Phase II Site Investigation Report

at Northfield Cottages, Fontwell, West Sussex BN18 0SW

for Dandara Commercial Ltd

Report Reference: LP1649

Report Date: 27th June 2018

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EXECUTIVE SUMMARY

The site is an irregularly shaped plot of land that occupies an approximate area of 16Ha. It is located to the south of the Fontwell Village, West Sussex, BN18 0SW and immediately to the east of the Fontwell racecourse. The topography of the site includes a general slope to the west, south, and south east. In addition to this a small valley of NNW-SSE direction is mapped in the eastern area of the site with Barn Farm built on its eastern slope.

It is proposed to redevelop the site with approximately 400 residential units (including affordable housing); commercial units occupying approximately 5000m^2 and public open space areas comprising allotments (approximately 4000m^2) paddocks (approximately 1.2ha) as well as an outdoor gym, and play/games areas.

The site has a history of use as agricultural land from the earliest mapping dated from 1876. The Desk Study has identified a number of potential sources of contamination associated with the site's former use as well as neighbouring historic and contemporary land uses. The conceptual site model has indicated some possible pollution linkages which may cause a moderate / low risk to future site users and construction workers. The risk to underlying controlled waters is also rated as moderate / low.

The vast majority of the site is mapped as being underlain by Head Deposits underlain by the Lambeth Group over Chalk at depth. However, in the north west corner of the site, Head Deposits are mapped as underlain directly by the Chalk. From the north west corner of the site, the geological boundary between the Lambeth Group and the Chalk extends in an east-west direction, generally parallel to the A27. Furthermore, the boundary between the Lambeth Group and the London Clay of the Hampshire Basin is mapped immediately beyond Wandleys Lane and the southern boundary of the site.

Ground conditions were found to comprise Head Deposits comprising an initial layer of firm to stiff / medium dense gravelly silty clays / very clayey gravels of flint. The thickness of this layer exceeds 3.0mbgl towards central and northern areas of the site and gradually reduces to the W, SW and SE, following the natural topography of the site. A layer of medium dense weathered chalk head recovered as very gravelly silt / very silty gravel chalk with occasional gravel of medium to coarse sub rounded to angular flint was encountered below the superficial gravels and along the flanks of the slope from 0.84-3.0mbgl [21.43-26.55mOD] and proven to 1.6-4.7mbgl [20.63-23.95mOD].

The superficial gravel / clays / chalk head were underlain by the Lambeth Group soils locally comprising an approximately 1m thick layer of stiff thinly laminated silty clay with occasional shell fragments from 1.0-4.7mbgl [or 20.59-24.38mOD] to 1.9-5.0mbgl or [19.69-23.48mOD]. These soils were encountered within the lower elevation sections of the site, namely at the bottom of the slope in the south west area of the site and at the bottom of the valley in the south east area of the site. The clays were then underlain by medium dense to dense fine to medium sands with occasional gravel flint and slightly cemented sand from 1.9-5.0mbgl [19.69-

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23.48mOD] to 2.6-6.0mbgl [16.69-23.28mOD] although their base was not proven in any of the trial holes.

Based on the BGS boreholes to the north and south of the site, the boundary with the Chalk presents a slope of about 1°to the south, having been found approximately at 29.2mOD 1km north east of the site and at -45mOD 3km to the south of the site. The Chalk boundary is therefore estimated to be encountered generally between 10.0-15.0mOD across the site, higher towards the northern boundary, noting that the depth to chalk may be highly variable.

Groundwater was encountered within the sands logged in all the windowless sampled boreholes and in trial pits TP101, TP104 and TP108 in the south west area of the site generally between 2.0-4.0mbgl [21.13-24.1mOD]. Poor recovery in the boreholes and trench instability in the trial pits were also noted.

Based on groundwater elevations to date, the groundwater beneath the site is at its highest in the north and east, reducing to the south and west. Groundwater flow is therefore estimated to flow towards the south west, however it should be noted that this is based on observations of 4No. current boreholes. Observations from further boreholes would be required to refine this assessment.

Loose sands were encountered in WS105 at about 2.0-3.0m [18.69-19.69mOD] in the south west area of the site and in the sands encountered in WS101, WS102 and WS103 in the south east area of the site between 3.0-5.0mbgl [23.1-21.29mOD] at the bottom of the slope. This generally correlates with the low blow counts recorded in probes DP101, DP102, and DP107 in the same areas, which indicated soft/loose spots at similar depths. WS105 showed groundwater ingress at about 3.0m and collapsing walls below 4.0m in the sands. WS101 shows the soils as wet from 4.0m. WS102 showed the soils as very wet from 4.0m and collapsing walls below 3.0mbgl in the sands.

Based on the above and given the fact that the sands are generally overlain by the first stiff clay layer of the Lambeth Group, these loose soils are likely associated with groundwater ingress and are not due to solution features.

At this stage an allowable bearing capacity of 80kPa is recommended on the firm to stiff / medium dense gravelly clays gravels below about 1.0m. Foundations may require deepening due to the presence of trees to NHBC MEDIUM VCP precautions. Where shallow (1.5-2m bGL) groundwater is encountered in the lower lying areas, particularly in the south west of the site, deepening may extend below the water table and running sands should be anticipated. Deepening of foundation trenches should be avoided in such instances and alternatively, a piled solution may be preferred in these areas.

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The site is situated within an area at risk of solution features and at this stage foundations should be designed to span any loose / soft zones. Therefore, where conventional foundations are proposed, the following preliminary recommendations should be adopted:-

- Cruciform shaped, reinforced foundations designed to extend at least 1m beyond the proposed building corner in each direction and with a minimum span of 5m (as per CIRIA C576)

- Proposed footprints should be kept as square as possible. Long terraces and linked buildings should be avoided.

- Foundation trenches should be inspected to ensure competent soils are encountered at founding level, and probing of the foundations is recommended to locate any soft areas (SPT N value should be >10 blow counts/300mm).

A piled foundation may be more suitable on the lower elevation areas of the site and the near trees where deepening is not recommended due to the potential for high groundwater and unstable excavations. For the ground conditions encountered on site, driven, bored or continuous flight augered (cfa) piles may be considered. Pile design was beyond the scope of works. If a piled solution is adopted then cable percussion boreholes to 25m and extending at least 5m onto the Chalk are recommended across the site for pile design.

Suspended floor slabs are recommended.

Soil sulphates in fall within BRE design class DS1 and the site conditions fall within the ACEC class AC-1.

Soakage testing was beyond the scope of works. By way of preliminary comment, shallow soakaways could be an option within the clayey gravels depending on the granular fraction and subject to confirmatory BRE365 full scale soakage testing, however the groundwater may limit storage in certain parts of the site and regulatory consent would be required to confirm discharge was acceptable. Alternatively, the site may be suitable for the use of a sustainable drainage system to collect, store and clean surface runoff prior to release. This may include permeable paving, swale or bioretention features.

Regarding the use of shallow soakaways, CIRIA C574 recommends that soakaways in low density chalk should be located a minimum of 10m from any foundations, and if the site is at a **moderate to high** risk of solution features, then the distance should be increased to 20m. Deep boreholes soakaways onto chalk at depth may be considered as an alternative and subject to additional investigations and confirmatory testing. However, the high groundwater table may limit storage in the lower lying areas of the site and close consultation with the EA will be required as their use due to the location of the site within an SPZ 1.

For the encountered gravelly clay head deposits, a preliminary design CBR value of 3-4% is recommended subject to confirmatory testing.

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A geo-environmental risk assessment has been carried out. The works to date have not identified any significant contamination with respect to identified human health / controlled waters receptors, however, given the site's history and neighbouring land use further exceedances cannot be discounted at this stage, particularly in the northern area of the site, where the disused brick barn, infilled sand and gravel pits and historical reservoir are located.

It is recommended that once the existing structures in this area have been demolished and hard standing removed, further intrusive investigations are undertaken to further refine the contamination risk assessment.

The investigations have indicated that the topsoil underlying the site is not contaminated with heavy metals, PAH and asbestos. However, of the five samples screened for Organochloride Pesticides one sample (TP102 at 0.2m) in the south west area of the site identified trace concentrations of p.p-DDD and p.p-DDT.

Given the small number of samples tested, if the topsoil is proposed to be stockpiled for reuse prior to the redevelopment of the site, then additional Organochloride Pesticide testing is recommended.

The made ground soils encountered in WS8, TP103, TP123, TP125 and in the burnt ground area in the eastern area of the site were found to be free from any significant contamination and are chemically suitable to remain on site.

Preliminary gas monitoring has classified the site as GREEN for residential properties with private gardens, therefore precautions against land gas are not recommended at this stage. As part of further investigation works across the site additional a full monitoring program should be completed to confirm the preliminary gas risk assessment.

The works to date highlighted the site as within an intermediate probability radon area, with between 5 and 10% of homes above the action level. At this stage a site-specific Radon report is recommended to be obtained for the site to further assess radon mitigation requirements.

It is anticipated that the majority of the made ground on site will be classified as non-hazardous waste, for offsite disposal purposes, based on the current investigations although an allowance should be made for an element of hazardous waste at this preliminary stage.

As with any redevelopment site, there is always the risk of hitherto undetected contamination, and further investigations should be carried out prior to redevelopment.

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Date :	28 June 2018
Revision:	Issue 1

A INTRODUCTION

1 Authority

Leap Environmental Ltd (hereafter referred to as LEAP) has been appointed by Dandara Commercial Ltd to undertake a Phase II intrusive Site Investigation of a site referred to as Northfield Cottages, Fontwell. The instruction was given in the quote letter reference LPQ4797 Rev B dated 15th May 2018 and signed by James Casson of Dandara Commercial Ltd.

2 Objective

LEAP understands that the site is at the prior to purchase stage and is currently being let to a tenant. It is proposed to redevelop the site with approximately 400 residential units (including affordable housing); commercial units occupying approximately 5000m^2 and public open space areas comprising allotments (approximately 4000m^2), paddocks (approximately 121500m^2) as well as an outdoor gym, meadow and games/play areas. The proposed site layout drawing reference LN31 Revision SK10 by Dandara South Region is attached in Appendix B.

The proposed development is currently at a planning phase and has been assessed in accordance with BS EN 1997[1], as being a Geotechnical Category 2 structure.

The objectives of this report are to:

- Provide information on the geotechnical and environmental quality of the ground present on the site;
- Assess the potential health and other environmental risks posed by the site to the proposed development and to other specifically identified receptors; and
- Assess the potential for offsite contamination to adversely affect the proposed development.

3 Previous Studies

The site has been the subject of previous investigations by others. The following site investigation report has been supplied by the Client and the reader is referred to this earlier report which should be read in conjunction with this report.

[1] BS EN 1997-1(2004) Eurocode 7:Geotechnical Design - Part 1:General Rules

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- Phase 1 Desk Study Report at Land at Fontwell, Sussex for Dandara Limited ref 14-0055.02 by Delta Simons dated February 2015

4 Limitations

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk.

Full details of the limitations are provided in Appendix A.

5 Scope of Works

This report describes a two stage process whereby the site is investigated and risks are assessed. The terms geotechnical and geoenvironmental are referred to throughout the report.

Geoenvironmental refers principally to the chemical nature of the ground and the degree of soil, water and/or land gas contamination and the impact that contamination may have on current or future development and also on the wider environment.

Geotechnical refers to all other aspects of the ground conditions and the impact they may have on the physical construction of existing or future development, principally foundations, slope stability, drainage, pavement and road design and groundwater control.

The investigation comprises two phases of work.

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5.1 Desk Study Review

The first part of this report presents a review of the previous Delta Simons Desk Study which was made available by the Client. An Envirocheck Ground Stability Report has been obtained for the site and review of this specific database also forms part of the Phase I works. The following additional sources of information have also been reviewed:

- British Geological Survey (BGS) mapping;
- British Geological Survey website (www.bgs.ac.uk) including historic BGS borehole data;
- Interrogation of the DEFRA Magic map website on 12/6/18;
- Interrogation of the Groundsure Enviro Data Viewer on 12/6/18;
- Interrogation of the Radon interactive mapping available on the Public Health England Website on 12/06/2018;
- Interrogation of the World Wide Web on 12/06/2018 for general information pertaining to the site history.

The desk study review has been used to update the conceptual site model, which forms the basis for the site investigation strategy. The site conceptual model is used to identify geotechnical and geoenvironmental hazards and the qualitative degree of risk associated with them. In terms of the geoenvironmental assessment the conceptual site model is used to identify potential sources of contamination, potential receptors and pathways by which the two may be connected. These are known as possible pollutant linkages and it is these pollutant linkages that are key to contaminated land risk assessment.

5.2 Intrusive Investigation Scope

The Phase II work comprises intrusive investigation, onsite monitoring and laboratory analysis. The results of this and previous investigation reports are used to validate and/or update the initial site conceptual model. This phase of site investigation comprised the following tasks:

- 8No. 3-6m deep windowless boreholes drilled with a tracked rig;
- 25No. 3m deep machine excavated trial pits;
- 1No. 1m deep trial hole drilled using hand auger boring apparatus;
- 8No. Dynamic Probing Super Heavy Tests (DPSH) to a depth of 10.0m

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- In-situ geotechnical testing including Standard Penetrometer Tests in the boreholes and perth penetrometer tests in the trial pits;
- Geotechnical Laboratory Testing including Atterberg Limit Tests, Particle Size Distribution tests, Saturated Moisture Content Tests and Sulphate Tests; and
- Chemical Laboratory tests including 30No. LEAP standard soil suite tests and 10No. Organochloride Pesticide Tests.

The intrusive works were completed by contractors who have been scrutinised and are on LEAP's approved contractor list. The windowless sampling and dynamic probing were carried out by Oakland Site Investigation Limited and supervised by LEAP. The machine excavated trial pits were carried out by Ryan Flippance of Harlington Homes and supervised by LEAP.

Selected samples of soil were scheduled for laboratory testing for a wide range of potential contaminants including metals, non-metals and polyaromatic hydrocarbons. The laboratory testing has been carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex.

Selected soil samples have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford.

The final stage in the geoenvironmental assessment comprises a quantitative risk assessment and revision of the Conceptual Site Model. Preliminary recommendations for remediation have been provided, based on various development assumptions which are detailed in the following section and in the text of this report. The risk assessment has been carried out in accordance with UK industry standards and in particular in accordance with CLR11[2] and BS10175:2011.

The final stage of the geotechnical assessment is the provision of preliminary soil parameters for use in geotechnical design, and broad recommendations for appropriate foundation options. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in Section 6 of Eurocode7[3].

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[2] Environment Agency, 2004. Model Procedures for the management of land contamination. Contaminated Land Report 11.

