activities):			
Time End (hh:mm)		15:24		15:25									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.3		0.1		21.6			
5		0		15		0.3		2.7		20.8			
10		0		30		0.2		2.7		20.6			
15		0		60		0.2		2.7		20.6			
20		0		90									
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.7		Time:		15:27:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		4.92		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
								Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

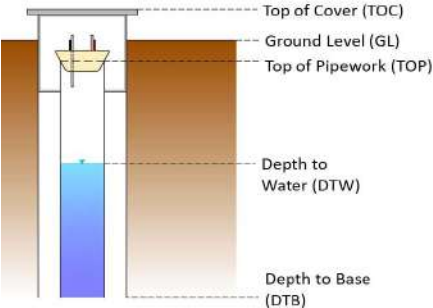
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0					
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000	
			Weather:		Partly cloudy dry		Serial Number:		G505800	
			Ground Conditions:		Dry		Daily Check:			
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light			
			Tidal State: (if applicable) High / Low / Rising / Falling				NA			
Exploratory Position ID:		WS9	Monitoring Round Number:		2		Test Number:		2	
Install Type: SINGLE / DOUBLE		Single	Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double			
Time Start (hh:mm)	12:01	12:16	1005	0.07	Observations (e.g. on-site activities):					
Time End (hh:mm)	12:16	12:18								
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID	
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)	
0	0	0	0.2	0.3	21.5	1	0		0.1	
5	0	15	0.5	1.7	21.3	2	0		0.4	
10	0	30	0.2	1.5	21.2	1	0		0.8	
15	0	60	0.2	1.1	21.3	1	0		0.8	
20	0	90	0.2	1.1	21.4	1	0		0.6	
25	0	120								
30	0	180								
40		240								
50		300								
60		360								
90		420								
120		480								
150		540								
180		600								
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0								
STAGE 3 WATER LEVEL OBSERVATION			Depth (from datum) to water (DTW): (m)		0.82	Time:		12:19:00	LNAPL Top (from datum) (m):	
			Depth (from datum) to well base (DTB): (m)		4.9	Purge Start:			DNAPL Top (from datum) (m):	
			Hole Purged: Yes / No		No	Purge End:			Water Observations:	
			Purge Volume: (litres)			Post-Purge (DTW) (m)				
			Post testing remarks:		Samples Taken: Yes / No		No			
					Sample Media: Gas/Water		N/A			
					Gas Cannister Start (mb)					
					Gas Cannister End (mb)					
					Gas Cannister Duration (mins)					
			Depth (from datum)		Sample Ref	Type (EW / G)	Container			
			Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley	
			Project Manager / Engineer:		James Lilley		Checked:			
			Contract Ref:		305276		Page number:			

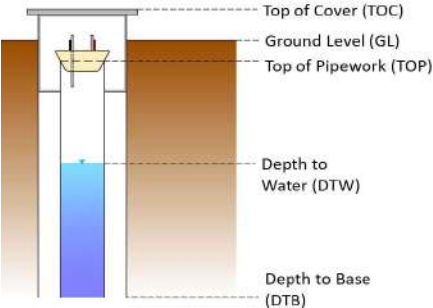
GAS MONITORING FIELD SHEET

Monitoring Date: 07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0			
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000		
			Weather:		Overcast		Serial Number:		G505800		
			Ground Conditions:		Dry		Daily Check:		Yes		
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light				
			Tidal State: (if applicable) High / Low / Rising / Falling				NA				
Exploratory Position ID:		WS9		Monitoring Round Number:		3		Test Number:		3	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE	
Time Start (hh:mm)		11:45		11:48		1018		0		Observations (e.g. on-site activities):	
Time End (hh:mm)		11:47		11:49							
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen	
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)	
0		0		0		0.2		0.3		20.8	
5		0		15		0.2		2.8		18.7	
10		0		30		0.2		2.6		20.2	
15		0		60		0.2		2.2		20.3	
20		0		90							
25		0		120							
30		0		180							
40				240							
50				300							
60				360							
90				420							
120				480							
150				540							
180				600							
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.					
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.08		Time:		11:52:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		4.87		Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No		Purge End:				Water Observations:	
		Purge Volume: (litres)				Post-Purge (DTW) (m)					
						Post testing remarks:		Samples Taken: Yes / No		No	
								Sample Media: Gas/Water		N/A	
								Gas Cannister Start (mb)			
								Gas Cannister End (mb)			
								Gas Cannister Duration (mins)			
		Depth (from datum)		Sample Ref		Type (EW / G)		Container			
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
		Contract Ref:		305276		Page number:					

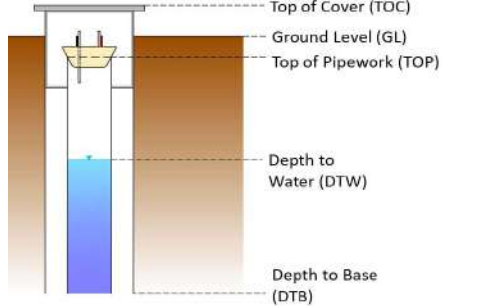
GAS MONITORING FIELD SHEET

Monitoring Date: 23/11/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		11		Device:		GA5000				
			Weather:		Partly cloudy		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:						
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS10		Monitoring Round Number:		1		Test Number:		1			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		14:13		14:16		990		0.07		Observations (e.g. on-site activities):			
Time End (hh:mm)		14:14		14:18									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0.7		0		0.2		0.1		21.6			
5		0.9		15		0.2		3		9			
10		1.1		30		0.2		3		8.8			
15		1.3		60		0.2		3		8.6			
20		1.5		90									
25		1.6		120									
30		1.7		180									
40		1.8		240									
50		1.7		300									
60		1.5		360									
90		1		420									
120		0.5		480									
150		0.2		540									
180		0.2		600									
Stage 1 gas flow - Peak (l/h)		1.8		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.									
Stage 1 gas flow - Steady State (l/h)		0.2											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.6		Time:		14:19:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		4.89		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:		Samples Taken: Yes / No		No			
								Sample Media: Gas/Water		N/A			
								Gas Cannister Start (mb)					
								Gas Cannister End (mb)					
						Gas Cannister Duration (mins)							
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

