

GROUND ENGINEERING

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SITE INVESTIGATION REPORT

KESTON NURSERY
MILL GREEN ROAD
PINCHBECK
SPALDING
LINCOLNSHIRE

Report Reference C13895

On behalf of:-

AMJ Construction Limited
c/o Robert Doughty Consultancy Ltd
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August 2016

AMJ CONSTRUCTION LIMITED

ROBERT DOUGHTY CONSULTANCY LIMITED

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FOR

PROPOSED RESIDENTIAL DEVELOPMENT

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INTRODUCTION

The client, AMJ Construction Limited, proposes to build a new residential development, at their site to the east of Mill Green Road, Pinchbeck, Spalding, Lincolnshire. The proposed layout and building loads were not known at the time of report writing.

Ground Engineering Limited was commissioned by the client, under the direction of town planners Robert Doughty Consultancy Limited, to carry out a site investigation to determine the nature and geotechnical properties of the underlying soils, and provide information for the design and construction of the foundations. A desk study checking past uses and a contamination assessment were also included within the scope of this report.

LOCATION, TOPOGRAPHY AND GEOLOGY OF THE SITE

The site is located at Keston Nursery, to the east of Mill Green Road, Pinchbeck near Spalding, Lincolnshire. The site is on the south-western side of Pinchbeck and approximately 2.5km north-west of Spalding town centre. The National Grid Reference for the centre of the site is TF 2369 2493 and its location is shown on a plan following this report text.

At the time of the investigation in July 2016, the approximately 200m wide by 450m long investigation area comprised Keston Nurseries, and was accessed from Mill Green Road to the west. A house and dormer bungalow were present in the northern-most part of the site. The main northern to central part of the site was covered with glasshouses, which were in use at the time of the investigation. The southern part of the site contained glasshouses, rows of plants and a crop. A reservoir was also present in the central western part of the site.

Trees were present on the site, including Silver Birch in the north part of the site. Along the western, southern and northern parts of the boundaries were Leyland Cypress trees, which were trimmed to form a hedge approximately 2m to 3m high. Along the eastern boundary were a variety of deciduous trees.

The site boundaries were defined by Mill Green Road to the west, including houses and gardens fronting Mill Green Road to the west and south-west; Cherry Holt Road to the north; a railway line to the east; and fields and additional glasshouses to the south. Drains were also present alongside the western boundary with Mill Green Road; along part of the railway line to the east; and part of the southern boundary to the field.

The site stands at an elevation of approximately 3mOD on level ground within the Lincolnshire Fens. The site is approximately 1km north of Vernatt's Drain, and 2.5km west of the northward flowing River Welland.

The site is between drainage and reclamation features including; Old Fendyke 2km to the west (limit of reclamation of freshwater and peat marsh pre 1066AD to c.1300AD); the 'probable Saxon coastline' 1.1km to the north-east (c.1000AD); and the outer limit of reclamation by c.1300AD ('Roman Bank') 2.2km to the east.

The 1992 geological map for the area at 1:50,000 scale, Sheet 144 'Spalding', shows the site to be underlain by superficial Barroway Drove Beds (more recently named Tidal Flat Deposits), covering the solid geology of the Oxford Clay Formation at depth. Previous investigations by Ground Engineering Limited in this area found superficial deposits including Marine Sand to approximately 11m depth, covering Boulder Clay, and the expected Oxford Clay below 15.00m depth. The River Welland is a major watercourse 2.5km to the east, flowing north to The Wash. The hydraulic gradient is anticipated to flow towards the east and the River Welland.

HISTORY OF THE SITE

Research into the site history involved reference to historical Ordnance Survey (OS) maps, photographs and information obtained from the internet. The map extracts studied are presented in the desk study map section, Appendix 1, and are described below. Distances are approximate.

<i>OS Map Extract</i>	<i>Description</i>
1887 Lincolnshire sheet 134SW Scale 1:10,560 Figure A	The site comprised parts of five parcels of land. Roads bounded the site to the north-west and north. The Great Northern & Great Eastern railway bounded the site to the east. The area around the site is generally fields with orchards to the north.
1889 Lincolnshire sheet 134.9 Scale 1:2500 Figure B	The site and immediate surrounding area appear unchanged. Drains are shown along the field edges crossing the site and along the boundaries to the roads and the railway.
1904 Lincolnshire sheet 134.9 Scale 1:2500 Figure C	The site area appears unchanged within fields. Some of the orchards to the north of the site are no longer shown.
1929 Lincolnshire sheet 134SW Scale 1:10,560 Figure D	The north-western part of the site is denoted as an orchard. A building is shown in the central western part of the site, and a small building in the north of the site. Two north-south aligned drains are no longer shown in the southern part of the site. Allotment gardens are shown off-site to the south-west, with semi-detached houses further west fronting Mill Green Road. Two new buildings are shown off-site to the north, which is denoted an orchard.
1932 Lincolnshire sheet 134.9 Scale 1:2500 Figure E	The site and immediate surrounding area appear unchanged.
1938 Lincolnshire sheet 134SW Scale 1:10,560 Figure F	The site and immediate surrounding area appear unchanged.

<i>OS Map Extract</i>	<i>Description</i>
1950 Lincolnshire sheets 134SW & 134NW Scale 1:10,560 Figure G	New buildings are shown in the northern part of the site. A smaller orchard is shown in the north-western part of the site. New buildings are also shown adjacent the central western part of the site. A new building is shown off-site to the north in the orchard.
1967 Sheets TF2324 & TF2325 Scale 1:2500 Figure H	Glasshouses and new buildings are shown in the northern part of the site, which is denoted as a nursery. New buildings are also shown in the central western part of the site along a track. An electricity transmission line aligned north-west to south-east is shown crossing the site. Nurseries are also shown off-site to the north, and east of the site beyond the railway. New housing is also shown east of the railway. A dairy is shown 120m east of the site. A sewage pumping station is shown 250m east of the site. An abattoir is denoted 120m south-west of the site (buildings previously shown on the 1950 map extract).
1975-80 Sheets TF22SW & TF22NW Scale 1:10,000 Figure I	The site area appears unchanged, with a nursery in the northern part of the site. New housing is shown east of the railway. A sewage works is shown 120m south-west of the site.
1984-88 Sheets TF2324 & TF2325 Scale 1:2500 Figure J	The north-western third of the site is denoted as Keston Nurseries. New large glasshouses, including a moveable one, and a circular tank are shown in the north-western part of the site. The buildings in the central western part of the site are no longer shown. A new property 'Rualen' has been built off-site adjacent the west of the site. Glasshouses are no longer shown to the east of the site. A glasshouse has also been cleared to the north of the site. Off-site to the south-east an orchard is denoted. An electricity sub-station is shown 190m east of the site.
1995 Sheets TF2324 & TF2325 Scale 1:2500 Figure K	The site area appears unchanged. New roads and houses are shown east of the site beyond the railway.
2002 Raster Map Scale 1:10,000 Figure L	New glasshouses are shown in the northern part of the site. Two circular tanks are shown in the central western part of the site. The south-eastern part of the site is denoted as an orchard. A glasshouse to the north of the site is no longer shown.
2007 GroundSure Aerial Photograph of Site (Appendix 2)	Additional glasshouses are shown in the central and south-eastern parts of the site. A new house is shown in the northern part of the site. Trees are evident in the north and north-eastern part of the site; along the eastern boundary to the railway line; and around the western and southern boundaries. Off-site to the south-east numerous cloches are evident.
2014 Sheets TF22SW & TF22NW Scale 1:10,000 Figure M	A new glasshouse is shown in the south-eastern part of the site. A reservoir is shown in the central western part of the site.

<i>OS Map Extract</i>	<i>Description</i>
2016 Sheets TF2324 & TF2325 Not to Scale Figure N	The site and immediate surrounding area appear unchanged.

Summary of Historical Information

The map of 1886 showed the site comprised fields. New buildings were shown in the central and northern parts of the site by 1929, and additional buildings were shown on the 1950 map. The site was denoted as a nursery on the 1967 map, when glasshouses and other buildings were shown, including a house in the northern part of the site. The glasshouses were enlarged in the 1970s, 1980s, and 2000s, and remain on-site to the present day. Circular (water) tanks were first shown in the middle of the site on the 2007 aerial photograph, and remain to the present day. A reservoir was constructed in the central western part of the site between 2010 and 2014. The south-western third of the site has remained undeveloped and used as cultivated fields.

The area around the site was mostly fields and orchards, with a railway line bounding the site to the east. Housing had been built off-site to the south-west in the 1920s, and the adjoining land was used as allotments. Other nurseries were shown to the north and east of the site, and a dairy to the east, in the 1960s. The nursery to the east had been cleared in the 1980s and the area redeveloped with roads and houses. The nursery to the north was cleared in the 1980s and 1990s.

SUMMARY OF ENVIRONMENTAL DATA

Appendix 2 contains information derived from Environmental Databases for a radius of up to 2,000m from the site. The information covers datasets held by Groundsure with contributors including the local authority, the Environment Agency (EA), British Geological Survey, Ordnance Survey and the Coal Authority and the results, within a radius of 250m, are summarised below:

1. Historical Industrial Sites	On-Site	0 - 250m
Potentially Contaminative Uses (1:10,000 mapping)	3	31
Historical Tank Database	2	3
Historical Energy Features Database	0	3
Historical Petrol & Fuel Site Database	0	0
Historical Garage & Motor Vehicle Repair Database	0	0
Potentially Infilled Land	0	10
2. Environmental Permits, Incidents and Registers	On-Site	0 - 250m
Sites Holding Environmental Permits/Authorisations	0	1
Records of COMAH and NIHHS Sites	0	0
Environment Agency Recorded Pollution Incidents	0	0
Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0
3. Landfill and Other Waste Sites	On-Site	0 - 250m
Landfill Sites	0	0
Landfill and Other Waste Sites	0	0
4. Current Land Use	On-Site	0 - 250m
Current Industrial Sites Data	0	3
Records of Petrol and Fuel Sites	0	0
Underground High Pressure Oil and Gas Pipelines	0	0
5. Geology		
Artificial Ground or Made Ground records	No	
Superficial Ground and Drift Geology records	Yes	
6. Hydrogeology and Hydrology	On-Site	0 - 250m
Productive strata within superficial geology	No	
Productive strata within solid geology	No	
Groundwater Abstraction Licences	0	0
Surface Water Abstraction Licences	0	0
Potable Water Abstraction Licences	0	0
Source Protection Zones	0	0
River Quality Data	No	No
Detailed River Network Entries	0	1
Surface Water Features	Yes	Yes

7. Flooding					
Environment Agency indicative Zone 2 floodplains within 250m of site				Yes	
Environment Agency indicative Zone 3 floodplains within 250m of site				Yes	
Risk of flooding from rivers & the sea (RoFRaS) rating				Medium	
Flood defences within 250m of site				No	
Any areas benefitting from flood defences within 250m of site				No	
Flood storage areas within 250m of site				Yes	
Maximum BGS groundwater flooding susceptibility within 50m of site				Not prone	
BGS confidence rating for groundwater susceptibility areas				Not applicable	
8. Designated Environmentally Sensitive Sites				On Site	0 - 250m
Environmentally sensitive sites (Nitrate Vulnerable Zones)				3	0
9. Natural Hazards (on site)					
Hazard	Negligible	Very Low	Low	Moderate	High
Shrinking or Swelling Clay	-	-	On-site	-	-
Landslides	-	On-site	-	-	-
Soluble rocks	On-site	-	-	-	-
Compressible Ground	-	-	-	On-site	-
Collapsible Rocks	On-site	-	-	-	-
Running Sand	-	-	-	On-site	-
9.2. Radon					
The property is not in a Radon Affected Area, as less than 1% of properties are above the action level. No Radon Protective Measures are required for new properties or extensions.					
10. Mining					
Coal mining areas within 75m of site				No	
Non coal-mining areas within 50m of site				No	
Brine affected areas within 75m of study site				No	

Database Summary

The potentially contaminative uses identified from 1:10,000 mapping are for the nurseries on the site; nurseries to the north (17m), east (20m) and west (194m); dairy 33m to the east; railway sidings 59m to 119m to the north; abattoir 112m to the west; sewage works and unspecified tank, 79m and 125m to the south-west; and a saw pit 211m to the north. There are tanks recorded on the site, and an unspecified tank 129m south-west at the sewage works. There are no historical energy features, historical petrol or fuel sites, garages or motor vehicle repair premises on the site. The closest electricity sub-station is 187m east of the site. There are no areas of potentially infilled land on the site, the closest to the site were the sewage works to the south-west and saw pit 211m north. There is a licensed discharge consent 181m south-west of the site, for unspecified effluent, which was revoked in 1997. There are no pollution incidents

recorded on, or within 250m of the site. There are no registered or historic landfills registered on, or within 250m of the site. The current industrial use of the site as a nursery is not recorded. Current industrial sites within 250m of the site relate to Houghton Produce Limited 178m west, a silo 208m west; and pumping station 237m to the north-east. There are no current petrol or fuel sites within 250m of the site.

Superficial Tidal Flat Deposits are indicated to cover the site, which are designated by the EA as an 'Unproductive' stratum. The site is underlain by the solid geology of the Oxford Clay Formation, which is also designated by the EA as an 'Unproductive' stratum. There are no groundwater abstractions on, or within 250m of the site. There are no river network entries on the site, the closest is the Blue Gowt Drain, a secondary river 227m east of the site. The surface water features recorded on the site relate to the drains along the boundaries. The site is within a Zone 2 and Zone 3 floodplain, and is not within an area benefiting from flood defences. The site has a 'medium' risk of flooding by rivers and the sea (RoFRaS) rating.

The site is assessed as having a 'moderate' hazard from compressible ground and running sand. The site is assessed as having a 'low' hazard from shrinking or swelling clay. The site is assessed as having a 'very low' hazard from landslides. The site is assessed as having a 'negligible' hazard from soluble rocks and collapsible rocks. The site is within a nitrate vulnerable zone, a designated environmentally sensitive area. The site is not within an identified mining area, or brine affected area. No radon protection measures are required for new residential properties or extensions.

PRELIMINARY RISK ASSESSMENT

Potential sources of contamination present on or beneath the site would relate primarily to; the historical use of the site; the presence of contaminated soil; and the potential presence of hazardous or ground gas beneath the site.

In order to assess the risks associated with the presence of ground contamination, the linkages between the sources and potential receptors to contamination need to be established and evaluated. This is in accordance with the Environmental Protection Act 1990, which provides a statutory definition of Contaminated Land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that;

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

There are three principal factors that are assessed whilst undertaking a qualitative risk assessment for any site. These are the presence of a contamination source, the existence of migration pathways and the presence of a sensitive target(s). It should be noted that it is necessary for each element of source, pathway and target to be present in order for exposure of a human or environmental receptor to occur.

UK Government guidance on the assessment of contaminated land, requires risk to human health and the environment to be reviewed using source – pathway – target relationships. If each of these elements is present, the linkage provides a potential risk to the identified targets.

Contaminants or **potential pollutants** identified as **sources** in relation to the identified previous uses are listed overleaf in Table 1.

Table 1: Identified Potential Contaminant Sources

<i>Contaminant Source</i>	<i>Comments</i>
Drainage/Buildings	Effluent from leaking drains would provide a contaminant source. Buildings and outbuildings may contain asbestos.
Soil Beneath Site	Contamination may be present within any made ground materials on the site.
Above Ground Tanks	Leaking tanks and pipework could provide a contaminant source.
Soil Gas	Potential soil gas generated from made ground or underlying geology.
Ground Contamination Outside Site Boundary	Ground contamination migrating from adjoining sites.

A **Pathway** is defined as one or more routes through which a receptor is being, or could be, exposed to, or affected by, a given contaminant.

Potential **Target or Receptors** fall within the categories of Human Health, Water Environment, Flora and Fauna, and Building Materials.

There are a number of possible pathways for the contaminants identified on the site to impact human and/or environmental receptors and these are summarised in Tables 2 and 3.

Table 2: Human Receptors and Pathways

<i>Human Receptor-Mechanism</i>	<i>Typical Exposure Pathway</i>
Human Inhalation	Breathing Dust and Fumes Breathing Gas emissions
Human Ingestion	Eating -contaminated soil, for example by small children -produce grown on contaminated soil Ingesting dust or soil on vegetables Drinking contaminated water
Human Contact	Direct skin contact with contamination Direct skin contact with contaminated liquids

Table 3: Water Receptors and Pathways

<i>Receptor-Water Environment</i>	<i>Typical Exposure Pathway</i>
Groundwater The superficial Tidal Flat Deposits are indicated to be an 'Unproductive' stratum. The solid geology Oxford Clay is also indicated by the EA to be an 'Unproductive' stratum. The site is not within any Source Protection Zones.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and migrate to underlying groundwater. Contamination leads to restriction/prevention of use as a resource, for example, drinking water, and can have secondary impacts on other resources, which depend on it.
Surface Water There are surface water features, drains, along some boundaries of the site.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and laterally migrate. Contamination leads to a restriction/prevention of use: -as drinking water resource -for amenity use Effects on aquatic life.

Preliminary Conceptual Model

Assessment of the potential linkage between ground contamination sources, human and environmental receptors have been assessed based on the desk study research documented in the preceding sections of this report.

A generalised preliminary conceptual model is presented below in Table 4.

Table 4: Preliminary Conceptual Model Relative to Proposed Residential Development

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources				
		Drainage/ Buildings	Soil Beneath Site	Above Ground Tanks	Soil Gas	Ground Contamination Outside Site Boundary
Human Health – ground or construction workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low likelihood/ Likely (asbestos-buildings)	Low likelihood	High likelihood	Low likelihood	Low likelihood
Human Health – end users	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Unlikely	Low likelihood	Likely	Low likelihood	Low likelihood
Water Environment	Migration through ground into surface water or surrounding groundwater	Low likelihood	Low likelihood	Likely	Unlikely	Unlikely
Flora	Vegetation on site growing on contaminated soil	Low likelihood	Low likelihood	Low likelihood	Low likelihood	Unlikely
Building Materials	Contact with contaminated soil	Low likelihood	Low likelihood	Likely	Low likelihood	Low likelihood

Key to Table 4 Estimated Potential for Linkage with Contaminant Source	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such an event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.
N/A	Not Applicable.

SITE WORK

The site work conducted between 13th and 15th July 2016 comprised twenty window sampled boreholes (WS1 to WS20), and three machine excavated trial pits including soakaway tests (TP1, TP2 and TP3). The positions are shown on the exploratory hole location plan following this report text.

Public utility service drawings were sourced and consulted prior to determining the exploratory hole positions. The service drawings sourced by Ground Engineering Limited are available on request. Prior to excavation, a service scan was made at each position using a CAT (Cable Avoidance Tool) to check for the absence of detectable buried services that may otherwise have been damaged by the investigation.

The exploratory hole records, presented following the exploratory hole location plan, give the descriptions and depths of the various strata encountered, details of all samples taken, in-situ tests and the groundwater conditions observed during and on completion of boring and excavation.

Window Sampled Boreholes

The window sampled boreholes, WS1 to WS20, were sunk to depths of between 2.00m and 4.45m, and selected boreholes were extended by dynamic probing to depths of between 6.00m and 10.00m where they were completed. Prior to the start of boring, an inspection pit was dug to 1.20m below ground level using hand tools to ensure the absence of buried services.

Representative small disturbed samples of soil were taken from the starter pits at regular intervals throughout their depth. Samples of topsoil were taken within polycarbonate pots and amber glass jars pending possible contamination testing.

The boreholes were formed by a small track mounted window sampling and super heavy dynamic probing rig. The window sampling equipment consisted of drive-in sample tubes of specially constructed and strengthened steel, lined with a plastic core-liner. The barrels were

initially of 87mm, 77mm or 67mm internal diameter and were reduced in diameter with successive barrels with increasing depth. Upon extraction, a continuous 'undisturbed' profile of the soil was obtained within the plastic liners. The plastic liners were subsequently split by a geotechnical engineer who sub-sampled them, with the remaining samples re-sealed within the plastic liners. An immediate assessment of the apparent shear strength of clay was made within the liners using a hand shear vane, the average of three readings for each test depth have been recorded and presented on the borehole records in kilopascals (kPa). The apparent cohesion results have been plotted against depth in Figure 1 with the results from the trial pits.

Standard penetration tests (SPTs) were undertaken in the window sample boreholes at regular intervals in order to give an indication of the in-situ relative density of the material. The test was made by driving a 50mm diameter split spoon attachment (S) into the soil at the base of the borehole by means of an automatic trip hammer weighing 63.50kg falling freely through 750mm. The penetration resistance ('N' value) was determined as the number of blows required to drive the tool the final 300mm of a total penetration of 450mm into the soil ahead of the borehole. The SPT test is fully described in BS EN22476:3:2005 and the results of these tests are presented on the borehole records. The SPT results have been plotted against depth in Figure 2.

Boreholes WS1, WS3, WS5, WS7, WS9, WS12, WS14, WS18 and WS19 were extended to depths of between 6.00m and 9.00m by dynamic probing. The probe was driven using the super heavy dynamic probing rig. The test comprised driving a 90° cone, 150mm² in area, on 35mm diameter rods using a 63.5kg hammer falling through 750mm. The blow count was recorded for every 100mm of penetration (N100). The results are presented as a plot of hammer blow counts against depth and accompany the borehole records.

On completion the exploratory holes were backfilled with arisings.

Machine Excavated Trial Pits

Trial pits TP1, TP2 and TP3 were excavated using a JCB to depths of between 2.20m and 2.70m. The exposed strata were sampled and recorded by a Geoenvironmental

Engineer. Representative small disturbed samples of soil were taken at regular intervals throughout the depth of each trial pit.

An immediate assessment of the apparent shear strength of clay was made within trial pit TP2 using a hand shear vane. The average of three readings for each test depth have been recorded and presented on the trial pit record in kilopascals (kPa). The apparent cohesion results have been plotted against depth in Figure 1 with the results from the boreholes.

Soakaway tests were carried out within trial pits TP1, TP2 and TP3, in broad accordance with BRE Digest 365 in order to allow the assessment of the soil infiltration rate. The general method of the test was to excavate the trial pits with vertical sides trimmed square to the base. The dimensions were accurately measured and recorded, and the pits were then filled with clean water. The rate of water dissipation from the pits was measured by recording the depth of water relative to a datum at frequent time intervals. As the water in trial pits was very slow to drain away only one fill could be undertaken at these positions, and the pits were not refilled. The results are presented and follow the trial pit records.

The trial pits were emptied of any remaining water and were backfilled with compacted arisings upon completion.

LABORATORY WORK

The samples were inspected in the laboratory and assessments of the soil characteristics have been taken into account during preparation of the borehole and trial pit records. The soil descriptions have been made in accordance with BS5930:2015. The geotechnical test results, undertaken in accordance with BS1377:1990, are presented following the exploratory hole records. The chemical test results follow the geotechnical test results.

The index properties of selected soil samples were determined as a guide to soil classification and behaviour. The liquid limit was determined by a cone penetrometer. The moisture content of each specimen was also determined.

The particle size distributions of selected samples were obtained by sieve analysis. The particle size distribution passing the 63 μ m sieve was obtained by pipette sedimentation. The results of these tests are given as particle size distribution curves at the end of this report.

California Bearing Ratio (C.B.R.) tests were performed on selected recompacted samples. The samples were recompacted using a 2.5kg rammer within a CBR mould. The tests consisted of jacking into the remoulded soil a cylindrical plunger with a cross sectional area of 1935mm². A force of 10N was applied initially to seat the plunger on the soil surface during each test and then the plunger was made to penetrate the soil at a uniform rate of 1mm/min. Readings of force were taken at intervals of penetration of 0.25mm to a penetration not exceeding 7.50mm. The CBR value is the ratio of the force required to achieve 2.50mm or 5.00mm penetration to standard forces expressed as a percentage.

Selected samples of soil were analysed to determine the concentration of soluble sulphates. The pH values were also determined.

Chemical analysis of ten soil and two water samples recovered from the exploratory holes was undertaken, by an independent laboratory, primarily for characterisation purposes. The samples were tested for a suite encompassing a wide range of potential contaminants outlined by the Environment Agency (EA) and National House Building Council (NHBC) document R&D 66; 2008 'Guidance for the Safe Development of Housing on Land

Affected by Contamination'. In addition, one soil sample was tested for speciated TPH CWG and six samples (four soil and two water) were tested for a pesticides screen (SVOC TICs).

A sample of made ground from WS8 at 0.30m depth was scheduled for a Waste Acceptance Criteria (WAC) CEN Leachate Suite test at 10l/kg.

GROUND CONDITIONS

The ground conditions beneath the site have been plotted as soil profiles in Figure 3 (north to south along the eastern side of the site) and Figure 4 (north to south along the western side of the site). The ground conditions comprised a surface layer of topsoil, underlain by the expected firm or soft clay, or very loose silt Tidal Flat Deposits, and Tidal Flat Deposit Roddons (silty sand), which were proved to at least the base of the boreholes to a maximum depth of 4.45m. Medium dense sand below 5m to 9m was indicated by probing. Groundwater was found as seepages below approximately 1.20m depth during boring and excavation. The concrete surfaced operational and public areas of the site were avoided as part of this investigation.

Topsoil

Topsoil was encountered to depths between 0.30m and 0.60m, and generally comprised brown/dark brown, slightly gravelly (WS1), sandy clay/silt, varying to clayey/silty sand. The gravel fraction in WS1 comprised fine and medium, sub-angular and sub-rounded, flint.

Tidal Flat Deposits

Tidal Flat Deposits were encountered beneath the Topsoil at between 0.30m and 0.60m depth, extending to between 2.00m and 4.45m below ground level, and interpreted from the probing to extend to depths of between 5.00m (WS7) and 9.00m (WS18). This deposit had an interpreted thickness of between 4.60m and 8.50m.

The Tidal Flat Deposits initially consisted of soft or firm, becoming very soft, locally slightly organic below 1.45m depth, slightly sandy, silty clays. The Tidal Flat Deposits had roddons (infilled channels) of very loose or loose, brown and orange brown, clayey/silty fine grained sand within them. These sands were locally slightly organic below approximately 2.40m depth in the south-western part of the site. The boreholes that were not probed, and all three trial pits were completed within Tidal Flat Deposits.

The probing indicated very loose, becoming loose, or very soft soils to between 5.00m depth and 9.00m depth.

Probable Marine Sand

The probing indicated medium dense conditions from between 5.00m and 9.00m depth, to at least the base of the probes at between 6.00m depth and 10.00m depth, a thickness of between at least 0.80m and at least 2.10m. These soils were interpreted to represent the expected superficial Marine Sand.

Groundwater

Groundwater was generally encountered as seepages at between 1.50m and 2.00m depth, rising to between 1.20m and 1.90m depth. On completion of the boreholes, groundwater was recorded at depths between 1.20m and 1.90m. Some of the boreholes and trial pits were dry during boring and on completion.

Observations

Live roots were observed in some of the boreholes and trial pits, and to a maximum depth of 0.80m in TP3 in the eastern part of the site close to the trees on the boundary.

The trial pit sides were generally unstable during excavation and on completion, and boreholes WS18, WS19 and WS20 collapsed during boring below 1.20m depth.

Evidence of Contamination

The made ground encountered during this investigation was not generally noted to have olfactory or visual evidence of fuel contamination, however there was a slight hydrocarbon odour in WS5 below 1.40m to 2.00m depth, in the eastern part of the site. The topsoil did not contain any artefacts. Made ground is likely to be present beneath the developed northern part of the site associated with the glasshouses.

COMMENTS ON THE GROUND CONDITIONS IN RELATION TO FOUNDATION DESIGN AND CONSTRUCTION

The proposed development is understood to comprise construction of a new residential development. The investigation confirmed the site to be underlain by topsoil resting on the expected superficial Tidal Flat Deposits. The topsoil had variable bearing properties and was locally found to a maximum depth of 0.60m. Any made ground beneath the existing nursery buildings and glasshouses should be avoided as a bearing stratum. The proposed building loads were not known at the time of report writing, although the anticipated houses are expected to be 'lightly' loaded. The underlying superficial deposits would only be capable of supporting lightly loaded traditional foundations for new buildings, locally deepened in clay soils due to the presence of trees. However deepened foundations may be unsuitable due to the presence of very soft organic soils below about 1.50m depth. The anticipated underlying Glacial Till and solid geology Oxford Clay would provide a suitable bearing stratum for piled foundations, however these soils would need to be proved by investigation using cable percussive boreholes. Excavations below 1.20m are likely to encounter groundwater, and be unstable, with running sand conditions. Ground bearing floor slabs could be adopted, but would need to be suspended in clay soils affected by tree roots.

Traditional Foundations

Foundations should be extended through any topsoil, which was locally found to a maximum 0.60m depth in the north of the site. The naturally deposited Tidal Flat Deposits could be used as a founding strata for traditional foundations, where encountered at shallow depth.

The naturally deposited Tidal Flat Deposit clays, could offer a founding stratum where encountered at shallow depth for lightly loaded traditional foundations. Deepened foundations extending into the very soft organic Tidal Flat Deposits may be unsuitable for locally deepened footings due to their poor bearing properties and high compressibility.

Samples of the Tidal Flat Deposits (clay and silt) had modified plasticity indices of between 11% and 35%. The results indicate the clays range from low to medium volume change potential based on NHBC Standards Chapter 4.2 'Building near trees' (2014). On an open site, away from the influence of trees, a minimum foundation depth of 0.90m below current or proposed ground level, whichever is deeper, would be required within the naturally deposited clays in order to be below the zone of seasonal volume change in accordance with the NHBC Standards.

It is likely that some of the proposed dwellings will be within influencing distances of high water demand trees where clay soils are present at shallow depth. Trees were present on the site, including Silver Birch and Leyland Cypress in the northern part of the site. Along most parts of the boundaries were Leyland Cypress trees forming a hedge, which were locally approximately 3m high. These will dictate deepened foundations both where trees remain and where removed.

Based on a high water demand Leyland Cypress tree, and low water demand Silver Birch trees, minimum foundation depths of between 1.10m, and 2.15m would be required in such clay soils based on NHBC Standards and a 5m distance from foundations to trees. Foundations would need to be at least 12m from the position of a mature Leyland Cypress tree, and 7m from a mature Silver Birch tree, for the adoption of the minimum foundation depth of 0.90m on this site. Within these distances foundation depths will depend on the proximity of trees to new foundations and depths should be determined using the NHBC Standards where clay forms the base of foundation excavations. Tree species along the site boundaries and distances to the proposed dwellings should be verified before final design of foundation depths based on NHBC Standards.

Foundations should be taken at least 0.50m below the last vestiges of live roots in clay soils. Live roots were encountered to a maximum depth of 0.80m within TP3 in clay soils, close to the mature trees on the eastern site boundary. The depth of roots is likely to vary across the site, and is likely to be deeper closer to the trees adjacent the site boundaries. Strip footings could be 'stepped' up along the length of wall runs where foundation depths vary due to the

influence of trees. Steps should not exceed 0.50m and further guidance is provided in the aforementioned NHBC document.

Evenly loaded raft foundations in accordance with NHBC Standards could be used if at least 4m from Leyland Cypress trees, and 1m from Silver Birch trees in clay soils.

Recommendations for foundation depths related to proposed tree planting are also provided in the NHBC Standards and the volume change potential should be considered for any proposed landscaping within the proposed scheme on the site.

In summary, foundations for the new building will need to be a minimum of 0.90m deep and may need locally to be taken to below 2.50m below ground level, in order to penetrate the depths of potential root-induced desiccation within this site.

The sandy silt to silty sand Tidal Flat Deposits would be considered non-shrinkable, but are potentially frost susceptible and a minimum footing depth in this stratum of 0.60m should be adopted in order to avoid the potentially damaging effects of frost action. Foundations would not need to be deepened within non-shrinkable soils.

Cable percussive boreholes would be required to provide information for design of piled foundations.

Bearing Capacity

The non-shrinkable, silty sand of the Tidal Flat Deposits would provide a suitable founding stratum for the proposed buildings. The naturally deposited silty sand, where present from a depth of 0.60m, has an allowable bearing pressure of 40kN/m² for foundations up to 0.60m wide, and 20kN/m² beneath a nominal 12m by 6m raft foundation, which should be sufficient for the proposed houses and limit immediate settlement to within 25mm.

The firm clay soils found at the minimum foundation depth of 0.90m offer a maximum safe bearing capacity of 40kN/m² with a factor of 3.0 incorporated for a 0.60m wide strip foundation, which is limited by the strength of the underlying very soft clays and very loose silts/sands. Similarly the Tidal Flat Deposits beneath a nominal 12m by 6m raft foundation cast at 0.90m depth would have a maximum safe bearing capacity of 20kN/m² with the same factor of safety of 3.0 incorporated.

These bearing capacities should also ensure that settlement beneath narrow strip foundations would be within 25mm, and the anticipated settlement beneath a 6m wide raft is approximately 40mm. Settlement within the underlying sand should occur as the loads are applied. Some differential movements are likely to occur where differences in the thickness of the clay crust occurs or where variations in either ground conditions or loadings are present. Differential consolidation settlement beneath a 0.60m wide strip foundation applying 40kN/m² would be expected to be in the order of 15mm, based on the encountered variation in organic content beneath the site. For this reason it may be prudent to adopt raft foundations for some of the proposed development away from trees providing that the relatively large total settlements could be accepted. Such raft foundations would be best suited to resist differential movements and minimise variations in foundation pressures, such as may occur along strip foundations, provided that they are regular in shape and evenly loaded.

Excavations

The made ground together with the underlying soils should be easily removed within excavations for the proposed buildings. The sides of excavations within the made ground are likely to be stable in the short term, but excavations should not be relied upon to stand unsupported, particularly when groundwater is encountered. Groundwater seepages are likely to be encountered below depths of about 1.20m.

Excavations could be expected to encounter groundwater within the Tidal Flat Deposits with resulting side instability, although groundwater seepages were encountered below about 1.20m depth in the exploratory holes. Care should be taken not to excavate below the water table in the absence of suitable groundwater control and side support, such as dewatering via screened sumps. The clay/silt soils are prone to softening and deterioration, in the presence of either surface water or groundwater, with loss of their already limited bearing properties. Care should be taken to keep the excavations dry. Consideration should be given to the possibility of settlement of neighbouring existing foundations which may be induced by dewatering. Deep sewers may have to be laid in organic or peaty soils, which would need flexible connections.

The base of foundation excavations should be inspected on completion to ensure that the condition of the soil complies with that assumed in design. Should pockets of inferior material or made ground be present, they should be removed and replaced with well graded, well compacted hardcore or lean mix concrete. The excavated surfaces should be protected from deterioration and a blinding layer of concrete used where foundations are not completed without delay, since the silty clay soils are prone to rapid deterioration. Care should therefore be exercised to ensure that neither surface water nor groundwater is allowed to collect in the base of excavations.

Attention should be given where personnel are to enter deep excavations, when sides should either be safely battered back, or close side support provided, in order to comply with statutory safety requirements and prevent sidewall collapse.

Floor Slabs

In open areas, well away from any trees, the proposed buildings could have a ground bearing floor slab, providing the sub-grade soils are well prepared. Ground bearing floor slabs would induce negative skin friction if piled foundations are proposed, although floor slabs suspended on the piles would avoid differential settlement. The proposed houses may be in areas close to trees in clay soils, where the floor slab should be suspended on the foundations in order to avoid any differential movements between them. A suspended floor slab would avoid any volume change movements within root affected clays, providing that the sub-floor gaps recommended in NHBC Standards Chapter 4.2, Tables 9 and 10, are adopted.

The site has a 'medium' risk of flooding by rivers and the sea (RoFRaS) rating, and the site levels may have to be raised. If ground levels are raised the floor slabs would still need to comply with NHBC recommendations.

Sulphate Conditions

Sulphate analysis of selected samples of soil and water yielded soluble sulphate concentrations within Design Sulphate Class DS-1 of the BRE Special Digest 1, Table C1

(2005), presented in Appendix 3. The pH results of samples ranged between 7.6 and 7.8 indicating alkaline conditions.

These results indicate an Aggressive Chemical Environment for Concrete (ACEC) Class of AC-1 for buried concrete. This ACEC Class should be considered when specifying a Design Chemical Class (DC Class) for buried concrete on this site, as detailed in the above cited BRE document.

Drainage

The soakaway tests (TP1, TP2 and TP3) gave soil infiltration rates (f) of between $1.68 \times 10^{-6} \text{m/s}$ and $2.48 \times 10^{-6} \text{m/s}$, for the silty sand Tidal Flat Deposit soils. These results rate the Tidal Flat Deposit as having a 'poor' drainage potential according to BS8004:1986, and reflect the poor drainage properties of the Tidal Flat Deposit clays and silts.

Groundwater was locally met as seepages between 1.20m and 2.00m depth in the exploratory holes, within the superficial Tidal Flat Deposits. Soakaway drainage on this site may deteriorate over time as the chambers could become blocked with silt. Provision should be made for regular cleaning. There would be no advantage in excavating soakaway chambers below the groundwater level, which reduces the effective zone of soakaway strata.

Hardstanding

Naturally deposited soft or firm, slightly sandy, silty clays or roddons of very loose, brown and orange brown, silty fine grained sand, were encountered at sub-grade level across this site. Laboratory determined CBR values ranged from 0.5% to 2.4% for the sandy, silty clay, and 4.4% to 4.6% for the silty sand soils.

Based on Interim Advice Note (IAN) 73/06 (2009) 'Design Guidance for Road Pavement Foundations (Draft HD25), Table 5.1 recommends a design CBR value of 3.0% for a clay with plasticity indices of 10% and 30%, and thin pavement construction, and 1% for silt. A conservative design CBR value of 1.0%, could be adopted for hardstanding design on this site. This assumes that any inferior soils at sub-grade level will be removed and replaced.

The sub-grade should be suitably compacted and inspected with any soft spots or root infested clays being removed and replaced with more suitable well-graded coarse-grained fill. Care should be taken not to allow the exposed soil at sub-grade level to become exposed to inclement weather conditions, as the condition of the very silty soils will rapidly deteriorate in the presence of water.

COMMENTS ON THE SOIL CHEMICAL TEST RESULTS

The results of the laboratory chemical testing on near surface soil samples have been compared to CLEA Soil Screening Values (SSVs) and Category 4 Screening Levels (C4SLs), which have been used as screening tools for use in the assessment of land affected by contamination.

Atkins Limited has derived ATRISKsoil SSVs based on the default assumptions provided in SR3, which have been used in the development of the Soil Guideline Values (SGVs) published by the Environment Agency in 2009. Atkins SSVs have been derived in line with the Environment Agency 2009 guidance (SR2, SR3, SR4, SR7) using the CLEA v1.04 and CLEA v1.06 software. These are provided under licence to Ground Engineering Limited, and respective toxicology reports and technical details on the derivation of the SSVs can be provided on request.

Following revised statutory guidance to support Part 2A of the Environment Protection Act (2012), Final Category 4 Screening Levels have been published (for arsenic, benzo[a]pyrene, cadmium, chromium VI and lead) by the Department for Environment Food and Rural Affairs in their document SP1010:2014. With the exception of lead and chromium VI the C4SLs are higher than the SSVs.

The following standard land uses form the basis of the assessment in relation to soils:

- Residential usage with home grown produce
- Residential usage without home grown produce
- Commercial and industrial usage

The intended purpose of the SSVs are as “intervention values” in the regulatory framework for assessment of human health risks in relation to land use. These values are not binding standards, but are intended to inform judgements about the need for action to ensure that a new use of land does not pose any unacceptable risks to the health of the intended users.

Table 5 compares the test results for the made ground with the SSVs, and C4SLs for lead and chromium (VI), in relation to the specified uses. The number of test results, which exceed these values, is also provided.