[3] BS EN 1997 Eurocode 7- Geotechnical Design- Part 1:General rules (2004) Part 2: Ground Investigation and Testing (2007)

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B DESK STUDY REVIEW

6 Environmental Setting

The site is an irregularly shaped plot of land that occupies an approximate area of 16Ha. It is located to the south of the village of Fontwell, West Sussex, BN18 0SW and immediately to the east of the Fontwell racecourse. The approximate National Grid Reference of the site is 495138, 106765. The site lies at an estimated elevation of between 20-31m Above Ordnance Datum (mAOD).

6.1 Site Location and Description

The site is comprised of 6No. approximately 1.5-4.5Ha open fields. The boundary of each field is generally marked by vegetation/hedges and lines of mature trees and wire fences with metal gates for access. Mature trees are also aligned with the boundaries of the site and generally comprise 16-20m tall maple, hazel, oak, willow, silver birch, willow, sycamore and ash.

The two fields located along the western boundary of the site and parallel to Fontwell Avenue are understood to be used as agricultural land by the current tenant. A 14m high mature oak tree and 5m high ash trees are located on the centre of the northmost of these fields, and clusters of 16-22m high pine trees are scattered on the southernmost field. A 1.5-2.0m deep E-W topographic depression is located in the south west area of the northern of the two fields (Photo 1, Appendix E). The clusters of pine trees along the southern field were noted to be slightly inclined (Photo 2, Appendix E), which may be indicative of ground movement. The boundary between these two fields is marked by a row of 6-8mm high ash trees and a 1m high wire fence while the eastern boundary, which is common to both, is marked by areas of dense vegetation with scattered 5-10m oak trees and a wire fence.

The two central fields are also used as agricultural land by the current tenant. The boundary between the northern central and southern central fields consists of a 4m high hedge with scattered oak trees and 1m high wire fence. The northern field is further divided by an additional barbed wire fence in poor state of repair. A roughly triangular area comprising heavily overgrown vegetation is located in the eastern extent of this field. This area includes discarded farm machinery and anecdotal evidence from the Barn Farm tenants indicated that collapsed light buildings were also located here although there was no visual evidence of these due to the dense vegetation.

Beyond the north west corner of the central fields is a separately fenced area including a flint / brick barn, timber store, brick building, concrete hardstanding and two further grassed areas according to the topographic survey reference LN31-DS-500.01 provided by the Client. However, access to the main compound via Arundel Road was not available at the time of the investigation. It was possible to access the southern extent of this area via a gap in the existing

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hedge, which comprised a heavily overgrown area, the southern wall of a single storey brick built building and a raised concrete area.

Beyond the southeast corner of the northern centre field is an access track leading to the Barn Farm complex, which is located offsite, east of the site boundary. The complex comprises a number of 1-2 storey brick buildings and timber sheds surrounded by blacktop hardstanding areas and access tracks. The southernmost 2-storey brick building is used as the main residential area while the brick and timber outbuildings are generally used as horse stables and for farm equipment and vehicle storage. The north easternmost building is used as a garage. A possible unbunded AST tank was noted adjacent to a timber building used as stables in the central area of the complex and a collapsed timber barn was noted in the western section.

The eastern fields are located to the north and south of the Barn Farm complex. These are currently used by the Barn Farm tenants as paddocks. An area of woodland is located along the southern area of the northernmost field and a patch of burnt ground was also identified to the north east of the farm buildings in the south east corner of the field.

The topography of the site includes a general slope to the west, south, and south east. In addition to this a small valley of NNW-SSE direction is mapped in the eastern area of the site with Barn Farm built on its eastern slope.

The higher ground is located in the central northern area of the site at about 29-31mOD, whilst the low-lying areas are located at the south western extent of the site adjacent to Fontwell Avenue at 19-20mOD and the south eastern extent of the site adjacent to Wandleys Lane stands at about 22-23mOD. The slope to the west stands at about 2-5°, whilst the slopes to the south and east are shallower at about 1-2°.

The site is bounded to the north east by residential properties and to the north west by Arundel Road, with a service station and the A27 beyond; to the south by residential properties with Wandleys Lane and a caravan park beyond; to the west by Fontwell Avenue, with the Fontwell racecourse beyond and to the east by Wandleys Lane and further agricultural land. Barn Farm is adjacent to the eastern site boundary.

6.2 Geology

The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey sheet 317/332, solid and drift edition, the BGS website (www.bgs.ac.uk) and the Delta Simmons Desk Study Report. The vast majority site is mapped as being underlain by Head Deposits underlain by the Lambeth Group over Chalk (undifferentiated) at depth. However, in the north west corner of the site Head Deposits are mapped as underlain by Chalk. River Terrace deposits are also indicated to encroach onto the southern corner of the site. From the north west corner of the site the geological boundary between the Lambeth Group and the Chalk extends in a east-west direction, generally parallel to the A27. Furthermore, the

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boundary between the Lambeth Group and the London Clay of the Hampshire Basin is mapped immediately beyond Wandleys Lane and the southern boundary of the site.

6.2.1 Head Deposits

Head deposits accumulated largely by solifluction (the slow downslope movement of soil in response to the seasonal freezing and thawing of ground) and hillwash, mainly under periglacial conditions during the Quaternary glaciations. In general, it occurs beneath concave slopes on the flanks and floors of valleys. It is locally derived, and its content reflects the base geology, in this case impure clays, silts, sands and gravels. Superficial deposits of composed of fine-grained weathered chalky silt and clay matrix with clasts of chalk and flint and some erratic pebbles can also occur on chalk dry valleys typically overlain by more-recent superficial deposits.

6.2.2 River Terrace Deposits

A series of River Terrace Deposits of fluvial origin were laid down during the Quaternary Period reflecting a local environment previously dominated by rivers. The deposits are of variable composition, ranging from coarse sands to fine grained silts and clays and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river.

6.2.3 Lambeth Group

The Lambeth Group underlies the Head Deposits in the study site. It tends to consist of grey and grey-brown interbedded fine sands silts and clays. There are sometimes shelly beds at the top and bottom of the formation. Some very strong bands of weakly cemented shells and limestone can be encountered, although these tend to be encountered further east in the area between Lewisham and Bermondsey.

6.2.4 Chalk (Undifferentiated)

Chalk is a very fine grained white limestone consisting predominantly of the disaggregated skeletal remains of tiny planktonic algae, and is composed of almost pure calcium carbonate. Layers of flint are common within the Chalk. Flint is composed of silica derived from the dissolved skeletons of siliceous sponges and microfossils. Locally the Chalk comprises the Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (undifferentiated).

The Chalk is a Major Aquifer in SE England.

Chalk is particularly affected by its weathering, particularly the affects of dissolution. The top surface of the chalk is usually irregular and may be include deep drift filled solution pipes for example. Chalk is also susceptible to frost action.

6.2.5 BGS Boreholes

The online BGS Geoindex (http://www.bgs.ac.uk/geoindex/) has been reviewed for detailed local geological and hydrogeological information. 8No. Boreholes have been identified within 200m of the site.

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Borehole refs SU90NW142-143, located 100m west of the site indicates ground conditions comprise made ground to 1.0mbgl over firm to very stiff silty clay with abundant flint gravel to 2.2-5.5mbgl over very dense light brown silty sand with coarse to fine sub angular gravel to 4.9-6.5mbgl over stiff to very stiff red brown and dark grey clay with flint gravel and pockets of silt and sand to 8.85-10.0mbgl over hard light brown clayey silt with calcareous cemented bands / nodules of limestone to 10.0m (Chalk) which denoted the full extent of the boreholes. Traces of black carboniferous matter were encountered on the clay soils below 6.5mbgl in borehole SU90NW143. The logs show groundwater was encountered at 5.8-9.4mbgl.

Borehole ref SU90NW144 located 120m west of the site indicates ground conditions generally comprise made ground to 1.0m over stiff brown silty clay with abundant flint gravel to 2.0mbgl over brown silty clayey sands and gravels to 8.8mbgl over very stiff red and grey clay to 9.7mbgl over strong off-white limestone (Chalk) to 10.0mbgl, which denoted the full extent of the borehole. The log shows groundwater was encountered at 7.0mbgl.

It is noted the ground level elevations recorded for this set of boreholes of between 7-10m AOD are not consistent with the observed topography.

Borehole refs SU90NE34 located 50m south east of the site indicates ground conditions include made ground to 0.5mbgl over head deposits comprising very clayey gravel of flint to 1.8mbgl over raised beach deposits comprising very clayey sands and silts to 4.6mbgl over the Lambeth Group comprising grey clayey sands to 5.1mbgl over grey red mudstone to 6.0mbgl which denoted the full extent of the borehole. The log shows groundwater was encountered at 1.8mbgl.

Borehole refs SU90NE78-81 located 50-150m south east of the site indicate ground conditions comprise topsoil to 0.3mbgl over layers of brown sandy clay, chalky clay stone and chalk to 2.7-5.8mbgl possibly associated with head deposits. A layer of brown soft clay possibly associated with the Lambeth Group was logged in SU90NE78 to 4.5mbgl which denoted the full extent of the borehole. The logs show groundwater was encountered generally at 2.0-3.0mbgl.

2No. deep boreholes were identified within 2km of the site to provide a measure of the ground conditions at depth.

Borehole ref SU90NW74 is located approximately 1km north west of the site. The borehole indicated head deposits to 3.3m (32.4mOD) over raised beach deposits comprising gravelly sands to 4.9m (29.2mOD). The Chalk was encountered from 29.2mOD to depth.

Borehole ref SU90NE32 located approximately 3km south east of the site indicated ground conditions comprised head deposits comprising gravelly clay over chalk gravel to 5.8m (5.5mOD) over the London Clay to 26.2m (-14.9mD) over the Lambeth Group to 56.23mbgl (-44.93mOD). The Chalk was encountered underneath the Lambeth Group to the full extent of the borehole.

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6.2.6 Solution Features

Solution features generally occur where preferential weathering of the chalk occurs along discontinuities or joints. They are more common along geological boundaries, where surface water runoff from impermeable soils meets the more permeable underlying chalk. They are generally infilled with loose/soft soils and can be visible at ground level due to surface depressions, although this may be masked by overlying superficial deposits. They may lie dormant for many years, and are generally reactivated by the introduction of water from, for example, a leaking drain, soakaway etc.

6.3 Hydrogeology

The hydrogeology of the site has been ascertained from DEFRA's Magic map website. The source of the data is reported to be the Environment Agency groundwater vulnerability mapping.

The superficial Head and River Terrace deposits soils which are mapped beneath the site are classified as Secondary A aquifers. The underlying Lambeth Group is also mapped as a Secondary A aquifer, whilst the Chalk is classed as a Principal aquifer.

The north east part of the site is classified as being within a groundwater Source Protection Zone (SPZ) II (outer zone – sub surface activity only). The north west corner of the site is classified as being within a groundwater SPZ1 (Inner zone). The remainder of the site is classified as being within a groundwater SPZ1 (Inner zone – subsurface activity only).

The Envirocheck database search contained within the Delta Simmons Desk Study Report indicates that there are four groundwater abstractions within 127-131m of the site. All four relate to the public potable water supply from Eastergate Pumping Station operated by Portsmouth Water Ltd.

6.4 Hydrology

The nearest surface water feature is an unnamed tertiary river, located approximately 50m east of the site.

The Envirocheck database contained within the Delta Simmons Desk Study report indicates that there is one discharge consent within 500m of the site relating to trade discharge – process water into land.

6.5 Flooding

According to the Envirocheck database contained within the Delta Simmons Desk Study report the western boundary of the site, where Fontwell Avenue is located, is classified as at risk from extreme flooding from rivers without defences (Zone 2).

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6.6 Ground Stability

Due to the underlying the geology and identified risk of solution features, an Envirocheck Ground Stability Report was obtained for the site and is attached in Appendix C.

6.6.1 Ground Workings

The Ground Stability Report indicates that 3No. historical ground workings recorded by the BGS were located within 500m of the site. The Hermitage Gravel Pit and the Slindon Bottom Gravel Pit situated 168 and 276m north of the site boundary respectively were for the extraction of sands and gravels associated with Quaternary Head Deposits. The Northfields Farm Gravel Pit was located 470m south of the site and was also reported for the extraction of sands and gravels associated with Quaternary Head Deposits. All are reported as ceased.

The Historical Land Use Information available in the Envirocheck Ground Stability Report (1:10000) indicates that the northern area of the central field and the brick barn area of the site have been historically affected by the quarrying of sand and clay and operation of sand and gravel pits. This is indicated by 4No. entries, of which 2No. are located onsite and 2No. are located 8m and 17m north east of the site boundary. The date of the mapping is reported as 1951-1961.

4No records indicating unknown filled ground are also reported on the same geographical locations of the sand / gravel pits (2No. on site, and 2No. 8m and 17m north east of the site boundary). The date of the mapping is reported as 1994.

An additional entry is reported 3.0m south of the site boundary relating to unknown filled ground (pond, marsh, river, stream, dock, etc). The date of the mapping is reported as 1880.

The Historical Land Use Information available in the Envirocheck Ground Stability Report (1:2500) indicates 2No. extractive industries or potential excavations dated from 1950-1980. These refer to a disused infilled reservoir adjacent to the northern boundary of the site (in the area of Fontwell Close) and an infilled pond located 57m east of the site. The date of the mapping is reported as 1974.

6.6.2 Mining

The Envirocheck Ground Stability Report indicates the site is not situated within an area affected by coal mining.

6.6.3 Natural Cavities

70No. sinkholes are reported 36m east of the site by the Envirocheck Ground Stability Report. These features are associated with the Chalk Group.

Furthermore, a 1.5-2.0m deep E-W topographic depression possibly associated with ground dissolution was observed on the south west extent of the north west field of the site.

The Fontwell area has a history of reactivation of natural cavities. A search of the internet has indicated that a burst water main in 1985 activated a number of solution features along Littleheath Road, located about 500m north west of the site.

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The opensource data platform Groundsure.io includes LIDAR digital terrain models which can show depressions in the landscape, a possible indication of infilled natural cavities. A search of the model indicates some localised depressions in the topography to the west of the site, trending in an east-west direction and in line with the depression noted in the north west corner of the subject site. Another more distinct E-W line of depressions is indicated to the north of the A27, about 250m north of the site.

Preliminary correspondence with the local Building Control officer has also highlighted the potential for natural cavities on site.