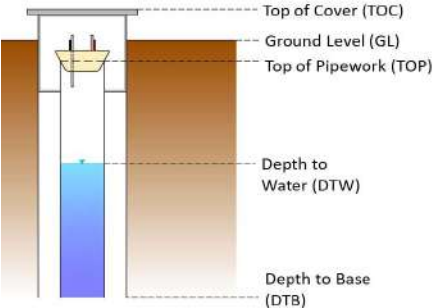
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0					
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000	
			Weather:		Partly cloudy dry		Serial Number:		G505800	
			Ground Conditions:		Dry		Daily Check:			
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light			
			Tidal State: (if applicable) High / Low / Rising / Falling				NA			
Exploratory Position ID:		WS10	Monitoring Round Number:		2		Test Number:		2	
Install Type: SINGLE / DOUBLE		Single	Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double			
Time Start (hh:mm)	12:50	12:50	1005	0	Observations (e.g. on-site activities):					
Time End (hh:mm)	12:50	12:52								
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID	
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)	
0	-4	0	0.2	3	20.8	1	0		0.4	
5	-4.1	15	0.2	3	19.1	1	0		0.6	
10	-4.2	30	0.2	3	17.6	1	0		1.5	
15	-4.8	60	0.2	3	17.4	1	0		1.5	
20	-4.9	90								
25	-5	120								
30	-5.2	180								
40		240								
50		300								
60		360								
90		420								
120		480								
150		540								
180		600								
Stage 1 gas flow - Peak (l/h)		-5.1	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		-5.2								
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.4	Time:		12:52:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		4.97	Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No	Purge End:				Water Observations:	
		Purge Volume: (litres)			Post-Purge (DTW) (m)					
			Post testing remarks:		Samples Taken: Yes / No		No			
					Sample Media: Gas/Water		N/A			
					Gas Cannister Start (mb)					
					Gas Cannister End (mb)					
					Gas Cannister Duration (mins)					
					Depth (from datum)	Sample Ref	Type (EW / G)	Container		
Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley				
Project Manager / Engineer:		James Lilley		Checked:						
Contract Ref:		305276		Page number:						

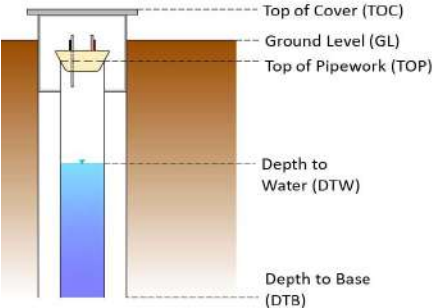
GAS MONITORING FIELD SHEET

Monitoring Date:		07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0			
Pre-Testing Remarks:				Air Temperature: °C		3		Device:		GA5000			
				Weather:		Overcast		Serial Number:		G505800			
				Ground Conditions:		Dry		Daily Check:		Yes			
				Wind: NONE / LIGHT / MEDIUM / STRONG						Light			
				Tidal State: (if applicable) High / Low / Rising / Falling						NA			
				Exploratory Position ID:		WS10		Monitoring Round Number:		3		Test Number:	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm/ 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		10:47		10:51		1020		0.07		Observations (e.g. on-site activities):			
Time End (hh:mm)		10:50		10:52									
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.3		0.2		21.4			
5		0		15		0.3		3.5		11.3			
10		0		30		0.3		3.5		9.7			
15		0		60		0.3		3.5		9			
20		0		90		0.3		3.5		8.9			
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.54		Time:		10:53:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.98		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
				Post testing remarks:		Samples Taken: Yes / No		No					
						Sample Media: Gas/Water		N/A					
						Gas Cannister Start (mb)							
						Gas Cannister End (mb)							
						Gas Cannister Duration (mins)							
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley							
Project Manager / Engineer:		James Lilley		Checked:									
Contract Ref:		305276		Page number:									
TPF210 Issue 6													

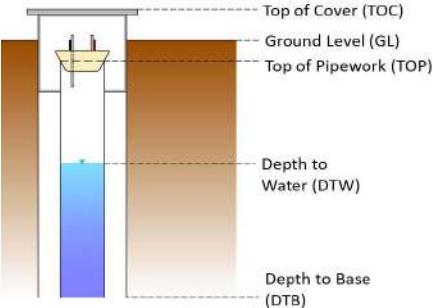
GAS MONITORING FIELD SHEET

Monitoring Date:	23/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0						
Pre-Testing Remarks:		Air Temperature: °C		11		Device:		GA5000			
		Weather:		Partly cloudy		Serial Number:		G505800			
		Ground Conditions:		Dry		Daily Check:					
		Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
		Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS11		Monitoring Round Number:		1		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double				
Time Start (hh:mm)	13:50	13:50	990	-0.03	Observations (e.g. on-site activities):						
Time End (hh:mm)	13:50	13:52									
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID		
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)		
0	0	0	0.2	0.2	21.6	1	0				
5	0	15	0	2.9	20.6	1	0				
10	0	30	0	2.9	20.2	1	0		0.9		
15	0	60	0	2.9	20.1	1	0		1		
20	0	90									
25	0	120									
30	0	180									
40		240									
50		300									
60		360									
90		420									
120		480									
150		540									
180		600									
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.								
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.08	Time:		13:53:00		LNAPL Top (from datum) (m):		
		Depth (from datum) to well base (DTB): (m)		4.79	Purge Start:				DNAPL Top (from datum) (m):		
		Hole Purged: Yes / No		No	Purge End:				Water Observations:		
		Purge Volume: (litres)			Post-Purge (DTW) (m)						
				Post testing remarks:		Samples Taken: Yes / No		No			
						Sample Media: Gas/Water		N/A			
						Gas Cannister Start (mb)					
						Gas Cannister End (mb)					
						Gas Cannister Duration (mins)					
Depth (from datum)		Sample Ref	Type (EW / G)	Container							
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
		Contract Ref:		305276		Page number:					

