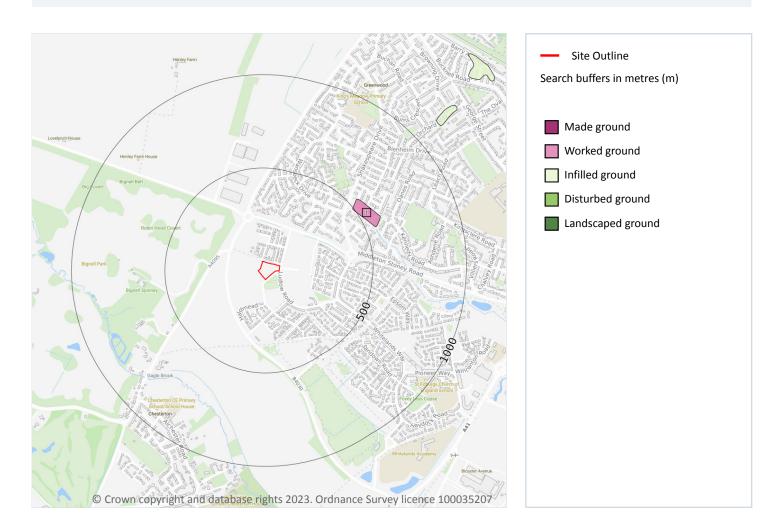


Geology 1:50,000 scale - Artificial and made ground



15.2 Artificial and made ground (50k)

Records within 500m

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on page 68 >

ID	Location	LEX Code	Description	Rock description
1	494m NE	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID

This data is sourced from the British Geological Survey.







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15.3 Artificial ground permeability (50k)

Records within 50m

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).







Geology 1:50,000 scale - Superficial

15.4 Superficial geology (50k)

Records within 500m

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.





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Geology 1:50,000 scale - Bedrock



Site Outline Search buffers in metres (m) Bedrock faults and other linear features (50k) Bedrock geology (50k) Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on page 71 >

ID	Location	LEX Code	Description	Rock age
1	On site	CB-LMST	CORNBRASH FORMATION - LIMESTONE	BATHONIAN
2	458m NE	FMB-LSMD	FOREST MARBLE FORMATION - LIMESTONE AND MUDSTONE, INTERBEDDED	BATHONIAN

This data is sourced from the British Geological Survey.







15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Very High	High

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m 0	
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Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.







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16 Boreholes

16.1 BGS Boreholes

Records within 250m

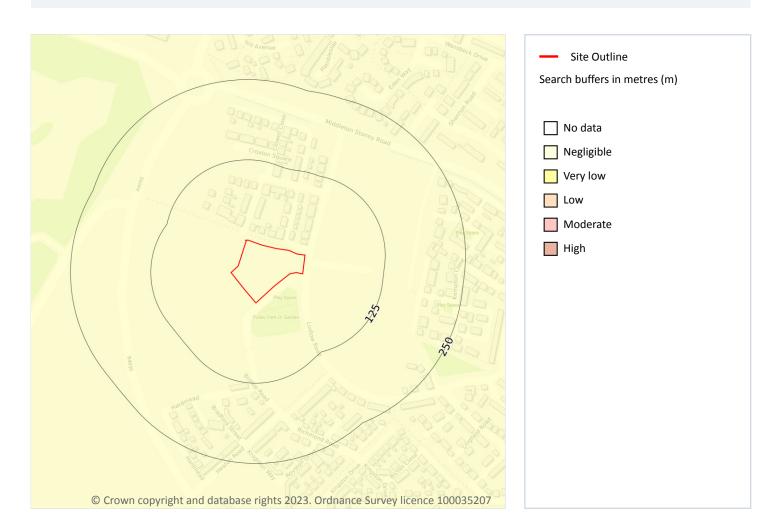
The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.







17 Natural ground subsidence - Shrink swell clays



17.1 Shrink swell clays

Records within 50m 1 The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as

they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on page 74 >

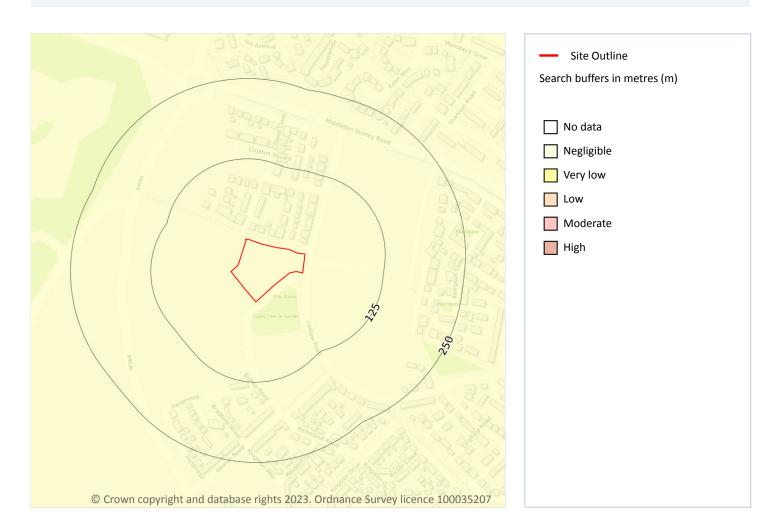
Location	Hazard rating	Details
On site	Negligible	Ground conditions predominantly non-plastic.







Natural ground subsidence - Running sands



17.2 Running sands

Records within 50m

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on page 75 >

Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

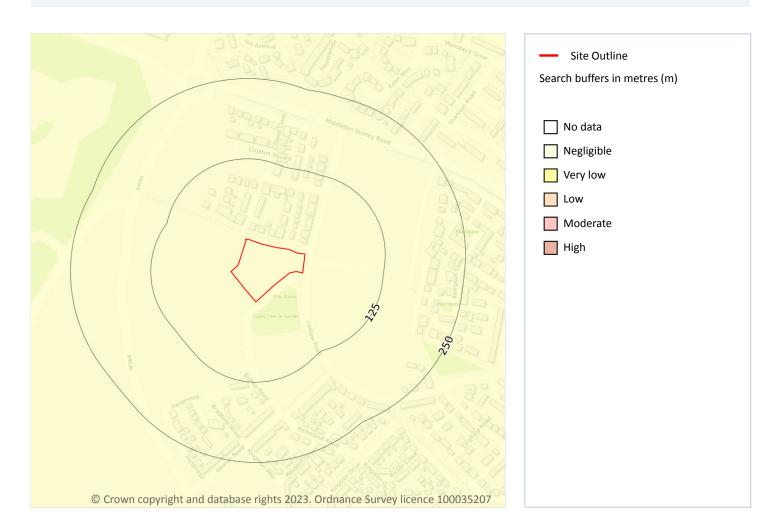
This data is sourced from the British Geological Survey.







Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on page 76 >

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

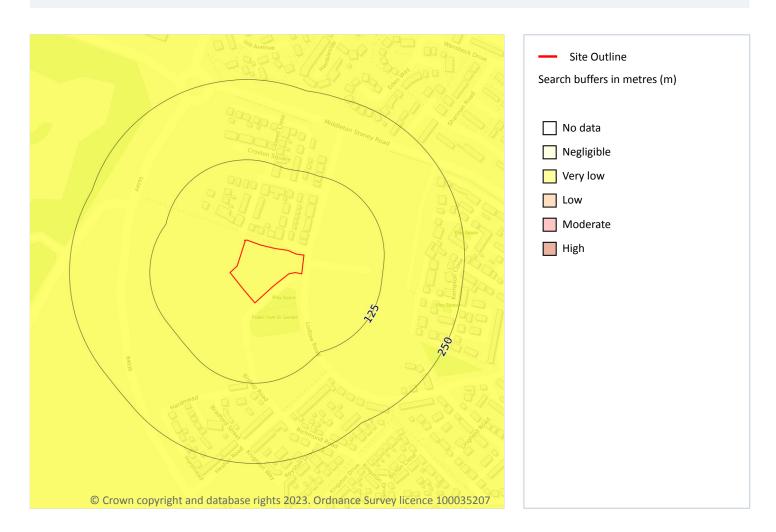
This data is sourced from the British Geological Survey.







Natural ground subsidence - Collapsible deposits



17.4 Collapsible deposits

Records within 50m

The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on page 77 >

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

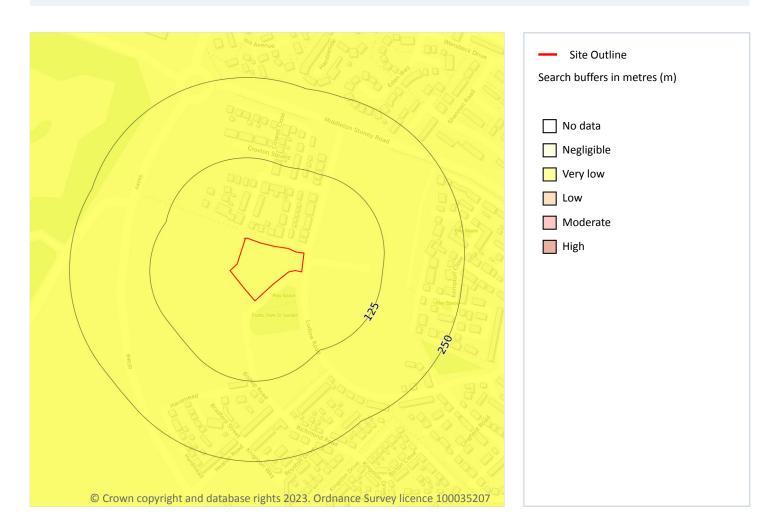
This data is sourced from the British Geological Survey.







Natural ground subsidence - Landslides



17.5 Landslides

Records within 50m

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on page 78 >

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

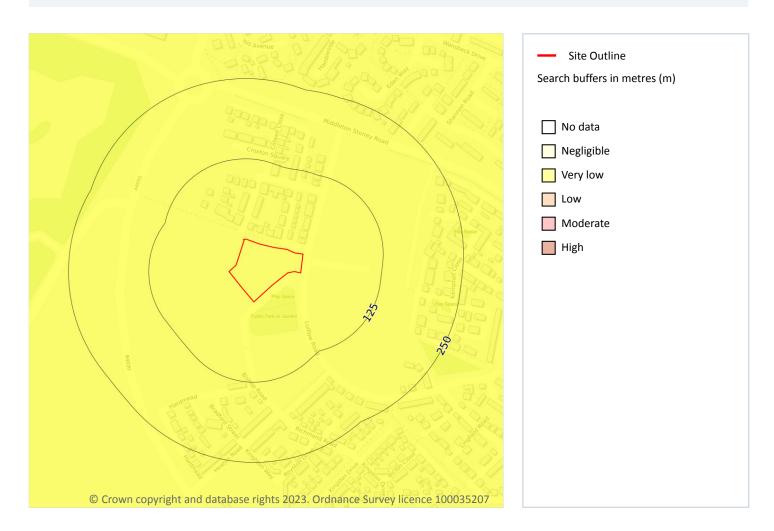
This data is sourced from the British Geological Survey.







Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on page 79 >

Location	Hazard rating	Details
On site	Very low	Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.





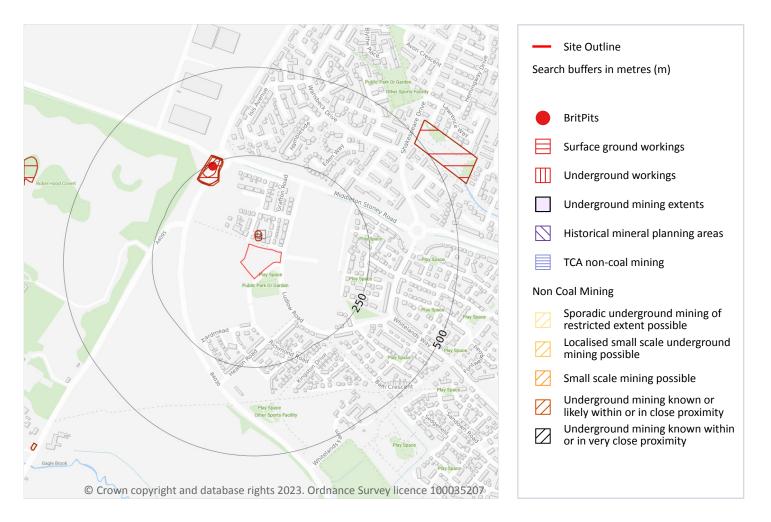








18 Mining and ground workings



18.1 BritPits

Records within 500m

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining and ground workings map on page 81 >







ID	Location	Details	Description
В	243m NW	Name: King's End Farm Address: Chesterton, OXFORD, Oxfordshire Commodity: Limestone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining and ground workings map on page 81 >

ID	Location	Land Use	Year of mapping	Mapping scale
А	16m N	Unspecified Heap	1880	1:10560
А	26m N	Unspecified Heap	1882	1:10560
В	194m NW	Unspecified Old Quarry	1966	1:10560
В	200m NW	Unspecified Old Quarry	1950	1:10560
В	200m NW	Unspecified Old Quarry	1938	1:10560
В	220m NW	Unspecified Quarry	1898	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.3 Underground workings

Records within 1000m 0	
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Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.







18.4 Underground mining extents

Records within 500m

This data identifies underground mine workings that could present a potential risk, including adits and seam workings. These features have been identified from BGS Geological mapping and mine plans sourced from the BGS and various collections and sources.

This data is sourced from Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 JPB mining areas

Records on site

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.8 The Coal Authority non-coal mining

Records within 500m

This data provides an indication of the potential zone of influence of recorded underground non-coal mining workings. Any and all analysis and interpretation of Coal Authority Data in this report is made by Groundsure, and is in no way supported, endorsed or authorised by the Coal Authority. The use of the data is restricted to the terms and provisions contained in this report. Data reproduced in this report may be the copyright of the





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Coal Authority and permission should be sought from Groundsure prior to any re-use.

This data is sourced from The Coal Authority.

18.9 Researched mining

Records within 500m	Records	within	500m
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This data indicates areas of potential mining identified from alternative or archival sources, including; BGS Geological paper maps, Lidar data, aerial photographs (from World War II onwards), archaeological data services, websites, Tithe maps, and various text/plans from collected books and reports. Some of this data is approximate and Groundsure have interpreted the resultant risk area and, where possible, specific areas of risk have been captured.

Location	Mineral type
499m NE	Stone

This data is sourced from Groundsure.

18.10 Mining record office plans

Records within 500m 0 This dataset is representative of Mining Record Office and/or plan extents held by Groundsure and should be

considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.11 BGS mine plans

Records within 500m

This dataset is representative of BGS mine plans held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.12 Coal mining

Records on site

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.





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18.13 Brine areas

Records on site

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.14 Gypsum areas

Records on site

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.15 Tin mining

Records on site

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.16 Clay mining

Records on site

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).





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19 Ground cavities and sinkholes

19.1 Natural cavities

Records within 500m

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

19.2 Mining cavities

Records within 1000m

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

19.3 Reported recent incidents

Records within 500m

This data identifies sinkhole information gathered from media reports and Groundsure's own records. This data goes back to 2014 and includes relative accuracy ratings for each event and links to the original data sources. The data is updated on a regular basis and should not be considered a comprehensive catalogue of all sinkhole events. The absence of data in this database does not mean a sinkhole definitely has not occurred during this time.

This data is sourced from Groundsure.

19.4 Historical incidents

Records within 500m

This dataset comprises an extract of 1:10,560, 1:10,000, 1:2,500 and 1:1,250 scale historical Ordnance Survey maps held by Groundsure, dating back to the 1840s. It shows shakeholes, deneholes and other 'holes' as noted on these maps. Dene holes are medieval chalk extraction pits, usually comprising a narrow shaft with a number of chambers at the base of the shaft. Shakeholes are an alternative name for suffusion sinkholes, most commonly found in the limestone landscapes of North Yorkshire but also extensively noted around the Brecon Beacons National Park.

Not all 'holes' noted on Ordnance Survey mapping will necessarily be present within this dataset.





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This data is sourced from Groundsure.

19.5 National karst database

Records within 500m

This is a comprehensive database of national karst information gathered from a wide range of sources. BGS have collected data on five main types of karst feature: Sinkholes, stream links, caves, springs, and incidences of associated damage to buildings, roads, bridges and other engineered works.

Since the database was set up in 2002 data covering most of the evaporite karst areas of the UK have now been added, along with data covering about 60% of the Chalk, and 35% of the Carboniferous Limestone outcrops. Many of the classic upland karst areas have yet to be included. Recorded so far are: Over 800 caves, 1300 stream sinks, 5600 springs, 10,000 sinkholes.

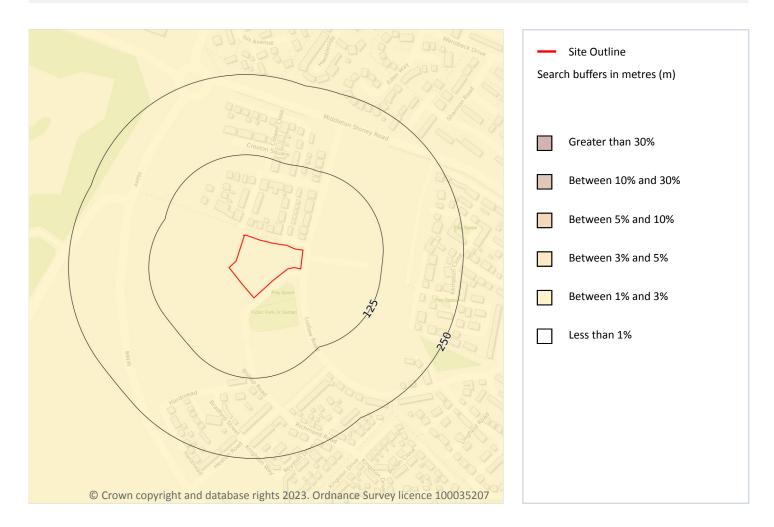
The database is not yet complete, and not all records have been verified. The absence of data does not mean that karst features are not present at a site. A reliability rating is included with each record.







20 Radon



20.1 Radon

Records on site

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The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on page 88 >

Location	Estimated properties affected	Radon Protection Measures required
On site	Between 1% and 3%	None







This data is sourced from the British Geological Survey and UK Health Security Agency.







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21 Soil chemistry

21.1 BGS Estimated Background Soil Chemistry

Records within 50m

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
3m NW	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
8m N	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

21.2 BGS Estimated Urban Soil Chemistry

Records within 50m

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).







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21.3 BGS Measured Urban Soil Chemistry

Records within 50m

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².







22 Railway infrastructure and projects

22.1 Underground railways (London)

Records within 250m

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

22.2 Underground railways (Non-London)

Records within 250m

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

22.3 Railway tunnels

Records within 250m

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

22.4 Historical railway and tunnel features

Records within 250m

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

22.5 Royal Mail tunnels

Records within 250m

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.





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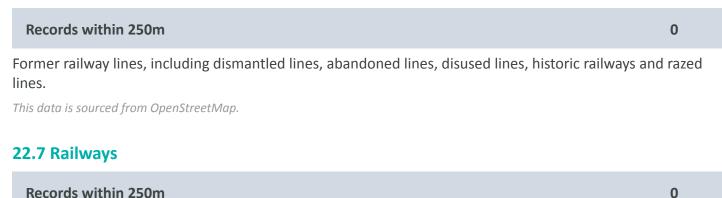
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This data is sourced from Groundsure/the Postal Museum.

22.6 Historical railways



Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways. This data is sourced from Ordnance Survey and OpenStreetMap.

22.8 Crossrail 1

Records within 500m

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

22.9 Crossrail 2

Records within 500m

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

22.10 HS2

Records within 500m

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.





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Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <u>https://www.groundsure.com/sources-reference</u> \nearrow .

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: <u>https://www.groundsure.com/terms-and-conditions-april-2023/</u> 7.





Appendix B HISTORICAL GROUND INVESTIGATION REPORTS





KINGSMERE PHASE 2, BICESTER

Combined Phase I & Phase II Geo-Environmental Assessment Report Countryside Properties (Bicester) Ltd 14/02/2013

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 3
Remarks	Draft	Updated following receipt of laboratory data from water samples	Updated following Client comments and additional gas monitoring
Date	06/02/13	14/02/2013	31/05/2013
Prepared by	O George	H Gardiner	H Gardiner
Signature			
Checked by	J Mortimer	S Jagger	K Hole
Signature		~	
Authorised by	P Dowson	P Dowson	P Dowson
Signature			
Project number	00028453	00028453	00028453
Report number	2	2	2
File reference	M:_SOIL & GROUNDWATER\Bids and Projects 1237\00028453 - Bicester Phase 2\(6) Reporting\Report\00028453- 002-051112-OEGREP- Bicester Phase 2-v1 2 Final. docx.doc	M:_SOIL & GROUNDWATER\Bids and Projects 1237\00028453 - Bicester Phase 2\(6) Reporting\00028453-002- 140213-HGREP-Bicester Phase 2-Rev1. docx	M:_SOIL & GROUNDWATER\Bids and Projects 1237\00028453 - Bicester Phase 2\(6) Reporting\00028453-002- 310513-HGREP-Bicester Phase 2-Rev 3. docx



KINGSMERE PHASE 2, BICESTER Countryside Properties (Bicester) Ltd

14/02/2013

Client

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Table of Contents

E	XECl	JTIVE SUMMARY	5
1	IN ⁻ 1.1 1.2 1.3 1.4 1.5 1.6 1.7	TRODUCTION. Authorisation Background Proposed Development. Objectives Scope of Works. Previous Reports. Limitations	7 7 7 7 7 8
2	SI 2.1 2.2 2.3 2.4 2.5	TE CHARACTERISATION Site Details Geology and Hydrogeology Radon Hydrology Site History	9 9 10 10
3	PR 3.1 3.2 3.3 3.4 3.5	ELIMINARY CONCEPTUAL SITE MODEL General Summary of Potential Sources Summary of Potential Pathways Summary of Identified Receptors Plausible Pollutant Linkages	12 12 13 13
4	SI 4.1 4.2	TE INVESTIGATION Fieldwork Rationale for Exploratory Hole Locations	14
5	GF 5.1 5.2 5.3 5.4 5.5 5.6 5.7	ROUND CONDITIONS General Summary of Ground Conditions Visual and Olfactory Evidence of Contamination Groundwater Ground Gas Infiltration Assessment Geotechnical Soil Parameters	16 16 17 17 17 17
6	GE 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8	OTECHNICAL ASSESSMENT. General Development Proposals Preliminary Geotechnical Parameters and Ground Model . Foundations Floor Slabs Groundwater Control Subgrade Assessment for Pavement Design Buried Concrete	20 20 21 21 21 21 21 21
7	CC 7.1 7.2 7.3 7.4	ONTAMINATION ASSESSMENT Human Health Assessment - Overview Risk Assessment Completed Within This Report Assessment of the Analytical Results – Human Health Metals and Inorganics	23 23 24



7.5 Organics			
7.6 Herbicides and Pesticides			
7.7 Controlled Waters			
7.9 Assessment of the Analytical Results – Controlled Waters	25 25		
7.10 Assessment of Potable Supply Pipes	25		
7.11 Assessment of Ground Gas	25		
7.12 Assessment of the Results – Ground Gas	26		
8 REVISED CONCEPTUAL SITE MODEL	27		
8.1 General			
8.2 Contaminant Sources			
8.3 Migration pathways			
8.5 Plausible Pollutant Linkage			
9 CONCLUSIONS AND RECOMMENDATIONS			
9.1 Ground Investigation			
9.2 Land Contamination			
Appendix A – Figures	31		
Appendix B – Exploratory Hole Logs from Previous Phases of	~~		
Investigation			
Appendix C – WSP Borehole Logs	33		
Appendix D – Monitoring Results	34		
Appendix E – Geotechnical Laboratory Results	35		
Appendix F - Geotechnical plots	36		
Appendix G – WSP Risk Assessment Approach	37		
Appendix H - Chemical Laboratory Results	38		
Appendix I - Limitations			

EXECUTIVE SUMMARY

WSP were instructed by Countryside Properties (Bicester) Ltd (the Client) to complete a Phase II Geo-Environmental and Geotechnical Assessment on Phase 2 of the Kingsmere Bicester development (the Site).

It is understood that the Site is to be developed for residential and light-commercial end-use. The assessment is required in order to identify potential ground related risks and present preliminary design options and solutions for the ground engineering aspects of the proposed scheme. As part of these works, the assessment will advise on potential environmental (contaminated land) risks associated with the proposed development and the prevalent ground, ground gas and groundwater conditions at the site. Previous phases of intrusive investigation have been undertaken by WSP across the site. Where applicable, this information has been used to supplement this investigation.

The site investigation works were completed between 1st and 10th October 2012 under the supervision of a WSP engineer.

Ground conditions at the Site were found to comprise a limited thickness of topsoil overlying strata of the Cornbrash Formation with Forest Marble Formation deposits at depth. The Cornbrash Formation was observed as either a very clayey gravel or a stiff to very stiff, gravelly clay. The Forest Marble Formation comprise very stiff, dark bluish grey clay to very weak mudstone with layers of strong, grey limestone. The ground conditions encountered at the site are consistent with the available published geology and with previous phases of investigation undertaken by WSP in the wider Kingsmere Bicester development.

Water seepages were noted in several exploratory holes at shallow depth and groundwater was encountered at depths of between 5.0m and 8.0m bgl. In several locations in the central region of the Site, groundwater was recorded to be under artesian pressure and rose to a maximum of 1.7m above ground level.

In-situ percolation tests were performed across the Site and indicate that the soils ranged from low permeability to practically impermeable, as defined in CIRIA C515. If soakaway drainage is proposed, it should be noted that there may be a requirement to provide a large storage capacity and it is recommended that additional testing is undertaken at the location of soakaway drains.

The concentration of arsenic in the near-surface soil at one location exceeds the residential GAC/SGV but all other determinands are below their respective residential GAC/SGV. It is considered that the localised exceedance of arsenic is naturally occurring as it is from a sample of natural soil with no observable anthropogenic source. It should also be noted that arsenic is generally slightly elevated within samples from across the site but below the residential GAC/SGV. If the area in which the elevated concentration of arsenic was recorded is to be within residential garden areas, it is recommended that a capping layer of 500mm clean topsoil is placed to provide an effective barrier between site end users and the shallow soils. This sample does not exceed commercial or public open space GAC and it is recommended that this sample should be re-appraised once the masterplan has been finalised.

Groundwater samples were collected from six of the monitoring installations and indicate that there has been some minor impaction, mainly in the northwestern part of the site, from heavy-end petroleum hydrocarbons, although it is noted that the concentrations decrease futher across the east of the site. The concentrations of these heavy end aliphatics are above solubility limits, however, site investigation data including borehole logs, soil data and groundwater monitoring observations do not support the presence of a free-phase as no odour or visible sheen has been noted. As such, it is considered likely that at the reported concentrations, this is at worst a light sheen. It should be noted that there is no identified on-site source for petroleum hydrocarbons and an off-site source is suspected. The absence of lighter end hydrocarbons indicates that the source is no longer contributing to the contamination of groundwater. It is recommended that additional, targeted water sampling is undertaken to confirm and supplement the existing data. This may be done as part of any proposed remediation of the wider site.

Ground gas monitoring has been undertaken on three occasions following the installation of the monitoring standpipes where suitable groundwater conditions allow.



Based on the three rounds of ground gas monitoring completed, the risks from ground gas on the proposed development are considered to be very low and reference to the relevant guidance documents indicates that no special precautions would be required. Given the flooded boreholes, please note that the local authority may require further monitoring.

It is considered that the Cornbrash Formation strata are suitable to allow the use of traditional strip or trench-fill foundations. A nett allowable bearing capacity of 250 kN/m^2 may be used when footings are placed on granular Cornbrash Formation. Where footings are placed within cohesive Cornbrash Formation strata, they should be placed a minimum of 0.9m deep and a nett allowable bearing capacity of 150 kN/m² may be adopted. It is not anticipated that piled foundations will be necessary but if particularly high foundation loads are proposed, it is recommended that further assessment is undertaken.

Although it is appreciated modern building techniques include suspended ground floor slabs, ground bearing floor slabs may be used within residential properties with footings on granular Cornbrash Formation strata. A suspended ground floor slab with a minimum 250mm void should be installed in residential properties with foundations on cohesive Cornbrash Formation strata, in accordance with National House Building Council recommendations.

Floor slab loads for light industrial properties have not been provided but are assumed to be relatively light and it is considered that ground bearing floor slabs could be used and may be designed on a modulus of subgrade reaction of 20 MN/m³.

It is recommended that a CBR value of 3% is used for the preliminary design of road pavements on cohesive Cornbrash Formation strata and a CBR value of 4% is used for road pavements on granular strata. Further testing along the route of road pavements is recommended.

1 INTRODUCTION

1.1 Authorisation

WSP Environment & Energy (WSP) was instructed by Countryside Properties (Bicester) Ltd (the Client) to complete a combined Preliminary and Intrusive Geo-Environmental Assessment on Phase 2 of the Kingsmere Bicester development (the Site). Site location and layout plans are provided as Figures 1 and Figure 2 respectively within **Appendix A**.

1.2 Background

The Phase 2 development site is located within the north-western corner of a wider development area known as Kingsmere Bicester. It is understood that the wider site is due to be redeveloped in phases for residential purposes, together with schools and a local centre.

WSP have previously undertaken seven phases of site investigation on the wider development area. These investigations were preliminary in nature; the first focused on a broad review of site conditions and the subsequent four investigations were concerned with areas for residential and commercial development. The sixth and seventh investigations focused on the area of Made Ground adjacent to Howes Lane and the Farmhouse area.

With respect to the Phase 2 Site, WSP have concurrently produced a chapter within the Environmental Statement for the development as referenced below. Information contained within the Environmental Statement chapter has contributed to this assessment.

WSP 00028453/001 (October 2012) Chapter 7: Ground Conditions. Phase 2, Kingsmere Bicester.

1.3 Proposed Development

It is understood that the Site will be developed for residential and light-commercial (retail) end-use.

1.4 Objectives

The assessment is required in order to identify potential ground related risks and present preliminary design options and solutions for the ground engineering aspects of the proposed scheme. As part of these works, the assessment will advise on potential environmental (contaminated land) risks associated with the proposed development and the prevalent ground, ground gas and groundwater conditions at the site.

1.5 Scope of Works

The following scope of works has been undertaken:

1.5.1 Preliminary Geo-Environmental Risk Assessment

- Review of readily available Ordnance Survey historical maps to identify former land uses and potential contaminative activities on and surrounding the Site;
- Review of relevant regulatory databases and contact with the local regulatory authorities including, the Local Authority Planning Department and Contaminated Land Officer (CLO) and the Environment Agency (EA) regarding any pertinent records held;
- Review of available published information relating to geology, hydrological features, hydrogeology, neighbouring land use and ecologically sensitive uses; and
- Develop a preliminary conceptual site model via the source-pathway-receptor pollutant linkage approach.

1.5.2 Intrusive Geo-Environmental Risk Assessment

- Preparation of site specific health and safety documentation;
- Utilities clearance survey of all proposed exploratory borehole locations to enable safe working;
- Fulltime, on-site supervision by an Engineer from WSP to undertake logging;



- Progression of 8 no. rotary cored boreholes to a maximum depth of 8.10m below ground level (m bgl) and eleven window sample boreholes including in-situ geotechnical testing, comprising Standard Penetration Tests (SPTs) and disturbed soil samples for laboratory testing. Upon completion, the boreholes were converted to dual purpose ground gas and groundwater monitoring wells;
- Excavation of 20 no. trial pits to a maximum depth of 3.6m bgl and the recovery of disturbed soil samples for laboratory testing;
- In-situ soakaway tests performed within 4 no. trial pits to assess whether soakaway drainage is feasible in the proposed development;
- Analytical laboratory testing for a range of targeted organic and inorganic determinands;
- Geotechnical laboratory analysis to determine the engineering properties of the materials at the Site; and
- Monitoring of ground gas concentrations and groundwater levels.

1.6 Previous Reports

A number of intrusive investigations have been undertaken on surrounding land parcels. The relevant reports are referenced below. Where applicable, the results of the relevant exploratory holes have been incorporated into this assessment.

 WSP 00022478/003 (July 2011) Howes Lane, Southwest Bicester, Oxfordshire Phase II Geo-Environmental Assessment and DQRA

The Howes Lane assessment was undertaken specifically to target an area of Made Ground/Landfill within the north-western corner of the Phase 2 area. Site specific remedial solutions for this area of the site were produced to mitigate contamination risks posed to the proposed development (construction of a road over the Made Ground). Although a number of exploratory holes from the investigation are within the Phase 2 site boundary, the information within the Howes Lane report has not been incorporated into this assessment given the localised nature of the Made Ground and its remediation. It should be noted that where the Made Ground extended outside of the road alignment, the Made Ground has been removed and replaced with clean site won materials. Further consideration should be given in this area where building footprints encroach onto the area of clean infilled material.

 WSP 12370178/001/01 (July 2007) Whitelands Farm, South West Bicester Geo-Environmental and Geotechnical interpretative Report.

The relevant exploratory holes are TP02, TP05, TP06 and TP51. Exploratory hole logs are presented within **Appendix B**.

1.7 Limitations

The general limitations to the assessment are outlined in Appendix I.

It should be noted that access issues to the south western area of the site prevented the progression of boreholes BH708 and WS712, such that only trial pitting could be undertaken in this part of the site.

2 SITE CHARACTERISATION

2.1 Site Details

Table 2.1: Site Details		
Site Address	Land known as Phase 2, Kingsmere, Bicester	
Grid Reference	456613, 222337	
Area	Approximately 32 ha.	
Site Location	The Site is located to the southwest of Bicester, within the County of Oxfordshire. The A4095 forms a curved boundary from the north-western corner sweeping down to the southern point of the site. Vendee Drive/Middleton Stoney Road runs along the northern boundary and former agricultural land now being developed as South West Bicester Phase 1 and Kingsmere is present to the east of the site.	
Summary of Surrounding Land Uses	The Site is predominantly surrounded by agricultural land but residential properties of Bicester are present immediately to the north and Phase I of the wider development is currently under construction to the east. The M40 motorway is located approximately 1.5 km to the west of the Site.	

The layout of the site is presented as **Figure 2** within **Appendix A**.

2.2 Geology and Hydrogeology

With reference to the British Geological Survey (BGS) 1:50,000 Map Sheet 219 Buckingham (Solid and Drift) published in 2002, the site is indicated to be underlain by the following geological sequence.