6.6.4 Ground Stability Hazards

The Envirocheck Ground Stability Report includes data regarding the potential for certain ground stability hazards in the soil in certain locations. The ground stability information for the subject site is summarised as follows:

Table 1 Ground Stability Hazard Risk Levels

Ground Stability Hazard	Reported Risk Level (Hazard potential)	Location
Collapsible Ground	Very Low to Low	Very Low – site wide Low - southern corner of the site
Compressible Ground	Very Low	Site wide
Ground Dissolution	Low to High	Low – site wide Moderate – north west area of the site (within 200m of the geological boundary with the Chalk) High – north west corner of the site (adjacent to the geological boundary with the Chalk
Landslides	Very Low	Site wide
Running Sands	Very Low	Site wide
Shrinking or Swelling clay	Very Low to Moderate	Very Low – site wide Low – southern corner of the site Moderate – south east corner of the site and north west area of the site, parallel to the west site boundary

From the table above the most relevant hazard is the moderate to high potential for ground dissolution in the north west area of the site.

The site is located on ground conditions where solution features can be prevalent (Head over Lambeth Group over Chalk).

On site the geological boundary between the Lambeth Group and the Chalk is located in the north west corner of the site overlain by the Head Deposits. The boundary then extends to

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the NE, roughly parallel to the A27. Solution features are most commonly encountered in the vicinity of the boundary between the two strata, where frequent fissures in the chalk are anticipated, and where surface water tends to accumulate (i.e. valleys or other topographic depressions).

Based on the information above it is considered that at this stage there is a risk of potential ground dissolution features on site. The highest risk area is indicated in the north west area of the site reflecting the proximity of the geological boundary however, it should also be noted that the actual risks from these hazards will be dependent on the actual ground conditions encountered.

7 Site Usage

7.1 Current Land Use

The current site layout is shown in Figure 1, Appendix B. The western and central fields are used as agricultural land, while the eastern fields are used as paddocks by the Barn Farm tenants. To the north east of central northern field are some outbuildings and hardstanding, currently disused and fenced off.

7.2 Evidence of Onsite Contamination

A walkover survey was carried out on 21/05/2018.

A roughly triangular area comprising heavily overgrown vegetation was noted in the eastern extent central field. This area includes discarded farm machinery and anecdotal evidence from the Barn Farm tenant indicated that collapsed light buildings were also located here although visual evidence of such was not encountered due to the dense vegetation.

A patch of burnt ground was noted to the north east of the farm buildings in the south east corner of the north east field.

Anecdotal evidence from the Building Control of Arun District Council indicates that the site may have been used to bury agricultural waste including animal carcasses.

7.3 Neighbouring Land Use

Immediately to the east of the site boundary is the Barn Farm complex comprising a number of 1-2 storey brick buildings and timber sheds surrounded by blacktop hardstanding areas and access tracks and currently in use. A possible unbunded AST was noted adjacent to a timber building used as stables in the central area of the complex and a collapsed timber barn was noted in the western section.

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The surrounding area of the site is predominantly undeveloped agricultural land, with residential areas located to the north and south of the site boundaries.

A dual carriageway (A27) runs E-W approximately 20-50m north of the site boundary. An active petrol fuel and service station (Shell) is located approximately 60m north east of the site.

The Fontwell Park Racecourse is located opposite Fontwell Avenue, west of the site boundary.

Furthermore, the Envirocheck report contained within the Delta Simmons Desk Study Report lists 6No. additional Contemporary Trade Directory Entries within 250m of the site. These potential sources are all listed as inactive and include industrial and commercial machinery, car body repairs, gunsmiths and hot foil stamping.

7.4 Other Regulatory Records

A Local Authority Pollution Prevention and Controls entry relating to the Shell fuel station is located approximately 60m north east of the site for a Local Authority Air Pollution Control.

A category 3 (minor incident) pollution incident to controlled waters is indicated approximately 20m north of the Site, relating to "oils – diesel" and likely related to the Shell fuel station.

7.5 Radon

According to the Radon interactive mapping available on the Public Health England Website the site is in an intermediate probability radon area, as between 5 and 10% of homes are above the action level. Therefore, special protective measures may be required in the construction of buildings on this site, in respect of radon gas.

8 Previous Investigations

The site has been subject of a Desk Study by Delta-Simons, the findings of which are summarised below.

8.1 Phase I Desk Study, Land at Fontwell by Delta-Simons, for Dandara Limited Report ref 14-0055.02, dated February 2015

Delta-Simons undertook a desk study for the site in February 2015.

Based on the historical maps dated 1876-2014 the report indicated that from the earliest mapping the site was predominantly undeveloped agricultural land. Small buildings of unspecified use, assumed by Delta-Simons to be associated with nearby farmhouses, were shown in the south-east and north-east of the site from 1974 to present.

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The following off site potential sources of contamination were also indicated by the report within 250m of the site:

- A gravel pit, located approximately 210 m south-west, from 1876 to 1912;
- A plant nursery, located approximately 200 north-west, from circa 1876 to circa 1974;
- A pumping station, located approximately 100 south-west, from 1897 to present;
- A reservoir, located in adjacent to the northern boundary, from circa 1939 to circa 1974;
- A garage, located approximately 50 m north, from 1974 to circa 1991;
- A builders yard, located approximately 150 m north, from 1974 to circa 2006;
- A filling station, located approximately 100 m north from 1974 to 1989;
- An electricity sub-station, located approximately 180 m north, from 1974 to circa 2006;
- An electricity sub-station, located approximately 50 m north, from 1989 to circa 1992;
- A petrol filling station (PFS), located approximately 50 m north, from circa 2006 to present

The Desk Study indicates that the majority of the site is within a lower probability radon area, with less than 1% of homes above the action level. However, the south-eastern part of the site was indicated as being in an area where between 5 and 10% of homes are above the action level and basic protection measures should be allowed at this stage for buildings in this area.

Based on the above the report indicates a low to moderate risk to human receptors and controlled waters from farming activities, contaminant migration from off-site sources and potential ACM within existing buildings and structures at the site.

The Desk Study recommended intrusive investigation to enable assessment of preliminary foundation design as well as to target onsite and offsite sources, assess the presence of elevated concentrations of ground gas and provide coverage of topsoil suitability for the proposed development. A site-specific report was also recommended to be obtained for the south-eastern part of the site to further assess potential radon mitigation requirements.

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C PRELIMINARY CONCEPTUAL SITE MODEL

9 Environmental Risk Assessment

9.1 Conceptual Site Model (CSM)

A risk based approach is used to assess contaminated or potentially contaminated land within the UK. For a potential risk to exist, there must be a pollutant linkage in place, i.e. there must be a source of contamination, a potential receptor, and a pathway linking the two.

In order to quantify the magnitude of the risk, it is necessary to first calculate the potential exposure of the receptor as a result of all the individual active pollutant linkages affecting that receptor. Secondly it is necessary to ascertain "what is an acceptable exposure level for each of the identified receptors and contaminants?". Various numerical models are available to aid in the assessment.

The purpose of the Conceptual Site Model, in this instance, is to identify all of the potential pollutant linkages by considering, in turn, the potential sources, receptors and pathways.

9.2 Sources

9.2.1 Onsite Sources

Based on a review of the available site information the following contaminants of concern are proposed:

Table 2: Onsite sources of contamination

Source	Contaminants of Concern
Made ground associated with disused brick barn (N of the site)	Heavy Metals, PAH, asbestos containing material (ACM)
Agricultural land	Pesticides
Burnt ground (E of the site)	Heavy Metals, PAH
Discarded farm machinery and collapsed buildings (Central field)	Heavy Metals, PAH, asbestos containing material (ACM), Petroleum hydrocarbons
Agricultural waste including animal carcasses	Ground gases, ammoniacal nitrogen, Pathogens inc. Anthrax
Infilled sand and gravel pits (N of the site and potentially extending on site)	Heavy Metals, PAH, PHC, asbestos, ground gas

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Infilled reservoir (adjacent to N boundary of the site)	Heave Metals, PAH, PHC asbestos, ground gas

The site has a history of use as farmland. The main contaminant of concern associated with this land use is the presence of pesticides for agricultural activities. Furthermore, anecdotal evidence from the Building Control of Arun District Council indicates that given the site's history, there is the potential for agricultural waste including animal carcasses to be buried on site, which may be a source of ground gases, ammoniacal nitrogen and Pathogens including anthrax.

Made ground associated with the disused brick barn in the northern area of the site and the area of burnt ground identified to the north east of the Barn Farm buildings may be a localised source of Heavy Metals and PAH. Furthermore, there is the potential of ACM to be present within the construction of the disused buildings in the brick barn area of the site.

Made ground associated with the historic infilled sand and gravel pits in the northern area of the site and the reservoir adjacent to the northern boundary of the site may be a source of Heavy Metals, PAH, PHC, asbestos and ground gas. However, the reservoir has been infilled prior to 1974 and the gravel pits were marked as infilled in the 1994 mapping. Given the dates any hydrocarbon and ground gas contamination from these sources may have attenuated at this stage.

9.2.2 Offsite Sources

The desk study has highlighted the following potential off site sources of contamination:

Table 3: Offsite sources of contamination

Source	Distance from Site (m)	Contaminants of Concern
Petrol Fuel Station Pollution incident	50 (N) 20 (N)	PHC, VOC, SVOC, BTEX, MTBE
Historic garage (1974-1991)	50 (N)	Heavy Metals, PAH, PHC
Barn Farm	10 (E)	Heavy Metals, PHC, PAH, asbestos
Above Ground Storage Tank (AST)	20 (E)	PHC, VOC, SVOC

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Historic electrical Substation (1989-1992)	50 (N)	PCB

There is the potential for any contaminants present on the adjacent areas north of the site to migrate onto site via the groundwater migration pathway, in particular petroleum hydrocarbons (PHC) from the nearby active petrol fuel station (Shell) and garages which are located up gradient of the site. However, given the distance from the site, the risk is considered to be low.

The Barn Farm complex adjacent to the eastern boundary of the site comprises a number of 1-2 storey brick buildings and timber sheds surrounded by blacktop hardstanding areas and access tracks. Most of the buildings are used as horse stables and for farm equipment and vehicle storage, and an above ground storage tank was noted in the centre of the farm. These may be a localised source of petroleum hydrocarbons. There is the potential of ACM being present within the construction of the existing buildings, although the risk of these impacting the subject site is considered to be low.

The historical electricity substation 50m north of the site is not considered to pose a substantial impact to the subject site as PCBs are low mobility compounds.

9.3 Receptors

Potential receptors are those which may be impacted by any of the contaminants of concern identified above, and include the following:-

- Future residents
- Construction workers
- Groundwater
    - Principal Aquifer (Chalk), Source Protection Zone I and II
    - Secondary A Aquifers (Lambeth Group, Head and River Terrace Deposits) and
- Material construction of buildings and infrastructure
- Neighbouring properties

9.4 Pathways and Potential Pollutant Linkages

The development will include private gardens and public open space. All potential pollutant linkages involving resident humans and soil contaminants will be active i.e. direct ingestion of

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soil, ingestion of soil attached to plants as well as via plant uptake, inhalation of indoor and outdoor vapour and of dust tracked back into the house and finally ingestion of water carried by plastic water pipes through contaminated ground.

Ground workers are at risk as a result from all of the above, except for those involving edible plants.

The site is underlain by a Secondary A aquifer(s) overlying a Principal aquifer of high leaching potential. Portsmouth Water's potable water supply Eastergate Pumping Station is located to the south west of the site, and the site is located within a Source Protection Zone I. There is a potential pathway for leachate from soil pollutants and for mobile liquid contaminants to enter the groundwater. The risk to groundwater is therefore considered to be High, based on the sensitivity of the groundwater resource.

9.5 Qualitative Risk Assessment of Pollutant Linkages

Risk levels within the preliminary CSM are determined on a qualitative basis following review of the available desk-based information. The significance of particular pollutant linkages is dependant both upon the severity and likelihood of the risk. These two factors are summarised in the following tables.

The potential pollutant linkages are summarised in the table appended in Appendix D and given a qualitative risk classification in accordance with current guidance. The details of the risk assessment methodology are presented in Appendix D.

9.6 Conclusions

The following pollutant linkages are rated as low to moderate and are considered further in Section G.

- The site has remained undeveloped agricultural land since the publication of the first historic maps in 1874 to present day. There is therefore a low to moderate risk from pesticides associated with agricultural land use;
- The Principal aquifer and therefore the groundwater on site has been identified as a high sensitivity receptor due to the location of some of the site within a Zone I Source Protection Zone. However, based on the BGS logs, about 10m of head and Lambeth Group soils are anticipated overlying the chalk, which will provide some protection from near surface sources of contamination. The site therefore poses a low to moderate risk to groundwater;
- Localised moderate risk to ground workers and future site users associated with inhalation of asbestos and presence of heavy metals and PAH in the northern area of the site, where the potential for made ground was identified in the vicinity of the barn and in the vicinity of the derelict buildings;

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- Localised low risk to ground workers and future site users associated with ground gas mainly the northern area of the site due to the presence of the infilled sand and gravel pits and reservoir;
- The sections above highlighted that areas of the site are within an intermediate probability radon area, as between 5 and 10% of homes are above the action level. A low to moderate radon risk is therefore assumed for the site.

10 Geotechnical Risk Assessment

10.1 Geotechnical Risk Register

The preliminary geotechnical risk register for the proposed development is summarised in the table in Appendix D. Details of the risk assessment methodology are presented in Appendix D

10.2 Conclusions

The following geotechnical hazards have been identified as substantial risks:-

Soft / loose soils associated with Head deposits may be anticipated across the site. Such soils may have a low bearing capacity and be subject to excessive settlements when loaded.

Given the presence of mature trees around the boundaries of the site and along the boundaries of the different fields, foundations will require deepening near trees where clay soils are encountered.

Deep made ground may be encountered along the northern boundary of the site where the historic brick barn and infilled sand and gravel pits and reservoir are located, and localised deepening of foundations may be required. Deep made ground may also be a source of land gas. A risk of radon gas has also been identified on site. Gas protection measures may therefore be required in some areas of the site.

Based on the historic BGS boreholes, the depth to groundwater is noted to be variable, generally between 2.0-9.0mbgl. Running sands may be anticipated in the more granular Head deposits particularly in the wet winter months, and in the underlying Lambeth Formation, particularly in the lower lying areas of the site. Localised deepened foundations may be required (see above) and excavations below the water table may be unstable and require dewatering.

The site is located on ground conditions where solution features may be prevalent (Head over Lambeth Group over Chalk). 70No. sinkholes are reported 36m east of the site by the Envirocheck Ground Stability Report. Furthermore, a 1.5-2.0m deep topographic depression was observed on the south west extent of the north west field of the site, and the tree in this area was noted to be inclined, indicative of potential ground movement. Surface depressions

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have been noted in the surrounding area (LIDAR Maps), and solution features are also known to have been reactivated by a burst watermain along Littleheath Road to the north.