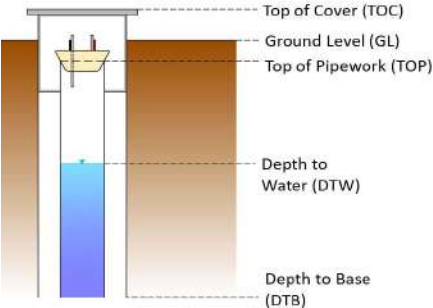
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0					
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000	
			Weather:		Partly cloudy dry		Serial Number:		G505800	
			Ground Conditions:		Dry		Daily Check:			
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light			
			Tidal State: (if applicable) High / Low / Rising / Falling				NA			
Exploratory Position ID:		WS11	Monitoring Round Number:		2		Test Number:		2	
Install Type: SINGLE / DOUBLE		Single	Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double			
Time Start (hh:mm)	12:20	12:20	1004	0	Observations (e.g. on-site activities):					
Time End (hh:mm)	12:23	12:30								
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID	
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)	
0	0	0	0.2	0.2	21.5	1	0		0.1	
5	0	15	0.2	3	21.4	1	0		0.9	
10	0	30	0.2	3	20.3	1	0		1	
15	0	60	0.2	3	20.3	1	0		1	
20	0	90								
25	0	120								
30	0	180								
40		240								
50		300								
60		360								
90		420								
120		480								
150		540								
180		600								
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0								
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.9	Time:		12:33:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		4.76	Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No	Purge End:				Water Observations:	
		Purge Volume: (litres)			Post-Purge (DTW) (m)					
			Post testing remarks:		Samples Taken: Yes / No		No			
					Sample Media: Gas/Water		N/A			
					Gas Cannister Start (mb)					
					Gas Cannister End (mb)					
					Gas Cannister Duration (mins)					
					Depth (from datum)	Sample Ref	Type (EW / G)	Container		
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley		
		Project Manager / Engineer:		James Lilley		Checked:				
		Contract Ref:		305276		Page number:				

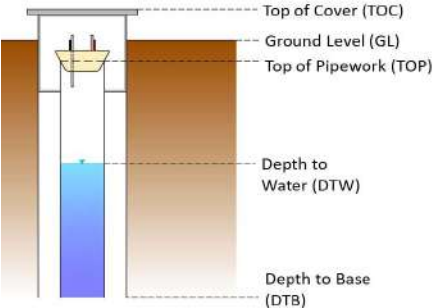
GAS MONITORING FIELD SHEET

Monitoring Date: 07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0			
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000		
			Weather:		Overcast		Serial Number:		G505800		
			Ground Conditions:		Dry		Daily Check:		Yes		
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light				
			Tidal State: (if applicable) High / Low / Rising / Falling				NA				
Exploratory Position ID:		WS11		Monitoring Round Number:		3		Test Number:		3	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE	
Time Start (hh:mm)		11:59		12:01		1018		0.03		Observations (e.g. on-site activities):	
Time End (hh:mm)		12:01		12:03							
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen	
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)	
0		0		0		0.2		0.1		20.1	
5		0		15		0.1		2.9		18.9	
10		0		30		0.1		2.9		17.4	
15		0		60		0.2		2.9		17.2	
20		0		90							
25		0		120							
30		0		180							
40				240							
50				300							
60				360							
90				420							
120				480							
150				540							
180				600							
Stage 1 gas flow - Peak (l/h)		0		Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.45		Time:		11:52:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		3.96		Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No		Purge End:				Water Observations:	
		Purge Volume: (litres)				Post-Purge (DTW) (m)					
						Post testing remarks:		Samples Taken: Yes / No		No	
								Sample Media: Gas/Water		N/A	
								Gas Cannister Start (mb)			
								Gas Cannister End (mb)			
								Gas Cannister Duration (mins)			
Depth (from datum)		Sample Ref		Type (EW / G)		Container					
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
		Contract Ref:		305276		Page number:					

GAS MONITORING FIELD SHEET

Monitoring Date:	23/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0						
Pre-Testing Remarks:		Air Temperature: °C		11		Device:		GA5000			
		Weather:		Partly cloudy		Serial Number:		G505800			
		Ground Conditions:		Dry		Daily Check:					
		Wind: NONE / LIGHT / MEDIUM / STRONG				Light					
		Tidal State: (if applicable) High / Low / Rising / Falling				NA					
Exploratory Position ID:		WS12		Monitoring Round Number:		1		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double				
Time Start (hh:mm)	11:00	11:09	985	37.14	Observations (e.g. on-site activities):						
Time End (hh:mm)	11:06	11:10									
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID		
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)		
0	0	0	0.2	0.8	17.8	0	0		0.1		
5	0	15	0.2	0.1	21.3	0	0		0.2		
10	0	30	0.1	0.1	21.4	0	0		0.2		
15	0	60	0.1	0.1	21.4	0	0		0.2		
20	0	90									
25	0	120									
30	0	180									
40		240									
50		300									
60		360									
90		420									
120		480									
150		540									
180		600									
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.								
Stage 1 gas flow - Steady State (l/h)		0									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		1.7	Time:	11:00:00	LNAPL Top (from datum) (m):				
		Depth (from datum) to well base (DTB): (m)		3.6	Purge Start:		DNAPL Top (from datum) (m):				
		Hole Purged: Yes / No		No	Purge End:		Water Observations:				
		Purge Volume: (lts)			Post-Purge (DTW) (m)						
				Post testing remarks:		Samples Taken: Yes / No		No			
						Sample Media: Gas/Water		N/A			
						Gas Cannister Start (mb)					
						Gas Cannister End (mb)					
						Gas Cannister Duration (mins)					
						Depth (from datum)	Sample Ref	Type (EW / G)	Container		
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
		Contract Ref:		305276		Page number:					