Table 2.2:Geological Strata

Geological Unit	Description	Aquifer Status*
Cornbrash Formation	Rubbly grey to brown limestone	Secondary (A) Aquifer
Forest Marble Formation	Grey mudstone with beds of limestone	Secondary (A) Aquifer

Note:* with reference to the Environment Agency website

The BGS database of borehole records was accessed for details of suitable boreholes on and surrounding the site. A borehole progressed at Whitelands Farm, to the southeast of the Site, has been obtained from the British Geological Survey and is provided in **Appendix B**. The borehole record indicates that topsoil may be present to a depth of 0.3m with alternating horizons of limestone and clay proven to a depth of approximately 42m. The record also indicated that groundwater was encountered at approximately 7.6m below ground level.

The borehole record obtained from the BGS appears to confirm the published geology.



The following groundwater abstractions have been noted within 1km of the site.

Table 2.3: Summary of Active Licenced Groundwater Abstractions				
Licence Nur	nber	Location	Start Date	Use
28/39/14/012	23	On Site	1967	General Farming And Domestic

The Site is not indicated to be located within an Environment Agency Source Protection Zone (SPZ).

2.3 Radon

According to the information provided in BRE 211 (2007), the Site is not in a radon affected area as less than 1% of homes are above the action level. Therefore, radon protective measures are considered not necessary in the construction of new dwellings or extensions.

2.4 Hydrology

Surface water features located on or within 500m of the Site are listed below.

Table 2.4:	On-site and Surrounding Key Surface Water Features
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Surface Water Feature	Distance (m)	Direction	Water Quality*
Land Drain	Adjacent	northeast	NA
Land Drain	200	southwest	NA
Gagle Brook	250	southwest	Not classified

Notes: * Environment Agency (EA) general quality assessment (GQA) river quality classification chemistry/biology

2.5 Site History

A review of readily available Ordnance Survey historical maps has been undertaken to identify any former potentially contaminative uses of the site and its adjacent land uses/potential geotechnical constraints. A summary of pertinent information is provided in Table 2.5 and Table 2.6.

Table 2.5:	Summary of On-site Land Uses	Defec
Land Use o	n Site	Dates
	fields including a number of footpaths traversing the land. eas of interest include:	Pre 1881-Present
An old wind	mill is indicated in the north-western region of the Site.	Pre 1881-Pre 1899
An old quar	ry in the north-eastern part of the Site.	Pre 1881-Pre 1922
	n about in the equilibrium partian of the site class to	110 1001 110 1022
	p shown in the south-eastern portion of the site close to Farm buildings.	Pre 1967-Pre1984
	present right on the north-western boundary of the site which ch slightly onto the site itself.	Pre 1899-Pre 1967

Table 2.6:Summary of Off-site Land Uses

Land Use off-Site	Distance/Direction	Dates
Whitelands Farm	40 m southeast	Pre 1875-Present
Whitelands Cottages and a 'Pump'	200m east	Pre 1881-Present
Quarry	20 m northwest	Pre 1899-Pre 1967
Housing Estates	50m north 200m north-east	Pre 1984-Present Pre 1967-Present



3 PRELIMINARY CONCEPTUAL SITE MODEL

3.1 General

On Site

This section presents the characteristics of the Site, provides a systematic indication of the potential risks and enables uncertainties and further assessment needs, or other actions, to be identified with respect to contamination.

The conceptual model has been developed based on the proposed future residential and light commercial land use scenario.

3.2 Summary of Potential Sources

Tables 3.1 and 3.2 provide a summary of the potential sources of contamination identified in the Environmental Statement.

Table 3.1: Potential Sou	rces of On-site Contamination
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On Site			
Source	Contaminants of Concern	Potential Migration Pathway	Receptor
Made Ground; Potential areas of burning; & Agricultural use.	Metals (such as naturally occurring arsenic); Asbestos from former farm buildings; Polycyclic aromatic hydrocarbons (PAHs) from potential areas of fallow land burning; Ground gases; & Herbicides and pesticides (including persistent organic pollutants).	Human Health Inhalation of ground gases; Ingestion of soil and dust; & Direct contact with soil. <u>Controlled Waters</u> Leaching into groundwater & lateral migration.	Future Site Users (residential); & Construction & Maintenance Staff; Groundwater: Secondary (A) Aquifer; Surface water: Gagle brook.

Table 3.2: Potential Sources of Off-site Contamination

Off Site				
Source	Contaminants of Concern	Potential Migration Pathway	Receptor	
Infilled quarry; & Made Ground	Metals and Inorganics (such as pH and sulphate) and asbestos; Total petroleum hydrocarbons (TPH); PAHs; Semi volatile organic compounds (SVOCs); & ground gas.	Migration of groundwater or gas onto site.	Future Site Users; Construction & Maintenance Staff; Groundwater: Secondary (A) Aquifer;	

3.3 Summary of Potential Pathways

Based on the sources of contamination identified, the Site setting and the proposed future land use scenario the following pathways may exist at the site;

- Direct contact with contaminated soil and groundwater (dermal contact, inhalation of dust and/or ingestion);
- Lateral and vertical migration of groundwater through permeable strata; and
- Lateral migration of ground gases through the unsaturated zone.

3.4 Summary of Identified Receptors

The identified receptors, based on the proposed future land use scenario, comprise site users, construction workers, the Secondary (A) Aquifer beneath the site and Gagle Brook.

3.5 Plausible Pollutant Linkages

Table 3.3 summarises the possible on-site pollutant linkages which have been identified:

Media	Source	Pathway	Exposure route	Receptor
		Direct contact with soils and absorption through skin.	Direct contact and Ingestion.	Future site users, construction workers
	Contaminants	Ingestion and inhalation of	Ingestion.	
Soils	associated with current and historical land	contaminated dust/ground gases.	Inhalation.	
	uses.	Aggressive ground/sulphate attack		Proposed
		Ingress into potable drinking water supplies		development
Groundwater diss	Contaminants present in their dissolved phase.	Migration through the unsaturated zone.	Perched groundwater migration.	Secondary (A) Aquifer.
		Migration through the saturated zone.	Groundwater migration.	Secondary (A) Aquifer on-site and off-site, groundwater abstractions, land drains and Gagle Brook.
		Direct contact with perched groundwater and absorption through skin.	Direct contact and ingestion.	Future site occupants and construction workers on and off site.

Table 3.3: Plausible Pollutant Linkages



4 SITE INVESTIGATION

4.1 Fieldwork

The site investigation works were completed between 1st and 10th October 2012 under the supervision of a WSP engineer. The works were as detailed in **Section 1.5**. An exploratory hole location plan and detailed logs showing the ground conditions encountered are presented in **Appendix A** and **Appendix C** respectively.

The ground investigation was undertaken in accordance with techniques outlined in BS EN 1997-2, BS5930:1999 + A2:2010 Code of Practice for Site Investigations and BS10175: 2011 Code of Practice for the Investigation of Potentially Contaminated Sites. In advance of the works, each exploratory hole location was cleared of services by a specialist contractor, as detailed within the WSP Health, Safety and Environmental Plan.

4.2 Rationale for Exploratory Hole Locations

Table 4.1 below gives a summary of the exploratory holes completed as part of the ground investigation, along with the rationale for each technique.

Element of investigation	Details	Rationale
Trial Pits and Soakaway Tests	TP701 to TP720. TP02, TP05, TP06 and TP51 (12370178/001/01, 2007)	To allow inspection of shallow soils and to allow the retrieval of samples for geotechnical and analytical laboratory testing. Soakaway tests were performed in trial pits TP701, TP705C, TP716 and TP720 to provide an indication of whether infiltration drainage may be feasible in the proposed development. A soakaway test was also previously undertaken in TP05.
Rotary Boreholes	BH701 to BH707.	Drilling of seven boreholes to a maximum depth of 8.1m bgl to provide geotechnical design parameters of the deeper strata and to allow the installation ground gas and groundwater monitoring wells.
Windowless Sample Boreholes	WS701 to WS711.	Progression of eleven windowless sample boreholes to investigate the near-surface soils and to provide geotechnical design parameters.Soil samples were recovered for analytical and geotechnical laboratory testing.Gas and groundwater monitoring wells were installed within four of the boreholes to target shallow, weathered strata.
In-situ Testing	Standard Penetration Tests (SPTs) were undertaken at 1.0m or 1.5m intervals within both rotary boreholes and windowless sample boreholes.	To provide geotechnical design parameters for foundation design.

Table 4.1: Exploratory Hole Rationale

Element of investigation	Details	Rationale
Installation of gas and groundwater monitoring wells	Installations within five rotary boreholes with four response zones within the Forest Marble Formation and one along the boundary of the Cornbrash Formation and Forest Marble Formation. Installations within four windowless sample boreholes with response zones within the Cornbrash Formation.	To provide information to characterise the ground gas regime and groundwater conditions.
Geotechnical Laboratory Testing	Selected soil samples were submitted to Geo Site and Testing Services Ltd., a UKAS accredited laboratory, for geotechnical testing.	To determine geotechnical soil and rock parameters, to aid classification and to provide information for use in foundation design. Geotechnical testing included pH, sulphate, atterberg limits, moisture content, maximum dry density (2.5 kg hammer/vibrating hammer), particle size distribution, particle density, CBR (remoulded), and point load.
Chemical Laboratory Analysis	Selected soil samples were submitted to ALcontrol UK Ltd., a UKAS and MCERTS accredited laboratory, for chemical analysis.	To provide information on potentially contaminated material at the site and to allow the assessment of potential risks to identified receptors to be undertaken. Determinands tested for included; metals and semi-metals, pH, sulphate, soil organic matter, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, volatile organic compounds and pesticides and herbicides.
	Groundwater samples were collected from 6 of the monitoring wells installed during the investigatory works and submitted to ALcontrol UK Ltd., a UKAS and MCERTS accredited laboratory, for chemical analysis.	To provide information on the groundwater beneath the site and to allow the assessment of potential risks to controlled waters. Determinands tested for included; metals, ammoniacal nitrogen, hardness, pH, sulphate, petroleum hydrocarbons, volatile and semi-volatile organic compounds, pesticides and herbicides.



5 GROUND CONDITIONS

5.1 General

The ground conditions encountered in the exploratory holes are broadly consistent with the geological sequence as described in the British Geological Survey map for the Site and are described below. In addition, the ground conditions encountered are consistent with previous phases of investigation undertaken previously by WSP across the Kingsmere development.

Made Ground was not observed across the Site. A thin horizon of topsoil was encountered across the Site beneath which is the Cornbrash Formation which was observed as very clayey gravel or a stiff to very stiff consistency, gravelly clay. Underlying the Cornbrash Formation is the Forest Marble Formation which was observed as alternating horizons of limestone and clay/mudstone.

In general, the depth to the base of the Cornbrash Formation/top of the Forest Marble Formation reduces to the southwest across the Site. In the northern part of the Site, the base of the Cornbrash Formation was recorded at 2m bgl and in the central and western areas of the Site the base of the Cornbrash Formation is up to 2.7m bgl. However, in the south-western part of the Site, the base of the Cornbrash Formation was recorded at 1.0m bgl. The base of the Forest Marble Formation was not proven.

5.2 Summary of Ground Conditions

The table below provides a summary of ground conditions encountered with the associated exploratory hole logs provided in **Appendix C.** A plan indicating the positions of the exploratory holes is provided as **Figure 2** within **Appendix A.**

Strata	Depth range to top of stratum (m bgl)	Depth to base of stratum (m bgl)	Brief Description
Topsoil	Ground level	Ground level 0.20 to 0.50 Topsoil was typically a dark brown sligh gravelly silty clay with frequent rootlets. T typically comprised fine to medium subang	
Cornbrash Formation	0.15 to 0.50	0.40 to 3.60*	Orange brown clayey to very clayey sandy fine to coarse subangular limestone GRAVEL. Locally the Cornbrash Formation was recorded as a stiff to very stiff consistency, orange brown, slightly sandy, gravelly to very gravelly CLAY. The gravel fraction typically comprised fine to medium subangular limestone and lithorelics.
Forest Marble Formation	0.80 to 3.00	> 8.10*	Alternating horizons of clay/mudstone and limestone. The clay horizons were generally recorded as a very stiff to hard, dark bluish grey, silty CLAY. In places the clay had not weathered back to clay and so was recorded as an extremely weak mudstone. The limestone horizons were generally recorded as a medium strong to strong, light grey fine grained limestone.

Table 5.1:Summary of Ground Conditions

* Base not proven

5.3 Visual and Olfactory Evidence of Contamination

No visual or olfactory indicators of contamination were encountered during the ground investigation.

5.4 Groundwater

Minor seepages of water were noted in several exploratory holes at depths of between 0.6m bgl and 1.9m bgl.

Groundwater at the site was encountered at elevations of between 68.8m above Ordnance Datum (AOD) and 77.2m AOD during drilling within the Forest Marble Formation. In several instances within the central region of the Site, within BH704, BH705 and BH706, groundwater was observed to be under artesian pressure within the Forest Marble Formation and rose to a maximum height of 1.7m agl (above ground level).

Subsequent monitoring within the standpipes installed within several exploratory holes recorded groundwater between 0.5m and 3.0m bgl. Groundwater elevation is indicated to be between 80.70m AOD in the north of the site and 72.70m AOD in the southwestern region. Ground levels fall towards the southeast from approximately 82.5m AOD in the northwest to approximately 74m AOD in the southeast. From the monitoring undertaken it appears that groundwater follows the topography and flows to the southeast.

Groundwater samples were collected from six of the borehole standpipes installed during the investigatory works and tested for a range of determinands to enable an assessment of the risk to human health and controlled waters.

5.5 Ground Gas

Ground gas monitoring has been completed from monitoring standpipes on three occasions following the completion of the investigation. A full ground gas monitoring record is provided in **Appendix E**.

Where suitable groundwater conditions allow, a number of boreholes (BH706, BH707, WS702 and WS711) have been monitored to assess the representative ground gas condition at the site (provided in **Appendix E**), a brief summary of the monitoring is provided below and is discussed in detail in **Section7.11**.

- Methane was recorded between 0% and 0.1% v.v;
- Carbon dioxide was recorded between <0.1% and 1.7% v.v;
- Oxygen ranged between 18.7% and 20.8% v.v; and
- Ground gas flow was recorded between <0.1 litres per hour (I/hr) and 0.1 I/hr.

5.6 Infiltration Assessment

In-situ soakaway tests were performed in trial pits TP701, TP705C, TP716 and TP720 and records of the tests are provided in **Appendix D**.

The soakaway tests were proposed to be undertaken in accordance with BRE Digest 365 'Soakaway Design' 2007. Two tests were completed within trial pits TP701 and TP716, however the water within the remaining trial pits did not drain within the available time constraints.

It has therefore, not been possible to derive suitable soil infiltration rates for the strata in accordance with the guidance in the BRE Digest as the fall in water level and number of repeat tests within the pits was not sufficient. Preliminary, indicative infiltration rates based on an extrapolation of the tests performed are summarised as follows:

- TP701 Soil infiltration rate of 3.6×10^{-5} m/s.
- TP705C Insufficient data. Based on the limited data obtained, the anticipated soil infiltration rate is likely to be less than 1 x 10⁻⁹ m/s.
- TP716 Soil infiltration rates of 1 x 10^{-4} and 4.2 x 10^{-5} m/s.



- TP720 Insufficient data. Based on the limited data obtained, the anticipated soil infiltration rate is likely to be less than 1 x 10⁻⁹ m/s.
- TP05 (12370178/001/01, 2007) Insufficient data. Based on the limited data obtained, the anticipated soil infiltration rate is likely to be less than 1 x 10⁻⁹ m/s.

It should be noted that the above infiltration rates are preliminary and indicative only and should not be used for the design of infiltration drainage.

On this basis, and with reference to CIRIA C515, the soils at the Site fall in the classification of low permeability to practically impermeable.

As indicated by the soakaway tests performed, infiltration rates are variable across the Site. Accordingly, should infiltration drainage be considered for the development, it is recommended that further soakaway tests be undertaken, in accordance with BRE 365: 2007, based on the final location, invert levels and required storage capacities of soakaway drains.

5.7 Geotechnical Soil Parameters

A summary of the geotechnical properties of the strata present at the site is given in the table below. A full copy of geotechnical laboratory data is presented in **Appendix F.**

	Stratum					
Geotechnical Properties	Cornbrash Formation (Granular)	Cornbrash Formation (Cohesive)	Forest Marble Formation			
SPT 'N' Value	18 – 50	11 - 50	17 – 50			
Moisture content (%)	16 - 18	13 – 39	Not Tested			
Plasticity Index (%)	N/A	24 – 35 (Intermediate to high plasticity)	Not Tested			
Plastic Limit (%)	N/A	12 - 22	Not Tested			
Bulk density (Mg/m³)	2.19 – 2.22	2.22	Not Tested			
Dry Density (Mg/m³)	1.85 – 1.89	1.92	Not Tested			
рН	7.53 - 8.53	7.26 - 8.38	Not Tested			
Water Soluble Sulphate (g/l)	0.01 - 0.05	<0.01 - 0.06	Not Tested			
Maximum Dry Density (2.5Kg Hammer Compaction (Mg/m ³))	2.07	1.91 - 2.06	Not Tested			
Optimum Moisture Content (%)	12.9	11-15	Not Tested			
Particle Density (mg/m3)	2.65	2.65 – 2.71	Not Tested			
Point Load Index (MPa)	N/A	2.28 - 4.59	Not Tested			
California Bearing Ratio (top of sample (%))	1.0-1.5	1.8	Not Tested			

 Table 5.2:
 Summary of Geotechnical Properties

With regard to the recorded CBR values within the granular Cornbrash Formation, it is believed that the test method, whereby only material passing the 20mm sieve forms the sample for testing, is not representative of the in-situ soil, which was predominantly comprised of gravel and cobbles. Therefore, it is considered that the in-situ CBR value of the granular Cornbrash Formation will be significantly higher than that reported above and it is recommended that in-situ CBR tests are undertaken along proposed access roads.

A plot of uncorrected SPT 'N' value verses depth for the strata encountered is presented in Appendix F.



6 GEOTECHNICAL ASSESSMENT

6.1 General

Under Eurocode 7 (EC7), WSP's Phase II Geo-Environmental Assessment would be equivalent to a Ground Investigation Report (GIR) with a preliminary geotechnical assessment appended. The preliminary geotechnical assessment will provide an outline ground engineering assessment and recommendations.

6.2 Development Proposals

It is understood that the Site is to be developed for residential and light-commercial use, together with a network of associated infrastructure including parking and roads. Structures are expected to vary but may be up to three-storeys in height.

6.3 Preliminary Geotechnical Parameters and Ground Model

On the basis of the ground conditions encountered and the proposed development, it is considered that the Cornbrash Formation will provide the likely foundation stratum across the Site. As the Cornbrash Formation was recorded as a granular and cohesive material, the following parameters have been assigned to the two different materials and used within this geotechnical assessment.

	Cornbrash Formation	Cornbrash Formation		
	(Granular)	(Cohesive)		
Standard Penetration Test 'N' value*	30	20		
Unit Weight	20	20		
(\mathbf{r}_{s} (kN/m ³) Saturated)				
Undrained Shear Strength	-	100		
c _u (kN/m³)				
Effective Cohesion	0	0		
c' (kN/m²)				
Angle of Shearing Resistance	35 ¹	25 ²		
φ° (degrees)				

Table 6.1: Characteristic Soil Properties

*Representative value used for the purposes of this assessment

Groundwater levels used in the design assessment have been based on records obtained during the ground investigation. Due to the variable nature of the groundwater recorded, for the purposes of this assessment, groundwater has been assumed to be 1m bgl.

¹ Peck, R.B., Hanson, W.E and Thornburn, R.A (1974) *Foundation Engineering,* John Wiley & Sons, New York

² NAVFAC DM7. (1971) Design Manual: Soil Mechanics, foundations and earth structures, U.S Department of the Navy, Washington, D.C

6.4 Foundations

It is considered that the strata of the Cornbrash Formation would be a suitable founding stratum for traditional strip or trench-fill foundations in the proposed development.

On the basis of the assessment, it is considered that, where the granular Cornbrash Formation is present, foundations may be designed on a nett allowable bearing capacity of 250kN/m². This assessment is based on an SPT 'N' value of 30 and, with reference to Terzaghi & Peck (1967), this should limit settlement to less than 25mm.

If cohesive Cornbrash Formation is observed at shallow depth, such as in the northern part of the Site, it is recommended that foundations are designed on a net allowable bearing capacity of 150 kN/m^2 in order to limit settlement to less than 25mm.

As the cohesive Cornbrash Formation strata are of medium volume change potential, as defined in the National House Building Council (NHBC) Standards (2011), it is recommended that a minimum foundation depth of 0.9m bgl is adopted in residential properties, in accordance with NHBC requirements.

It should be noted that, due to the strength of the granular Cornbrash Formation, excavations with conventional plant may not progress beyond approximately 1.3m depth in the southern region of the Site.

6.5 Floor Slabs

Within residential properties with foundations on cohesive Cornbrash Formation strata, in accordance with NHBC Standards, it is recommended that a suspended ground floor slab with a minimum 250mm void is installed as a precaution against heave. It is appreciated that modern houses normally incorporate suspended floors but where footings are within granular Cornbrash Formation strata, no precautions against heave are required.

With regard to commercial properties, floor slab loads have not been provided but are assumed to be relatively light and it is considered that ground-bearing slabs could be used and may be designed on a modulus of subgrade reaction of 20 MN/m³. Alternatively, suspended floor slabs may also be considered.

6.6 Groundwater Control

Groundwater seepages have been recorded at shallow depths and may be encountered during excavation of footings. However, such seepages should be adequately controlled by sump pumping.

6.7 Subgrade Assessment for Pavement Design

As discussed previously, the recorded CBR values within the granular Cornbrash Formation are believed to be unrepresentative of the in-situ soil, which predominantly composed of gravel and cobbles, and that the insitu CBR value of the granular Cornbrash Formation will be significantly higher than that reported by the laboratory. Similarly, the CBR value for the remoulded cohesive Cornbrash Formation is considered to be lower than the in-situ value.

Considering the above, the assessment of subgrade condition has been undertaken in accordance with the recommendations presented in HD 26/06 and the Highways Agency Interim Advice Note IAN 73/06.

An assessment of the equilibrium subgrade stiffness (California Bearing Ratio (CBR)) for each of the likely strata to be encountered at road formation level has been carried out for the site and is outlined below. This assessment is based on the plasticity index of the sub-grade as set out in IAN 73/06.

As the regional groundwater level is likely to be about 1m below sub-formation level, a low groundwater level condition has been applied throughout. It is also considered reasonable to assume average construction conditions and a thin pavement.

The design equilibrium stiffness should be taken as equal to or below the lowest (most conservative) 3 point average of direct measurements and as such is considered to be conservative and low risk.



Subgrade stiffness in terms of CBR % may be converted to MPa by means of the equation given in both TRL1132 and IAN 73/06: $E = 17.6(CBR)^{0.64}$. Both values have been used to populate Table 6.2 below:

	Plastic	ity Index		Equilibrium	n CBR / Stiffness			Preliminary Design CBR / Stiffness	
Subgrade Material			Estimated from PI		Assessed from Insitu Shear Strength			ODIT/ Otimicas	
	Range	Maximum Recorded	CBR (%)	Stiffness (MPa)	C _u (kN/m ²)	CBR (%)	Stiffness (MPa)	CBR (%)	Stiffness (MPa)
Cornbrash Formation (cohesive)	24-35	35	3	35	100	7	60	3	35
Cornbrash Formation (granular)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	43

Table 6.2: Design Subgrade Stiffness (CBR %) Assessment

It is recommended that confirmation of subgrade stiffness should be checked by means of in-situ CBR or plate bearing tests once the subgrade formation has been exposed along proposed roads. It is assumed that soft spots will be identified and treated on-site during construction works. Test frequencies should be stipulated in an Earthworks Specification.

6.8 Buried Concrete

In accordance with the assessment methodology outlined in British Research Establishment (BRE) Special Digest 1, relevant chemical test results from the ground investigation have been utilised to determine the Design Sulphate Class of the strata present. As the maximum concentration of sulphate recorded at the site is 60 mg/l, the following concrete classification is considered applicable.

Table 6.3: Design Sulphate Class

Stratum	Design Sulphate (DS) Class	Aggressive Chemical Environment Class (ACEC)
Cornbrash Formation	DS-1	AC-1

7 CONTAMINATION ASSESSMENT

7.1 Human Health Assessment - Overview

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Part 2A was introduced into the EPA by the Environment Act 1995. Part 2A, its accompanying regulations and Statutory Guidance contained in DEFRA Contaminated Land Statutory Guidance (2012) presented the statutory definition of "contaminated land". For the purposes of Part 2A, contaminated land is defined as: "any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land that::

- Significant harm is being caused or there is a significant possibility of such harm being caused; and
- Pollution of controlled waters is being, or is likely to be caused.

The Part 2A regime was designed and intended to encourage voluntary remediation rather than regulatory action and to work with the established role of planning and building control in those cases where the land is suitable for or scheduled for redevelopment.

DEFRA Contaminated Land Statutory Guidance (2012) makes clear that, where new development is taking place, it is the developer's responsibility to ensure that development is safe and suitable for use for the purpose for which it is intended and thus to carry out any necessary remediation. In most cases the enforcement of remediation requirements is therefore through planning conditions and building control rather than through a Remediation Notice under Part 2A. The National Planning Policy Framework, states that 'As a minimum, after carrying out the development and commencement of its use, the land should not be capable of being determined as contaminated land under Part 2A of the EPA 1990.'

A developer will need to satisfy the local authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

Legislation and guidance on the assessment of contaminated sites acknowledges the need for a tiered risk based approach. This report represents a Generic Quantitative Risk Assessment (GQRA) being a comparison of site contaminant levels against generic standards and compliance criteria including an assessment of risk using the source-pathway-receptor model.

The term pollutant linkage has been described in the Preliminary Conceptual Site Model (Section 3) above as has Source, Pathway and Receptors. Each of these three elements can exist independently, but they create a risk only where they are linked together, so that a particular contaminant affects a particular receptor through a particular pathway. Without a pollutant linkage, there is not a risk – even if a contaminant is present. Even where there is a pollutant linkage and therefore some measure of risk, the question still needs to be asked as to whether the level of risk justifies remediation. In the context of land contamination, 'risk' is a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

Further details of the WSP risk assessment approach are provided in **Appendix G**.

7.2 Risk Assessment Completed Within This Report

Compliance Criteria

The EA have produced a number of Soil Guideline Values (SGVs) and where these are not available and in order to provide a consistent methodology for the assessment of various contaminants a series of Generic Assessment Criteria (GAC) screening values have been calculated by WSP. These values have been



calculated using the EAs Contaminated Land Exposure Assessment software, CLEA V1.06, a computer modelling tool designed to assess human health related risks presented by contaminated soil.

Analysis of Data

This report includes a GQRA which is presented in the following sections. The assessment completed is based on the proposed development comprising residential properties with back gardens. In addition, no statistical analysis has been completed and recorded concentrations have been compared directly to relevant SGVs and GACs.

7.3 Assessment of the Analytical Results – Human Health

A total of eighteen samples, comprising six of topsoil and twelve of the Cornbrash Formation to a depth of 2.0m, were analysed for a range of metal, inorganic and organic determinands. Copies of the analytical results are provided in **Appendix H**.

7.4 Metals and Inorganics

With the exception of one sample from the southern region of the Site (TP713 at 0.5m depth), none of the samples tested recorded determinand concentrations above the relevant GAC/SGV for residential (with plant uptake) end use.

Location TP713 recorded an elevated arsenic concentration of 45.6 mg/kg which exceeds the published residential SGV of 32 mg/kg. It should be noted that this sample is from natural soil which contained no observable anthropogenic source of arsenic. Concentrations of arsenic elsewhere across the site are slightly elevated but are below the GAC such that it is considered that the exceedance is an isolated incident and, based on knowledge of the wider development area (incorporating Phase 1 of the development), it is assumed to be naturally occurring.

If the area in which the elevated concentration of arsenic was recorded is to be within residential garden areas, it is recommended that a capping layer of clean topsoil is placed to provide an effective barrier between site end users and the shallow soils (top 1m). It should be noted that this sample does not exceed commercial or public open space GAV and it is recommended that this result is reappraised once the masterplan has been finalised.

No asbestos was detected in seven samples screened.

7.5 Organics

Concentrations of organic determinands including Total Petroleum Hydrocarbons (TPH), Criteria Working Group (CWG), polycyclic aromatic hydrocarbons (PAH), semi-volatile organic compounds (SVOC) and volatile organic compounds (VOCs) were not detected above the relevant GAC.

7.6 Herbicides and Pesticides

All levels of herbicides and pesticides, including Persistent Organic Pollutants (POPs) were below their respective laboratory limits of detection.

7.7 Controlled Waters

Samples of groundwater were collected in December 2012 and were submitted for analytical laboratory testing. The results of the analytical testing are provided within **Appendix H.**

The results indicate that the majority of determinands are below the GAC for groundwater/drinking water. However, within BH701, BH702, BH707 and WS701, slightly elevated concentrations of some heavy-end petroleum hydrocarbons were recorded. Within BH701, the concentration of aromatic species C21-C35 was recorded as 114 μ g/l, which exceeds the GAC for groundwater/drinking water and aliphatic C21-C35 is above the limit of solubility. Within BH702 and BH707, concentrations of aliphatic C21-C35 are above the limit of solubility. Within WS701, the concentration of aliphatic C12-C16 petroleum hydrocarbons is below the GAC and for aliphatic C16-C21 and C21-C35 is above solubility limits.

7.8 Water Quality Standards (WQS)

Based on the 'prevent and limit' approach of the Water Framework Directive (2000/60/EC) and the identified receptors, the following Water Quality Standards (WQS) have been applied:

- UK Drinking Water Quality Standards 2000 (Amended 2004);
- Environmental Quality Standards (EQS). The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions 2010; and
 World Health Organisation (WHO) Petroleum Products in Drinking Water, 2008.
- 7.9 Assessment of the Analytical Results Controlled Waters

The analytical laboratory testing undertaken indicates that there has been some minor impaction, mainly in the northwestern part of the site, from heavy-end petroleum hydrocarbons, although it is noted that the concentration decreases futher across the east of the site. The concentrations of these heavy end aliphatics are above solubility limits, however, site investigation data including borehole logs, soil data and groundwater monitoring observations do not support the presence of a free-phase as no odour or visible sheen has been noted. As such, it is thought that at the reported concentrations, this is at worst a light sheen. It should be noted that there is no identified on-site source for the petroleum hydrocarbons and an off-site source is suspected. The absence of lighter end hydrocarbons indicates that the source is no longer contributing to the contamination of groundwater.

Although the groundwater itself constitutes a receptor, the area in which the hydrocarbons have been detected is localised and concentrations of hydrocarbons appear to reduce towards the east, away from the suspected source. The Detailed Quantitative Risk Assessment (DQRA) completed for the adjacent development (report reference WSP 00022478/003 July 2011) derived a Tier 3 groundwater remedial target of 44,000µg/l, based on a theoretical compliance point located 250m from the site (note that the nearest water abstraction is 500m upgradient of the site). The same approach for this site would mean that the maximum reported concentration of 1,250µg/l (BH701) is an order of magnitude below the remedial target values in the DQRA and therefore, the risk posed to controlled waters is low. It is recommended that additional, targeted water sampling is undertaken in the northwestern part of the site to confirm the previous concentrations detected and to provide more data on the extent of hydrocarbon impaction within the groundwater. It may also be prudent to obtain a water sample, if possible, from the drain which runs along the northern boundary of the site to determine the presence of petroleum hydrocarbons.

7.10 Assessment of Potable Supply Pipes

On the basis of the analytical laboratory testing undertaken and with reference to UKWIR 10/MW/03/21, it is considered that normal plastic pipes may be used for the potable water supply.

7.11 Assessment of Ground Gas

A ground gas assessment has been undertaken within boreholes where groundwater conditions allow to assess potential risks associated with carbon dioxide and methane to future site users and to provide an initial view of the potential ground gas regime should future development be considered. The results obtained have been compared with relevant guidance that includes the following:

- The Building Regulations 2006, Approved Document C, Section 2;
- Assessing Risks Posed by Hazardous Gases to Buildings, CIRIA Report C665, 2007;
- BS 8485: 2007. Code of practice for the characterisation and remediation from ground gas in affected developments; and
- Protecting Developments from Methane, CIRA 149 Report 1995.



The CIRIA C665 method uses both gas concentrations and borehole flow rates to define a characteristic situation for a site based on the limiting borehole gas volume flow for methane and carbon dioxide. The limiting borehole gas volume flow is now renamed as the gas screening value and the calculation is carried out for both methane and carbon dioxide and the worst case value adopted.

7.12 Assessment of the Results – Ground Gas

Ground gas monitoring has been undertaken on three occasions following completion of the works in boreholes where high groundwater levels has not prevented potential ground gas within the unsaturated soils from entering the monitoring wells The results are presented in **Appendix E**.

On this basis the ground gas regimes have been characterised as follows:

• CIRIA: Very Low Risk (Characteristic Situation 1).

Based on the three rounds of ground gas monitoring completed, the risks from ground gas on the proposed development are considered to be very low and reference to the relevant guidance documents indicates that no special precautions would be required. Please note that the appropriate regulators may require further monitoring.

8 REVISED CONCEPTUAL SITE MODEL

8.1 General

Following the results of the analytical laboratory testing and an assessment of the risk to Human Health and Controlled Waters, presented in **Section 7**, the following section provides a revised conceptual model for the Site.

8.2 Contaminant Sources

Based on the data available, it is considered that there are no identified on-site sources for the petroleum hydrocarbons detected. It has been noted that the concentrations of hydrocarbons in the groundwater decrease further to the east of the site.

Although arsenic was recorded at a concentration above the residential SGV in one location, as concentrations of arsenic within the other samples across the Site are below the residential SGV, it is considered that this is an isolated incidence and not characteristic of the Site. In addition, based on knowledge of the wider site and underlying geology, it is considered that this result is indicative of naturally occurring arsenic. It should be noted that this sample does not exceed commercial or public open space GAV and it is recommended that this result is reappraised once the masterplan has been finalised, and the land-use in that particular area confirmed.

8.3 Migration pathways

Given the proposed end use of the site, the following pathways have been confirmed or discounted.

Discounted Pathways

The following pathways have been discounted:

- Ingress into potable water supply pipes; and
- Sulphate and chemical attack on the built environment

Active Pathways

The following pathways are considered to be active (based on an isolated elevated concentration of arsenic in soil and heavy-end petroleum hydrocarbons in the groundwater):

- Ingestion of soil and dust;
- Dermal contact with soil; and
- Migration via the underlying soils and groundwater

8.4 Receptors

Potential receptors are considered to comprise the following:

- Future Site users;
- Underlying Secondary (A) aquifer;
- Land drains/brooks; and
- Construction workers.