On site, the geological boundary between the Lambeth Group and the Chalk is located in the north west corner of the site overlain by the Head Deposits. Solution features are most commonly encountered in the vicinity of the boundary between the two strata, where frequent fissures in the chalk are anticipated, and where surface water tends to accumulate (i.e. valleys or other topographic depressions).

A risk of solution features has therefore been identified on site.

The site is sloping to the west, south and southeast, with the steeper slopes in the west and south west (2-5°). Some inclined trees were also noted on these slopes, which could be an indication of ground movement. Based on the underlying geology, the risk of global instability issues (landslides) is considered low. However, the proposed development will likely require some cut and fill operations on the steeper slopes and this may result in the requirement for retaining walls, as well as alter the site drainage. Filling may also induce settlement.

On the basis of the initial review and preliminary risk assessment, the site is given a Geotechnical Classification of **Geotechnical Category 2** in accordance with EN1997-1 §2.1(14)-(21), primarily due to the risk of solution features on site.

11 Recommendations for Intrusive Ground Investigation

Based on the findings of the desk study review further intrusive investigations were recommended on site. A series of trial pits to a maximum depth of 3.0m are proposed across the site to provide full coverage of each of the proposed development areas, expose the underlying soils and to allow for disturbed samples to be taken for both geotechnical and geo-environmental purposes.

A risk of solution features has been identified on site, and on this basis a preliminary program of dynamic penetrometer testing is proposed comprising 8No. DPSH tests, combined with 8No. windowless sampled boreholes around the site to assess the potential for natural cavities and to provide geotechnical parameters for foundation design.

Shallow gas and groundwater monitoring wells to depths of 4m are proposed within four of the boreholes.

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D PHASE II INTRUSIVE INVESTIGATION

12 Investigation Rationale

A total of 35No. trial holes were excavated across the site. These included 26No. machine excavated trial pits to a depth of around 2.3-3.3mbgl and 8No. windowless sampled boreholes to depths of between 1.0-6.0m below ground level. A single shallow hand dug pit (HP1) was undertaken on the identified burnt ground area in the eastern end of the site to collect a sample for environmental testing purposes.

8No. dynamic probing tests (DPSH) were also undertaken to provide a preliminary indication of depths of loose / soft soils, and to assess natural soil density.

The trial holes were located to give general coverage, taking into consideration the proposed development and the potential geoenvironmental and geotechnical risks/hazards highlighted by the CSM in accordance with BS10175. In addition, trial holes WS101, WS102, WS105 and WS107 were specified to 6.0mbgl to assess ground conditions at depth on the proposed new housing areas. Trial holes WS103, WS104, WS106 and WS108 targeted the proposed green open space areas and were specified to a depth of 1.0-3.0mbgl.

The windowless sampled boreholes were undertaken next to the DPSH tests in order to provide both a soil column and SPT values to correlate with the DPSH blow counts.

Gas / groundwater monitoring wells have been installed in trial holes WS101, WS102, WS105 and WS107.

Trial hole TP122 could not be conducted as no access was available at the time of the investigation due to the presence of electric fencing.

Table 4 Rationale for Investigation Locations

Trial Hole/Test Location	Rationale	Proposed Depth (mbGL)	Notes
TP101-TP125	Provide information on the ground conditions, provide samples for contamination and geotechnical testing	3.0	Trial holes TP107, 110a, TP111, TP112 and TP124 were terminated between 2.3-2.8mbgl due to the presence of dense soils at depth Trial hole TP126 was terminated at 2.6mbgl due to pit instability

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TP126	Provide information on the ground conditions, provide samples for contamination testing	3.0	TP125 was hand dug to 1.0m due as there was no access for the JCB 3CX at the time of the investigation
WS101, WS102, WS105 and WS107	Provide information on the ground conditions, location of gas monitoring wells and provide samples for contamination and geotechnical testing	6.0	Trial holes located on the proposed housing areas across the site.
WS103, WS104, WS106 and WS108	Provide information on the ground conditions, and provide samples for contamination testing	1.0-3.0	Trial holes located on the proposed green open space areas across the site
DP1-8	Provide information of the density of soils across the site for foundation design.	10.0	-
HP1	Provide samples for contamination testing	0.5	Located in the identified burnt ground area in the eastern end of the site

The site investigation locations are shown on Figure 2, Appendix B.

13 Site Work

13.1 Date and Weather Conditions

The windowless sampled boreholes, trial pits and DPSH tests were undertaken in a single phase on between 21/05/2018 and 25/05/2018. At the time of the investigations, the weather was dry and sunny with occasional spells of heavy rain.

May was generally dry and warm with showers, thunderstorms and longer spells of rain braking out by the end of the month, especially in central and southern areas. The mean rainfall was 69% of average, and most places had a dry month, but rainfall was generally close to normal across central and southern England.

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13.2 Site Work Methods

13.2.1 Borehole Drilling

Boreholes were drilled using a dando terrier windowless sampler rig. The boreholes were excavated at 150mm diameter reducing to 100mm diameter with depth. Borehole logs are attached in Appendix F.

13.2.2 Trial Pitting

Trial pits were dug by a backhoe excavator. The trial pits had a target depth of 3.0mbgl and were typically 0.5m wide by 2.0m long. Trial pit dimensions are shown on the trial pit logs, included as Appendix F. Spoil was placed on plastic sheeting to prevent cross-contamination and was replaced in reverse order. Trial pits were left mounded to allow for future settlement.

13.2.3 Hand Pitting

Hand pits were excavated using hand tools at 50m diameter. Spoil was reinstated in reverse order.

13.2.4 Soil Logging and Sampling

Soil samples were recovered from the boreholes and trial pits for field screening, logging and sampling.

Boreholes were logged in general accordance with the requirements of BS 5930: 1999+A2:2010 and BS EN ISO 14688 Pt 1&2. Borehole logs are presented in Appendix F.

Visual and olfactory evidence of contamination was noted if encountered. These observations were used to aid scheduling of samples for chemical laboratory analyses, and are included on the borehole logs in Appendix F and summarised in Section 14.

Samples were collected with a clean sampling trowel or by hand (using dedicated nitrile gloves for each sampling location). Samples were placed into laboratory supplied sampling containers, specific to the type of analyses required.

All sample containers were sealed and labelled with a unique location identity, depth and date of sampling.

13.2.5 Monitoring Well Installation

4No. monitoring wells were installed during this investigation within the windowless sample boreholes. The monitoring wells were constructed of 50mm diameter HDPE pipe. The response zone was typically targeted to intercept the groundwater surface and was surrounded by washed filter gravel. The plain zone was surrounded with bentonite to provide a seal. The monitoring wells were finished with bungs with gas taps and flush mounted steel covers. Monitoring well installations are shown on the borehole logs and summarised in the following table.

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Table 5: Borehole installation details

Borehole	Type G-gas W-water V-vapour	Plain Well Screen (mbgl) and ID (mm)	Slotted Well Screen (mbgl)	Bentonite Seal (mbgl)	Comments
WS101	GW	1.0	4.0	1.0	-
WS102	GW	1.0	4.0	1.0	-
WS105	GW	1.0	4.0	1.0	Left proud of surface to allow for easier visual identification
WS107	GW	1.0	4.0	1.0	Left proud of surface to allow for easier visual identification

13.3 Field Tests

13.3.1 Standard Penetration Tests

Standard penetration tests were undertaken in the boreholes at 1.0m centres in accordance with BS EN ISO 22476-3;2005. Uncorrected blow counts, 'N values', are recorded on the borehole logs in Appendix F.

13.3.2 Dynamic Probing

8No. dynamic probe (super heavy) tests were undertaken across the site, in accordance with BS EN ISO 22476-2:2005 +A1;2011. The results have been correlated with soil density/undrained shear strength directly from the corresponding SPT N blow counts on site, taking into account the site conditions, and using Cearns and McKenzie (1988)[4] and Huntley SL (1990)[5] for guidance. The results are attached in Appendix F.

13.4 Ground Gas and Groundwater Monitoring

13.4.1 Ground gas monitoring

3No. rounds of ground gas monitoring were proposed during this investigation. At the time of writing 2No. visits had been completed on 07/06/2018 and 18/06/2018. The wells were monitored for methane, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide using a GFM series portable gas analyser.

[4] Cearns PJ and McKenzie (9188) Application of dynamic cone penetrometer testing in East Anglia. Penetration Testing in the UK, Thomas Telford, London

[5] Huntley SL (1990) Use of a dynamic penetrometer as a ground investigation tool in Hertfordshire. Field Engineering in Engineering Geology. Geological Society. Engineering Geology Special Publication No. 6.

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The wells were also monitored for volatile organic compounds using a PhoCheck+ Portable Ionisation Detector (PID).

13.5 Laboratory Analysis

13.5.1 Chemical Soil Analysis

Selected samples of soil have been subjected to laboratory testing. Sampling techniques and storage have been undertaken as per BS 10175:2011 Code of Practice for Investigation of Potentially Contaminated Sites. The laboratory testing has been carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex. Where available, the tests procedures are UKAS and MCERTS accredited.

The following analyses were completed on selected samples:-

- LEAP standard Soil suite (metals, speciated PAHs, asbestos)
- Organochlorine Pesticides

The full laboratory test results are presented in Appendix H.

13.5.2 Geotechnical Laboratory Testing

Selected samples of the soils have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford, in accordance with BS1377[6]. The sampling technique, type, storage and transport and the number of laboratory tests have been undertaken where possible in accordance with BS EN 1997-2:2007 and EN ISO 22475.

The following laboratory tests have been undertaken:

Table 6 Geotechnical Laboratory Testing

Test	Number of tests	
	Head	Lambeth Group
Moisture Content	4	4
Atterberg Limit Test	4	4
Particle Size Distribution Test	4	3
Saturated Moisture Content	1 (Chalk head)	-
Sulphate Determination	4	1
pH	4	1

[6] BS1377 Parts 1-9:1990 Methods of test for Soils for Civil Engineering Purposes

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14 Ground Conditions

The ground conditions are described in detail in the logs attached in Appendix F. In summary the soil conditions were as follows:

Table 7: Summary of soils encountered

Depth From (m) / (mOD)	Depth To (m) / (mOD)	Soil Type	Description
GL / 21.69-31.08	0.20-0.45 / 21.44-30.76	TOPSOIL	Dark brown gravelly silty TOPSOIL with frequent rootlets. Gravel is of fine to coarse angular to sub rounded flint.
GL / 25.3-31.43	0.33-1.0 / 24.7-30.83	MADE GROUND	Dark and light brown and grey slightly gravelly very sandy silt. Gravel is of fine to coarse angular to sub rounded flint, with glass, brick, clinker and ash fragments. TP103, TP123, TP125 and WS8 only. MADE GROUND
0.20-1.0 / 21.44-30.83	0.84-3.0 / 20.59-26.55	CLAY / GRAVEL	Firm to stiff / Medium dense red brown very gravelly silty friable CLAY / very clayey GRAVEL. Gravel is of fine to coarse and cobbles of rounded to sub angular flint. HEAD DEPOSITS
0.84-3.0 / 21.43-26.55	1.6-4.7 / 20.63-23.95	SILT / GRAVEL	Medium dense weathered pale grey white yellow and light brown chalk recovered as very gravelly SILT / very silty GRAVEL of chalk with occasional gravel of medium to coarse sub rounded to angular flint. Clasts are fine to cobbles of low density chalk. TP101-TP109, TP110A, TP113-TP115, TP117-120, TP123-TP124, WS1. HEAD DEPOSITS
1.0-4.7 / 20.59-24.38	1.9-5.0 / 19.69-23.48	CLAY	Stiff pale grey mottled red brown orange thinly laminated silty CLAY with occasional shell fragments. TP101-TP104, TP106, TP108-TP109, TP114-TP115, TP117, TP121, WS101-3 and WS105. LAMBETH GROUP
1.9-5.0 / 19.69-23.48	2.6*-6.0* / 16.69-23.28*	SAND	Loose to dense light brown yellow and grey clayey fine to medium SAND with occasional gravel of medium to coarse and cobbles of rounded to sub angular flint and

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			slightly cemented sand. TP104, TP117, TP121, WS101-WS103, WS105 and WS107 LAMBETH GROUP

* denotes full extent of investigation.

Made ground was encountered in TP103, TP123, TP125 and WS8 to 0.33-1.0mbgl and comprised gravelly very sandy silt. Gravel is of fine to coarse angular to sub rounded flint, with glass, brick, clinker and ash fragments.

The site is underlain by Head Deposits comprising an initial layer of firm to stiff / medium dense red brown very gravelly silty friable clays / very clayey gravels of fine to coarse and cobbles of rounded to sub angular flint. The thickness of this layer was noted to increase towards the ridge in the central and northern areas of the site, exceeding 3.0m on TP110, TP111, TP112, WS104, TP116 and TP125, where its base was not proven. The overall thickness gradually reduces to the W, SW and SE, following the natural topography of the site. It was proven to 0.84m in TP104, 1.1m in WS105 and TP108 adjacent to the west boundary of the site and to 1.0m in WS102, adjacent to Wandleys Lane in the south east area of the site.

A layer of medium dense chalk head recovered as very gravelly silt / very silty gravel of low density chalk with occasional gravel of medium to coarse sub rounded to angular flint was then encountered below the superficial gravels and along the flanks of the slope from 0.84-3.0mbgl [21.43-26.55mOD] and proven to 1.6-4.7mbgl [20.63-23.95mOD] in trial holes TP101-TP104, TP106, TP108-TP109, TP114-TP15, TP117 and WS1. Where proven, the thickness of these soils was noted to range generally between 1.0-1.5m; however, they were not encountered at the top of the slope in the northern area of the site. Based on the regional geology of the West Sussex coastal plain, it is considered that this layer consists of older head deposits comprising a weathered chalk silt matrix derived from the slopes that comprise the chalk South Downs to the north of the site.

The superficial gravel / clays / chalk head were underlain by the Lambeth Group locally comprising a an approximately 1m thick layer of stiff thinly laminated silty clay with occasional shell fragments from 1.0-4.7mbgl [20.59-24.38mOD] to 1.9-5.0mbgl [19.69-23.48mOD]. These soils were encountered within the lower elevation sections of the site, namely at the bottom of the slope in the south west area of the site (TP101-TP104, TP106, TP108-TP109, WS105) and at the bottom of the valley in the south east area of the site (TP114-TP115, TP117, TP121, WS102).