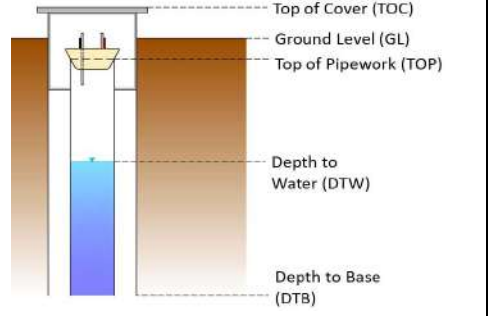
GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0				
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000
			Weather:		Partly cloudy dry		Serial Number:		G505800
			Ground Conditions:		Dry		Daily Check:		
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light		
			Tidal State: (if applicable) High / Low / Rising / Falling				NA		
Exploratory Position ID:		WS12	Monitoring Round Number:		2		Test Number:		2
Install Type: SINGLE / DOUBLE		Single	Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double		
Time Start (hh:mm)	10:37	10:48	1003	0	Observations (e.g. on-site activities):				
Time End (hh:mm)	10:40	10:48							
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)
0	0	0	0.3	0.2	20.9	0	0		0.1
5	0	15	0.1	0.2	20.9	0	0		0.1
10	0	30							
15	0	60							
20	0	90							
25	0	120							
30	0	180							
40		240							
50		300							
60		360							
90		420							
120		480							
150		540							
180		600							
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.						
Stage 1 gas flow - Steady State (l/h)		0							
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.97	Time:	10:50:00	LNAPL Top (from datum) (m):		
		Depth (from datum) to well base (DTB): (m)		3.59	Purge Start:		DNAPL Top (from datum) (m):		
		Hole Purged: Yes / No		No	Purge End:		Water Observations:		
		Purge Volume: (litres)			Post-Purge (DTW) (m)				
			Post testing remarks:		Samples Taken: Yes / No		No		
					Sample Media: Gas/Water		N/A		
					Gas Cannister Start (mb)				
					Gas Cannister End (mb)				
					Gas Cannister Duration (mins)				
					Depth (from datum)	Sample Ref	Type (EW / G)	Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley	
		Project Manager / Engineer:		James Lilley		Checked:			
		Contract Ref:		305276		Page number:			

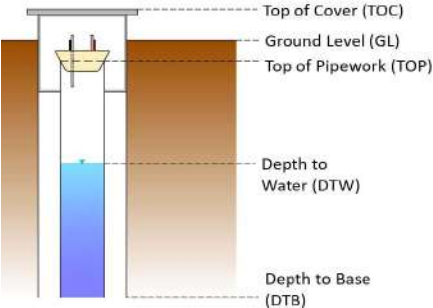
GAS MONITORING FIELD SHEET

Monitoring Date: 07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):		0					
Pre-Testing Remarks:			Air Temperature: °C		3		Device:		GA5000				
			Weather:		Overcast		Serial Number:		G505800				
			Ground Conditions:		Dry		Daily Check:		Yes				
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light						
			Tidal State: (if applicable) High / Low / Rising / Falling				NA						
Exploratory Position ID:		WS12		Monitoring Round Number:		3		Test Number:		1			
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm / 40mm / 50mm / Other (mm)		50			
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBLE			
Time Start (hh:mm)		13:15		13:20		1016		0.1		Observations (e.g. on-site activities):			
Time End (hh:mm)		13:19		13:22						Foul organic smell given off by well.			
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen			
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)			
0		0		0		0.2		0.3		21.3			
5		0		15		0.2		4.3		17.8			
10		0		30		0.2		4.3		15.1			
15		0		60		0.2		4.3		14.9			
20		0		90		0.2		4.3		14.8			
25		0		120									
30		0		180									
40				240									
50				300									
60				360									
90				420									
120				480									
150				540									
180				600									
Stage 1 gas flow - Peak (l/h)		0				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		0											
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		2.77		Time:		13:25:00		LNAPL Top (from datum) (m):			
		Depth (from datum) to well base (DTB): (m)		3.605		Purge Start:				DNAPL Top (from datum) (m):			
		Hole Purged: Yes / No		No		Purge End:				Water Observations:			
		Purge Volume: (litres)				Post-Purge (DTW) (m)							
						Post testing remarks:							
						Samples Taken: Yes / No		No					
						Sample Media: Gas/Water		N/A					
						Gas Cannister Start (mb)							
						Gas Cannister End (mb)							
						Gas Cannister Duration (mins)							
						Depth (from datum)		Sample Ref		Type (EW / G)		Container	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley					
		Project Manager / Engineer:		James Lilley		Checked:							
		Contract Ref:		305276		Page number:							