8.5 Plausible Pollutant Linkage

On the basis of this assessment, one plausible pollutant linkage has been identified which involves the isolated concentration of arsenic recorded within soil for a residential end use. A development plan has not been provided, so it has not been possible to determine what will be present in the area of elevated arsenic. However, if the area in which the elevated concentration of arsenic was recorded will be beneath areas of



hardstanding such as houses or road pavements, as there is no pathway to humans, the linkage will be broken and the risk will be negligible. Furthermore, in these areas, as infiltration will be reduced by low permeability building materials, the risk to controlled waters will also be negligible.

If the area in which the elevated concentration of arsenic was recorded will be within residential garden areas, the pollutant pathway to humans will be valid. Accordingly, it is likely that a capping layer of clean topsoil would be required to form an effective barrier between site end users and the shallow soil.

With regard to the elevated concentrations of petroleum hydrocarbons in the northwestern part of the site, although the groundwater itself constitutes a receptor, the area in which the hydrocarbons have been detected is localised and the risk to the groundwater abstraction point is considered to be low. Accordingly, there is no valid pollutant linkage and the risk to other receptors from the detected hydrocarbons is considered to be low.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Ground Investigation

A Phase II Geo-Environmental and Geotechnical Assessment on Phase 2 of the Kingsmere Bicester development was undertaken between 1st and 10th October 2012 and comprised the progression of seven rotary boreholes, twenty trial pits and eleven windowless sample boreholes. Soakaway tests were performed in four of the trial pits and groundwater and ground gas monitoring standpipes were installed in selected boreholes. Data from previous WSP investigations have also been considered within this assessment where exploratory holes fall within the site boundary.

Ground conditions encountered at the Site are consistent with the published geological maps and comprise a thin horizon of topsoil overlying strata of the Cornbrash Formation with Forest Marble Formation at depth. The Cornbrash Formation was observed either as very clayey gravel or a stiff to very stiff consistency, gravelly clay. The Forest Marble Formation was recorded as very stiff clay to very weak mudstone with horizons of medium strong to strong, grey limestone. Made Ground was not encountered across the Site.

Water seepages were encountered in several trial pits and windowless sample boreholes and groundwater was encountered at depths of between 5.0m and 8.0m bgl. In several instances in the central region of the Site, groundwater was observed to be under artesian pressure.

Soakaway tests indicate that the soils at the Site are of low permeability to practically impermeable, as defined in CIRIA C515. If it is proposed to use soakaway drainage in the development, it is recommended that further tests are performed in the location of proposed drains to confirm suitability.

9.2 Land Contamination

Soil

With the exception of arsenic within a single soil sample, all determinands were below their respective residential GAC/SGV. The exceedance of arsenic is considered to be naturally occurring and not representative of the Site. However, there may be a requirement to provide a capping layer of clean topsoil to provide an effective barrier if the area in which the elevated concentration of arsenic was found will be within residential garden areas. It is considered that normal plastic pipes may be used for the potable water supply. It should be noted that this sample does not exceed commercial or public open space GAV and it is recommended that this result is reappraised once the masterplan has been finalised.

Ground Gas

Ground gas monitoring has been undertaken on three occasions following completion of the works in boreholes where high groundwater levels allow and indicates concentrations of methane and carbon dioxide are negligible. On the basis of the three rounds of ground gas monitoring completed so far, the risks from ground gas on the proposed development are considered to be very low and reference to the relevant guidance documents indicates that no special precautions would be required.

The number of viable ground gas monitoring wells has been reduced from the number initially installed. This is due to the adverse weather events that have been experienced recently which has led to an increased groundwater table, which in turn has meant that several of the boreholes are now unsuitable for ground gas monitoring as the high water table has screened out the previously unsaturated zone. Please note that further monitoring may be required by the appropriate regulators.

Groundwater

Heavy-end petroleum hydrocarbons have been detected in the groundwater samples obtained from the northwestern part of the site and concentrations suggest that there may be a free-phase product present. The risk to other receptors, however is considered to be low as there are no nearby groundwater abstraction points. Notwithstanding this, as groundwater samples have only been collected on one occasion, it is



recommended that additional, targeted sampling is undertaken in the northwestern part of the site to confirm and supplement the existing data. This may be done as part of any proposed remediation of the wider site.

9.3 Geotechnical

It is considered that the Cornbrash Formation strata are suitable to permit the use of traditional strip/trenchfill foundations in the proposed development.

Where granular strata of the Cornbrash Formation are present in excavations for footings, it is considered that a net allowable bearing pressure of 250 kN/m^2 may be adopted and ground bearing floor slabs may be used.

If cohesive strata of the Cornbrash Formation are observed at shallow depth, such as in the northern part of the Site, it is recommended that foundations are designed on a net allowable bearing capacity of 150 kN/m². In addition, a suspended floor slab with a minimum 250mm void should be installed. With regard to commercial properties, floor slab loads have not been provided but are assumed to be relatively light and it is considered that ground-bearing slabs could be used. Alternatively, suspended floor slabs may also be considered.

In accordance with BRE Special Digest 1, it is considered that the concrete should comprise design sulphate class DS-1 Aggressive Chemical Environment for Concrete (ACEC) class AC-1.

It is recommended that a CBR value of 3% is used for the preliminary design of road pavements on cohesive Cornbrash Formation strata and a CBR value of 4% is used for road pavements on granular strata. Further testing along the route of road pavements is recommended.

WSP ENVIRONMENT & ENERGY

Appendix A – Figures



Appendix B – Exploratory Hole Logs from Previous Phases of Investigation

Appendix C – WSP Borehole Logs



Appendix D – Monitoring Results

Appendix E – Geotechnical Laboratory Results



Appendix F - Geotechnical plots

Appendix G – WSP Risk Assessment Approach



Appendix H - Chemical Laboratory Results

Appendix I - Limitations



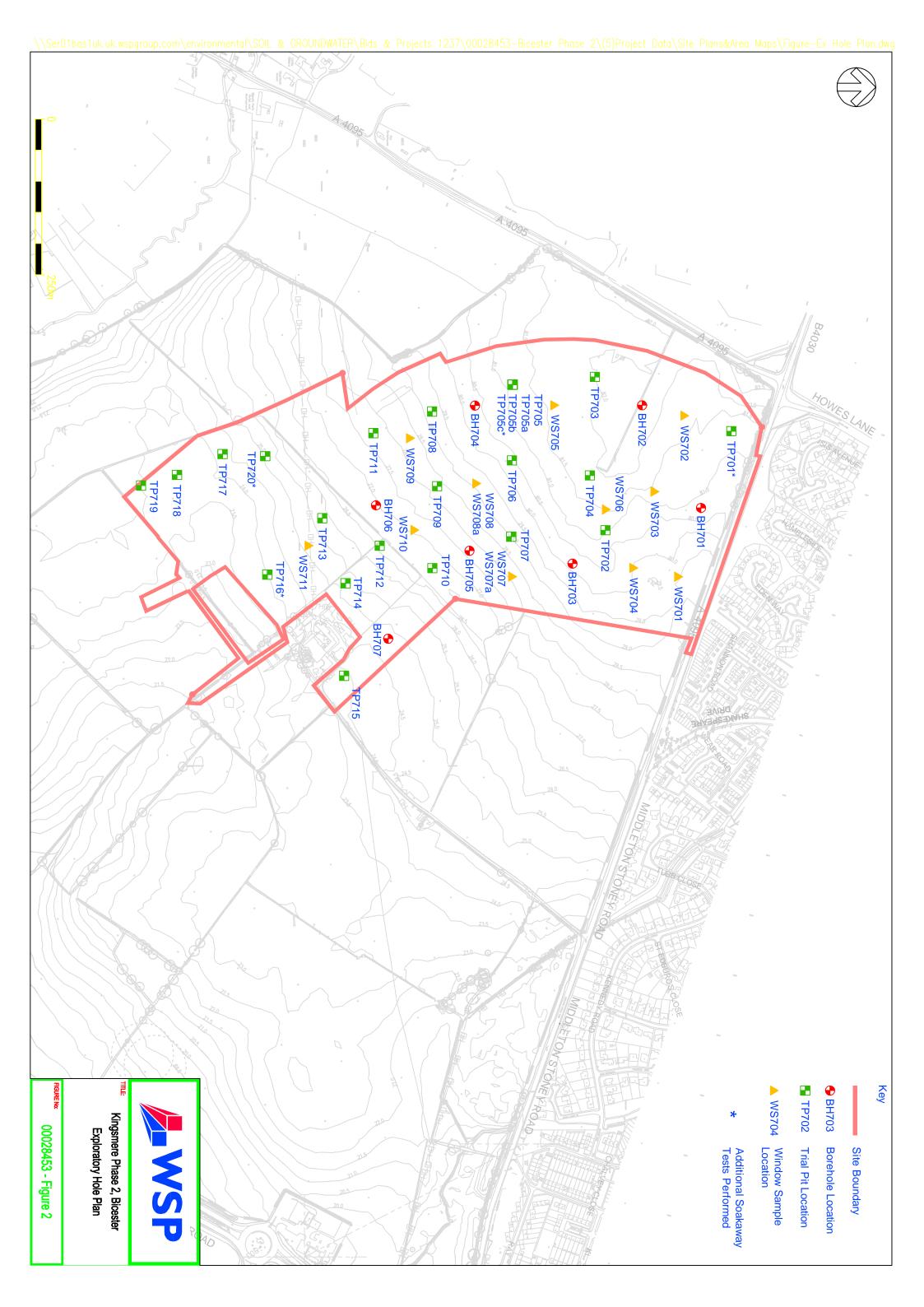
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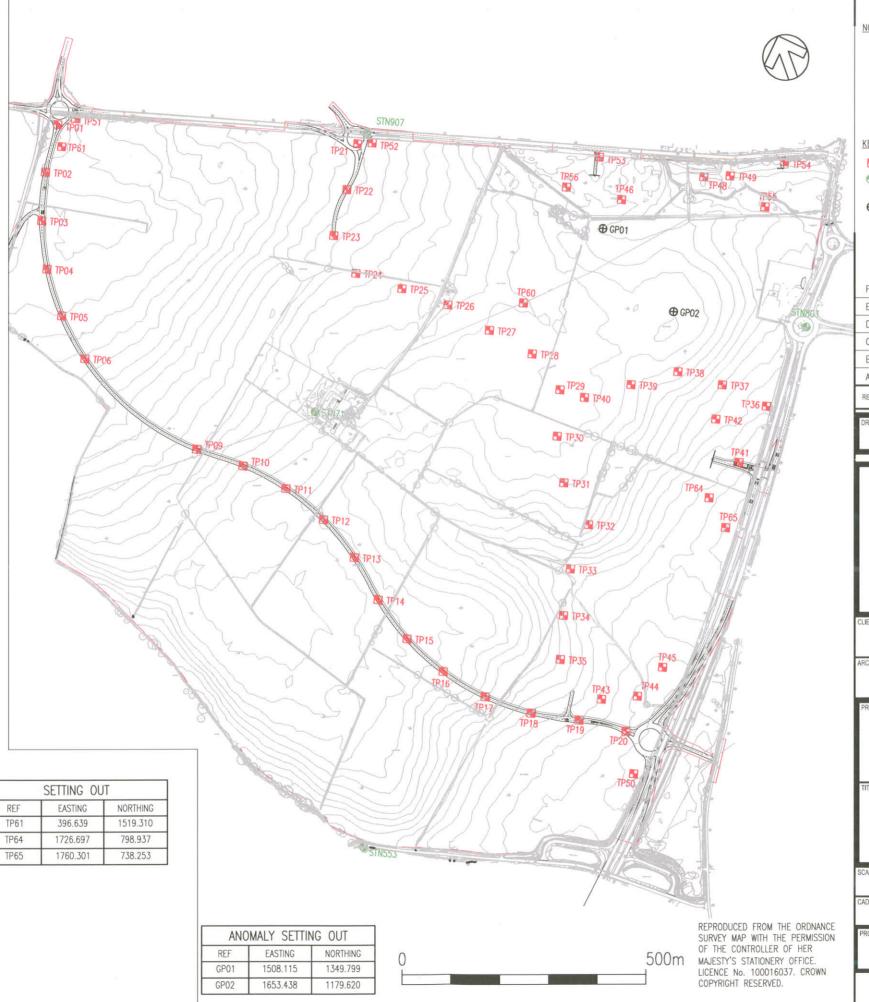
Appendix A – Figures







REF	EASTING	NORTHING	1
STN553	1016.322	88.302	1
STN712	916.336	975.659	1
STN803	1924.877	1147.554	1
STN907	1022.797	1545.722	1
TP01	388.393	1564.488	1
TP02	363.364	1466.499	1
TP03	355.557	1367.362	1
TP04	366.391	1268.204	1
TP05	396.652	1172.631	1
TP06	444.601	1085.135	1
TP09	673.676	899.786	1
TP10	768.341	865.575	1
TP11	856.315	819.048	1
TP12	933.771	756.131	1
TP13	997.543	678.493	1
TP14	1046.649	592.161	1
TP15	1106.268	512.272	1
TP16	1180.499	445.232	1
TP17	1266.226	394.121	1
TP18	1360.011	360.419	1
TP19	1458.453	345.980	1
TP20	1555.672	323.017	1
TP21	1004.165	1524.450	1
TP22	981.908	1430.860	1
TP23	955.084	1336.341	1
TP24	1000.827	1259.248	1
TP25	1095.657	1227.510	1
TP26	1189.847	1194.407	1
TP27	1274.853	1141.739	1
TP28	1362.461	1093.588	1
TP29	1419.218	1020.134	1
TP30	1413.540	925.323	1
TP31	1427.248	830.193	1
TP32	1478.193	744.978	1
TP33	1440.593	654.276	1
TP34	1426.230	559.482	1
TP35	1419.821	469.609	1
TP36	1843.597	985.752	1
TP37	1753.826	1029.812	1
TP38	1662.457	1057.083	1
TP39	1565.986	1030.753	1
TP40	1469.514	1004.423	1
TP41	1787.374	871.368	1
TP42	1740.403	959.651	1
TP43	1504.859	388.797	1
TP44	1578.937	395.023	1
TP45	1630.783	453.766	1
TP46	1546.623	1409.303	1
TP48	1715.659	1455.161	-
TP49	1769.459	1456.982	1
TP50	1571.158	236.642	1
TP51	425.010	1576.912	-
TP51	1034.327	1526.320	-
TP52	1500.660	1496.156	-
TP53	1880.844	1496.156	-
TP55	1840.663	1393.754	-
TP55	1432.626	1434.561	-
11.20	1432.020	1404.001	-



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0			STIGATION PIPE/ANOMALY. REFER TO GEOP ENVIRO STATEMENT FIG 5.4	HYSICA	NL.								
F	09/07/07	PJ	TRIAL HOLES NO 07, 08, 47, 57, 58, 59, 62, 63 REMOVED.	ML	ML								
E	01/05/07	GD	TRIAL HOLES ADDED FOR ANOMALY	ML	ML								
D	20/04/07 12/04/07	GD GD	ARCHAEOLOGICAL SENSITIVE AREAS ADDED ADDITIONAL TRIAL PIT SETTING OUT ADDED	ML	ML								
B	22/03/07	DAH	TRIAL PIT SETTING OUT ADDED	1FK	1FK								
A	14/03/07	DAH	INITIAL ISSUE	1FK	TFK								
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Appendix B – Exploratory Hole Logs from Previous Phases of Investigation



BOREHOLE LOG

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	ng Prog	1		ater Ot Casir		ONS Water		Chisellin	Ť		Added	GENE REMA		
Date	Time	Dept		epth [Dia. mm	Dpt	From	To	Hours	From	То			
05-01-10	00.00	5.36		1.50		3.90	1.4 5	1.9 5.25	1.00 0.50					
Date	Time	Strik			Standing	Casing]							
05-01-10		1.50 4.50		20 20	1.00 3.90	1.20 1.50								
				-										
	nsions in m		Contr	actor / Di	iller		Mo			1		Logged By		
	ale 1:37.5	iettes			ic Sampl	ing Uk	INIE	aiou/i iaiil		n 1500		C. Wa	alker	



Pro	oject										TI	RIAL PI	T No
lot	Southw	/est		ato	Ground L	ovel (m)	<u> </u>	rdinates ()			_	TP10	2
	12370399 [.]	-001		05-01-10 05-01-10		9.000	0-0		06 N 222,52	23			
	pervising Er		er	00 01 10	,	Client		E 100,70			Shee	et	
	Helen (Garc	liner			Country	side Pro	perties Lt	td			1 of	1
ter	Depth		Red'cd			STRA	ATA			SAM	PLES	Н	SV
Water	(thickness)	No	Level			ESCRIPTIO			Legend	Depth	Туре	Depth	Result kN/m2
	0.00-0.30		78.70	Corn over soft brow rootlets. Gravel is a cobbles of limeston (TOPSOIL)	ngular, fine								
	0.30-0.90	-	78.70	Yellow brown grey fine to coarse of lim (CORNBRASH FO	nestone. Fre	ey GRAVEL. equent cobble	Gravel is a es of limes	angular, stone.					
	- (0.60) -		70.10										
1 <u>−</u>	0.90-1.25	-	78.10	Soft yellow brown g angular, fine of lime (CORNBRASH FO	estone and s	gravelly friab hell.	le CLAY. (Gravel is		0.90-1.10 0.90-1.10			
	-		77.75										
	_1.25-1.70			1.40	184								
	(0.45)											1.40 1.40 1.40	196 220
	1.70-2.30 - -	_	77.30	Light grey brown m Gravel is angular, f cobbles of limeston (FOREST MARBLE	ine to coarse e.	e of limeston	y clayey Gl e. Freque	RAVEL. nt					
	(0.60) 									2.00-2.10 2.00-2.10	B ES		
	2.30-2.60	-	76.70	Very stiff laminated (FOREST MARBLE			e brown C	LAY.				2.40 2.40	196 204
	2.60-2.90	_	76.40	Light grey mottled of subangular to angu	orange brow	n clayey GRA	AVEL. Gra	avel is imestone.		- - - -			
	(0.30)		76.10	(FOREST MARBLE	FORMATIC	ON)							
	2.90			Refusal at 2.90m b	gl -Pit termin	nated.							
	oring/Suppo ability: Sides			se.								ENERA EMAR	
	⊧	2.00 A		→ ∓			м + 		€CF101 TP102 ●TF102 ●XE102 ●XE103 ■ XE104 ■ XE104 ■ XE104	NME101 TP103	Seepage 19mm ha	at 1.0m bgl nd shear va	ne used.
D		С		B 0.50					Ф ингоб Финалоб Финалоб Финалоб Финалоб Б трло7	5 €-005112			
	All dimensions Scale 1:1		tres	Contractor		Meth Plant	iod/ t Used	JC	B		Logged	^{By} C. Walke	er



Dre	laat											
Pro	ject Southw	+	Diagat								RIAL PI	I NO
lot	No No	/est		ato	Ground Level (r	m) Co-	Ordinates ()			_	TP10	5
	12370399·	001		05-01-10 05-01-10	78.700		E 456,77	71 N 222,42	20			
	pervising En			03-01-10	Clien		L 430,77	/ IN 222,42	20	Shee	et	
ou	Helen (-				ountryside P	ronartias I	td			1 of	1
			1									
Water	Depth (thickness)		Red'cd Level			STRATA		Levend		PLES		SV Besult
5	0.00-0.30	No		Corn over soft brow	DESCRI		CLAY with	Legend	Depth	Туре	Depth	Result kN/m2
	_			occasional rootlets.	Gravel is subangu	ular to angular	, fine to					
	(0.30)			medium of limestone (TOPSOIL)	Э.					P		
			78.40			0000			9.20-0.30 9.20-0.30	B ES		
	0.30-1.20			Orange brown slight subangular to angul	ar, fine to coarse	with cobbles	L. Gravel is					
	_			limestone. (CORNBRASH FOF				0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~				
	_				- ,							
	(0.90)							000000 000000				
	_							0-0-0-0-0-0-				
	—							07050 <u>0</u> 000000				
	_								00-1.10	B ES		
1	-		77.50						1.00-1.10	Eð		
Ļ	1.20		11.50	Refusal at 1.20m bg	I - Pit terminated.							
	_											
	-											
	_											
	_											
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	_											
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Sho Sta	oring/Suppor bility: Sides	rt: N stab	one Ile to ba	50				€cp101	0.1	G		AL
Jid	Sinty. Oldes	Jiau						■ TP102	• ws101		EMAR	
							N	● ms103 ■ TP104	TP103	Seepage	at 1.20m bç	ji.
	4	2.00		►			Ï.	TP105	TP106			
		A		₮			•		107			
D				B 0.50				•мыр106 🖬 тр107 •ср102				
		С		<u>¥</u>				TP108	•			
			T	O carbon ci		NA-11 11		⊕ ms108 ₩ TP10	<u> </u>	<u> </u>	D	
/	All dimensions Scale 1:1		tres	Contractor		Method/ Plant Used	JC	В		Logged	^{By} C. Walke	er
	0000111						00				and	~



Pro	ject										TF	RIAL PI	T No
loh	Southw No	/est		oto	Ground L		Co Ord	linates ()			_	TP10	8
	12370399-	.001		18-01-10 18-01-10		7.000			8 N 222,30	14			
	pervising En			10 01 10	,	Client		_ +00,7 +	0 11 222,00		Shee	et	
	Helen (Garc	liner			Country	side Prop	erties Lt	d			1 of	1
er	Depth		Red'cd			STRA	ТА			SAM	PLES	H	SV
Water	(thickness)	No	Level		DE	SCRIPTION			Legend	Depth		Depth	Result kN/m2
	0.00-0.40			Grass over soft ora fine to coarse. Free	nge brown sl quent rootlets	lightly sandy s.	CLAY. Sa	nd is					
	- (0.40)			(TOPSOIL)									
	_ (0.10)								an a				
	_		76.60							0.30	ES1		
	0.40-0.70			Orange brown sligh limestone.		ghtly sandy c	obbly GRA	VEL					
	(0.30)			(CORNBRASH FOI	RMATION)				0-0-0-0	0.50	ES2		
1			76.30	Defeeded 0 70 mb	Dittanti					0.60	B3		
	0.70			Refusal at 0.70m bo	gl - Pit termir	nated.							
	-												
	_												
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<u> </u>	 pring/Suppor	rt. NI) Dhe	I									└ <u>───</u>
Sta	bility: Sides	stab	le to ba	se.									
											Inflow at (
		2.00		►			и 4		TP108				
		Α		T T			ţ,						
D				B 0.50									
		С		<u>¥</u>									
	All -6-	1		Contractor		Metho	od/					Bv	
A	All dimensions Scale 1:1		tres	Contractor		Plant	Used	JC	В		Logged	^{By} I Gardin	er



Pro	ject										TF	RIAL PI	T No
	Southw	/est			1							TP11	0
	No	0.01		ate 18-01-10	Ground L		Co-Ordina						U
	12370399- pervising En			18-01-10		5.500 Client	E 4	56,779 N 222	2,208		Shee	. †	
Su	Helen C	-					side Proper	ties I td			Onee	1 of ¹	1
2	Depth	r –	1			-	•					I	
Water	(thickness)	No	Red'cd Level		וס	STRA ESCRIPTION		Legen			PLES Type	Depth	SV Result
~	0.00-0.40			Soft orange brown s							Type	Deptin	kN/m2
	_			Occasional rootlets. (TOPSOIL)		-							
	- (0.40)							La se antres y la service de la la service de la service de la service de la la service de la service de la service de la service de la service de la service de la la service de la service de la service de la la service de la service de la service de la la service de la servi	0.2	20	ES1		
	-		75 40					i na fari na serie da la companya d La companya da la comp La companya da la comp La companya da la comp La companya da la comp La companya da la comp					
	0.40-1.00		75.10	Brown yellow slightly	y clayey gra	velly COBBL	ES of limestor	ne. 800					
	_			Gravel is subangula (CORNBRASH FOF	r, fine to coa (MATION)	arse of limes	tone.	$D \odot ($	0.5	50	ES2		
	-												
	- (0.60)							$D_{\alpha} \cap \epsilon$	ິ	0	B3		
	_												
	_		74.50										
	1.00	1	74.50	Refusal at 1.00m bg	I - Pit termi	nated.			2~				
	_												
	_												
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	_												
	_												
Shr	oring/Suppor	rt: N	one					🕏 WS106 📑 TF107	• Hes107	•	6		AL.
Sta	bility: Sides	stab	le to ba	se.				TP108	CP102			EMAR	
								⊕ ₩#108	TP109				
	 	2.00		►			N 4	TP110 ••••1	09 8 MS116	┫			
		Α		∓			4		P120				
D				B 0.50				• sec 1	18 CP105				
	L	С		<u>*</u>				Ň					
	All dimensions i		tres	Contractor		Meth	od/ .		•	 L	ogged	Ву	
	Scale 1:1	8.2				Plant	Used	JCB			H	Gardin	er



Pro	ject									TF	RIAL PI	ΓΝο
	Southw	/est	Bicest	er								
Job	No			ato	Ground Level (m) Co-	Ordinates ()				TP12	3
	12370399-	-001		18-01-10 18-01-10	74.300	o l	E 456,86	S2 N 222,10)9			
Su	pervising En	igine	er		Clien	nt				Shee	et	
	Helen (Garc	liner		Co	ountryside Pi	operties L	td			1 of	1
P	Depth		Red'cd		1	STRATA			SAM	PLES	Н	SV
Water	(thickness)	No	Level		DESCR			Legend	Depth		Depth	Result kN/m2
	0.00-0.30			Soft brown slightly s subangular, fine to c	andy slightly grav	elly CLAY. Gra	vel is					N VIII L
	(0.30)			Occasional rootlets.	coarse of limeston	ie. Sand is fine	to coarse.					
	- , ,			(TOPSOIL)					0.20	ES1		
	0.30-1.50	-	74.00	Yellow brown slightly	v clavev slightly s	andy gravelly C	OBBLES					
	_			of limestone. Grave (CORNBRASH FOF	l is subangular, fi	ine to coarse of	limestone.	$b \odot 0^{\circ}$	1			
	_			0.30 - 0.90 Soft orar		gravelly clay.						
	-							0°0 C		500		
	_							$P_{0} \circ \circ$	0.60	ES2		
	_											
	- (1.20)								1			
	(1.20)								0.90	B3		
	_											
	-											
	-							ρ_{0}				
	_											
	-								1.40	B4		
	1.50	-	72.80	Refusal at 1.50m bg	I - Pit terminated			<u> </u>				
	-			neiusai at 1.50m by								
	_											
	_											
	_											
	_											
	-											
	_											
	_											
	_											
	_											
	_											
	-											
Shr	 oring/Suppor	rt· Ni	one	1			@m5108	TP109		C		 \ I
Sta	bility: Sides	stab	le to ba	se.				∰ TP119 ⊕aws109 ⊕aws116 ♠awa	-		EMAR	
								10 TP120 TP121	TP122			
	4	2.00		— >		1	r /	TP123	• MES 1 1			
		2.00 A		- 1		-		TP123	∕ ∥			
_							'	• • • • •				
D				B 0.50								
	L	С		T								
	All dimonsions	inma	troc	Contractor		Method/	L		J [Logged	Bv	
	All dimensions Scale 1:1		ues	Contractor		Plant Used	JC	В		H	Gardine	ərt
						1						



Project														E	BOREH	OLE	No
	outhw	vest B												_	WS	103	
Job No			D	ate 2	6-01	-10	Grour	nd Level (I			linates ()						
1237 Supervis	0399			20	6-01	-10		79.100		E 45	6780.00	0 N 222	2479.000	Sh	eet		
-	-	Gardii							ent ountryside	Properti	as I ta				1 o	f 1	
								00	-						10	1 1	2
SAMP					Water		Depth		2	STRAT	A					ygy	men
Depth	Type No	Test Result	HSV Depth	Result kN/m2	Ň		(Thick- ness)								Legend	Geology	Instrument/ Backfill
0.00 0.10	ES D		0.20	25		78.85	(0.25) 0.25	CLAY. Frequer (TOPSC	Gravel is s nt rootlets. OIL)	subangı	ular, fine to	medium	ightly grave of limeston	e.	$\frac{\sqrt{t_2}}{\sqrt{t_2}} \frac{\sqrt{t_2}}{\sqrt{t_2}} \frac{\sqrt{t_2}}{\sqrt{t_2}}$		
	ES D	25,50 N=50/ 25	0.20	62.5 37.5	Ţ	78.15	- (0.70) - (0.70) 	Very de of limes limestor (CORNI 0.50 - 1	stone. Gra ne. BRASH F(.00 No rec	orel is su ORMAT covery,	ubangular,	fine to co	elly COBBL arse of	ES			
Date Date 26-01-10	Tim		Depth Strike 0.40	¹ D	C epth	s Standi	Wat m Dp	<u>ot</u>		N 4 1 1		• crioi • crioi • WS103 • Frioi • weice • rrioi	■ 17103 ■ 18152 ● MR103 ■ 18152 ● 17103 17104 ■ 18104 ■ 18105 ■ 1810		GENE REMA ge at 0.40r	RKS	
All dime Sca	nsions ale 1:1		res	Contra	actor	/ Driller GSS	6		Method/I		sed Competitor	Dart 130		Logge	ed By H Garo	diner	



Project														BOF	REH	OLE	No
	outhv	vest B					_							- L	NG	106	
Job No			D	^{ate} 2	5-01	-10	Grour	nd Leve	. ,		linates ()				vU	100	
1237				2	5-01	-10		78.0		E 45	6759.000	N 22236	6.000	0.			
Supervis	-	-							Client					Sheet			
		Gardir							Countryside						1 0	r 1	
SAMP	LES	& TE:	STS	1	er		Deveth	1		STRA	ΓA					ув	nent
Depth	Type No	Test Result	HSV Depth	Result kN/m2	Water		Depth Thick- ness)				CRIPTION				gend	Geology	Instrument/ Backfill
0.10	ES				Ţ	-	(0.30)	Grav rootl	rel is subang ets.	prown slig Jular, fine	ghtly sandy to medium	slightly grav of limeston	elly CLAY e. Freque				
0.20	D				÷	77.70	0.30		PSOIL) - 1.00 No re	covery.							
0.30	D	20,50 N=50/ 10				-	(0.65)	Very of lin limes	dense oran nestone. Gr stone. RNBRASH F	avel is si	ubangular, f	ayey gravelly fine to coars	COBBLE e of	s S C			
-						-	. ,) ° C	ð		
-						77.05	0.95	Refu	sal at 0.95n	hal - Ha	le terminat	ed			, P		10231
- - - - - - - - - - - - - - - - - - -	ing P	rogre	SS at	nd W.	ater	- - - - - - - - - - - - - - - - - - -	ations								ENEI		
Date	Tin		Depth			asing		er				€a65103 ∰ TP1	mms102 ∰ TP103 04		EMAI		
Date 25-01-10	Tin		Strike 0.20	e Mi	nutes	Standir				8		A #2103 0 771 T7105 T7105 Overald VS106 Overald T7107 Overald T7107 Overald T7107 Overald Overald	• 110 • wst07 C7102 • T7119 • T7119 • Ast116	Seepage at	: 0.20m		
All dime	nsions ale 1:1		res	Contra	actor	/ Driller GSS			Method	Plant Us	sed Competitor [Dart 130	L	.ogged B H	y Gard	iner	
50	ale 1:1	0./3				655				(Joinpetitor L	Jan 130			Gal	n ei	



Project												BOR	EHOL	E No
	outhv	vest B										- v	/S10	8
Job No			D	ate 2	5-01	-10	Grour	nd Level		Co-Ordinates ()			1010	U
12370				2	5-01	-10		76.60		E 456753.000	N 222264.000			
Supervisi	-	-							Client			Sheet		
		Gardiı								Properties Ltd			1 of 1	
SAMPI	LES	& TE	STS		e				<u> </u>	STRATA			≥	l lent
Depth	Type No	Test Result	HSV Depth	Result kN/m2	Water		Depth Thick- ness)			DESCRIPTION		Leg	end of	linstrument/ Backfill
- 0.20 0.20 0.20 0.20 - - - - - -	D ES D ES	14,11,14 18,16,75 N=123/ 165	0.20	112.5	¥	76.30	(0.30) 0.30 (0.75)	Grave rootle (TOP: Very o of lime limest (COR 0.60 -	el is subangi ts. SOIL) dense orang estone. Gra ione. NBRASH F 1.00 No red	ular, fine to medium ge brown slightly cla avel is subangular, fi ORMATION)		ent (2000)	0 0	
-							-							
	-	-		1		Observ asing		er						
Date Date 25-01-10	Tin		Depth Strike 0.10		epth nute:	asing Dia. mi Dia. mi Siandir		<u>t</u>		WS108	REI	UARK 0.10m bg		
All dimen Sca	isions Ile 1:1		res	Contra	actor	/ Driller GSS			Method/	Plant Used Competitor D		Logged By H G	Gardine	er



Project														BORE	HOL	E No
	outhv	vest B					0			0.0				W	S11	8
Job No 1237	იაიი	001		ate 2	5-01 5-01	-10	Groun		evel (m) 5.600		linates ()	N 000140				-
Supervis				2:	5-01	-10		76	Client	E 40	6821.000	N 222142	.000	Sheet		
	-	Gardir							Countryside	Properti	es Ltd				of 1	
SAMP										STRAT						
		Test		Result	Water	Reduced	Depth								ogy	Instrument/ Backfill
Depth	Type No	Result	Depth	kN/m2	Ν		(Thick- ness)			DESC	CRIPTION			Lege	Geology	Instrum Backfill
- 0.20 _ 0.25	ES D					76.30	(0.30) 0.30	Gr ro (T	rass over soft b ravel is subang otlets. OPSOIL) ery dense oran	ular, fine	to medium	of limestone.	Frequer	nt view		
- - 0.50 -	ES					-		lin	limestone. Gr nestone. ORNBRASH F		-	ne to coarse	of			
0.80	D	9,16,30				-	_ (1.15) _	0.9	90 - 1.00 No re	covery.						
-		20 N=50/ 95			Ţ	75.15		Re	efusal at 1.45m	ı bgl - Hc	ole terminate	d.				
- - - - - - - - - - - - -		rogre	55.2	nd Wi	ater	Observ									JERAI	
Date	Tin		Depth			asing		er t	-		● m5108	TP109	O		IARKS	
Date 25-01-10	Tin		Strike	e Mi	nutes				-	8 		• Aution • Destité • Destité • Destité • Destité • Crios • Crios • Crios	• weil1 p131 • •	eepage at 1.		
All dime Sca	nsions ale 1:1		res	Contra	actor	/ Driller GSS	3		Method	Plant Us/ C	ed Competitor D	art 130	Lo	ogged By H G	ardine	r