Table 5: Comparison of Chemical Test Results with SSVs and C4SLs for Near Surface Soils

Determinand	Number of Samples	Min Value mg/kg	Max Value mg/kg	Number of Samples Exceeding SSV/C4SL for			Measured 95 th Percentile mg/kg	Assessment Method	Soil Screening Criteria 1% SOM [#]		
				Residential with home grown produce	Residential without home grown produce	Commercial/Industrial			Residential with home grown produce mg/kg	Residential without home grown produce mg/kg	Commercial/Industrial mg/kg
Organic Matter	10	1.5%	2.9%	-	-	-	-	-	-	-	-
Arsenic	10	8.2	15	0	0	0	11.50	SSV	32	35	640
Cadmium	10	0.12	0.34	0	0	0	0.18	SSV	10	83	230
Chromium (III)*	10	12	29	0	0	0	19.61	SSV	12,800	15,500	21,300
Chromium (VI)	10	<0.50	<0.50	0	0	0	<0.50	C4SL	21 [#]	21 [#]	49 [#]
Lead	10	16	57	0	0	0	27.57	C4SL	200 [#]	310 [#]	2330 [#]
Mercury	10	<0.10	0.79	0	0	0	0.30	SSV	6	7	66
Selenium	10	<0.20	0.44	0	0	0	0.33	SSV	350	595	13,000
Nickel	10	9.7	18	0	0	0	15.66	SSV	130	130	1800
Phenols	10	<0.30	<0.30	0	0	0	<0.30	SSV	162	262	686
Benzo[a]pyrene	10	<0.10	<0.10	0	0	0	<0.10	SSV	0.8	0.9	14
Copper	10	8.1	26	0	0	0	14.89	SSV	3970	8370	109,000
Zinc	10	32	73	0	0	0	53.34	SSV	16,900	46,800	917,000
Free Cyanide	10	<0.50	<0.50	0	0	0	<0.50	SSV	34	34	34

Notes * The concentration of Trivalent Chromium is assumed to be equivalent to the Total Chromium concentration. This is because most naturally occurring chromium is in the trivalent (chromic) state.

[#] Category 4 Screening Levels for lead and chromium VI are based on 6% SOM.

Table 6: Comparison of Speciated TPH result for Soil with SSVs

Determinand	Number of Samples	Value (mg/kg)	Number of Samples Exceeding SSV for:				Soil Screening Values (SSV) (1% SOM)		
			Residential with home grown produce	Residential without home grown produce	Commercial/Industrial	Residential with home grown produce (mg/kg)	Residential without home grown produce (mg/kg)	Commercial/Industrial (mg/kg)	
Aliphatic TPH >C5-C6	1	<1.0	-	-	-	-	-	-	
Aliphatic TPH >C6-C8	1	<1.0	0	0	0	69.8	70.0	1,000,000	
Aliphatic TPH >C8-C10	1	8.7	0	0	0	9.79	9.80	167,000	
Aliphatic TPH >C10-C12	1	25	0	0	0	1390	1750	171,000	
Aliphatic TPH >C12-C16	1	100	0	0	0	5100	5210	171,000	
Aliphatic TPH >C16-C21	1	120	0	0	0	145,000	146,000	1,000,000	
Aliphatic TPH >C21-C35	1	30	0	0	0				
Aliphatic TPH >C35-C44	1	<1.0	-	-	-	-	-	-	
Aromatic TPH >C5-C7	1	<1.0	-	-	0	0.0493	0.0925	13.1	
Aromatic TPH >C7-C8	1	<1.0	0	0	0	86.9	219	414,000	
Aromatic TPH >C8-C10	1	7.6	0	0	0	14.8	16.0	58,600	
Aromatic TPH >C10-C12	1	11	0	0	0	57.3	97.7	68,300	
Aromatic TPH >C12-C16	1	26	0	0	0	142	1800	68,400	
Aromatic TPH >C16-C21	1	17	0	0	0	272	1330	28,400	
Aromatic TPH >C21-C35	1	4.4	0	0	0	888	1330	28,400	
Aromatic TPH >C35-C44	1	<1.0	-	-	-	-	-	-	

Discussion of Soil Results

The results of the laboratory analysis indicate that the near surface topsoil did not contain any elevated concentrations of contaminants, with all results within the soil screening values for a residential with home grown produce end use; for a residential without home grown produce end use; or for a commercial or industrial usage, representative of proposed buildings and hardstanding end use.

None of the US95 values for the elements and compounds tested exceeded the corresponding screening values for either residential end use, or for a commercial or industrial usage.

The near surface soils encountered during this investigation were not generally noted to have olfactory or visual evidence of fuel contamination, the exception being close to the glasshouses in the north-east of the site (WS5) where a slight hydrocarbon odour was noted to 2.00m depth. Total petroleum hydrocarbon concentrations of between less than 10mg/kg (below laboratory detection limit) and 350mg/kg (WS5) were recorded in the samples tested.

The results of the laboratory analysis indicate that the soil in WS5 does not contain elevated concentrations of speciated hydrocarbons, which did not exceed the residential end use soil screening values, or the soil screening values for a commercial/industrial end use.

Other Contaminants

No asbestos containing materials were observed in any of the samples.

COMMENTS ON THE WATER CHEMICAL TEST RESULTS

Samples of groundwater were recovered from boreholes WS2 and WS7, located in the north and north-eastern parts of the site, during the investigation on 13th and 14th July 2016 and was analysed in the laboratory for a suite of common inorganic and organic contaminants primarily for characterisation purposes.

The primary assessment tool employed for the generic screening of samples for the protection of 'Controlled Waters' consists of the Statutory Instrument 2000 No.3184 'The Water Supply (Water Quality) Regulations 2000'. Where available Environmental Quality Standards (EQS) have also been used. The test results together with the fraction of test results that exceed these levels are summarised in Table 7 over page.

Table 7: Comparison of Chemical Test Results with Water Supply Regulations & Environmental Quality Standards (EQS) (freshwater)

Determinand	Min. Value	Max. Value	The Water Supply (Water Quality) Regulations 1989-2000 Maximum Concentration/ value for Consumers Taps	Fraction of samples exceeding Water Supply Regulation	EQS freshwater	Fraction of samples exceeding EQS
Arsenic (total) µg/l	3.4	21	10 µg/l	1/2	25µg/l	0/2
Boron µg/l	280	370	1000 µg/l	0/2	2000µg/l	0/2
Cadmium (total) µg/l	<0.080	<0.080	5.0 µg/l	0/2	5.0µg/l	0/2
Chromium (total) µg/l	6.9	14	50 µg/l	0/2	-	-
Copper (total) µg/l	3.2	11	2000 µg/l	0/2	28µg/l	0/2
Cyanide (total) mg/l	<0.050	<0.050	0.05 mg/l	0/2	-	-
Lead (total) µg/l	<1.0	<1.0	10 µg/l	0/2	250µg/l	0/2
Mercury (total) µg/l	<0.50	<0.50	1.0 µg/l	0/2	1.0µg/l	0/2
Nickel (total) µg/l	8.7	8.9	20 µg/l	0/2	50µg/l	0/2
Phenol mg/l	<0.030	<0.030	0.5 mg/l	0/2	0.03mg/l	0/2
pH value	7.8	7.8	6.5 min. 10.0 max.	0/2	-	-
Selenium (total) µg/l	1.3	1.4	10 µg/l	0/2	-	-
Sulphate (soluble) mg/l	55	110	250 mg/l	0/2	400mg/l	0/2
Zinc (total) µg/l	1.0	3.9	5000 µg/l	0/2	125µg/l	0/2
Naphthalene µg/l	<0.010	<0.010	10 µg/l	0/2	10 µg/l	0/2
Total PAH µg/l	<0.20	<0.20	0.1 µg/l	-/2	-	-

The groundwater sample from WS12 at 1.00m depth, had only a slightly elevated arsenic concentration above the drinking water standard threshold, and no concentrations above the EQS values for freshwater.

In addition, both groundwater samples were screened for pesticides, and none were found to be present.

UPDATED CONCEPTUAL MODEL

Assessment of the potential linkage between ground contamination sources, human and environmental receptors have been assessed based on the desk study research and the intrusive ground investigation documented in the preceding sections of this report.

A generalised conceptual model relative to the existing site and proposed new residential development use of the site is presented in Table 8 below.

Table 8: General Conceptual Model Relative to Future Residential Development

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources				
		Drainage/ Buildings	Soil	Above Ground Tanks	Soil Gas	Off-Site Sources
Human Health – ground workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low/ High (asbestos)	Very Low	High	Low	Very Low
Human Health – users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	N/A	Low	N/A	Very Low	Very Low
Water Environment	Migration through ground into surface water or groundwater	Low	Very Low	Low	Very Low	Very Low
Flora	Vegetation on site growing on contaminated soil	Very Low	Very Low	Very Low	Very Low	Very Low
Building Materials	Contact with contaminated soil	Very Low	Very Low	Moderate	Very Low	Very Low

<u>Key to Table 8</u> Risk	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or, there is evidence that severe harm to a designated receptor is currently happening. The risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) and remedial works may be necessary in the short term and likely over the long term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.
N/A	Not Applicable because the proposed development will remove the source.

COMMENTS ON GROUND CONTAMINATION IN RELATION TO PROPOSED DEVELOPMENT

Anticipated exposure scenarios relating to the existing nursery site, the site history and proposed residential use of the site, in the context of the conceptual model, are discussed as follows.

The proposed development is understood to comprise construction of a new residential development, including gardens, landscaping and areas of hardstanding. No details of the proposed site layout were available at the time of writing this report.

This investigation may not have revealed the full extent of contamination on the site and appropriate professional advice should be sought if subsequent site work reveals materials that may appear to be contaminated.

Contaminated Soil

On the basis of the ground investigation, the site is underlain by up to 0.50m of topsoil. The chemical testing has identified no elevated concentrations in respect to the proposed residential with home grown produce end use. No testing was undertaken in the operational northern part of the site associated with the glasshouses.

Existing Drainage, Fuel Tank, Pipework & Buildings

Redundant foul or surface water drain runs, if present, should be removed where encountered from beneath the site and precautions should ensure that any remaining effluent or sediment is directly disposed off-site. The integrity of the existing drains should be checked, and where they are to be retained, any damaged sections should be replaced prior to development.

It is recommended that any disused tanks, associated pipework and interceptors together with any fuel impacted soils are removed from site and appropriate validation

undertaken during such removal. These measures should reduce the risk to human health and the water environment.

The existing buildings may have asbestos containing materials within them. It is recommended that an asbestos survey be conducted in order to determine the presence, type and nature of such materials prior to any demolition. Suitable precautions, in line with current best practice, should be put in place to protect workers from the effects of asbestos material, during the demolition and site excavation phases.

Soil Gas

According to the environmental database there are no landfills within 250m of the site. The site is underlain by a thin layer of topsoil, covering superficial Tidal Flat Deposits which became slightly organic with depth.

There is a low risk that hazardous gas would affect groundworkers during the construction phase and a very low risk of hazardous gas affecting future users of the site.

The site lies within an area where less than 1% of homes are above the BRE action level for radon and that no radon protection measures are required.

Human Health - Construction Workers

Based on the chemical test results, no special precautions would be required during the development of the site by workers who may come into contact with the soil during groundworks, providing standard precautions are adopted which should generally include the procedures given by the Health and Safety Executive (The Blue Book) HS(G)66.

For the protection of workers during groundworks the following is recommended:

a) Limit repeated or prolonged skin contact with soils by wearing gloves with sleeves rolled down.

b) Washing facilities should be made available to groundworkers, so as to minimise the potential for inadvertent ingestion of soil.

c) If any soils are revealed which are different to those encountered by this ground investigation, the advice of a specialist should be sought in view of classifying the material and ascertaining its risk to groundworkers.

d) Consideration should be given to gas monitoring within deep or confined spaces, particularly where organic clay thickens, to ensure safety of personnel entering them, since carbon dioxide and hydrocarbon vapours could accumulate within any excavations, service chambers or sub-structures.

Human Health - Users of Completed Development

The results of the chemical analysis undertaken would indicate that the topsoil should be considered suitable for re-use at the surface in any new garden, landscaped or planted areas.

Other than the removal of any tanks, pipework and TPH contaminated soils, the test results indicate that no scheme of remediation would be considered necessary for areas covered by buildings or hard surfaced areas, which would effectively provide a barrier from end users to the made ground.

Any soil imported to site must be certified as "suitable for use".

Water Environment

The site is underlain by 'Unproductive' superficial strata, covering an 'Unproductive' solid geology stratum. There are surface water features, drains, along the boundaries of the site. The site does not lie within a source protection zone. The site has a 'medium' risk of flooding by rivers and the sea (RoFRaS) rating, and the site levels may have to be raised to comply with Environment Agency requirements.

The risk to the water environment is considered as low as it is unlikely that the proposed development and contaminants within the made ground soils would impact the quality of the water environment.

Effects on Building Materials and Buried Services

The sulphate requirements for buried concrete have been discussed in the previous section of this report.

The local water supply company should be consulted if new buried plastic water pipes within the made ground soils on this site are proposed.

Any fuel impacted soils should be removed and replaced to avoid coming into contact with services and buried concrete.

Off-Site Disposal of Soil Arisings

The results of chemical analysis provided to the rear of this report should be used within the information necessary for basic characterisation of the soil destined for landfill. The Environment Agency publication Hazardous Waste, Technical Guidance WM2 outlines the methodology for classifying wastes and should be referenced for guidance. The test results (total metals, hydrocarbons and cyanide) should be compared to the relevant thresholds to determine whether they fall into the primary categories of non-hazardous or hazardous waste and will help indicate the likely European Waste Catalogue (EWC) code which is determined by the waste type. The results of Waste Acceptance Criteria (WAC) leachate testing, on a sample of made ground (WS8 at 0.30m depth) should be used to check whether, if categorised as non-hazardous waste it could be disposed of at an inert waste landfill; or if categorised as hazardous waste whether it could qualify as stable non-reactive hazardous waste for disposal in non-hazardous landfill.

Excavated material and excess spoil should always be classified prior to removal from site as required by 'Duty of Care' (Environmental Protection Act, 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal. Basic characterisation is the responsibility of the waste producer, whilst compliance checking and on-site verification are generally the responsibility of the landfill operator. The landfill operator

will need to liaise with the waste producer, as the approach relies on the information from basic characterisation.

It is expected that arisings of natural soils from the excavations across this site would fall into the inert category under the European Waste Catalogue description 'Soil and Stones', EWC code 17 05 04 with restrictions excluding topsoil and peat.

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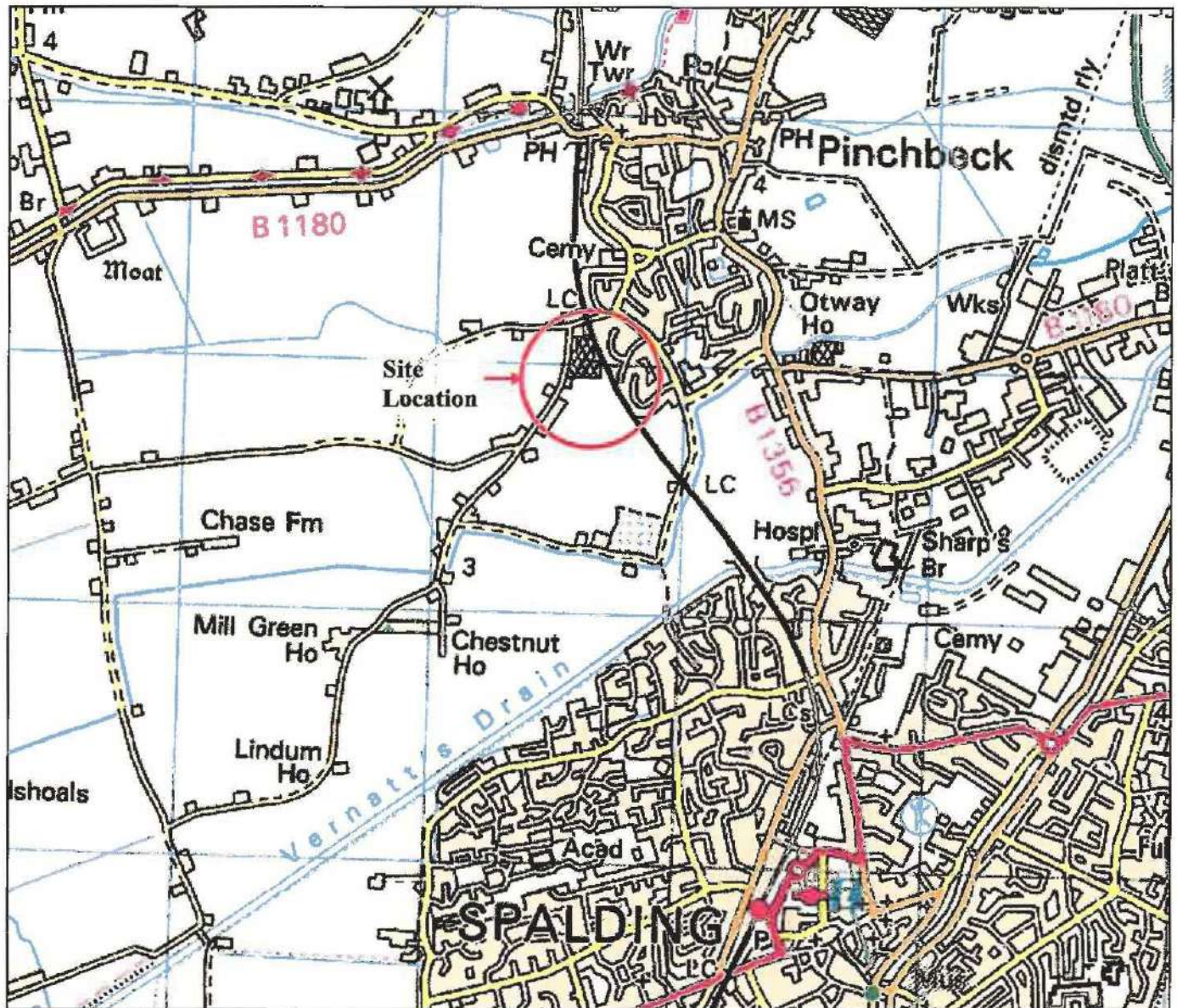
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Director

Site Location Plan

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Not To Scale



Project : Keston Nursery, Mill Green Road, Pinchbeck,
Spalding, Lincolnshire

Client : AMJ Construction Limited

GROUND
ENGINEERING
LIMITED

Peterborough

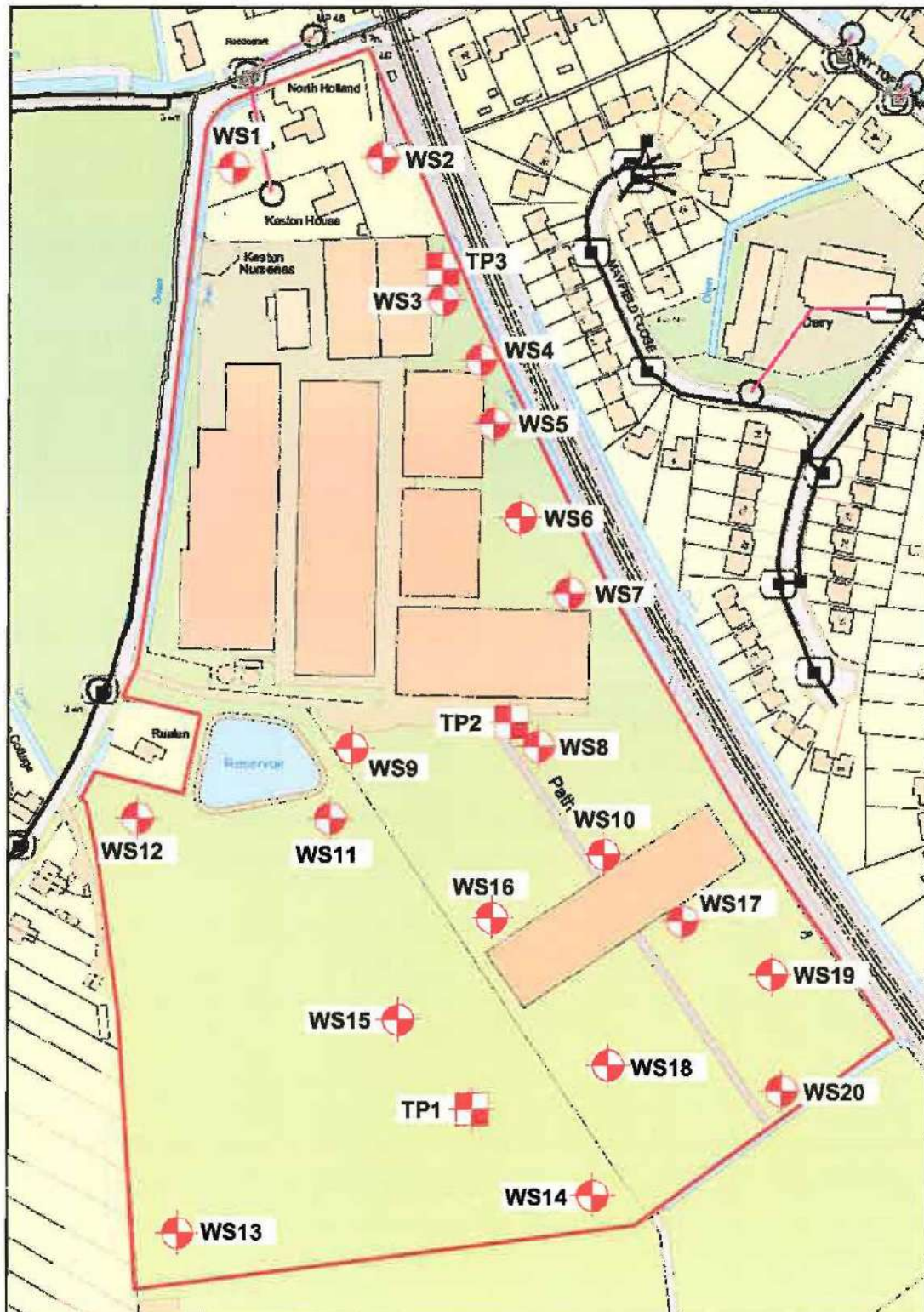
Tel : 01733 566566

Project No.

C13895

Exploratory Hole Location Plan

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Not To Scale

Project : Keston Nursery, Mill Green Road, Pinchbeck,
Spalding, Lincolnshire

Client : AMJ Construction Limited

**GROUND
ENGINEERING
LIMITED**

Peterborough Tel : 01733 566566

Project No.
C13895

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 13/07/16

Hole Size: 87mm dia to 2.00m
50mm dia to 9.00m

Ground
Level:

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth
2. No live roots observed
3. Hole completed at 2.45m depth then probed to 9.00m depth

Project No
13895

Scale	Page
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D - Disturbed Sample	ES - Environmental Sample
B - Bulk Sample	M - Macintosh Probe
U - Undisturbed Sample	V - Vane Shear Test
W - Water Sample	Cohesion () kPa
☒ Water Strike	P () - Hand Penetrometer
☒ Depth to Water on completion	Cohesion () kPa
	Standpipe Level

Depth m

No	Struck	Rose to	Rate	Cased	Sealed
1	2.00	1.90			

Depth m

Date	Hole	Casing	Water
13/07/16	9.00		1.90

GROUND ENGINEERING

L I M I T E D
Tel: 01733-566566 www.groundengineering.co.uk

DYNAMIC PROBE PENETRATION TEST

Date 13/07/16

PROBE No
WS1

Project
Number 13895

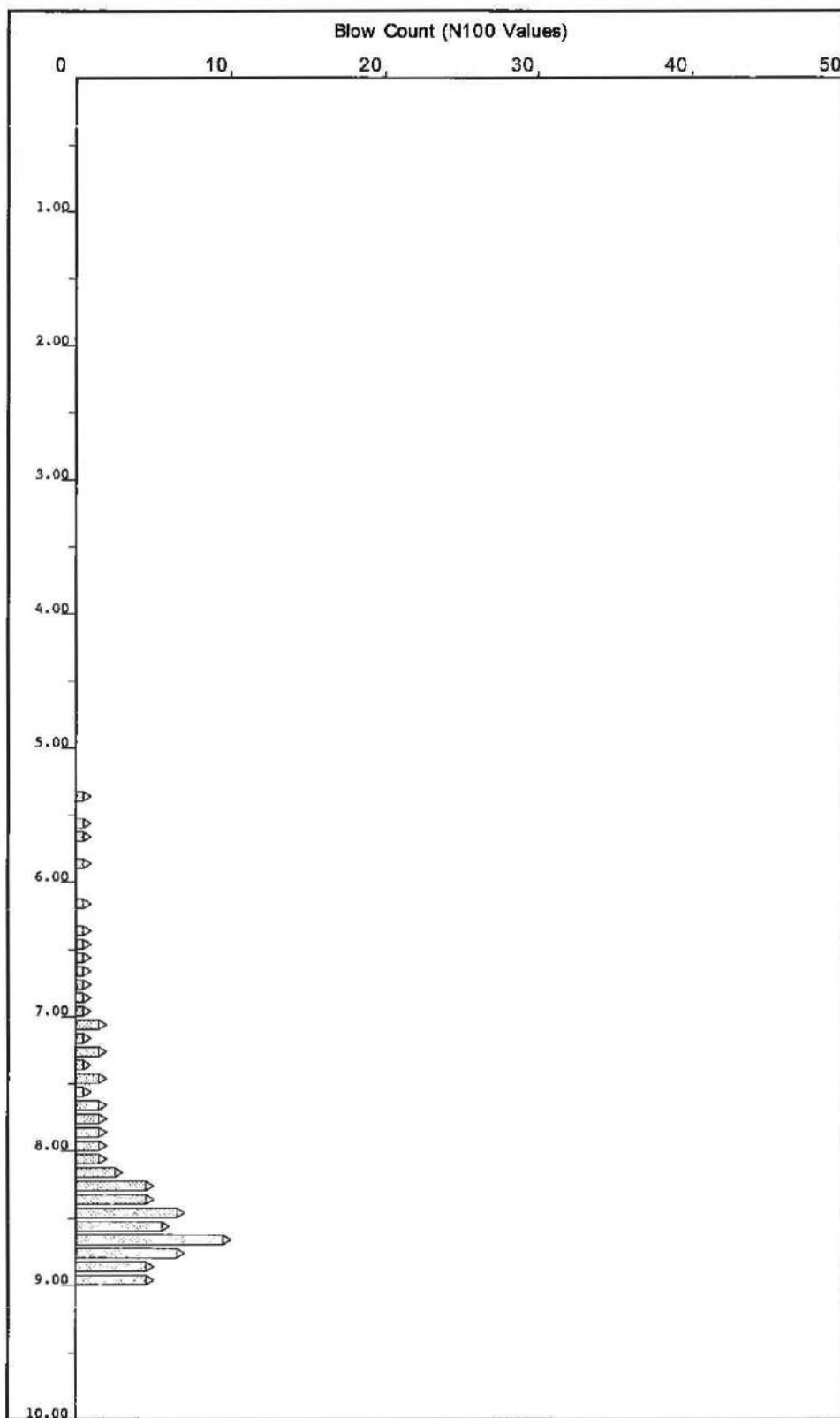
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
1.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
2.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
3.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
4.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
5.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
6.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
7.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
8.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
9.0		-



Remarks :

Probed from base of WS1 at 2.45m depth

Hammer 63.5 kg
Standard Drop 750 mm
Cone 50 mm dia
Rod 8kg / 35 mm

13895

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK				WINDOW SAMPLE WS2					
			Date: 13/07/16		Hole Size: 67mm dia to 2.00m		Ground Level:					
Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m					
Depth m	Type	Result										
0.20	D1	N1 (40)	1 ✓	TOPSOIL - Light brown and brown, slightly clayey, very silty SAND. Sand is fine.		0.30						
0.50	D2			Brown, clayey/silty SAND. Sand is fine. (TIDAL FLAT DEPOSIT)		0.60						
0.90	D3			Soft, light brown, silty, very sandy CLAY. Sand is fine. (TIDAL FLAT DEPOSIT)		1.45						
1.20	D4			1 ✓	1 ✓			1.45				
1.20-2.00	U1											
1.20	W1											
1.35-1.65	S											
1.65	V1			Firm, becoming soft, grey, brown and orange brown mottled, slightly sandy, silty, slightly organic CLAY. (TIDAL FLAT DEPOSIT)		2.00						
2.00	D5	Hole completed at 2.00m depth										
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed							Project No 13895					
							Scale 1:50 Page 1/1					
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ✓ Water Strike P () - Hand Penetrometer ✓ Depth to Water Cohesion () kPa on completion ✓s Standpipe Level			Groundwater Strikes				Groundwater Observations					
			Depth m						Depth m			
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
1	2.00	1.20				13/07/16	2.00		1.20			

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK				WINDOW SAMPLE WS3					
			Date: 13/07/16		Hole Size: 87mm dia to 2.00m 50mm dia to 9.00m		Ground Level:					
Samples and in-situ Tests			(Date) Water	Description of Strata			Legend	Depth m	O.D. Level m			
Depth m	Type	Result										
0.30	D1			TOPSOIL - Brown, silty, very clayey SAND. Sand is fine.				0.40				
0.60	D2			Soft, light brown and brown, sandy to very sandy, silty CLAY. Sand is fine.								
0.90	D3											
1.20	D4											
1.20-2.00 1.35-1.65	U1 S	N2	1 ✓	(TIDAL FLAT DEPOSIT)								
2.00	D5			1 ✓					2.45			
2.15-2.45	S	N2										
				Probing indicates very loose/very soft soils.								
				(PROBABLE TIDAL FLAT DEPOSIT)								
				Probing indicates medium dense soils.								
				(PROBABLE MARINE SAND)				8.00				
				Hole completed at 9.00m depth								
								9.00				
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole completed at 2.45m depth then probed to 9.00m depth								Project No 13895				
								Scale 1:50	Page 1/1			
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ✓ Water Strike P () - Hand Penetrometer ∇ Depth to Water Cohesion () kPa on completion ∇s Standpipe Level			Groundwater Strikes						Groundwater Observations			
			Depth m						Depth m			
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
1	2.00	1.60				13/07/16	9.00		1.60			

GROUND ENGINEERING

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DYNAMIC PROBE PENETRATION TEST

Date 13/07/16

PROBE No
WS3

Project
Number 13895

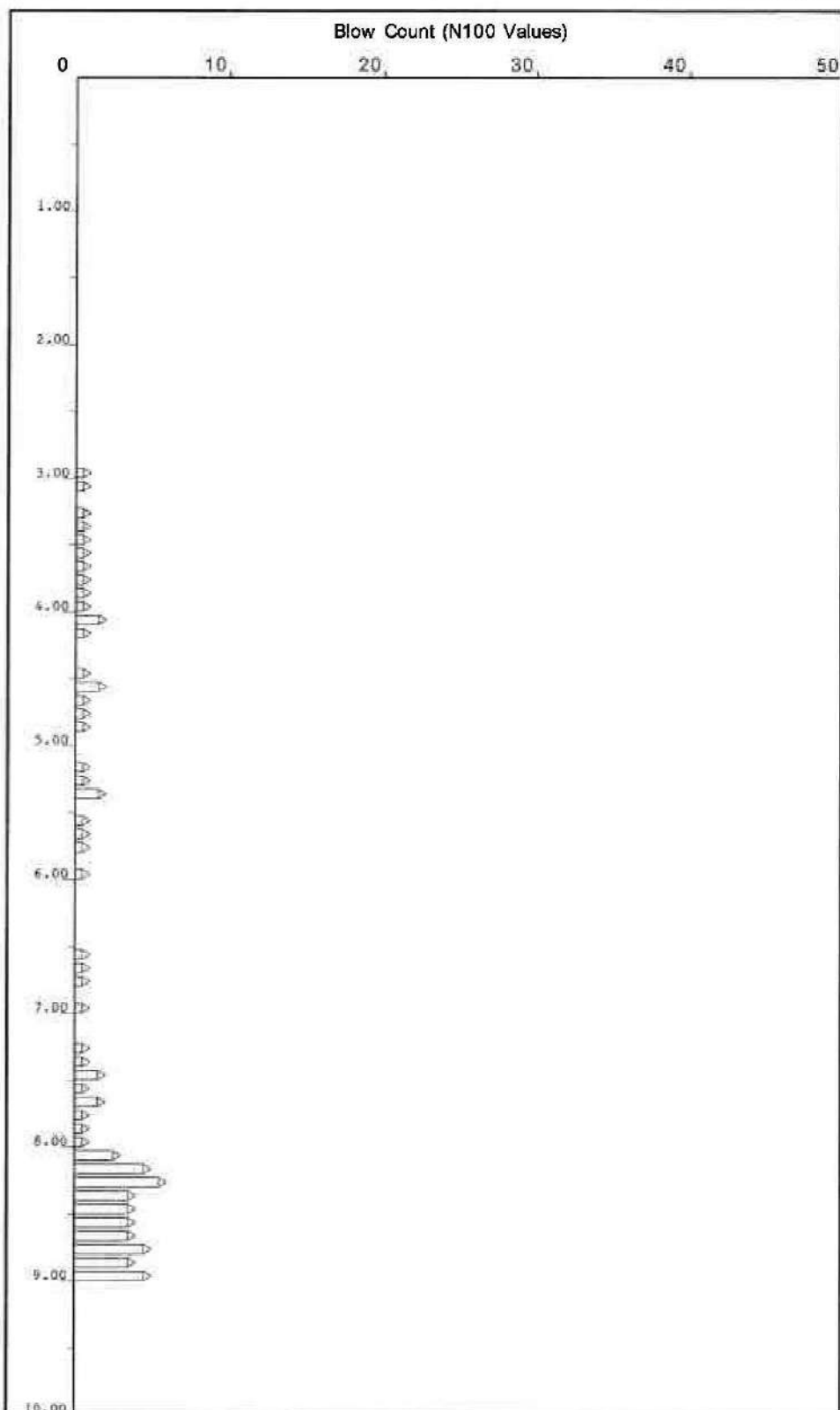
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
1.1		
1.2		
1.3		
1.4		
1.5		
1.6		
1.7		
1.8		
1.9		
2.0		
2.1		
2.2		
2.3		
2.4		
2.5		
2.6		
2.7		
2.8		
2.9		
3.0		
3.1		
3.2		
3.3		
3.4		
3.5		
3.6		
3.7		
3.8		
3.9		
4.0		
4.1		
4.2		
4.3		
4.4		
4.5		
4.6		
4.7		
4.8		
4.9		
5.0		
5.1		
5.2		
5.3		
5.4		
5.5		
5.6		
5.7		
5.8		
5.9		
6.0		
6.1		
6.2		
6.3		
6.4		
6.5		
6.6		
6.7		
6.8		
6.9		
7.0		
7.1		
7.2		
7.3		
7.4		
7.5		
7.6		
7.7		
7.8		
7.9		
8.0		
8.1		
8.2		
8.3		
8.4		
8.5		
8.6		
8.7		
8.8		
8.9		
9.0		



Remarks :

Probed from base of WS3 at 2.45m depth

Hammer 63.5 kg

13895

Standard Drop 750 mm

Cone 50 mm dia

Rod 8kg / 35 mm

GROUND ENGINEERING LIMITED Tel: 01733-586566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS4																					
			Date: 13/07/16		Hole Size: 87mm dia to 2.00m 57mm dia to 4.00m			Ground Level:																					
Samples and In-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m																						
Depth m	Type	Result																											
0.30	D1	N2		TOPSOIL - Brown, clayey, sandy SILT. Sand is fine.		0.40																							
0.60	D2			Very loose, brown, clayey, silty SAND. Sand is fine.																									
0.90	D3			(TIDAL FLAT DEPOSIT)		1.80																							
1.20	D4																												
1.20-2.00	U1																												
1.35-1.65	S	N2		Very soft, grey and brown, silty, very sandy CLAY. Sand is fine.		3.00																							
2.00	D5			(TIDAL FLAT DEPOSIT)																									
2.00-4.00	U2			Grey and brown, slightly silty SAND. Sand is fine grained.		4.00																							
2.15-2.45	S	(TIDAL FLAT DEPOSIT)																											
				Hole completed at 4.00m depth																									
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed							Project No 13895																						
							Scale 1:50	Page 1/1																					
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample W - Water Sample ∇ - Water Strike ▽ - Depth to Water on completion ES - Environmental Sample M - Mackintosh Probe V - Vane Shear Test Cohesion () kPa P () - Hand Penetrometer Cohesion () kPa ∇s Standpipe Level			Groundwater Strikes Depth m <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>No</th> <th>Struck</th> <th>Rose to</th> <th>Rate</th> <th>Cased</th> <th>Sealed</th> </tr> <tr> <td>1</td> <td>2.00</td> <td>2.00</td> <td></td> <td></td> <td></td> </tr> </table>				No	Struck	Rose to	Rate	Cased	Sealed	1	2.00	2.00				Groundwater Observations <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Date</th> <th>Hole</th> <th>Casing</th> <th>Water</th> </tr> <tr> <td>13/07/16</td> <td>4.00</td> <td></td> <td>2.00</td> </tr> </table>			Date	Hole	Casing	Water	13/07/16	4.00		2.00
No	Struck	Rose to	Rate	Cased	Sealed																								
1	2.00	2.00																											
Date	Hole	Casing	Water																										
13/07/16	4.00		2.00																										

GROUND ENGINEERING LIMITED Tel: 01733-566586 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS5				
			Date: 13/07/16		Hole Size: 87mm dia to 2.00m 50mm dia to 6.00m			Ground Level:				
Samples and in-situ Tests			(Date) Water	Description of Strata			Legend	Depth m	O.D. Level m			
Depth m	Type	Result										
0.30	D1	N4	1 V	TOPSOIL - Dark brown, clayey sandy SILT. Sand is fine.				0.40				
0.60	D2			Soft, brown, sandy, silty CLAY. Sand is fine. (TIDAL FLAT DEPOSIT)								
0.90	D3			Brown, slightly clayey, silty SAND. Sand is fine. (TIDAL FLAT DEPOSIT)								
1.20	D4											
1.20-2.00	U1											
1.35-1.65	S											
2.00	D5	N3	1 V	Soft, grey and brown, very sandy CLAY. Sand is fine. (TIDAL FLAT DEPOSIT)				1.90				
2.15-2.45	S			Grey and brown, clayey/silty SAND. Sand is fine. (TIDAL FLAT DEPOSIT)								
				Probing indicates very loose soils, becoming loose below 4.60m depth.								
							2.45					
			(PROBABLE TIDAL FLAT DEPOSIT)									
							5.20					
			Probing indicates loose soils, becoming medium dense, below 5.50m depth. (PROBABLE MARINE SAND)									
							6.00					
			Hole completed at 6.00m depth									
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole completed at 2.45m depth then probed to 6.00m depth								Project No 13895				
								Scale 1:50	Page 1/1			
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa V Water Strike P () - Hand Penetrometer V Depth to Water Cohesion () kPa on completion V/s Standpipe Level			Groundwater Strikes						Groundwater Observations			
			Depth m						Depth m			
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
1	2.00		seepage			13/07/16	6.00		dry			

GROUND ENGINEERING

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DYNAMIC PROBE PENETRATION TEST