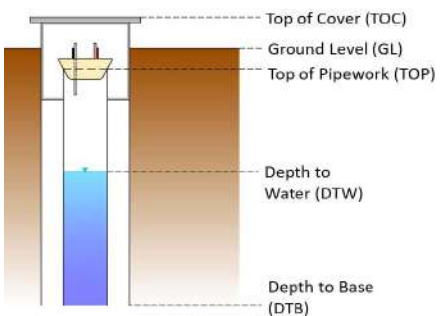
GAS MONITORING FIELD SHEET

Monitoring Date:		23/11/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m):			0								
Pre-Testing Remarks:				Air Temperature: °C		11		Device:		GA5000									
				Weather:		Partly cloudy		Serial Number:		G505800									
				Ground Conditions:		Dry		Daily Check:											
				Wind: NONE / LIGHT / MEDIUM / STRONG				Light											
				Tidal State: (if applicable) High / Low / Rising / Falling				NA											
Exploratory Position ID:		WS13		Monitoring Round Number:		1		Test Number:		1									
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm/ 40mm / 50mm / Other (mm)		50									
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBBLE		Double							
Time Start (hh:mm)		10:35		10:36		985		0.02		Observations (e.g. on-site activities):									
Time End (hh:mm)		10:36		10:38															
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen		Carbon monoxide		Hydrogen sulphide		LEL		PID	
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)		(ppm)		(ppm)		(%)		(ppm)	
0		0.4		0		0.2		0.1		21.4		14		0				1.2	
5		0.5		15		0.2		1.4		10.8		1		0				1.2	
10		0.5		30		0.2		1.3		11.5		1		0				0	
15		0.5		60		0.2		1.3		12.1		1		0				0	
20		0.5		90															
25		0.5		120															
30		0.5		180															
40				240															
50				300															
60				360															
90				420															
120				480															
150				540															
180				600															
Stage 1 gas flow - Peak (l/h)		0.5				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.													
Stage 1 gas flow - Steady State (l/h)		0.5																	
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0		Time:		10:25:00		LNAPL Top (from datum) (m):									
		Depth (from datum) to well base (DTB): (m)		0		Purge Start:				DNAPL Top (from datum) (m):									
		Hole Purged: Yes / No		No		Purge End:				Water Observations:									
		Purge Volume: (litres)				Post-Purge (DTW) (m)													
						Post testing remarks:		Samples Taken: Yes / No		No									
								Sample Media: Gas/Water		N/A									
								Gas Cannister Start (mb)											
								Gas Cannister End (mb)											
								Gas Cannister Duration (mins)											
						Depth (from datum)		Sample Ref		Type (EW / G)		Container							
		Contract Name:		Storrington Road, Thakeham				Data Collected By:		James Lilley									
		Project Manager / Engineer:		James Lilley				Checked:											
		Contract Ref:		305276				Page number:											
TPF210 Issue 6																			

GAS MONITORING FIELD SHEET

Monitoring Date:	28/11/2022	Measurement datum: TOC / GL / TOP / Other	TOC	Offset to GL (m):	0					
Pre-Testing Remarks:			Air Temperature: °C		8		Device:		GA5000	
			Weather:		Partly cloudy dry		Serial Number:		G505800	
			Ground Conditions:		Dry		Daily Check:			
			Wind: NONE / LIGHT / MEDIUM / STRONG				Light			
			Tidal State: (if applicable) High / Low / Rising / Falling				NA			
Exploratory Position ID:		WS13	Monitoring Round Number:		2		Test Number:		2	
Install Type: SINGLE / DOUBLE		Single	Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm/ 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)	Flow readings	Gas readings	Atmospheric Pressure (mb)	Differential Pressure (mb)	Gas tap: SINGLE / DOUBLE		Double			
Time Start (hh:mm)	10:26	10:31	1003	-0.03	Observations (e.g. on-site activities):					
Time End (hh:mm)	10:29	10:33								
Stage 1 Flow Readings	Stage 1 Flow Readings	Stage 2 Gas Monitoring:	Methane	Carbon Dioxide	Oxygen	Carbon monoxide	Hydrogen sulphide	LEL	PID	
Time of flow monitoring (sec)	Flow Reading (l/hr)	Time of gas monitoring (sec)	(%/vol)	(%/vol)	(%/vol)	(ppm)	(ppm)	(%)	(ppm)	
0	0	0	0.3	0.2	21	3	0		0	
5	0	15	0.3	1.4	11.7	0	0		0	
10	-0.1	30	0.3	1.3	10.5	0	0		0	
15	-0.1	60								
20	-0.1	90								
25	-0.1	120								
30	-0.1	180								
40		240								
50		300								
60		360								
90		420								
120		480								
150		540								
180		600								
Stage 1 gas flow - Peak (l/h)		0	Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.							
Stage 1 gas flow - Steady State (l/h)		-0.1								
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.15	Time:		10:37:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		2	Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No	Purge End:				Water Observations:	
		Purge Volume: (litres)			Post-Purge (DTW) (m)					
			Post testing remarks:		Samples Taken: Yes / No		No			
					Sample Media: Gas/Water		N/A			
					Gas Cannister Start (mb)					
					Gas Cannister End (mb)					
					Gas Cannister Duration (mins)					
					Depth (from datum)	Sample Ref	Type (EW / G)	Container		
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley		
		Project Manager / Engineer:		James Lilley		Checked:				
		Contract Ref:		305276		Page number:				

GAS MONITORING FIELD SHEET

Monitoring Date:		07/12/2022		Measurement datum: TOC / GL / TOP / Other		TOC		Offset to GL (m);		0	
Pre-Testing Remarks:				Air Temperature: °C		3		Device:		GA5000	
				Weather:		Overcast		Serial Number:		G505800	
				Ground Conditions:		Dry		Daily Check:		Yes	
				Wind: NONE / LIGHT / MEDIUM / STRONG				Light			
				Tidal State: (if applicable) High / Low / Rising / Falling				NA			
Exploratory Position ID:		WS13		Monitoring Round Number:		3		Test Number:		1	
Install Type: SINGLE / DOUBLE		Single		Pipe Ref: 1) Shallow 2) Deep		Shallow		Pipe Diameter: 19mm/ 40mm / 50mm / Other (mm)		50	
Time of Monitoring (hh:mm)		Flow readings		Gas readings		Atmospheric Pressure (mb)		Differential Pressure (mb)		Gas tap: SINGLE / DOUBBLE	
Time Start (hh:mm)		13:38		13:43		1015		0.05		Observations (e.g. on-site activities):	
Time End (hh:mm)		13:43		13:45							
Stage 1 Flow Readings		Stage 1 Flow Readings		Stage 2 Gas Monitoring:		Methane		Carbon Dioxide		Oxygen	
Time of flow monitoring (sec)		Flow Reading (l/hr)		Time of gas monitoring (sec)		(%/vol)		(%/vol)		(%/vol)	
0		0.1		0		0.2		0.2		21.2	
5		0.4		15		0.2		0.6		19.1	
10		0.6		30		0.2		0.6		16.9	
15		0.9		60							
20		1.1		90							
25		1.2		120							
30		1.2		180							
40		1.4		240							
50		1.4		300							
60		1.5		360							
90		1.7		420							
120		1.8		480							
150		1.9		540							
180		1.9		600							
Stage 1 gas flow - Peak (l/h)		1.9				Note: Flow should be recorded at 5 second intervals up to 30 seconds, 10 second intervals to 2 minutes and 30 second intervals up to 3 minutes or until steady-state readings are obtained. Typically, steady state conditions occur within 30 seconds to a minute. The differential pressure reading (in Pa) should also be recorded during this period.					
Stage 1 gas flow - Steady State (l/h)		1.9									
STAGE 3 WATER LEVEL OBSERVATION		Depth (from datum) to water (DTW): (m)		0.26		Time:		13:45:00		LNAPL Top (from datum) (m):	
		Depth (from datum) to well base (DTB): (m)		1.98		Purge Start:				DNAPL Top (from datum) (m):	
		Hole Purged: Yes / No		No		Purge End:				Water Observations:	
		Purge Volume: (litres)				Post-Purge (DTW) (m)					
				Post testing remarks:		Samples Taken: Yes / No		No			
						Sample Media: Gas/Water		N/A			
						Gas Cannister Start (mb)					
						Gas Cannister End (mb)					
						Gas Cannister Duration (mins)					
						Depth (from datum)		Sample Ref		Type (EW / G)	
		Contract Name:		Storrington Road, Thakeham		Data Collected By:		James Lilley			
		Project Manager / Engineer:		James Lilley		Checked:					
		Contract Ref:		305276		Page number:					
TPF210 Issue 6											