Project														BOREH	OLE	No
S	outhv	vest B	icest	er										WS	120	
Job No			D	ate 2	5-01	-10	Grour		evel (m)	Co-Ord	linates ()			113	120	
1237				2	5-01	-10		74	.000	E 45	6900.000	N 222073.000				
Supervis	-	-							Client					Sheet	. .	
		Gardir			1	I			Countrysi	de Properti				1 0	t 1	
SAMP	LES	& TE	STS	1	e					STRAT	A				λĉ	nent
Depth	Type No	Test Result	HSV Depth	Result kN/m2	Water		Depth (Thick- ness)				CRIPTION			Legend	Geology	Instrument/ Backfill
0.10	ES D					-	. (0.35)	Gr roo	ass over sof avel is suba otlets. OPSOIL)	ft brown slig Ingular, fine	ghtly sandy s to medium	lightly gravelly CL. of limestone. Frec	.AY. quent			
-						73.65	0.35	Ve	nu donao or	ango brown	alightly alou	ey gravelly COBB				
0.40	ES							of	limestone.	Gravel is su	ıbangular, fii	ne to coarse of	IE3			
0.50	D								estone. ORNBRASH	H FORMAT	ION)					
-					₹											
-					Ŧ			0	75 1 00 No							
-								0.1	75 - 1.00 No	recovery.				ÞÖ		
-																
1.00	D	8,9,9 8,8,8					-									
-		N=33					(1.50)									
-														00		
-																
1.40		12,13,50 N-50/						1.4	40 - 2.00 No	recovery.						
-		20												P _o O		
-																
-																
-						72.15	1.85		fund at 1 0	Embal IIa	la tarminata	4				
-									lusai al 1.0	Sili byi - Hu	ne terminate	u.				
-							-									
-																
-																
-																
-																
-																
-																
-																
F																
-																
Bor	ina P	roare	ss ar	nd Wa	ater	Observ	ations			[• -ws109			GENE	R۵I	
Date	-	-						er			■ TP110 ● ■ TP120	ms116 €.ms117 ₩TP121 ₩TP122		REMA		
					opui						9 -mc118	€ CP105 ⊕ MK5119	See	page at 0.70n	n bgl.	
										N		WS120				
										t		\checkmark				
Date	Tin	ne	Strike	eMi	nutes	s Standi	ng Casi	ng								
25-01-10			0.70													
			res	Contra	actor				Metho			ort 130	Log	iged By H Garc	liner	
500	ale I.	Progress and Water Observations Time Depth Depth Dia. mm Dpt Time Strike Minutes Standing Casing 0.70													an iei	

**	. .	RECORD OF WELL (SHAFT OR BORE)
	British Geological Surve	At Whitelands Farm, Nicester, SP52SE 3.
	EXACT SITE OF WELL	Town or Village Bicester. SP 5224
2	B	CountyOxon $SF.76$ 22.07CountyOxon $SF.5676$ 22.03Six-inch quarter sheet2.3 $S\omega/\omega$ Mish Geological SurveyBritish Geological State whether owner, tenant, builder, builder, OwnFor Mr.Messres, A.D.Woodley Ltd., contractor, consultant, etc. :-
		Address (if different from above) If well-top is not at ground above; Level of ground surface 76 above sea-level (O.D.) If well-top is not at ground above;
	British Geological Surve	SHAFTft.; diameterft.; Details of headings British Geological Survey British Geological Survey
		BORE 138 ft.; diameter of bore: at top <u>6"</u> ins.; at bottom <u>6</u> ins. Details of permanent lining tubes <u>60ft.</u> <u>6"</u> plain tube, <u>78ft.</u> <u>6"</u> perforate
	B	Water struck at depths ofBrift, below
	<u>م</u> (Part level of motor 25 ft X to Suction at 130ft Vield on 8 hou
	TEST	pumping at 1000 galls. per hourwith depression to 80 ft. below well-top.
-	CON	Recovery to rest-level in 25 mins. Capacity of pump 1000 g.p.h. Date of measurements
	British Geological Surve	
	NORMAL	Make and/or type
	NOI	Capacitygallons per hour. Suction atft.
	l	Amount pumpedgalls. per day. Estimated consumptiongalls.
	В	Well made by G. Lines Don Ltd. John Date of well Ish Geological Survey British Geological Survey British Geological Survey
		Information from
		ADDITIONAL NOTES Sited by O on 6 map Oxon 23 Sw/w - 16.10.53. Rx.
	British Geological Surve	British Geological Survey British Geological Survey
	Gp.685	
	10 \$/48 A.& E.W.Led.	, . tish Geological Survey British Geological Survey British Geologica

	RECORD OF WELL (SHAFT OR BORE)
British Geolog	The sto has a grid address that is 219 52 where Earlies 2 50 FARM 219
EXACT SITE OF WELL	Town or Village BICESTER SP52 24
	County Geological Survey OXON. SP. 5676 2203 Six-inch quarter sheet 23 Sw/k State whether owner, tenant, builder, contractor, consultant, etc. :-
	Address (if different from above)
	Level of ground surface If well-top is not at ground above; above sea-level (O.D.) ft.
British Geologi	SHAFT
	BOREft.; diameter of bore: at topins.; at bottomins.
	Details of permanent lining tubes
2	Water struck at depths offt. below v
SNO	Rest-level of waterft. above well-top. Suction atft. Yield onhours' days'
TEST	pumping atgalls. perwith depression toft. below well-top.
British Geologi	Recovery to rest-level in mins. Capacity of pumpg.p.h. Date of measurements
1	Description of permanent pumping equipment :
NORMAL	Make and/or type
NOF	Capacity
l	Amount pumped galls. per day. Estimated consumption galls. p
	Well made byDate of well
	Information from
	ADDITIONAL NOTES
British Geologic	well & wind king.
	Said to be deepen than Chesterton bore 219/143 O.D. c 255 feet. Inelds sufficient mate, except
	Tield sudicient mater excent
Gp.685	British Geological Survey under British Geological Survey Gails. British Geological Survey
-	Electric kumos then used.
& B.W.Ltd	

(For Survey use only)	SP 52 SE 3 NATURE OF STRATA	Тніс	KNESS	DE	PTH
Britist GEOLOGICAL CLASSIFICATION	Brilf measurements start below ground surface, state how far	Feet	Inches 	log Feet rv	ey Inche
Carohah	Top Soil	1	-	2.	
. Corrina	Shale Ironstone	8		9	-
British Geological 5	Survey Yellow Clay British Geological Survey	3		12	Britis k- Seol
- 	Limestone with odd lavers Blue Glay.	240	-	52	-
1	Blue Clay	15	•	67	-
British Geological Survey		3	Bookish Ga	ologica 7:0 v	у 🕳
	Elue Clay	30	_	100	-
	Limestone	2		102	_
	Blue Clay	8	-	110	_
British Ga ological C	Limestone	2	-	112	antiah Gaol
	Black Clay	10	-	122	-
· .	Blue Clay	16		138	-
• · · · · · · ·	With a filteration of green sand at approximately 110ft.				
British Geological Survey	British Geological Survey		British G	ilogical surv	ey
			``		
2010 - 1. 1. 1. 1.					
British Geological S	Survey British Geological Survey				British Geol
British Geological Survey	British Geological Survey		British Geo	ological Surv	ey
			[.		
British Geological S					British Geol

Appendix C – WSP Borehole Logs



WSPE		• • • •		P al Limite	t l	R	ΟΤΑ	R	Y DRII	LLH	OL	E LO	G	F	lole No.	BH7()1	
Tel	Moun F ephor	tbatte RG21	en Ho 4HJ 1256 3	use 318800	Project		К	ing	smere Bic	ester I	Phas	e 2		S	Sheet	1 of	1	
Job No C	002	284	53/(001	Client			Co	untryside F	Propert	ies L	td		[Date	01-10- 01-10-		
Contract		Drill			Method/Plar Coma	it Used	00	L	ogged By OE	G		E	ates (NGR) 456573.687 222632.413		Grou	nd Level 80.8	•	D)
			TA 11	<u> </u>					_		STRAT		222032.41)				Install /
Depth		SCR		(SPT 'N')	Rock Test Result (MPa)	Elev. (mAOD	Depth (Thick -ness)	Disco	ntinuities	Detail		cription	Main			Legend	Geology	Backfill Dia.
						80.58	, ,					n slightly silty SOIL)	slightly gravelly	CLAY.			TS	
						79.93	(0.65) 0.90	0.60 brov) Becoming oran wn	gish	angu GRA	ar and subar √EL.	ey slightly sand gular fine to coa DRNBRASH FO	irse lime	estone		СВ	
				(20) (S)		79.63	1.20 - -(0.80)				subai	ngular COBB tone. Gravel	ightly clayey gra LES. Gravel and is medium to co DRNBRASH FO	l cobble arse lim	estone.		СВ	
2.30				(50/0.169) (S)		78.83	2.00				Stiff y CLA	ellowish brov ′. Gravel is fin tone.	vn slightly sandy ne to medium su DRNBRASH FO	very gr Ibangula	avelly ar		FMB	
	20	15	0	. (3)			(0.70)				Stiff t slight subro	o very stiff da ly gravelly sil ounded limest	rk green mottled ty CLAY. Gravel	d bluish is fine t	grey		FMB	
3.00 3.10				(50/0.022) (S)		77.83					Medi	um strong to ed LIMESTO ires. 20% TC	strong light brow NE. Very close o R. 15% SCR, 0%	/n and g drilling ir	nduced		FMB	
	100	100	20	(50/0.026)			(1.70)				(FOR Firm is me	EST MARBL dark bluish g dium subang	E FORMATION rey slightly grave ular limestone. E FORMATION	elly CLA	Y. Gravel		FMB	
4.80				(50/0.026) (S)	Ţ	76.03					Media grain with c	um strong to ed LIMESTO	strong grey fine NE. Close subho ay filling. 100% T	and me	l fractures			
				(30) (S)		75.93	4.90				Medi	um strong da STONE. Fra	E FORMATION rk grey medium ctures very clos	, grained			FMB	
							(1.60)				Hard, recov	dark green s ered as an e	E FORMATION silty CLAY. Uppe xtremely weak nur remely weak mu	r 100m nudston	e.		FMB	
6.50	100	100	100	(50/0.026) (S)	<u>↓</u> <u>−</u>	74.33	-				Medi	um strong ligi	E FORMATION nt grey fine grain ced fractures. Up	ed LIME	ESTONE.)mm			
7.15	100	100	100			73.68	(0.65) - 7.15	6.80 bed) Becoming close ded below 6.8m	ely	extre clay/r \ TCR,	mely weather nudstone with 100% SCR,	ed hard to very n pockets of clay 100% RQD, FI 1 E FORMATION	weak /ey grav 150/150/	el. 100%		FMB	
				(50/0.276)		72.83	- (0.85) - 8.00					dark bluish g EST MARBL	rey CLAY. E FORMATION)			FMB	
<u>6.50</u> 7.15				(S)														
					Boring Progre	ss	<u> </u>						Rotan	y Flush				
Date			Time	D	epth Cas	ing Dpt	Core Dia.	(mm)	Water Strike	From		То	Туре	Re	turn D	epth Casin	-	ng Dia
01-10-1	2	0	0.00	8	.00 3	3.00	300			2.40		8.00	Air/Mist	G	bod	3.00	3	300
From			C To	Chiselling H	ours -	Tool	W From 2.4		Added To 8	General	Rema	rks						
Date 01-10-1																		
So	ale 1	1:62.	5		s: All dimensi ual identificati		etres. Log	gs sł	hould be read i	n accorda	ance w	ith the prov	ided Key. Des	criptior	is are bas	ed on visu	al and	

WSP F	P	N	/S	P al Limited		R	ΟΤΑΓ	RY DRI	LLHO	OL	E LO	G	Hc	ole No.	BH70)2	
Tele	Mour F ephor	itbatte RG21	en Hoi 4HJ 1256 3	use 318800	Project		Kin	gsmere Bic	ester F	Phas	e 2		Sh	neet	1 of	1	
Job No O	002	284	53/(001	Client		C	ountryside F	Properti	es Li	td		Da		02-10-′ 03-10-′		
Contract	tor /	Drill	er	Ν	lethod/Pla	nt Used		Logged By				ates (NGR)		Grour	nd Level	(m AC	D)
C.,	J. A	ssoc	iate	s	Coma	icchio 3	00	H	G			456408.816 222537.843			82.2	23	
	RUN	I DE	TAIL	s					S	TRAT	A						Install Backf
Depth	TCR	SCR	RQD	(SPT 'N') Fracture Spacing	Rock Test Result (MPa	Elev. (mAOD	Depth) (Thick -ness)	continuities	Detail	Des	cription	Main			Legend	Geology	Dia. mm
						81.72	2 0.50			freque	ent rootlets a igular limesto	over brown silty nd rare coarse a one gravel.				TS	
				(33) (S)	1		- - - - - - -			sandy angula at 1.2	very gravelly ar to subangi m.	ottled orangish b y CLAY. Gravel ular limestone. L DRNBRASH FO	is fine to imestone	medium cobbles		СВ	
				(36)	1 	80.72	2 1.50 - - - - -(1.15)			Stiff lightl slightl to me occas	ght greenish y sandy sligh dium subrou ional fine to o	brown mottled li tly gravelly CLA nded limestone coarse subangu	ght bluish Y. Grave lithorelics	grey I is fine and with		СВ	
				(S)		79.57	7 2.65		-	(WEA	weak limesto	DRNBRASH FO	mottled t	orown		СВ	
3.55				(50/0.247) (S)		79.22	-(0.55)			limest (COR Very s	one GRAVE		Y. Slightly	/		FMB	
	100	60	60	(50/0.05) (S)			(1.45)			Mediu LIMES drilling TCR	im strong gre STONE. Frac induced frac 100%, SCR 6	y fine and medi tures very close ctures and some 60%, RQD 60%, E FORMATION	um graine to close. e natural fi FI NI/50/	Some ractures.		FMB	
5.00				(39) (S)	1 <u>−</u>	77.22	2- 5.00		-			n silty CLAY.					
				(0)			(1.20)			(FOR		E FORMATION)			FMB	
6.40				(50/0.029) (S)		76.02 75.82	2 6.40			Recov grave	vered as a cla I. Abundant c	nt grey fine grain ayey fine to coar lay matrix. E FORMATION	rse suban			FMB	
7.40	100	90	90			74.82	-			fractu fractu TCR	res wide, sub re zone 6.7-6 100%, SCR 9	ine grained, LIM phorizontal fractu 3.8m with very g 90%, RQD 90%, E FORMATION	ures. Pote ravelly cla FI NI/100	ential ay infill.		FMB	
				(50/0.211) (S)		74.22	2 8.00		-			nottled orangish E FORMATION		ty CLAY.		FMB END	
					Boring Progre							Rotan	y Flush				
Date			īme	De	epth Cas	ing Dpt	Core Dia. (mr	m) Water Strike	From		То	Туре	Retu		epth Casing	-	ing Dia
02-10-12	2	0	0.00		00	3.50	300		3.50		8.00	Air/Mist	Goo	od	3.50	3	300
From			<u>To</u>	Chiselling Ho	ours	ΓοοΙ	From 3.5	er Added To 8	General F	Remar	ks		<u> </u>				
Sc	ale 1	:62.	5		: All dimens al identificat		etres. Logs	should be read i	in accorda	nce wi	ith the provi	ded Key. Des	criptions	are base	ed on visu	al and	

WSPI		W		P al Limite	b4		R	ΟΤΑ	R	Y DRII	LLHC	C	E LO	G	F	lole No.	BH7	03	
	Mour I Iephor	tbatte	n Hou 4HJ 256 3	use 318800		oject		Ki	ings	mere Bic	ester P	has	e 2		S	Sheet	1 of	1	
Job No (0002	2845	53/0	001	CI	ient		(Cou	ntryside F	Propertie	es L	td				03-10- 03-10-		
Contrac	tor /	Drille	ər		Metho	d/Plant	Used		Lo	gged By				ates (NGR)		Grou	nd Level	(m AC	D)
C.	.J. A	ssoc	iates	s		Comac	chio 3	00		OE	G			456663.190 222425.952			80.1	158	
	RUN	I DE	TAIL	S							S	TRA	ΓA						Install / Backfill
Depth	TCR	SCR	RQD	(SPT 'N Fracture Spacing	Roce Resu	k Test It (MPa)	Elev. (mAOD)	Depth (Thick -ness)	Discont	tinuities	Detail	Des	scription	Main			Legend	Geology	Dia.
							79.96	- 0.20				frequ suba	ent rootlets a ngular limesto	over brown silty nd rare coarse a one gravel.			0000	TS CB	
							79.56	-				Grey	SOIL) sandy angula tone GRAVE	ar and subangula	ar fine to	coarse		CD	
				(11) (S)	1		78.96	-(0.60) - 1.20				(WEA Stiff o	ATHERED CO prangish brow	ORNBRASH FO	Y. Grave	,		CB	
					Ť		78.46	(0.50) 1.70				(WE	ATHERED CO	subangular lime DRNBRASH FC brown mottled t	RMATIO	, ,		СВ	
				(25)							\	limes	tone lithorelic	equent fine subro s. Rare limestor DRNBRASH FC	ne cobbl	es.			
				(S)				-(1.20)				Very greer	stiff light grey very gravell	rish green becor y CLAY with slig	ning dar htly she	k greyish lly and		СВ	
2.90	100	0	0	(25)			77.26	-				tabul	ar limestone.	bles. Gravel is f				FMB	
3.20	1	-	-	(S)			76.96	-				as fin	e to medium	ght brown MUDS subangular grav , NON INTACT.	vel. TCR			FMB	
3.70	100	0	0				76.46	3.70			Ń	(FOF Very	REST MARBL stiff bluish gr	E FORMATION	l)	ightly silty	× ×	FMB	
4.50				(46) (S)			75.66	-(0.80) - 4.50				Very	EST MARBL weak, bluish	E FORMATION grey, MUDSTO	NE, TCF		× × ×	FMB	
	100	75	90		1			- 			N N	fine t	o coarse suba	6, NON INTACT angular tabular g E FORMATION	gravel.	ered as		FMB	
5.00				(50/0.154 (S)	•) ₹		75.16	5.00				(FOF	REST MARBL	oluish grey slight E FORMATION lium grained LIM	I)]			
								(1.00)				Fract SCR	ures very clo 75%, RQD 9	se to close, 0° d 0%, FI 30/100/2 E FORMATION	lip, TCR 00.		× ···· × ··· × ···	FMB	
6.20)						74.16 73.96					Very	stiff grey slig	ntly silty CLAY.	,			FMB	
6.50 6.70	100	100 100		(50/0.03 [,]	0		73.66 73.46	-			N	asa	fine to coarse	MESTONE, Nor subangular gra E FORMATION	ivel.	recovered	┢╧╍╧	FMB FMB	
				` (S)			10.10	-			N	Stron	ig light grey fi g induced fra	ne grained LIME ctures 0° dip. T0	STONE	. Close 6, SCR			
								(1.30)				(FOF		, FI 170/200. E FORMATION and medium gra]		FMB	
							72.16	8.00				LIME fractu	STONE, frac ires. TCR 10	tures close, 0° d 0% SCR 100% F E FORMATION	dip, drillir RQD 809				
				(50/0.039 (S)	9)			-			N	Very	stiff, dark blu ly silty CLAY.	ish grey mottled	dark gre	een		END	
												<u>(FOF</u>	EST MARBL	E FORMATION	1)]			
2 Date		т	ïme		Boring Depth	Progres Casir		Core Dia. (I	mm)	Water Strike	From		То	Rotar Type	y Flush Re		epth Casin	g Cas	ing Dia
03-10-1	2		0.00		8.00	-	50	300			4.50		8.00	Air/Mist		bod	4.50	-	300
From			C To	Chiselling	Hours		loc	Wa From	ater A	Added To	General F	Rema	rks						
								4.5		8									
Date 03-10-1																			
S	cale '	:62.5	5		es: All d nual idei			etres. Log	gs sho	ould be read i	n accordai	nce w	ith the prov	ided Key. Des	cription	is are base	ed on visu	al and	

WSPF		W		P al Limitec	1	R	ΟΤΑ	RY DRI	LLHOL	E LC)G	Hole 1	No. BH70	4	
Tele	Moun F ephor	tbatte RG21 4	n Hou 4HJ 256 3	use 318800	Projec	t	Ki	ngsmere Bio	cester Phas	se 2		Sheet	1 of <i>1</i>	1	
Job No O	002	2845	53/0	001	Client		(Countryside F	Properties L	td		Date	08-10-1 10-10-1		
Contract	tor /	Drille	er	Ν	/lethod/Pla	ant Used		Logged By		Co-Ordir	nates (NGR)	G	Fround Level	(m AO	D)
С.	J. A	soc	iate	s	Com	nacchio 3	00	OE	G		E 456409.253 N 222269.168		80.3	35	
	RUN	I DE	TAIL	S					STRA	TA					Install Backfil
Depth	TCR	SCRI	RQD	(SPT 'N') Fracture Spacing	Rock Tes Result (MF	t Elev. Pa) (mAOD	Depth) (Thick -ness)	liscontinuities	Detail	scription	Main		Legend	Geology	Dia. mm
						79.84	(0.50) - 0.50		occa limes		vn slightly sandy silty ts and medium subar			TS	
						79.49	0.85		Oran	gish brown a	and grey slightly claye rse subangular limes	ey slightly tone		CB	
				(18) (S)		79.04	- - - 1.30		GRA	ÍVEL. ATHERED C	ORNBRASH FORM	ATION)	0- <u>0</u> 0	СВ	
						78.59) <u>1.75</u>		suba limes	ngular limest stone lithoreli	very clayey fine to co tone GRAVEL with o cs. CORNBRASH FORM	ccasional		СВ	
				(22) (S)		78.09	F		Very grave limes	stiff light gre elly CLAY. G stone. Rare li	enish brwon slightly ravel is fine to coarse mestone cobbles. CORNBRASH FORM	sandy very e subangul	lar	СВ	-
				(20)		77.49	-		Extre as lig grave	emely weak li ht brown silt	ight brown LIMESTO y fine to medium sub	NE recove	ered	FMB FMB	
	(38) (S)								Very	stiff dark gre Y. Gravel is f	ORMATION) en mottled orangish îne subangular limes	brown gra tone			-
							_(1.25)		(FOF	REST MARB	LE FORMATION) ne grained LIMESTO	NE.		FMB	
4.35				(50/0.274) (S)		75.99	4.35		Very		LE FORMATION) ish grey silty CLAY v ics.	vith freque			-
	90	80	100	(50/0 192)	1	75.54	4 <u>-</u> 4.80		(FOF	coming an ex	andy LE FORMATION) «tremely weak MUDS	STONE bel	11 - 2	FMB	
5.35				(50/0.183) (S)	Ţ		[(1.10)		Stror (FOF	ng grey fine g REST MARB	rained LIMESTONE LE FORMATION)			FMB	
	100	85	90			74.44	- 5.90		(FOF	REST MARB ally an extrer	dark green silty CLA` LE FORMATION) mely weak dark gree	n MUDST(
6.25				(50/0.026)		73.69	(0.75) 6.65				rained LIMESTONE LE FORMATION)			FMB	
7.05	90	90	90	(S)					Extre	emely weak t	o weak dark green N	UDSTON			
7.25	100	80	80				(1.15)							FMB	
8.00				(50/0.085) (S)	1 <u>−</u>	72.54	-		LIME	STONE.	shelly medium graine	ed		FMB END	
				(3)						-					
					Boring Prog						Rotary FI				
Date 08-10-12	2		ime 0.00		epth Ca	asing Dpt 3.00	Core Dia. (1 300	mm) Water Strike	From 4.35	To 8.00	Type Air/Mist	Return good	Depth Casing 3.00	-	ng Dia i00
10-10-12			0.00		00	3.00						-			
				Chiselling				ater Added							
From			To	Hc	ours	Tool	From 4.35	<u> </u>	General Rema	ırks					
Sc	ale 1	:62.5	5		: All dimen		etres. Log	s should be read	in accordance w	vith the prov	vided Key. Descrip	tions are	based on visua	al and	

	WSP I	/ Envi	ronm	SP ental	Limited		R	OT	٩R	Y DRI	LLH	OL	E LO	G			BH70	5	
	Tel	lepho	RG21	n House 4HJ 256 318 318700	800	Project		۲	King	smere Bic	ester F	Phas	se 2		She	et	1 of ⁻	1	
	Job No C	000	2845	53/00	1	Client			Co	untryside F	Properti	es L	.td		Dat		05-10-1 08-10-1		
C	Contrac	tor /	Drille	er	Me	ethod/Plant	Used		L	ogged By			Co-Ordina	ates (NGR)		Grour	nd Level	(m AO	D)
	C.	.J. A	ssoc	iates		Comad	cchio 3	00		Н	G			456642.514 222260.370			77.7	14	
Γ		RUI	N DE	TAILS							ę	STRA	TA						Install Backfi
	Depth	TCR	SCR	RQD F	SPT 'N') Fracture Spacing	Rock Test Result (MPa)	Elev. (mAOD)	Depth (Thick -ness)	Disco	ntinuities	Detail	Des	scription	Main			Legend	Geology	Dia. mm
						<u>×</u>	77.51	,				<u>∖(TOF</u>	PSOIL)	ghtly sandy slightl		/	0.00	TS CB	
							76.91	F` ´					ar GRAVEL. ATHERED CO	ORNBRASH FOF	RMATION)		0,00	CD	
					(15) (S)		76.21	 [(0.70) 1.50				sligh to me	tly sandy sĺigh edium angular	rown mottled orar ttly gravelly CLAY weathered limes DRNBRASH FOR	 Gravel is stone. 	s fine		СВ	
					(14)			 (1.20)				Grav limes	rel is subangul stone. Sand is	atly sandy slightly lar fine to mediun fine to coarse. DRNBRASH FOR	n weathere	ed		СВ	
					(S)			-											
							75.01	- 2.70			-			AY with occasior	nal organic	;			
					(17) (S)			 (1.30)				mate (FOF		e formation)				FMB	
					(38) (S)		73.71	4.00 (0.85)) - 4.00 Very wea estone.	ak -			uish grey silty CL/ E FORMATION)	AY.			FMB	
				(5	0/0.042)		72.86 72.61	-	lime) - 4.85 Very wea estone. 5 - 5.00 No recov	ŀ	Horiz	zontal very clo	ne grained shelly se fractures. TCF				FMB	
					(S)		72.18	5.53				(FOF		E FORMATION)		/		FMB	_
							71.71	-	non	3 - 5.60 Recovered intact weak light limestone.		Horiz 100% (FOF	contal medium 6 RQD 100% REST MARBL	E FORMATION)	100% SCF	<u>-</u>		FMB FMB	
1				(5	0/0.037) (S)		71.41	-	6.50) - 6.80 No recov	very.	(FOF Stror Horiz	REST MARBL ng light grey fir zontal medium	ght bluish grey Cl E FORMATION) ne grained shelly n fractures. TCR -	LIMESTO	NE.			
L							70.71	- 7.00 - - - 	7.00) - 7.20 Dark gre	у.	(FOF Stror subh	ng light grey fir	E FORMATION) The grained LIMES ures . TCR 100%				FMB	•
				(5	0/0.031) (S)		69.81 69.71	- 7.90				(FOF Very limes (FOF Stror	REST MARBL stiff to hard gr stone. REST MARBL ng light grey fir	E FORMATION) reen CLAY interb E FORMATION) ne grained LIMES actures. TCR-100	STONE.	/		FMB END	-
													-100% FI100.]			
;L		1				oring Progres		-		I				Rotary	Flueb				<u> </u>
	Date		Т	ïme	Dept			Core Dia.	. (mm)	Water Strike	From		То	Туре	Return	n De	epth Casing	Casi	ng Dia
	08-10-1	2	0	0.00	8.00	3	.00	300)	0	5.00		8.00	Air/Mist	Good		3.00	3	800
	From			Chi To	selling Hou	rs T	ool	V Fron 5		Added To 8	General Artesian		arks en 6.50-8.00m	ı bgl.					
	So	cale	1:62.5	5		All dimensio		etres. Lo	ogs sl	nould be read i	n accorda	ince v	vith the provi	ided Key. Desc	riptions a	are base	ed on visua	al and	

WSP E	J Envir	W onm	S	P al Limited		R	ΟΤΑ	٩R	Y DRII	LHO	LE LO	G	Hole No	BH70	6	
Tele	Fephon	tbatte RG21 4 ie: 01 01256	4HJ 256 3	18800	Project		K	(ing	smere Bic	ester Pha	ise 2		Sheet	1 of 7	1	
Job No Ol	002	2845	53/0	001	Client			Co	untryside F	Properties	Ltd		Date	04-10-1 05-10-1		
Contracto	or /	Drille	er	М	ethod/Plan	t Used		L	ogged By		Co-Ordin	ates (NGR)	Gro	und Level	(m AO)D)
С.	J. As	ssoc	iates	s	Coma	cchio 30	00		OE	G		456569.523 222110.076		76.93	34	
	RUN	I DE	TAILS	s						STR	ATA					Install Backfil
Depth -	TCR	SCRI	RQD	(SPT 'N') Fracture Spacing	Rock Test Result (MPa)	Elev. (mAOD)	Depth (Thick -ness)	Disco	ontinuities	D Detail	escription	Main		Legend (Geology	Dia. mm
						76.63	- 1			fre lim	quent rootlets. I estone gravel.	n slightly sandy cla Rare fine and mediu			TS CB	
				(50/0.166)	1 ⊻	76.23 75.93	-			Ora		layey slightly sandy one GRAVEL with c			СВ	
				(S)	_ 					(W Ora sub	EATHERED C angish brown v	ORNBRASH FORM ery clayey sandy m /EL. Gravel is limes	edium			
				(23) (S)	Ŧ		[-(2.00)			(W Stir	EATHERED C If to very stiff co AY with occasi	ORNBRASH FORM onsistency dark blui onal mudstone litho LE FORMATION)	sh grey silty		FMB	
3.00				(50/0.02) (S)		73.93 73.83 73.73 73.63	3.10 3.20/			\(FC	DREST MARBL	een fine grained LIM E FORMATION)	ESTONE.		FMB FMB FMB	
4.00	60	70	60			73.53				(FC) Str	OREST MARBL	sh grey silty CLAY. <u>E FORMATION)</u> een fine grained LIM <u>E FORMATION</u>)	ESTONE.		FMB	
	100	90	80	(25) (S)	2 	70.00	(1.50)			Ex (FC Ve	tremely weak to DREST MARBL ry stiff to hard o	very weak grey M E FORMATION) greyish green silty C E FORMATION)			FMB	
5.10				(50/0.028) (S)		72.03	-			(FC Ex	DREST MARBI	rained LIMESTONE LE FORMATION) ark grey MUDSTON LE FORMATION)			FMB	
	100	90	90				(1.20)				JREST MARBL				FMB	
6.60			_	(50/0.021) (S)		70.53	6.40 -					rained LIMESTONE E FORMATION)				
	90	80	80				-(1.30)								FMB	
8.10				(40) (S)	2 <u>−</u>	69.23 68.83	- 7.70 - 8.10			blu lith	ish greý silty C orelics.	onsistency dark gree LAY with frequent n LE FORMATION)		× × ×	FMB END	
				/												
				Bi	oring Progres	s	-					Rotary F	lush			
Date			ime	Dep	th Casi	ng Dpt	Core Dia.		Water Strike	From	То	Туре	Return	Depth Casing		ing Dia
04-10-12 05-10-12			0.00 0.00	2.0 8.1		.60 .00	300			3.00	8.10	Air/mist	good	3.00	3	300
From		· · ·	C To	hiselling Hou	rs T	ool	W From 3		Added To 8.1	General Ren	harks					
Sci	ale 1	:62.5	5		All dimensic		etres. Lo	ogs st	hould be read in	n accordance	with the prov	rided Key. Descri	otions are ba	sed on visua	al and	

w	SP E		N ronm		P al Limited		R	ΟΤΑΙ	RY DRI	LLHOL	E LC	G	Hole No.	BH70)7	
	l Tele	Mour F phor	itbatte RG21	n Hoi 4HJ 256 3	use 318800	Project		Kir	ngsmere Bio	ester Pha	se 2		Sheet	1 of	1	
Job		002	284	53/(001	Client		С	Countryside F	Properties I	_td		Date	04-10-1 04-10-1		
Con	tract	or /	Drill	er	M	ethod/Plan	t Used		Logged By		Co-Ordir	nates (NGR)	Gro	und Level	(m AC)D)
	С.	J. As	ssoc	iate	s	Coma	cchio 3	00	OE	G		E 456783.771 N 222129.800		74.6	17	
		RUN	I DE	TAIL	S					STRA	TA					Install / Backfill
De	epth [.]	TCR	SCR	RQD	(SPT 'N') Fracture Spacing	Rock Test Result (MPa)	Elev. (mAOD)	Depth (Thick -ness)	scontinuities	De Detail	escription	Main		Legend	Geology	Dia. mm
							74.32 74.12	- 0.30		CLA and (TO	Y with freque subangular lii PSOIL)	e over brown slightly nt rootlets and rare c mestone gravel. y angular and subang	oarse angular	$\int_{0}^{0} \frac{1}{\sqrt{2}} \frac{1}{\sqrt{2}}$	TS CB	
					(50/0.173)	4				\ med	lium limeston	e GRAVEL. ORNBRASH FORM				
					(S)	Ľ ⊥	72.62	(1.50) 		angi GRA	ular and suba AVEL.	nd grey slightly sand ngular fine to coarse ORNBRASH FORM	limestone		СВ	
					(42) (S)		72.32	-		CLA	Y. Gravel is f	sh brown slightly san ine to medium subro	dy gravelly unded		СВ	
					(28) (S)			(1.90)		\(WE Very to m	/ stiff dark gre iedium mudst	ORNBRASH FORM y slightly silty CLAY one gravel. LE FORMATION)	/		FMB	
	4.20				(46) (S)		70.42	2 4.20 E				UDSTONE. Wide he	orizontal	×× _		
		80	80	80				(0.80)			tures . FI NI/1 REST MARBI	00/200 LE FORMATION)			FMB	
	5.00				(21) (S)		69.62	- - - (0.90)		Very (FO	/ stiff dark blu REST MARB	ish grey slightly silty (LE FORMATION)	CLAY.		FMB	
71/11/91	5.90	90	80	80	(50/0.039) (S)		68.72	- 5.90 - (1.20)		LIMI	ESTONE. Ho tures. FI NI/20	strong grey fine graii rizontal medium drillir 00/350/450. LE FORMATION)			FMB	
	7.10						66.92	-		with mud (FO	rare carbona Istone lithoreli REST MARBI	dark bluish grey sligh ceous material. Freq cs. LE FORMATION) en slightly sandy slig	uent		FMB	
					(33) (S)		66.62	2 8.00 		CLÁ	Y.	LE FORMATION)		<u> </u>	END	
					B	oring Progres						Rotary Flu	Ish			
	Date			īme	Dep	oth Casi	ng Dpt	Core Dia. (m		From	То	Туре		Depth Casing		ing Dia
	I-10-12	2	0	0.00 C	8.0 Chiselling	0 4	.00	300 Wat	4.26 ter Added	4.00	8.00	Air/Mist	Good	3.00	3	300
	From			To	Hou	irs T	ool	From 4	To 8	General Rema	arks					
	Sca	ale 1	:62.5	5		All dimensio		etres. Logs	should be read i	n accordance	with the prov	vided Key. Descrip	tions are ba	sed on visua	al and	