Date 13/07/16

PROBE No
WS5

Project
Number 13895

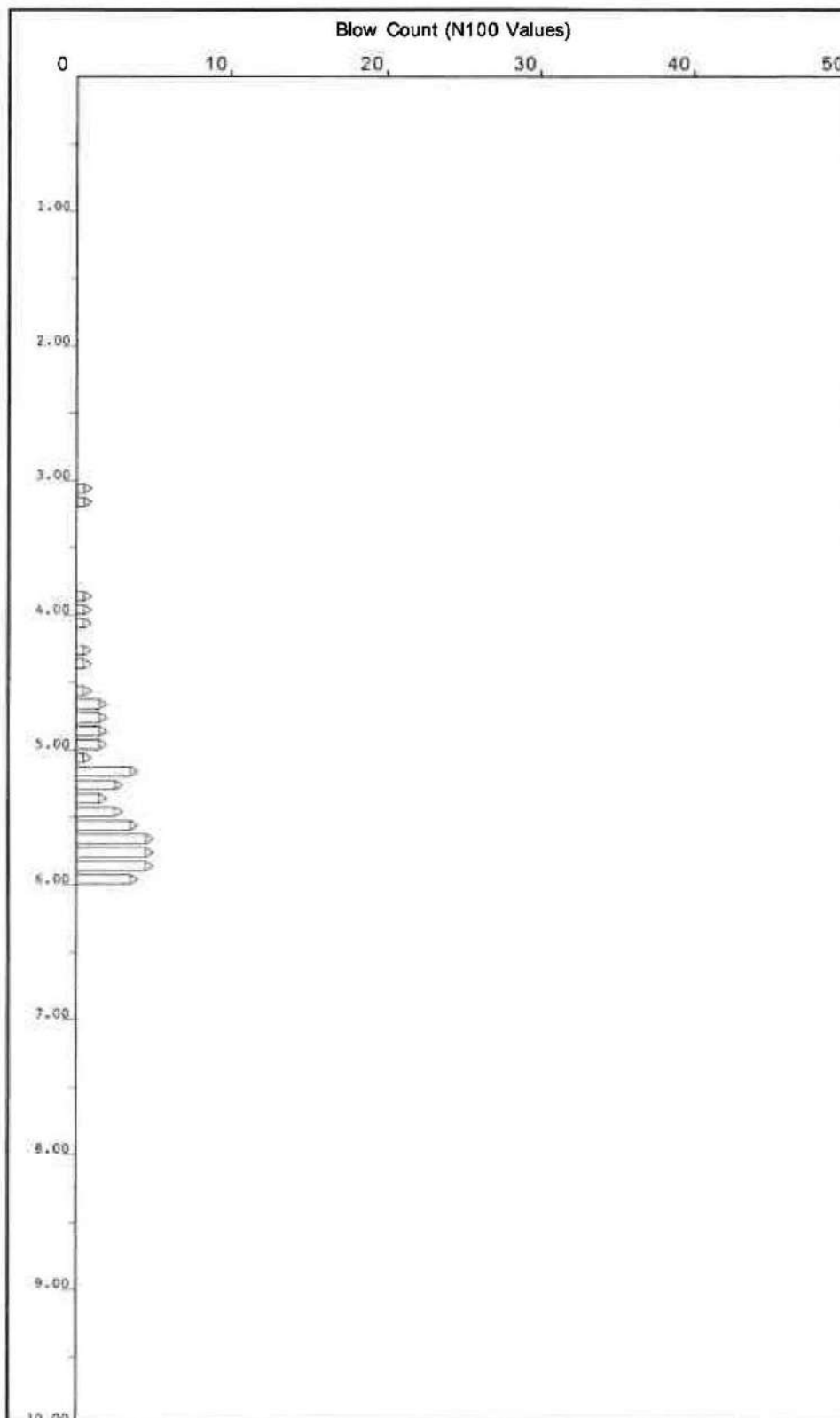
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
1.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
2.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
3.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
4.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
5.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
6.0		-



Remarks :

Probed from base of WS5 at 2.45m depth

Hammer 63.5 kg

13895

Standard Drop 750 mm

Cone 50 mm dia

Rod 8kg / 35 mm

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 14/07/16

Hole Size: 87mm dia to 2.00m
57mm dia to 4.45m

WINDOW SAMPLE
WS6

Ground
Level:

REMARKS	1. Starter pit excavated from 0.00m to 1.20m depth 2. Live roots observed to 0.60m depth	Project No 13895	
		Scale 1:50	Page 1/1

[illegible]

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 14/07/16

Hole Size: 77mm dia to 2.00m
67mm dia to 4.00m
50mm dia to 7.00m

WINDOW SAMPLE
WS7

Ground
Level:

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth
2. No live roots observed
3. Hole completed at 4.00m then probed to 7.00m depth

Project No
13895

Scale 1:50	Page 1/1
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D - Disturbed Sample	ES - Environmental Sample
B - Bulk Sample	M - Mackintosh Probe
U - Undisturbed Sample	V - Vane Shear Test
W - Water Sample	Cohesion () kPa
☒ Water Strike	P () - Hand Penetrometer
☒ Depth to Water on completion	Cohesion () kPa
	Standpipe Level

Depth m

No	Struck	Rose to	Rate	Cased	Sealed
1	2.00	1.40			

Depth m

Date	Hole	Casing	Water
14/07/16	7.00		1.40

GROUND ENGINEERING

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DYNAMIC PROBE PENETRATION TEST

Date 14/07/16

PROBE No
WS7

Project
Number 13895

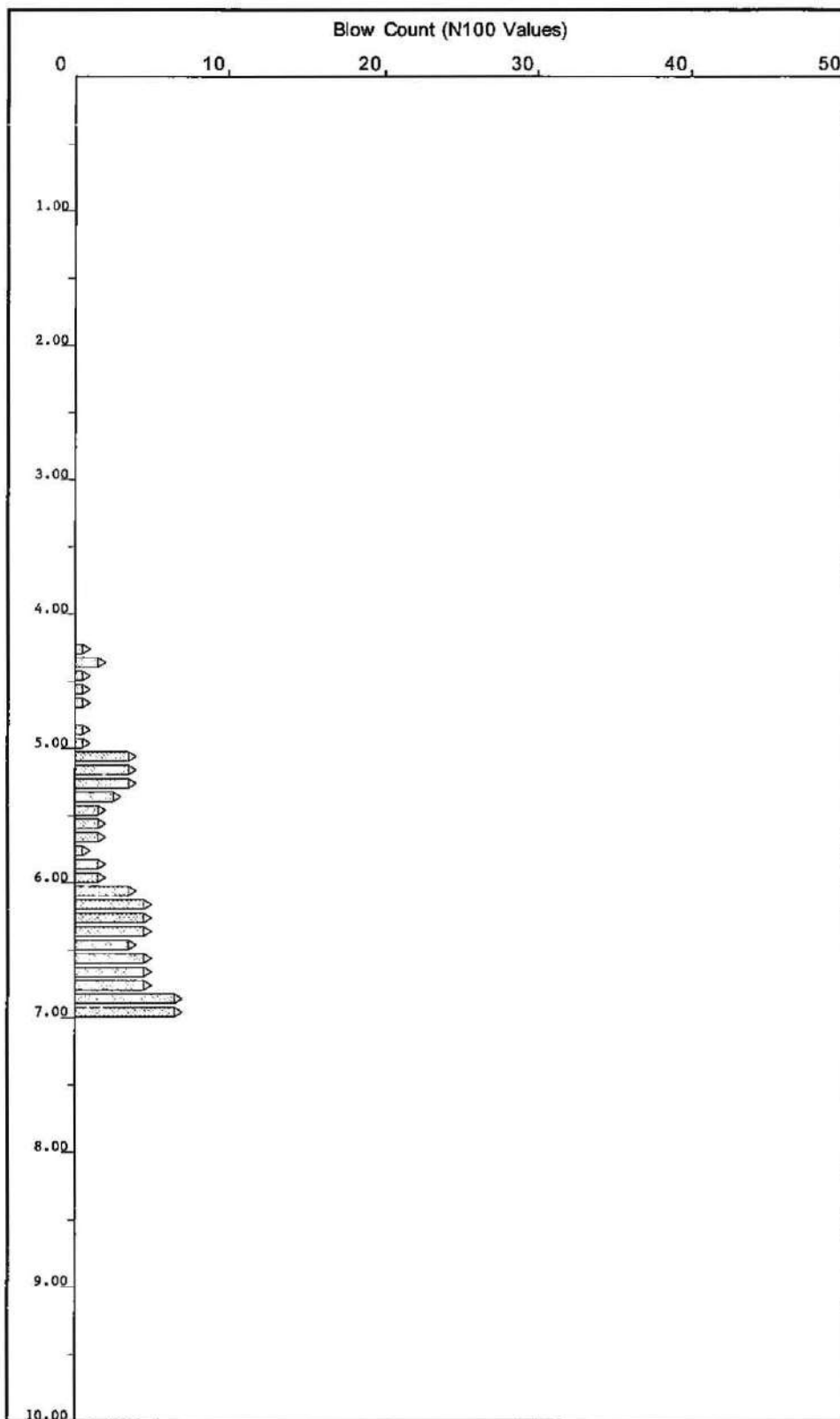
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
1.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
2.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
3.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
4.0		-
.1		0
.2		0
.3		1
.4		2
.5		1
.6		1
.7		1
.8		0
.9		1
5.0		1
.1		4
.2		4
.3		4
.4		3
.5		2
.6		2
.7		2
.8		1
.9		2
6.0		2
.1		4
.2		5
.3		5
.4		5
.5		4
.6		5
.7		5
.8		5
.9		7
7.0		7



Remarks :

Probed from base of WS7 at 4.00m depth

Hammer 63.5 kg
Standard Drop 750 mm
Cone 50 mm dia
Rod 8kg / 35 mm

13895

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 14/07/16

Hole Size: 77mm dia to 2.00m
57mm dia to 4.00m

Ground
Level:

REMARKS	1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed	Project No 13895	
		Scale 1:50	Page 1/1

[illegible]

GROUND ENGINEERING LIMITED Tel: 01733-565566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS9				
			Date: 14/07/16		Hole Size: 67mm dia to 2.00m 57mm dia to 4.00m 50mm dia to 8.00m			Ground Level:				
Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m					
Depth m	Type	Result										
0.30	D1	N2 (48)	1 V	TOPSOIL - Brown and dark brown, sandy SILT. Sand is fine.		0.40						
0.60	D2			Brown, clayey, sandy SILT. Sand is fine (TIDAL FLAT DEPOSIT)		0.75						
0.90	D3			Firm, brown and grey, slightly sandy to very sandy, silty CLAY. Sand is fine. (TIDAL FLAT DEPOSIT)		1.60						
1.20	D4			Very loose, brown, clayey, silty SAND with lenses of very soft, dark grey, silty, sandy, slightly organic clay. (TIDAL FLAT DEPOSIT)								
1.20-2.00	U1											
1.35-1.65	S											
1.40	V1	N1	1 V	Very loose, brown, clayey, silty SAND with lenses of very soft, dark grey, silty, sandy, slightly organic clay. (TIDAL FLAT DEPOSIT)		3.80 4.00						
2.00	D5											
2.00-4.00	U2											
2.15-2.45	S											
				Dark grey, silty, SAND. Sand is fine. (TIDAL FLAT DEPOSIT)								
				Probing indicates very loose soils.								
				(PROBABLE TIDAL FLAT DEPOSIT)								
				Probing indicates medium dense soils.		7.10						
				(PROBABLE MARINE SAND)		8.00						
				Hole completed at 8.00m depth								
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole completed at 4.00m depth then probed to 8.00m depth							Project No 13895					
							Scale 1:50	Page 1/1				
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ▽ Water Strike R () - Hand Penetrometer ▽ Depth to Water Cohesion () kPa on completion ▽s Standpipe Level			Groundwater Strikes				Groundwater Observations					
			Depth m				Depth m					
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
			1	2.00		seepage			14/07/16	8.00		dry

GROUND ENGINEERING

L I M I T E D
Tel: 01733-566556 www.groundengineering.co.uk

DYNAMIC PROBE PENETRATION TEST

Date 14/07/16

PROBE No
WS9

Project
Number 13895

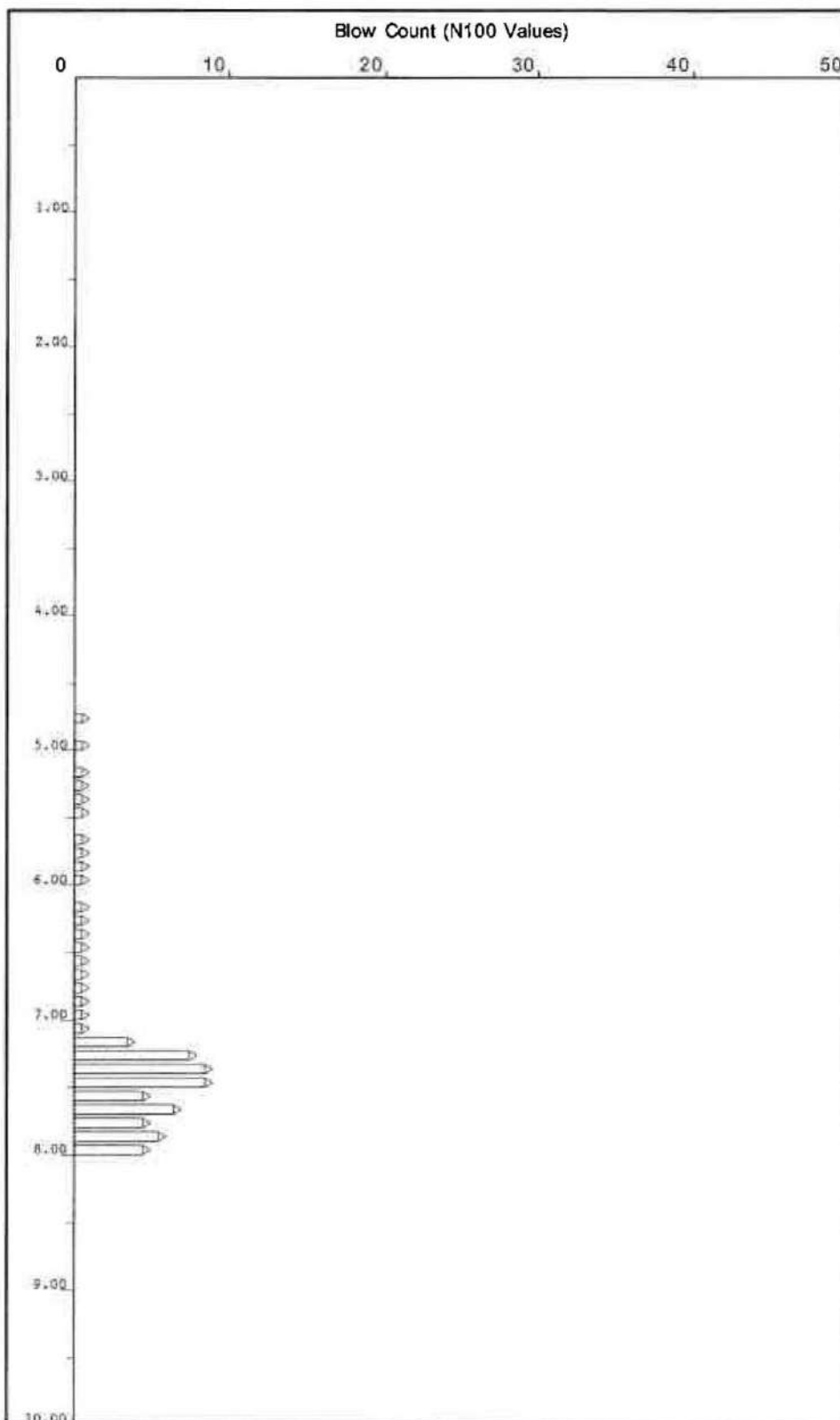
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
1.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
2.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
3.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
4.0		-
.1	0	0
.2	0	0
.3	0	0
.4	0	0
.5	0	0
.6	0	0
.7	0	0
.8	0	1
.9	0	0
5.0	0	1
.1	0	1
.2	1	1
.3	1	1
.4	1	1
.5	0	1
.6	1	1
.7	1	1
.8	1	1
.9	0	1
6.0	0	1
.1	0	1
.2	1	1
.3	1	1
.4	1	1
.5	1	1
.6	1	1
.7	1	1
.8	1	1
.9	1	1
7.0	1	1
.1	1	4
.2	4	8
.3	8	9
.4	9	9
.5	5	7
.6	7	5
.7	5	6
.8	6	5
.9	5	5
8.0		



Remarks :

Probed from base of WS9 at 4.00m depth

Hammer 63.5 kg

13895

Standard Drop 750 mm

Cone 50 mm dia

Rod 8kg / 35 mm

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS10					
			Date: 14/07/16		Hole Size: 77mm dia to 2.00m 67mm dia to 3.45m			Ground Level:					
Samples and in-situ Tests			(Date) Water	Description of Strata			Legend	Depth m	O.D. Level m				
Depth m	Type	Result											
0.30	D1			TOPSOIL - Dark brown, silty SAND. Sand is fine.				0.40					
0.60	D2			Loose, brown and light brown, silty SAND. Sand is fine, becoming fine and medium.									
0.90	D3			(TIDAL FLAT DEPOSIT-RODDON)									
1.20	D4												
1.20-2.00	U1												
1.35-1.65	S	N4		(TIDAL FLAT DEPOSIT-RODDON)				2.50					
2.00	D5												
2.00-3.00	U2												
2.15-2.45	S	N5		Very loose, grey and brown, silty SAND. Sand is fine and medium.				3.45					
3.15-3.45	S	N3	(TIDAL FLAT DEPOSIT-RODDON)										
				Hole completed at 3.45m depth									
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole sides collapsed below 1.30m depth								Project No 13895					
								Scale 1:50	Page 1/1				
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ∇ Water Strike P () - Hand Penetrometer ∇ Depth to Water Cohesion () kPa on completion ∇s Standpipe Level				Groundwater Strikes						Groundwater Observations			
				Depth m						Depth m			
				No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
				1	2.00	1.30				14/07/16	3.45		1.30

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS11			
			Date: 14/07/16		Hole Size: 87mm dia to 2.00m 67mm dia to 3.45m			Ground Level:			
Samples and in-situ Tests			(Date) Water	Description of Strata			Legend	Depth m	O.D. Level m		
Depth m	Type	Result									
0.30	D1	N4	▼c	TOPSOIL - Brown and dark brown, silty SAND. Sand is fine.				0.40			
0.60	D2			Loose, brown and orange brown, very silty SAND. Sand is fine.							
0.90	D3			(TIDAL FLAT DEPOSIT-RODDON)							
1.10	D4										
1.20	D5										
1.20-2.00	U1	N5		(TIDAL FLAT DEPOSIT-RODDON)				2.50			
1.35-1.65	S										
2.00	D6										
2.00-3.00	U2	N5		Loose, dark grey and brown, silty SAND with decayed plant fragments.				3.45			
2.15-2.45	S			(TIDAL FLAT DEPOSIT-RODDON)							
3.00	D7	N5		(TIDAL FLAT DEPOSIT-RODDON)							
3.15-3.45	S										
				Hole completed at 3.45m depth							
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed								Project No 13895			
								Scale 1:50	Page 1/1		
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ▼ Water Strike P () - Hand Penetrometer ▼ Depth to Water Cohesion () kPa on completion ▼s Standpipe Level			Groundwater Strikes					Groundwater Observations			
			Depth m					Depth m			
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing
						14/07/16	3.45		1.20		

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK				WINDOW SAMPLE WS12		
Date: 13/07/16			Hole Size: 87mm dia to 2.00m 57mm dia to 3.00m 50mm dia to 9.00m				Ground Level:		
Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m		
Depth m	Type	Result							
0.30	D1	N10		TOPSOIL - Brown and dark brown, very silty SAND. Sand is fine.		0.40			
0.60	D2			Medium dense, brown, very silty SAND. Sand is fine.		1.80			
0.90	D3			(TIDAL FLAT DEPOSIT-RODDON)					
1.10	D4								
1.20	D5								
1.20-2.00	U1								
1.35-1.65	S	N3		Very loose, brown and grey, silty SAND. Sand is fine and medium.		3.45			
				(TIDAL FLAT DEPOSIT-RODDON)					
2.00	D6			N4			Probing indicates very loose soils, becoming loose below 5.00m depth		
2.00-3.00	U2								
2.15-2.45	S			(PROBABLE TIDAL FLAT DEPOSIT)		8.00			
				Probing indicates medium dense soils.					
				(PROBABLE MARINE SAND)					
3.15-3.45	S			Hole completed at 9.00m depth		9.00			
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole completed at 3.45m depth then probed to 9.00m depth								Project No 13895	
								Scale 1:50	
								Page 1/1	
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample W - Water Sample ∇ - Water Strike ∇ - Depth to Water on completion ES - Environmental Sample M - Mackintosh Probe V - Vane Shear Test Cohesion () kPa P () - Hand Penetrometer Cohesion () kPa ∇s Standpipe Level			Groundwater Strikes Depth m No Struck Rose to Rate Cased Sealed				Groundwater Observations Date Hole Casing Water		
							13/07/16 9.00 dry		

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DYNAMIC PROBE PENETRATION TEST

Date 13/07/16

PROBE No
WS12

Project
Number 13895

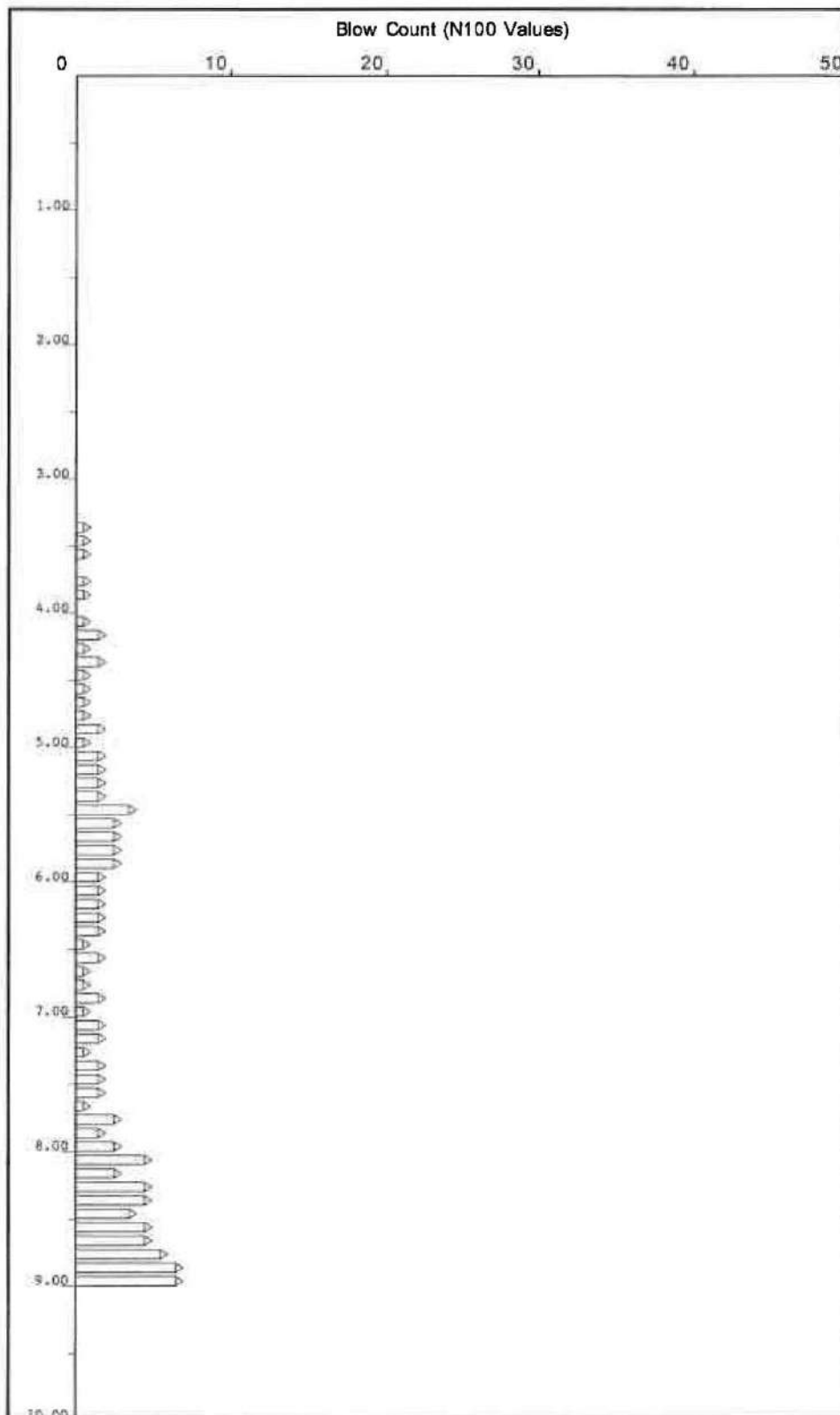
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
1.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
2.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
3.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
4.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
5.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
6.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
7.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
8.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
9.0		-



Remarks :

Probed from base of WS12 at 3.00m depth

Hammer 63.5 kg

13895

Standard Drop 750 mm

Cone 50 mm dia

Rod 8kg / 35 mm

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Date: 13/07/16

Hole Size:	77mm dia to 2.00m
	67mm dia to 3.00m
	57mm dia to 4.45m

WINDOW SAMPLE
WS13

Ground
Level:

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth
2. No live roots observed

Project No
13895

Scale	Page
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KEY

D - Disturbed Sample	ES - Environmental Sample
B - Bulk Sample	M - Mackintosh Probe
U - Undisturbed Sample	V - Vane Shear Test
W - Water Sample	Cohesion () kPa
☒ Water Strike	R () - Hand Penetrometer
☒ Depth to Water on completion	Cohesion () kPa
	Standpipe Level

Groundwater Strikes

Depth m

No	Struck	Rose to	Rate	Cased	Sealed

Groundwater Observations

Depth m

Date	Hole	Casing	Water
13/07/16	4.45		1.30

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS14				
			Date: 14/07/16		Hole Size: 77mm dia to 2.00m 57mm dia to 3.00m 50mm dia to 9.00m			Ground Level:				
Samples and in-situ Tests			(Date) Water	Description of Strata			Legend	Depth m	O.D. Level m			
Depth m	Type	Result										
0.30	D1			TOPSOIL - Brown and dark brown, very sandy SILT.				0.40				
0.60	D2			Loose, locally very loose, brown becoming grey, silty SAND. Sand is fine.								
0.90	D3			(TIDAL FLAT DEPOSIT-RODDON)								
1.10	D4											
1.20	D5											
1.20-2.00	U1	N6										
1.35-1.65	S			(PROBABLE TIDAL FLAT DEPOSIT)			3.45					
2.00	D6											
2.00-3.00	U2	N2										
2.15-2.45	S			Probing indicates very loose soils, becoming loose/medium dense below 4.40m depth.			6.90					
3.00	D7											
3.15-3.45	S	N4	(PROBABLE MARINE SAND)			9.00						
							Probing indicates medium dense soils.					
			Hole completed at 9.00m depth									
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole completed at 3.45m depth then probed to 9.00m depth												
								Project No 13895				
								Scale 1:50	Page 1/1			
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa Water Strike P () - Hand Penetrometer Depth to Water Cohesion () kPa on completion Standpipe Level			Groundwater Strikes				Groundwater Observations					
			Depth m						Depth m			
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						14/07/16	9.00		1.20			

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DYNAMIC PROBE PENETRATION TEST

Date 14/07/16

PROBE No
WS14

Project
Number 13895

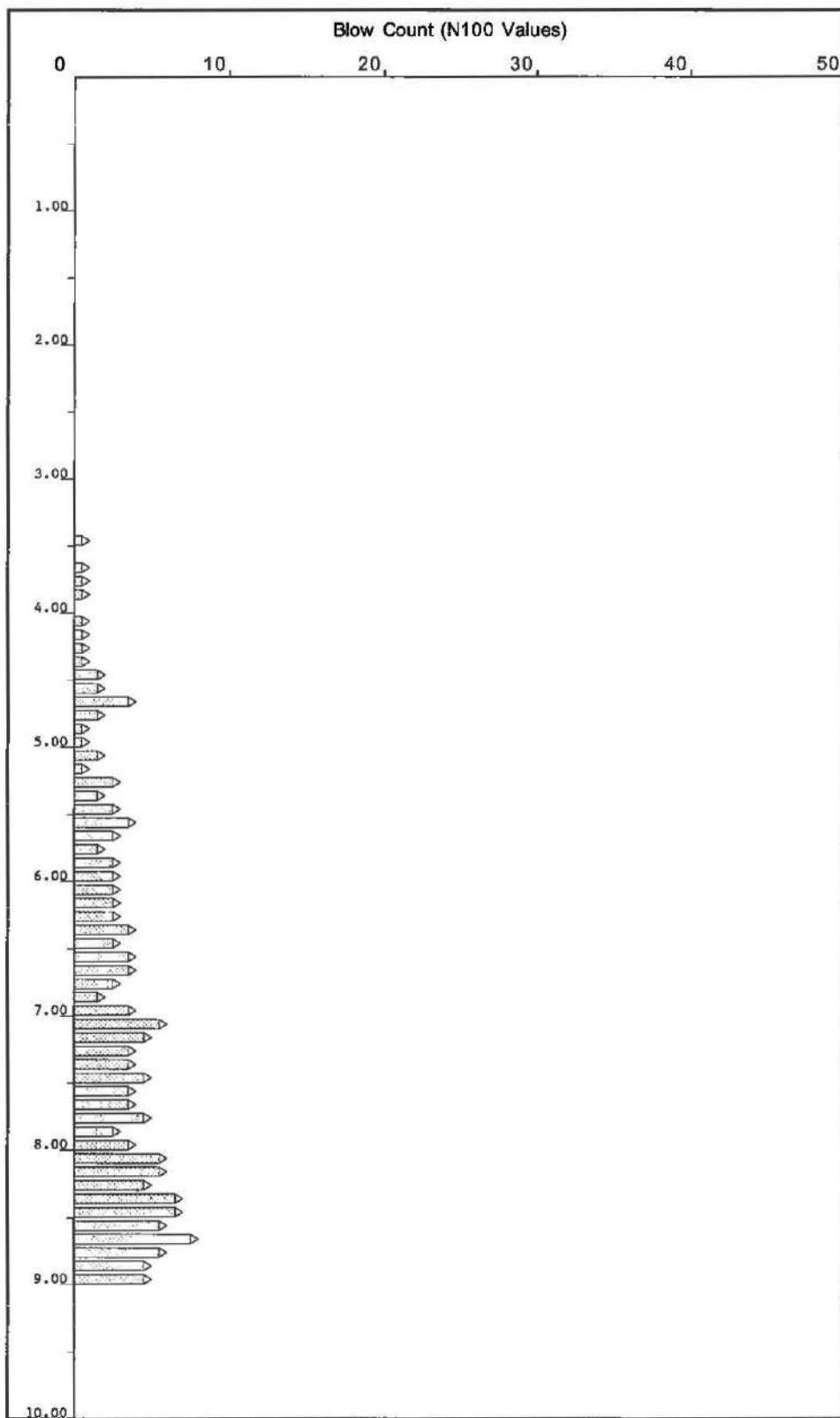
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		
.2		
.3		
.4		
.5		
.6		
.7		
.8		
.9		
1.0		
.1		
.2		
.3		
.4		
.5		
.6		
.7		
.8		
.9		
2.0		
.1		
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3.0		
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4.0		
.1		
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5.0		
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6.0		
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.8		
.9		
7.0		
.1		
.2		
.3		
.4		
.5		
.6		
.7		
.8		
.9		
8.0		
.1		
.2		
.3		
.4		
.5		
.6		
.7		
.8		
.9		
9.0		



Remarks :

Probed from base of WS14 at 3.45m depth

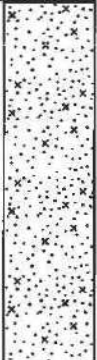
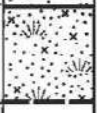
Hammer 63.5 kg

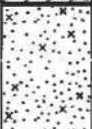
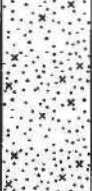
13895

Standard Drop 750 mm

Cone 50 mm dia

Rod 8kg / 35 mm

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK				WINDOW SAMPLE WS15		
			Date: 14/07/16		Hole Size: 77mm dia to 2.00m 67mm dia to 3.45m		Ground Level:		
Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m		
Depth m	Type	Result							
0.30	D1	N5	▼c	TOPSOIL - Brown and dark brown, sandy SILT. Sand is fine.		0.40			
0.60	D2			Loose, brown and grey, silty SAND. Sand is fine.					
0.90	D3			(TIDAL FLAT DEPOSIT-RODDON)					
1.10	D4								
1.20	D5								
1.20-2.00	U1	N4			2.80				
1.35-1.65	S								
2.00	D6								
2.00-3.00	U2	N3		3.45					
2.15-2.45	S								
3.00	D7			Very loose, brown and grey, silty, slightly organic SAND. Sand is fine. (TIDAL FLAT DEPOSIT)					
3.15-3.45	S			Hole completed at 3.45 depth					
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed							Project No 13895		
							Scale 1:50 Page 1/1		
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ▼ Water Strike P () - Hand Penetrometer ▼ Depth to Water Cohesion () kPa on completion ▼s Standpipe Level			Groundwater Strikes				Groundwater Observations		
			Depth m				Depth m		
			No Struck	Rose to	Rate	Cased	Sealed	Date	Hole
						14/07/16	3.45		1.30

GROUND ENGINEERING LIMITED Tel: 01733-666666 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS16				
			Date: 15/07/16		Hole Size: 87mm dia to 2.00m 67mm dia to 3.00m			Ground Level:				
Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m					
Depth m	Type	Result										
0.30	D1	N4		TOPSOIL - Brown and dark brown, very sandy SILT. Sand is fine.		0.30						
0.60	D2			Loose, brown and grey, very silty SAND. Sand is fine.								
0.90	D3			(TIDAL FLAT DEPOSIT-RODDON)								
1.20	D4											
1.20-2.00 1.35-1.65	U1 S											
2.00	D5	N3		Very loose, dark brown and grey, silty, slightly organic SAND. Sand is fine. (TIDAL FLAT DEPOSIT)		2.40						
2.00-3.00	U2											
2.15-2.45	S											
				Hole completed at 3.00m depth		3.00						
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole sides collapsed below 1.50m depth								Project No 13895				
								Scale 1:50	Page 1/1			
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ▽ Water Strike R () - Hand Penetrometer ▽ Depth to Water Cohesion () kPa on completion ▽s Standpipe Level			Groundwater Strikes				Groundwater Observations					
			Depth m						Depth m			
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
1	2.00	1.30				15/07/16	3.00		1.30			

L I M I T E D
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Date: 15/07/16

Hole Size: 67mm dia to 2.00m
57mm dia to 3.00m

WINDOW SAMPLE
WS17

Ground
Level:

REMARKS	1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole sides collapsed below 1.50m depth	Project No 13895	
		Scale 1:50	Page 1/1

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Site: LAND OFF MILL GREEN ROAD, PINCHBECK

WINDOW SAMPLE
WS18

Date: 15/07/16

Hole Size: 87mm dia to 2.00m
67mm dia to 3.00m
50mm dia to 10.00m

Ground
Level:

Samples and in-situ Tests			(Date)	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result	Water				
0.30	D1			TOPSOIL - Brown and dark brown, sandy SILT. Sand is fine.		0.50	
0.60	D2			Loose, brown, slightly clayey, silty SAND. Sand is fine.			
0.90	D3						
1.20	D4						
1.20-2.00	U1						
1.35-1.65	S	N6		(TIDAL FLAT DEPOSIT-RODDON)			
2.00	D5					2.40	
2.00-3.00	U2			Very loose, brown and grey, silty SAND. Sand is fine.			
2.15-2.45	S	N3		(TIDAL FLAT DEPOSIT-RODDON)		3.00	
				Probing indicates very loose soils, becoming loose below 4.40m depth.			
				(PROBABLE TIDAL FLAT DEPOSIT)			
						9.00	
				Probing indicates medium dense soils.			
				(PROBABLE MARINE SAND)			
						10.00	

REMARKS

Borehole completed at 10.00m depth

1. Starter pit excavated from 0.00m to 1.20m depth
2. No live roots observed
3. Hole sides collapsed below 1.20m depth
4. Hole completed at 3.00m depth then probed to 10.00m depth

Project No
13895

Scale
1:50

Page
1/1

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
WS - Water Strike
WD - Depth to Water on completion
ES - Environmental Sample
M - Mackintosh Probe
V - Vane Shear Test
Cohesion () kPa
P () - Hand Penetrometer
Cohesion () kPa
Standpipe Level

Groundwater Strikes

Depth m					
No	Struck	Rose to	Rate	Cased	Sealed
1	2.00	1.20			

Groundwater Observations

Depth m			
Date	Hole	Casing	Water
15/07/16	10.00		1.20

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DYNAMIC PROBE PENETRATION TEST

Date 18/07/16

PROBE No
WS18

Project
Number 13895

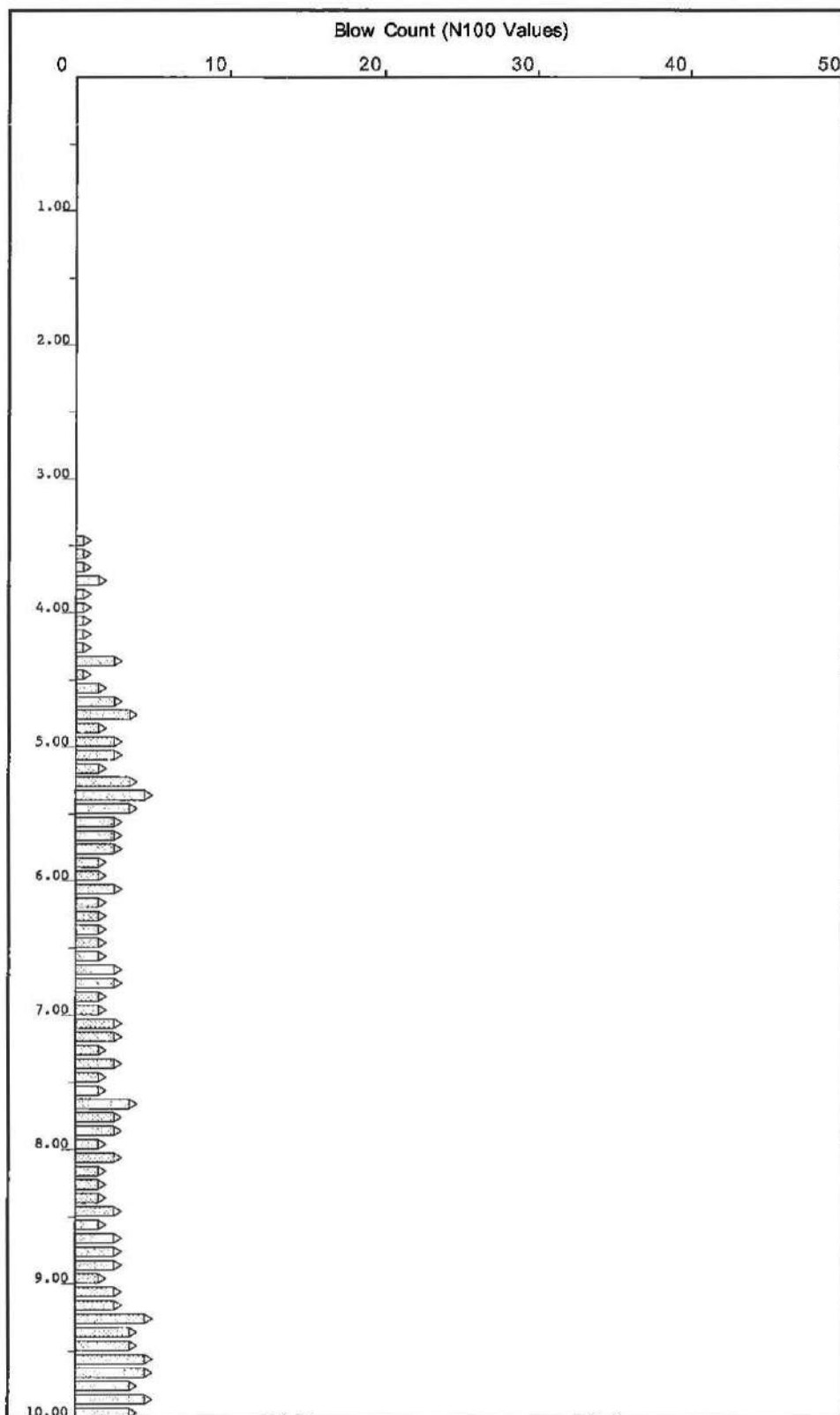
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		
.2		
.3		
.4		
.5		
.6		
.7		
.8		
.9		
1.0		
.1		
.2		
.3		
.4		
.5		
.6		
.7		
.8		
.9		
2.0		
.1		
.2		
.3		
.4		
.5		
.6		
.7		
.8		
.9		
3.0		
.1		0
.2		0
.3		0
.4		0
.5		1
.6		1
.7		1
.8		2
.9		1
4.0		1
.1		1
.2		1
.3		1
.4		3
.5		1
.6		2
.7		3
.8		4
.9		2
5.0		3
.1		3
.2		2
.3		4
.4		5
.5		4
.6		3
.7		3
.8		3
.9		2
6.0		2
.1		3
.2		2
.3		2
.4		2
.5		2
.6		2
.7		3
.8		3
.9		2
7.0		2
.1		3
.2		3
.3		2
.4		3
.5		2
.6		2
.7		4
.8		3
.9		3
8.0		2
.1		3
.2		2
.3		2
.4		2
.5		3
.6		2
.7		3
.8		3
.9		3
9.0		2
.1		3
.2		3
.3		5
.4		4
.5		4
.6		5
.7		5
.8		4
.9		5
10.0		4



Remarks :