[illegible]



Groundwater Sampling Data Form

This form is also available for RSK Mobile Data Capture.

Project Information	Project Name:		Storrington Road			
	Project Number:		305276			
	Sampling Date:		13/10/2022	Sampled by:		James Lilley
	Weather:		Overcast dry			
	Well Notes - e.g. Condition, access, safety:		YSI not used due to very low water level and slow recharge.			
Monitoring Information	Water Quality Meter Used:		YSI			
	Water Quality Meter Last Calibrated:					
	Dissolved oxygen probe last calibrated:					
	Water Level Meter Used (X that applicable):					
	Interface probe		Dip Meter	Yes		
	Typical Parameter Stabilisation Criteria for Low-Flow Sampling		Dissolved Oxygen (D.O.)		0.3 mg/l	
			Specific Conductivity (Sp.Cond)		3%	
			p.H		0.1 unit	
Oxygen Reduction Potential (ORP)			10mV			
* For REDOX correction, see separate guidance						

BH ID	WS1											
Measurement Datum Notes:	Top Of Cover (TOC), Ground Level (GL), Top Of Pipework (TOP). If 'Ground Level', the offset from datum to GL will be 0m. Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL. See figure above for definitions.											
Measurement Datum:	GL							Offset from datum to GL (m):		0		
Start Time:	10:19:00	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Turbidity (NTU)	Corr. REDOX (mV)	Notes / Flow (ml/min)	
Well Diameter (mm)	50	10:19								YSI	<Select Probe	
Well Material												
Initial Water Level (m)	3.67											
LNAPL Present? (Y/N)	No											
Initial LNAPL Level (m)												
Well Headspace Reading (PID/FID)												
Purge Method (Give details in Notes section)	Low Flow											
Sampling Method (Give details in Notes section.)	Peristaltic											
Pump Intake Depth (m)	3.77	Sampling Notes (e.g. oil/colour/odour), reasons if not monitored, include purge / sampling method if "Other" selected.										
Depth to Base (m)	3.87											
DNAPL Present? (Y/N)	No	Sample Containers Obtained					No					
Initial DNAPL Level (m)		Sample Collection Time					10:19:00					



Groundwater Sampling Data Form

This form is also available for RSK Mobile Data Capture.

Project Information	Project Name:		Storrington Road		
	Project Number:		305276		
	Sampling Date:	13/10/2022	Sampled by:	James Lilley	
	Weather:		Overcast dry		
	Well Notes - e.g. Condition, access, safety:				
Monitoring Information	Water Quality Meter Used:		YSI		
	Water Quality Meter Last Calibrated:				
	Dissolved oxygen probe last calibrated:				
	Water Level Meter Used (X that applicable):				
	Interface probe		Dip Meter	Yes	
	Typical Parameter Stabilisation Criteria for Low-Flow Sampling		Dissolved Oxygen (D.O.)		0.3 mg/l
			Specific Conductivity (Sp.Cond)		3%
			p.H		0.1 unit
Oxygen Reduction Potential (ORP)			10mV		
* For REDOX correction, see separate guidance					

BH ID	WS3												
Measurement Datum Notes:	Top Of Cover (TOC), Ground Level (GL), Top Of Pipework (TOP). If 'Ground Level', the offset from datum to GL will be 0m. Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL. See figure above for definitions.												
Measurement Datum:	TOC							Offset from datum to GL (m):		0			
Start Time:	12:37:00	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Turbidity (NTU)	Corr. REDOX (mV)	Notes / Flow (ml/min)		
Well Diameter (mm)	50									YSI	<Select Probe		
Well Material	HDPE	13:04	16.2	2036	1.89	6.36	153.6			364.60			
Initial Water Level (m)	3.66	13:07	16.3	2036	1.83	6.35	151.8			362.80			
LNAPL Present? (Y/N)	No	13:10	16.6	2034	2.19	6.36	148.2			358.50			
Initial LNAPL Level (m)		13:13	16.8	2036	2.2	6.37	145			355.30			
Well Headspace Reading (PID/FID)		13:16	16.9	2039	1.88	6.38	142.7			353.00			
Purge Method (Give details in Notes section)	Low Flow	13:19	16.9	2045	1.9	6.38	141.4			351.70			
Sampling Method (Give details in Notes section.)	Peristaltic												
Pump Intake Depth (m)	4.66	Sampling Notes (e.g. oil/colour/odour), reasons if not monitored, include purge / sampling method if "Other" selected.											
Depth to Base (m)	4.93												
DNAPL Present? (Y/N)	No	Sample Containers Obtained					No						
Initial DNAPL Level (m)		Sample Collection Time					12:37:00						