WSP Er	viron		P	imite	bd				TRIAL F	PIT LO	G		H	ole No.	TP7()1	
N	lountba	tten H 21 4HJ 01256	ouse 3188			Project		К	ingsmere Bio	cester Pha	se 2		S	heet	1 of	1	
Job No O(0284	453/	/001			Client			Countryside I	Properties	Ltd			ate	03-10- 03-10-	12 12	
Contracto	or / Dr	iller			Met	hod/Pla J(nt Useo CB 3CX		Logged By	G	E	ates (NGR) 456450.441 222681.117		Grour	nd Level 81.1		D)
SAMF	PLES	& TE	STS	;						STR	ATA						Install / Backfill
Depth	Туре	DID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Desc	cription				Legend	Geology	
0.20	В					80.87	(0.30)	Brown sli limestone (TOPSOI	ghtly sandy slightly e. Frequent roots a L)	r gravelly CLAN and rootlets.	Y. Gravel is fi	ne to medium	subang	gular	$\frac{1}{2} \frac{1}{2} \frac{1}$	TS	
-0.20 -0.20 -0.60	D ES B				Recovered as yellow brown slightly sandy slightly gravelly clayey CO LIMESTONE. Gravel is subangular, tabular of limestone. Sand is fir (WEATHERED CORNBRASH FORMATION)											05	
-0.60 -0.60 -	ES													CB			
	60 D ES											20 ΠΤ ΡΙΙ.		END			
							Length		Shoring/Support:			Water	Strikes				
⊢ 		- 2.0 A	0 —			Ŧ	2. Width	00m 60m	None Stability:	Date	Time	Strike 1.15	Minu	utes	Standing	S	marks light spage.
	2.00 → None 1.15													a.			
Scal	dogreeo nom												criptions	s are base	ed on visu	al and	

	6		Hole No	TP7	02	
	e 2		Sheet	1 of	1	
	d		Date	01-10 01-10		
	Co-Ordinate		Gro	und Leve	el (m AC	DD)
		56609.522 22478.777		81.	.095	
	ТА					Insta Bac
	otion			Legend	Geolog	Y
	equent rootlets	S.		<u>1, st 1</u> <u>1, st 1</u> 1, st 1,	TS	
avel is fin	iravelly CLAY.	. Gravel is fi	to medium,		СВ	
e limestoi	vel is rounded	d fine limesto	e.		CB	
	Time			Standing	Re	marks
	10.33	1.70		<u>,</u> , yan 'g		epage
ated on hai	ks 2.70m bgl - Tern m bgl.	rminated on ha	l strata.			
Strike 1.70 ated o	ks 2.70m bgl - Tern m bgl.	Strike 1.70	n harc		Minutes Standing	Minutes Standing Re

WSP E		NS men	_	mite	H				TRIAL I	PIT LO	G		Ho	ole No.	TP7()3	
N Teler	/lountba	tten Ho 1 4HJ 01256	ouse 31880			Project		K	ingsmere Bi	cester Pha	se 2		St	heet	1 of	1	
Job No O(0284	453/	/001		(Client			Countryside	Properties	Ltd		D	ate	01-10- 01-10-	12 12	
Contracto	or / Dr	ller		1	Vetł	nod/Pla J(nt Use		Logged By H	G	E	ates (NGR) 456363.240 222461.806		Grour	nd Level 81.9		DD)
SAMF	PLES	& TE	STS							STR	ATA						Install / Backfill
Depth	Туре	DID (DpmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Desc	ription				Legend	Geology	
0.10	в					81.73	-	Grass an (TOPSO	d stubble over ora IL)	ngish brown sli	ghtly sandy C	CLAY with freq	juent roc	otlets.		INKNOV	
-0.10 -0.10 -	D ES						-(0.40)	Dark red (WEATH	dish brown clayey ERED CORNBRA	tabular limesto SH FORMATIO	ne COBBLES ON)	3.				СВ	
0.50 - - 1.00 - 1.00 - 1.00 - 1.00	B B D ES					81.33	0.60	is angula	to soft orangish ye r, fine to medium I ERED CORNBRA	imestone		Sand is fine to	coarse.	Gravel		СВ	
1.60 - - - 1.60 - 1.60 - -	BD				1 <u>−</u>	80.43	- - - - - - (0.90)	subangul	tiff mottled orangis ar fine to medium ERED CORNBR4	limestone.	, , , , ,	avelly CLAY. (Gravel is	5		СВ	
- - - - - - - - - -						79.53	- 2.40 - - - - -									END	
- - - - - - - - - - - - - - - - - -							-										
							Length	.00m	Shoring/Support:	Date	Time	Water Strike	Strikes	ıtes	Standing	Re	marks
		- 2.0 A	0 —		->	Ŧ	Width		None	01-10-12	11.57	1.40				See	epage.
D		C		Note		B 0.60 ⊥	Orientati degr r	ees from horth	Stability: Stable gs should be read		at 2.40m bgl - `	Terminated on h			d on viev	Jal and	
Sca	le 1:31	.25		man	ual io	dentificat	ion.										

WSP Er		NS men	_	imite					TRIAL F	PIT LO	G		Hole	TP7)4	
	Nountbat RG2 phone: 0 ax: 012	1 4H.I		00		Project		к	ingsmere Bio	cester Pha	se 2		Shee	t 1 of	1	
Job No OC)0284	453/	/001	l		Client			Countryside I	Properties	Ltd		Date	01-10- 01-10-		
Contracto	or / Dri	iller			Met	hod/Pla J(nt Use		Logged By	G	E	ates (NGR) 456521.546 1 222453.904		Ground Level		DD)
SAMF		8. TE								STR		1222433.904				Insta
Depth	1		1	P.Pen (kN/m2)	Water	Elev. (mAOD)					ription			Legend	Geology	Back
0.80 1.00 1.00	ES B D				1	81.69	- - - - -(1.20) - - - - -	(TOPSOI Firm orar tabular lir (WEATH	igish brown gravel	ly CLAY with a	bundant cobl	lets. Dies. Cobbles are	angular	,,,	TS CB	
2.00 2.00	B D					80.49	1.40 	Firm to st CLAY. G	iff light grey to gre avel is subangula ERED CORNBRA	r, fine to mediu	m limestone.	ghtly sandy slightly	y gravell	y 0	СВ	
						78.89	3.00 								END	
							Length		Shoring/Support:			Water Stri	kes			
⊢ –		- 2.0 A	0 —			Б 0.60	Width	.00m .60m	None Stability:	Date 01-10-12	Time 11.21	Strike 1.20	Minutes	Standing		marks epage.
		С				<u> </u>		on ees from lorth	Stable	General Rem End of trial pit		Terminated on hard	strata.			
Scale	e 1:31	.25				ll dimens dentificat		metres. Log	gs should be read	in accordance	with the prov	ided Key. Descript	tions are	e based on visu	al and	

WSPI	Enviror	NS		imite	24				TRIAL F	PIT LO	G		Ho	le No.	TP7()5	
	Mountba	atten H 21 4HJ 01256	ouse 3188			Project		К	ingsmere Bio	cester Pha	ase 2		Sh	leet	1 of	1	
Job No (0028	453	/001		1	Client			Countryside I	Properties	Ltd		Da	ate	01-10- 01-10-	12 12	
Contrac	tor / Dr	iller			Met	nod/Pla J(nt Use CB 3C>		Logged By H	G	E	ates (NGR) 456375.727 222329.723	1	Grour	nd Level 81.2		D)
SAN	IPLES	& TE	STS	3					I	STF	RATA						Install / Backfill
Depth	Туре	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Des	cription				Legend	Geology	
-						81.08	_	Grass and (TOPSOI	d stubble over ora L)	ngish brown s	lightly sandy C	LAY with frequ	ient root	tlets.	<u>11, 11, 11,</u>	TS	
- - - 0.50 - 0.50	B					80.58	(0.50)	Dark redo (WEATH	lish brown clayey ERED CORNBRA	tabular limesto SH FORMATI	one COBBLES ION)					СВ	
-0.50 - -	ES		1.50				-(0.40)	Gravel is	to soft, orangish y angular, fine to m ERED CORNBRA	edium limesto	ne.	Sand is fine to	coarse.			СВ	
- - - 1.50 - 1.50 - 1.50 - - - - - -	B D ES					80.18	1.10 - - - - -(1.40) - - - - -	subangul	iff, light grey mottl ar, fine to medium ERED CORNBRA	limestone. Oc	casional black	ravelly CLAY. (c staining.	Gravel is	5		СВ	
2.50 2.50 	B					78.78	2.50 - - - - - - - - - - - - - - - - - - -									END	
							Length 2	.00m	Shoring/Support:	Date	Time	Water S Strike	Strikes Minut	ies	Standing	Rei	marks
		- 2.0 A C	0 —			B 0.60 ⊻	Orientati		Stability: Collapse from 0.60m bgl.	General Ren End of trial pir Pit dry.		Ferminated on ha	ard strata				
	ale 1:31	.25		Note mar	es: Al nual io	l dimens dentificat	ions in i	ees from orth netres. Log	gs should be read	in accordance	with the provi	ded Key. Desc	riptions	are base	ed on visu	ual and	

		NS							TRIAL F	PIT LO	G		Ho	ole No.	ГР70	5A	
Tele	/lountba	tten H 21 4HJ 01256	ouse J 3 3188			Project		к	ingsmere Bio	cester Pha	se 2		Sł	heet	1 of	1	
Job No O(00284	453	/00′	1		Client			Countryside I	Properties	Ltd		D	ate	08-10- 08-10-	12 12	
Contracto	or / Dr	iller			Met	nod/Pla J(nt Use		Logged By OE	ĒG	E	ates (NGR) 456375.727 222329.723		Grou	nd Level 81.2		D)
SAMI	PLES	& TE	STS	3						STR	ATA						Install / Backfill
Depth	Туре	PID (ppmV)	HSV kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)				Desc	cription				Legend	Geology	
-						81.08	<u>-ness)</u> - 0.20	Brown sli	ghtly sandy CLAY	with frequent r	ootlets. Grass	and stubble o	over.			INKNOW	
- - - - - - - -					1	80.08	- - - (1.00) - -	GRAVEL	brown slightly san with frequent cobl ERED CORNBRA	bles. Gravel ad	l cobbles are t	d subangular abular limesto	fine to c one.	coarse		СВ	
-						00.00	-	limestone	bluish grey very gr e.			ngular, fine to	mediun	n			
-						79.68	-(0.40) 1.60	(WEATH	ERED CORNBRA	SH FORMATIO	ON)					CB	
							Length		Shoring/Support:	Date	Time	Water		ites	Standing	Ber	marke
		– 1.8 	3 —			■ ■ B 0.8	Width	.80m .80m	None Stability:	Date	Time	Strike 1.10	Minu		Standing	F	marks Fast pages faces
		С				¥		on ees from iorth	Spalling 0.60m Face C	General Rem End of pit at 1							
Sca	le 1:31	.25		Not mar	es: Al nual io	l dimens dentificat	ions in i	metres. Log	gs should be read	in accordance	with the provi	ded Key. Desc	criptions	s are bas	ed on visu	al and	

WSP Environme	SP ental Lii	imite					TRIAL F	PIT LO	G				P70	5B	
Mountbatten RG21 4l Telephone: 012 Fax: 01256 3	HJ 256 31880	00	F	Project		К	ingsmere Bio	cester Pha	se 2		Sh	leet	1 of	1	
Job No 0002845	3/001		(Client			Countryside I	Properties	Ltd		Da	ate	08-10- 08-10-	12 12	
Contractor / Drille	r		Meth	nod/Pla JC	nt Useo CB 3CX		Logged By OE	G	E	ates (NGR) 456375.727 222329.723		Grour	d Level 81.2		D)
SAMPLES & 1	TESTS	;						STR	ATA						Install / Backfill
	(ppmV) HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Desc	cription				Legend	Geology	20010
-				80.98	(0.30)	Grass and (TOPSOI	d stubble over bro L)	wn slightly san	dy CLAY with	frequent rootl	lets.		$\frac{\sqrt{1_{z}}}{\frac{1_{z}}{2}} \frac{\sqrt{1_{z}}}{\sqrt{1_{z}}}$	TS	
			⊥		-(0.40)	limestone	brown slightly san GRAVEL. ERED CORNBRA			igular fine to o	coarse ta	bular		СВ	
			_ ₽ _	80.58	-(0.40)	fine to me	light bluish grey sp edium subrounded ERED CORNBRA	limestone litho	orelics.	ghtly gravelly	CLAY. G	ravel is		CB	
Image: Scale 1:31.25					- - - - - - - - - - - - - - - - - - -		Shoring/Support:			Water	Strikes				
1 2 2					Length	80m	Shoring/Support:	Date	Time	Water Strike	Strikes Minut	ies	Standing	Rer	marks
⊢ 1 1	1.8 —— A			Б 0.8	Width	80m 80m	None Stability:			0.60 1.00				M see 0.6m Seep	linor epage n Face C bage all ces.
	C	Note	ος· ΔΙ		'n	ees from orth	Stable gs should be read	General Rem End of pit at 1.	.1m bgl	led Key Dec	criptions	are has	d on vieu		
Scale 1:31.25)	man	ual ic	dentificat	ion.	1.00003. LUL			mar are provid	ucu ney. Des	Subrous				

WS		viron		_	imite	vd .				TRIAL F	PIT LO	G		Ho	ole No. T	P70	5C	
003	Mo Telepi	ountbat	tten Ho 1 4HJ 01256	ouse 3188			Project		К	ingsmere Bio	cester Pha	se 2		Sr	neet	1 of	1	
Job N		0284	453/	/001			Client			Countryside I	Properties	Ltd		D	ate	08-10- 08-10-	12 12	
Contr	actor	r / Dri	ller			Met	nod/Pla J(nt Use CB 3C>		Logged By Of	EG	E	ates (NGR) 456375.727 222329.723		Grour	nd Level 81.2		D)
S	AMP	LES	& TE	STS	3						STR							Install /
Dep			DID (Vmdd)		1	Water	Elev. (mAOD)	Depth (Thick			Desc	cription				Legend	Geology	Backfill
			d)	- <u>×</u>) E S	_ >		<u>-ness)</u> (0.30)	(TOPSOI	d stubble over bro L)	wn slightly san	dy CLAY with	frequent root	ets.		$\frac{\underline{x}^{1}}{\underline{x}} \frac{\underline{x}^{1}}{\underline{x}} \frac{\underline{x}^{1}}{\underline{x}}$	TS	
- - -							80.98	- -(0.60) -	Orangish with frequ	brown slightly sar ent cobbles. Grav ERED CORNBRA	el and cobbles	are tabular li	ngular fine to o mestone.	coarse G	GRAVEL		СВ	
							80.38 80.18	L	frequent li	ry stiff light bluish imestone lithorelic ar limestone. Cobl ERED CORNBRA	s and rare cob ples are limesto	bles. Gravel i one.	velly slightly si s medium to c	Ity CLAY coarse	/ with		CB END	
										Shoring/Support:			Water	Strikes				
								Length 1	.80m		Date	Time	Strike	Minu	ites	Standing	Rer	marks
			- 1.8 <u>A</u> C	3			B 0.8 ⊥	Orientati degr	.80m on ees from horth	None Stability: Stable	General Rem Pit dry. Soakaway tes	arks t performed in p	Dit.					
	Scale	e 1:31	.25		Note mar	es: Al nual io	l dimens dentificat	ions in i ion.	metres. Log	s should be read	in accordance	with the provi	ided Key. Des	criptions	are base	ed on visu	al and	

WSP Er		NS Imen		.imite					TRIAL I	PIT LO	G		Hole No	TP7	06	
Telep	lountba RG2 hone: ax: 012	21 4HJ 01256	3188	300		Project		к	ingsmere Bi	cester Pha	se 2		Sheet	1 of	1	
Job No OC	028	453/	/00 [,]	1		Client			Countryside	Properties	Ltd		Date	01-10- 01-10-		
Contracto	r / Dr	iller			Met	hod/Pla			Logged By	10		ates (NGR) 456497.419	Gro	und Leve		D)
						J	CB 3C>		F	IG		222328.655		80.4	409	Insta
SAMF Depth		1		P.Pen (kN/m2)	Water	Elev. (mAOD)				STR	ription			Legend	Geology	Bac
.20	в		-	<u>>-e</u>	-	80.11	<u>-ness)</u> (0.30) 0.30	Grass an (TOPSO		angish brown sli	ghtly sandy (CLAY with frequen	t rootlets.		тѕ	
.20 .20 .20	D ES						(0.50)	Dark redo (WEATH	dish brown clayey ERED CORNBRA	tabular limestor ASH FORMATIC	ne COBBLE: DN)	5.			СВ	
.80 .80	B D				1	79.61	0.80 - - - - - - - - - - -	angular, f	ngish yellow slight fine to medium lin ERED CORNBR/	nestone.		d is fine to coarse	. Gravel is		СВ	
.50 .50 .50	B D ES					78.91		subangul	tiff light grey mottl ar, fine to mediun ERED CORNBR/	n of weak weath	ered limesto	ravelly CLAY. Gra ne.	vel is		СВ	
.00 .00	B D B					77.01	- - - - 3.40		oming gravelly. G			CLAY with frequer	t cobbles			
.40	D					76.81	- <u>3.60</u> 	Gravel is	angular, fine to d ERED CORNBR/	parse of strong	imestone. S	and is fine to coars	se.		END	
							- - - Length		Shoring/Support:	1		Water Stri	kes			
◄		- 2.0	0 —			4		.00m	None	Date 01-10-12	Time 13.47	Strike 1.40	Minutes	Standing		mark: inflo
D		A C				B 0.60	Orientati		Stability: Stable	General Rem End of trial pit Pit dry.		Terminated on hard	strata.			
Scale	e 1:31						degr r	ees from Iorth		Pit dry.		ided Key. Descrip		ased on vis	ual and	

WSP E		NS	_	imite	ed				TRIAL P	PIT LO	G				TP7()7	
Tele	Mountba	tten H 21 4HJ 01256	ouse 3188			Project		k	(ingsmere Bio	cester Pha	ase 2		Sh	leet	1 of	1	
Job No O	0028	453/	/001			Client			Countryside I	Properties	Ltd		Da	ate	01-10- 01-10-	12 12	
Contract	or / Dr	iller			Met	hod/Pla J(nt Use CB 3C>		Logged By H	G	E	ates (NGR) 456619.839 222327.504		Groun	d Level 78.9		D)
SAM	PLES	& TE	STS	3						STF	RATA						Install / Backfill
Depth	Туре	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Des	cription				Legend	Geology	
-						78.78	-	(TOPSO Dark ora	ngish brown clavey	/ tabular limes	tone COBBLE		uent root	tlets.		TS	
0.50 0.50	B D					70.40	-(0.60)	(WEATH	IĔRED CORNBŔĂ	SH FORMATI	ON)					СВ	
													END				
-							- - Length		Shoring/Support:			Water	Strikes				
+		- 2.0					2. Width	.00m	None	Date	Time	Strike	Minut	ies i	Standing	Rei	marks
D		<u>A</u>				B 0.60		.60m	Stability:	General Ren							
		С				-	Orientati degr r	on ees from lorth	Stable		t at 0.80m bgl - ⊺	Ferminated on h	ard strata.				
Sca	ale 1:31	.25		Note mar	es: Al nual io	ll dimens dentificat	ions in 1 ion.	netres. Lo	gs should be read	in accordance	with the provi	ded Key. Deso	criptions	are base	d on visı	ial and	

WSP	Enviror	WS		imite	he				TRIAL F	PIT LO	G		Hc	ole No.	TP7()8	
	Mountba	atten H 21 4H. 01256	ouse J 3 3188			Project		K	ingsmere Bio	cester Pha	ase 2		Sr	neet	1 of	1	
Job No	, 00028	453	/00′	1		Client		I	Countryside I	Properties	Ltd		Da	ate	01-10- 01-10-	12 12	
Contra	ctor / D	riller			Met	hod/Pla J(nt Use		Logged By Of	EG	E	ates (NGR) 456418.857 222200.386		Grour	nd Level 79.2		D)
SAI	MPLES	& TE	STS	S						STF	RATA						Install / Backfill
Depth	Туре	DID (DpmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Des	cription				Legend	Geology	Dackini
-						78.98	(0.30)	Stubble of (TOPSOII	ver orangish brow L)	n slightly sand	ly clayey SILT	with frequent r	ootlets.		$\frac{\underline{x_1}}{\underline{y_2}} = \frac{\underline{x_1}}{\underline{x_1}}$	TS	
- 0.40 - - -	ES							Cobbles a	brown and white are limestone. Abu ERED CORNBRA	undant fine wh	ite lithorelics.	gravel and ran	e cobble	es.	× × × × × × × ×	СВ	
 1.10 	В					77.68	77.68 1.60									СВ	
- - - - -					1 <u>−</u>		Very stiff to hard bluish arey silty CLAY with numerous cobbles. Cobbles							angular		СВ	
							-									END	
					<u> </u>		Length		Shoring/Support:			Water S	Strikes		<u> </u>		
		— 2 A					2 Width	.00m .80m -	None	Date 02-10-12	Time 10.09	Strike 1.90	Minu	tes	Standing	_	marks
	C Orientation degrees from north Stable												d strata.				
S	cale 1:3 ⁻	1.25		Not mar	es: A nual i	ll dimens dentificat	ions in i	riptions	are base	ed on visu	ial and						

WSP E	Inviror		ital L	imite		During			TRIAL F	PIT LO	G			ole No.	TP7()9	
Tele	Mountba RG2 ephone: Fax: 012	21 4H. 01256	J 5 3188	00		Project		к	ingsmere Bio	cester Pha	ase 2			leel	1 of	1	
Job No O	0028	453	/001			Client			Countryside	Properties	Ltd		D	ate	02-10- 02-10-	12 12	
Contract	or / Dr	iller			Met	hod/Pla J(nt Use		Logged By	EG	E	ates (NGR) 456538.888 222208.384		Grour	nd Level 78.2		D)
SAM	IPLES	& TF	STS	 ;								222200.004					Install /
Depth		-	HSV (kN/m2)	-	Water	Elev. (mAOD)	Depth (Thick				cription				Legend	Geology	_ Backfill
-			÷	,- ±			<u>-ness)</u> - _(0.35)	Dark brov (TOPSO	wn slightly sandy c IL)	layey SILT wit	h rare coarse (gravel.			<u>1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1</u>	TS	
0.30	ES					77.90	(0.25)	Orangish (WEATH	brown slightly clar ERED CORNBRA	yey gravelly Co SH FORMATI	OBBLES. ON)					СВ	
0.60	В				1	77.65	0.60 - -	cobbles.	, bluish grey to ora Cobbles are limes ERED CORNBRA	stone. Termina	ated on hard st	ilty CLAY with rata.	frequen	ıt			
-					-		 (1.30) 									СВ	
-						76.35	1.90									END	
							Length		Shoring/Support:	Detr	Time	Water		*****	Ctorrell		morter
		— 2 A			->	 	Width	.00m	None	Date	Time	Strike 1.00	Minu	ites	Standing	F	marks Fast epage
	ale 1:31	C 25		Note	es: A	B 0.7 ↓	Orientati degr r	ees from north	Stability: Stable gs should be read	Pit dry.	t at 1.90m bgl - 1				ed on visu	ual and	
				mar	iual i	dentificat	ion.										

ws	P Env		men		imite					TRIAL F	PIT LO	G				TP7′	10	
	Teleph	RG2 one: (ten Ho 1 4HJ 01256 56 318	3188	00		Project		к	ingsmere Bio	cester Pha	se 2		She	eet	1 of	1	
Job N	ە 000	284	153/	001		1	Client			Countryside I	Properties	Ltd		Da		01-10- 01-10-	12 12	
Contr	actor	/ Dri	ller			Met	nod/Plai JC	nt Use CB 3C)		Logged By	G	E	ates (NGR) 456670.522 222200.786		Groun	d Level 76.6		D)
s	AMPL	ES a	& TE	STS	3						STR	ATA						Install /
Dep			DID (ppmV)		-	Water	Elev. (mAOD)	Depth (Thick -ness)				ription				Legend	Geology	_ Backfill
0.10 0.10 -0.10 -0.10		B D ES					76.46	-	(TOPSO Orangish	d stubble over ora L) brown clayey tabu ERED CORNBRAS	lar limestone (COBBLES.	LAY with freq	uent rootl	lets.		TS	
0.50 - -		В						- _(0.90) -									СВ	
						1 <u>−</u>	75.56	 1.10									END	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $																		
								Length 2	.00m	Shoring/Support:	Date	Time	Water Strike	Strikes Minute	es	Standing	Rei	marks
			2.00 A	0 —			B 0.60	Width 0 Orientati degr	.60m	None Stability: Stable	01-10-12 General Rem	15.29 arks	1.10				_	page.
	Scale	1:31.	25		Note mar	es: Al nual io	l dimens dentificat	ions in ion.	metres. Lo	gs should be read	in accordance	with the provi	ded Key. Des	criptions a	are base	d on visı	al and	

.w/c	SP En		NS		imit	a d				TRIAL F	PIT LO	G		Hol	le No.	TP7′	11	
vva	M Telep	ountba	tten H 21 4HJ 01256	ouse I 5 3188	300		Project		к	ingsmere Bio	cester Pha	se 2		She	eet	1 of	1	
Job		0284	453/	/00 [,]	1		Client			Countryside F	Properties I	_td		Da		02-10- 02-10-	12 12	
Cont	racto	r / Dri	iller			Met	nod/Pla J(nt Use CB 3C>		Logged By OE	G	E	ites (NGR) 456453.585 222105.883		Groun	d Level 77.7		D)
S	SAMP	LES	& TE	ST	S						STR	ATA			I			Install / Backfill
De	pth	Туре	(Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)				ription				Legend	Geology	
-							77.51		Stubble of (TOPSO	over dark brown slig L)	ghtly sandy clay	yey SILT with	frequent rootl	ets.		<u>str</u> <u>str</u>	TS	
- - - - - - - - - - -		В				1	76.31	- - - -(1.20) - - - - - - - - - -	COBBLE	brown and grey sl S. Gravel is fine to ERED CORNBRA	coarse angula	r and subang	and subangu ular limestone	ılar limes 2.	tone		СВ	
													END					
								Length		Shoring/Support:	Date	Time	Water		20	Standing	Por	marke
- D	•		— 2 A				■ 0.8	Width	.00m .80m	None Stability:	Date 02-10-12	Time 10.42	Strike 1.30	Minute		Standing	M	marks linor epage ce C
			С				*		on ees from iorth	Stable	General Rem End of trial pit Pit dry.	arks at 1.40m bgl - T	erminated on h	ard strata.				
	Scale	e 1:31	.25		Not mai	es: Al nual io	l dimens dentificat	ions in i ion.	metres. Lo	gs should be read	in accordance	with the provid	led Key. Deso	criptions a	are base	d on visı	ial and	

WSP Environmental Limited		TRIAL	PIT LO	G				ΓΡ7 [,]	12	
Mountbatten House RG21 4HJ Telephone: 01256 318800 Fax: 01256 318700	Project	Kingsmere B	icester Phas	se 2		She	et	1 of	1	
Job No 00028453/001	Client	Countryside	Properties L	_td		Date	()2-10-)2-10-	12 12	
Contractor / Driller	JCB 3C>		DEG	E	ates (NGR) 456634.450 222116.027		Groun	d Level 76.8		D)
SAMPLES & TESTS			STR	ΑΤΑ						Install / Backfill
Debth Laber	Elev. (mAOD) (Thick -ness)		Descr	ription				Legend	Geology	
-	(0.30) 76.52 0.30	Grass over reddish brown frequent medium to coars (TOPSOIL)	slightly sandy sli e subangular lime	ghtly silty CLA estone gravel	AY with abunda	int rootle	ts and	<u>17 x17</u> 17 <u>x17</u> x	TS	
- - - 0.60 ES	(0.50)	Reddish brown slightly gra (SUBSOIL)	avelly clayey fine t	to coarse SA	ND with numer	ous rootle	ets.	· · <u>· · · · · · · · · · · · · · · · · </u>	TS	
	76.02 0.80 	Reddish brown and grey s GRAVEL with abundant c (WEATHERED CORNBR	obbles. Gravel ar	nd cobbles an	medium and co e tabular limest	oarse tone.			СВ	
									END	
	Length	Shoring/Support:	Data	Time	Water S			Yonding	De	marka
A2A	→ Width B 0,8	.00m None .80m Stability:	Date	Time	Strike	Minutes	s 5	Standing	Rei	marks
C		on Stable ees from north	General Rema End of trial pit a Pit dry. Soakaway test	at 1.50m bgl - T	erminated on hai	rd strata.				
	s: All dimensions in r al identification.	metres. Logs should be rea	d in accordance v	with the provid	ded Key. Descr	iptions a	re base	d on visı	ual and	

	WSP Er		NS		.imite					TRIAL F	PIT LO	G				TP7′	13	
	Telep	lountba RG2 hone: ax: 012	21 4HJ 01256	I 5 3188	800		Project		к	ingsmere Bio	cester Pha	se 2		Sh	leet	1 of	1	
J	ob No 00	0284	453	/00 [/]	1	(Client			Countryside I	Properties	Ltd		Da	ate	02-10- 02-10-	12 12	
С	ontracto	r / Dr	iller			Meth	nod/Pla	nt Use		Logged By OE	EG	E	ates (NGR) 456590.284 222023.855		Grour	id Level 75.7		DD)
	SAMF	LES	& TE	ST	 S						STR	ATA						Install / Backfill
	Depth	Туре	DID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Desc	ription				Legend	Geology	
-							75.45	(0.30)	rootlets.	d stubble over dar Gravel is fine to me L)	k brown slightly edium subangu	/ gravelly very llar limestone	r clayey SILT w	vith frequ	uent	<u>x17</u> <u>x17</u>	TS	
_ 0.	.50	ES						-(0.40)		d grey slightly san ERED CORNBRA	dy clayey angu SH FORMATIO	llar and subar ON)	igular COBBLI	ES.			СВ	
							75.05	0.70	Brown an and grave	d grey slightly san el are tabular limes ERED CORNBRA	stone.		abundant cob	bles. Co	obbles			
-								(0.70)	(WEATH	ERED CORNBRA	SH FORMATI	UN)					СВ	
							74.35	<u>1.40</u>									END	
08 WSP TP LOG STANDARD 00028453 KINGSMERE BICESTER.GPJ WSPETEMPLATE1.03.GDT 16/11/12																		
ARD 00028453 KINGSMERE BICESTER	P 		- 2.2 A				Б 0.8	Width	.20m .80m	Shoring/Support: None Stability:	Date	Time	Water : Strike	Strikes Minut	ies i	Standing	Re	marks
TP LOG STANE			С				¥.		on ees from horth	Stable	General Rem End of trial pit Pit dry.		Ferminated on ha	ard strata				
16VV 80	Scale	e 1:31	.25		Note mar	es: Al iual io	l dimens dentificat	ions in i ion.	metres. Log	gs should be read	in accordance	with the provi	ded Key. Desc	criptions	are base	d on visu	al and	

WSP E		NS nmen		imite						PIT LO	G				TP7 [,]	14	
Tele	Mountba RG2 phone: Fax: 012	21 4HJ 01256	J 5 3188	00	1	Project		к	ingsmere Bio	cester Pha	se 2		Sł	heet	1 of	1	
Job No O(0028	453	/001	l	(Client			Countryside I	Properties	Ltd		D	ate	02-10- 02-10-	·12 ·12	
Contracto	or / Dr	iller			Meth	nod/Pla J(nt Use CB 3C)		Logged By OF	EG	E	ates (NGR) 456694.876 222061.325		Grour	nd Leve		DD)
SAM	PLES	& TE	STS	3						STR	ATA						Install / Backfill
Depth	Туре	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Desc	cription				Legend	Geology	
-						74.83	(0.30)	Grass ov rootlets. (TOPSO	er reddish brown s IL)	lightly clayey s	ilty fine and m	nedium SAND	with free	quent	$\frac{\underline{v_1}}{\underline{v_2}} \cdot \underline{v_1}$	тѕ	
0.50	ES						(0.70)	GRAVEL	brown and grey s with frequent cob ERED CORNBRA	bles. Gravel an	d cobbles are	d subangular f tabular limes	îne to co tone.	oarse		СВ	
-						74.13	- - 1.00	0.80 Fred	quent boulders								
1.00	В					73.93	_	Orangish COBBLE (WEATH	brown and grey sl S with abundant b ERED CORNBRA	ightly silty sand oulders. Cobbl SH FORMATIO	dy angular an es and boulde ON)	d subangular f ers are tabular	ine to co limesto	oarse ine.		CB END	
Provide a state of the state o																	
							Length		Shoring/Support:	Date	Time		Strikes	ites	Standing	Re	marks
D		— 2.(A C			>	B 0.8 ⊻	Width 0 Orientati degr	.00m .80m on ees from horth	None Stability: Stable	Date General Rem End of trial pit Pit dry.		Strike	Minu ard strata		Standing	Ke	marks
Scale 1:31.25 Notes: All dimensions in metres. Logs manual identification.									gs should be read	in accordance	with the provi	ded Key. Des	criptions	s are base	ed on visi	ual and	