Probed from base of WS18 at 3.00m depth

Hammer 63.5 kg

13895

Standard Drop 750 mm

Cone 50 mm dia

Rod 8kg / 35 mm

GROUND ENGINEERING

L I M I T E D
Tel: 01733-566566 www.groundengineering.co.uk

DYNAMIC PROBE PENETRATION TEST

Date 14/07/16

PROBE No
WS19

Project
Number 13895

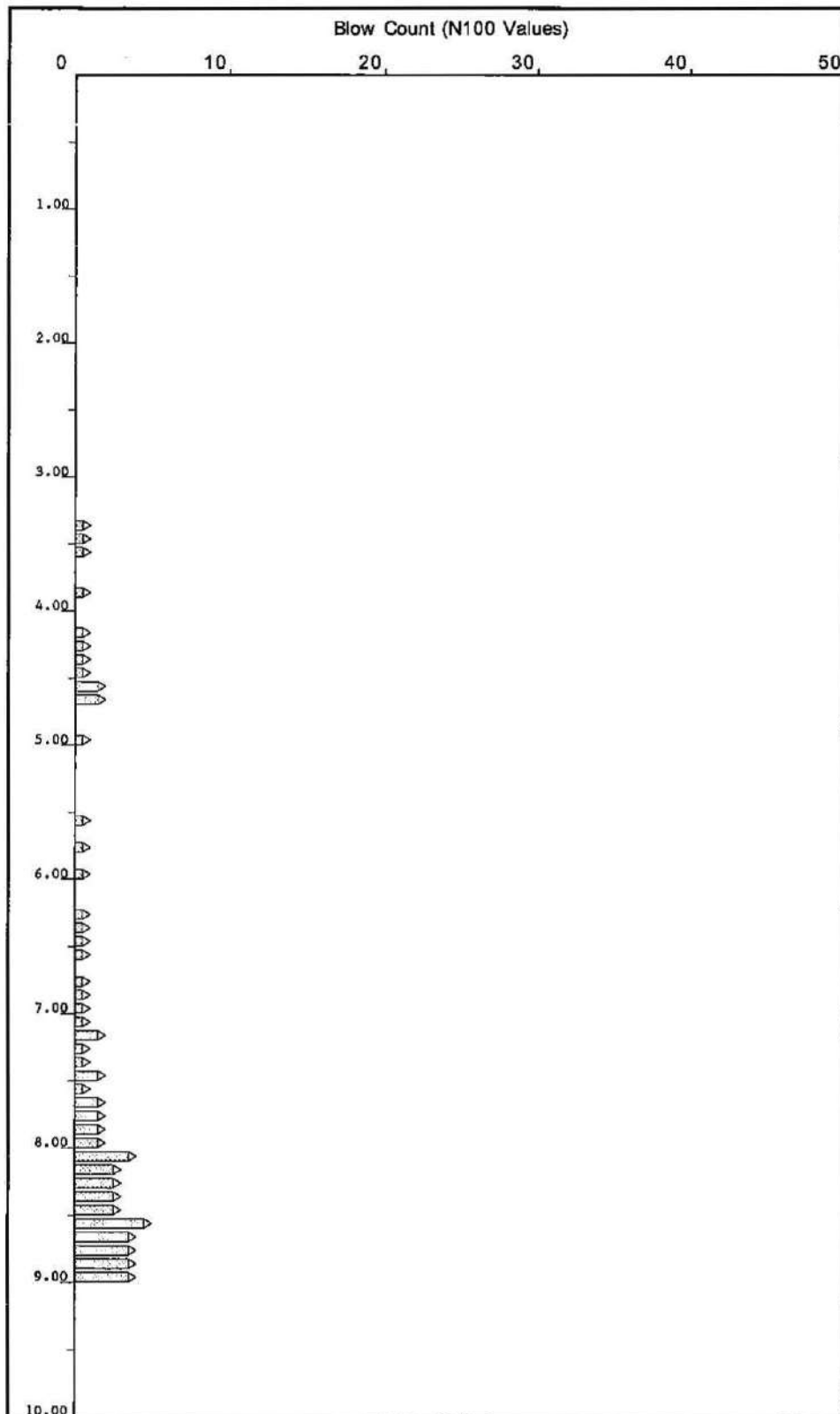
Sheet 1 of 1

Method
BS 1377 : Part 9 : Clause 3.2 (DPSH)

Client
DR & MJ HULL

Site
LAND OFF MILL GREEN ROAD, PINCHBECK

Depth (m)	Torque	Blows (100mm)
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
1.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
2.0		-
.1		-
.2		-
.3		-
.4		-
.5		-
.6		-
.7		-
.8		-
.9		-
3.0		-
.1		0
.2		0
.3		0
.4		1
.5		1
.6		1
.7		0
.8		0
.9		1
4.0		0
.1		0
.2		1
.3		1
.4		1
.5		1
.6		2
.7		2
.8		0
.9		0
5.0		0
.1		0
.2		0
.3		0
.4		0
.5		0
.6		1
.7		0
.8		1
.9		0
6.0		0
.1		0
.2		0
.3		1
.4		1
.5		1
.6		1
.7		0
.8		1
.9		1
7.0		1
.1		1
.2		2
.3		1
.4		1
.5		2
.6		1
.7		2
.8		2
.9		2
8.0		4
.1		3
.2		3
.3		3
.4		3
.5		3
.6		5
.7		4
.8		4
.9		4
9.0		4



Remarks :

Probed from base of WS19 at 3.00m depth

Hammer 63.5 kg

13895

Standard Drop 750 mm

Cone 50 mm dia

Rod 8kg / 35 mm

GROUND ENGINEERING L I M I T E D Tel: 01733-566566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK					WINDOW SAMPLE WS20 Ground Level:																															
			Date: 15/07/16		Hole Size: 87mm dia to 2.00m 77mm dia to 4.00m																																		
Samples and in-situ Tests <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Depth m</th> <th>Type</th> <th>Result</th> </tr> </thead> <tbody> <tr><td>0.20</td><td>D1</td><td></td></tr> <tr><td>0.50</td><td>D2</td><td></td></tr> <tr><td>0.80</td><td>D3</td><td></td></tr> <tr><td>1.20</td><td>D4</td><td></td></tr> <tr><td>1.20-2.00</td><td>U1</td><td></td></tr> <tr><td>1.35-1.65</td><td>S</td><td>N2</td></tr> <tr><td>2.00-4.00</td><td>U2</td><td></td></tr> <tr><td>2.15-2.45</td><td>S</td><td>N1</td></tr> </tbody> </table>			Depth m	Type	Result	0.20	D1		0.50	D2		0.80	D3		1.20	D4		1.20-2.00	U1		1.35-1.65	S	N2	2.00-4.00	U2		2.15-2.45	S	N1	(Date) Water	Description of Strata TOPSOIL - Brown and dark brown, sandy SILT. Sand is fine. Very loose, brown, slightly clayey, very silty SAND. Sand is fine. (TIDAL FLAT DEPOSIT) Dark grey and brown, silty, slightly organic SAND. Sand is fine. (TIDAL FLAT DEPOSIT) Hole completed at 4.00m depth			Legend	Depth m	O.D. Level m			
Depth m	Type	Result																																					
0.20	D1																																						
0.50	D2																																						
0.80	D3																																						
1.20	D4																																						
1.20-2.00	U1																																						
1.35-1.65	S	N2																																					
2.00-4.00	U2																																						
2.15-2.45	S	N1																																					
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. No live roots observed 3. Hole sides collapsed below 1.20m depth						Project No 13895																																	
						Scale 1:50	Page 1/1																																
KEY D - Disturbed Sample ES - Environmental Sample B - Bulk Sample M - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ∇ - Water Strike P () - Hand Penetrometer ∇ - Depth to Water Cohesion () kPa on completion ∇s Standpipe Level			Groundwater Strikes <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="6">Depth m</th> </tr> <tr> <th>No</th> <th>Struck</th> <th>Rose to</th> <th>Rate</th> <th>Cased</th> <th>Sealed</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2.00</td> <td>1.20</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Depth m						No	Struck	Rose to	Rate	Cased	Sealed	1	2.00	1.20				Groundwater Observations <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Depth m</th> </tr> <tr> <th>Date</th> <th>Hole</th> <th>Casing</th> <th>Water</th> </tr> </thead> <tbody> <tr> <td>15/07/16</td> <td>4.00</td> <td></td> <td>1.20</td> </tr> </tbody> </table>			Depth m				Date	Hole	Casing	Water	15/07/16	4.00		1.20
Depth m																																							
No	Struck	Rose to	Rate	Cased	Sealed																																		
1	2.00	1.20																																					
Depth m																																							
Date	Hole	Casing	Water																																				
15/07/16	4.00		1.20																																				

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 13/07/16

TRIAL PIT
TP1

Ground
Level:

KEY	REMARKS		
D - Disturbed Sample	1. Live roots observed to 0.40m depth		
B - Bulk Sample	2. Pit sides unstable and collapsed between 2.50m and 1.60m depth		
U - Undisturbed Sample	3. Pit dry		
R - Root Sample			
W - Water Sample			
ES - Environmental Sample			
▽ - Water Strike			
▽ - Water Rise			
▽c - Level on completion			
MP - Mackintosh Probe			
P () - Hand Penetrometer			
Cohesion () kPa			
V - Vane Shear Test			
Cohesion () kPa			
		Project No 13895	
		Scale	Page
		1:25	1/1

SOAKAWAY TEST RESULTS

BRE DIGEST 365 - SOIL INFILTRATION RATE

Project: Land off Mill Green Road, Pinchbeck
Client: AMJ Construction Limited

Project No: C13895
Sheet No: 1/1

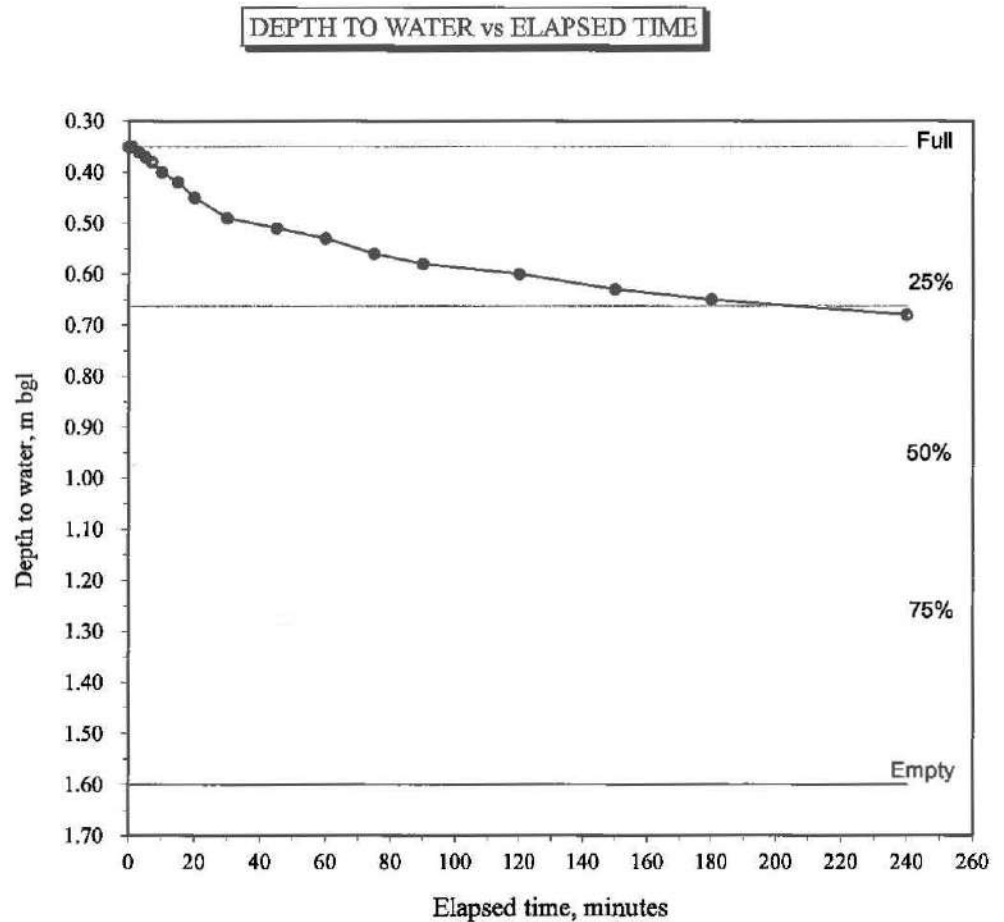
Trial Pit: TP1 FIRST FILLING
Depth: 1.60
Length: 1.50
Width: 0.70

Description of Stratum under test: Brown silty sand

Depth to water prior to test: Dry
(below ground level)

Elapsed Time mins	Depth to Water m
0	0.35
1	0.35
3	0.36
5	0.37
7	0.38
10	0.40
15	0.42
20	0.45
30	0.49
45	0.51
60	0.53
75	0.56
90	0.58
120	0.6
150	0.63
180	0.65
240	0.68

All dimensions given in metres



$$f = (V75 - V25) / A50(T75 - T25)$$

$V75 - V25 = 0.656$
 $A50 = 3.800$
 $T75 - T25 = 1148$

Extrapolated Soil Infiltration Rate $f = \underline{2.51E-06} \text{ m/s}$

GROUND ENGINEERING L I M I T E D Tel: 01733-665566 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK		TRIAL PIT TP2	
			Date: 13/07/16	Pit Size: 1.50m L x 0.70m W x 2.70m D.		Ground Level:
Samples and In-situ Tests			(Date) Water	Description of Strata		Legend
Depth m	Type	Result				Depth m
0.20	D1			TOPSOIL - Brown and dark brown, sandy SILT. Sand is fine.		0.40
0.50 0.50-0.70	D2 CBR1			Firm, locally soft, brown, locally very sandy, silty CLAY. Sand is fine.		
1.00 1.00	D3 V1	(38)				
1.50 1.50	D4 V2	(40)		(TIDAL FLAT DEPOSIT)		
2.00	D5					2.30
2.50	D6			Grey, silty SAND. (TIDAL FLAT DEPOSIT)		2.70
				Pit completed at 2.70m depth		
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample R - Root Sample W - Water Sample ES - Environmental Sample Water Strike Water Rise Level on completion MP - Mackintosh Probe P () - Hand Penetrometer Cohesion () kPa V - Vane Shear Test Cohesion () kPa			REMARKS 1. Live roots observed to 0.40m depth 2. Pit sides unstable and collapsed between 2.70m to 2.30m depth 3. Pit dry			
						Project No 13895
						Scale 1:25
						Page 1/1

SOAKAWAY TEST RESULTS

BRE DIGEST 365 - SOIL INFILTRATION RATE

Project: Land off Mill Green Road, Pinchbeck
Client: AMJ Construction Limited

Project No: C13895
Sheet No: 1/1

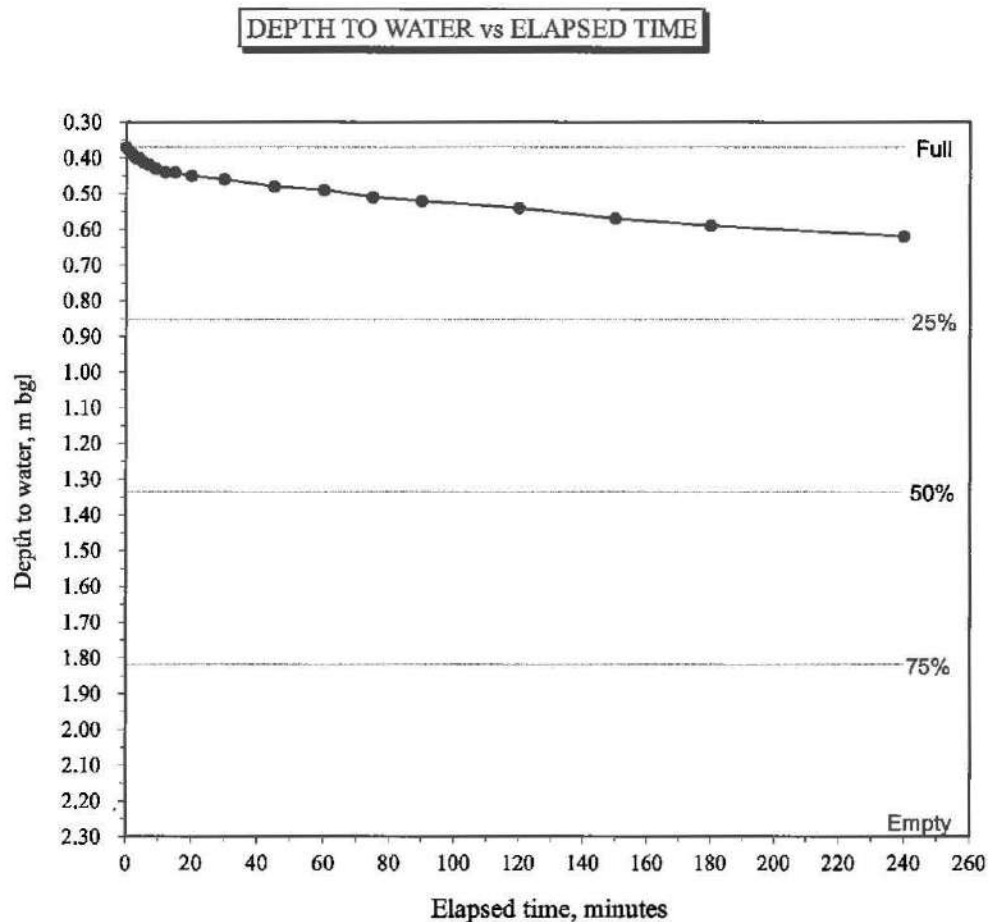
Trial Pit: TP2 FIRST FILLING
Depth: 2.30
Length: 1.50
Width: 0.70

Description of Stratum under test: Firm, Brown sandy, silty CLAY

Depth to water prior to test: Dry
(below ground level)

Elapsed Time mins	Depth to Water m
0	0.37
1	0.38
2	0.39
3	0.40
4	0.40
5	0.41
7	0.42
9	0.43
12	0.44
15	0.44
20	0.45
30	0.46
45	0.48
60	0.49
75	0.51
90	0.52
120	0.54
150	0.57
180	0.59
240	0.62

All dimensions given in metres



$$f = (V75 - V25) / A50(T75 - T25)$$

$$V75 - V25 = 1.013$$

$$A50 = 5.296$$

$$T75 - T25 = 1925$$

$$\text{Extrapolated Soil Infiltration Rate } f = \underline{1.66E-06} \text{ m/s}$$

GROUND ENGINEERING LIMITED Tel: 01733-586586 www.groundengineering.co.uk			Site: LAND OFF MILL GREEN ROAD, PINCHBECK		TRIAL PIT TP3	
			Date: 13/07/16	Pit Size: 1.90m L x 0.70m W x 2.20m D.		Ground Level:
Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m
Depth m	Type	Result				
0.20	D1			TOPSOIL - Dark brown, sandy SILT. Sand is fine.		0.30
0.50 0.50-0.70	D2 CBR1			Firm, locally soft, brown and orange brown, sandy, silty CLAY. Sand is fine.		
1.00	D3			(TIDAL FLAT DEPOSIT)		2.20
1.50	D4					
2.00	D5		1  2 			
				Pit completed at 2.20m depth		
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample R - Root Sample W - Water Sample ES - Environmental Sample  Water Strike  Water Rise  Level on completion MP - Mackintosh Probe R() - Hand Penetrometer Cohesion () kPa V - Vane Shear Test Cohesion () kPa			REMARKS 1. Live roots observed to 0.80m depth 2. Groundwater seepage from 1.70m after 15 mins, Groundwater at 2.00m depth 3. Pit sides unstable			
			Project No 13895		Scale 1:25	
					Page 1/1	

SOAKAWAY TEST RESULTS

BRE DIGEST 365 - SOIL INFILTRATION RATE

Project: Land off Mill Green Road, Pinchbeck
Client: AMJ Construction Limited

Project No: C13895
Sheet No: 1/1

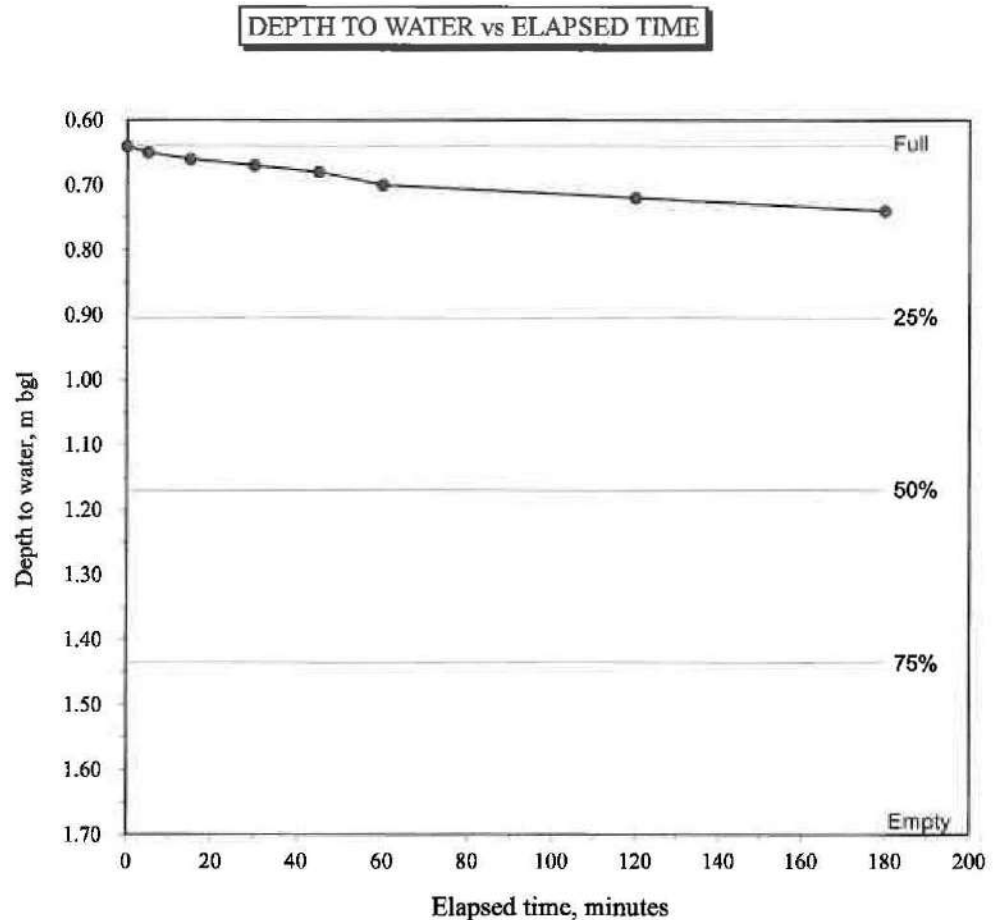
Trial Pit: TP3 FIRST FILLING
Depth: 2.20
Length: 1.90
Width: 0.70

Description of Stratum under test: Brown sandy silt

Depth to water prior to test: Dry
(below ground level)

Elapsed Time mins	Depth to Water m
0	0.64
5	0.65
15	0.66
30	0.67
45	0.68
60	0.70
120	0.72
180	0.74

All dimensions given in metres



$$f = (V75-V25)/A50(T75-T25)$$

$$V75-V25 = 0.705$$

$$A50 = 4.086$$

$$T75-T25 = 1620$$

$$\text{Extrapolated Soil Infiltration Rate } f = \underline{1.77E-06} \text{ m/s}$$

LABORATORY TEST RESULTS

CONTRACT KESTON NURSERIES, MILL GREEN ROAD, PINCHBECK

Bore-hole	Sample	Depth m	Classification				Density		Triaxial Compression					Sulphates (SO ₄)				Remarks
			Liquid Limit %	Plastic Limit %	Plasticity Index %	Moisture Content %	Bulk Mg/m ³	Dry Mg/m ³	Type	Principal Stress Difference kPa	Cell Pressure kPa	Shear Strength kPa	Angle of Shear Resistance degrees	Total Dry Wt. %	Soil Aqueous Extract mg/l	Water mg/l	pH	
WS1	D3	0.90	33	21	12	25												SOIL CLASSIFICATION = CL 0% retained on 425µm sieve
WS2	D4	1.20																SOIL CLASSIFICATION = CI 0% retained on 425µm sieve
	D5	2.00	48	19	29	36							25			7.8		
WS3	D2	0.60	32	21	11	22											SOIL CLASSIFICATION = CL 0% retained on 425µm sieve	
WS4	D5	2.00												272			7.6	SOIL CLASSIFICATION = CH 0% retained on 425µm sieve
WS7	D3	0.90	62	27	35	32												
WS9	D4	1.20													33		7.5	SOIL CLASSIFICATION = CL/CI 0% retained on 425µm sieve
	D5	2.00	35	21	14	33												
WS13	D3	0.90														66	7.9	
WS20	D4	1.20														82	8.0	

LABORATORY TEST RESULTS

CONTRACT KESTON NURSERIES, MILL GREEN ROAD, PINCHBECK

Trial-pit	Sample	Depth m	Classification				Density		Triaxial Compression					Sulphates (SO ₄)				C.B.R.		Remarks
			Liquid Limit %	Plastic Limit %	Plasticity Index %	Moisture Content %	Bulk Mg/m ³	Dry Mg/m ³	Type	Principal Stress Difference kPa	Cell Pressure kPa	Shear Strength kPa	Angle of Shear Resistance degrees	Total % Dry Wt.	Aqueous Extract mg/l	Water mg/l	pH	Top %	Base %	
TP1	B1	0.50 - 0.70				30	1.83	1.45										4.4	6.6	0% retained on 20mm sieve
	D3	1.00												66			7.8			
	B1	0.50 - 0.70				30	1.90	1.46										2.4	2.3	0% retained on 20mm sieve
TP2	D3	1.00												49			7.6			
	B1	0.50 - 0.70				27	1.95	1.53										0.6	0.5	0% retained on 20mm sieve
	D3	1.00												58			7.6			
TP3	B1	0.50 - 0.70																		
	D3	1.00																		
	B1	0.50 - 0.70																		
	D3	1.00																		

U - UNDISTURBED SAMPLE
D - DISTURBED SAMPLE
B - BULK SAMPLE
W - WATER SAMPLE

C.U. - CONSOLIDATED UNDRAINED
C.D. - CONSOLIDATED DRAINED
Q. - IMMEDIATE UNDRAINED
Q.M. - IMMEDIATE UNDRAINED MULTISTAGE

Aqueous Extract 2:1 Water:Soil

C.B.R. - CALIFORNIA BEARING RATIO



8180

GROUND ENGINEERING**TEST CERTIFICATE**

Newark Road Peterborough
t: 01733 566566 f: 01733 315280
e: admin@groundengineering.co.uk

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
Client Address: Newark Road
Peterborough
PE1 5UA

Contact: Simon Weatherley

Site Name: Keston Nurseries
Site Address: Pinchbeck

Certificate Number: PL5493-1/2/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Sampled By: Client

TEST RESULTS

Laboratory Reference: PL5493-1/2

Client Reference: U1

Pre-treatment for
organic material:

No

Sample Description: Brown orange brown slightly clayey sandy SILT

Material Specification: Not Required

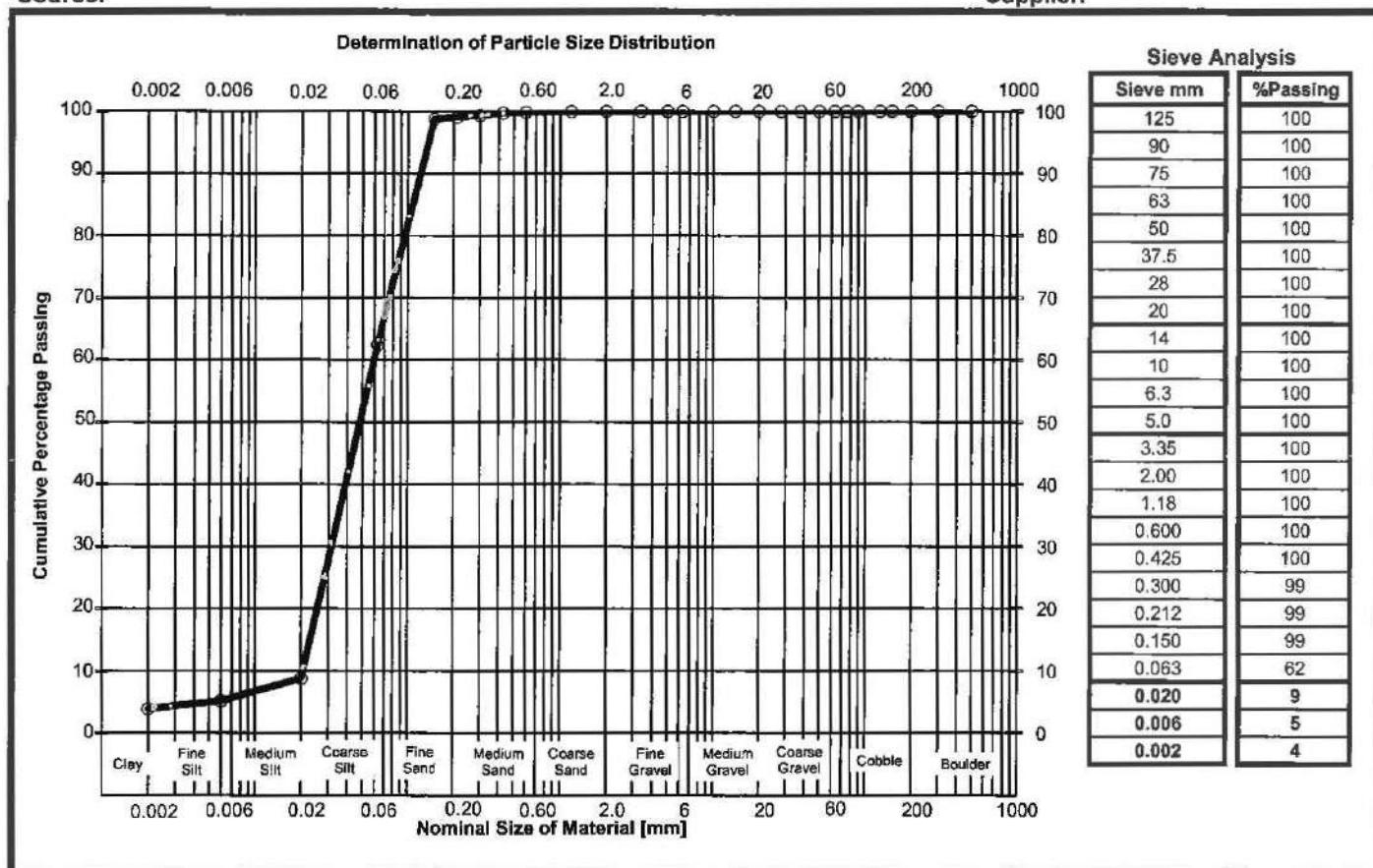
Location: WS1

Source:

Depth Top: 1.20m

Depth Base: 2.00m

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
Form Number: GELab/C/709-2 Version 46

Registered in England & Wales

Registration Number: 6929574

Reg Office: Ground Engineering Ltd

Newark Rd, Peterborough PE1 5UA

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GROUND ENGINEERING

PETERBOROUGH ROAD, PETERBOROUGH, CAMBS, PE1 5UA

TEST CERTIFICATE

Newark Road Peterborough

t: 01733 566566 f: 01733 315280

e: admin@groundengineering.co.uk

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4

Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
 Client Address: Newark Road
 Peterborough
 PE1 5UA

Certificate Number: PL5493-1/7/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Contact: Simon Weatherley

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Sampled By: Client

Site Name: Keston Nurseries
 Site Address: Pinchbeck

TEST RESULTS

Laboratory Reference: PL5493-1/7

Pre-treatment for organic material:

No

Client Reference: U1

Sample Description: Brown orange brown grey slightly clayey SILT/SAND

Material Specification: Not Required

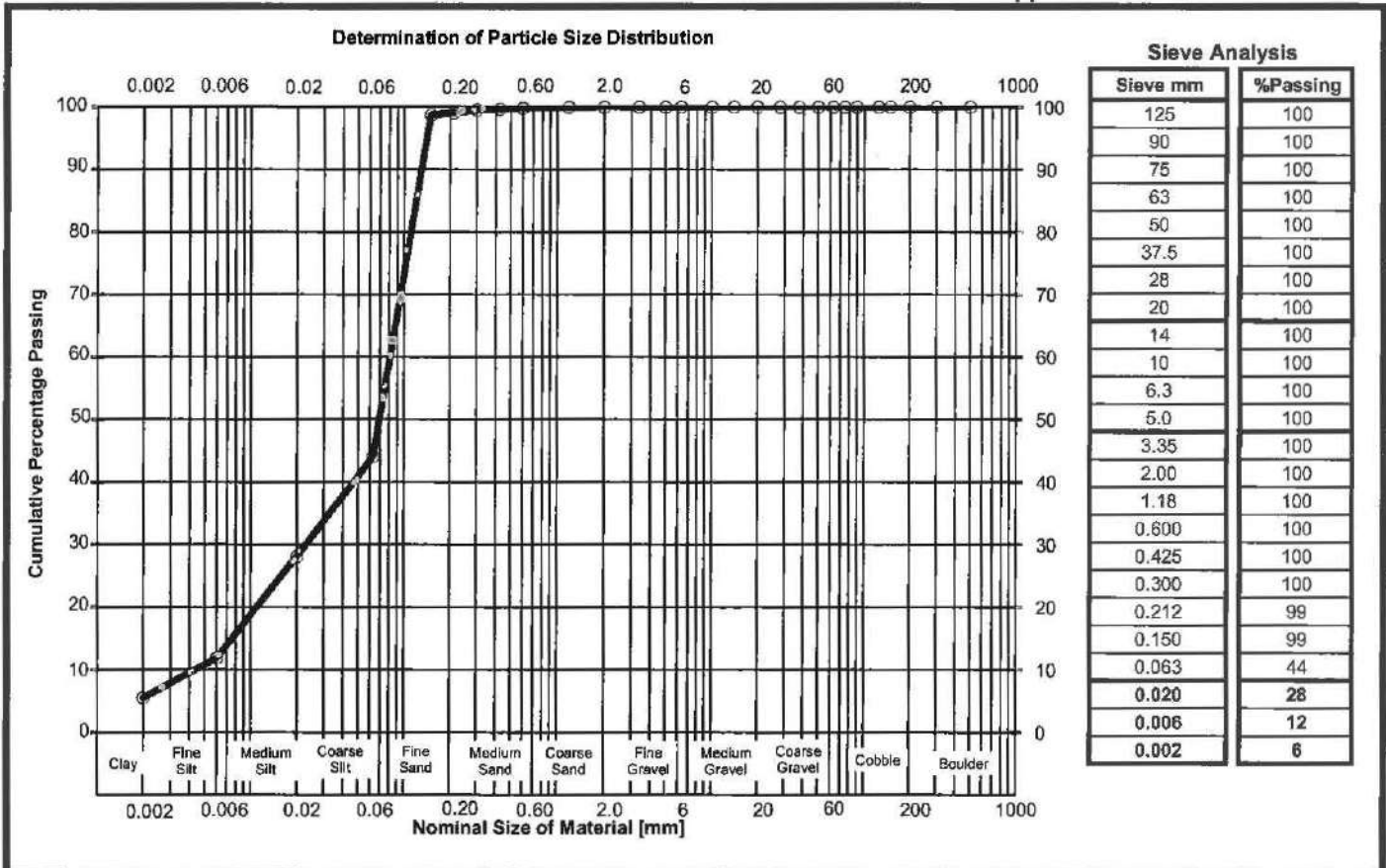
Depth Top: 1.20m

Location: WS6

Depth Base: 2.00m

Source:

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
 Form Number: GELab/C/709-2 Version 46

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 Newark Rd, Peterborough PE1 5UA



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GROUND ENGINEERING**TEST CERTIFICATE**

Newark Road Peterborough
t: 01733 566566 f: 01733 315280
e: admin@groundengineering.co.uk

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
Client Address: Newark Road
Peterborough
PE1 5UA

Contact: Simon Weatherley

Site Name: Keston Nurseries
Site Address: Pinchbeck

Certificate Number: PL5493-1/11/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Sampled By: Client

TEST RESULTS

Laboratory Reference: PL5493-1/11

Client Reference: U2

Pre-treatment for
organic material:

No

Sample Description: Grey brown orange brown silty SAND

Material Specification: Not Required

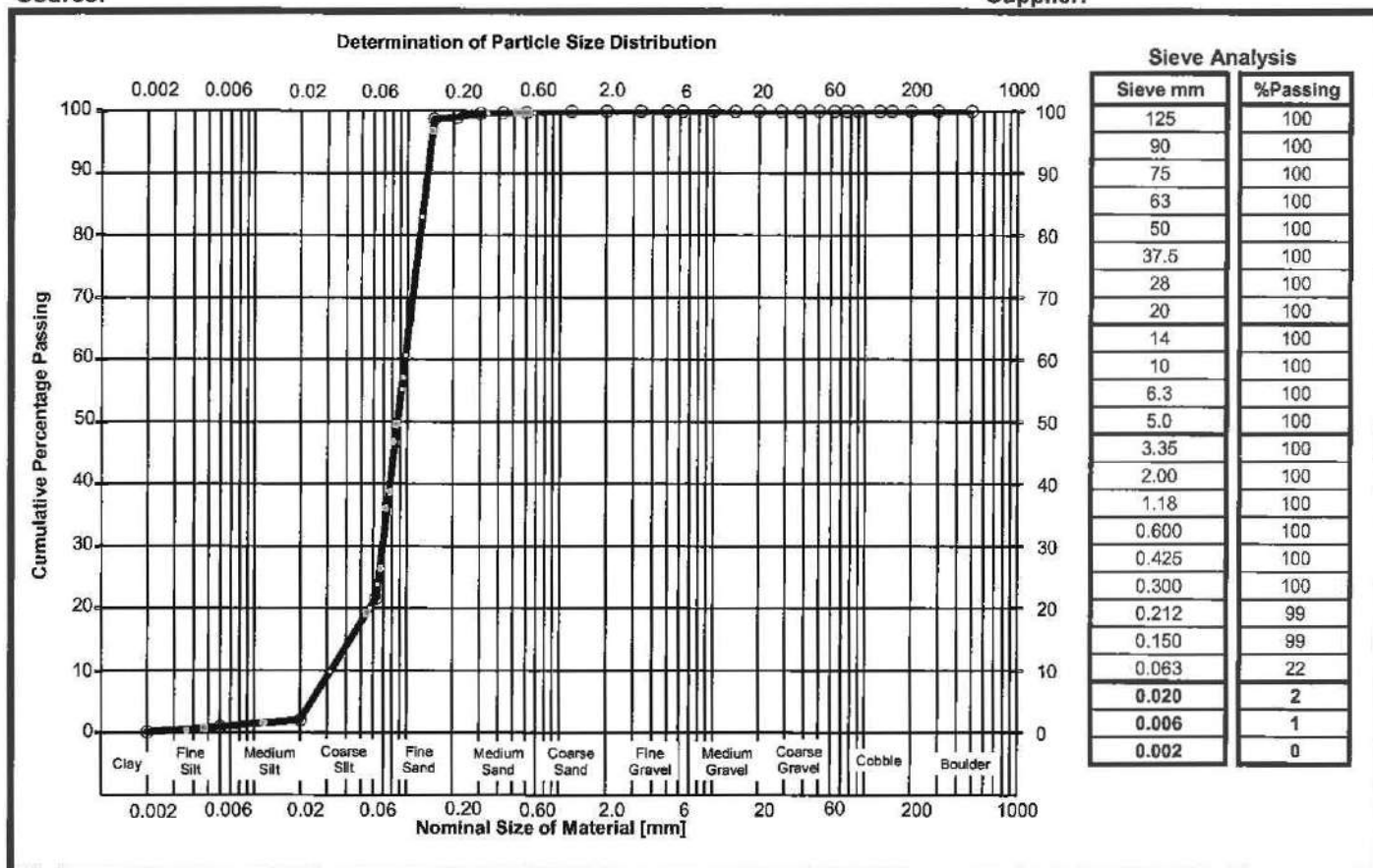
Location: WS11

Source:

Depth Top: 2.00m

Depth Base: 3.00m

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
Form Number: GELab/C/709-2 Version 46

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Registration Number: 6829574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

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GROUND ENGINEERING

Newark Road Peterborough
t: 01733 566566 f: 01733 315280
e: admin@groundengineering.co.uk