The clays were underlain by loose to dense fine to medium sands with occasional gravel of medium to coarse and cobbles of rounded to sub angular flint and slightly cemented sand. These soils were encountered from 1.9-5.0mbgl [19.69-23.48mOD] to 2.6-6.0 [16.69-23.28mOD] within trial holes WS105, TP104, WS107, WS102, TP117, TP121 and WS101 although their base was not proven in any of the trial holes.

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Based on the BGS boreholes to the north and south of the site, the boundary with the Chalk presents a slope of about 1°to the south, having been found approximately at 29.2mOD 1km north east of the site and at -45mOD 3km to the south of the site.

The Chalk boundary is therefore estimated to be encountered generally between 10.0-15.0mOD across the site, higher towards the northern boundary, although it must be noted that this is an estimate only, and the depth to chalk can be highly variable.

To better illustrate the morphology of the site and encountered ground conditions 3No. cross sections are presented as Figures 3, 4 and 5, Appendix B. The section lines are presented in Figure 2, Appendix B.

14.1 Dynamic Penetrometer Tests

A total of 8 Dynamic Penetrometer Tests (DPT) were undertaken across the site to provide general coverage. Probe DP108 also targeted the topographic depression is located on the south west area of the northern field. The results are attached in Appendix F.

Probe DP101 was located next to WS101 in the north eastern area of the site. Blow counts within the gravelly clay head deposits logged to 3.0mbgl [25.1mOD] were in the range of N_{100}=2-13 indicating medium dense soils, with the higher results reflecting the presence of gravel bands within the clay. A loose / soft spot is then identified between 3.0-3.7mbgl with an average N_{100}=0. This low value may reflect both the presence of the chalk head between 3.0-5.0mbgl [22.1-25.1mOD] and the groundwater inflow at 4.0mbgl. Below 5.0mbgl to 10.0mbgl [18.1mOD] the probe results are in the range of N_{100}=3-10 with an average value of N_{100}=5 typical of the interbedded medium dense sands and firm to stiff clays of the Lambeth Group.

Probe DP102 was located next to WS102 in the south eastern end of the site. Blow counts within the gravelly clay head deposits logged to 1.0mbgl [23.29mOD] were in the range of N_{100}=2-6 indicating medium dense soils. From 1.0 to 5.0mbgl [19.29mOD] blow counts in the Lambeth Group soils were generally in the range of N_{100}=2-4, with an average value of N_{100}=2. The blow counts then increase below 5.0m to around 8.5m [15.8mOD] ranging N_{100}=3-6 with an average value of N_{100}=4 indicating medium dense soils. There is a marked increase below 8.5mbgl to 10.0mbgl [14.8mOD] with blow counts ranging N_{100}=7-34, but generally higher than N_{100}=10+ below 9.0m, which may reflect the boundary with the Chalk at depth.

Probe DP103 was located at the top of the slope in the central northern area of the site and next to WS104. Blow counts within the gravelly clay head deposits to approximately 3.6mbgl [25.9mOD] were in the range of N_{100}=2-15 indicating medium dense soils, with the higher results reflecting the presence of gravel bands within the clay. From 3.6mbgl to 4.2mbgl [25.3mOD] blow counts reduce to N_{100}=1-2, likely reflecting the boundary with the first clay layer of the Lambeth Group. From 4.2mbgl to 5.0mbgl [24.5mOD] blow counts are of N_{100}=0 indicating locally loose soils. Below 5.0mbgl to 10.0mbgl [19.5mOD] a range of N_{100}=3-14,

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with an average value of N_{100}=7 is indicated typical of the interbedded firm to stiff clays and medium dense sands of the Lambeth Group.

Probes DP104 and DP105 were located in the central southern area of the site. The natural soils locally returned blow counts ranging N_{100}=2-16, indicating generally firm to stiff / medium dense soils along the full profile of both probes.

Probe DP106 was located in the south area of the site. From GL to 2.0mbgl [21.84mOD] blow counts ranged N_{100}=1-6 associated with the gravelly clay head deposits. A soft spot is indicated between 2.0mbgl and 3.5mbgl [20.34mOD] with an average blow count of N_{100}=1 and this is considered to be associated with the chalk head logged at similar depths within TP103 and TP101. From 3.5mbgl to the full depth of the test at 10.0mbgl [13.84mOD] blow counts ranged between N_{100}=1-6, averaging at about N_{100}=3 indicating firm / medium dense soils.

Probe DP107 was located adjacent to the south west boundary of the site at the bottom of the slope and next to WS105. From GL to 2.3mbgl [19.5mOD] blow counts ranged N_{100}=1-5, associated with the head deposits and the first firm to stiff silty clay layer of the Lambeth Group soils. From 2.3 to 3.3mbgl [18.5mOD] results indicate a soft spot associated with loose silty sands and groundwater ingress. From 4.2mbgl to 8.0mbgl [13.8mOD] blow counts of N_{100}=2-7 with an average value of N=3-4 are indicated typical of the interbedded medium dense sands and firm to stiff clays of the Lambeth Group. There is a marked increase below 8.0mbgl to 10.0mbgl [11.8mOD] with blow counts ranging N_{100}=7-22, but generally higher than N_{100}=10+, which may reflect the boundary with the Chalk at depth.

Probe DP108 targeted the topographic depression on the south west area of the northern field and was located next to WS107. The natural soils locally returned blow counts ranging N_{100}=2-11, with an average value of N_{100}=5 indicating generally firm to stiff / medium dense soils along the full profile of the probe.

14.2 Groundwater

Groundwater strikes were recorded in the following trial holes:-

Table 8: Groundwater Strikes

Trial Hole	Date of water strike	Depth to Groundwater strike (mbGL)	Depth to Groundwater strike (mOD)	Comments
TP101	21/05/2018	2.1	21.13	Soils moist at 2.1m
TP104	21/05/2018	2.4	21.24	Soils moist at 2.4m
TP108	21/05/2018	2.4	21.94	Groundwater seepage at 2.4m Groundwater at 2.7m after 10 minutes on completion of digging
TP117	23/05/2018	2.7	23.0	Soils moist at 2.7m

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TP121	23/05/2018	2.4	23.48	Groundwater seepage at 2.4m. Trial pit walls collapsing below 2.3m
WS101	25/05/2018	4.0	24.1	Soils wet below 4.0m in the sands
WS102	25/05/2018	4.0	20.29	Soils wet below 4.0m. Poor recovery below 4.0m in the sands
WS103	25/05/2018	2.2	22.8	Soils wet below 2.2m
WS105	25/05/2018	3.0	18.69	Soils wet below 3.0m. Poor recovery below 4.0m in the sands
WS107	25/05/2018	4.0	21.27	Soils wet below 4.0m. Borehole walls stable

Groundwater monitoring results are summarised as follows:-

Table 9: Groundwater Monitoring Results

Monitoring well	Depth to groundwater (mbgl)		Depth to groundwater (mOD)	
	07/06/2018	18/06/2018	07/06/2018	18/06/2018
WS101	No access	3.19	No access	24.91
WS102	No access	2.06	No access	22.23
WS105	1.67	1.76	20.02	19.93
WS107	3.98	4.02	21.29	21.25

It should be noted that groundwater monitoring was undertaken during a period of prolonged dry weather.

Based on groundwater elevations to date, the groundwater beneath the site is at its highest in the north and east, reducing to the south and west. Groundwater flow is therefore estimated to flow towards the south west, however it should be noted that this is based on observations of 4No. current boreholes. Observations from further boreholes would be required to refine this assessment.

14.3 Visual and Olfactory Evidence of Contamination

Apart from occasional clinker fragments within the made ground soils no significant evidence of contamination was encountered.

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E GEOTECHNICAL INFORMATION

15 Strata Encountered

15.1 Made Ground

Pockets of made ground were encountered in TP103, TP123, TP125 and WS8 to 0.33-1.0mbgl and comprised gravelly very sandy silt. with flint, with glass, brick, clinker and ash fragments.

Made ground or fill is by nature highly variable in both composition and bearing capacity and can be subject to large differential settlements when loaded. It is therefore generally unsuitable for use as a bearing stratum. In addition, made ground may contain contaminated and/or putrescible material. It can therefore be potential source of contamination and landfill gas.

15.2 Head Deposits

15.2.1 Gravelly Clays

The site is underlain by Head Deposits comprising an initial layer of firm to stiff / medium dense red brown very gravelly silty friable clays / very clayey gravels. The thickness of this layer increases towards the ridge in the central and northern areas of the site, exceeding 3.0m on TP110, TP111, TP112, WS104, TP116 and TP125, where its base was not proven. The overall thickness gradually reduces to the E, SW and SE, following the natural topography of the site.

The results of the geotechnical laboratory testing are summarised in Tables 10 and 11 below.

Table 10: Summary of Particle Size Distribution tests for Head Deposits – gravelly clays

Strata	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
Gravelly clays	13-21	8-25	3-4	51-73	0
	Clay and Silt (%)				
	18				

Table 11: Summary of Geotechnical Test Results for Head Deposits – gravelly clays

Test	Range
SPT 'N value'	5-50+
DPSH N_{100}	1-16
Moisture Content (%)	6.5-26.0
Liquid Limit (%)	25-58
Plastic Limit (%)	17-25
Plasticity Index (%)	8-33
Undrained shear strength (kPa)*	50-150
Sulphate Content (g/l)	<0.01
pH	7.3-7.5

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** Derived from hand penetrometer tests*

The results of the particle size distribution testing indicate the more gravelly fractions comprise very silty clayey gravels.

The results of the laboratory testing indicate the more cohesive fractions comprise low to medium plasticity clays.

N values from both SPT and perth penetrometer blow counts within the gravelly clays vary from N=5-50+. A plot of the SPT blow count versus depth for the sands is shown as Chart 1, Appendix B indicating generally stiff / medium dense to dense soils. DPSH results in the gravelly clay soils were generally in the range of N_{100} =2-15.

Lower blow counts of N=5-8 were obtained within the clays encountered in WS105, W107, and WS103 at about 1.0mbgl at the bottom of the slope. This is considered to be a more clayey horizon of these soils. The hand penetrometer results in these locations were in the range of 155-270kPa, indicating stiff clays.

Undrained shear strengths derived from the hand penetrometer tests in the more cohesive layers of the gravelly clays was in the range of 50-150kPa, averaging at approximately 90kPa, indicating generally firm to stiff clays.

15.2.2 Chalk Head

A layer of reworked chalk recovered as very gravelly silt / very silty gravel of low density chalk with occasional gravel of medium to coarse sub rounded to angular flint was encountered below the superficial gravels and along the flanks of the slope from 0.84-3.0mbgl [21.43-26.55mOD] and proven to 1.6-4.7mbgl [20.63-23.95mOD] in trial holes TP101-TP104, TP106, TP108-TP109, TP114-TP15, TP117 and WS101. It is considered that this layer consists of older head deposits comprising a weathered chalk silt matrix derived from the slopes that comprise the chalk South Downs to the north of the site.

The results of the geotechnical laboratory testing are summarised in Table 12 below.

Table 12: Summary of Geotechnical Test Results for Head Deposits – chalk head

Test	Range
SPT 'N value'	9-43
DPSH N_{100}	0-6
Saturated Moisture Content (%)	17
Bulk Density (Mg/m^3)	2.16
Dry Density (Mg/m^3)	1.86
Sulphate Content (g/l)	<0.01
pH	8.5

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A sample of the chalk head was submitted for saturated moisture content testing. The intact dry density value was of 1.86 Mg/m^3 classifying the chalk as high density according to CIRIA 574 (2002) guidelines.

N values from both SPT and perth penetrometer tests within the chalk head associated with the head deposits vary from N=9-43. A plot of the SPT blow count versus depth for the sands is shown as Chart 2, Appendix B indicating medium dense soils.

DPSH results in the chalk head were generally in the range of N_{100} =1-6 lower than the superficial gravelly clays. However, a soft spot was identified in DP101 between 3.0-3.7mbgl with an average N_{100}=0.

15.3 Lambeth Group – Clays and Sands

The superficial gravel / clays / chalk head were underlain by the Lambeth Group locally comprising an approximately 1m thick layer of stiff thinly laminated silty clay with occasional shell fragments from 1.0-4.7mbgl [20.59-24.38mOD] to 1.9-5.0mbgl [19.69-23.48mOD]. These soils were encountered within the lower elevation sections of the site, namely at the bottom of the slope in the south west area of the site (TP101-TP104, TP106, TP108-TP109, WS105) and at the bottom of the valley in the south east area of the site (TP114-TP115, TP117, TP121, WS102).

The clays were underlain by loose to dense fine to medium sands with occasional gravel of medium to coarse and cobbles of rounded to sub angular flint and slightly cemented sand. These soils were encountered from 1.9-5.0mbgl [19.69-23.48mOD] to 2.6-6.0 [16.69-23.28m OD] within trial holes WS105, TP104, WS107, WS102, TP117, TP121 and WS101 although their base was not proven in any of the trial holes.

The results of the geotechnical laboratory testing are summarised in tables 13 and 14 below

Table 13: Summary of Particle Size Distribution tests for Lambeth Group

Strata	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
Silty clayey sands	19-22	38-58	23-48	1-46	0
	Clay and Silt (%)				
	6				

Table 14: Summary of Geotechnical Test Results for Lambeth Group

Test	Range
SPT 'N value'	2-24
DPSH N_{100}	1-16
Moisture Content (%)	21.5-25.9
Liquid Limit (%)	49-65
Plastic Limit (%)	19-22
Plasticity Index (%)	30-46

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Undrained shear strength (kPa)*	45-215
Sulphate Content (g/l)	<0.01
pH	8.3

** Derived from hand penetrometer tests*

The results of the particle size distribution testing indicate the more gravelly fractions comprise very silty clayey sands / very sandy silts.

The results of the laboratory testing indicate the more cohesive fractions comprise medium to high plasticity clays.

N values from the SPT tests within the clays and sands associated with the Lambeth Group vary from N=2-24. A plot of the SPT blow count versus depth for the sands is shown as Chart 3, Appendix B.

DPSH results were generally in the range of N_{100} =1-16, averaging at about N_{100} =2-3 typical of the interbedded clays and sands of the Lambeth Group. The higher blow counts were generally obtained in the more granular strata.

Lower SPT blow counts of N=2-3 were obtained within sands at about 2.0-3.0m [18.69-19.69mOD] in WS105 in the south west area of the site, which is confirmed by the N_{100} =0-1 results obtained from DP107 in the same location. WS105 shows groundwater ingress at about 3.0m and collapsing walls below 4.0m in the sands which may be the reason for the occurrence of this soft spot.