Munitation is have Twee 17.128 311000 Project Kingsmere Bicester Phase 2 Sheet Job NO 00028453/001 Otient Countryside Properties Ltd Date Contractor / Driller Method/Plant Used JCB 3CX Logged By Deg N Co-Ordinates (NGR) E 45643.283 0EG Cr Co SAMPLES & TESTS Them Difference (no.9) Them Difference (no.9) Them Difference (no.9) Them Difference (no.9) Compash from alignity samy CLAY with frequent notes. (NEATHERED CORNERASH FORMATION) COBBLES (NEATHERED CORNERASH FORMATION) 040 FS Difference (NEATHERED CORNERASH FORMATION) Them Difference (NEATHERED CORNERASH FORMATION) Water Strikes. 040 FS Difference (NEATHERED CORNERASH FORMATION) Them Difference (NEATHERED CORNERASH FORMATION) Water Strikes. 040 FS Difference (NEATHERED CORNERASH FORMATION) Them Difference (NEATHERED CORNERASH FORMATION) Water Strikes. 040 FS Difference (NEATHERED CORNERASH FORMATION) Them Difference (NEATHERED CORNERASH FORMATION) Them Difference (NEATHERED CORNERASH FORMATION) 050 FS Difference (NEATHERED CORNERASH FORMATION) Them Difference (NEATHERED CORNERASH FORMATION) The Difference (NEATHERED CORNERASH FORMATION)			mite	ed					TRIAL F	PIT LO	G				ΤΡ7 [,]	15	
O0028453/001 Countryside Properties Ltd Contractor / Dniller Method/Plant Used JCB 3CX Logged By OEG Co-Ordinates (NGR) E 456843.283 N 222058.886 Grassing E 456843.283 N 222058.886 SAMPLES & TESTS Elev. Depth Type Q g g g g g g g g g g g g g g g g g g	8	1880	0		Proj	ject		К	ingsmere Bio	ester Pha	ise 2		Sr	ieet	1 of	1	
JCB 3CX OEG E 456843.283 N 222058.886 SAMPLES & TESTS STRATA Depth Type Q.Q.Q.S.Y.Y.Z.O.S.R.86 Description (0.30) (Thick (mAOD)(Thick) Description (0.33) (TOPSOIL) Toravel is fine to coarse. Gravel and cobbles are tabular timestone. (WEATHERED CORNBRASH FORMATION) 0.60 ES 1.30		01			Clie	nt			Countryside I	Properties	Ltd		Da		02-10- 02-10-	12 12	
SAMPLES & TESTS Depth Type Orgen (a) (b) (b) (b) (b) (b) (b) (b) (b) (b) (b				Me	thod/					G	E	456843.283		Grour	nd Level 73.6		D)
Depth Type Type Effective B Depth (mAOD) Depth (mAOD) Description 0.60 ES 0.30 Grass and stubble over brown slightly sandy CLAY with frequent rootlets. (10.30) Grass and stubble over brown slightly sandy CLAY with frequent rootlets. (73.34 0.30 0.60 ES 0.30 Grave is fine to coarse. (WEATHERED CORNBRASH FORMATION) Grave is fine to coarse. (WEATHERED CORNBRASH FORMATION)		TS								STF							Install /
Crass and stubble over brown slightly sandy CLAY with frequent rootlets. (0.30) 7.3.34 0.30 7.3.34 0.30 7.3.34 0.30 Orangish brown and grey slightly clayey gravelly angular and subangular COBBLES Gravel is fine to coarse. Gravel and cobbles are tabular limestone. (WEATHERED CORNBRASH FORMATION) 7.3.4 1.30 7.3.4 1.30 7.3.4 1.30				Water	Ele (mA	lev. AOD)	(Thick								Legend	Geology	_ Backfill
Complexity of the second secon		0)		7		(0.30)	Grass and (TOPSOI	d stubble over brov L)	wn slightly san	dy CLAY with	frequent root	ets.		$\frac{\underline{x}^{1} \cdot \underline{x}}{\underline{1}_{1}} \cdot \underline{x}^{1} \cdot \underline{1}_{2}$	TS	
						3.34	0.30 - - -	Orangish Gravel is (WEATH	brown and grey sl fine to coarse. Gra ERED CORNBRA	ightly clayey g avel and cobbl SH FORMATI	ravelly angula es are tabular ON)	r and subangu limestone.	ular COB	BLES.		- 	
							-(1.00) - 									СВ	
													END				
A Vidth Stability: C C Vidth C Stability: C C C C Stability: C C C C Stability: C C C C C Stability: C C C C C Stability: C C C C C C Stability: C				>	BC	₹ 0.8 ¥	2. Nidth 0. Drientati degri r	.00m .80m on ees from iorth	None Stability: Stable	General Ren End of trial pit Pit dry.	narks at 1.30m bgl - ⁻	Strike Terminated on h	Minu Minu	N.	Standing		marks

WSF	P Envir	ronr		- tal Li	mite					TRIAL F	PIT LO	G				TP7′	16	
1	l Felephor	RG2' ne: 0	ten Ho 1 4HJ 1256 56 318	31880	00		Project		к	ingsmere Bio	cester Pha	se 2		Sł	neet	1 of	1	
Job N	o 0002	284	53/	001		(Client			Countryside I	Properties	Ltd		D	ate	03-10- 03-10-	12 12	
Contra	ictor /	Dril	ler			Meth	nod/Pla J(nt Use		Logged By	G	E	ates (NGR) 456680.896 221935.636		Grour	d Level 74.0		D)
SA	MPLE	-5.8	۲F	STS							STR							Install /
Dept				HSV (kN/m2)		Water	Elev. (mAOD)					cription				Legend	Geology	_ Backfill
-								<u>-ness)</u> - -(0.40)	Soft brow subangul (TOPSO	<i>r</i> n slightly gravelly ar, tabular of limes IL)	sandy CLAY. Stone.	Sand is fine to	o coarse. Grav	vel is		<u>NIZ NIZ</u>	TS	
- - - 0.80 -0.80		B D					73.67	0.40 - - - - - - - - - - - - - - - - - - -	subangul	n brown slightly cla ar, fine to corse lin ERED CORNBRA	nestone. Sand	is fine to coal	nestone COBI 'se.	BLES. C	Gravel is		СВ	
-							72.77	1.30									END	
A C																		
								Length	00m	Shoring/Support:	Date	Time	Water Strike	Strikes Minu	ites	Standing	Re	marks
			2.00 A C) —			B 1.00	Width 1 Orientati degr	.00m .00m on ees from horth	None Stability: Stable	General Rem	arks	Terminated on h					
5	Scale 1	:31.	25		Note man	es: Al iual ic	l dimens dentificat	ions in i ion.	metres. Lo	gs should be read	in accordance	with the provi	ded Key. Deso	criptions	are base	d on visu	ial and	

WSP E		NS		imite	d				TRIAL F	PIT LO	G		Ho	le No.	TP7′	17	
Tel	Mountba	tten H 21 4HJ 01256	ouse 3188			Project		K	ingsmere Bio	cester Pha	se 2		Sh	eet	1 of	1	
Job No C	0028	453	/001			Client			Countryside I	Properties	Ltd		Da		02-10- 02-10-	12 12	
Contract	tor / Dr	iller			Metl	nod/Pla J(nt Use CB 3C>		Logged By OE	G	E	ates (NGR) 456487.261 221863.542		Grour	id Level 74.1		D)
SAN	IPLES	& TE	STS	3						STR	ATA						Install /
Depth	-	DID (Judd)	1	-	Water	Elev. (mAOD)					cription				Legend	Geology	Backfill
 - -						70.70	-ness) - -(0.40)	Brown sliq (TOPSOI	ghtly sandy silty Cl L)	LAY with frequ	ent rootlets a	nd frequent straw	Ι.		<u> </u>	TS	
0.40 0.50	ES B					73.78	-	Orangish (WEATH	brown slightly clay ERED CORNBRA	ey gravelly CC	OBBLES. ON)					СВ	
-						73.18	-(0.60) - - 1.00									END	
	<u> </u>	•	•	<u>·</u>	•	·	Length		Shoring/Support:	Data	Time	Water Str		ac .	Standing	De	marke
		— 2 A C				B 0.8 ⊻	Width 0. Orientatio degri r	80m on ees from iorth	None Stability: Stable	Pit dry.	arks at 1.0m bgl - T	Strike erminated on hard s			Standing		marks
Sc	ale 1:31	.25		Note mar	es: Al nual io	l dimens dentificat	ions in i ion.	metres. Log	s should be read	in accordance	with the provi	ided Key. Descrip	otions	are base	d on visu	ial and	

WSP E				imite	d				TRIAL P	PIT LO	G		Ho	ole No.	TP7′	18	
Tele	Mountba	tten H 21 4HJ 01256	ouse 31880			Project		K	(ingsmere Bio	cester Pha	se 2		Sh	neet	1 of	1	
Job No O	0028 [,]	453/	/001		(Client			Countryside I	Properties	Ltd		Da	ate	02-10- 02-10-	12 12	
Contract	or / Dr	iller			Meth	nod/Pla J(nt Use CB 3C>		Logged By Of	ĒG	E	ates (NGR) 456520.582 221790.305		Grour	nd Level 73.7		D)
SAM	PLES	& TE	STS	3						STR	ATA						Install / Backfill
Depth	Туре	DID (DpmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Desc	ription				Legend	Geology	
-						73.24	(0.50)	Brown sli (TOPSO	ightly sandy slightly IL)	y silty CLAY wit	h frequent ro	otlets.			<u>x 12</u> x 12 <u>12</u> x 12 <u>x 12</u> x 12 <u>x 12</u> x 12 <u>12</u> x 12 x 12	TS	
 _0.70 _0.80	B ES						- -(0.60)	rootlets.	<i>r</i> n mottled orangish Locally greenish gr ERED CORNBRA	rey.	-	with occasiona	al roots	and		СВ	
- - -						72.64	-(0.40) 1.50	GRAVEL (WEATH	i brown clayey san ERED CORNBRA ey slightly clayey s	SH FORMATIO	ON)					СВ	
									ERED CORNBRA	<u>SH FORMATIO</u>	N)						
		-					Length 2	.00m	Shoring/Support:	Date	Time	Water S Strike	Strikes Minut	tes	Standing	Rei	marks
D		— 2 A C				B 0.8 ↓	Orientati degr r	ees from horth	None Stability: Stable	Minor seepage	.6m bgl - Termi e at base of pit	nated on hard str					
Sca	le 1:31	.25				l dimens dentificat		metres. Lo	gs should be read	in accordance	with the prov	ided Key. Desc	riptions	are base	ed on visu	al and	

ment ten Ho 1 4HJ 01256 56 318	ouse 31880			Project				PIT LO	-			TP71		
	5700	00		FIOJECI		К	ingsmere Bio	cester Pha	se 2		Sheet	1 of	1	
53/	001			Client			Countryside I	Properties I	_td		Date	03-10- 03-10-	12 12	
ler			Met				Logged By	G	E	456537.700	Gr			D)
λ τε	STS	;						STR	ATA					Install / Backfill
DID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)				Desc	ription			Legend	Geology	
				73.33	- - -(0.60) -	(TOPSOI	L) iff mottled orangis	h brown CLAY.	Occasional I	enses of fine to n	nedium		TS	
					- - -(1.80) - - - - -								СВ	
			Ţ	71.53	2.40 - - - - - - - - - - - - - - - - - - -								END	
A C	0	Note		∎ 1.00 ¥	2. Width 1. Orientatio n	00m on ees from orth	Shoring/Support: None Stability: Stable	End of pit at 2.	4m bgl - Termiı	Strike 2.40 nated on hard strate	Minutes	Standing	See	marks epage
JCB 3CX HG E456537 N 221732 SAMPLES & TESTS Depth Type R d d d d d d d d d d d d d d d d d d												JCB 3CX HG E 486637 700 N 221732.641 ITESTS OB 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	30:001 Country State Properties Ltd 08:10- 08:10- 08:10- 0001 08:10- 0001 08:10- 001 08:10- 001 08:10- 001 08:10- 001 08:10-001 08:10	33:001 COUNTY State Properties ELU 03:10-12 er Method/Plant Used Logged By Co-Ordinates (NGR) Ground Level (m AC 73.928 TESTS STRATA Energy (maco) Description Legred Geology Energy (maco) Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Partin Energy (maco) Energy (maco) Energy (maco) Energy (maco) Parint Energy (maco) Energy (maco)<

			NS	_	,					TRIAL F	PIT LO	G		H	ole No.	TP72	20	
	Telep	ountba	tten He 1 4HJ 01256	ouse 31880			Project		к	ingsmere Bio	cester Pha	ise 2		SI	heet	1 of	1	
Jot	00 No 00	0284	453/	/001			Client			Countryside I	Properties	Ltd		D	oate	08-10- 08-10-	12 12	
Co	ntracto	r / Dri	iller			Met	hod/Pla	nt Use CB 3C)		Logged By	EG	E	ates (NGR) 456490.568 221932.119		Grour	nd Level		D)
	SAMF	1 FS	& TF	STS	 ;						STR							Install /
	Depth			-		Water	Elev. (mAOD)					cription				Legend	Geology	Backfill
						-		<u>-ness)</u> _ _(0.35)	Brown sli (TOPSOI	ghtly sandy CLAY L)	with frequent r	ootlets and st	raw.			$\frac{\underline{x} \cdot \underline{x}}{\underline{x}} \cdot \underline{x} \cdot \underline{x} \cdot \underline{x}$	TS	
-							74.65	- 0.35 - - - (0.35)	limestone (WEATH	brown slightly san GRAVEL. ERED CORNBRA	SH FORMATI	ON)	-			0-0-0 0-0-0 0-0-0 0-0-0 0-0-0	СВ	
-							74.30	0.70	subangul Orangish frequent l	a stiff consistency ar limestone grave brown slightly clay boulders. Gravel, o ERED CORNBRA	el. /ey gravelly an cobbles and bo	gular and sub oulders are lim	angular COBE		/		СВ	
-							73.80	1.20									END	
								Length	00.0	Shoring/Support:	Date	Time	Water Strike	Strikes Minu	ites	Standing	Re	marks
	⊢		— 2 A C				B 0.8 ⊥	Width	.00m .80m on	None Stability:	General Rem	narks	Strike				Ke	
L —								degr r	ees from horth	Stable								
	Scale	e 1:31	.25		mar	es: A nual io	ll dimens dentificat	ions in ion.	metres. Lo	gs should be read	in accordance	with the provi	aea Key. Desc	criptions	s are base	ea on visi	ial and	

WODE		VSP	imite	d				WIN	D	ow s/		ELOG		Hole	e No.	NS7	01	
Telep	lountbat RG2 phone: (tten House 1 4HJ 01256 318 56 318700	800		Proje	ect		k	King	smere Bic	ester Pha	se 2		She	eet	1 of	1	
Job No OC)0284	453/00	1		Clier	nt			Co	untryside F	Properties	Ltd		Dat		03-10- 03-10-	12 12	
Contracto	or / Dri	ller		Meth	hod/l	Plan	Used		L	ogged By			ates (NGR)		Grour	nd Level	(m AO	D)
C.J.	. Assc	ciates			С	ompe	etitor 13	30		JE	Μ		456684.124 222594.486			79.5	568	
SA	MPLE	ES & TE	-									STRAT	٩					Install Backfi
Depth	Туре	Test Result	(Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription				Legend	Geology	Dia. mm
-							79.27	(0.30) 0.30		wn slightly grav						$\frac{\sqrt{J_{\chi}}}{J_{\chi}} \frac{\sqrt{J_{\chi}}}{\sqrt{J_{\chi}}} \sqrt{\sqrt{J_{\chi}}}$	TS	
_0.30-1.00 	ES							- - -(0.80)	CLA coa	Y. Gravel is fi	ne to coarse s	ubangular lime	y sandy slightly estone. Sand is	gravelly fine to	/		СВ	
- 1.00-1.45	D	3,4,4					78.47	- - 1.10										
1.10-1.50	(S) ES	6,7,11 N=28.					10.11	-	bloc San	ky CLAY. Gra d is fine to coa	vel is fine to co arse.	barse subroun	wn slightly sand ded to subangu	dy grave Ilar lime	elly stone.			
-								_(0.90) 		EATHERED C		ORMATION					СВ	
2.00 	D (S)	4,4,5 16,29 N=50/ 0.225.					77.57	 									END	
-								-										
- 								-										
-								-										
-								-										
-								-										
-								-										
-								-										
-								-										
-								-										
L	Hole	Diamete	r					Recov	very				Water St	trikes		1		I
Depth	Diar	neter (mm) R	emark	is (Core ⁻	Гор (m) (Core Bas	se (m)	% Recovery	Date	Time	Strike	Minute	es	Standing	Ca	asing
- - - - - - - - - - - - - - - - - - -											General Rem Terminated or							
Sca	le 1:37	.5	Note mar	es: Al nual io	II dim dentif	ensic icatic	ns in me n.	etres. Lo	ogs sł	nould be read i	n accordance	with the provid	ded Key. Descri	ptions a	are base	ed on visu	al and	

WSP En		VSP	imite	hd				WIN	D	ow s/	AMPLE	ELOG		Hol	le No.	S702	•	
M	RG2 hone: 0	ten House 1 4HJ 01256 318 56 318700	800		Proje	ect		k	Cing	smere Bio	ester Pha	se 2		Sh	eet 1	of 1		
Job No 00	0284	153/00	1	1	Clier	nt			Co	untryside F	Properties	Ltd		Da	03-	10-12 10-12		
Contracto	r / Dri	ller		Meth	hod/	Plant	t Used		L	ogged By			ates (NGR)		Ground L	evel (m	AO))
C.J.	Asso	ciates			C	ompe	etitor 13	30		JE	М		456425.417 222604.322			81.606		
SA	MPLE	ES & TE	STS									STRAT	4					Install Backf
Depth	Туре	Test Result	PID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription				gend Geo	logy	Dia. mm
0.10-0.30	ES							(0.30)	Brov	wn slightly gra	velly CLAY wit	h rare rootlets	(TOPSOIL).				s	
							81.31	0.30 - -(0.40)	sub	y mottled brow rounded mediu EATHERED C	im and coarse	limestone GF	andy subangu RAVEL.	ular and	0	- 0 - 0 4 0 (В	
						1 <u>↓</u>	80.91 80.61	0.70 (0.30) 1.00	Ver	y dense, orang rounded mediu	ish brown to g um and coarse	rey slightly sa GRAVEL. Sa	ndy clayey sul and is fine to c	bangular oarse.	and °_	<u> </u>	В	
	D (S)	6,17,18 32 N=50/ 0.145.															ND	
	-	Diamete	1			1		Recov					Water		I			
Depth	Dian	neter (mm) R	emark	IS I	Core 7	Гор (m) (Core Bas	ie (m)	% Recovery	Date 03-10-10	Time 11.57	Strike 0.90	Minute 05	es Stan	ding	Cas	ing
Scal	e 1:37	.5	Note	es: Al	ll dim	ensio	ons in me	etres. Lo	ogs st	nould be read i	General Rem Terminated or n accordance	ı hard strata.	ded Key. Desc	criptions a	are based or	n visual a	Ind	

WSP Er		VSP	imite	he				WIN	D	ow s/	AMPLE	E LOG		Hole	e No.	NS7	03	
M	lountbat RG2 hone: (tten House 1 4HJ 01256 318 56 318700	300		Proj€	ect		ł	King	smere Bic	ester Pha	se 2		She	et	1 of	1	
Job No OC	0284	453/00	1		Clier	nt			Co	untryside F	Properties	Ltd		Dat		03-10- 03-10-		
Contracto	r / Dri	ller		Met	hod/l	Plant	Used		L	ogged By			ates (NGR)		Groun	d Level	(m AC	D)
C.J.	Asso	ciates			С	ompe	etitor 13	30		JE	М		456547.518 222556.384			81.4	165	
SA	MPLE	ES & TE	STS									STRAT	A	I				Install Backfil
Depth	Туре	Test Result	(Judd) (Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription				Legend	Geology	Dia.
0.10-0.40	ES						81.07	-(0.40)	Brov	wn slightly grav	velly CLAY wit	h rare rootlets	(TOPSOIL).			<u>1, 1, 1,</u> 1, <u>1, 1</u> , 1	TS	
- - - - -	D (S)	11,14,23 12,7,10 N=52.					80.47	-(0.60)	and (WE	y dense, grey r subrounded n EATHERED C	nedium and co	arse limeston		ly subar	ngular		СВ	
-							80.27		Firm	n to stiff, orang	ish brown to li ne to coarse s	ght grey slight ubangular lim	ly sandy slightly estone. Sand is	gravelly	y		СВ	
[1.20-1.50 - -	ES							-(0.60)	Coa WE Stiff	rse. EATHERED Co f to hard grey n	ORNBRASH F	ORMATION)		with rare	e Sand		СВ	
-							79.67	1.80	is fir	ne to coarse. EATHERED C				5310116. 0	Janu			
2.00	D	2,4,5					79.47	2.00					own CLAY with r jular limestone.				CB END	295
- - - - - - - - - - - - - - - - - - -																		
		Diamete	-					Reco			_		Water St					-
Depth	Dian	neter (mm) R	emark	(S)	Core 1	Гор (m)	Core Bas	se (m)	% Recovery	Date General Rem Terminated or		Strike	Minutes	s :	Standing	Ca	asing
Sca	le 1:37	7 .5		es: Al nual io				etres. Lo	ogs sł	hould be read i	n accordance	with the provi	ded Key. Descri	ptions a	ire base	d on visı	ial and	

WEDER		VSP	imito	d				WIN	D	ow s/		ELOG		Hol	e No.	WS7	04	
Telep	lountbat RG2 hone: (ten House 1 4HJ 01256 318 56 318700	800		Proje	ect		۴	(ing	smere Bic	ester Pha	se 2		She	eet	1 of	1	
Job No 00	0284	153/00	1		Clier	nt			Co	untryside F	Properties	Ltd		Da		03-10- 03-10-	12 12	
Contracto	r / Dri	ller		Meth	hod/l	Plant	Used		L	ogged By			ates (NGR)		Grour	nd Level	(m AC	D)
C.J.	Asso	ciates			Co	ompe	etitor 1	30		JE	М		456670.113 222522.256			79.8	893	
SA	MPLE	ES & TE	STS									STRAT	٩					Install Backf
Depth	Туре	Test Result	(Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)				escription				Legend	Geology	Dia. mm
-							79.49	- -(0.40) - 0.40	Brov	wn slightly grav	velly CLAY wit	h rare rootlets	(TOPSOIL).			<u>44</u> <u>4</u> 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	TS	
_0.40-0.90 _ _	ES						10.40	(0.50)	CLA coai	Y. Gravel is find	ne to coarse s	ubangular lim	ly sandy slightly estone. Sand is	y gravell fine to	ly		СВ	
- _0.90-1.50 _1.00-1.45	ES D (S)	1,2,2 3,4,5					78.99	0.90 - -(0.60)	Stiff	to hard fissure	ed grey mottled	d orangish bro	wn blocky CLA subangular lim	Y with restone.	are Sand		СВ	
- - -		N=14.					78.39	ÈÍ	(WE	EATHERED C			n gravelly SILT.			×0 ×	СВ	
-							78.09	(0.30) 1.80	(WE	EATHERED C	ORNBRASH F	ORMATION)				××o×	СВ	
2.00	D (S)	3,13,50 N=50/ 0.07.					77.89	2.00	with lime	y stiff to hard fi rare gravel. G estone. Sand is EATHERED C	ravel is fine to fine to coarse	coarse subro	h brown slightly unded to subar	/ sandy ngular	CLAY		CB END	
-	Hole	Diamete	r					- Recov	very				Water S	trikes				
Depth	Dian	neter (mm) Re	emark	is (Core 7	Гор (m)	Core Bas	e (m)	% Recovery	Date	Time	Strike	Minute	es	Standing	Ca	asing
											General Rem Terminated or							
Scal	le 1:37	.5				ensio icatio		etres. Lo	ogs st	nould be read i	n accordance	with the provi	ded Key. Descr	iptions a	are base	ed on visu	ial and	

WSP Er		VSP	imite	be				WIN	D	ow sa	AMPLE	E LOG		Hol	e No.	NS7	05	
M	lountbat RG2 hone: (tten House 1 4HJ 01256 318 56 318700	800		Proj€	ect		ł	King	smere Bic	ester Pha	ise 2		She	eet	1 of	1	
Job No 00	0284	453/00	1		Clier	nt			Co	untryside F	Properties	Ltd		Da		03-10- 03-10-	12 12	
Contracto	r / Dri	ller		Meth	hod/l	Plant	Used		L	ogged By		Co-Ordina	ates (NGR)		Grour	d Level	(m AC	DD)
C.J.	Asso	ciates			С	ompe	etitor 13	30		JE	M		456408.858 222395.554			81.6	642	
SA	MPLE	ES & TE	STS									STRAT	A					Install / Backfill
Depth	Туре	Test Result	(Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			D	escription				Legend	Geology	Dia.
 0.30-0.50	ES							(0.50)		wn slightly grav PSOIL)	velly CLAY wit	th rare rootlets	i.			<u> 12</u> <u>11</u> <u>17</u> <u>11</u> <u>17</u> <u>11</u>	тѕ	
-							81.14	-(0.40)	sub	rounded mediu	im and coarse	e limestone GI		ar and			СВ	
- _1.00 -	ES																СВ	
- - - 1.50-2.00	(S) 3,4,7 N=18. 0 ES . (0.40) coarse. (WEATHERED CORNBRASH FORMATION) Stiff to hard grey mottled orangish brown slightly sandy CLAY gravel. Gravel is subrounded to subangular fine to coarse line is fine to coarse. (0.70) (WEATHERED CORNBRASH FORMATION)													with ran estone.	re . Sand		СВ	
2.00	ES																END	
- - - - - - - - - - - - - - - - - - -																		
	Hole	Diamete	<u> </u>					Recov	very				Water S	trikes				
Depth	Dian	neter (mm) Re	emark	is (Core	Гор (m)	Core Bas	se (m)	% Recovery	Date	Time	Strike	Minute	es	Standing	Ca	asing
											General Ren Terminated or							
Scal	le 1:37	7 .5				ensio		etres. Lo	ogs sl	hould be read i	n accordance	with the provi	ded Key. Descri	iptions a	are base	d on visu	ual and	

WSP Er		VSP	imite	ad a				WIN	D	ow sa		LOG		Hol	e No.	NS7	06	
M	lountbat RG2 hone: (tten House 1 4HJ 01256 318 56 318700	800		Proje	ect		ŀ	۲ing	smere Bic	ester Pha	se 2		She	eet	1 of	1	
Job No 00	0284	453/00	1		Clie	nt			Со	untryside F	Properties I	_td		Da		03-10- 03-10-	12 12	
Contracto	r / Dri	ller		Met	hod/	Plant	Used		L	ogged By		Co-Ordina	ites (NGR)		Grour	nd Level	(m AC	D)
C.J.	Asso	ciates			С	ompe	etitor 13	30		JE	М		456576.200 222478.100			81.0	000	
SA	MPLE	ES & TE	-					D				STRAT	Ą			1		Install Backfi
Depth	Туре	Test Result	(Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm
-							80.60	(0.40)	Brov	wn slightly grav	elly CLAY with	n rare rootlets	(TOPSOIL).			$\frac{s^{1}l_{2}}{l_{1}} \frac{s^{1}l_{2}}{s^{1}l_{2}} \frac{s^{1}l_{2}}{s^{1}l_{2}}$	TS	
0.40	ES					₹	80.00	-			ark orange to b	prown slightly	sandy CLAY wi	ith rare	fine		СВ	
0.60-1.00	ES D	3,3,3				¥_	79.90	- - - - - - 1.10	Ligh	EATHERED Cont ant grey mottled	orangish brow avel is fine to	n slightly sand	dy gravelly CLA gular of limesto	Y. Sano ne.	d is		СВ	
	(S)	3,4,5 N=15.						(0.30)	(WE	y soft, brown s EATHERED C	andy CLAY wit ORNBRASH F	h rare fine gra ORMATION)	avel.				СВ	1目
-							79.60	1.40 - - -(0.60)	Stiff Gra coa	vel is fine to co	arse subround	led to subang	wn CLAY with ı ular limestone.	rare gra Sand is	ivel. s fine to		СВ	
2.00	D (S)	2,2,4 8,12,28 N=52/ 0.265.															END	
- - - - - -								-										
- - - - - - -								-										
- - - - -								-										
-								-										
	Hole	Diamete	r					Recov	very				Water S	trikes				
Depth	Dian	neter (mm) R	emark	ks	Core 1	Гор (m)	Core Bas	se (m)	% Recovery	Date 03-10-12	Time	Strike 0.60	Minute	es	Standing	Ca	asing
- - - - - - - - - - - - - - - - - - -											General Rem Terminated on Borehole coord	hard strata.	vation estimated f	rom topo	ographica	l survey.		
Sca	le 1:37	.5				ensio ficatio		etres. Lo	ogs sl	hould be read i	n accordance	with the provid	ded Key. Descri	iptions a	are base	ed on visu	al and	

	WSP En		VSP	Limite	ed				WIN	ID	ow sa	AMPLE	E LOG		Hole	WS7	07	
	M Telep	ountbatt RG2 ⁻ hone: 0	ten House 1 4HJ 01256 3188 56 318700	800		Proje	ect		۲	King	smere Bic	ester Pha	se 2		Shee	t 1 of	1	
J	ob No 00	0284	53/00	1		Clier	nt			Со	untryside F	Properties	Ltd		Date	03-10 03-10	-12 -12	
c	Contracto	r / Dril	ler		Met	hod/	Plant	Used		L	ogged By		Co-Ordina	ates (NGR)		Ground Leve	l (m AC	DD)
	C.J.	Asso	ciates			C	ompe	etitor 1	30		JE	M		456684.054 222327.464			083	
	SA	MPLE	S & TE	STS									STRAT	A				Install / Backfill
	Depth	Туре	Test Result	DID (Jund)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription			Legend	Geology	Dia. mm
									-(0.40)	Brov	wn slightly grav	velly CLAY with	h rare rootlets	(TOPSOIL).		<u>1/ 1/ 1/</u>	TS	
ł								77.68 77.58	0.40 0.50	No r	recovery.						NODATA END	
SN-			Diamete	-					Recov					Water S				
OW SAMPLE LOG 00028453 K	Depth	Diam	neter (mm) R	emark	KS	Core 1	Гор (m)	Core Bas	se (m)	% Recovery	Date General Rem Terminated on		Strike	Minutes	Standing	Ci	asing
08 WSP WIND	Scal	le 1:37	.5	Not	es: Al	ll dim dentif	ensio	ns in me	etres. Lo	ogs sh	nould be read i	n accordance	with the provi	ded Key. Descr	iptions are	e based on vis	ual and	

WSP Er	viron							WIN	D	ow s/	AMPLE	E LOG		Hole	WS70)7a	
	RG2	tten House 1 4HJ 01256 318 56 318700			Proje	ect		ł	King	smere Bio	ester Pha	ise 2		Shee	t 1 of	1	
Job No OC	0284	453/00	1	1	Clier	nt			Co	untryside F	Properties	Ltd		Date	03-10- 03-10-	-12 -12	
Contracto	r / Dri	ller		Meth	nod/l	Plan	t Used		L	ogged By		Co-Ordina	ates (NGR)	(Ground Leve	l (m AC	DD)
C.J.	Asso	ciates			С	ompe	etitor 13	30		JE	М		456684.054 222327.464		78.	083	
SA	MPLE	ES & TE	STS									STRAT	A				Install Backfil
Depth	Туре	Test Result	DID (Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription			Legend	Geology	Dia. / mm
								-(0.40)	Brov	wn slightly gra	velly CLAY wit	h rare rootlets	(TOPSOIL).		$\frac{\frac{\sqrt{1}}{2}}{\frac{1}{2}} \frac{\sqrt{1}}{\sqrt{1}}$	тѕ	
0.50	D	10,15,39					77.68 77.58	0.40 0.50	Noi	recovery.							V SS
	Hole	N=50/ 0.085.											Water	Strikes			
Depth	_	Diamete neter (mm	_	emark	s	Core ⁻	Гор (m)	Recov Core Bas		% Recovery	Date	Time	Water Strike	Minutes	Standing	Ca	asing
)		General Rem Terminated or	narks					3
Sca	le 1:37	7 .5	Not mai	es: Al nual io	l dim dentif	ensic icatic	ons in me in.	etres. Lo	ogs sl	hould be read i	n accordance	with the provi	ded Key. Desc	riptions are	e based on vis	ual and	

WSP E		VSP mental		ed				WIN	D	ow sa	AMPLE	E LOG	İ			NS7	08	
Tele	Mountbat RG2 phone: (ten House 1 4HJ 01256 318 56 318700	800		Proje	ect		٢	King	smere Bic	ester Pha	ise 2		She	et	1 of	1	
Job No O	00284	153/00	1		Clier	nt			Co	untryside F	Properties	Ltd		Dat	(03-10- 03-10-	12 12	
Contract	or / Dri	ller		Met	hod/	Plant	Used		L	ogged By		Co-Ordina	ates (NGR)		Groun	d Level	(m AO	D)
С.	J. Asso	ciates			C	ompe	etitor 1	30		JE	М		456534.486 222269.967			79.2	237	
S	AMPLE	ES & TE	STS									STRAT	A	I				Install / Backfill
Depth	Туре	Test Result	DID (DmV)	HSV «N/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)				De	escription				Legend	Geology	Dia.
-				=			78.94	-ness) (0.30) 0.30	Brov	wn slightly gra	velly CLAY wit	h rare rootlets	(TOPSOIL).			<u>x17</u> <u>x17</u>	TS	
E							78.84		Nor	recovery.							INKNOW END	603
-								-										
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	Hole	Diamete	er					Recov	verv				Water	Strikes				
Depth		neter (mm	-	lemarl	ks	Core 7	Top (m)	Core Bas	-	% Recovery	Date	Time	Strike	Minute	s S	Standing	Ca	asing
10700																		
											General Rem	arks						
											Terminated or							
	ale 1:37	5	Not	es: A	ll dim	ensio	ns in m	etres. Lo	ogs sh	nould be read i	n accordance	with the provi	ded Key. Desc	riptions a	ire base	d on visı	ual and	
. SC	are 1.3/		ma	nual i	dentif	icatio	n		<u> </u>				,				-	

WSP Er		VSP	imite	d			١	WIN	ID	ow sa	AMPLE	ELOG	1	Hol	le No.	S70	8a	
M	lountbat RG2 hone: (ten House 1 4HJ 01256 318 56 318700	800		Proje	ect		k	King	smere Bic	ester Pha	se 2		She		l of ^r	1	
Job No OC	0284	453/00	1	(Clier	nt			Co	untryside F	Properties	Ltd		Da	03	3-10-1 3-10-1	12 12	
Contracto	r / Dri	ller		Meth	nod/l	Plant	Used		L	ogged By		Co-Ordina	ates (NGR)		Ground	Level	(m AO	D)
C.J.	Asso	ciates			С	ompe	etitor 13	30		JE	Μ		456534.486 222269.967			79.2	37	
SA	MPLE	ES & TE						Depth				STRAT	A					Install Backf
Depth	Туре	Test Result	DID (Judd)	HSV (kN/m2	P.Pen (kN/m2	Water	Elev. (mAOD)				De	escription			L	egend	Geology	Dia. mm
-								-(0.40)	Brov	wn slightly grav	velly CLAY wit	h rare rootlets	(TOPSOIL).		<u>17</u>	$\frac{I_{\chi}}{\underline{x}^{1}I_{\chi}}$	TS	
_0.40	(S)	17,8,50 N=50/ 0.06.					78.84 78.64	0.40	mec	y mottled brow dium and coars	se GRAVEL w	ith rare clay.	ubangular and	subrour	nded	0.00	CB END	
	Hole	Diamete	r					Recov	very				Water S	Strikes	I			I
Depth	Dian	neter (mm) Re	emark	s (Core 1	「op (m) (Core Bas	se (m)	% Recovery	Date	Time	Strike	Minute	es Sta	anding	Ca	ising
											General Rem Terminated or							
Sca	le 1:37	.5	Note	s: All ual id	l dim lentif	ensio icatio	ns in me n.	etres. Lo	ogs st	hould be read i	n accordance	with the provi	ded Key. Desc	riptions a	are based	on visua	al and	