TEST CERTIFICATE**Determination of Particle Size Distribution**

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4

Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
Client Address: Newark Road
Peterborough
PE1 5UA

Contact: Simon Weatherley

Site Name: Keston Nurseries
Site Address: Pinchbeck

Certificate Number: PL5493-1/12/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Sampled By: Client

TEST RESULTS

Laboratory Reference: PL5493-1/12

Client Reference: U1

Pre-treatment for organic material:

No

Sample Description: Brown orange brown grey silty SAND

Material Specification: Not Required

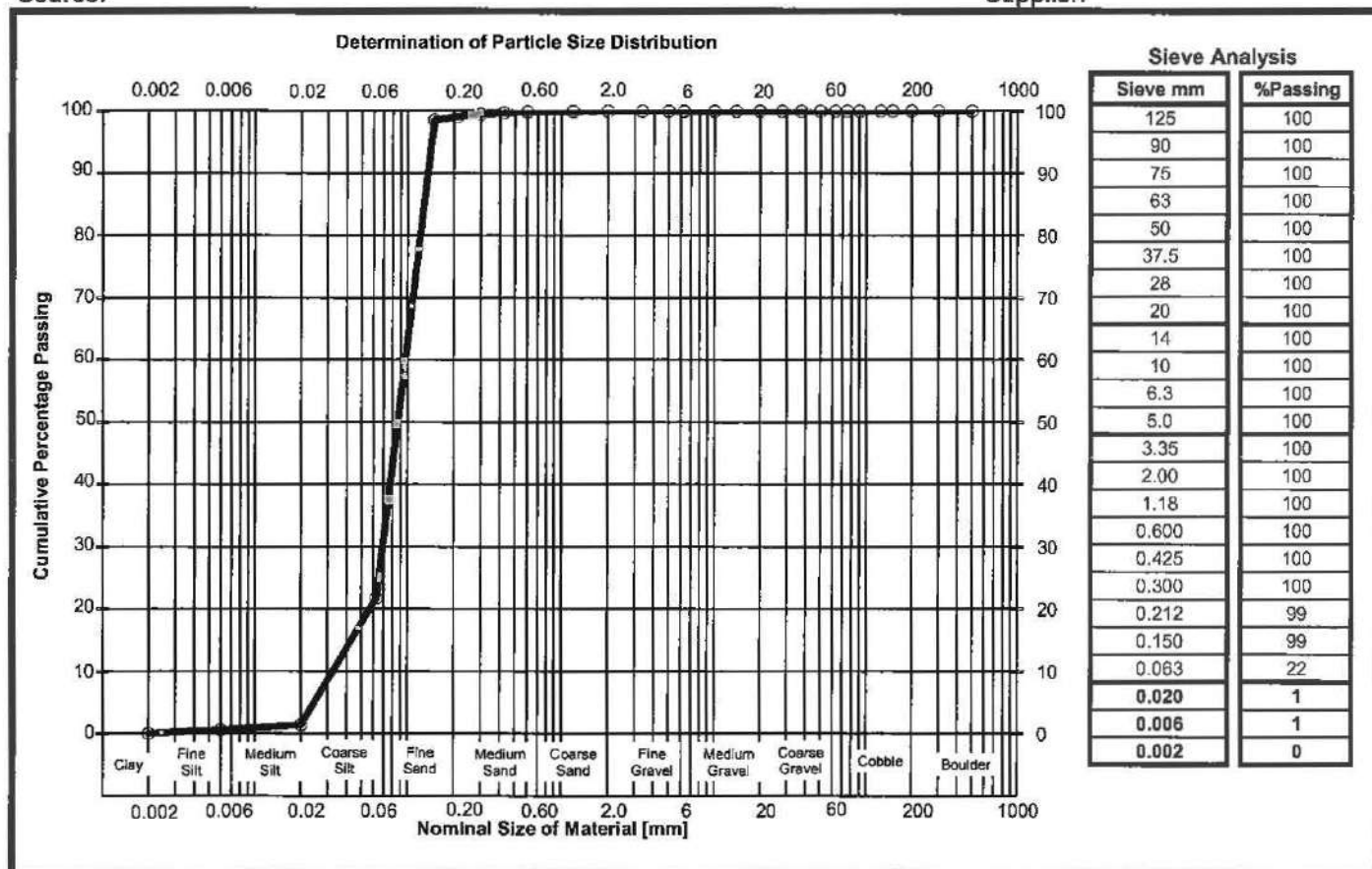
Location: WS12

Source:

Depth Top: 1.20m

Depth Base: 2.00m

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
Form Number: GELab/C/709-2 Version 46

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

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8180

TEST CERTIFICATE**GROUND ENGINEERING**

Newark Road Peterborough
t: 01733 586566 f: 01733 315280
e: admin@groundengineering.co.uk

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
Client Address: Newark Road
Peterborough
PE1 5UA

Certificate Number: PL5493-1/14/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Sampled By: Client

Contact: Simon Weatherley

Site Name: Keston Nurseries
Site Address: Pinchbeck

TEST RESULTS

Laboratory Reference: PL5493-1/14

Client Reference: U1

Pre-treatment for
organic material: No

Sample Description: Brown grey orange brown silty SAND

Material Specification: Not Required

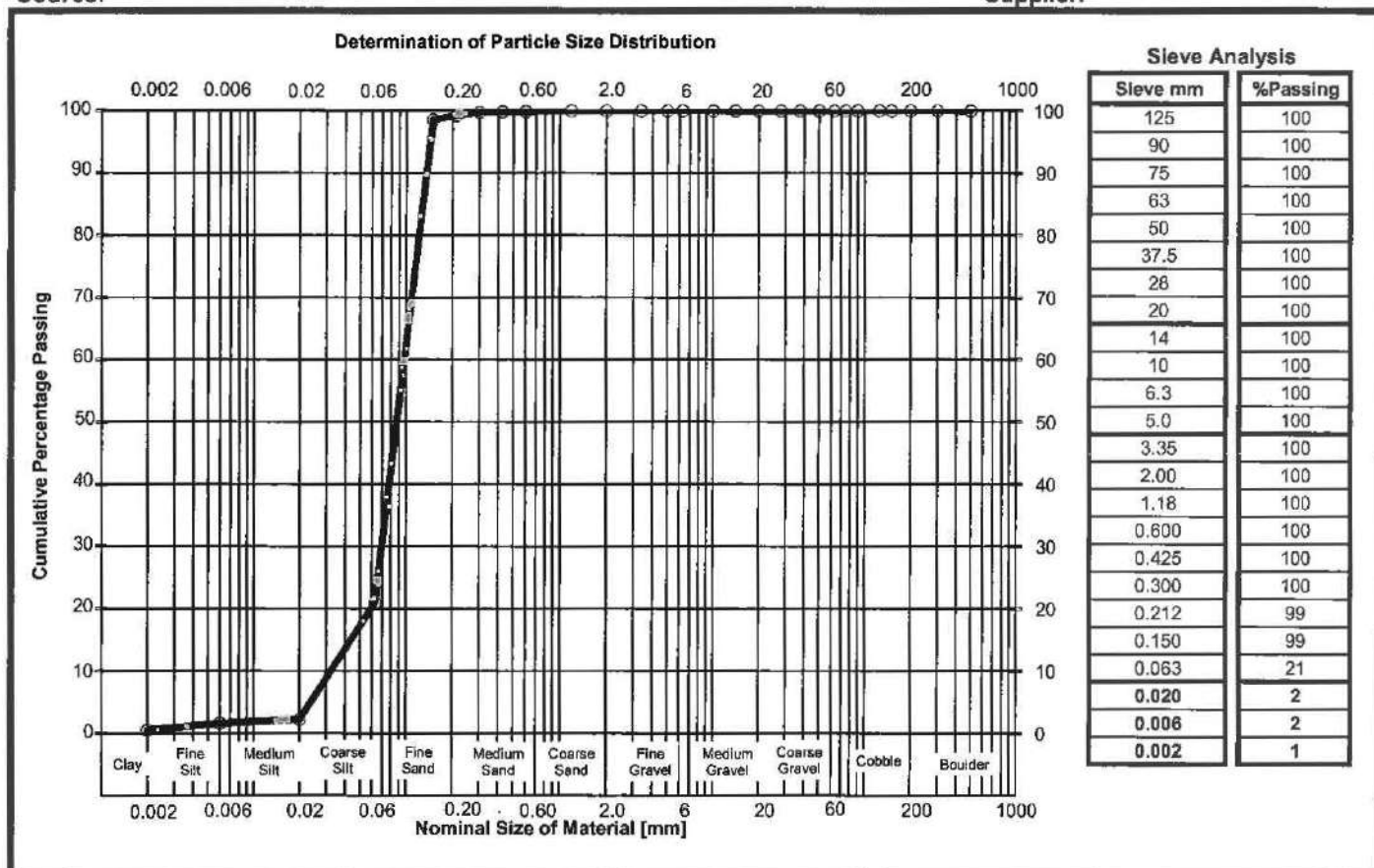
Location: WS13

Source:

Depth Top: 1.20m

Depth Base: 2.00m

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
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GROUND ENGINEERING

NEWARK ROAD, PETERBOROUGH, CAMBS, PE1 5UA

TEST CERTIFICATE

Newark Road Peterborough
t: 01733 566566 f: 01733 315280
e: admin@groundengineering.co.uk

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4

Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
Client Address: Newark Road
Peterborough
PE1 5UA

Certificate Number: PL5493-1/15/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Contact: Simon Weatherley

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Sampled By: Client

Site Name: Keston Nurseries
Site Address: Pinchbeck

TEST RESULTS

Laboratory Reference: PL5493-1/15

Client Reference: U1

Pre-treatment for
organic material:

No

Sample Description: Brown orange brown grey silty SAND

Material Specification: Not Required

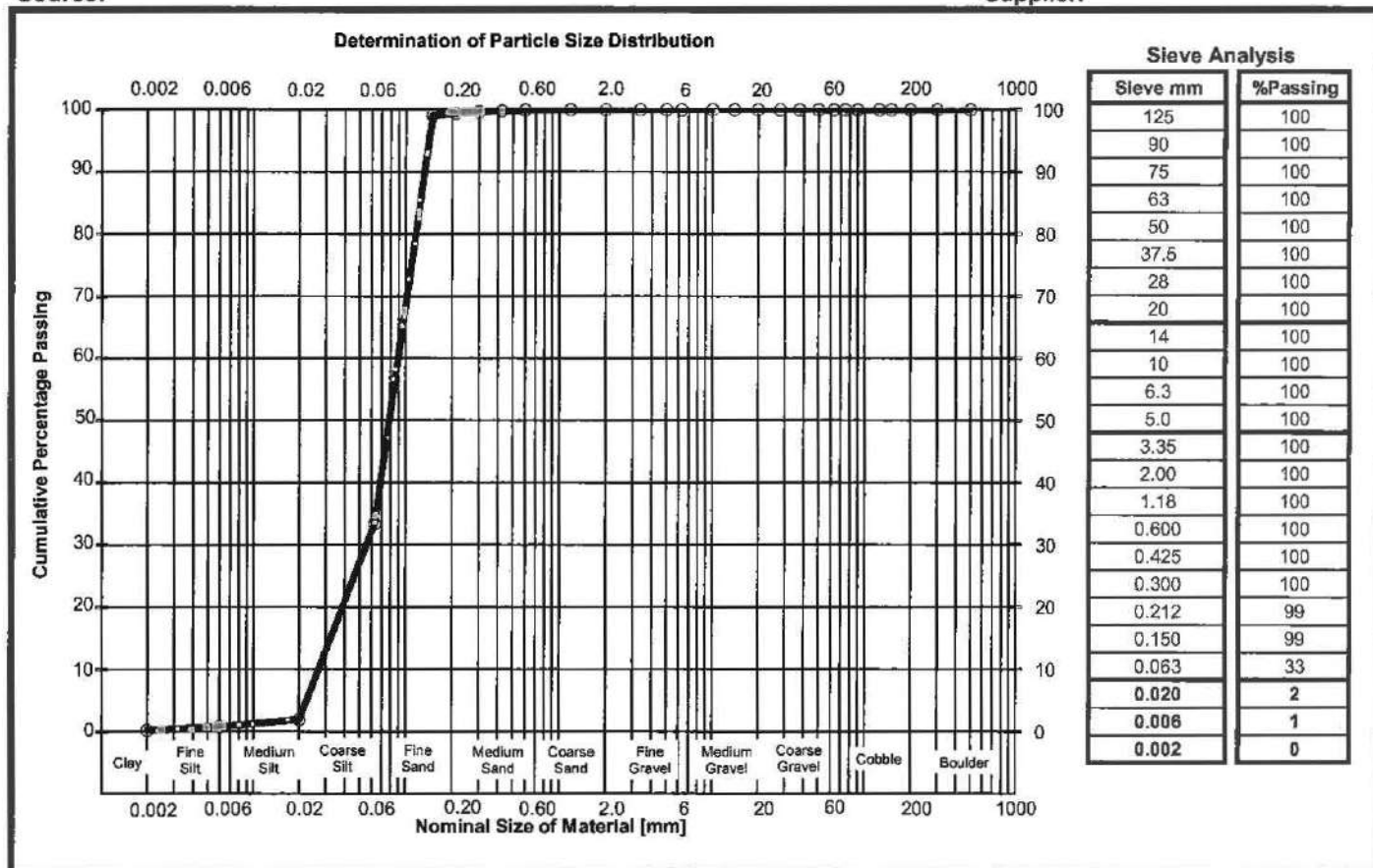
Location: WS16

Source:

Depth Top: 1.20m

Depth Base: 2.00m

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
Form Number: GELab/C/709-2 Version 46

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Newark Rd, Peterborough PE1 5UA



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GROUND ENGINEERING

NEWARK ROAD, PETERBOROUGH, PE1 5UA

TEST CERTIFICATE

Newark Road Peterborough
t: 01733 566566 f: 01733 315280
e: admin@groundengineering.co.uk

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4

Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
Client Address: Newark Road
Peterborough
PE1 5UA

Certificate Number: PL5493-1/16/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Contact: Simon Weatherley

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Site Name: Keston Nurseries
Site Address: Pinchbeck

Sampled By: Client

TEST RESULTS

Laboratory Reference: PL5493-1/16

Pre-treatment for
organic material:

No

Client Reference: U2

Sample Description: Brown orange brown grey silty SAND

Material Specification: Not Required

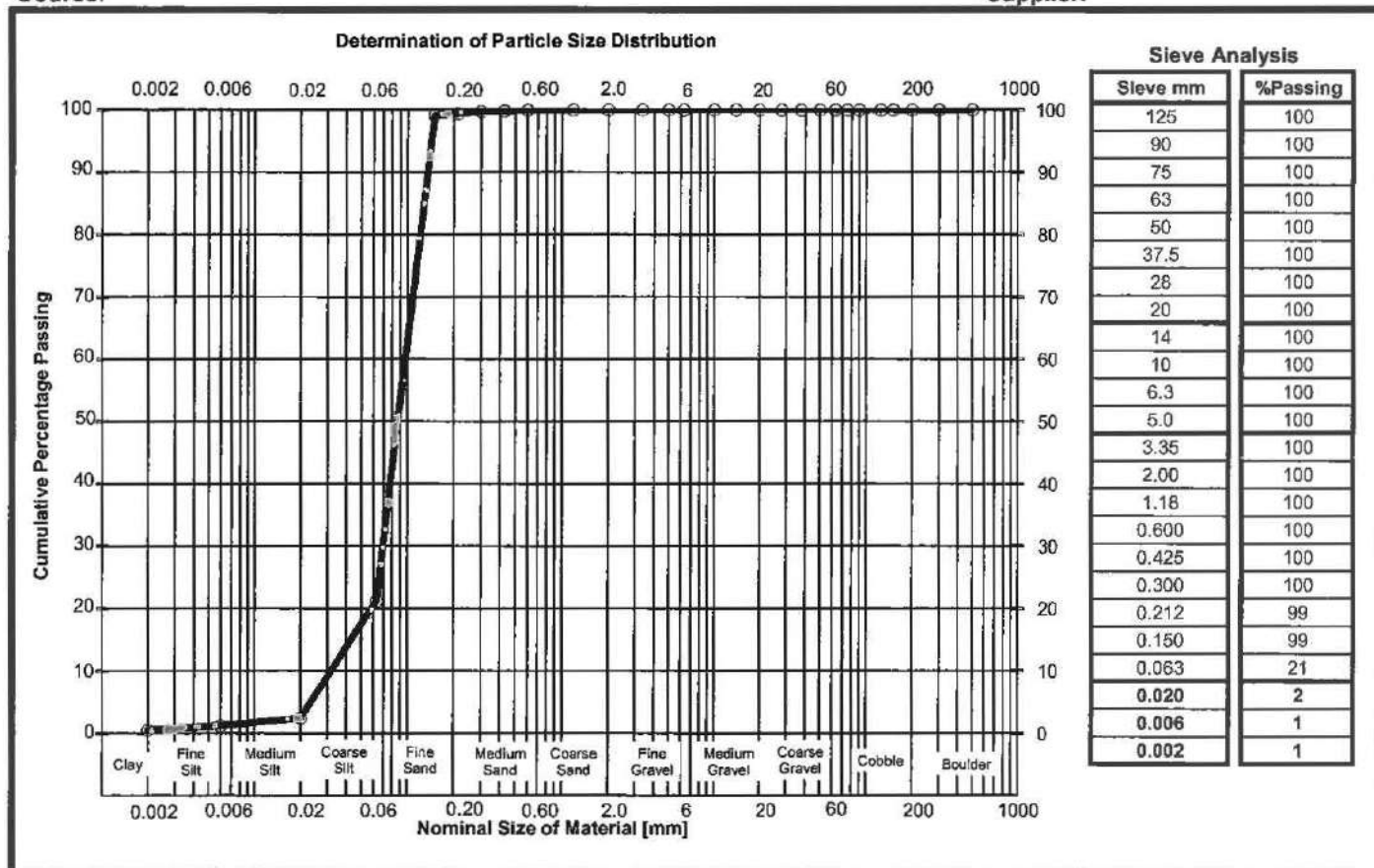
Depth Top: 2.00m

Location: WS18

Depth Base: 3.00m

Source:

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
Form Number: GELab/C/709-2 Version 46

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GROUND ENGINEERING

Newark Road Peterborough
 t: 01733 566566 f: 01733 315280
 e: admin@groundengineering.co.uk

TEST CERTIFICATE**Determination of Particle Size Distribution**

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
 Sieved Grading and Sedimentation by Pipette

Client: Ground Engineering Ltd
 Client Address: Newark Road
 Peterborough
 PE1 5UA

Contact: Simon Weatherley

Site Name: Keston Nurseries
 Site Address: Pinchbeck

Certificate Number: PL5493-1/17/710-2

Client Reference: C13895

Lab Job Number: PL5493-1

Date Sampled: Unknown

Date Received: 19.07.2016

Date Tested: 04.08.2016

Certificate of Sampling: N/A

Sampling Certificate No.: N/A

Sampled By: Client

TEST RESULTS

Laboratory Reference: PL5493-1/17

Client Reference: U1

Pre-treatment for
organic material:

No

Sample Description: Brown orange brown grey silty SAND

Material Specification: Not Required

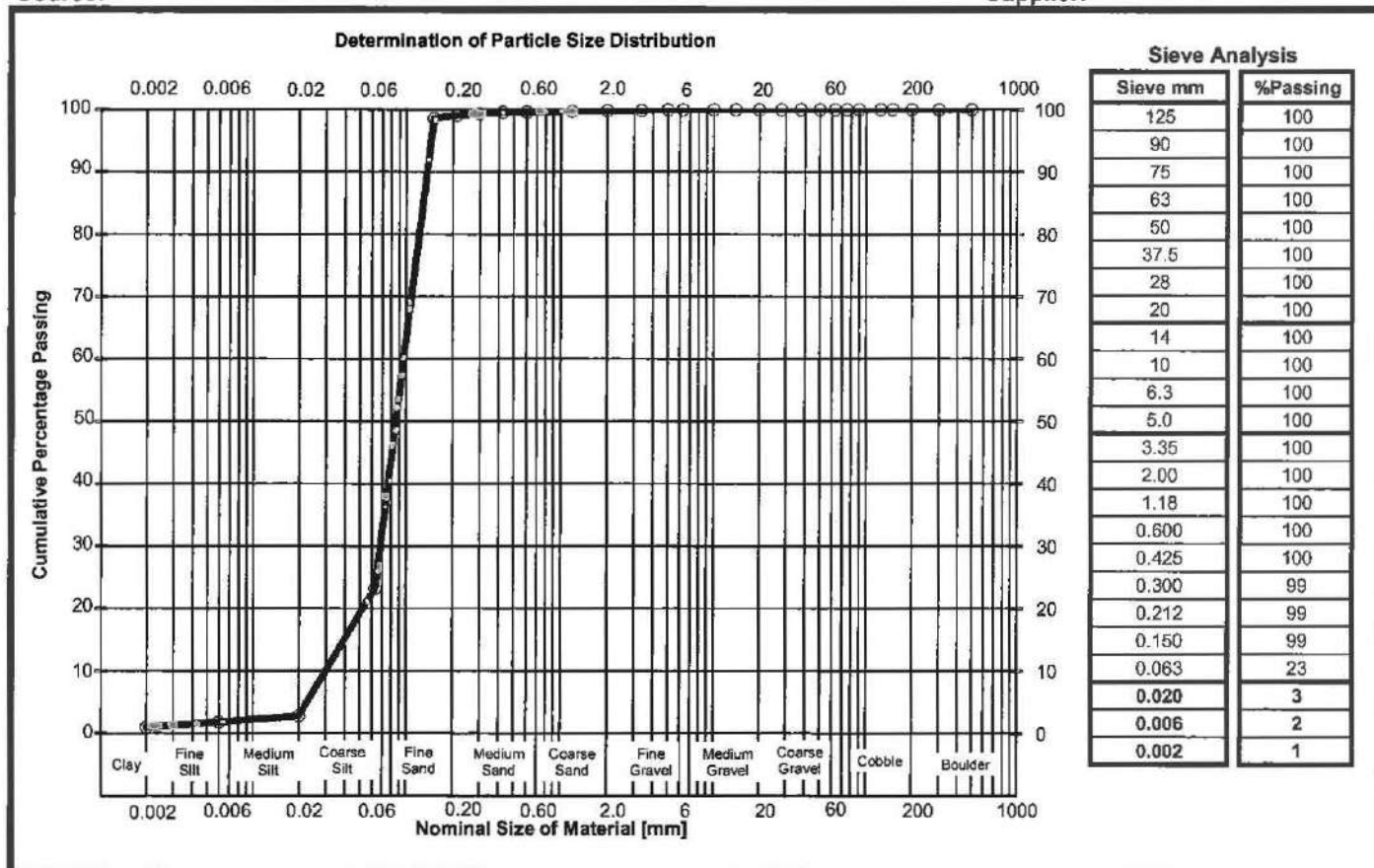
Location: WS20

Source:

Depth Top: 1.20m

Depth Base: 2.00m

Supplier:



Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 05.08.2016 Page 1 of 1
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Final Report

Report No.: 16-17304-1
Initial Date of Issue: 27-Jul-2016
Client: Ground Engineering Limited
Client Address: Newark Road
Peterborough
Cambridgeshire
PE1 5UA
Contact(s): Simon Weatherley
Project: SW/C13895 - Keston Nurseries, Mill
Green Road, Pinchbeck

Quotation No.:		Date Received:	20-Jul-2016
Order No.:	SW/C13895	Date Instructed:	20-Jul-2016
No. of Samples:	14		
Turnaround (Wkdays):	5	Results Due:	26-Jul-2016
Date Approved:	27-Jul-2016		

Approved By:

KT Jones

Details: Keith Jones, Technical Manager

Project: SW/C13895 - Keston Nurseries, Mill Green Road, Pinchbeck

Client: Ground Engineering Limited		Chemtest Job No.:		16-17304		16-17304		16-17304		16-17304		16-17304		16-17304		16-17304		16-17304	
Quotation No.:	Chemtest Sample ID.:	326269	326270	326271	326272	326273	326274	326275	326276	326277	326278	326279	326280	326281	326282	326283	326284	326285	326286
Order No.: SW/C13895	Client Sample Ref.:	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1	D1
	Client Sample ID.:	TP1	TP2	TP3	WS1	WS2	WS3	WS4	WS5	WS6	WS7	WS8	WS9	WS10	WS11	WS12	WS13	WS14	WS15
	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	Date Sampled:	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016
Parameter	Accred	SOP	Units	LOD	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304
pH	U	2010		N/A	8.3	7.9	8.3	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Moisture	N	2030	%	0.020	17	19	18	16	16	16	16	16	16	16	16	16	16	16	16
Stones	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.91	1.3	1.2	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Sulphate (2:1 Water Soluble) as SO ₄	U	2120	g/l	0.010	0.020	0.014	< 0.010	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50	1.1	1.3	0.93	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Arsenic	U	2450	mg/kg	1.0	8.9	10	15	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Cadmium	U	2450	mg/kg	0.10	0.15	0.13	0.34	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Chromium	U	2450	mg/kg	1.0	13	18	29	19	19	19	19	19	19	19	19	19	19	19	19
Copper	U	2450	mg/kg	0.50	8.3	14	26	12	12	12	12	12	12	12	12	12	12	12	12
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	0.79	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Nickel	U	2450	mg/kg	0.50	12	16	17	17	17	17	17	17	17	17	17	17	17	17	17
Lead	U	2450	mg/kg	0.50	16	22	57	22	22	22	22	22	22	22	22	22	22	22	22
Selenium	U	2450	mg/kg	0.20	< 0.20	0.34	0.28	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Zinc	U	2450	mg/kg	0.50	35	45	73	54	54	54	54	54	54	54	54	54	54	54	54
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.9	2.6	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Acenaphthene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Results - Soil

Page 3 of 14

Results - Soil

Project: SW/C13895 - Keston Nurseries, Mill Green Road, Pinchbeck

Client: Ground Engineering Limited		Chemtest Job No.: 16-17304		16-17304		16-17304		16-17304		16-17304		16-17304		16-17304		16-17304	
Quotation No.:	Chemtest Sample ID.:	326269	326270	326271	326272	326274	326275	326276	326279	326280							
Order No.: SW/C13895	Client Sample Ref.:	D1	D1	D1	D1	D1	D1	U1 A	D1	D1							
	Client Sample ID.:	TP1	TP2	TP3	WS1	WS3	WS5	WS5	WS12	WS13							
	Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL							
	Top Depth (m):	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.30	0.30							
	Date Sampled:	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016							
Compound	Accred.	SOP	Units	LOD													
1,3-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
1,2-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2-Methylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
4-Methylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Nitrobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Isophorone	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2,4-Dichlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Hexachlorobutadiene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2-Methylnaphthalene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2,4,6-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2,4,5-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2-Chloronaphthalene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Dimethylphthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2,6-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Dibenzofuran	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
4-Chlorophenylphenylether	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2,4-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Diethyl Phthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
4-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Azobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Hexachlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50							

Results - Soil

Project: SW/C13895 - Keston Nurseries, Mill Green Road, Pinchbeck

Client: Ground Engineering Limited		Chemtest Job No.:		16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304	16-17304
Quotation No.:		Chemtest Sample ID.:	326269	326270	326271	326272	326274	326275	326276	326279	326280		
Order No.:	SW/C13895	Client Sample Ref.:	D1	D1	D1	D1	D1	D1	U1 A	D1	D1		
		Client Sample ID.:	TP1	TP2	TP3	WS1	WS3	WS5	WS5	WS12	WS13		
		Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
		Top Depth (m):	0.20	0.20	0.20	0.30	0.30	0.30	2.00	0.30	0.30		
		Date Sampled:	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016	13-Jul-2016		
Analyte		Accred.	LOP	Unit	LOD								
Carbazole		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Butylbenzyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Pesticide Scan		N	2790	mg/kg	N/A	None Detected	None Detected	None Detected	None Detected	None Detected	None Detected		
SVOC TIC		N	2790	mg/kg	N/A	None Detected	None Detected	None Detected	None Detected	None Detected	None Detected		

Project: SW/C13895 - Keston Nurseries, Mill Green Road, Pinchbeck

Client: Ground Engineering Limited		Chemtest Job No.:	16-17304	16-17304
Quotation No.:		Chemtest Sample ID.:	326281	326282
Order No.:	SW/C13895	Client Sample Ref.:	D1	D1
		Client Sample ID.:	WS16	WS19
		Sample Type:	SOIL	SOIL
		Top Depth (m):	0.30	0.30
		Date Sampled:	15-Jul-2016	15-Jul-2016
Parameter	Accred.	SOI	Units	LOD
pH	U	2010		N/A
Moisture	N	2030	%	8.1
Stones	N	2030	%	15
Boron (Hot Water Soluble)	U	2120	mg/kg	0.020
Sulphate (2:1 Water Soluble) as SO ₄	U	2120	g/l	0.54
Cyanide (Free)	U	2300	mg/kg	0.010
Cyanide (Total)	U	2300	mg/kg	0.50
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50
Arsenic	U	2450	mg/kg	0.68
Cadmium	U	2450	mg/kg	1.0
Chromium	U	2450	mg/kg	0.10
Copper	U	2450	mg/kg	0.15
Mercury	U	2450	mg/kg	1.0
Nickel	U	2450	mg/kg	0.50
Lead	U	2450	mg/kg	0.50
Selenium	U	2450	mg/kg	0.50
Zinc	U	2450	mg/kg	0.20
Chromium (Hexavalent)	N	2490	mg/kg	0.50
Organic Matter	U	2625	%	0.50
Acenaphthene	N	2790	mg/kg	1.5
Acenaphthene	U	2700	mg/kg	0.50
Acenaphthylene	N	2790	mg/kg	0.10
Acenaphthylene	U	2700	mg/kg	0.50
Anthracene	N	2790	mg/kg	0.10
Anthracene	U	2700	mg/kg	0.50
Benzo[a]anthracene	N	2790	mg/kg	0.10
Benzo[a]anthracene	U	2700	mg/kg	0.50
Benzo[a]pyrene	N	2790	mg/kg	0.10
Benzo[a]pyrene	U	2700	mg/kg	0.50
Benzo[b]fluoranthene	N	2790	mg/kg	0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.50
Benzo[k]fluoranthene	N	2790	mg/kg	0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.50
Benzo[e]pyrene	N	2790	mg/kg	0.10
Benzo[e]pyrene	U	2700	mg/kg	0.50
Benzo[g,h,i]perylene	N	2790	mg/kg	0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.50
Benzo[k]fluoranthene	N	2790	mg/kg	0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.50
Chrysene	N	2790	mg/kg	0.10
Chrysene	U	2700	mg/kg	0.50
Dibenz[a,h]Anthracene	N	2790	mg/kg	0.10
Dibenz[a,h]Anthracene	U	2700	mg/kg	0.50

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Client: Ground Engineering Limited		Chemtest Job No.:		16-17304		9-17304	
Quotation No.:		Chemtest Sample ID.:		326281		326282	
Order No.: SW/C13895		Client Sample Ref.:		D1		D1	
		Client Sample ID.:		WS16		WS19	
		Sample Type:		SOIL		SOIL	
		Top Depth (m):		0.30		0.30	
		Date Sampled:		15-Jul-2016		15-Jul-2016	
Substrate		Accretd.	SOP	Units	LOD		
Dibenz(a,h)Anthracene		U	2700	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene		N	2790	mg/kg	0.50		< 0.50
Fluoranthene		U	2700	mg/kg	0.10	< 0.10	0.55
Fluorene		N	2790	mg/kg	0.50		< 0.50
Fluorene		U	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		N	2790	mg/kg	0.50		< 0.50
Indeno(1,2,3-c,d)Pyrene		U	2700	mg/kg	0.10	< 0.10	< 0.10
Naphthalene		N	2790	mg/kg	0.50		< 0.50
Naphthalene		U	2700	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene		N	2790	mg/kg	0.50		< 0.50
Phenanthrene		U	2700	mg/kg	0.10	< 0.10	< 0.10
Pyrene		N	2790	mg/kg	0.50		< 0.50
Pyrene		U	2700	mg/kg	0.10	< 0.10	0.54
Total Of 16 PAH's		U	2700	mg/kg	2.0	< 2.0	< 2.0
Total Phenols		U	2920	mg/kg	0.30	< 0.30	< 0.30
Aliphatic TPH >C5-C6		N	2680	mg/kg	1.0		
Aliphatic TPH >C6-C8		N	2680	mg/kg	1.0		
Aliphatic TPH >C8-C10		U	2680	mg/kg	1.0		
Aliphatic TPH >C10-C12		U	2680	mg/kg	1.0		
Aliphatic TPH >C12-C16		U	2680	mg/kg	1.0		
Aliphatic TPH >C16-C21		U	2680	mg/kg	1.0		
Aliphatic TPH >C21-C35		U	2680	mg/kg	1.0		
Aliphatic TPH >C35-C44		N	2680	mg/kg	1.0		
Total Aliphatic Hydrocarbons		N	2680	mg/kg	5.0		
Aromatic TPH >C5-C7		N	2680	mg/kg	1.0		
Aromatic TPH >C7-C8		N	2680	mg/kg	1.0		
Aromatic TPH >C8-C10		U	2680	mg/kg	1.0		
Aromatic TPH >C10-C12		U	2680	mg/kg	1.0		
Aromatic TPH >C12-C16		U	2680	mg/kg	1.0		
Aromatic TPH >C16-C21		U	2680	mg/kg	1.0		
Aromatic TPH >C21-C35		N	2680	mg/kg	1.0		
Aromatic TPH >C35-C44		N	2680	mg/kg	1.0		
Total Aromatic Hydrocarbons		N	2680	mg/kg	5.0		
Total Petroleum Hydrocarbons		N	2680	mg/kg	10		
N-Nitrosodimethylamine		N	2790	mg/kg	0.50		< 0.50
Phenol		N	2790	mg/kg	0.50		< 0.50
2-Chlorophenol		N	2790	mg/kg	0.50		< 0.50
Bis-(2-Chloroethyl)Ether		N	2790	mg/kg	0.50		< 0.50

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Client: Ground Engineering Limited		Chemtest Job No.:			16-17304		16-17304	
Quotation No.:		Chemtest Sample ID.:		326281	326282			
Order No.: SW/C13895		Client Sample Ref.:		D1	D1			
		Client Sample ID.:		WS16	WS19			
		Sample Type:		SOIL	SOIL			
		Top Depth (m):		0.30	0.30			
		Date Sampled:		15-Jul-2016	15-Jul-2016			
Sample Name	Accred.	SOP	Units	LOD				
1,3-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50			
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50			
1,2-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50			
2-Methylphenol	N	2790	mg/kg	0.50	< 0.50			
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.50	< 0.50			
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50			
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.50	< 0.50			
4-Methylphenol	N	2790	mg/kg	0.50	< 0.50			
Nitrobenzene	N	2790	mg/kg	0.50	< 0.50			
Isophorone	N	2790	mg/kg	0.50	< 0.50			
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50			
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50			
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.50	< 0.50			
2,4-Dichlorophenol	N	2790	mg/kg	0.50	< 0.50			
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.50	< 0.50			
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50			
Hexachlorobutadiene	N	2790	mg/kg	0.50	< 0.50			
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.50	< 0.50			
2-Methylnaphthalene	N	2790	mg/kg	0.50	< 0.50			
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50			
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50			
2,4,6-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50			
2,4,5-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50			
2-Chloronaphthalene	N	2790	mg/kg	0.50	< 0.50			
2-Nitroaniline	N	2790	mg/kg	0.50	< 0.50			
Dimethylphthalate	N	2790	mg/kg	0.50	< 0.50			
2,6-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50			
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50			
Dibenzofuran	N	2790	mg/kg	0.50	< 0.50			
4-Chlorophenylphenylether	N	2790	mg/kg	0.50	< 0.50			
2,4-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50			
Diethyl Phthalate	N	2790	mg/kg	0.50	< 0.50			
4-Nitroaniline	N	2790	mg/kg	0.50	< 0.50			
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50			
Azobenzene	N	2790	mg/kg	0.50	< 0.50			
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.50	< 0.50			
Hexachlorobenzene	N	2790	mg/kg	0.50	< 0.50			
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50			

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Client: Ground Engineering Limited		Chemtest Job No.:		16-17204	16-17204
Quotation No.:		Chemtest Sample ID.:		326281	326282
Order No.: SW/C13895		Client Sample Ref.:		D1	D1
		Client Sample ID.:		WS16	WS19
		Sample Type:		SOIL	SOIL
		Top Depth (m):		0.30	0.30
		Date Sampled:		15-Jul-2016	15-Jul-2016
Designation		Accred.	SOP	Units	LOD
Carbazole		N	2790	mg/kg	0.50
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50
Butylbenzyl Phthalate		N	2790	mg/kg	0.50
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50
Pesticide Scan		N	2790	mg/kg	N/A
SVOC TIC		N	2790	mg/kg	N/A
					None Detected
					None Detected

Client: Ground Engineering Limited		Chemist Job No.: 16-17304		16-17304	
Quotation No.:	Chemtest Sample ID.:	326273	326277	W1	W1
Order No.: SW/C13895	Client Sample Ref.:	WS2	WATER	1.20	1.40
	Client Sample ID.:	WS7	WATER	1.20	1.40
	Sample Type:	WATER	WATER	1.20	1.40
	Top Depth (m):	13-Jul-2016	14-Jul-2016	13-Jul-2016	14-Jul-2016
	Date Sampled:	13-Jul-2016	14-Jul-2016	13-Jul-2016	14-Jul-2016
	Accred.	SOE	Unit	LOD	
pH	U	1010		N/A	7.8
Boron (Dissolved)	U	1450	µg/l	20	370
Sulphate	U	1220	mg/l	1.0	110
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050
Sulphide	U	1325	mg/l	0.050	< 0.050
Arsenic (Dissolved)	U	1450	µg/l	1.0	21
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	14
Copper (Dissolved)	U	1450	µg/l	1.0	11
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	8.9
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	1.3
Zinc (Dissolved)	U	1450	µg/l	1.0	3.9
Acenaphthene	N	1790	µg/l	C:50	< 0.50
Acenaphthene	N	1700	µg/l	0.010	< 0.010
Acenaphthylene	N	1790	µg/l	0.50	< 0.50
Acenaphthylene	N	1700	µg/l	0.010	< 0.010
Anthracene	N	1790	µg/l	0.50	< 0.50
Anthracene	N	1700	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1790	µg/l	0.50	< 0.50
Benzo[a]anthracene	N	1700	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1790	µg/l	0.50	< 0.50
Benzo[a]pyrene	N	1700	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1790	µg/l	0.50	< 0.50
Benzo[b]fluoranthene	N	1700	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1790	µg/l	0.50	< 0.50
Benzo[g,h,i]perylene	N	1700	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1790	µg/l	0.50	< 0.50
Benzo[k]fluoranthene	N	1700	µg/l	0.010	< 0.010
Chrysene	N	1790	µg/l	0.50	< 0.50
Chrysene	N	1700	µg/l	0.010	< 0.010
Dibenz[a,h]Anthracene	N	1790	µg/l	0.50	< 0.50
Dibenz[a,h]Anthracene	N	1700	µg/l	0.010	< 0.010
Fluoranthene	N	1790	µg/l	0.50	< 0.50
Fluoranthene	N	1700	µg/l	0.010	< 0.010
Fluorene	N	1790	µg/l	0.50	< 0.50