Lower blow counts of N=5-9 and N_{100} =0-1 were also obtained in the sands encountered in WS101, WS102 and WS103 in the south east area of the site between 3.0-5.0mbgl (23.1-21.29mOD) which also may be associated with groundwater inflow.

Undrained shear strength derived from the hand penetrometer tests in the more cohesive layers of the gravelly clays was in the range 45-215kPa, averaging at approximately 125kPa, indicating generally stiff clays.

15.4 Chalk (Undifferentiated)

Based on the BGS boreholes to the north and south of the site, the boundary with the Chalk presents a slope of about 1°to the south, having been found approximately at 29.2mOD 1km north east of the site and at -45mOD 3km to the south of the site.

DP102 and DP107 indicated blow counts ranging N_{100}=7-34 from 8.0mbgl to 10.0mbgl (but generally higher than N_{100}=10+ below 9.0mbgl on both locations (15.8-12.8mOD), which may reflect the boundary with the Chalk at depth.

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F GEOTECHNICAL APPRAISAL

The foregoing geotechnical appraisal does not constitute a Geotechnical Design Report in accordance with EN1997. The following recommendations are for preliminary design purposes only.

For the detailed design, the short-term and long-term design situations must be considered. Where relevant, the following limit states should be considered:-

- Loss of equilibrium of the structure or the ground, considered as a rigid body, in which the strengths of structural material and the ground are significant in providing resistance (EQU)
- Internal failure or excessive deformation of the structure or structural elements in which the strength of structural materials is significant in providing resistance (STR)
- Failure or excessive deformation of the ground, in which the strength of soil or rock is significant in providing resistance (GEO)
- Loss of equilibrium of the structure or the ground due to uplift by water pressure or other vertical actions (UPL)
- Hydraulic heave, internal erosion and piping in the ground caused by hydraulic gradients (HYD)

The following factors should also be considered.

- Overall stability and ground movements
- Nature and size of the proposed construction including the design life
- Conditions with regards to the surroundings (e.g. neighbouring structures, traffic, utilities, vegetation, contamination etc.)
- Ground and groundwater conditions
- Influence of the environment.

16 Swelling and Shrinkage

Based on the laboratory test results in Section E, an overall classification of NHBC **MEDIUM** Volume Change Potential (VCP) is recommended for the gravelly clay soils associated with the head deposits.

Foundations will therefore require deepening in accordance with NHBC Chapter 4.2 where clay soils are encountered near trees, particularly along the boundaries of the existing fields. Foundation depths should be calculated based on the mature height of the tree, however, the existing height is relevant for trees which are to be removed.

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17 Sulphates

5No. samples of the natural soils were tested for sulphate content and pH. In accordance with the BRE[7] methodology and the number of samples tested, the site has been classified on the highest two measured sulphate contents.

Based on the results detailed in Section E and the above, the soils are classified by the BRE as sulphate design class DS-1, and, assuming a mobile groundwater table, the ACEC class is AC-1.

18 Groundwater

The groundwater monitoring results/observations are given in Section 14. Groundwater was encountered within the sands logged in all the windowless sampled boreholes and in trial pits TP101, TP104 and TP108 in the south west area of the site generally between 2.0-4.0mbgl [21.13-24.1mOD]. Poor recovery in the boreholes and trench instability in the trial pits were also noted.

Perched shallow groundwater should therefore be anticipated where granular soils are encountered, particularly during the wet winter months, and running sands should be expected in the more granular horizons.

Based on groundwater elevations to date, the groundwater beneath the site is at its highest in the north and east, reducing to the south and west. Groundwater flow is therefore estimated to flow towards the south west, however it should be noted that this is based on preliminary observations of 4No. current boreholes. Observations from further boreholes would be required to refine this assessment.

19 Swallow Holes / Solution Features

The site has been assessed as at risk of solution features due to the findings from the desk study as follows:-

- The site is located on ground conditions where solution features can be prevalent (Head over Lambeth Group over Chalk).
- On site the geological boundary between the Lambeth Group and the Chalk is located in the north west corner of the site overlain by the Head Deposits. Solution features are most commonly encountered in the vicinity of the boundary between the two

[7] Building Research Establishment Special Digest 1: 2005. Concrete in aggressive ground. Part 1: Assessing the aggressive chemical environment.

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strata, where frequent fissures in the chalk are anticipated, and where surface water tends to accumulate (i.e. valleys or other topographic depressions), resulting in high volumes of water penetrating the chalk along the boundary

- The Fontwell area has a history of reactivation of natural cavities. A search of the internet has indicated that a burst water main in 1985 activated a number of solution features along Littleheath Road, located about 500m north west of the site. Furthermore 70No. sinkholes are reported 36m east of the site by the Envirocheck Ground Stability Report. These features are associated with the Chalk Group.
- A 1.5-2.0m deep E-W topographic depression possibly associated with ground dissolution was observed on the south west extent of the north west field of the site.
- A search of the local digital terrain models indicates some localised depressions in the topography to the west of the site, trending in an east-west direction and in line with the depression noted in the north west corner of the subject site. Another more distinct E-W line of depressions is indicated to the north of the A27, about 250m north of the site.

The results from the current investigation have indicated loose sands at depth on the south west (at about 2.0-3.0mbgl or 18.69-19.69mOD) and south east (at about 3.0-5.0mbgl or 23.1-23.29mOD) areas of the site at the bottom of the slope which were overlain by the first stiff clay layer of the Lambeth Group. At this stage it is considered that these layers are associated with groundwater ingress in the sands and are not due to solution features.

Probe DP108 targeted the topographic depression on the south west area of the northern field and was located next to WS107. The natural soils locally returned blow counts ranging N_{100}=2-11, with an average value of N_{100}=5 indicating generally firm to stiff / medium dense soils along the full profile of the probe. Furthermore, WS107 returned hand penetrometer values of 195-155kPa in the gravelly clays to 2.0mbgl [22.57mOD] and SPT values of N=11-24 in the sands to 5.0mbgl [20.27mOD]. The soil densities obtained in the depression are not characteristic of a solution feature, however, given the history of the site and local area, the risk of solution features cannot be discounted.

Based on the BGS boreholes to the north and south of the site, the boundary with the Chalk presents a slope of about 1°to the south, having been found approximately at 29.2mOD 1km north east of the site and at -45mOD 3km to the south of the site. DP102 and DP107 indicated blow counts ranging N_{100}=7-34 from 8.0mbgl to 10.0mbgl (but generally higher than N_{100}=10+ below 9.0mbgl on both locations [15.8-12.8mOD], which may reflect the boundary with the Chalk at depth.

At this stage a high risk of solution features should be assumed for the whole site. However, where a significant thickness of the Lambeth Group can be proved overlying the Chalk the risk classification may be reduced. An additional phase of investigation targeting the boundary with the Chalk is therefore recommended.

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Swallow holes are generally activated by water ingress, as has been evident with the increase in frequency of their occurrence over the wet winter in 2013/14, the wettest in recorded history.

This report provides recommendations for precautions for the design of foundations on a site at high risk of solution features and swallow holes. Whilst the precautions should minimise the risk to the proposed structures, the risk of swallow holes opening within the site remains the same, and the potential for swallow holes to occur on site cannot be discounted or designed against and the reputational (and possibly financial) impact of any such occurrence should not be underestimated. It is essential that **all efforts to minimise surface water migration into the ground are adhered to.** In particular, the design of water supply and sewer pipes should take into account the potential for relatively large settlements to occur where ground levels are raised and be designed accordingly. Where possible, ground level raises should be avoided. Conventional soakaways must be avoided if possible, and borehole soakaways must extend and discharge only into the competent rock at depth.

20 Soakage Potential

Soakage testing was beyond the scope of works. By way of preliminary comment, shallow soakaways could be an option within the clayey gravels depending on the granular fraction and subject to confirmatory BRE365 full scale soakage testing, however the groundwater may limit storage in certain parts of the site and regulatory consent would be required to confirm discharge was acceptable. Alternatively, the site may be suitable for the use of a sustainable drainage system to collect, store and clean surface runoff prior to release. This may include permeable paving, swale or bioretention features.

Regarding the use of shallow soakaways, CIRIA C574 recommends that soakaways in low density chalk should be located a minimum of 10m from any foundations, and if the site is at a **moderate to high** risk of solution features, then the distance should be increased to 20m. Deep boreholes soakaways onto chalk at depth may be considered as an alternative and subject to additional investigations and confirmatory testing. However, the high groundwater table may limit storage in the lower lying areas of the site.

The north east part of the site is classified as being within a SPZII (outer zone – sub surface activity only). The north west corner of the site is classified as being within a groundwater SPZ1 (Inner zone). The remainder of the site is classified as being within a groundwater SPZ1 (Inner zone – subsurface activity only). Soakage directly into groundwater is unlikely to be acceptable to the Environment Agency (EA) in an SPZ I except in exceptional cases due to the potential risk of contamination. If the proposed soakaway is only designed to drain surface water runoff from roof drains, then it may be possible to discharge into the chalk. If the soakaway is also designed to take road drainage, then some form of pre-treatment of surface water discharge may be required. In any case, the EA should be consulted as early as possible as to the acceptability of the use of any type of soakaways on site.

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21 Bearing Capacity and Foundations

21.1 Shallow Foundations

All loads should be transferred beneath any topsoil, made ground, loose, soft, low strength, desiccated or disturbed soils and transferred onto the firm to stiff / medium dense to dense gravelly clays at depth.

SPT blow counts of N=2-9 were achieved within the sands encountered in WS105 at about 2.0-3.0m [18.69-19.69mOD] in the south west area of the site and in the sands encountered in WS101, WS102 and WS103 in the south east area of the site between 3.0-5.0mbgl [23.1-21.29mOD] at the bottom of the slope. This generally correlates with the low blow counts recorded in probes DP101, DP102, and DP107 in the same areas, which indicated soft/loose spots at similar depths. WS105 showed groundwater ingress at about 3.0m and collapsing walls below 4.0m in the sands. WS101 shows the soils as wet from 4.0m. WS102 showed the soils as very wet from 4.0m and collapsing walls below 3.0mbgl in the sands.

Based on the above and given the fact that the sands are generally overlain by the first stiff clay layer of the Lambeth Group, these loose soils are likely associated with groundwater ingress and are not due to solution features.

At this stage an allowable bearing capacity of 80kPa is recommended on the firm to stiff / medium dense gravelly clays gravels below about 1.0m.

Groundwater was encountered within the sands generally between 21.13-24.1mOD and at depths of generally between 2.0-4.0m in the lower elevation areas of the site at the bottom of the slope. Foundations may require deepening due to the presence of trees to NHBC MEDIUM VCP precautions. Where shallow (1.5-2m bGL) groundwater is encountered in the lower lying areas, particularly in the south west of the site, deepening may extend below the water table and running sands should be anticipated. Deepening of foundation trenches should be avoided in such instances and alternatively, a piled solution may be preferred in these areas.

The site is situated within an area at risk of solution features and foundations should be designed to span any loose / soft zones. CIRIA C574 "Engineering in Chalk" indicates that where there is a potential for solution features foundations should be designed to span 5m.

Therefore, where conventional foundations are proposed, the following preliminary recommendations should be adopted:-

- Cruciform shaped, reinforced foundations designed to extend at least 1m beyond the proposed building corner in each direction and with a minimum span of 5m (as per CIRIA C576);
- Proposed footprints should be kept as square as possible. Long terraces and linked buildings should be avoided;

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- Foundation trenches should be inspected to ensure competent soils are encountered at founding level, and probing of the foundations is recommended to locate any soft areas (SPT N value should be >10 blow counts/300mm).

At this stage the investigation results indicate that this may be required in the northern area of the site closer with the geological boundary with the Chalk. The above preliminary recommendations are subject to revision following subsequent investigations.

21.2 Piling

For the ground conditions encountered on site, driven, bored or continuous flight augered (cfa) piles may be considered. Pile design was beyond the scope of works. If a piled solution is adopted, then deep cable percussion boreholes extending 5m onto the Chalk are recommended across the site for pile design. A piled foundation may be more suitable on the lower elevation areas of the site and the near trees where deepening is not recommended due to the potential for high groundwater and unstable excavations.

22 Floor Slabs

With reference to NHBC Standard 5.2, suspended floor slabs are recommended:-

- Where the depth of fill exceeds 600mm
- Where foundations are deepened below 1.5m in accordance with NHBC Standards Chapter 4.2
- Where desiccated soils are encountered
- Where vibratory ground improvement techniques have been used
- Where foundations have been piled.
- Where a risk of solution features has been identified.

Given the potential for clays soils to be present within the influence of trees in certain areas of the site, suspended floor slabs would be recommended for conventional foundations for plots located in the zone of influence of trees. Suspended floor slabs are also recommended where piled foundations are proposed, and where solution features are a risk.

23 Roads

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CBR testing was beyond the scope of works. However, as a preliminary guide, IAN 73 06[8] and LR1132[9] indicate that for average construction conditions with a water table below 600mm of the formation level, an estimated CBR value for silty sandy clays with a plasticity index of 20-40% of 3-4%. The CBR value may be higher depending on the gravel content, however confirmatory testing would be required to confirm this.

24 Excavations

Excavations in the shallow gravelly clays at the top of the slope should be stable in the short term. However, groundwater seepages should be anticipated along the more granular soils encountered at the bottom of the slope in the west and south east areas of the site generally between generally between 2.0-4.0mbgl [21.13-24.1mOD]. Excavations in such areas may therefore be unstable. Running sands/gravels and piping in excavation bases should also be anticipated in these areas.

Excavations extending below the water table will require de-watering, and deepening of foundations should therefore be avoided if possible.

Excavations will be unstable in the long term and should be backfilled as soon as possible.

Appropriate Health and Safety precautions must be adhered to where man entry into excavations is required. Even stiff clay soils at shallow depth can collapse, particularly following wet weather, and great care should be taken at all times.

25 Filling

The preliminary recommendations contained within this report assume that ground levels are to remain at a similar level across the site for the proposed development, and that no significant changes in level are proposed. However, it is noted that given the sloping nature of the site, some cut and fill operations may be required.

In the event that ground levels are to be raised, this may induce significant settlement, particularly across the areas of soft clays / loose sands / loose gravels/ solution features, which could adversely affect foundation design, drainage etc. Where significant changes in ground levels are proposed then further investigation will be required to assess the impact of such earthworks on the above recommendations.

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[8] Interim Advice Note 73/06 Rev 1 Design guidance for road pavement foundations (Draft HD25) (2009)

[9] TRRL Laboratory Report 1132 The structural design of bitumous roads. Powell, Potter Mayhew and Nunn (1984)

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26 Slope Stability

The topography of the site includes a general slope to the west, south, and south east. In addition to this a small valley of NNW-SSE direction is mapped in the eastern area of the site with Barn Farm built on its eastern slope.