WSP Er		VSP mental		ed				WIN	D	ow sa	AMPLE	LOG	ĺ			NS7	09	
N Teler	Nountbat RG2 phone: (ten House 1 4HJ 01256 318 56 318700	800		Proje	ect		۲	King	smere Bic	ester Pha	se 2		She	eet	1 of	1	
Job No OC)0284	153/00	1		Clier	nt			Co	untryside F	Properties L	_td		Da		04-10- 04-10-	12 12	
Contracto	or / Dri	ller		Met	hod/l	Plant	t Used		L	ogged By		Co-Ordina	ates (NGR)		Groun	d Level	(m AO	D)
C.J	. Asso	ciates			С	ompe	etitor 13	30		OE	G		456461.667 222163.596			78.2	248	
SA	MPLE	ES & TE		1				Death				STRAT	A					Install Backfi
Depth	Туре	Test Result	(Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm
-							78.05		freq	uent rootlets. (over brown sli Gravel is fine to se subangular li	medium sub	lightly gravelly bangular tabular	CLAY w r limesto	rith one		TS	
0.40	(S)	25,30 20					77.85	0.40	\(TO \Ligh	PSOIL) nt brown and o	rangish brown	slightly claye	y slightly sandy	angular	and		CB END	1002
- -	(-)	N=50/ 0.11.						-	(WE	angular fine ar EATHERED C	nd medium lime ORNBRASH F	ORMATION)	'EL.					
-								-										
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Depth		Diamete	-	emark	(S)	Core 7	Гор (m)	Recov Core Bas		% Recovery	Date	Time	Water S Strike	Strikes Minute	es (Standing	Ca	ising
					\uparrow				. /									
											Opposed D							
											General Rema Terminated on							
			Not	es [.] Al	ll dim	ensio	ins in m	etres I c	as sh	ould be read i	n accordance v	with the provi	ded Key. Descr	riptions	are hase	d on visu	al and	
Sca	le 1:37	.5	mai	nual io	dentif	icatio	n.	51.55. LL	.90 01									

WSP Er		VSP		he				WIN	D	ow sa		ELOG	İ	Hole	e No. V	NS7 [,]	10	
N Telep	lountbat RG2 hone: (ten House 1 4HJ 01256 318 56 318700	800		Proj€	ect		k	(ing	smere Bic	ester Pha	se 2		She	eet	1 of	1	
Job No OC)0284	153/00	1		Clier	nt			Co	untryside F	Properties I	Ltd		Dat	(04-10- 04-10-	12 12	
Contracto	r / Dri	ller		Met	hod/l	Plant	Used		L	ogged By			ates (NGR)		Groun	d Level	(m AO	D)
C.J.	Asso	ciates			С	ompe	etitor 13	30		OE	G		456609.306 222170.394			77.0)71	
SA	MPLE	ES & TE	STS									STRAT	A					Install Backf
Depth	Туре	Test Result	DID (Junv)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription				Legend	Geology	Dia. mm
-							76.92				over brown sl um to coarse g			frequent	/		TS	
0.40	(S)	25,50 N=50/					76.72 76.57	_	Stiff mec (WE	dark brown sl dium subangul EATHERED C	ightly sandy sli ar limestone. ORNBRASH F	ghtly gravelly ORMATION)	CLAY. Gravel		,/	- <u>·</u>	CB CB END	
- - -		0.075.						-	\GR/	AVEL.	rown clayey sa ORNBRASH F			nestone				
- -								_										
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	Hole	Diamete	er					Recov	/ery				Water	Strikes				I
Depth	Dian	neter (mm	1) R	emark	(S	Core	Гор (m)	Core Bas	e (m)	% Recovery	Date	Time	Strike	Minute	es S	Standing	Ca	asing
											General Rem	arks						
											Terminated on							
Sca	le 1:37	.5						etres. Lo	ogs st	nould be read i	n accordance	with the provi	ded Key. Desc	criptions a	are base	d on visu	al and	
Jud	.5 1.57			nual io								-	-					

WSP Er		VSP mental		be				WIN	D	ow s/	AMPLE	LOG	l	Hol	e No. W	S7′	11	
N Teler	lountbat RG2 hone: (tten House 1 4HJ 01256 318 56 318700	e 8800		Proj€	ect	t Kingsmere Bicester Phase 2					She	Sheet 1 of 1					
Job No OC)0284	453/00)1		Clier	nt		Countryside Properties Ltd					Da	04	-10-´ -10-´	12 12		
Contracto	or / Dri	ller		Met	hod/l	Plan	t Used		L	ogged By			ates (NGR)		Ground I	Level	(m AO	D)
C.J	. Asso	ciates			С	ompe	etitor 1	30		OE	G		456634.450 222000.548			75.0	39	
SA	MPLE	ES & TE	STS									STRAT	A					Install Backfi
Depth	Туре	Test Result	(Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)				scription					Geology	Dia. mm
- -							74.64	- -(0.40) - 0.40	root	ss and stubble lets and freque PSOIL)	over brown sli ent fine to coars	ghtly sandy s se tabular lim	ilty CLAY with estone gravel	frequent	<u>1/</u>	<u>ly (1)</u> <u>stry</u> <u>ty (1)</u>	TS	>.a >
- - _0.60		10,7,7					74.44		Brov lime	wn and grey sl stone GRAVE ATHERED C	ightly sandy an L. ORNBRASH F	gular and sul ORMATION)	bangular fine to	o coarse		2 0 0	CB END	
-	(S)	20,23 N=50/ 0.18.						-										
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	_	Diamete	_	•				Recov					Water		I			
Depth	Dian	neter (mm	1) R	lemark	(S	Core ⁻	Fop (m)	Core Bas	se (m)	% Recovery	Date	Time	Strike	Minute	es Star	nding	Ca	ising
Depth																		
											General Rema Terminated on							
			Not	es: A	ll dim	ensio	ins in m	etres Lo	nas er	ould he read i	n accordance v	with the provi	ded Kev Desc	riptions	are based o	n vieu	al and	
Sca	le 1:37	r.5	mai	nual i	dentif	ficatio	nis in 110 n.	cues. LC	,৭১ ১		n accordince i		usu ney. Dest		שיב שמשבע ט	/1 1/50	uidiiU	

Appendix D – Monitoring Results



Site Name	Kingsmere Bicester, Phase II Complete Results
Client	Countryside Properties Ltd
Job No.	00028453/001

Start Date	09/11/2012
End Date	14/12/2012
No. Visits	3

Borehole	Methane	e (% v/v)		Dioxide v/v)	Oxygen	ı (% v/v)	Flow	(l/hr)	Standin Leve	g Water el (m)	Value Methane	Value Carbo
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	(l/hr)	Dioxide (l/hr)
BH701	0.0	0.1	0.1	0.4	20.5	20.9	-0.2	0.0	1.10	1.55		
BH702	0.0	0.1	0.1	0.6	19.3	20.8	-0.2	0.0	1.45	1.63		
BH703	0.0	0.0	0.0	0.5	20.7	20.9	-0.3	0.0	3.02	3.80		
BH706	0.0	0.0	0.0	0.9	20.6	21.0	-0.8	0.1	1.43	1.88		0.0009
BH707	0.0	0.0	0.2	1.5	18.7	20.3	0.0	0.1	1.56	1.92	0.000/	0.0015
WS701	0.0	0.1	0.0	1.2	19.2	21.1	-0.5	0.1	0.46	0.72	0.0001	0.0012
WS702 WS706	0.0	0.1	0.0	1.7 1.1	19.0 18.2	20.8 21.0	-0.2 -1.1	0.0	0.71 0.89	1.19 1.20		
WS708 WS711	0.0	0.1	0.0	1.1	19.7	21.0	-0.4	0.0	1.00	1.19		
W3711	0.0	0.0	0.0	1.7	19.7	20.4	-0.4	0.0	1.00	1.19		
	l											



Site Name	Kingsmere Bicester, Phase II Complete Results
Client	Countryside Properties Ltd
Job No.	00028453/001

Start Date	09/11/2012
End Date	14/12/2012
No. Visits	3

Borehole	Leve			se Zone	Produc	ness of ct (mm)	ррі		H2S ppm	CO ppm	Was the well ever flooded?	Was Produc >1mm detected?
BH701	MIN 1.1	MAX 1.6	TOP 6.5	BASE 8.0	MIN 0	MAX 0	MIN 0	MAX 0	MAX	MAX 0	Yes	No
									1			
BH702 BH703	1.5 3.0	1.6 3.8	4.0 4.0	8.0 8.0	0	0	0	0	1	0	Yes Yes	No No
BH703 BH706	3.0 1.4	3.8 1.9	4.0	5.8	0	0	0	0	0	0	No	No
BH706 BH707	1.4	1.9	1.0	5.0 8.0	0	0	0	0	0	0	No	No
WS701	0.5	0.7	1.0	2.0	0	0	0	0	0	1	Yes	No
WS701	0.3	1.2	0.3	1.0	0	0	0	0	0	2	No	No
WS706	0.9	1.2	1.0	2.0	0	0	0	0	1	0	Yes	No
WS711	1.0	1.2	0.3	0.6	0	0	0	0	0	0	No	No
			 									
			 									
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09/11/2012

14/12/2012

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Site Name	Kingsmere Bicester, Phase II Complete Results
Client	Countryside Properties Ltd
Job No.	00028453/001

Visit No.	Visit Date	Pressure Trend	Start mB	End mB
1	09/11/2012	No Change	1003	1003
2	07/12/2012	Not Recorded		
3	14/12/2012	Falling	973	
4			1013	1011
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

*GSV Max Per Hole is the maximum calculated GSV using data specific to each borehole over the monitoring period.

	Minimum mB	Maximum mB
Barometric Pressure	973	1013

Start Date

End Date

No. Visits

Gas Screening Value (GSV) Calculation

	GSV Max per hole* (l/hr)	GSV using Max Values** (l/hr)	Maximum Values (% v/v)
Carbon Dioxide	0.0015	0.0017	1.7
Methane	0.0001	0.0001	0.1
		_	
Max Flow (l/hr)	0.1		
		-	
Mathana	Oashaa Diavida	Death to Mater	

Key	Methane Column	Carbon Dioxide Column	Depth to Water Column	Gas Flow
	n/a	n/a	Response Zone Part Flooded	n/a
	> 1% v/v	> 5% v/v	Response Zone Totally Flooded	>70 l/hr

**GSV Using Max Values is a worst case estimated of the GSV using Maxmimum Concentration and Maximum Flow for the whole data set.

CIRIA C665 - Table 8.5 (Refer to CIRIA document for full table and notes) (2007)

Characteristic Situation (CIRIA R149)	Comparable PIT gas regime	Risk Classification	Gas Screening Value (I/hr)	Additional Factors
K 149)				
1	A	Very Low Risk	<0.07	Typically methane ≤ 1% and/or carbon dioxide ≤ 5% otherwise consider increase to Characteristic Situation 2
2	В	Low Risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to Characteristic Situation 3
3	С	Moderate Risk	<3.5	
4	D	Moderate to High Risk	<15	Quantitative Risk Assessment required to evaluate scope of protection measures
5	Е	High Risk	<70	
6	F	Very High Risk	>70	

NHBC Report No. 4 - Table 14.1 (Refer to NHBC document for full table) (March 2007)

Traffic Light	М	ethane	Carbon Dioxide		
Classification	Typical Max Concentration (%v/v) Gas Screening Value (l/hr) Ty		Typical Max Concentration (%v/v)	Gas Screening Value (I/hr)	
Green					
Green	1	0.13	5	0.78	
Amber					
	5	0.63	10	1.6	
Amber 2				<u> </u>	
	20	1.6	30	3.1	
Red	-				

Notes:

1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst case temporal conditions that the site may be expected to encounter will be the decider as to what Traffic Light is allocated.

2. Borehole Gas Volume Flow Rate, in litres per hour is defined as Wilson and Card (1999), is the borehole flow rate multiplied by the concentrations in the air stream of the particular gas being considered;

3. The typical Maximum Concentration can be exceeded in certain circumstances should the conceptual model indicate that it is safe to do so;

4. The Gas Screening Value Threshold should not generally be exceeded without the completion fo a detailed ground gas risk assessment taking into account site-specific conditions.



Site Name	Kingsmere Bicester, Phase II Representative
Client	Countryside Properties Ltd
Job No.	00028453/001

Start Date	09/11/2012
End Date	14/12/2012
No. Visits	3

Borehole	Methane		(%			(% v/v)		(l/hr)	Leve	g Water el (m)	Gas Screening Value Methane (I/hr)	Gas Screenir Value Carbo Dioxide (l/hr
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
BH706	0.0	0.0	0.3	0.9	20.6	20.8	0.0	0.1	1.79	1.88		0.0009
BH707	0.0	0.0	0.6	1.5	18.7	19.2	0.0	0.0	1.57	1.92		
WS702	0.0	0.1	0.1	1.7	20.0	20.8	0.0	0.0	0.71	1.19		
WS711	0.0	0.0	1.7	1.7	19.7	19.7	0.0	0.0	1.00	1.19		
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Site Name	Kingsmere Bicester, Phase II Representative
Client	Countryside Properties Ltd
Job No.	00028453/001

Start Date	09/11/2012
End Date	14/12/2012
No. Visits	3

Borehole	Standin Leve	g Water el (m)	Respon	se Zone		ness of ct (mm)	PID Re	eadings mV	H2S ppm	CO ppm	Was the well ever flooded?	Was Produc
	MIN	MAX	TOP	BASE	MIN	MAX	MIN	MAX	MAX	MAX		detected?
BH706	1.8	1.9	1.0	5.8	0	0	0	0	0	0	No	No
BH707	1.6	1.9	1.0	8.0	0	0	0	0	0	0	No	No
WS702	0.7	1.2	0.3	1.0	0	0	0	0	0	2	No	No
WS711	1.0	1.2	0.3	0.6	0	0	0	0	0	0	No	No
	1		1									



09/11/2012

14/12/2012

Site Name	Kingsmere Bicester, Phase II Representative
Client	Countryside Properties Ltd
Job No.	00028453/001

Visit No.	Visit Date	Pressure Trend	Start mB	End mB
1	09/11/2012	No Change	1003	1003
2	07/12/2012	Not Recorded		
3	14/12/2012	Falling	973	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

*GSV Max Per Hole is the maximum calculated GSV using data specific to each borehole over the monitoring period.

	Minimum mB	Maximum mB
Barometric Pressure	973	1003

Start Date

End Date

No. Visits

Gas Screening Value (GSV) Calculation

		GSV Max per hole* (l/hr)	GSV using Max Values** (l/hr)	Maximum Values (% v/v)
Carbon Dio	xide	0.0009	0.0017	1.7
Methane	e	0	0.0001	0.1
		-	_	
Max Flow (l/hr)		0.1		
Mot	0000	Carbon Diavida	Dopth to Water	

Key	Methane Column	Carbon Dioxide Column	Depth to Water Column	Gas Flow
	n/a	n/a	Response Zone Part Flooded	n/a
	> 1% v/v	> 5% v/v	Response Zone Totally Flooded	>70 l/hr

**GSV Using Max Values is a worst case estimated of the GSV using Maxmimum Concentration and Maximum Flow for the whole data set.

CIRIA C665 - Table 8.5 (Refer to CIRIA document for full table and notes) (2007)

Characteristic Situation (CIRIA R149)	Comparable PIT gas regime	Risk Classification	Gas Screening Value (l/hr)	Additional Factors
1	A	Very Low Risk	<0.07	Typically methane ≤ 1% and/or carbon dioxide ≤ 5% otherwise consider increase to Characteristic Situation 2
2	В	Low Risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to Characteristic Situation 3
3	С	Moderate Risk	<3.5	
4	D	Moderate to High Risk	<15	Quantitative Risk Assessment required to evaluate scope of protection measures
5	Е	High Risk	<70	
6	F	Very High Risk	>70	

NHBC Report No. 4 - Table 14.1 (Refer to NHBC document for full table) (March 2007)

Traffic Light	М	ethane	Carbon Dioxide		
Classification	Typical Max Concentration (%v/v)	Gas Screening Value (I/hr)	Typical Max Concentration (%v/v)	Gas Screening Value (I/hr)	
Green					
Green	1	0.13	5	0.78	
Amber	-		-		
	5	0.63	10	1.6	
Amber 2					
	20	1.6	30	3.1	
Red					

Notes:

1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst case temporal conditions that the site may be expected to encounter will be the decider as to what Traffic Light is allocated.

2. Borehole Gas Volume Flow Rate, in litres per hour is defined as Wilson and Card (1999), is the borehole flow rate multiplied by the concentrations in the air stream of the particular gas being considered;

3. The typical Maximum Concentration can be exceeded in certain circumstances should the conceptual model indicate that it is safe to do so;

4. The Gas Screening Value Threshold should not generally be exceeded without the completion fo a detailed ground gas risk assessment taking into account site-specific conditions.



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	depth	width	length	Depth to	water prior to test	der			
ground level	0.00	1.10	2.80		The disconstruction of the second	dry 0.56		Elapsed time	Water level
base					water start of test		m	(minutes)	(m bgl)
base	2.40	1.10	2.80		water at end of test	0.95	m	0	0.56
				Assumed	empty depth	0.95	m	1.0	0.58
st test	(assume	1						2.0	0.59
	depth	width	length					3.0	0.60
ground level	0.00	1.10	2.80					5.0	0.60
base	2.40	1.10	2.80					6.0	0.61
								7.0	0.62
alysis								8.0	0.63
								9.0	0.63
ective depth c	of top of soa	kaway		0.56	m			10.0	0.64
%	effective			1.02	m			15.0	
1/0	effective			1.48	m				0.64
%	effective							20.0	0.64
/0	enective	depth		1.94	m			30.0	0.66
uma de la la	750/ . //		(2			60.0	0.74
ume of pit at				4.25	m ³			120.0	0.80
ume of pit at				1.42	m ³			180.0	0.83
avel placed in		, 0 if no)		0				240.0	0.87
ume outflowir	ng v ₇₅ -v ₂₅			2.83	m ³			300.0	0.89
								360.0	0.94
se area				3.08	m ²			420.0	0.95
ewall area fro	m base to 5	0% dept	h	7.18	m ²			420.0	0.00
50				10.26	m ²				
					leensa.				
ne at 75% full ne at 25% full ne to drain fro		6 full (t _{p7}	₅ -t _{p25})	Not Reach N/A	<mark>lec</mark> minutes		extrapolation		
ie at 25% full	m 75 to 259			N/A	o Determine		extrapolation		
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A			extrapolation		
ne at 25% full ne to drain fro	m 75 to 259			N/A			extrapolation		
ne at 25% full ne to drain fro il infiltrati	m 75 to 259			N/A			extrapolation		
ne at 25% full ne to drain fro il infiltrati	m 75 to 259			N/A			extrapolation		
ne at 25% full ne to drain fro il infiltrati	m 75 to 259			N/A			extrapolation		
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A			extrapolation		
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A			extrapolation		
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation		
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t			extrapolation	75%	
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation	75%	
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation	75%	
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation	75%	
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation		
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation		
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation		
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259			N/A Too Low t	o Determine		extrapolation	50%	
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation	50%	
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259			N/A Too Low t	o Determine		extrapolation	50%	
e at 25% full e to drain fro il infiltrati	m 75 to 259			N/A Too Low t	o Determine		extrapolation	50%	
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259 on facto	r, f		N/A Too Low t	o Determine			25%	
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259	r, f		N/A Too Low t	o Determine			50%	
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259 on facto	r, f		N/A Too Low to	o Determine			25%	
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259 on facto	r, f		N/A Too Low to	o Determine			25%	
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259 on facto	r, f	120	N/A Too Low to 150 180 Elapse	o Determine			25%	
e at 25% full e to drain fro il infiltrati 0.00 0.50 0.50 0.50 0.50 0.50 0.50 0.5	m 75 to 259 on facto	r, f 90 ed out 9	120 th May 20	N/A Too Low to 150 180 Elapse	o Determine			25%	

Water Soakage Test TP05 Bicester, Whitelands Farm Report No. 12370178/001

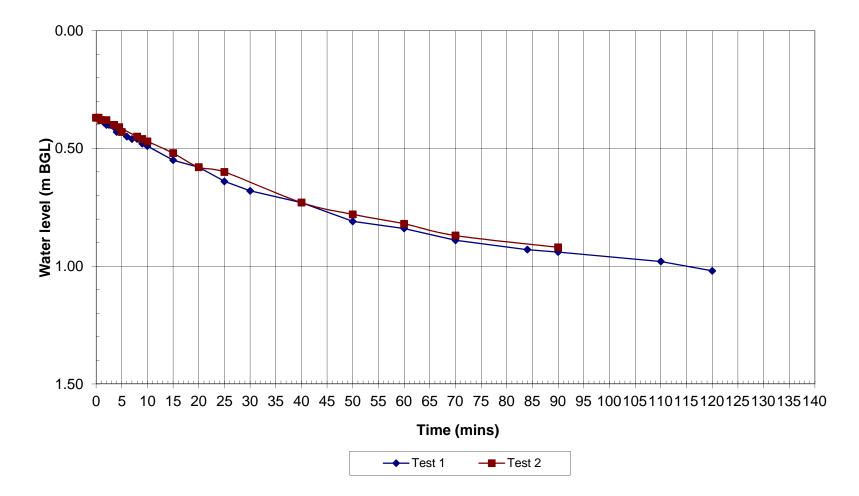
1

WSP Environ	mental						
Project: Number:	Kingsmere Bicest 00028453/001	er Phase 2					
		TRIAL PIT SOA	AKAGE TEST enter data in	- Field data colle	ction and calcu e purple cells)	ation sheet	
	TEST DATA						
it reference			TP701]			
Pit depth (m) Pit width (m)			1.15				
it length (m)			2	1			
Depth to standi	ng water (m)		0.37]			
	Test 1			Test 2			Test 3
	Time (min)	Depth (m)]	Time (min)	Depth (m)		Time (mi
	0	0.37		0	0.37		
	0.5	0.37		0.5	0.37		(
	1	0.38	1	1	0.38		
	1.5	0.39		2	0.38		1
	2	0.40		3.5	0.40		
	2.5	0.40		4.5	0.41		2
	3	0.40		5	0.43		
	3.5	0.41	-	3.5	0.40		1
	4.5	0.43	-	8	0.45		4
	4.5	0.43		9	0.46		
	6	0.45	-	15	0.47		
	7	0.45		20	0.52		
	8	0.46		20	0.60		
	9	0.40		40	0.73		
	10	0.49		50	0.78		
	15	0.55		60	0.82		
	20	0.58		70	0.87		
	25	0.64		90	0.92		
	30	0.68					
	40	0.73					
	50	0.81					
	60	0.84					
	70	0.89					
	84	0.93					
	90	0.94	-				
	110	0.98					1
	120	1.02					1
			-				1
							1
							1
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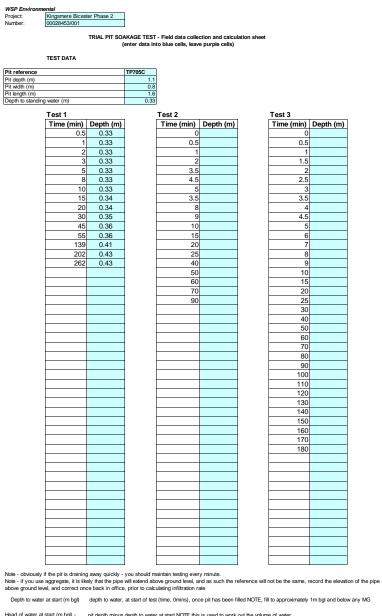
Depth (m)

Note - obviously if the pit is draining away quickly - you should maintain testing every minute. Note - if you use aggregate, it is likely that the pipe will extend above ground level, and as such the reference will not be the same, record the elevation of the pipe above ground level, and correct once back in office, prior to calculating infiltration rate

Depth to water at start (m bg) depth to water, at start of test (time, Omins), once pit has been filled NOTE, fill to approximately 1m bgl and below any MG Head of water at start (m bgl) - pit depth minus depth to water at start NOTE this is used to work out the volume of water 25% effective depth (m bal) depth to water at start plus 1/4 of head of water at start (25% of the water has drained away) depth to water at start plus 1/2 of head of water at start 50% effective depth (m bgl) -75% effective depth (m bgl) depth to water at start plus 3/4 of head of water at start NOTE this is the minimum depth bgl that you must drain to, ideally the pit should empty Aggregate size (if used) void ratio use 0.3 if 10mm aggregrate, 0.4 if 20mm aggregate and 1 if no aggregate at all 1 Depth to water at start (m) Effective Depth (m) 25% effective depth (m) 50% effective depth (m) 75% effective depth (m) 0.37 0.78 0.37 t25 (mins) -t75 (mins) the time taken for 25% of the water in the pit to drain away (i.e. to drain to 25% effective depth) the time taken for 75% of the water in the pit to drain away (i.e. to drain to 75% effective depth) 18.00 100.00 18.00 100.00 t25 (mins) t75 (mins) scale from graph scale from graph Г volume of water in pit between 75% and 25% effective depth surface area of pit through which the water is infiltrating (based on 50% effective depth) time taken from pit to drain from 75% to 25% effective depth Vp (75-25) (m3) ap 50 (m2) -t (75-25) (mins) -7.8E-01 4.34E+00 7.8E-01 4.34E+00 Vp (75-25) (m3) 1.2E+00 5.45E+00 ap 50 (m2) t (75-25) (mins) 82.00 82.00 soil infiltration rate (m/s) this is the value that we use in our report - check with table below for consistency with the soil type observed 3.65E-05 3.65E-05 #DIV/0! soil infiltration rate (m/s)

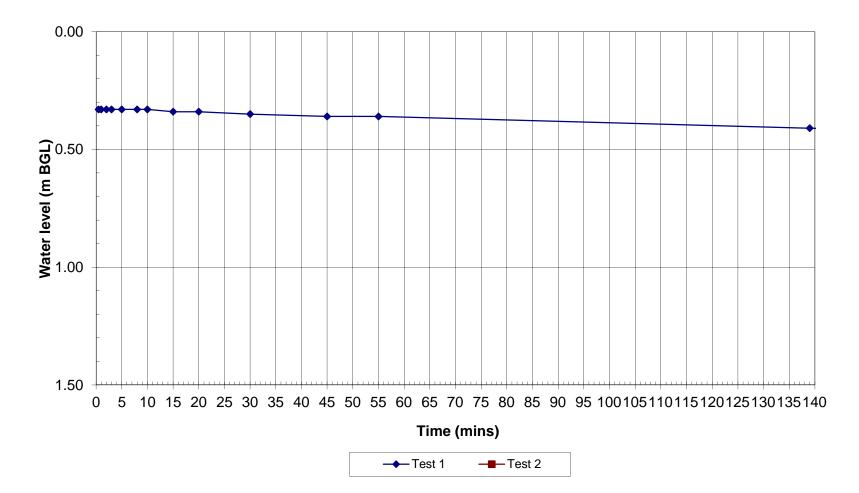


Soakaway TP701



25% effective depth (m bgl) -	depth to water at start plus 1/4 of head of water at start (25% of the water has drained away)
50% effective depth (m bgl) -	depth to water at start plus 1/2 of head of water at start
75% effective depth (m bgl) -	depth to water at start plus 3/4 of head of water at start NOTE this is the minimum depth bgl that you must drain to, ideally the pit should empty
Aggregate size (if used) void ratio	use 0.3 if 10mm aggregrate, 0.4 if 20mm aggregate and 1 if no aggregate at all
Depth to water at start (m) Effective Depth (m) 25% effective depth (m) 50% effective depth (m) 75% effective depth (m)	0.33 0.00 0.00 0.77 1.10 1.10 0.52 0.28 0.28 0.72 0.55 0.55 0.91 0.83 0.83
	or 25% of the water in the pit to drain away (i.e. to drain to 25% effective depth) or 75% of the water in the pit to drain away (i.e. to drain to 75% effective depth)
t25 (mins) scale from graph t75 (mins) scale from graph	
Vp (75-25) (m3) - ap 50 (m2) - t (75-25) (mins) -	volume of water in pit between 75% and 25% effective depth surface area of pit through which the water is infiltrating (based on 50% effective depth) time taken from pit to drain from 75% to 25% effective depth
Vp (75-25) (m3) ap 50 (m2) t (75-25) (mins)	4.9E-01 7.0E-01 7.0E-01 3.13E+00 3.92E+00 3.92E+00 0.00 0.00 0.00
soil infiltration rate (m/s)	this is the value that we use in our report - check with table below for consistency with the soil type observed
soil infiltration rate (m/s)	#DIV/0! #DIV/0!

WSP



Soakaway TP705C

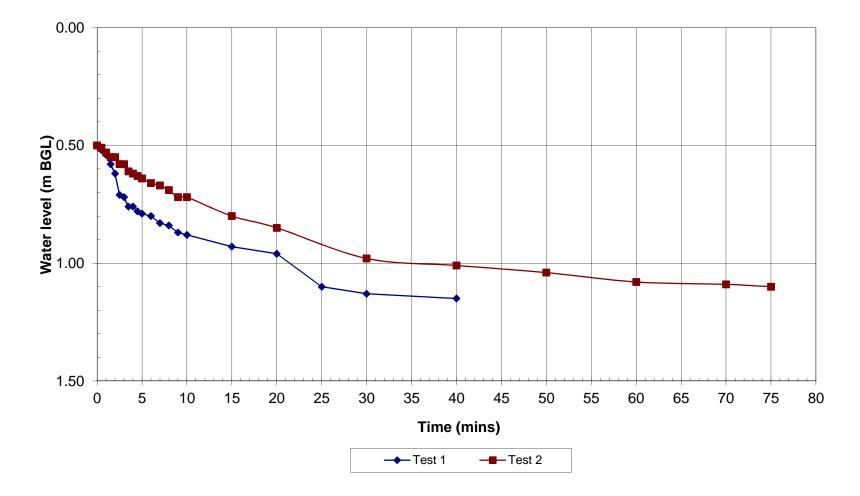
WSP Environn	mental						
Project: Number:	Kingsmere Bices 00028453/001	ter Phase 2					
				- Field data colle to blue cells, leav		ation sheet	
	TEST DATA						
Pit reference			TP716]			
Pit depth (m) Pit width (m)			1.3				
Pit length (m)			1.7				
Depth to standi	ng water (m)		0.50				
	Test 1			Test 2			Test 3
	Time (min)	Depth (m)	1	Time (min)	Depth (m)		Time (min
	0	0.50		0	0.50		
	0.5	0.52		0.5	0.51		0
	1	0.54		1	0.53		
	1.5	0.58		1.5	0.55		1
	2	0.62		2	0.55		
	2.5	0.71		2.5	0.58		2
	3	0.72	-	3	0.58		-
	3.5	0.76		3.5	0.61		3
	4	0.76	-	4	0.62		
	4.5	0.78		4.5	0.63		4
	5	0.79		5	0.64		
	7	0.80		7	0.67		
	8	0.84		8	0.69		
	9	0.87		9	0.72		
	10	0.88		10	0.72		
	15	0.93		15	0.80		
	20	0.96		20	0.85		1
	25	1.10		30	0.98		
	30	1.13		40	1.01		:
	40	1.15		50	1.04		4
				60	1.08		(
				70	1.09		(
			-	75	1.10		
				-			8
			-				1
							1
							1:
							1:
							14
							1(
			1				10
			1				17
							18
			4				
			4				
							L
			-				L
	1		1	1			1

Time (min)	Depth (m)
0	
0.5	
1	
1.5	
2	
2.5	
3	
3.5	
4	
4.5	
5	
6	
7	
8	
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10	
15 20	
20	
25	
40	
50	
60	
70	
80	
90	
100	
110	
120	
130	
140	
150	
160	
170	
180	

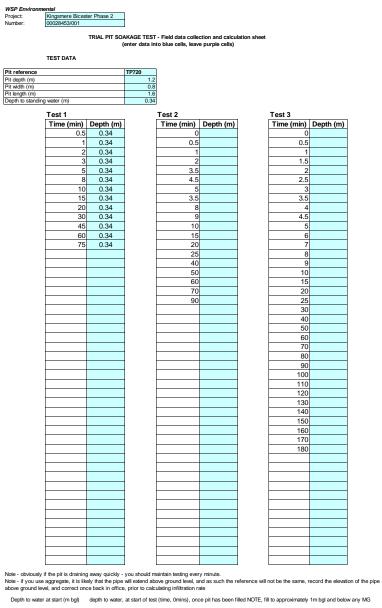
Note - obviously if the pit is draining away quickly - you should maintain testing every minute. Note - if you use aggregate, it is likely that the pipe will extend above ground level, and as such the reference will not be the same, record the elevation of the pipe above ground level, and correct once back in office, prior to calculating infiltration rate

Depth to water at start (m bgl) depth to water, at start of test (time, Omins), once pit has been filled NOTE, fill to approximately 1m bgl and below any MG

Head of water at start (m bgl) -	pit depth minus depth to water at start NOTE this is used to work out the volume of water
25% effective depth (m bgl) -	depth to water at start plus 1/4 of head of water at start (25% of the water has drained away)
50% effective depth (m bgl) -	depth to water at start plus 1/2 of head of water at start
75% effective depth (m bgl) -	depth to water at start plus 3/4 of head of water at start NOTE this is the minimum depth bgl that you must drain to, ideally the pit should empty
Aggregate size (if used) void ratio	use 0.3 if 10mm aggregrate, 0.4 if 20mm aggregate and 1 if no aggregate at all
Depth to water at start (m) Effective Depth (m) 25% effective depth (m) 50% effective depth (m) 75% effective depth (m)	0.50 0.50 0.00 0.80 0.80 1.30 0.70 0.70 0.33 0.90 0.65 1.10
	r 25% of the water in the pit to drain away (i.e. to drain to 25% effective depth) 75% of the water in the pit to drain away (i.e. to drain to 75% effective depth)
t25 (mins) scale from graph t75 (mins) scale from graph	2.50 8.25 25.00 75.00
Vp (75-25) (m3) - ap 50 (m2) - t (75-25) (mins) -	volume of water in pit between 75% and 25% effective depth surface area of pit through which the water is infiltrating (based on 50% effective depth) time taken from pit to drain from 75% to 25% effective depth
Vp (75-25) (m3) ap 50 (m2) t (75-25) (mins)	6.1E-01 9.9E-01 3.61E+00 3.61E+00 22.50 66.75
soil infiltration rate (m/s)	this is the value that we use in our report - check with table below for consistency with the soil type observed
soil infiltration rate (m/s)	0.000126 4.23E-05 #DIV/0!