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Client: Ground Engineering Limited		Chemtest Job No.:	16-17304	16-17304	16-17304
Quotation No.:		Chemtest Sample ID.:	326273	326273	326277
Order No.: SW/C13895		Client Sample Ref.:	W1	W1	W1
		Client Sample ID.:	WS2	WS2	WS7
		Sample Type:	WATER	WATER	WATER
		Top Depth (m):	1.20	1.20	1.40
		Date Sampled:	13-Jul-2016	14-Jul-2016	14-Jul-2016
Parameter	Accred.	SOP	Units	LOD	
Fluorene	N	1700	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	1700	µg/l	0.010	< 0.010
Naphthalene	N	1790	µg/l	0.50	< 0.50
Naphthalene	N	1700	µg/l	0.010	< 0.010
Phenanthrene	N	1790	µg/l	0.50	< 0.50
Phenanthrene	N	1700	µg/l	0.010	< 0.010
Pyrene	N	1790	µg/l	0.50	< 0.50
Pyrene	N	1700	µg/l	0.010	< 0.010
Total Of 16 PAH's	N	1700	µg/l	0.20	< 0.20
Total Phenols	U	1920	mg/l	0.030	< 0.030
Hardness	U	1415	mg/l	15	700
N-Nitrosodimethylamine	N	1790	µg/l	0.50	< 0.50
Phenol	N	1790	µg/l	0.50	< 0.50
2-Chlorophenol	N	1790	µg/l	0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.50	< 0.50
1,3-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
1,4-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
1,2-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.50	< 0.50
Hexachloroethane	N	1790	µg/l	0.50	< 0.50
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.50	< 0.50
4-Methylphenol	N	1790	µg/l	0.50	< 0.50
Nitrobenzene	N	1790	µg/l	0.50	< 0.50
Isophorone	N	1790	µg/l	0.50	< 0.50
2-Nitrophenol	N	1790	µg/l	0.50	< 0.50
2,4-Dimethylphenol	N	1790	µg/l	0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.50	< 0.50
2,4-Dichlorophenol	N	1790	µg/l	0.50	< 0.50
1,2,4-Trichlorobenzene	N	1790	µg/l	0.50	< 0.50
4-Chloroaniline	N	1790	µg/l	0.50	< 0.50
Hexachlorobutadiene	N	1790	µg/l	0.50	< 0.50
4-Chloro-3-Methylphenol	N	1790	µg/l	0.50	< 0.50
2-Methylnaphthalene	N	1790	µg/l	0.50	< 0.50
Hexachlorocyclopentadiene	N	1790	µg/l	0.50	< 0.50
2,4,6-Trichlorophenol	N	1790	µg/l	0.50	< 0.50
2,4,5-Trichlorophenol	N	1790	µg/l	0.50	< 0.50

Project: SW/C13895 - Keston Nurseries, Mill Green Road, Pinchbeck

Client: Ground Engineering Limited		Chemtest Job No.:	16-17304	16-17304
Quotation No.:		Chemtest Sample ID.:	326273	326277
Order No.:	SW/C13895	Client Sample Ref.:	W1	W1
		Client Sample ID.:	WS2	WS7
		Sample Type:	WATER	WATER
		Top Depth (m):	1.20	1.40
		Date Sampled:	13-Jul-2016	14-Jul-2016
Parameter	Accred.	SOP	Units	LOD
2-Chlorophthalene	N	1790	µg/l	< 0.50
2-Nitroaniline	N	1790	µg/l	< 0.50
Dimethylphthalate	N	1790	µg/l	< 0.50
2,6-Dinitrotoluene	N	1790	µg/l	< 0.50
3-Nitroaniline	N	1790	µg/l	< 0.50
Dibenzofuran	N	1790	µg/l	< 0.50
4-Chlorophenylphenylether	N	1790	µg/l	< 0.50
2,4-Dinitrotoluene	N	1790	µg/l	< 0.50
Diethyl Phthalate	N	1790	µg/l	< 0.50
4-Nitroaniline	N	1790	µg/l	< 0.50
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	< 0.50
Azobenzene	N	1790	µg/l	< 0.50
4-Bromophenylphenyl Ether	N	1790	µg/l	< 0.50
Hexachlorobenzene	N	1790	µg/l	< 0.50
Pentachlorophenol	N	1790	µg/l	< 0.50
Carbazole	N	1790	µg/l	< 0.50
Di-N-Butyl Phthalate	N	1790	µg/l	< 0.50
Butylbenzyl Phthalate	N	1790	µg/l	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	< 0.50
Di-N-Octyl Phthalate	N	1790	µg/l	< 0.50
4-Nitrophenol	N	1790	µg/l	< 0.50
SVOC TIC	N	1790	µg/l	N/A
				None Detected

Results - Single Stage WAC

Project: SW/C13895 - Keston Nurseries, Mill Green Road, Pinchbeck

Chemtest Job No: 16-17304

Chemtest Sample ID: 326278

Sample Ref: D1+J1

Sample ID: WS8

Top Depth(m): 0.30

Bottom Depth(m): 14-Jul-2016

Sampling Date: 14-Jul-2016

Determination	SOP	Accred.	Units	Landfill Waste Acceptance Criteria		
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon	2625	U	%	1.5	3	6
Loss On Ignition	2610	U	%	0.61	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--
pH	2010	U		7.8	> 6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.031	To evaluate	To evaluate
Eluate Analysis				Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
Arsenic	1450	U	10:1 Eluate mg/l	0.087	0.5	25
Barium	1450	U	0.0079	< 0.50	20	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	5
Chromium	1450	U	0.013	0.13	0.5	70
Copper	1450	U	0.0061	0.061	2	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	2
Molybdenum	1450	U	0.0053	0.053	0.5	30
Nickel	1450	U	0.0022	< 0.050	0.4	40
Lead	1450	U	0.0020	0.020	0.5	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	7
Zinc	1450	U	0.0075	< 0.50	4	200
Chloride	1220	U	1.6	16	800	25000
Fluoride	1220	U	0.26	2.6	10	500
Sulphate	1220	U	< 1.0	< 10	1000	50000
Total Dissolved Solids	1020	N	67	670	4000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	--
Dissolved Organic Carbon	1610	U	20	200	500	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at our Coventry laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container

Sample Retention and Disposal

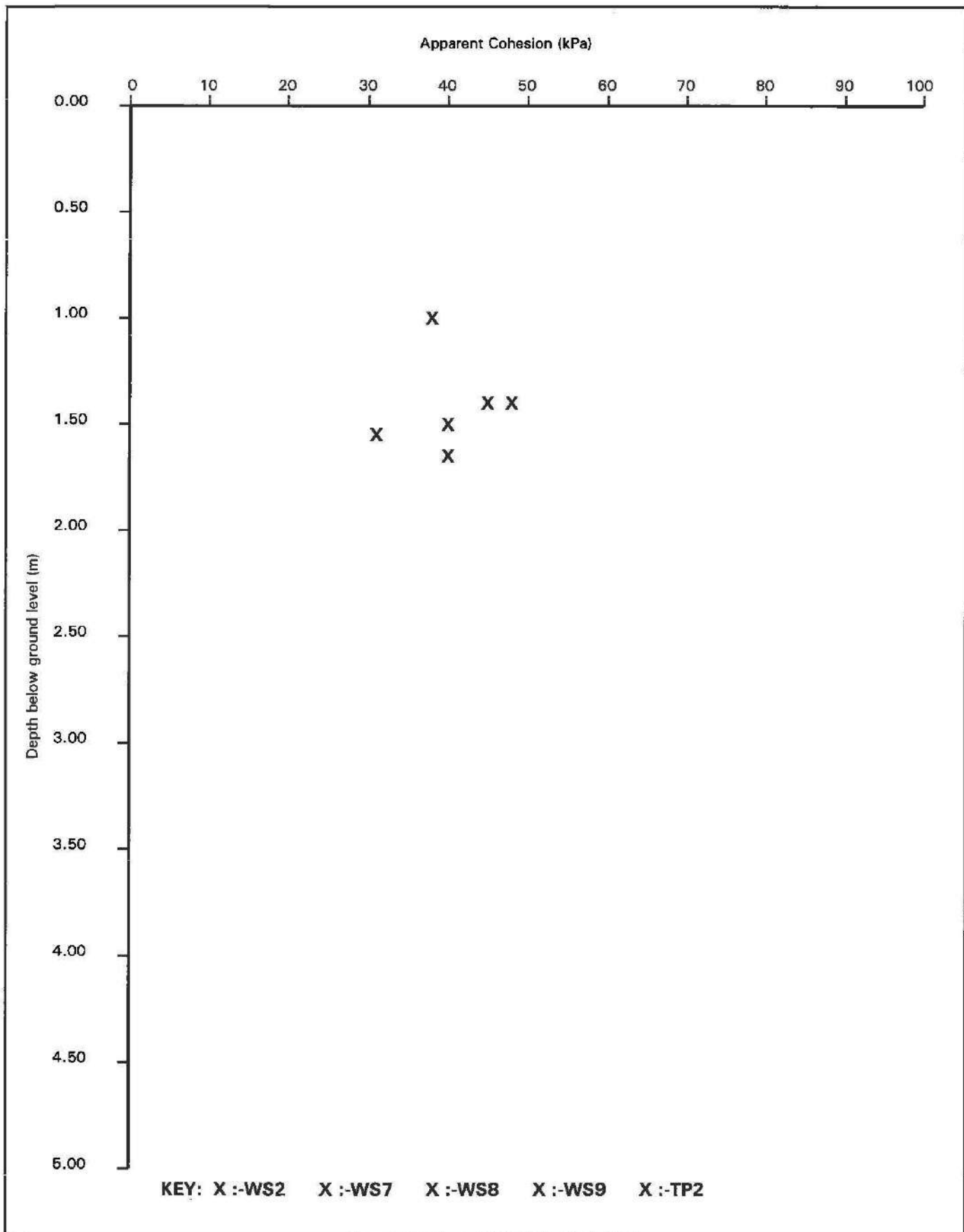
All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

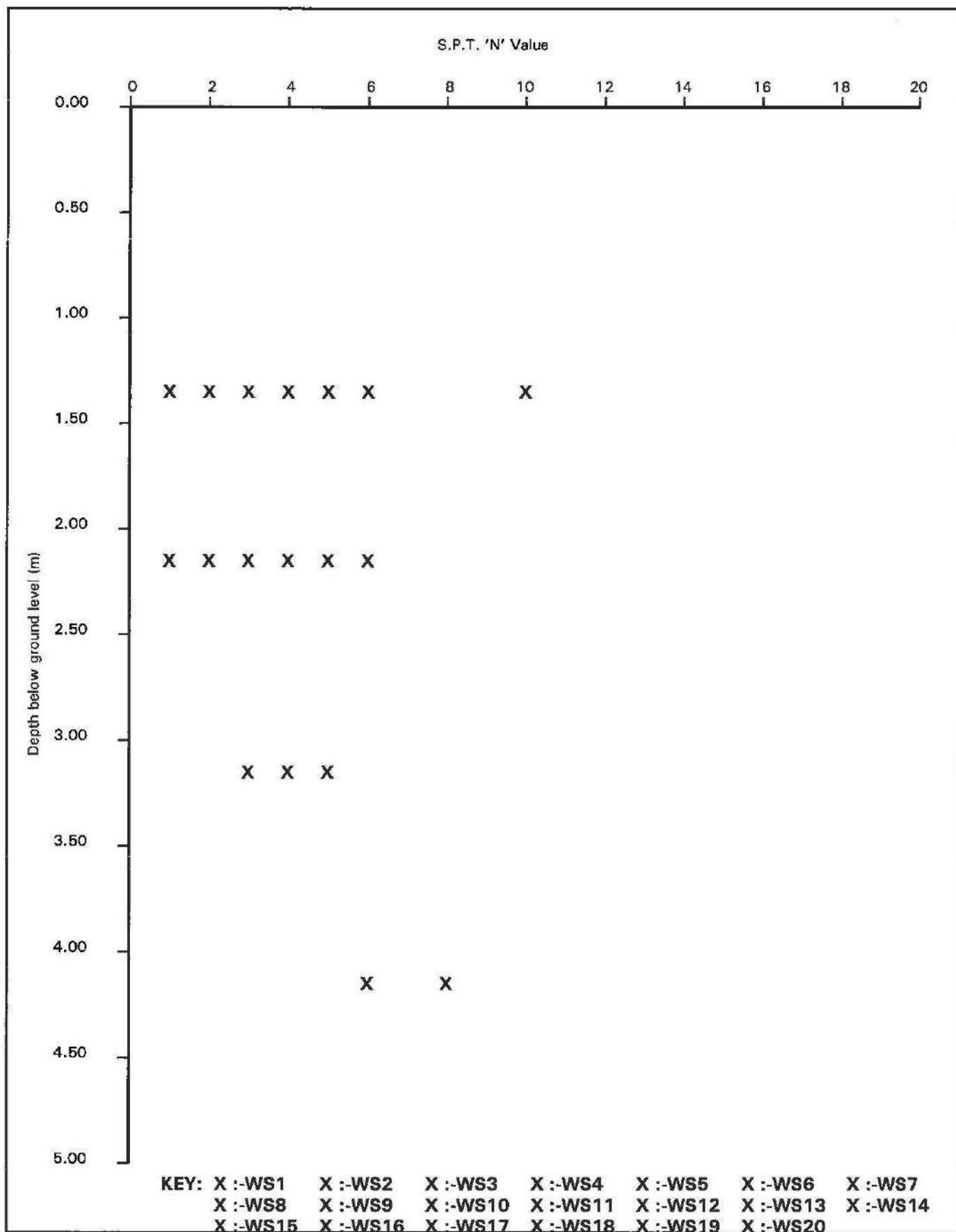
If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.co.uk



Apparent Cohesion (kPa) vs Depth below ground level (m).

SITE		LAND OFF MILL GREEN ROAD, PINCHBECK	
CLIENT		AMJ CONSTRUCTION LIMITED	Contract Number 13895
GROUND ENGINEERING L I M I T E D		Tel: 01733-566566 www.groundengineering.co.uk	Date 25/08/16 Figure 1

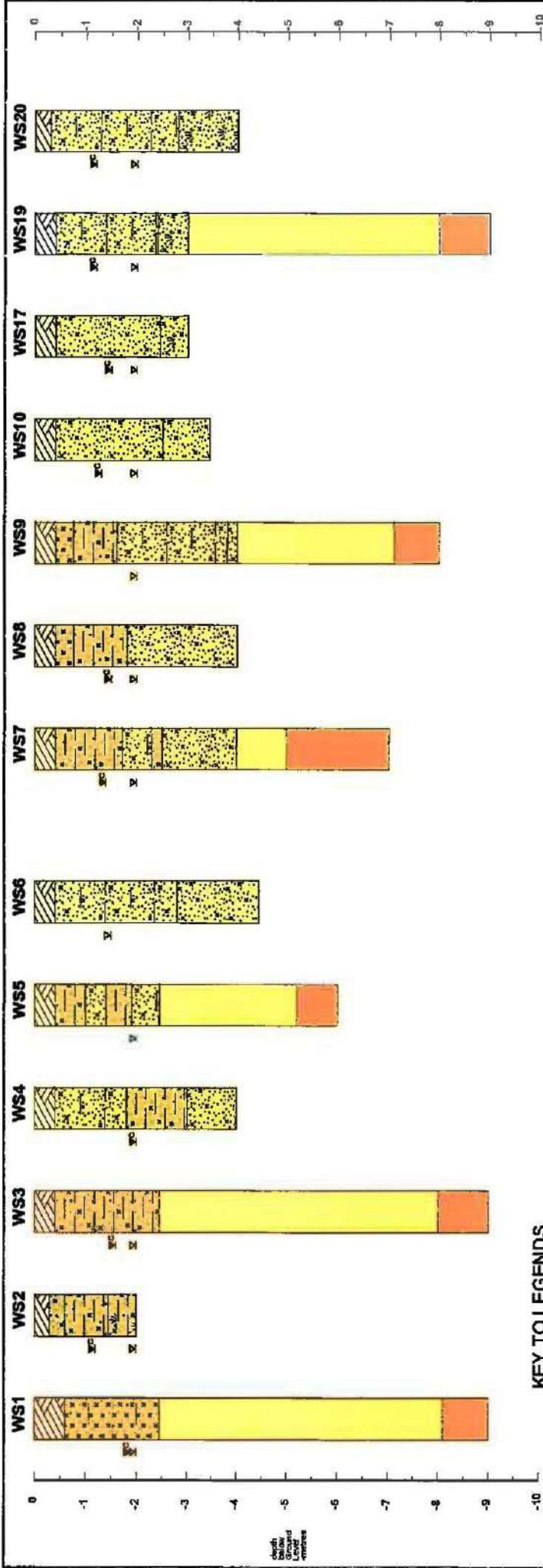


S.P.T. 'N' Value vs Depth below ground level (m).

SITE		LAND OFF MILL GREEN ROAD, PINCHBECK	
CLIENT		AMJ CONSTRUCTION LIMITED	Contract Number 13895
GROUND ENGINEERING LIMITED		Tel: 01733-666666 www.groundengineering.co.uk	Date 25/08/16 Figure 2

NORTH

SOUTH



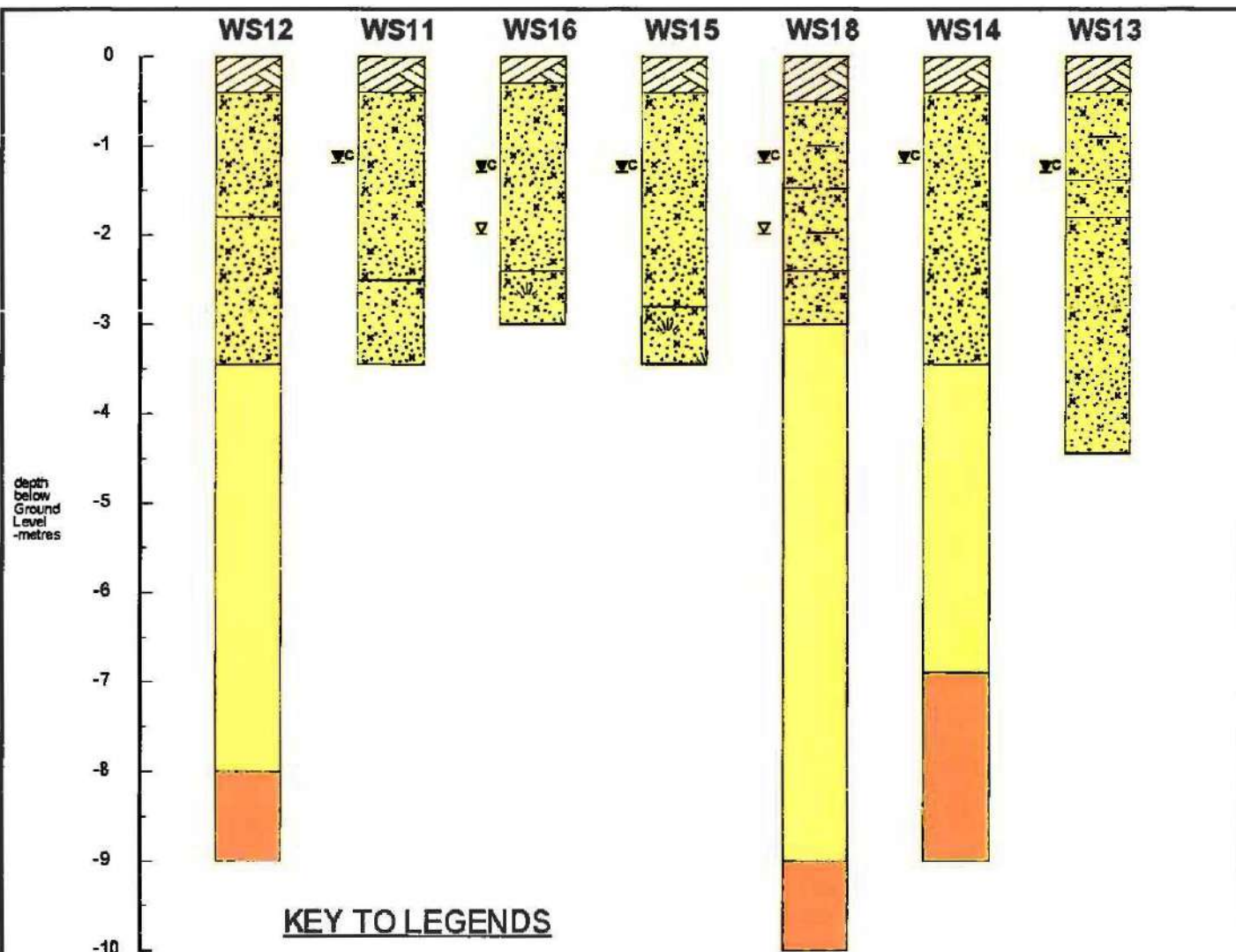
KEY TO LEGENDS

- TOPSOIL
- TIDAL FLAT DEPOSIT
- TIDAL FLAT DEPOSIT
- TIDAL FLAT DEPOSIT-RODDON
- PROBABLE TIDAL FLAT DEPOSIT
- PROBABLE MARINE SAND
- Groundwater Encountered
- Groundwater Rise
- Level on Completion
- Level Casing Withdrawn

SITE	LAND OFF MILL GREEN ROAD, PINCHBECK	Contract No.	13895
CLIENT	AMJ CONSTRUCTION LIMITED	Vertical Scale	1:75
SOL PROFILE		Date	25/05/16
SGROUND ENGINEERING LIMITED, PETERBOROUGH.		Tel (01733) 596566	Fig No 3

NORTH

SOUTH



TOPSOIL



TIDAL FLAT DEPOSIT



TIDAL FLAT DEPOSIT



TIDAL FLAT DEPOSIT-RODDON



PROBABLE TIDAL FLAT DEPOSIT



PROBABLE MARINE SAND



Groundwater Encountered



Groundwater Rise



Level on Completion



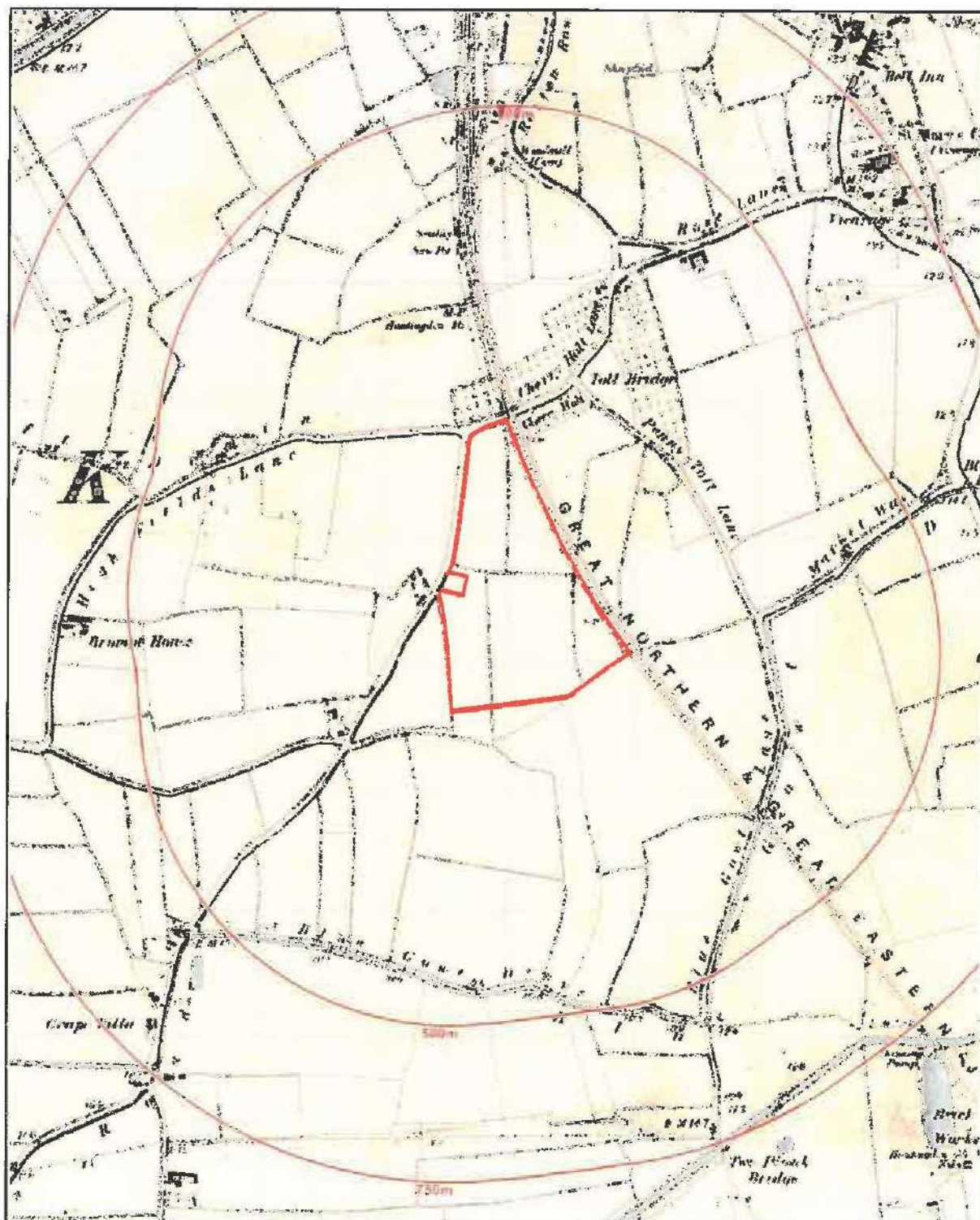
Level Casing Withdrawn

SITE	LAND OFF MILL GREEN ROAD, PINCHBECK	Contract No.	13895
CLIENT	AMJ CONSTRUCTION LIMITED	Soil Profile	Vertical Scale 1:75
GROUND ENGINEERING LIMITED, PETERBOROUGH. Tel (01733) 566566		Date 25/08/16	Fig. No 4

APPENDIX 1

HISTORICAL MAP EXTRACTS

Figure A

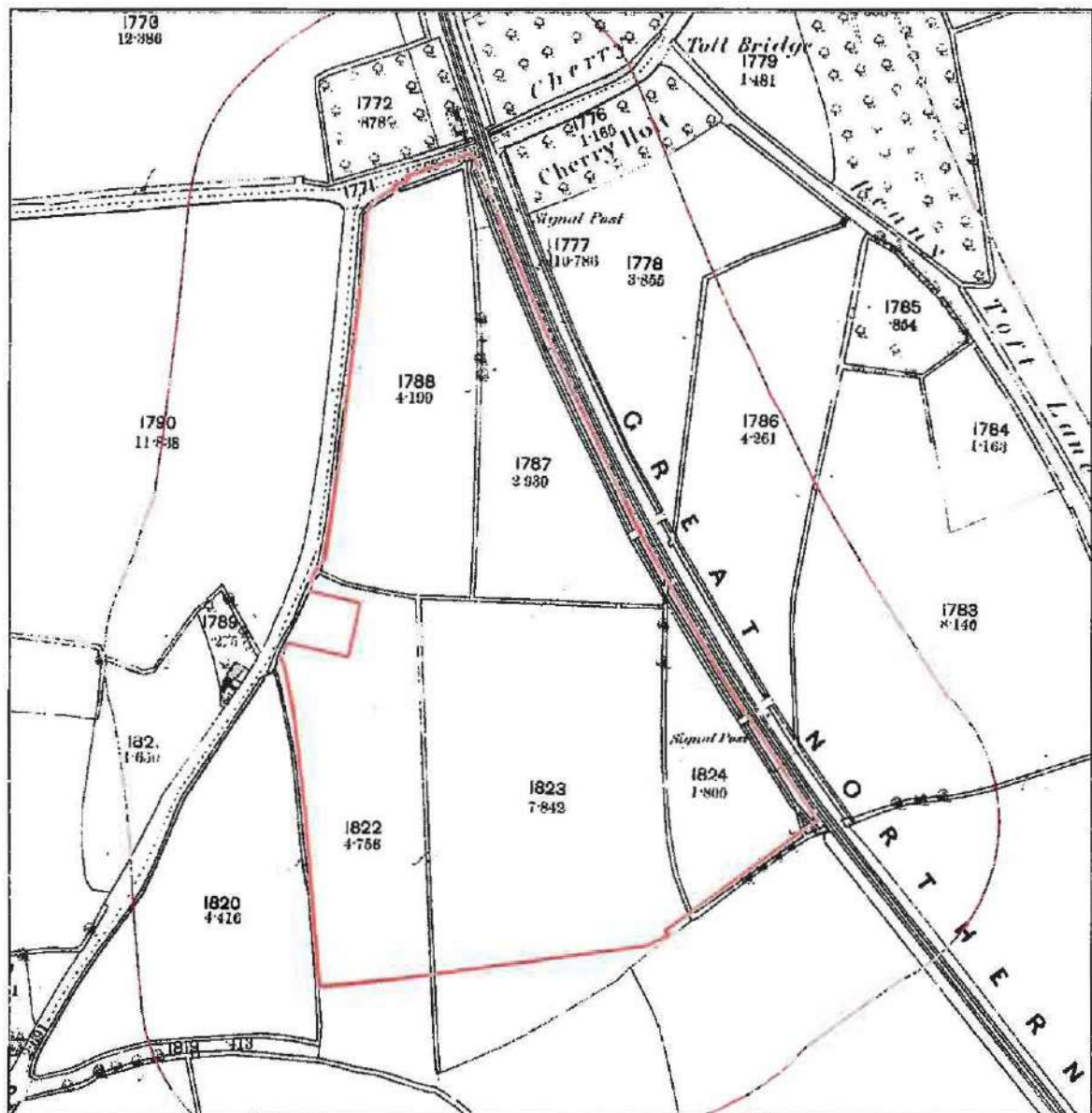


Peterborough Tel : 01733 566566

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Figure B

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Client : AMJ Construction Limited

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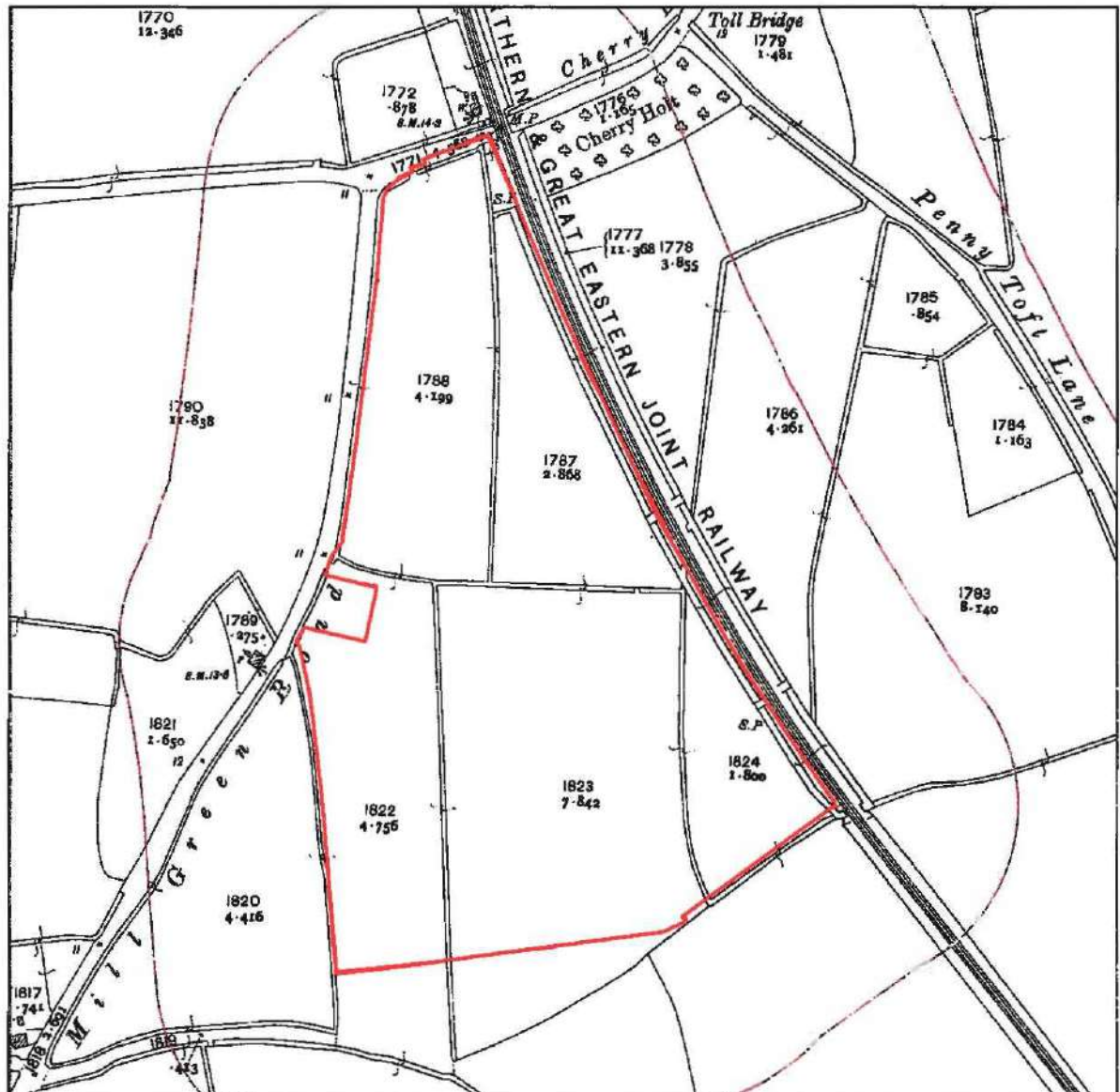
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Site History

Figure C

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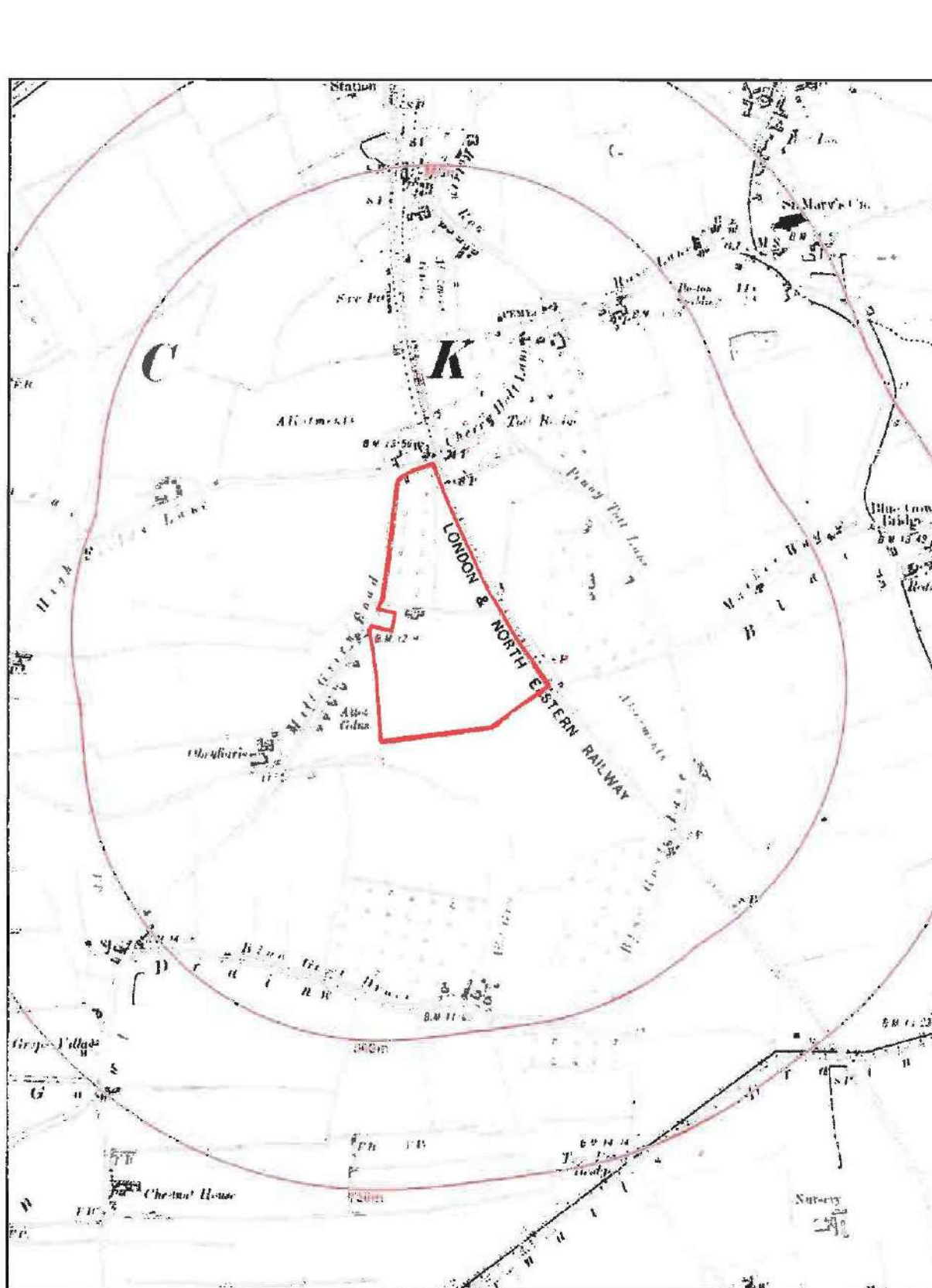
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Figure D

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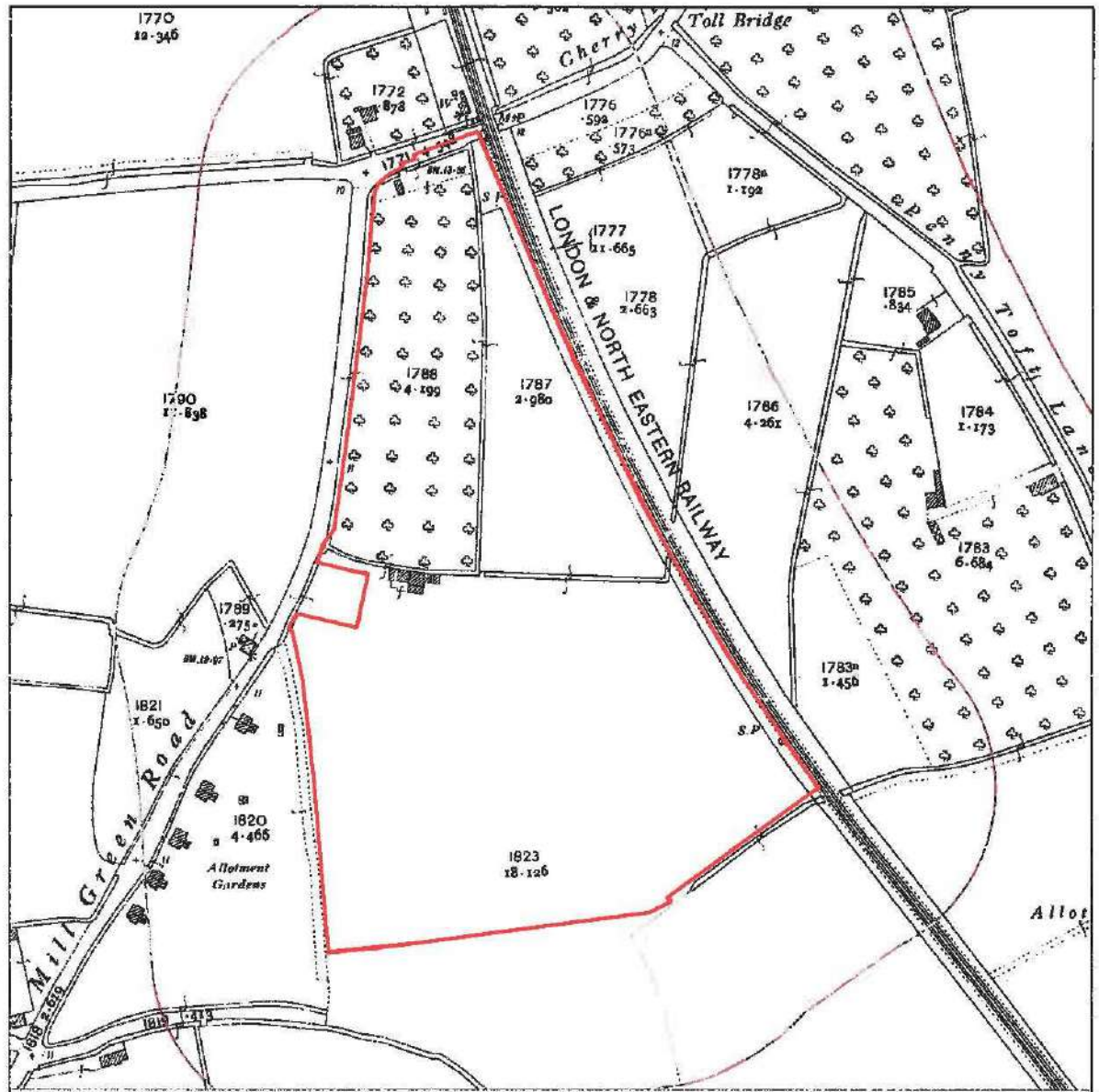
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Site History