		Groundwater Sampling Data Form			
		This form is also available for RSK Mobile Data Capture.			
Project Information	Project Name:		Storrington Road		
	Project Number:		305276		
	Sampling Date:		13/10/2022	Sampled by:	James Lilley
	Weather:		Overcast sunny		
	Well Notes - e.g. Condition, access, safety:				
Monitoring Information	Water Quality Meter Used:		YSI		
	Water Quality Meter Last Calibrated:				
	Dissolved oxygen probe last calibrated:				
	Water Level Meter Used (X that applicable):				
	Interface probe		Dip Meter	Yes	
	Typical Parameter Stabilisation Criteria for Low-Flow Sampling		Dissolved Oxygen (D.O.)		0.3 mg/l
			Specific Conductivity (Sp.Cond)		3%
			p.H		0.1 unit
Oxygen Reduction Potential (ORP)			10mV		
* For REDOX correction, see separate guidance					

The diagram illustrates a well with a pump at the top. Key levels are marked: Top of Cover (TOC) at the very top, Ground Level (GL) below it, Top of Pipework (TOP) below GL, Depth to Water (DTW) indicated by a blue line representing the water level, and Depth to Base (DTB) at the bottom of the well casing.

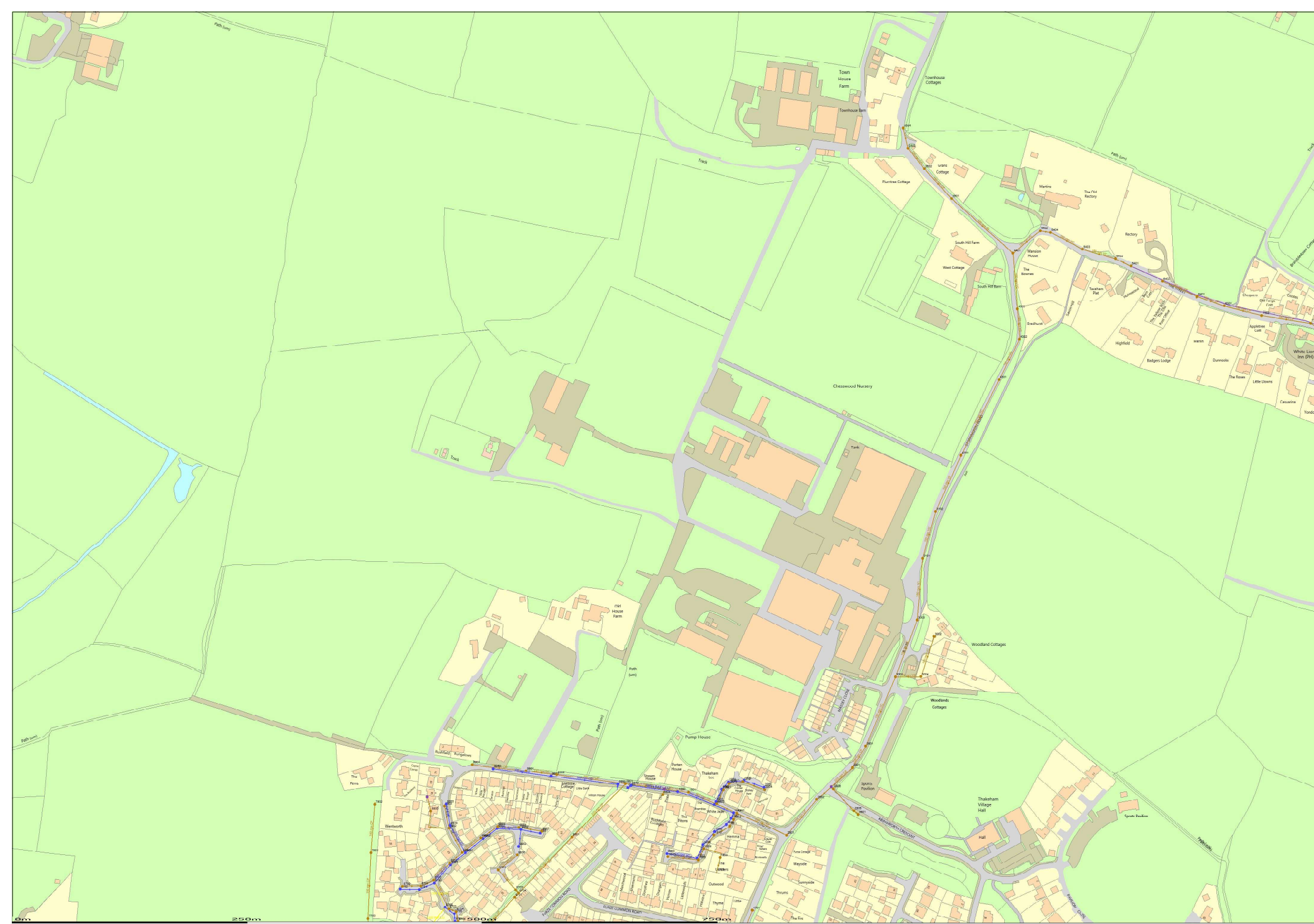
BH ID	WS4											
Measurement Datum Notes:	Top Of Cover (TOC), Ground Level (GL), Top Of Pipework (TOP). If 'Ground Level', the offset from datum to GL will be 0m. Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL. See figure above for definitions.											
Measurement Datum:	TOC							Offset from datum to GL (m):		0		
Start Time:	14:41:00	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Turbidity (NTU)	Corr. REDOX (µV)	Notes / Flow (ml/min)	
Well Diameter (mm)	50									YSI	<Select Probe	
Well Material	HDPE	14:41	16.4	1133	5.37	6.58	62.6	3.34		273.60		
Initial Water Level (m)	3.22	14:44	16.5	1124	2.27	6.58	65.4	3.39		275.70		
		14:47	16.3	1105	2.18	6.59	68.8	3.41		279.80		
LNAPL Present? (Y/N)	No	14:50	16.3	1098	2.16	6.6	72.5	3.43		283.50		
Initial LNAPL Level (m)		14:53	16.5	1092	2.34	6.61	76.9	3.46		287.20		
Well Headspace Reading (PID/FID)		14:56	16.5	1092	2.29	6.62	78.5	3.47		288.80	Started due to lack	
Purge Method (Give details in Notes section)	Low Flow											
Sampling Method (Give details in Notes section.)	Peristaltic											
Pump Intake Depth (m)	3.53	Sampling Notes (e.g. oil/colour/odour), reasons if not monitored, include purge / sampling method if "Other" selected.										
Depth to Base (m)	3.86											
DNAPL Present? (Y/N)	No	Sample Containers Obtained					No					
Initial DNAPL Level (m)		Sample Collection Time					13:20:00					