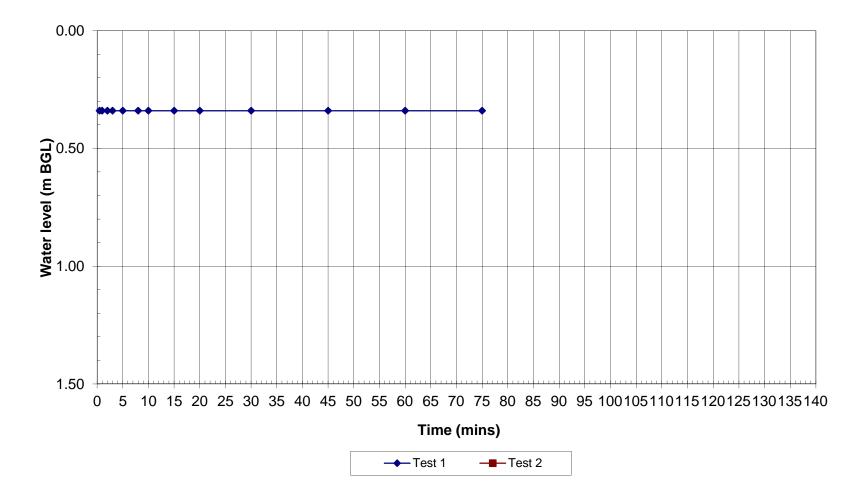


Soakaway TP716



Head of water at start (m bgl) -	pit depth minus depth to water at start NOTE this is used to work out the volume of water
25% effective depth (m bgl) -	depth to water at start plus 1/4 of head of water at start (25% of the water has drained away)
50% effective depth (m bgl) -	depth to water at start plus 1/2 of head of water at start
75% effective depth (m bgl) -	depth to water at start plus 3/4 of head of water at start NOTE this is the minimum depth bgl that you must drain to, ideally the pit should empty
Aggregate size (if used) void ratio	use 0.3 if 10mm aggregrate, 0.4 if 20mm aggregate and 1 if no aggregate at all
Depth to water at start (m) Effective Depth (m) 25% effective depth (m) 50% effective depth (m) 75% effective depth (m)	0.34 0.00 0.00 0.86 1.20 1.20 0.56 0.30 0.30 0.77 0.60 0.60 0.99 0.90 0.30
	or 25% of the water in the pit to drain away (i.e. to drain to 25% effective depth) or 75% of the water in the pit to drain away (i.e. to drain to 75% effective depth)
t25 (mins) scale from graph t75 (mins) scale from graph	
Vp (75-25) (m3) - ap 50 (m2) - t (75-25) (mins) -	volume of water in pit between 75% and 25% effective depth surface area of pit through which the water is infiltrating (based on 50% effective depth) time taken from pit to drain from 75% to 25% effective depth
Vp (75-25) (m3) ap 50 (m2) t (75-25) (mins)	5.5E-01 7.7E-01 7.7E-01 3.34E+00 4.16E+00 4.16E+00 0.00 0.00 0.00
soil infiltration rate (m/s)	this is the value that we use in our report - check with table below for consistency with the soil type observed
soil infiltration rate (m/s)	#DIV/0! #DIV/0!

WSP



Soakaway TP720

Appendix E – Geotechnical Laboratory Results





WSP Environmental Mountbatten House Basing View Baskingstoke Hampshire RG21 4HJ

Attention: Helen Gardiner

CERTIFICATE OF ANALYSIS

Date: Customer: Sample Delivery Group (SDG): Your Reference: Location: Report No: 06 November 2012 H_WSP_BAS 121024-16 28453 Kingsmere Bicester Phase 2 200581

We received 77 samples on Wednesday October 24, 2012 and 33 of these samples were scheduled for analysis which was completed on Tuesday November 06, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:



Operations Manager

Alcontrol Laboratories is a trading division of ALcontrol UK Limited Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No.

CERTIFICATE OF ANALYSIS

Validated

SDG:	121024-16	Location:	Kingsmere Bicester Phase 2	Order Number:	
Job:	H_WSP_BAS-71	Customer:	WSP Environmental	Report Number:	200581
Client Reference:	28453	Attention:	Helen Gardiner	Superseded Report:	

Received Sample Overview

ab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
6391158	BH701	B1	0.40	
6391169	BH702	B1	0.50	
6391181	BH702	B2	1.50	
6391192	BH703	B1	0.50	
6391206	BH703	B2	1.50	
6391218	BH707	B1	0.70	
6391159	TP701	B2	0.60	
6391229	TP701	B1	0.20	
6391238	TP701	B1	0.20	
6391239	TP701	B2	0.60	
6450905	TP701	В	1.00	
	TP702	B1	0.20	
6391160				
6391161	TP702	B1	0.20	
6391162	TP702	B2	0.60	
6391163	TP702	B2	0.60	
6391164	TP702	B3	2.00	
6391165	TP702	B3	2.00	
6391166	TP703	B1	0.10	
6391167	TP703	B1	0.10	
6391168	TP703	B2	0.50	
6391171	TP703	B2	1.00	
6391172	TP703	B3	1.00	
6391173	TP703	B3	1.60	
	TP703	B4	1.60	
6391174	TP704	B4 B1	1.00	
6391175				
6391176	TP704	B1	1.00	
6391177	TP704	B2	2.00	
6391178	TP704	B2	2.00	
6391179	TP705	B1	0.50	
6391180	TP705	B1	0.50	
6391182	TP705	B2	1.50	
6391183	TP705	B2	1.50	
6391184	TP705	В3	2.50	
6391185	TP705	B3	2.50	
6391186	TP706	B1	0.20	
	TP706	B1	0.20	
6391187				
6391188	TP706	B2	0.80	
6391189	TP706	B2	0.80	
6391190	TP706	B3	1.50	
6391191	TP706	B3	1.50	
6391193	TP706	B4	3.00	
6391194	TP706	B4	3.00	
6391195	TP706	B5	3.40	
6391196	TP706	B5	3.40	
6391198	TP707	B1	0.50	
6391201	TP707	B1	0.50	
	TP708	B2	1.10	
6391202	TP709	B2	0.60	
6391203				
6391204	TP710	B1	0.10	
6391205	TP710	B1	0.10	
6391207	TP710	B2	0.50	
6391208	TP711	B1	0.80	
6391209	TP712	B1	1.40	
6391210	TP714	B1	1.00	
6391212	TP715	B1	0.70	
6391213	TP716	B1	0.80	

CERTIFICATE OF ANALYSIS

SDG: Job: Client Reference:	121024-16 H_WSP_BAS-71 28453	Location: Customer: Attention:	Kingsmere Bicester Phase 2 WSP Environmental Helen Gardiner	Order Number: Report Number: Superseded Report:	200581
6391214		TP716	B1	0.80	
6391215		TP717	B1	0.50	
6391216		TP719	B1	0.40	
6391217		TP719	B1	0.40	
6391219		TP719	B2	1.40	
6391220		TP719	B2	1.40	
6391221		TP719	В3	2.30	
6391222		TP719	В3	2.30	
6391223		WS701	B1	1.00	
6391224		WS701	B2	2.00	
6391225		WS702	B1	1.00	
6391226		WS703	B1	0.60	
6391227		WS703	B2	2.00	
6391228		WS704	B2	1.00	
6391230		WS704	B2	2.00	
6391231		WS705	B1	1.00	
6391232		WS705	B2	2.00	
6391234		WS706	B1	1.00	
6391235		WS706	B2	2.00	
6391236		WS707a	B1	0.50	
6391237		WS708a	B1	0.60	

Only received samples which have had analysis scheduled will be shown on the following pages.

ALcontrol Laborato								_																			١	/alidat	ted
		ER										rs	IS																
SDG: 121024-1 Job: H_WSP_ Client Reference: 28453		er:	WS	ngsr SP E elen	Env	iron	me	ter F ntal	Pha	ise	2					R	ep	ort	N	mb um led	be		ort:		20	0581			
SOLID													~ ~																
Results Legend	Lab Sample No(s)	33912	33912	53911 53911	33911	53911	33912	6391176 6391175	3912	3911	53911 53911	3911	53911	301 1	3912	33912	03912	3912	33912	33912	03912	3912	3912	33912	33912	3013			
X Test		39	0,73	62	2 68 7	71	27	75 75	28	79	88	89	90	ал 98	2	20	30	38	60	10 i	20	<u>ה</u> 4	: 5	19	20	33			
No Determination Possible	Quarteria																												
	Customer Sample Reference	TP701	WS701	TP702	TP703	TP703	WS703	TP704	WS704	TP705	TP706	TP706	TP706	TP707	TP707	TP708	TP710	TP711	TP712	TP714	TP715	TP716	TP717	TP719	TP719	TD710			
	AGS Reference	B2	ᄜᅋ	B2	B2	во B2	B2	8 <u>1</u>	B2	<u>B</u>	B1	B2	B25	<u>5</u> 8	B1	B2	5 82	B1	B1	B1	<u>m</u> <u>r</u>	<u>ה</u>	2 B1	B2	B2	B 3			
	Depth (m)	0.60	1.00	0.60	0.50	1.00	2.00	1.00	1.00	0.50	0.50	0.80	2.00 3.40	0.50	0.50	1.10	0.50	0.80	1.40	1.00	0.70	0.80	0.50	1.40	1.40	3 30			
	Container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Geolabs container	Coolabe contained			
Geotechnical Testing*	All NDPs: 0 Tests: 33																												
		X	xx	X	X	x>		xx		X	xx	X	X	x	X	X)			X	X	X	xx		x	x	ĸ			

ALcontrol La	aboratories	5	CEPT	IFICATE OF A			L	Validated
SDG: Job: Client Reference:	121024-16 H_WSP_BAS- 28453	-71	Location:	Kingsmere Bicester Ph WSP Environmental Helen Gardiner		Order Number: Report Number: Superseded Repo	200581 rt:	
Results Legend		Customer Sample R	TP701	TP701	TP702	TP703	TP703	TP703
# ISO17025 accredited. M mCERTS accredited.								
§ Deviating sample. aq Aqueous / settled sample diss.filt Dissolved / filtered samp		Depth (m) Sample Type	0.60 GeoTech Soils	1.00 GeoTech Soils	0.60 GeoTech Soils	0.50 GeoTech Soils	1.00 GeoTech Soils	1.00 GeoTech Soils
t.unfilt Total / unfiltered sample. * Subcontracted test.		Date Sampled Sample Time	-	-	-	-	-	-
** % recovery of the surrog check the efficiency of th	e method. The	Date Received SDG Ref	24/10/2012 121024-16	24/10/2012 121024-16	24/10/2012 121024-16	24/10/2012 121024-16	24/10/2012 121024-16	24/10/2012 121024-16
results of individual com samples aren't corrected (F) Trigger breach confirmed	for the recovery	Lab Sample No.(s) AGS Reference	6391239 B2	6450905 B	6391162 B2	6391168 B2	6391171 B2	6391172 B3
Component	LOD/U	nits Method						
CBR Remoulded*	-	SUB		See Attached	See Attached	See Attached		
Moisture Content	-	SUB					See Attached	
GEOTECH)* Compaction 2.5kg*	-	SUB						See Attached
								0
Particle Density*	-	SUB						See Attached
Plasticity Index 4 point*	-	SUB					See Attached	
Point Load Axial*	-	SUB	See Attached			See Attached		
PSD Wet/Dry sieve*		SUB	See Attached		See Attached			
Sedimentation*	-	SUB			See Attached			
oH (GEOTECH)*	-	SUB					See Attached	
WS Sulphate (GEOTEC	CH) -	SUB					See Attached	

					TIFICATE OF A				
SDG: Job: Client Reference:	121024-1 H_WSP_ 28453			Customer:	Kingsmere Bicester Ph WSP Environmental Helen Gardiner	ase 2	Order Number: Report Number: Superseded Report	200581 ::	
Results Leger	nd	C 11	etemes Comple D	70704	TOTAL	70705	TOTAL	70700	70700
# ISO17025 accredited. M mCERTS accredited. § Deviating sample. aq Aqueous / settled samp diss.fiit Dissolved / filtered sam	ole. Iple.		stomer Sample R Depth (m) Sample Type	TP704 1.00 GeoTech Soils	TP704 1.00 GeoTech Soils	TP705 0.50 GeoTech Soils	TP705 0.50 GeoTech Soils	TP706 0.80 GeoTech Soils	TP706 0.80 GeoTech Soils
ot.unfilt Total / unfiltered sample * Subcontracted test. ** % recovery of the surro check the efficiency of 1 results of individual con samples aren't correcte (F) Trigger breach confirm	e. ogate standard to the method. The mpounds within ed for the recovery		Date Sampled Sample Time Date Received SDG Ref ab Sample No.(s) AGS Reference	- 24/10/2012 121024-16 6391175 B1	- 24/10/2012 121024-16 6391176 B1	- 24/10/2012 121024-16 6391179 B1	- 24/10/2012 121024-16 6391180 B1	- 24/10/2012 121024-16 6391188 B2	- 24/10/2012 121024-16 6391189 B2
Component		.OD/Units							
CBR Remoulded*		-	SUB				See Attached		
Moisture Content GEOTECH)*		-	SUB		See Attached				See Attached
Particle Density*		-	SUB	See Attached					
Plasticity Index 4 point	*	-	SUB		See Attached				See Attached
Point Load Axial*		-	SUB			See Attached			
Sedimentation*		-	SUB					See Attached	
/ibrating Hammer*		-	SUB	See Attached					
oH (GEOTECH)*		-	SUB		See Attached				See Attached
WS Sulphate (GEOTE	CH)	-	SUB		See Attached				See Attached
			+						
			ļļ						
							<u> </u>		

	101001.11				TIFICATE OF A		Order M.		
SDG: Job: Client Reference:	121024-16 H_WSP_E 28453			Customer:	Kingsmere Bicester Ph WSP Environmental Helen Gardiner	ase 2	Order Number: Report Number: Superseded Repo	200581 rt:	
Results Legend # ISO17025 accredited. M mCERTS accredited.	d	Cus	tomer Sample R	TP706	TP707	TP707	TP708	TP709	TP710
S Deviating sample. Aqueous / settled sample diss.filt Dissolved / filtered sample t.unfilt Total / unfiltered sample Subcontracted test.	ole.		Depth (m) Sample Type Date Sampled Sample Time	3.40 GeoTech Soils -	0.50 GeoTech Soils -	0.50 GeoTech Soils -	1.10 GeoTech Soils -	0.60 GeoTech Soils -	0.50 GeoTech Soils -
 ** % recovery of the surrog check the efficiency of th results of individual com samples aren't corrected (F) Trigger breach confirmer 	ne method. The pounds within I for the recovery	La	Date Received SDG Ref b Sample No.(s) AGS Reference	24/10/2012 121024-16 6391196 B5	24/10/2012 121024-16 6391198 B1	24/10/2012 121024-16 6391201 B1	24/10/2012 121024-16 6391202 B2	24/10/2012 121024-16 6391203 B1	24/10/2012 121024-16 6391207 B2
component		DD/Units	Method						
CBR Remoulded*		-	SUB			See Attached			See Attached
Moisture Content GEOTECH)*		-	SUB	See Attached				See Attached	
Compaction 2.5kg*		-	SUB				See Attached		
Particle Density*		-	SUB			See Attached	See Attached		
Plasticity Index 4 point*		-	SUB	See Attached				See Attached	
Point Load Axial*		-	SUB		See Attached				See Attached
Sedimentation*		-	SUB				See Attached	See Attached	
Vibrating Hammer*		-	SUB			See Attached			
oH (GEOTECH)*		-	SUB	See Attached				See Attached	
WS Sulphate (GEOTEC	CH)	-	SUB	See Attached				See Attached	
						1	1 I		

CERTIFICATE OF ANALYSIS

Validated

			CERI	IFICATE OF A	INAL 1515			
SDG: Job: Client Reference:	121024-16 H_WSP_BAS 28453	S-71	Customer: V	ingsmere Bicester Pr /SP Environmental lelen Gardiner	nase 2	Order Number: Report Number: Superseded Repo	200581 rt:	
_				-	-			
Results Lege # ISO17025 accredited.	nd	Customer Sample	R TP711	TP712	TP714	TP715	TP716	TP716
M mCERTS accredited. § Deviating sample. aq Aqueous / settled sam diss.filt Dissolved / filtered sam	nple.	Depth (Sample Ty	pe GeoTech Soils	1.40 GeoTech Soils	1.00 GeoTech Soils	0.70 GeoTech Soils	0.80 GeoTech Soils	0.80 GeoTech Soils
tot.unfilt Total / unfiltered sample * Subcontracted test. ** % recovery of the surror check the efficiency of results of individual co	ogate standard to the method. The	Date Sampi Sample Ti Date Receiv SDG F	ne . ed 24/10/2012 Ref 121024-16	- 24/10/2012 121024-16	- 24/10/2012 121024-16	24/10/2012 121024-16	- 24/10/2012 121024-16	- 24/10/2012 121024-16
(F) samples aren't correct (F) Trigger breach confirm Component		Lab Sample No. AGS Referen Units Method	ce B1	6391209 B1	6391210 B1	6391212 B1	6391213 B1	6391214 B1
CBR Remoulded*		- SUB	See Attached		See Attached			
Moisture Content (GEOTECH)*		- SUB	See Attached	See Attached				See Attached
Particle Density*		- SUB					See Attached	
Plasticity Index 4 point	*	- SUB	See Attached	See Attached				See Attached
Point Load Axial*		- SUB				See Attached		
PSD Wet/Dry sieve*		- SUB		See Attached		See Attached	See Attached	
pH (GEOTECH)*		- SUB	See Attached	See Attached				See Attached
WS Sulphate (GEOTE *	CH)	- SUB	See Attached	See Attached				See Attached

CERTIFICATE OF ANALYSIS

Validated

	024-16 /SP_BAS-71 53		Customer: W	ingsmere Bicester P /SP Environmental elen Gardiner	hase 2	Order Number: Report Number: Superseded Repo	200581 rt:	
B 10 + + -								
Results Legend # ISO17025 accredited.	Cus	stomer Sample R	TP717	TP719	TP719	TP719	WS701	WS702
M mCERTS accredited. § Deviating sample.		Denth (m)						
aq Aqueous / settled sample. diss.filt Dissolved / filtered sample.		Depth (m) Sample Type	0.50 GeoTech Soils	1.40 GeoTech Soils	1.40 GeoTech Soils	2.30 GeoTech Soils	1.00 GeoTech Soils	1.00 GeoTech Soils
tot.unfilt Total / unfiltered sample.		Date Sampled	-	-	-	-	-	-
* Subcontracted test. ** % recovery of the surrogate stand		Sample Time Date Received	. 24/10/2012	24/10/2012	24/10/2012	. 24/10/2012	24/10/2012	24/10/2012
check the efficiency of the metho results of individual compounds	within	SDG Ref	121024-16	121024-16	121024-16	121024-16	121024-16	121024-16
samples aren't corrected for the r (F) Trigger breach confirmed	ecovery La	ab Sample No.(s) AGS Reference	6391215 B1	6391219 B2	6391220 B2	6391222 B3	6391223 B1	6391225 B1
Component	LOD/Units	Method						
Moisture Content	-	SUB	See Attached		See Attached	See Attached	See Attached	See Attached
(GEOTECH)*								
Compaction 2.5kg*	-	SUB		See Attached				
Particle Density*	-	SUB		See Attached				
Plasticity Index 4 point*	-	SUB	See Attached		See Attached	See Attached	See Attached	See Attached
Point Load Axial*	-	SUB	See Attached					
PSD Wet/Dry sieve*	-	SUB	See Attached					
pH (GEOTECH)*	-	SUB	See Attached		See Attached	See Attached	See Attached	See Attached
WS Sulphate (GEOTECH)	-	SUB	See Attached		See Attached	See Attached	See Attached	See Attached
*								
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	+							

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CERTIFICATE OF ANALYSIS

Validated

Results Legend # ISO17025 accredited.	Cu	stomer Sample R	WS703	WS704	WS706		
M mCERTS accredited.							
 § Deviating sample. aq Aqueous / settled sample. 		Depth (m)	2.00	1.00	2.00		
diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample.		Sample Type Date Sampled	GeoTech Soils	GeoTech Soils -	GeoTech Soils		
* Subcontracted test.		Sample Time					
** % recovery of the surrogate standa check the efficiency of the method.		Date Received	24/10/2012	24/10/2012	24/10/2012		
results of individual compounds with	thin	SDG Ref	121024-16 6391227	121024-16 6391228	121024-16 6391235		
samples aren't corrected for the rec (F) Trigger breach confirmed	covery L	ab Sample No.(s) AGS Reference	B2	B2	B2		
Component	LOD/Units						
Moisture Content	-	SUB	See Attached	See Attached	See Attached		
(GEOTECH)*							
Plasticity Index 4 point*	-	SUB	See Attached	See Attached	See Attached		
pH (GEOTECH)*	-	SUB	See Attached	See Attached	See Attached		
		0110	O Alle she d	O Alle she d	O Alle she d	 	
WS Sulphate (GEOTECH)	-	SUB	See Attached	See Attached	See Attached		
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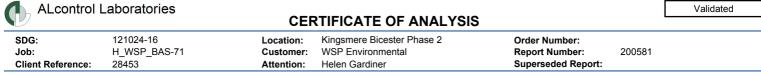


Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
SUB	Subc	ontracted Test		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

ALcontrol Laboratories							Va	lidated			
	CERTIFICATE OF ANALYSIS										
SDG:	121024-16		Location:	Kingsmere	Bicester Pha	se 2	Orde	r Number:			
Job:	H_WSP_BAS-71		Customer:	WSP Envir	onmental		Repo	rt Number:	200582	l	
Client Reference:	28453		Attention:	Helen Gar	diner		Supe	rseded Repo	rt:		
			Τοσ	t Com	nlation	n Dates	6				
			163		pietioi	I Dates	3				
L	ab Sample No(s)	6391239	6450905	6391162	6391168	6391171	6391172	6391175	6391176	6391179	6391180
Custo	mer Sample Ref.	TP701	TP701	TP702	TP703	TP703	TP703	TP704	TP704	TP705	TP705
	AGS Ref.	B2	В	B2	B2	B2	B3	B1	B1	B1	B1
Depth		0.60	1.00	0.60	0.50	1.00	1.00	1.00	1.00	0.50	0.50
Type GEOTECH			GEOTECH	GEOTECH	GEOTECH	GEOTECH	GEOTECH	GEOTECH	GEOTECH	GEOTECH	GEOTECH
Geotechnical Testing*		06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-201
	,	-				·			-		

Lab Sample No(s)	6391188	6391189	6391196	6391198	6391201	6391202	6391203	6391207	6391208	6391209
Customer Sample Ref.	TP706	TP706	TP706	TP707	TP707	TP708	TP709	TP710	TP711	TP712
AGS Ref.	B2	B2	B5	B1	B1	B2	B1	B2	B1	B1
Depth	0.80	0.80	3.40	0.50	0.50	1.10	0.60	0.50	0.80	1.40
Туре	GEOTECH									
Geotechnical Testing*	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012

Lab Sample No(s)	6391210	6391212	6391213	6391214	6391215	6391219	6391220	6391222	6391223	6391225
Customer Sample Ref.	TP714	TP715	TP716	TP716	TP717	TP719	TP719	TP719	WS701	WS702
AGS Ref.	B1	B1	B1	B1	B1	B2	B2	B3	B1	B1
Depth	1.00	0.70	0.80	0.80	0.50	1.40	1.40	2.30	1.00	1.00
Туре	GEOTECH									
Geotechnical Testing*	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012	06-Nov-2012

Lab Sample No(s)	6391227	6391228	6391235
Customer Sample Ref.	WS703	WS704	WS706
AGS Ref.	B2	B2	B2
Depth	2.00	1.00	2.00
Туре	GEOTECH	GEOTECH	GEOTECH
Geotechnical Testing*	06-Nov-2012	06-Nov-2012	06-Nov-2012



Laboratory Report



Contract Number: 17490

Client's Reference:	SDG121024-16 PO156281	Report Date: 05-11-2012	
Client Name:	ALcontrol Laboratories		
Contract Title:	Kingsmere Bicester Phase 2		
For the attention of:	HAWARDEN		
Date Received:	08-10-2012		
Date Commenced:	08-10-2012		
Date Completed:	05-11-2012		
Test Description	Quantity	Checked	Approved

Moisture Content	16	
*		
Plasticity 4 Point Limit	16	
*		
PSD-Wet Sieve/Dry Sieve	6	
*		
Sedimentation	4	
*		
Ph Limit	16	5
WS Sulphate	16	
Particle Density	6	
*		

Test Description	Quantity	Checked	Approved
CBR Remoulded	8		
*			
Compaction 2.5kg Rammer	3		
Compaction - Vibrating Hammer Method	2		
Point Load Axial/Diametrical	7		

Notes: Observations and Interpretations are outside the UKAS Accreditation * - Denotes test included in laboratory scope of accreditation

- Denotes test carried out by approved contractor

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Approved Signatories: Paul Evans (Quality Manager), Emma Williams (Office Manager), Benjamin Sharp (Laboratory Coordinator), Alex Wynn (Business Development Manager).

Summary of Laboratory Sample Descriptions

Hole Number	Sample Number	Sample Type	Depth (m)	Description of Sample*
TP701			0.60	Brown silty clayey sandy GRAVEL with many cobbles
TP702			0.60	Brown silty clayey gravelly (fine to coarse) clayey SILT.
TP703			0.50	Brown gravelly silty CLAY
TP703			1.00	Brown gravelly silty CLAY
TP703			1.00	Brown silty sandy very gravelly (fine to coarse) CLAY
TP704			1.00	Brown gravelly silty CLAY
TP704			1.00	Brown silty sandy very gravelly (fine to coarse) CLAY
TP705			0.50	Brown silty sandy very gravelly (fine to coarse) CLAY
TP706			0.80	Brown gravelly silty CLAY
TP706			0.80	Brown gravelly silty CLAY
TP706			3.40	Greenish brown silty CLAY
TP707			0.50	Brown silty sandy very gravelly (fine to coarse) CLAY
TP708			1.10	Brown silty sandy very gravelly (fine to coarse) CLAY
TP709			0.60	Brown gravelly silty CLAY
TP710			0.50	Brown silty sandy very gravelly (fine to coarse) CLAY
TP711			0.80	Brown gravelly silty CLAY
TP712			1.40	Brown silty clayey sandy GRAVEL with many cobbles
TP714			1.00	Brown silty sandy very gravelly (fine to coarse) CLAY
TP715			0.70	Brown silty clayey sandy GRAVEL with many cobbles
TP716			0.80	Brown silty clayey sandy GRAVEL with many cobbles
TP716			0.80	Brown gravelly silty CLAY
TP717			0.50	Brown silty clayey sandy GRAVEL with many cobbles
TP719			1.40	Greenish brown silty CLAY
TP719			1.40	Brown silty sandy very gravelly (fine to coarse) CLAY
TP719			2.50	Grey silty CLAY
WS701			1.00	Brown slightly gravelly sandy silty CLAY
WS702			1.00	Greenish brown silty CLAY
WS703			2.00	Brown gravelly sandy SILT
WS704			1.00	Greenish brown silty CLAY
WS706			2.00	Brown silty CLAY

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory





Approved by

5/11/12 Date

Circence by



Kingsmere Bicester Phase 2

Contract No.: 17490-241012 Client ref: SDG 121024-16

Issue No. 1.1

Page 15 of 43

Test Report: Method of the Determination of the plastic limit and plasticity index BS 1377 : Part 2 : 1990 Method 5

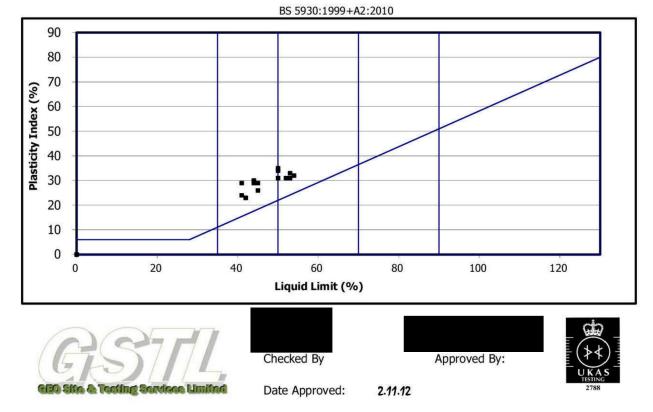
Client ref:	SDG 121024-16
Location:	Kingsmere Bicester Phase 2
Contract Number:	17490-241012

Hole/			Moisture	Liquid	Plastic	Plasticity	%	
Sample	Sample	Depth	Content	Limit	Limit	Index	Passing	Remarks
Number	Туре	m	%	%	%	%	.425mm	
			Cl. 3.2	Cl. 4.3/4.4	Cl. 5.	Cl. 6.		
TP703		1.00	14	50	19	31	80	CI/H Inter/High Plasticity
TP704		1.00	19	44	14	30	80	CI Intermediate Plasticity
TP706		0.80	36	54	22	32	95	CH High Plasticity
TP706		3.40	13	41	12	29	60	CI Intermediate Plasticity
TP709		0.60	19	41	17	24	60	CI Intermediate Plasticity
TP711		0.80	17	44	15	29	70	CI Intermediate Plasticity
TP712		1.40	10	45	16	29	70	CI Intermediate Plasticity
TP716		0.80	26	45	19	26	60	CI Intermediate Plasticity
TP717		0.50	32	53	20	33	90	CH High Plasticity
TP719		1.40	39	53	22	31	90	CH High Plasticity
TP719		2.30	15	42	19	23	80	CI Intermediate Plasticity
WS701		1.00	20	50	16	34	90	CI/H Inter/High Plasticity
WS702		1.00	10		NP		25	27238 (BA
WS703		2.00	15		NP		25	
WS704		1.00	30	52	21	31	80	CH High Plasticity
WS706		2.00	25	50	15	35	90	CI Intermediate Plasticity



NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



Page 16 of 43



Certificate of Analysis

Date:	02/11/2012
Client:	Alcontrol
Our Reference:	17490-081012
Client Reference:	SDG121024-16
Contract Title:	Kingsmere Bicester Phase 2
Description: (Total Samples)	16
Date Received:	24/10/2012
Date Started:	27/10/2012
Date Completed:	02/11/2012
Test Procedures:	(B.S. 1377 : PART 3 : 1990)

Notes:

Solid samples will be disposed 1 month and liquids 2 weeks

Approved By:

Authorised Signatories:

Emma Williams Laboratory Office Manager Wayne Honey Laboratory Technician Paul Evans Quality Manager
 Contract No:
 17490-081012

 Client Ref:
 SDG121024-16

 Location:
 Kingsmere Bicester Phase 2

 Date:
 02/11/2012

SUMMARY OF CHEMICAL ANALYSIS

(B.S. 1377 : PART 3 : 1990)

			Sulphate Content SO3 (as SO ₄)			Chloride	Content				
Hole Number	Sample Number	Depth m	Acid Soluble Sulphate as % SO ₄	Aqueous Extract Sulphate as g/l SO ₄	Ground- water g/l	Soluble Chloride as % equiv. NaCl	Ground- water g/l	pH Value @ 25°C	Organic Matter Content %	Loss on Ignition %	Remarks
			Clause 5.5.	Clause 5.5.	Clause 5.4.	Clause 7.3	Clause 7.2	Clause 9.	Clause 3.	Clause 4.	
TP703		1.00		0.02 (0.02)				7.73			
TP704		1.00		0.03 (0.03)				8.16			
TP706		0.80		0.03 (0.03)				8.38			
TP706		3.40		0.02 (0.02)				7.87			
TP709		0.60		0.01 (0.02)				7.26			
TP711		0.80		0.05 (0.07)				8.23			
TP712		1.40		0.01 (0.02)				8.17			
TP716		0.80		0.03 (0.03)				8.41			
TP717		0.50		0.01 (0.02)				7.53			
TP719		1.40		0.05 (0.06)				8.15			
TP719		2.30		0.02 (0.02)				7.63	1.		
WS701		1.00		<.01 (<.01)				8.20			
WS702		1.00		0.02 (0.02)				8.53			
WS703		2.00		0.01 (0.02)				8.08			
WS704		1.00		0.01 (0.02)				8.24			
WS706		2.00		0.06 (0.07)				8.36			

NCP - No Chloride present

SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

Hole Number	Sample Number	Depth m	Moisture Content % Clause 3.2	Bulk Density Mg/m ³ Clause 7.2	Dry Density Mg/m ³ Clause 7.2	Particle Density Mg/m ³ Clause 8.*		Remarks
TP703		1.00				2.65		
TP704		1.00				2.71		
TP707		0.50				2.65		
TP708		1.10				2.66		
TP716		0.80				2.65		
TP719		1.40				2.67		



Test Report:

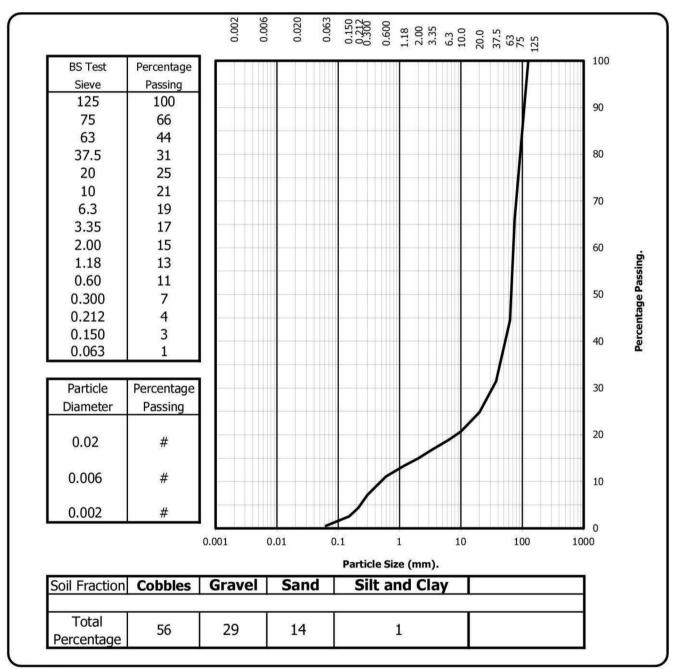
Particle Size Distribution Test BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref: Location: **Contract Number: Hole Number** Sample Number: Depth (m) : Sample Type

SDG121024-16 **Kingsmere Bicester Phase 2** 17490-081012 **TP701**

0.60



Remarks:

#- not determined





Date Approved:



5.11.12



GEO/104