Figure E

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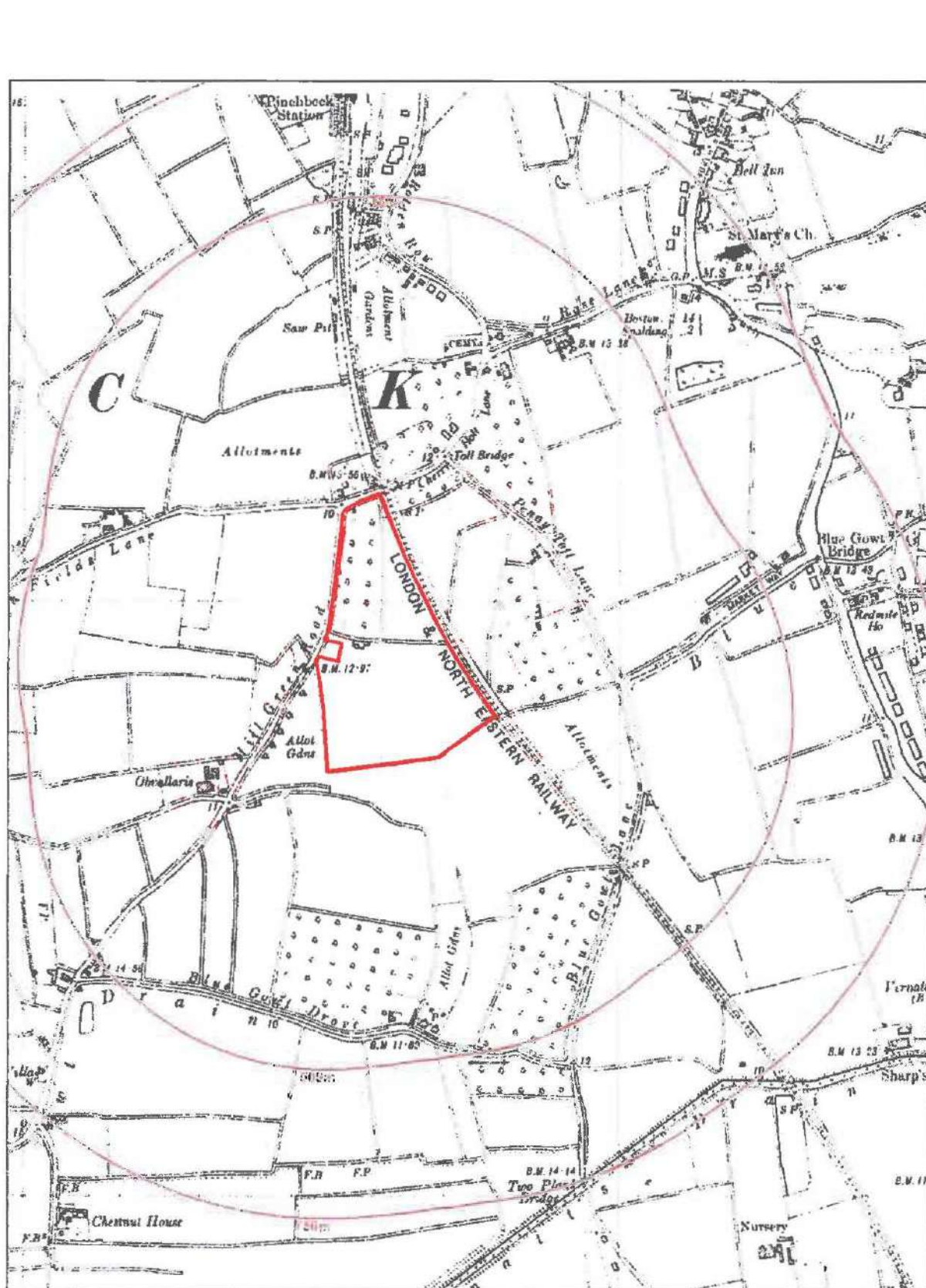
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Site History

Figure F

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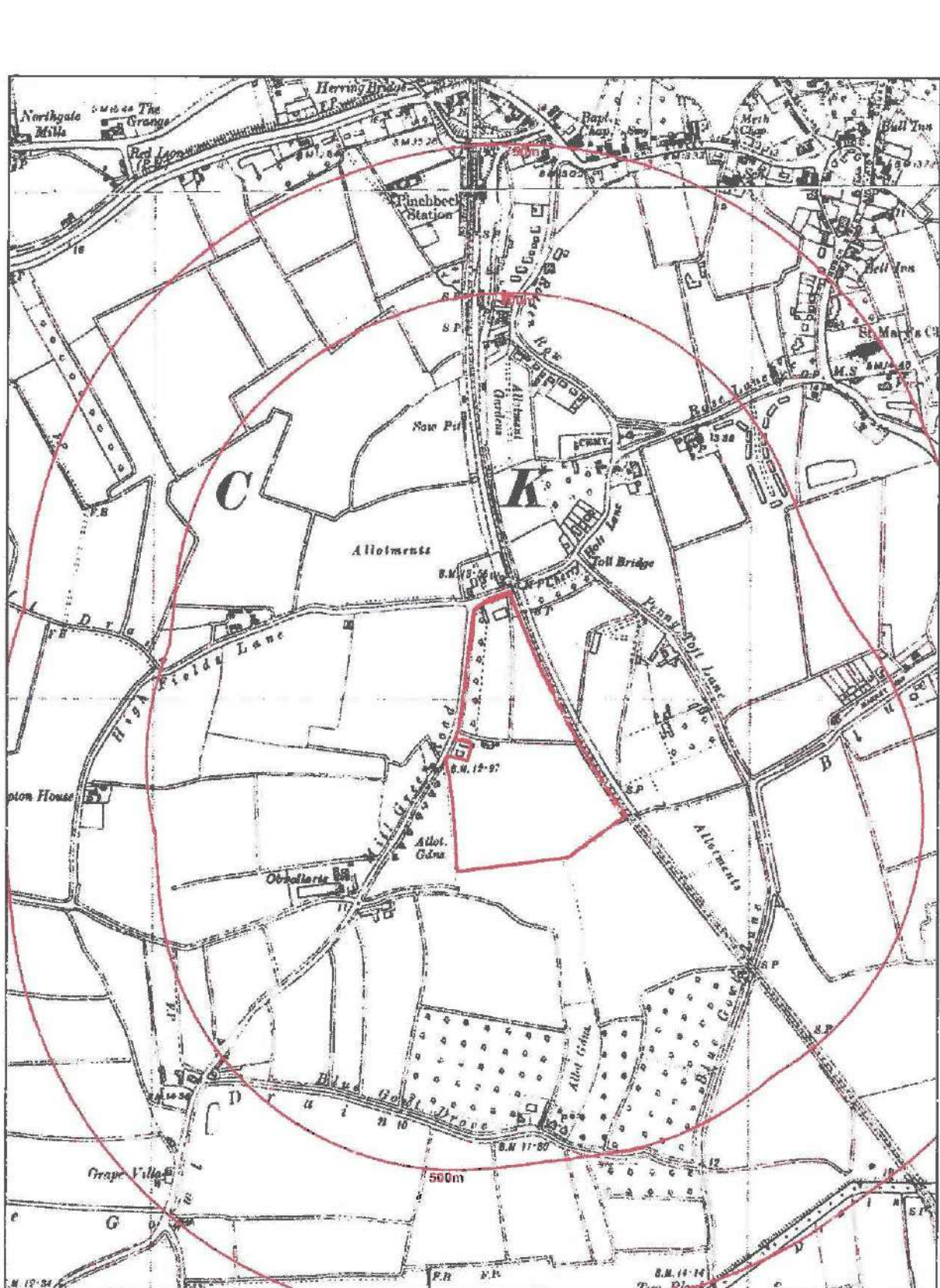
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Site History

Figure G

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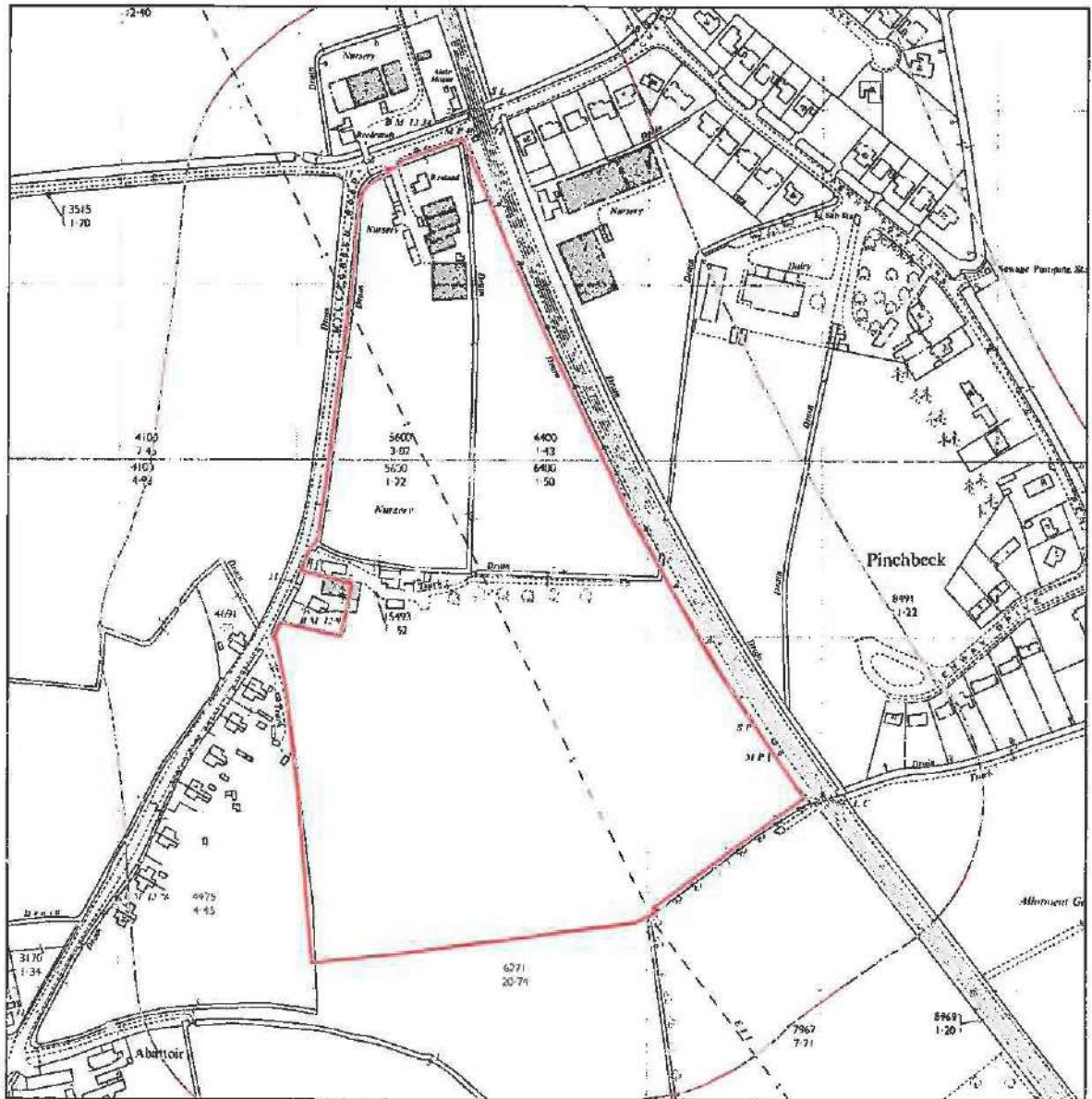
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Site History

Figure H

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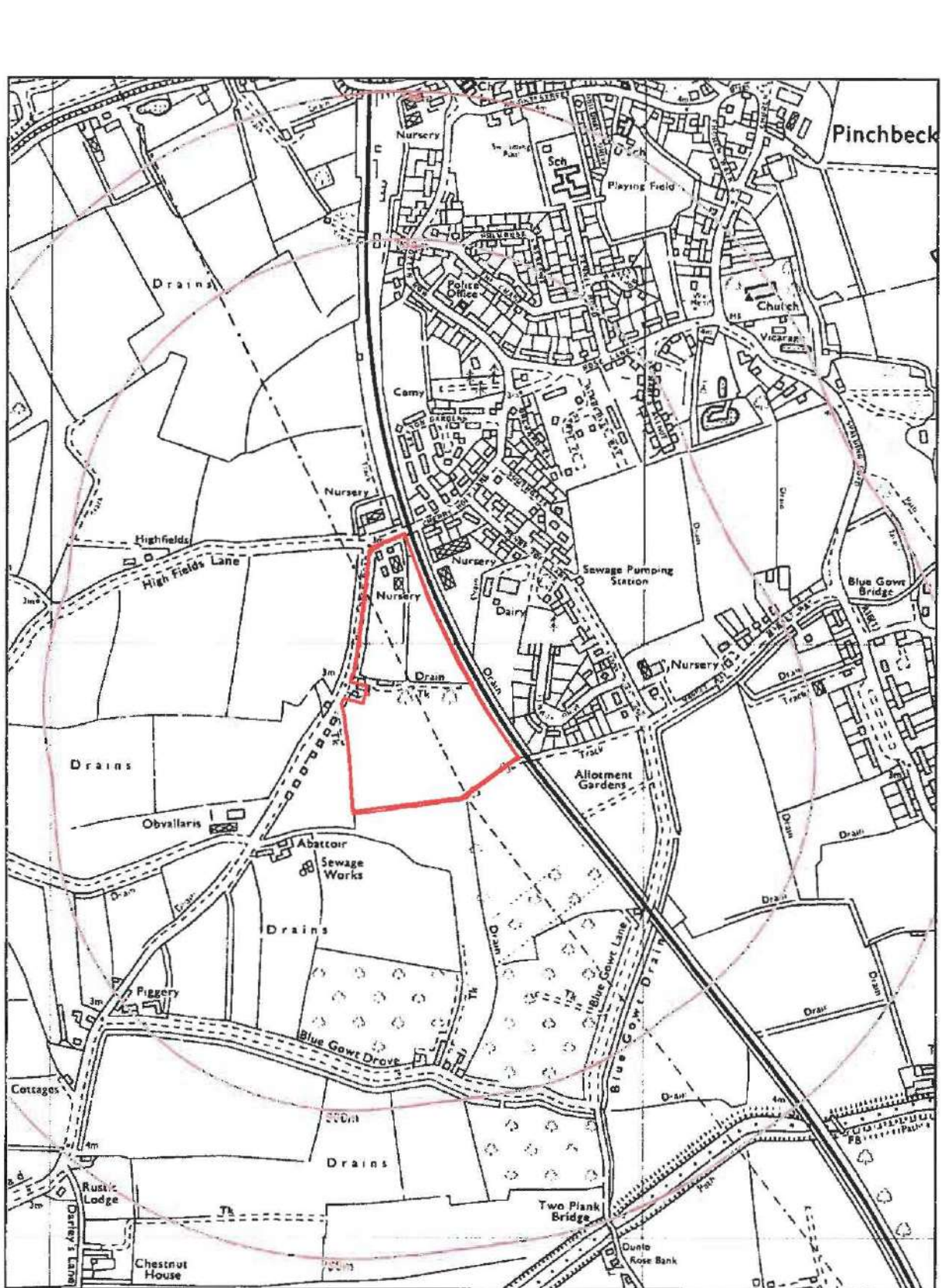
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Site History

Figure 1

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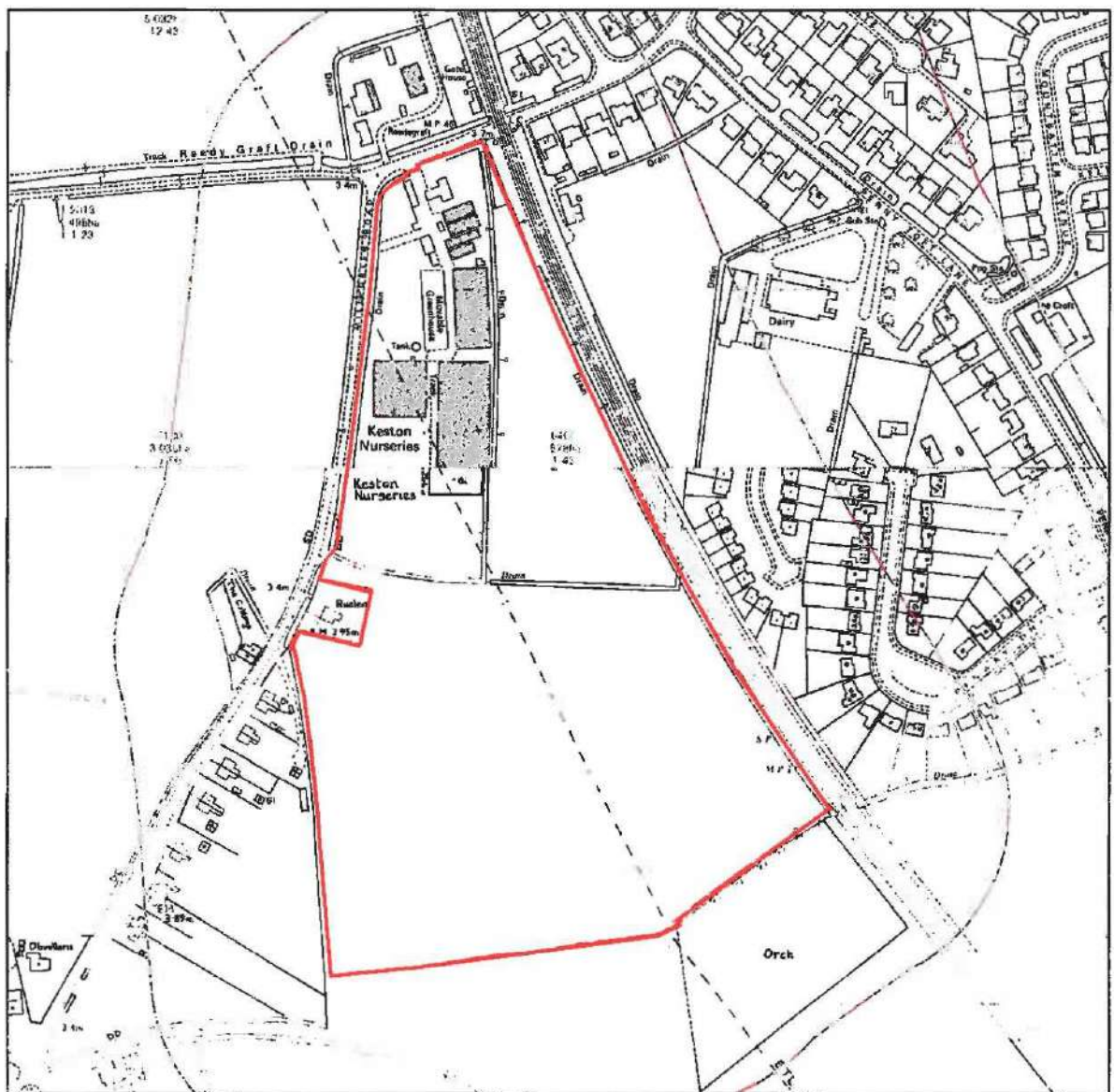
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Figure J

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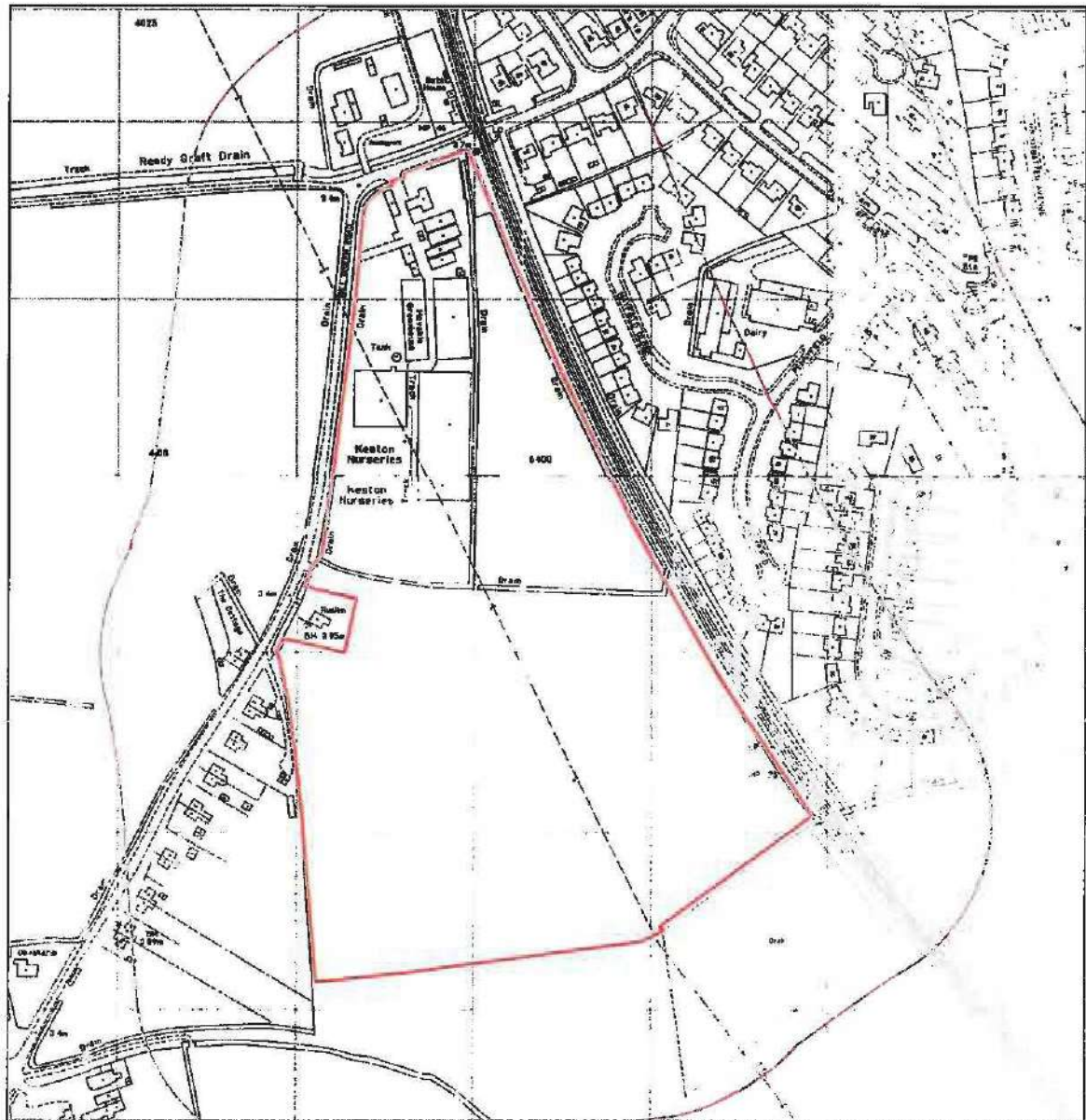
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Site History

Figure K

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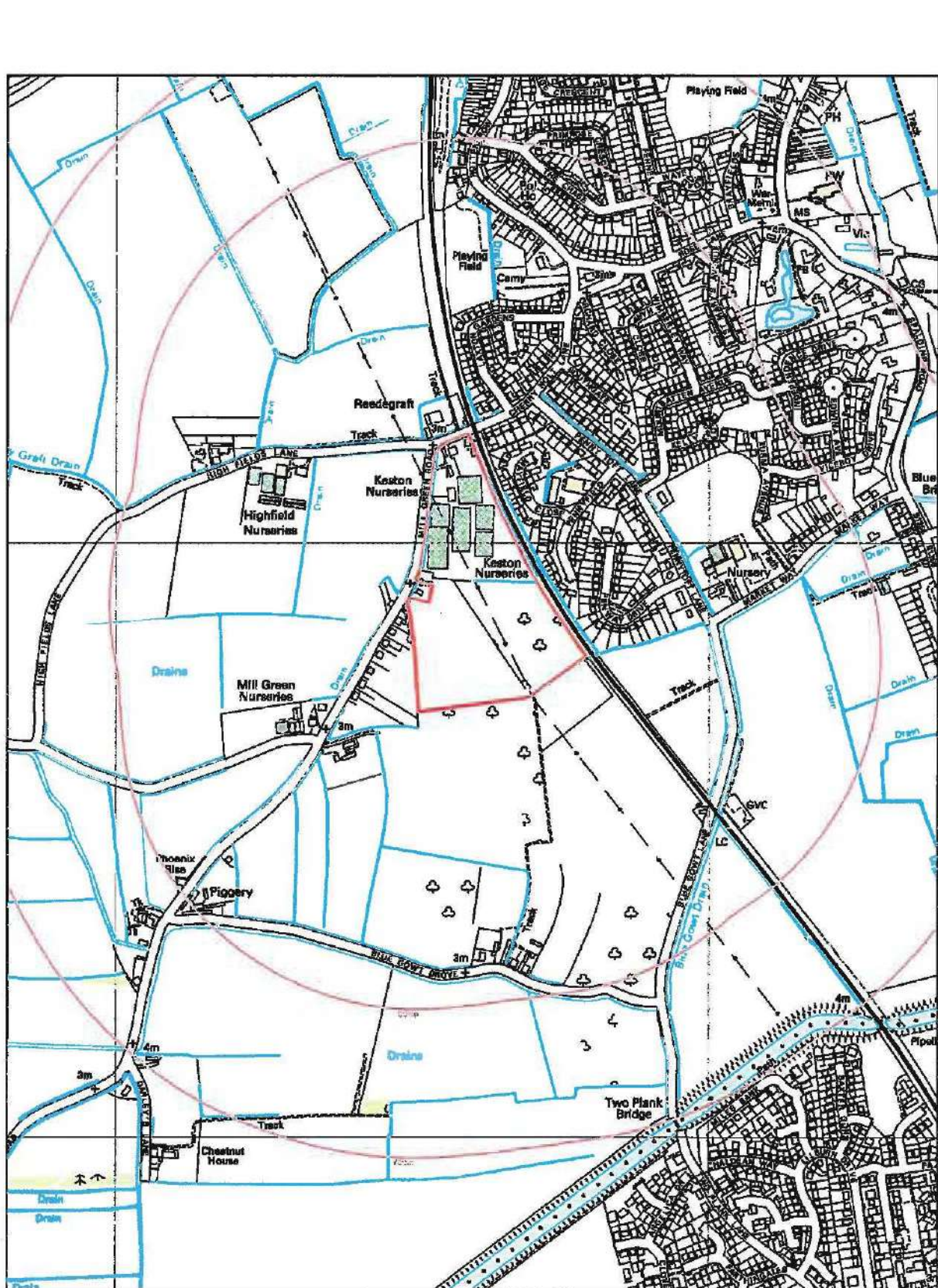
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Site History

Figure L

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Client : AMJ Construction Limited

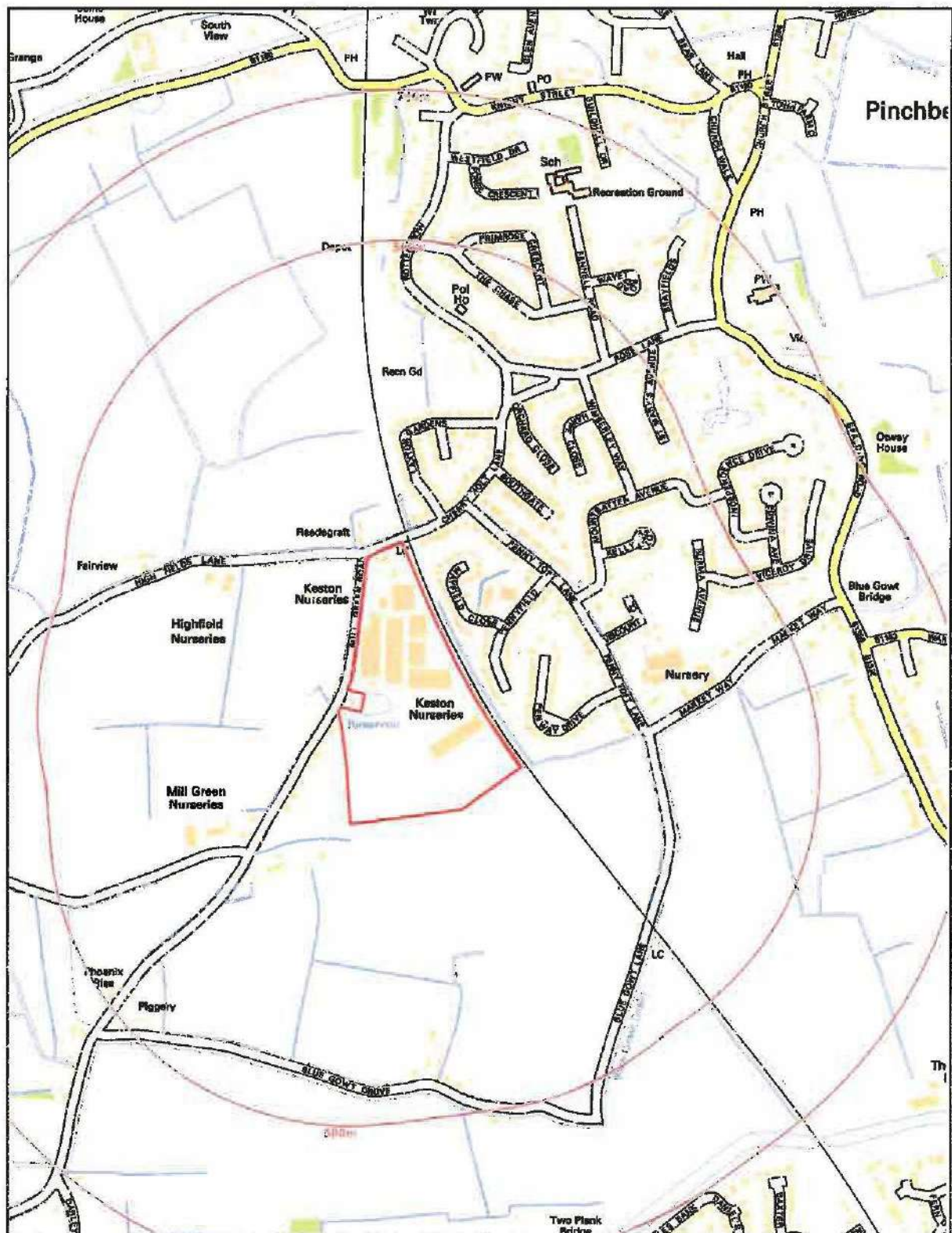
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Project No.

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Figure M



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Site History

Figure N

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Client : AMJ Construction Limited

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Project No.

C13895

APPENDIX 2

ENVIRONMENTAL DATABASE SEARCH

Groundsure Enviro Insight

Address: KESTON NURSERY, MILL GREEN ROAD, SPALDING, PE11 3PU
Date: 6 Jul 2016
Reference: GS-3158229
Client: Ground Engineering Limited



Aerial Photograph Capture date: 16-Sep-2007
Grid Reference: 523694,324931
Site Size: 7.99ha

Report Reference: GS-3158229
Client Reference: SWQG5236

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Overview of Findings

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Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	3	3	28	30
1.2 Additional Information – Historical Tank Database	2	0	3	5
1.3 Additional Information – Historical Energy Features Database	0	0	3	8
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Potentially Infilled Land	0	0	10	6

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	1	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	1
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency Historic Landfill Sites	0	0	0	0	1	2
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	0	0

Section 4: Current Land Use

	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	3	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology

5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?

No

5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?

Yes

5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.

Section 6: Hydrogeology and Hydrology

0-500m

6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?

Yes

6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?

Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	3	9
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	0	0	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500

Section 6: Hydrogeology and Hydrology

0-500m

6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	0	0	1	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	Yes
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Medium
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Not Prone
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Not Applicable

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	1
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	3	0	0	1	1	1
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?

Moderate

9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?

Low

9.1.2 What is the maximum Landslides hazard rating identified on the study site?

Very Low

9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?

Negligible

9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?

Moderate

9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?

Negligible

9.1.6 What is the maximum Running Sand hazard rating identified on the study site?

Moderate

9.2 Radon

9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?

No

10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?

No

10.3 Are there any brine affected areas within 75m of the study site?

No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon.

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

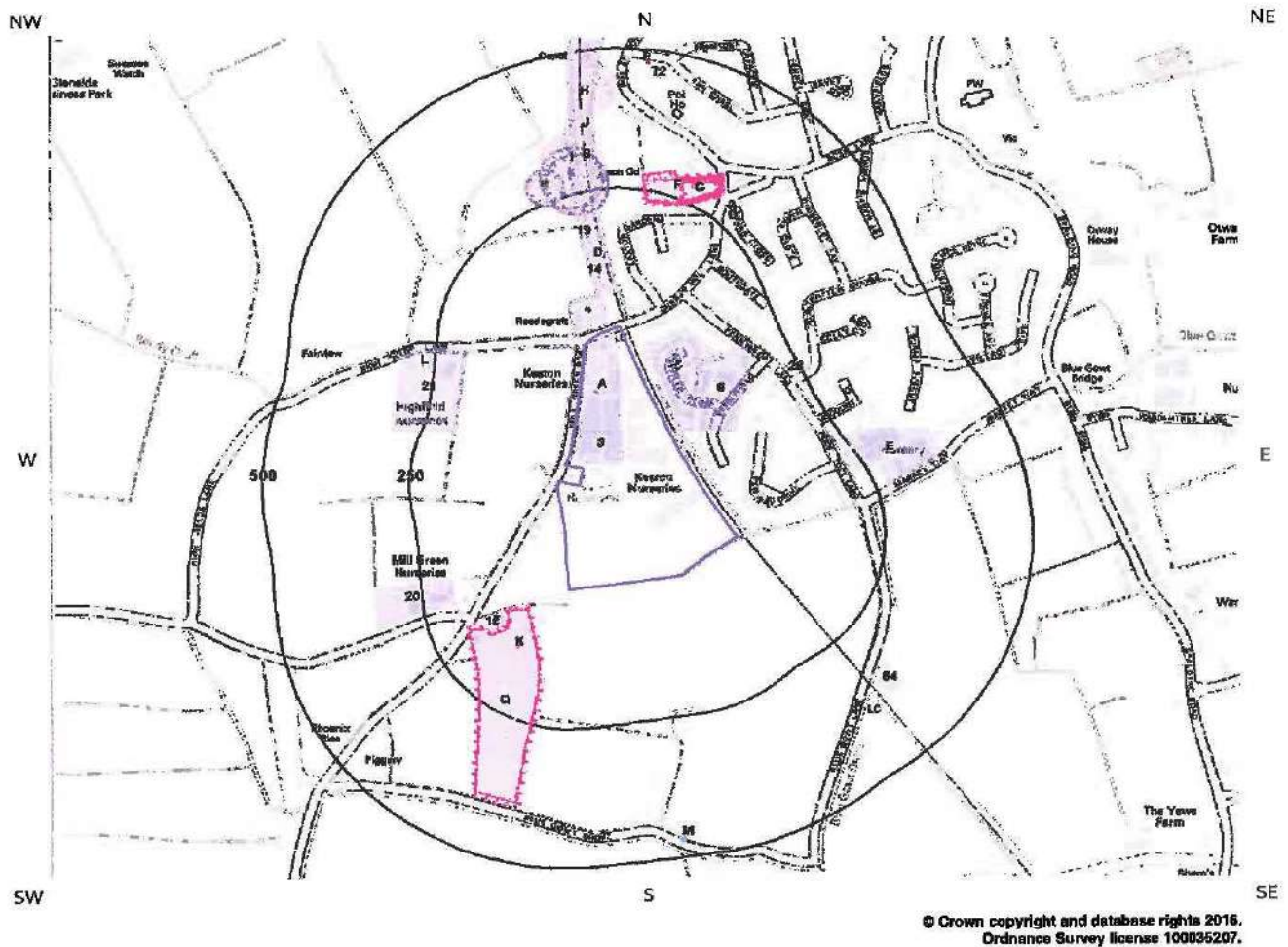
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



1. Historical Industrial Sites

1.1 Potentially Contaminative Uses Identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 64

ID	Distance [m]	Direction	Use	Date
1A	0	On Site	Nurseries	1989
2A	0	On Site	Nursery	1973
3	0	On Site	Nurseries	1990
4	17	NW	Nursery	1973
5	20	E	Nursery	1973
6	33	NE	Dairy	1973
7B	59	N	Railway Sidings	1955
8B	68	N	Railway Sidings	1950
9B	68	NW	Railway Sidings	1938
10C	73	N	Railway Sidings	1929
11C	73	N	Railway Sidings	1929
12D	79	N	Railway Sidings	1903
13Q	79	SW	Sewage Works	1980
14	90	N	Railway Building	1903
15	112	W	Abattoir	1980
16J	119	N	Railway Sidings	1887
17K	125	SW	Unspecified Tank	1980
18D	138	N	Railway Building	1903
19	168	N	Railway Building	1903
20	194	W	Nurseries	1990
21	196	W	Nurseries	1989
22C	211	N	Saw Pit	1903
23C	224	N	Saw Pit	1887
24E	229	NE	Nursery	1990
25E	229	NE	Nursery	1980
26F	231	N	Cemetery	1989
27F	234	N	Cemetery	1973
28	237	NE	Sewage Pumping Station	1973
29R	245	N	Saw Pit	1950
30G	246	NE	Cemetery	1955
31C	247	N	Smithy	1887
32G	249	NE	Cemetery	1950
33G	249	NE	Cemetery	1929
34G	249	NE	Cemetery	1929

35G	251	NE	Cemetery	1938
36C	258	N	Railway Building	1955
37C	259	N	Railway Buildings	1950
38C	264	N	Railway Building	1938
39H	273	N	Railway Sidings	1903
40C	275	N	Saw Pit	1955
41H	276	N	Railway Sidings	1929
42H	276	N	Railway Sidings	1929
43C	279	N	Saw Pit	1929
44C	279	N	Saw Pit	1929
45C	281	N	Saw Pit	1938
46C	281	N	Saw Pit	1938
47C	291	N	Railway Building	1955
48C	296	N	Railway Building	1938
49I	299	N	Smithy	1903
50I	319	N	Railway Building	1955
51I	324	N	Railway Building	1938
52I	324	N	Railway Building	1950
53B	335	N	Railway Building	1955
54	336	SE	Gas Valve Compound	1990
55B	340	N	Railway Building	1950
56B	340	N	Railway Building	1903
57B	341	N	Railway Building	1938
58J	379	N	Corn Windmill	1887
59M	454	S	Unspecified Tank	1990
60H	469	N	Railway Building	1955
61H	476	N	Railway Building	1938
62H	480	N	Railway Building	1903
63H	480	N	Railway Building	1950
64H	480	N	Railway Building	1887

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

10

ID	Distance (m)	Direction	Use	Date
65A	0	On Site	Unspecified Tank	1986
66A	0	On Site	Unspecified Tank	1984
67K	129	SW	Unspecified Tank	1967
68K	129	SW	Unspecified Tank	1995
69K	131	SW	Unspecified Tank	1988

70L	265	W	Unspecified Tank	1984
71L	269	W	Unspecified Tank	1986
72	453	N	Unspecified Tank	1967
73M	461	S	Unspecified Tank	1995
74M	462	S	Unspecified Tank	1988

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 11

ID	Distance (m)	Direction	Use	Date
75N	187	NE	Electricity Substation	1984
76N	187	NE	Electricity Substation	1967
77N	188	NE	Electricity Substation	1965
78O	270	NE	Electricity Substation	1986
79O	271	NE	Electricity Substation	1984
80O	275	NE	Electricity Substation	1967
81O	276	NE	Electricity Substation	1965
82P	474	N	Electricity Substation	1984
83P	474	N	Electricity Substation	1967
84P	475	N	Electricity Substation	1965
85P	475	N	Electricity Substation	1986

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

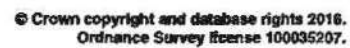
Database searched and no data found.