The higher ground is located in the central northern area of the site at about 29-31mOD, whilst the low lying areas are located at the south western extent of the site adjacent to Fontwell Avenue at 19-20mOD and the south eastern extent of the site adjacent to Wandleys Lane stands at about 22-23mOD. The slope to the west stands at about 2-5°, whilst the slopes to the south and east are shallower at about 1-2°. The clusters of pine trees along the south west area of the site were noted to be slightly inclined (Photo 2, Appendix E), which may be indicative of ground movement.

Based on the proposed development layout drawing reference LN31 Revision SK10 by Dandara South Region, cut and fill operations may be anticipated in the western area of the site and this should be considered in more detail in the final design. Furthermore, earthworks in the low lying areas of the slope may reduce the depth / expose the groundwater bearing strata at about 2.0-3.0m [18.69-19.69mOD] in the south west area of the site and between 3.0-5.0mbgl [23.1-21.29mOD] in the south east area of the site.

General recommendations for developing on slopes include the following:

- Care must be taken to ensure that any cut and fill operations do not destabilise the slope. As a general principal, loading at the crest and cutting at the toe would have such an effect.
- Retaining walls should be avoided if possible, kept to a maximum height of 900mm where necessary, and include adequate drainage. Retaining structures over 900mm in height will require global stability checks and detailed design.
- Filling of subfloor voids should be avoided.
- Drainage of the site will be crucial.
- All drains should be laid at twice the normal fall to accommodate any local ground movement.
- Vegetation will have stabilising effect and should be maintained for as long as possible.
- Introduction of water into the slope must be avoided. Soakaways should be kept remote from slopes and services at the slope crest should be designed accordingly, with, for example, clay breaks in the surround.
- Excavations across the slope should be avoided if possible. Where necessary, they should be kept to short lengths, say 5m, and backfilled immediately.

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A stability analysis of the slope was beyond the scope of this investigation. At this stage it is recommended that the crest of the slope is not overloaded with any temporary or permanent structures no tree or vegetation clearance is carried out on the slope as this may exacerbate any underlying slope stability issues. Furthermore, adequate drainage of the site will be crucial and introduction of water into the slope must be avoided.

27 Retaining Walls

At this stage it is not known if retaining walls are proposed across the site. This should be confirmed at the detailed design stage.

28 Settlement

Based on the allowable bearing capacity given in Section 21, settlements should be within typical tolerable limits for the low rise development proposed.

If soft clays are encountered at formation level or below, significant settlement should be anticipated, and serviceable limit state analyses will be required. For Geotechnical Category 2 and 3 structures, detailed settlement analyses are usually required.

At this stage it is assumed that ground levels will remain at the current level for the proposed development. If significant level raises are proposed, this may induce significant settlement in the natural soils and detailed settlement analyses will be required.

Where foundations are stepped or span different soil types, differential settlement should be anticipated and allowance should be made for nominal reinforcement.

29 Heave and Uplift

In accordance with NHBC Standards Chapter 4.2, precautions against heave should be used where foundations are within the influence of trees and the resulting foundation depth is greater than 1.5m. Compressible material must be provided against the inside faces of all external wall foundations greater than 1.5m in depth. For pier and beam foundations, additional voids are required below ring beams.

For piled foundations, the effect of uplift induced by heave must be included in the pile design. Piles should be reinforced for the length of pile governed by the heave design, and allowance should be made for the inclusion of void former or similar on the underside of ground beams.

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G GEO-ENVIRONMENTAL APPRAISAL

30 Conceptual Site Model

The preliminary conceptual site model has identified a number of potential pollutant linkages.

The main contaminant of concern associated with the continuous use of the site as farmland is the presence of pesticides for agricultural activities.

Other localised on-site sources of contamination likely to impact the site include made ground in the northern extent of the site associated with the disused brick barn area, historic infilled sand and gravel pits and the reservoir adjacent to the northern boundary of the site. These may be impacted with Heavy Metals, PAH, asbestos and ground gas. ACM may also be present within the construction of the disused buildings in the brick barn area of the site.

These sources are considered to pose a low / moderate risk to human receptors and a low / moderate risk to controlled waters.

31 Testing Strategy

31.1 Soil Sampling

Trial hole locations were generally spread evenly across the site to provide even, non-targeted coverage. The trial holes were roughly placed on a herringbone grid. The trial hole spacing was consistent with the recommended spacing of 25 to 50m for an exploratory investigation according to (BS10175 Section 7).

In addition, trial hole WS108 targeted the potential made ground associated with the yard in the northern area of the site and a shallow hand dug pit targeted the burnt ground area in the eastern section of the site. TP123 targeted the made ground in the overgrown expanse in the central section of the site where the discarded farm machinery was encountered.

Samples have been tested for the presence of the identified contaminants of concern (heavy metals, PAH, asbestos and organochlorine pesticides).

31.2 Land gas monitoring

The land gas investigation strategy has been designed to provide general coverage across the site.

The sensitivity of the development has been combined with the generation potential of the source to determine an ideal well spacing as well as monitoring frequency and period. In this instance the sensitivity of the development (residential with gardens) is rated as HIGH. The

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generation potential of the source has been assessed using the modified form of the Wilson and Card Classification scheme as presented in CIRIA665, as LOW RISK.

The recommended well spacing is 50->75m. The recommended monitoring frequency is 6 visits over 2 months. In this instance, 4No. gas monitoring wells (spacing ~300m) were installed across the site and we have allowed for 3 visits in 6 weeks in order to give a preliminary indication of the gas regime.

32 Assessment Criteria

32.1 Human Health Assessment Criteria

Pollutant linkages containing human health have been risk assessed by comparing the soil laboratory test results to Tier 1 Generic Assessment Criteria. These are based on published Suitable for Use Levels (S4UL[10]) and Category Four Screening Levels (C4SL[11]) assuming a residential land use as a conservative approach.

In accordance with current HPA guidance[12], the assessment of PAHs has been carried out using a surrogate marker approach, whereby the assessment of risk from Benzo(a)Pyrene also captures potential risks from other carcinogenic PAHs that may be present. The threshold PAHs have been assessed similarly, by using Naphthalene as a marker compound.

32.1.1 Statistical Assessment

In assessing soil test results and comparing them to any threshold or screening value, an assessment must first be made as to how accurately the test results reflect the true mean of the contaminant level within the ground. In this assessment for each parameter the test data have been subjected to statistical assessment based on the methodology set out in *CIEH report 2008: Guidance on comparing Soil Contamination Data with a Critical Concentration.* The Upper Confidence Level or U_{95} value is thereby calculated as being the level at which we would be 95% confident that the true mean is **less** than this value. For the purposes of this assessment, a conservative approach has been adopted in the statistics. All non-detect values have been treated as being equal to half the limit of detection.

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[10] The LQM/CIEH S4ULs for Human Health Risk Assessment, Nathaniel P et al, 2015. Copyright Land Quality Management Ltd, reproduced with permission: Publication Number S4UL3509

[11] CL:AIRE Final Project Report. SP1010 – Development of Category 4 Screening Levels for assessment of land affected by contamination. CL:AIRE, December 2013

[12] HPA Contaminated Land Information Sheet. Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs). Version 3. Health Protection Agency, 2010.

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It should be noted that for the purposes of these assessments, no statistical outliers have been excluded. The CIEH guidance document that accompanies the statistics calculator states:

> ***outliers should be excluded from a dataset ONLY where they:***
>
> - *are obviously and demonstrably the result of an error that can be identified and explained, or*
> - *clearly indicate that more than one soil population exists within the dataset and this can be justified by (or informs the further development of) the conceptual model*

32.2 Land Gas Assessment Criteria

Gas monitoring is currently underway. An initial conservative assessment has been made using the method outlined in CIRIA 665[13] for low rise housing. This is consistent with current NHBC guidance for low rise housing.

In this assessment the model low rise house is assumed, ie. one with a floor plan area of 8mx8m, a well-ventilated sub-floor void of 150mm and a minimum ventilation rate of one complete volume change per 24 hours.

A risk based method is used to allow for identification of gas protection measures for such housing by comparing measured emission rates to generic "Traffic Lights". Typical maximum concentrations of methane and carbon dioxide are considered and where these exceed typical maximums for the generation potential of the particular source then risk based Gas Screening Values are considered. In this assessment the highest concentrations have been combined with the highest flow rates to provide a conservative Tier 1 assessment.

The source is then rated as Green, Amber 1, Amber 2 or Red and appropriate design protection measures recommended in line with NHBC guidance

33 Analytical Test Results – Soils

33.1 Metals and Non-Metals

The soil samples have been subdivided into 3 populations representing made ground, topsoil and the underlying natural clayey gravels / gravelly clays.

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[13] Wilson S, Oliver s, Mallett H, Hutchings H and Card G. 2007. Assessing risks posed by hazardous ground gases to buildings. CIRIA Report 665.

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The test results for each population have been subject to statistical analysis as described above and the results tabulated below:

33.2 Metals and Non Metals – Made Ground

Table 15: Summary of soil contamination test results within made ground (5 samples)

Determinant	Arithmetic Mean (mg/kg)	Number of samples	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic Assessment Criteria Residential with private gardens (mg/kg)	Samples which exceed GAC (Including outliers)
Arsenic	10.7	5	16.4	100	37	-
Cadmium	0.20	5	0.74	100	26	-
Hexavalent Chromium	0.4	5	0.4	100	21	-
Copper	142.6	5	658.9	100	2400	-
Lead	72.6	5	136.1	99	200	-
Mercury	0.25	5	0.25	100	40[1]	-
Nickel	13.84	5	19.6	100	170	-
Zinc	223.2	5	413.2	100	3700	-

Notes to table

1. *Assessment criterion based on inorganic Mercury*

There is at least a 95% confidence limit that the true mean of each of the above parameters is below the Acceptance Criteria. That is to say that, statistically, there is an acceptable degree of confidence that the made ground soils are not contaminated with any of the above parameters.

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33.3 Polyaromatic Hydrocarbons (PAH) – Made Ground

PAH are widespread within made ground and the urban environment generally. They are one of the most common contaminants in made ground and the one that most commonly drives remediation. Benzo(a)Pyrene is a particular problem, being very commonly found in association with tarmac, clinker and any burnt products and also being highly toxic to human health. The assessment criterion for BaP is close to levels that are found naturally in many topsoils and this makes it very difficult for any population of soils to pass the CIEH statistics with a 100% evidence level.

The BaP and naphthalene results have been subject to statistical analysis as for the metals.

The mean Soil Organic Matter of the population has been used to determine an appropriate Tier 1 GAC for each population. The results are summarised as follows:

Table 16: Summary of BaP and Naphthalene in made ground (5 samples)- mean SOM 1%

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic Assessment Criteria[1] (mg/kg) Residential with plant uptake 1% SOM	Samples that exceed GAC (Including outliers)
Benzo(a)Pyrene	0.11	0.32	100	5.0	-
Naphthalene	0.06	0.10	100	2.3	-

There is at least a 95% confidence limit that the true mean of each of the above parameters is below the Acceptance Criteria. That is to say that, statistically, there is an acceptable degree of confidence that the made ground soils are not contaminated with any of the above parameters.

33.4 Metals and Non Metals – Topsoil

Table 17: Summary of soil contamination test results within topsoil (20 samples)

Determinant	Arithmetic Mean (mg/kg)	Number of samples	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic	Samples which exceed GAC (Including outliers)

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					Assessment Criteria Residential with private gardens (mg/kg)	
Arsenic	5.9	20	8.0	100	37	-
Cadmium	0.28	20	0.4	100	26	-
Hexavalent Chromium	0.4	20	0.4	100	21	-
Copper	8.9	20	17.7	100	2400	-
Lead	19.2	20	30.1	100	200	-
Mercury	0.25	20	0.25	100	40[1]	-
Nickel	11.9	20	20.7	100	170	-
Zinc	58.9	20	119.6	100	3700	-

Notes to table

2. *Assessment criterion based on inorganic Mercury*

There is at least a 95% confidence limit that the true mean of each of the above parameters is below the Acceptance Criteria. That is to say that, statistically, there is an acceptable degree of confidence that the topsoil is not contaminated with any of the above parameters.

33.5 Polyaromatic Hydrocarbons (PAH) – Topsoil

The mean Soil Organic Matter of the population has been used to determine an appropriate Tier 1 GAC for each population. The results are summarised as follows:

Table 18: Summary of BaP and Naphthalene in made ground (20 samples)- mean SOM 1%

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier1 Generic Assessment Criteria[1] (mg/kg)	Samples that exceed GAC (Includin

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				Residential with plant uptake 1% SOM	g outliers)
Benzo(a)Pyrene	0.06	0.09	100	5.0	-
Naphthalene	0.05	0.05	100	2.3	-

There is at least a 95% confidence limit that the true mean of each of the above parameters is below the Acceptance Criteria. That is to say that, statistically, there is an acceptable degree of confidence that the topsoil is not contaminated with any of the above parameters.

33.6 Metals and Non Metals – Natural Ground

Table 19: Summary of soil contamination test results within the natural gravelly clays (5 samples)

Determinant	Arithmetic Mean (mg/kg)	Number of samples	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic Assessment Criteria Residential with private gardens (mg/kg)	Samples which exceed GAC (Including outliers)
Arsenic	6.9	5	9.16	100	37	-
Cadmium	0.25	5	0.25	100	26	-
Hexavalent Chromium	0.4	5	0.4	100	21	-
Copper	8.9	5	11.9	100	2400	-
Lead	11.4	5	13.4	100	200	-
Mercury	0.25	5	0.25	100	40[1]	-
Nickel	14.2	5	29.0	100	170	-
Zinc	45.1	5	58.0	100	3700	-

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Notes to table

3. *Assessment criterion based on inorganic Mercury*

There is at least a 95% confidence limit that the true mean of each of the above parameters is below the Acceptance Criteria. That is to say that, statistically, there is an acceptable degree of confidence that the natural gravelly clays are not contaminated with any of the above parameters.

33.7 Polyaromatic Hydrocarbons (PAH) – Natural Ground

The mean Soil Organic Matter of the population has been used to determine an appropriate Tier 1 GAC for each population. The results are summarised as follows:

Table 20: Summary of BaP and Naphthalene in made ground (5 samples)- mean SOM 1%

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic Assessment Criteria[1] (mg/kg) Residential with plant uptake 1% SOM	Samples that exceed GAC (Including outliers)
Benzo(a)Pyrene	0.05	0.05	100	5.0	-
Naphthalene	0.05	0.05	100	2.3	-

There is at least a 95% confidence limit that the true mean of each of the above parameters is below the Acceptance Criteria. That is to say that, statistically, there is an acceptable degree of confidence that the natural gravelly clays are not contaminated with any of the above parameters.