		Groundwater Sampling Data Form			
		This form is also available for RSK Mobile Data Capture.			
Project Information	Project Name:		Storrington Road		
	Project Number:		305276		
	Sampling Date:		13/10/2022	Sampled by:	James Lilley
	Weather:		Overcast dry		
	Well Notes - e.g. Condition, access, safety:		Well is dry.		
Monitoring Information	Water Quality Meter Used:		YSI		
	Water Quality Meter Last Calibrated:				
	Dissolved oxygen probe last calibrated:				
	Water Level Meter Used (X that applicable):				
	Interface probe		Dip Meter	Yes	
	Typical Parameter Stabilisation Criteria for Low-Flow Sampling		Dissolved Oxygen (D.O.)		0.3 mg/l
			Specific Conductivity (Sp.Cond)		3%
			p.H		0.1 unit
Oxygen Reduction Potential (ORP)			10mV		
* For REDOX correction, see separate guidance					

The diagram illustrates a cross-section of a groundwater sampling well. It shows the 'Top of Cover (TOC)' at the top, followed by 'Ground Level (GL)'. Below GL is the 'Top of Pipework (TOP)'. The 'Depth to Water (DTW)' is indicated by a blue line representing the water level. The 'Depth to Base (DTB)' is shown at the bottom of the well casing.

BH ID	WS5											
Measurement Datum Notes:	Top Of Cover (TOC), Ground Level (GL), Top Of Pipework (TOP). If 'Ground Level', the offset from datum to GL will be 0m. Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL. See figure above for definitions.											
Measurement Datum:	TOC							Offset from datum to GL (m):		0		
Start Time:	12:31:00	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Turbidity (NTU)	Corr. REDOX (mV)	Notes / Flow (ml/min)	
Well Diameter (mm)	50									YSI	<Select Probe	
Well Material	HDPE	12:31										
Initial Water Level (m)												
LNAPL Present? (Y/N)	No											
Initial LNAPL Level (m)												
Well Headspace Reading (PID/FID)												
Purge Method (Give details in Notes section)	Low Flow											
Sampling Method (Give details in Notes section.)	Peristaltic											
Pump Intake Depth (m)		Sampling Notes (e.g. oil/colour/odour), reasons if not monitored, include purge / sampling method if "Other" selected.										
Depth to Base (m)	3.51											
DNAPL Present? (Y/N)	No	Sample Containers Obtained					No					
Initial DNAPL Level (m)		Sample Collection Time					12:31:00					

Appendix E



Appendix F

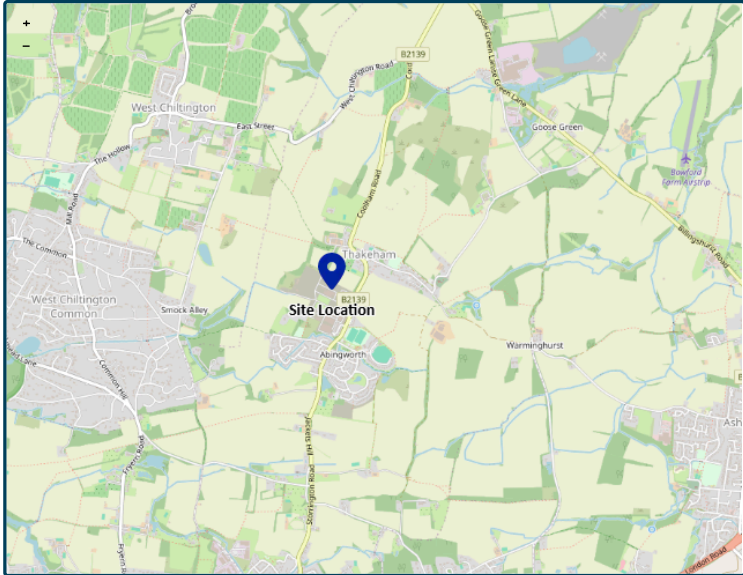
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	18/09/2025
Calculated by	N. Chalmers
Reference	
Model version	2.1.2

Location

Site name	
Site location	



© OpenStreetMap (<https://www.openstreetmap.org/copyright>) contributors.

Site easting (British National Grid)	510233
Site northing (British National Grid)	117131

Site details

Total site area (ha)	1	ha
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Greenfield runoff

Method

Method

FEH statistical

FEH statistical

My value

SAAR (mm)

850

mm

Map value

850

0.66

QMed-QBar conversion

1.136

1.136

QMed (l/s)

2.66

l/s

QBar (FEH statistical) (l/s)

3.02

l/s

Growth curve factors

My value

Hydrological region

7

Map value

7

1 year growth factor

0.85

2 year growth factor

0.88

10 year growth factor

1.62

30 year growth factor

2.3

100 year growth factor

3.19

200 year growth factor

3.74

Results

Method

FEH statistical

Flow rate 1 year (l/s)

2.6

l/s

Flow rate 2 year (l/s)

2.7

l/s

Flow rate 10 years (l/s)

4.9

l/s

Flow rate 30 years (l/s)

6.9

l/s

Flow rate 100 years (l/s)

9.6

l/s

Flow rate 200 years (l/s)

11.3

l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.1.2) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.