1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 16

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
86Q	79	SW	Sewage Works	1980
87C	211	N	Saw Pit	1903
88C	224	N	Saw Pit	1887
89F	231	N	Cemetery	1989
90F	234	N	Cemetery	1973
91R	245	N	Saw Pit	1950
92G	246	NE	Cemetery	1955
93G	249	NE	Cemetery	1950
94G	249	NE	Cemetery	1929
95G	249	NE	Cemetery	1929
96G	251	NE	Cemetery	1938
97C	275	N	Saw Pit	1955
98C	279	N	Saw Pit	1929
99C	279	N	Saw Pit	1929
100C	281	N	Saw Pit	1938
101C	281	N	Saw Pit	1938



- | | | | | | |
|---|--------------------|---|-------------------------------|---|--|
|  | Site Outline |  | Recorded Pollution Incident |  | RAS 3 & 4 Authorisations |
|  | Search Buffers (m) |  | Dangerous Substances (List 1) |  | Part A(1) Authorised Processes and Historic IPC Authorisations |
|  | Search Buffers (m) |  | Dangerous Substances (List 2) |  | Part A(2) and Part B Authorised Processes |
|  | Search Buffers (m) |  | Water Industry Referrals |  | COMAH / NIHS Sites |
|  | Search Buffers (m) |  | Licenced Discharge Consents |  | Sites Determined as Contaminated Land |
|  | Search Buffers (m) |  | Red List Discharge Consents |  | Hazardous Substance Consents and Enforcements |

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

1

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
2	181	SW	523350 324630	Address: PREMISES OF DAVID PARKER HOMES LTD, MILL GREEN ROAD, SPALDING Effluent Type: UNSPECIFIED Permit Number: PR5LF5120 Permit Version: 1 Receiving Water: Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 20/01/1986 Effective Date: 20-Jan-1986 Revocation Date: 16/09/1997

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

2.3 Environment Agency Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

1

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
1	261	SW	523302 324558	Incident Date: 06-Feb-2002 Incident Identification: 57059 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Vegetable Cuttings and Deposits Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

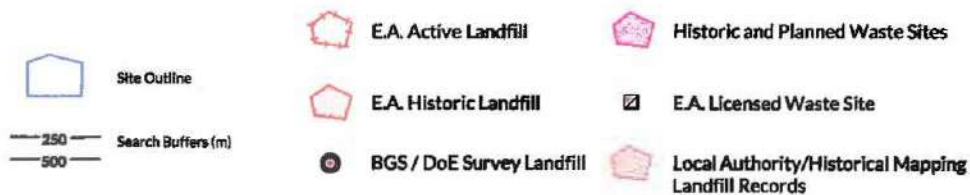
0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

3

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	793	SE	524300 324000	Site Address: Woolram Wygate, Spalding, Lincolnshire Waste Licence: - Site Reference: RD7-71-01/89, SH-71-01/89, 2500/5041 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1055	SE	524300 324000	Site Address: Woolram Wygate, Spalding, Lincolnshire Waste Licence: - Site Reference: RD7-71-01/89, SH-71-01/89, 2500/5041 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1127	SE	524300 324000	Site Address: Woolram Wygate, Spalding, Lincolnshire Waste Licence: - Site Reference: RD7-71-01/89, SH-71-01/89, 2500/5041 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

3.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

0

Database searched and no data found.

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

3

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	178	W	Houghton Produce Ltd	523333 324697	Fengate Road, Pinchbeck, Spalding, PE11 3PS	Fruit, Flower and Vegetable Growers	Farming
2	208	W	Silo	523301 324717	PE11	Hoppers and Silos	Farming
3	237	NE	Pumping Station	523881 325122	PE11	Water Pumping Stations	Industrial Features

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site:

0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TFD	TIDAL FLAT DEPOSITS	CLAY AND SILT [UNLITHIFIED DEPOSITS CODING SCHEME]

5.3 Bedrock and Solid Geology

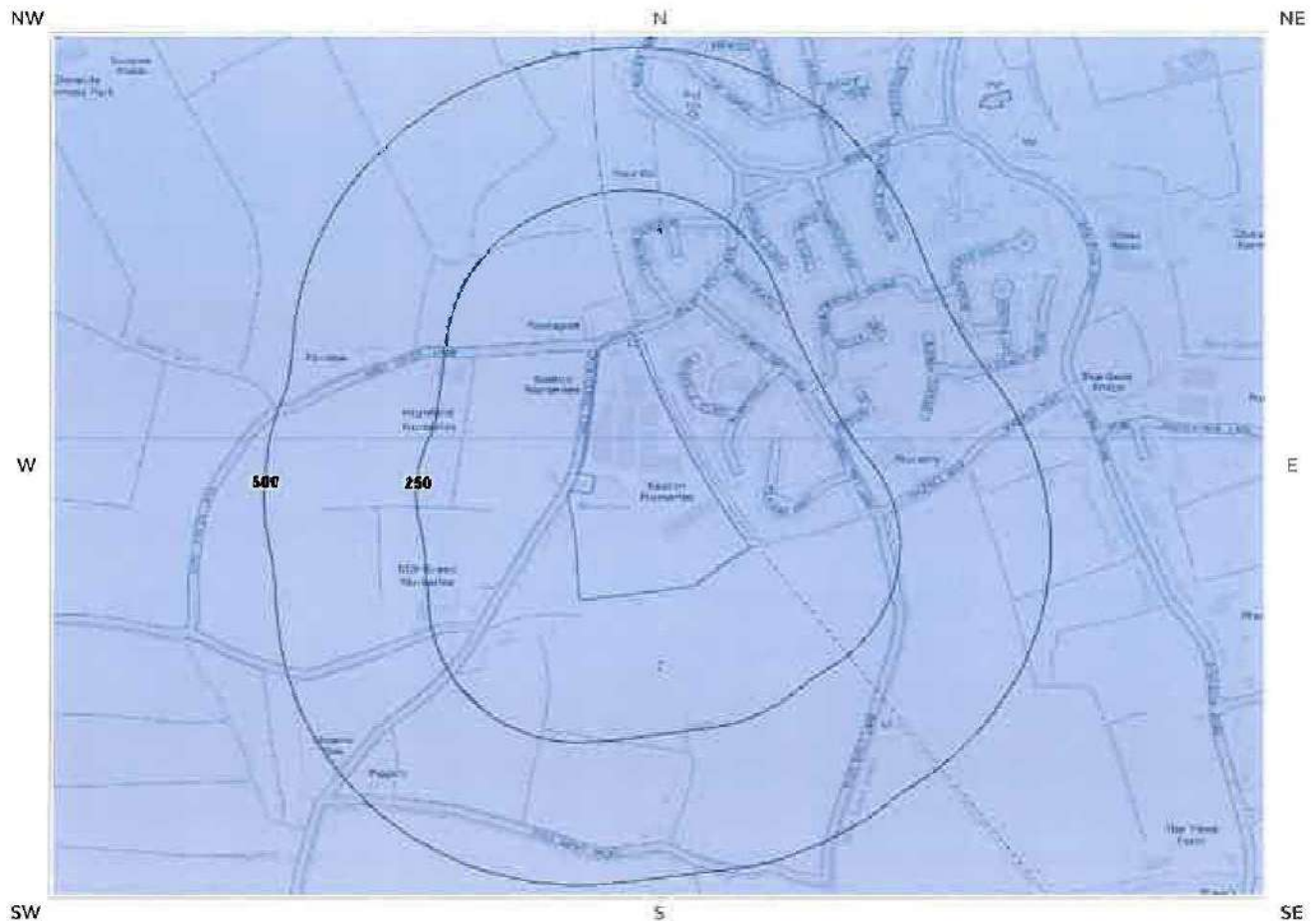
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
OXO-MDST	OXFORD CLAY FORMATION	MUDSTONE

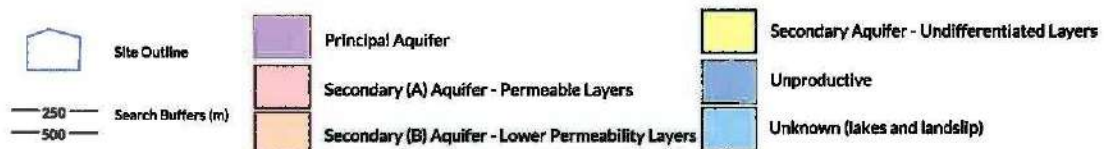
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

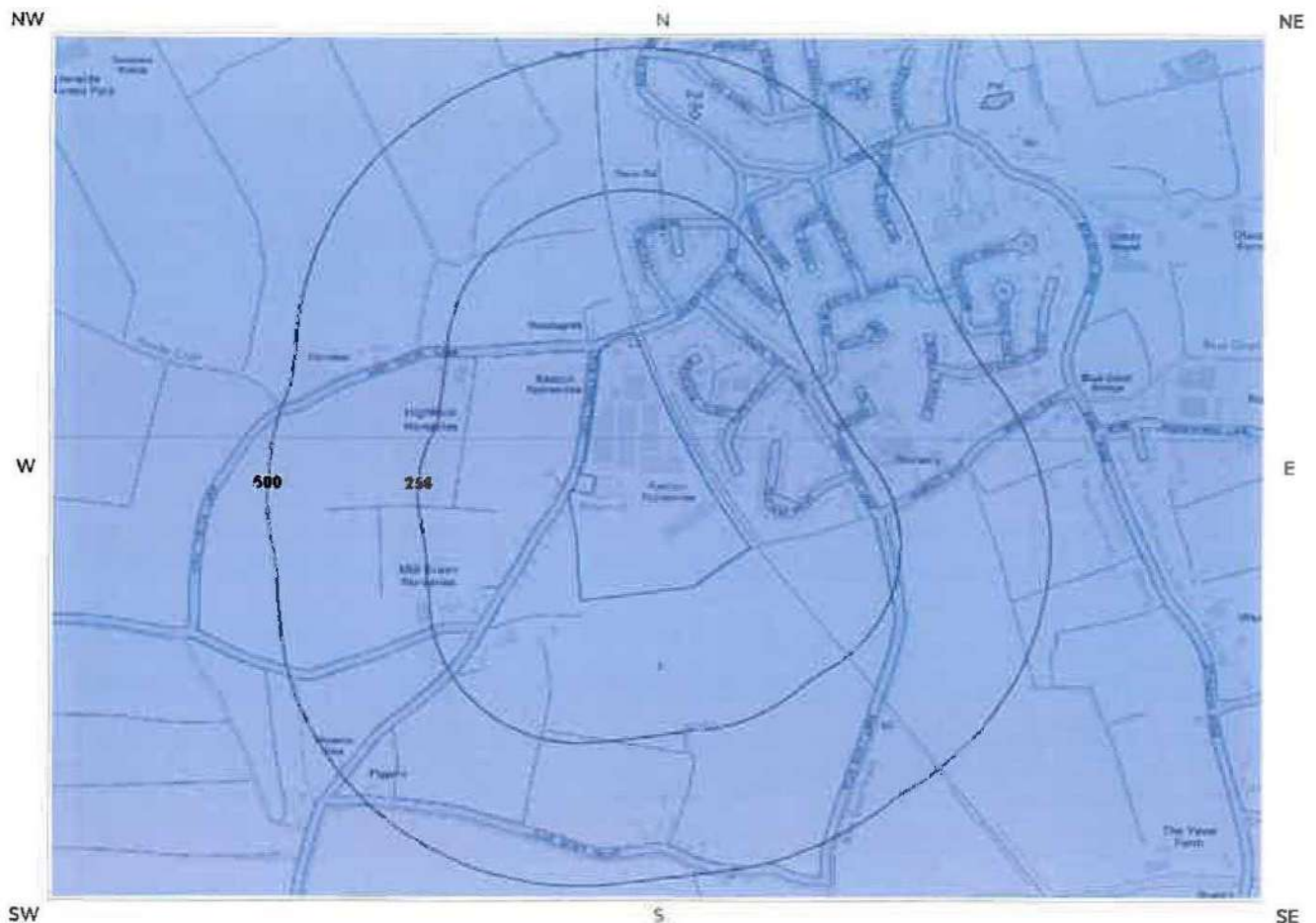
6a. Aquifer Within Superficial Geology



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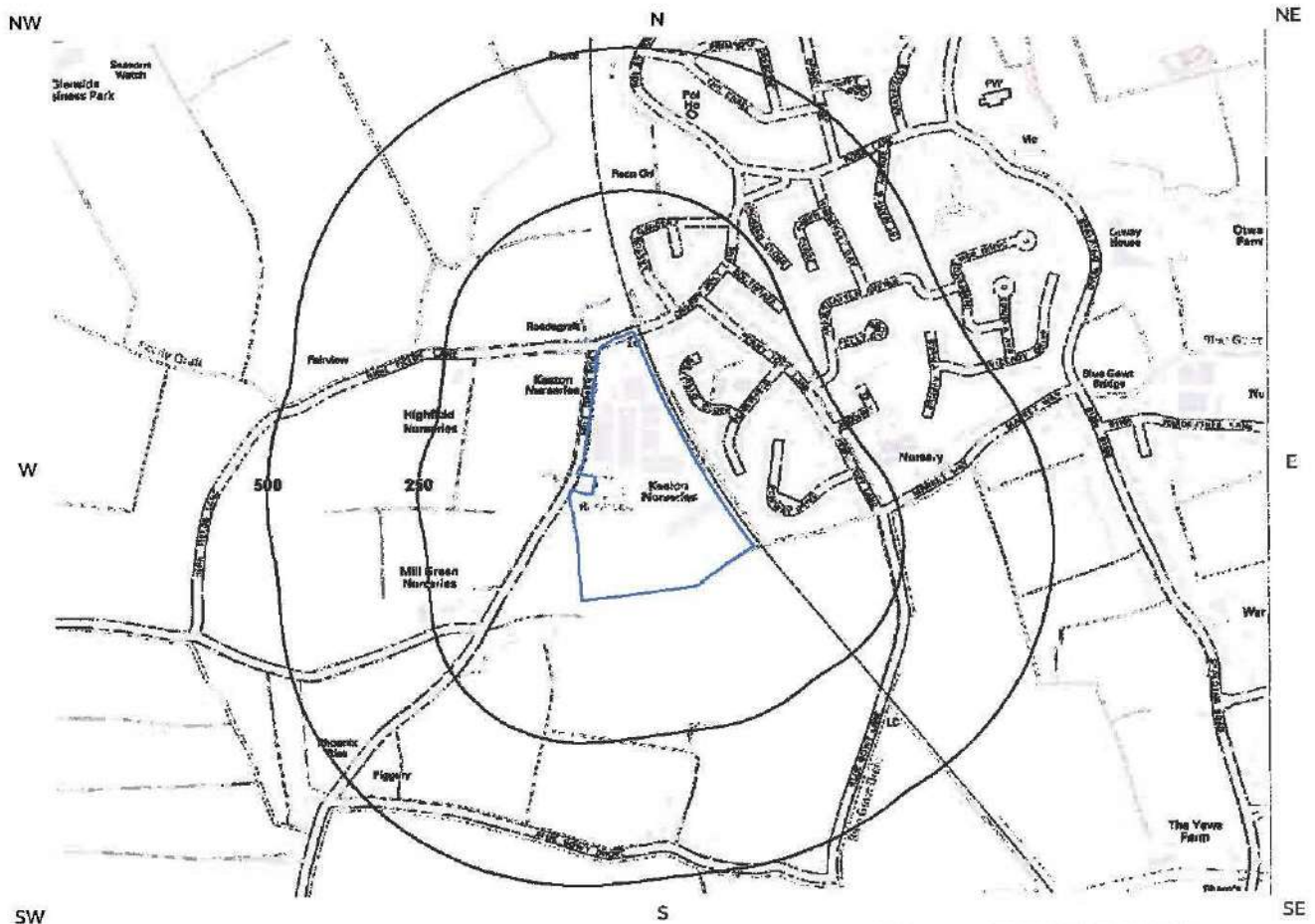
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



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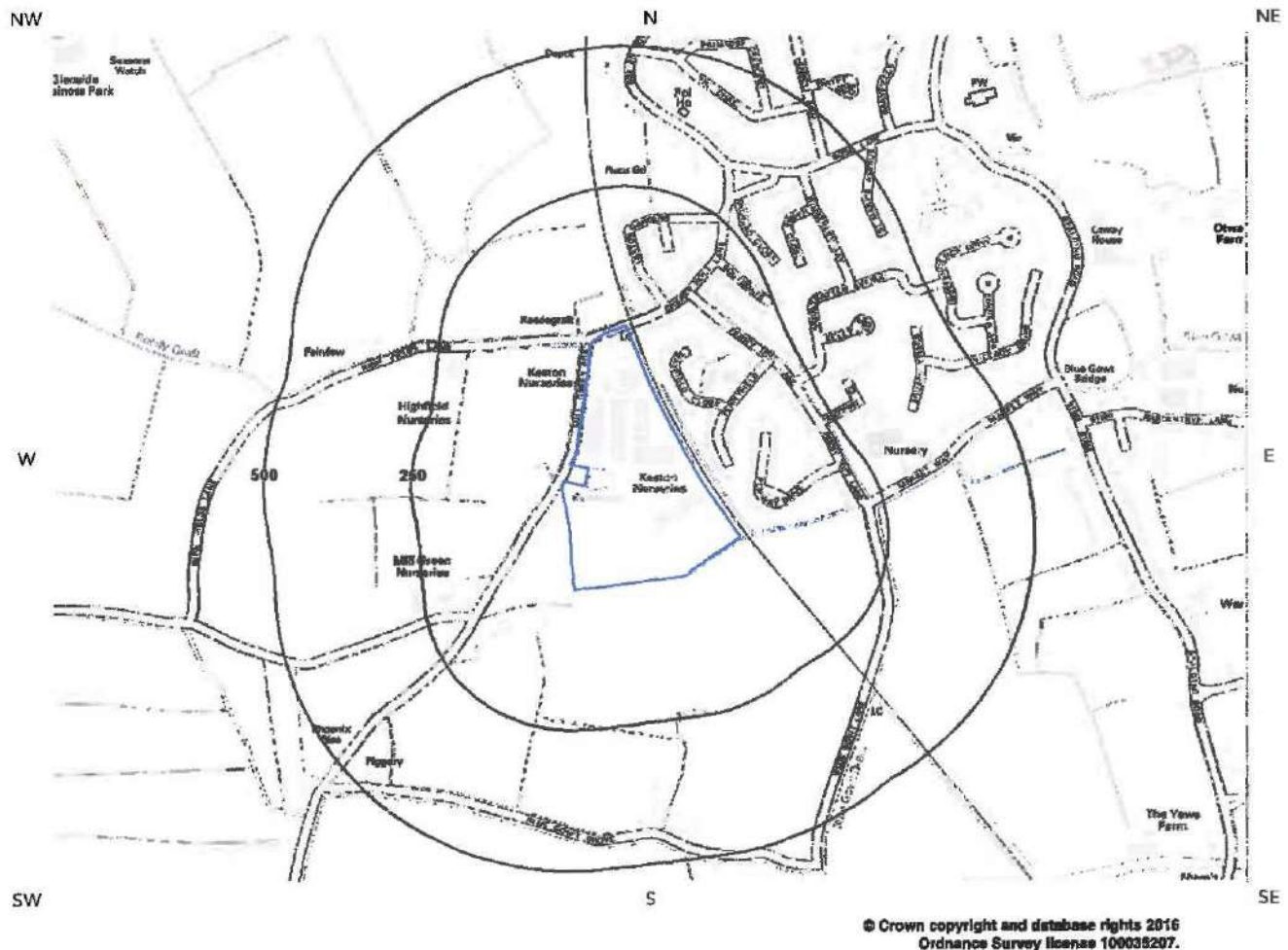
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



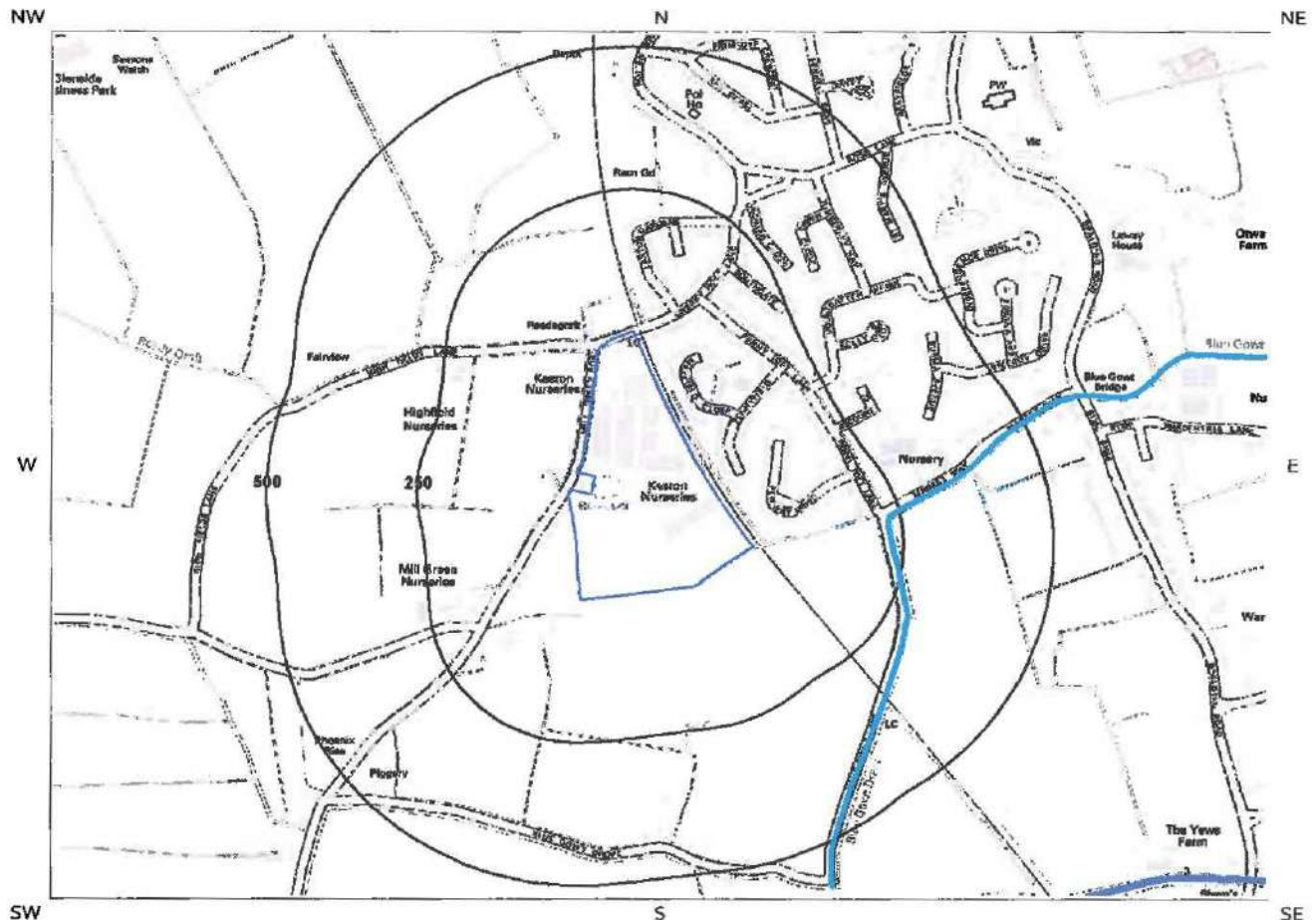
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6d. Hydrogeology – Source Protection Zones within confined aquifer



6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? **Yes**

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? **Yes**

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
Not shown	1504	W	522070 324280	Status: Historical Licence No: 5/31/14/*G/0007 Details: General Farming & Domestic Direct Source: Ground Water Source Of Supply Point: Bore Chase Farm Pinchbeck Data Type: Point Name: MOLSON Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 1/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/2/1979 Version End Date:
Not shown	1513	W	522070 324250	Status: Historical Licence No: 5/31/14/*G/0007 Details: General Farming & Domestic Direct Source: Ground Water Source Of Supply Point: Borehole - Chase Farm Data Type: Point Name: MOLSON Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: NS834 Original Start Date: 1/2/1966 Expiry Date: - Issue No: 101 Version Start Date: 23/8/1999 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
Not shown	767	S	523900 324000	Status: Active Licence No: 5/31/14/*S/0117 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Vernatts Drains - South Holland Data Type: Line Name: C W DOBBS & SON LTD Annual Volume (m³): 5455 Max Daily Volume (m³): 1027 Application No: N1226 Original Start Date: 1/3/1966 Expiry Date: - Issue No: 101 Version Start Date: 29/11/2001 Version End Date:
Not shown	820	N	524550 325970	Status: Historical Licence No: 5/31/14/*S/0247 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Captains Drain "e - F" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135000 Max Daily Volume (m³): 8000 Application No: NS761 Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:
Not shown	821	N	524550 325970	Status: Active Licence No: 5/31/14/*S/0247 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Captains Drain "e - F" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135000 Max Daily Volume (m³): 8000 Application No: NS761 Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1361	NW	522600 326140	Status: Active Licence No: 4/30/12/*S/0179 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Unnamed Farm Dyke Pinchbeck Data Type: Point Name: LINCOLNSHIRE FIELD PRODUCTS LTD	Annual Volume (m³): 22730 Max Daily Volume (m³): 1455 Application No: NA469 Original Start Date: 1/3/1966 Expiry Date: - Issue No: 101 Version Start Date: 12/1/2006 Version End Date:
Not shown	1368	NW	522600 326150	Status: Historical Licence No: 4/30/12/*S/0179 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Unnamed Farm Dyke Pinchbeck Data Type: Point Name: GRANGE FARM PINCHBECK	Annual Volume (m³): 22730 Max Daily Volume (m³): 1454.75 Application No: - Original Start Date: 1/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/5/1986 Version End Date:
Not shown	1371	NW	522950 326400	Status: Active Licence No: 4/30/12/*S/0179 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Unnamed Farm Dyke Pinchbeck Data Type: Point Name: LINCOLNSHIRE FIELD PRODUCTS LTD	Annual Volume (m³): 22730 Max Daily Volume (m³): 1455 Application No: NA469 Original Start Date: 1/3/1966 Expiry Date: - Issue No: 101 Version Start Date: 12/1/2006 Version End Date:
Not shown	1622	E	525340 324320	Status: Active Licence No: 5/31/14/*S/0014 Details: Non-Evaporative Cooling Direct Source: Surface Water Source Of Supply Point: Vernatts Drain Data Type: Line Name: SPALDING ENERGY CO LTD	Annual Volume (m³): 2727660 Max Daily Volume (m³): 22912 Application No: NS967 Original Start Date: 1/1/1966 Expiry Date: - Issue No: 101 Version Start Date: 2/2/2002 Version End Date:
Not shown	1709	NW	522620 326600	Status: Active Licence No: 4/30/12/*S/0179 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Unnamed Farm Dyke Pinchbeck Data Type: Point Name: LINCOLNSHIRE FIELD PRODUCTS LTD	Annual Volume (m³): 22730 Max Daily Volume (m³): 1455 Application No: NA469 Original Start Date: 1/3/1966 Expiry Date: - Issue No: 101 Version Start Date: 12/1/2006 Version End Date:
Not shown	1720	NW	522600 326600	Status: Historical Licence No: 4/30/12/*S/0179 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Unnamed Farm Dyke Pinchbeck Data Type: Point Name: GRANGE FARM PINCHBECK	Annual Volume (m³): 22730 Max Daily Volume (m³): 1454.75 Application No: - Original Start Date: 1/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/5/1986 Version End Date:
Not shown	1794	W	521000 325300	Status: Active Licence No: 5/31/14/*S/0116A Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: River Glen, West Pinchbeck Data Type: Line Name: SNEATH	Annual Volume (m³): 32000 Max Daily Volume (m³): 1900 Application No: - Original Start Date: 1/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/5/1996 Version End Date:
Not shown	1882	NW	521900 326080	Status: Active Licence No: 4/30/12/*S/0207 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Graft Drain(& Tribs)pinchbeck Data Type: Line Name: F TIPLER & SONS PINCHBECK LTD	Annual Volume (m³): 4546 Max Daily Volume (m³): 363.69 Application No: - Original Start Date: 1/12/1967 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2004 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1952	W	520800 325250	Status: Active Licence No: 4/30/12/*5/0184 Details: Spray Irrigation - Direct Direct Source: Surface Water Source Of Supply Point: Farm Drains Pinchbeck West Data Type: Line Name: SNEATH Annual Volume (m³): 10274 Max Daily Volume (m³): 436 Application No: - Original Start Date: 1/9/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/4/1998 Version End Date:

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

No

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site?

No

Database searched and no data found.

6.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site?

No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	227	E	River Name: Blue Gowt Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

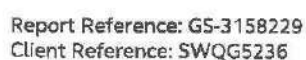
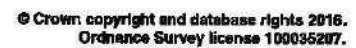
6.11 Surface Water Features

Are there any surface water features within 250m of the study site?

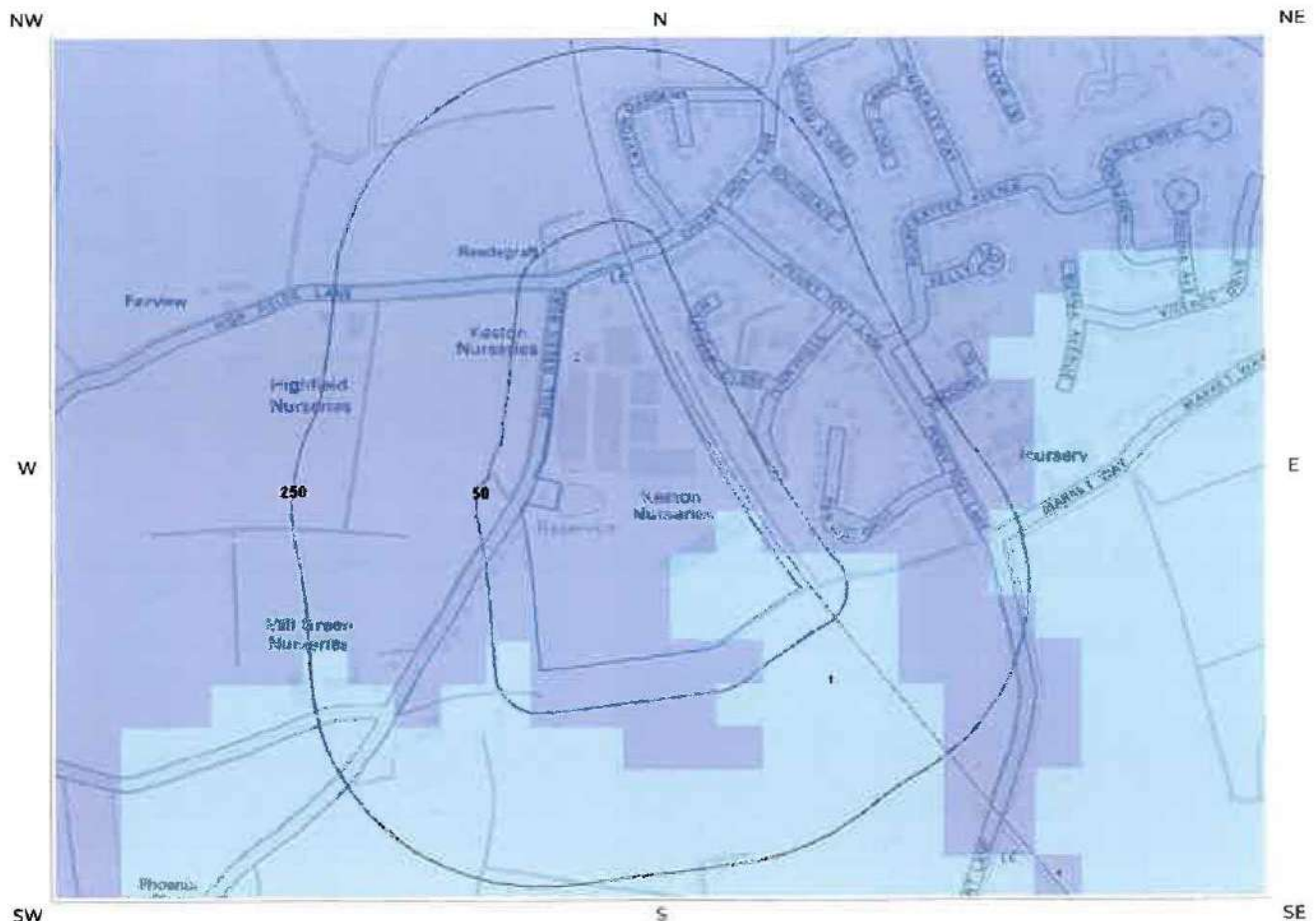
Yes

The following surface water records are not represented on mapping:

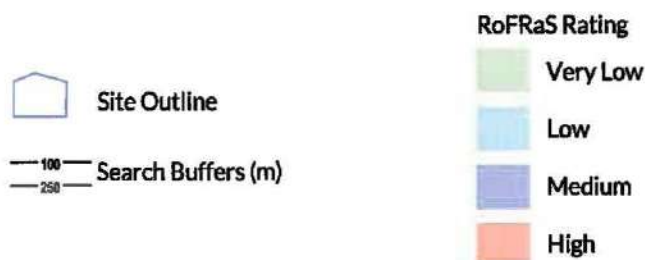
Distance (m)	Direction
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
7	N
9	W
14	NW
15	NE
25	S
40	NW
97	SW
127	W
132	NE
145	E
159	E
174	NE
177	W
188	NE
189	SW
202	NE
213	E
213	NE
214	NE
224	E
227	N
227	NE
230	NE
232	SW
233	E
246	E



7b. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency Zone 2 floodplain?

Yes

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1	0	On Site	08-Feb-2016	Zone 2 - (Fluvial /Tidal Models)
2	0	On Site	08-Feb-2016	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency Zone 3 floodplain?

Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1	0	On Site	23-Feb-2016	Zone 3 - (Fluvial Models)

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite?

Medium

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Medium (greater than 1 in 100 but less than 1 in 30) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS flood Risk
----	--------------	-----------	-------------------

1	0.0	On Site	Low
2	0.0	On Site	Medium

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? No

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Not Prone

The area is not considered to be prone to groundwater flooding based on rock type.

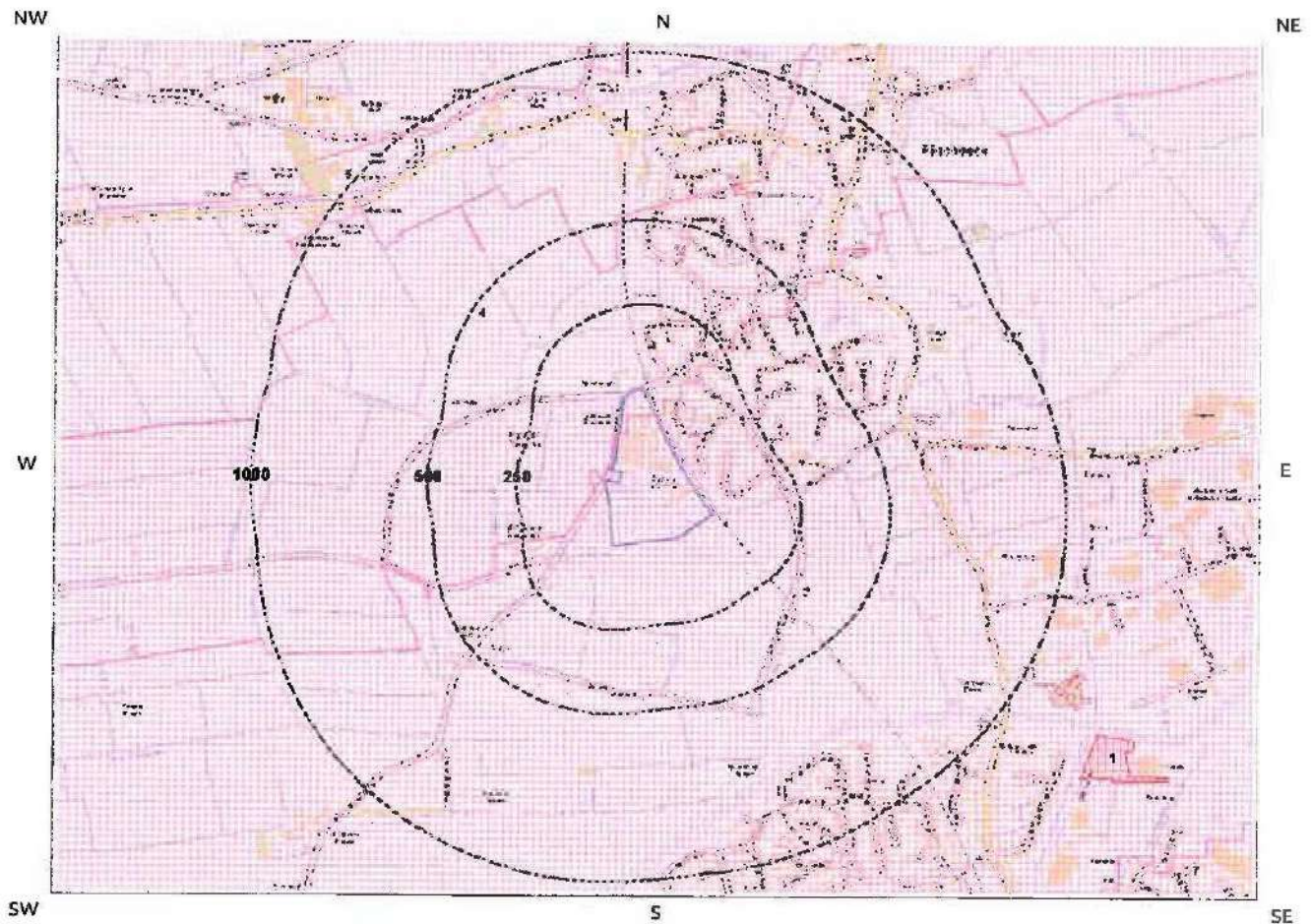
7.8 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? Not Applicable

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

0

Database searched and no data found.

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

1

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
1	1268	SE	Vernatts	Natural England

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

6

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
2	0	On Site	Existing	DEFRA
3	0	On Site	New	DEFRA
4	0	On Site	Existing	DEFRA
5	362	N	New	DEFRA
6	908	N	Existing	DEFRA
7	1535	SE	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our [website](#). The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell** hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? **Moderate**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build ☐ consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property ☒ possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? **Negligible**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand* hazard rating identified on the study site? **Moderate**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build ☐ consider the consequences of soil and groundwater conditions during and after construction. For existing property ☐ possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? **The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.**

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing

ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site?

No

Database searched and no data found.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary?

No

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

No

Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:
Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk

Public Health England
Public Information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: South Holland District Council
Phone: 01775 761 161
Web: <http://www.sholland.gov.uk/>
Address: Council Offices, Priory Road, Spalding, Lincolnshire, PE11

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444



APPENDIX 3

CLASSIFICATION OF AGGRESSIVE CHEMICAL ENVIRONMENT FOR BURIED CONCRETE

TABLE C1 – AGGRESSIVE CHEMICAL ENVIRONMENT FOR CONCRETE
(ACEC) CLASSIFICATION FOR NATURAL GROUND LOCATIONS^a

Table C1 Aggressive Chemical Environment for Concrete (ACEC) classification for natural ground locations ^a						
Sulfate Design Sulfate Class for location	2:1 water/soil extract ^b	Groundwater	Total potential sulfate ^c	Groundwater Static water	Mobile water	ACEC Class for location
1	2 (SO ₄ mg/l)	3 (SO ₄ mg/l)	4 (SO ₄ %)	5 (pH)	6 (pH)	7
DS-1	< 500	< 400	< 0.24	≥ 2.5	> 5.5 ^d 2.5–5.5	AC-1s AC-1 ^d AC-2z
DS-2	500–1500	400–1400	0.24–0.6	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-1s AC-2 AC-2s AC-3z
DS-3	1600–3000	1500–3000	0.7–1.2	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-2s AC-3 AC-3s AC-4
DS-4	3100–6000	3100–6000	1.3–2.4	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-3s AC-4 AC-4s AC-5
DS-5	> 6000	> 6000	> 2.4	> 3.5 2.5–3.5	≥ 2.5	AC-4s AC-5

Notes

- ^a Applies to locations on sites that comprise either undisturbed ground that is in its natural state (ie is not brownfield – Table C2) or clean fill derived from such ground.
- ^b The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered relative to previous Digests (Box C7).
- ^c Applies only to locations where concrete will be exposed to sulfate ions (SO₄) which may result from the oxidation of sulfides (eg pyrite) following ground disturbance (Appendix A1 and Box C8).
- ^d For flowing water that is potentially aggressive to concrete owing to high purity or an aggressive carbon dioxide level greater than 15 mg/l (Section C2.2.3), increase the ACEC Class to AC-2z.

Explanation of suffix symbols to ACEC Class

- Suffix 's' indicates that the water has been classified as static.
- Concrete placed in ACEC Classes that include the suffix 'z' primarily have to resist acid conditions and may be made with any of the cements or combinations listed in Table D2 on page 42.

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