33.8 Organochlorine Pesticides

Five samples of the topsoil were tested for a suite of Organochlorine pesticides. Of the five samples tested only the topsoil within TP102 at 0.2m in the south west area of the site returned results slightly above the limit of detection of 10µg/kg.

The test results identified trace concentrations of Dichlorodiphenyldichloroethane (p.p-DDD) and Dichlorodiphenyltrichloroethane (p.p-DDT) at 19µg/kg and 12µg/kg respectively.

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However, the above assessment is based on 5No. samples and the risk of further pesticide contamination across the site cannot be discounted at this stage.

33.9 Asbestos

All of the soil samples tested were screened for the presence of asbestos containing materials and/or loose asbestos fibres. None were detected.

34 Land Gas Monitoring Results

Two rounds of gas monitoring have been completed at the time of writing on 07/06/2018 and 18/06/2018. Access was not available to WS101 and WS102 on 07/06/2018 as the area was in use by horses undergoing physical rehabilitation.

Table 21: Summary of land gas monitoring results

Monitoring Visit Date	WS101					
	CO_2 (%)	CH_4 (%)	CO (%)	O_2 (%)	Flow rate (l/hr)	Atmospheric Pressure (mB)
07/06/2018	No access					
18/06/2018	0.0	0.0	0.0	20.8-20.6	0.0	1017

Monitoring Visit Date	WS102					
	CO_2 (%)	CH_4 (%)	CO (%)	O_2 (%)	Flow rate (l/hr)	Atmospheric Pressure (mB)
07/06/2018	No access					
18/06/2018	0.0	0.0	0.0	20.5-20.6	0.0	1017

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Monitoring Visit Date	WS105					
	CO_2 (%)	CH_4 (%)	CO (%)	O_2 (%)	Flow rate (l/hr)	Atmospheric Pressure (mB)
07/06/2018	0.0-3.9	0.0	0.0	20.6-18.0	0.0	1013
18/06/2018	0.0	0.0	0.0	21.0	0.0	1017

Monitoring Visit Date	WS107					
	CO_2 (%)	CH_4 (%)	CO (%)	O_2 (%)	Flow rate (l/hr)	Atmospheric Pressure (mB)
07/06/2018	0.0-1.3	0.0	0.0	20.2-19.0	0.0	1013
18/06/2018	0.0-2.7	0.0	0.0	17.8-21.0	0.0	1017

Negligible flow rates and methane concentrations were recorded. The maximum recorded CO_2 concentration was 3.9% in WS105 on 07/06/2018.

35 Risk Assessment

35.1 Human Health

The works to date have not identified any significant contamination with respect to identified human health receptors.

The topsoil across the site tested free from heavy metal, PAH and asbestos contamination. However, of the five samples screened for Organochloride Pesticides one sample (TP102 at 0.2m) in the south west area of the site identified trace concentrations of Dichlorodiphenyldichloroethane (p.p-DDD) and Dichlorodiphenyltrichloroethane (p.p-DDT).

Given the small number of samples tested, if the topsoil is proposed to be stockpiled for reuse prior to the redevelopment of the site, then additional Organochloride Pesticide testing is recommended to confirm that no further elevated concentrations exist.

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The made ground soils encountered in WS8, TP103, TP123, TP125 and in the burnt ground area in the eastern area of the site tested free from any significant contamination and are chemically suitable to remain on site.

Whilst the assessment has not found any other significant contamination, access into some areas, including those that may be impacted by offsite sources, has not been possible and there remains the possibility that as yet unidentified contamination may be present, particularly beneath currently existing structures in the northern area of the site, where the disused brick barn is located.

35.2 Controlled Waters

35.2.1 Groundwater

The Principal aquifer and therefore the groundwater on site has been identified as a high sensitivity receptor due to the location of the site within a Zone 1 Source Protection Zone.

The nearest groundwater abstraction is located 127m south west of the site and is licensed as a Potable Water Supply from Eastergate Pumping Station operated by Portsmouth Water Ltd.

The measured levels of potential contaminants encountered soils are negligible, when compared to GACs for a Residential end use. Furthermore, no visual or olfactory evidence of PHC were encountered during the site investigation. On this basis, the ground conditions on site are not considered to pose a significant risk to groundwater. This assessment should be reconsidered if significant contamination is identified at a later stage.

35.2.1 Surface Water

The nearest surface water feature is an unnamed tertiary river, located approximately 50m east of the site. However, based on the recorded concentrations of contaminants the site is not considered to pose a risk to surface water receptors.

35.3 Land gases

35.3.1 Ground Gas

The methodology set out in CIRIA 665[14] has been used to assess the risks to human health and structures. The gassing potential for this site has been assessed as very low. The sensitivity of this development would be classified as HIGH and hence the minimum number of monitoring visits as recommended by CIRIA would be six visits over three months.

At this stage three visits over two months has been recommended as a preliminary screening. The calculated gas risk values at this stage should therefore be considered as a preliminary assessment.

[14] CIRIA 665 Assessing risks posed by hazardous ground gases to buildings 2007

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Two visits at two weeks intervals have been completed at the time of writing.

Adopting this method and assuming a gas flow rate of say 0.1 l/hr, then Gas Screening Values would be calculated for both methane and carbon dioxide for the site as follows:

Table 22: Calculated Gas Screening Values

	Carbon Dioxide	Methane
Gas Screening Value	0.0039/hr	0.0001/hr

A maximum methane concentration of 0.1% is assumed based on the collated gas monitoring data.

A maximum carbon dioxide concentration of 3.9% is assumed based on the collated gas monitoring data.

Adopting the modified Card and Wilson classification system as set out in CIRIA 665 then the gas regime would be classified as GREEN and gas protection measures are not required, however further monitoring will be required to confirm this.

35.3.2 Radon

The Desk Study highlighted the site is within an intermediate probability radon area, as between 5 and 10% of homes are above the action level. Therefore, special protective measures may be required in the construction of buildings on this site, in respect of radon gas.

At this stage a site specific Radon report is recommended to be obtained for the site to further assess potential radon mitigation requirements.

36 Waste Disposal

It is anticipated that the proposed development will generate waste soils and materials will need to be removed from site as part of the construction process.

It is anticipated that the majority of the made ground on site will be classified as non-hazardous, or possibly even inert, waste, for offsite disposal purposes, based on the current investigations although an allowance should be made for an element of hazardous waste at this preliminary stage.

Where soils are to be disposed off-site, it is the duty of the waste producer, in this case Dandara Commercial Ltd to ensure that all waste is disposed of appropriately and that any that is sent to landfill is sent to an appropriately licensed one. All waste sent to landfill must be classified and must be pre-treated. The form of pre-treatment should be documented in the Site Waste Management Plan. There are various forms of pre-treatment that are

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acceptable. In this case it could include "reduction in volume", which could be achieved by segregating the Made Ground and re-using part of it on site.

Where made ground soil is to be re-used on site then it is recommended that this is carried out under the CL:AiRE Definition of Waste Industry Code of Practice (DoWCoP) for re-use of soils[15].

It is strongly advised that detailed discussions be held with groundworks contractors and that receiving landfill sites are identified in advance of commencing any waste removal.

37 Conclusions and Recommendations

The works to date have not identified any significant contamination with respect to identified human health / controlled waters receptors, however, given the site's history and neighbouring land use further exceedances cannot be discounted at this stage, particularly in the northern area of the site, where the disused brick barn, infilled sand and gravel pits and historical reservoir are located.

It is recommended that once the existing structures in this area have been demolished and hard standing removed, further intrusive investigations are undertaken to further refine the contamination risk assessment.

The investigations have indicated that the topsoil underlying the site is not contaminated with heavy metals, PAH and asbestos. However, of the five samples screened for Organochloride Pesticides one sample (TP102 at 0.2m) in the south west area of the site identified trace concentrations of p.p-DDD and p.p-DDT.

Given the small number of samples tested, if the topsoil is proposed to be stockpiled for reuse prior to the redevelopment of the site, then additional Organochloride Pesticide testing is recommended, together with a quantitative risk assessment to derive screening levels.

The made ground soils encountered in WS8, TP103, TP123, TP125 and in the burnt ground area in the eastern area of the site is free from any significant contamination and are chemically suitable to remain on site.

Preliminary gas monitoring has classified the site as GREEN for residential properties with private gardens, therefore precautions against land gas are not recommended at this stage. As part of further investigation works across the site additional a full monitoring program should be completed to confirm the preliminary gas risk assessment.

[15] The Definition of Waste: Development Industry Code of Practice. Version 2 2011. Cl:aire

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The works to date highlighted the site as within an intermediate probability radon area, with between 5 and 10% of homes above the action level. At this stage a site-specific Radon report is recommended to be obtained for the site to further assess radon mitigation requirements.

It is anticipated that the majority of the made ground on site will be classified as non-hazardous, or possibly even inert, waste for offsite disposal purposes, based on the current investigations although an allowance should be made for an element of hazardous waste at this preliminary stage.

As with any redevelopment site, there is always the risk of hitherto undetected contamination, and further investigations should be carried out prior to redevelopment.

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APPENDIX A - LIMITATIONS

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7[16], although this is subject to the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and

[16] BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

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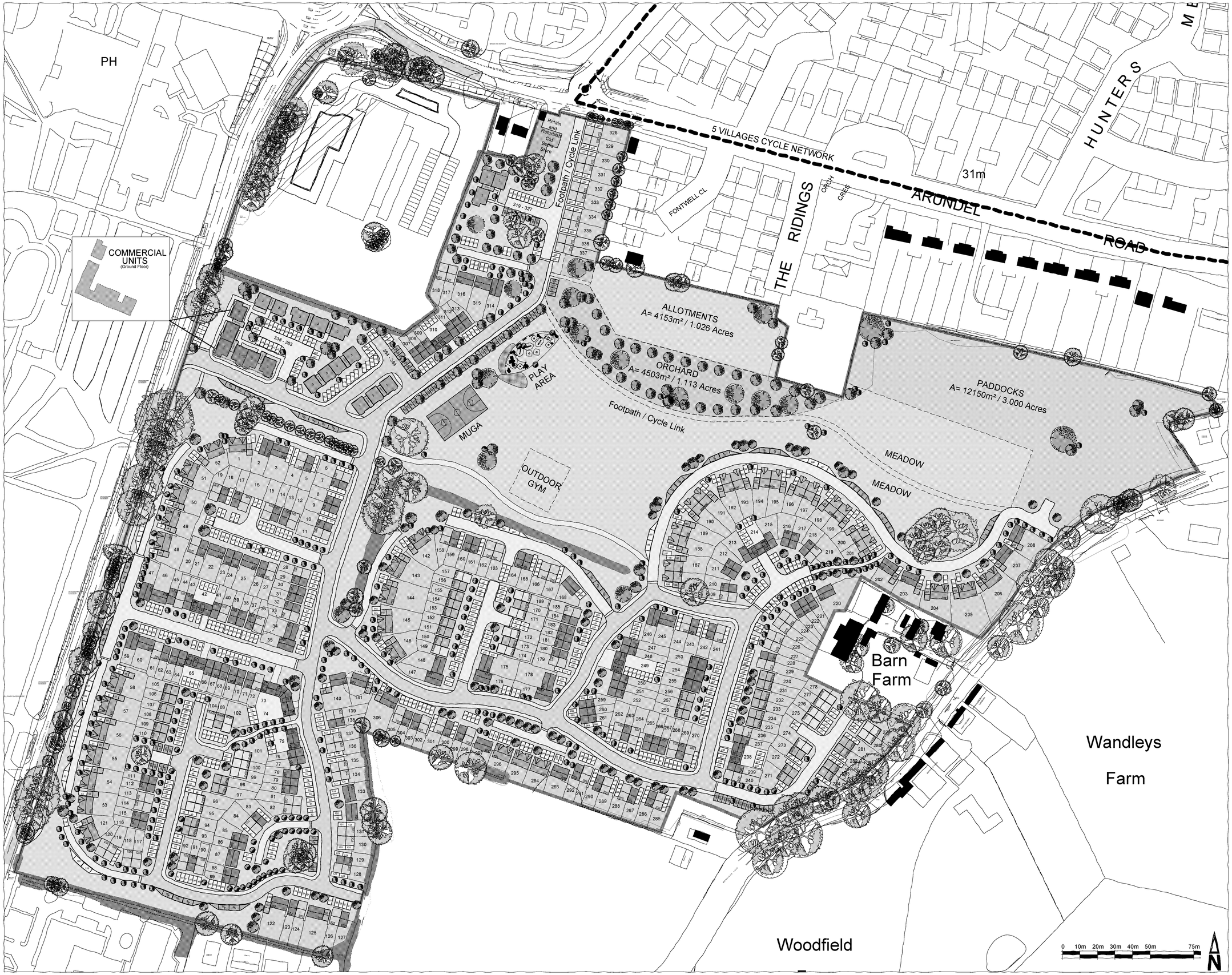
structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

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APPENDIX B - FIGURES

Figures



Private Tenure

2 BED HOUSE 756 sqft 203	x 104
2 BED FOG 759 sqft 204	X 9
3 BED HOUSE 947 sqft 302	x 79
3 BED HOUSE 1117 sqft 305	x 28
3 BED HOUSE 1117 sqft 305+	x 9
4 BED HOUSE 1182 sqft 406	x 16
4 BED HOUSE 1537 sqft 407	x 24
TOTAL	269

COMMERCIAL UNITS
4649 sqft (431.9m²)

Affordable Tenure

R=RENTED S=SHARED OWNERSHIP

2 BED HOUSE 753 sqft	X 36
3 BED HOUSE 919 sqft	X 20
4 BED HOUSE 1184 sqft	X 3
1 BED FLATS 538 sqft	X 29
2 BED FLATS 657 sqft	X 27
TOTAL	115
TOTAL DEVELOPMENT	384

GROSS AREA	17.78 hectares / 43.96 acres
NET AREA	8.61 hectares / 21.28 acres
FLOOR AREA	3.40 hectares / 8.40 acres
	(Private - 2.57 hectares / 6.36 acres)
	(Affordable - 0.82 hectares / 2.04 acres)

Development
Land at Fontwell
West Sussex

Drawing Title
Site Layout

dandara
south region
TEL: +44(0)1442 838 130

Status: PLANNING

File Ref.

Scale: 1:1000 @ A1

Date: 18.04.2018 | Drawn | Checked

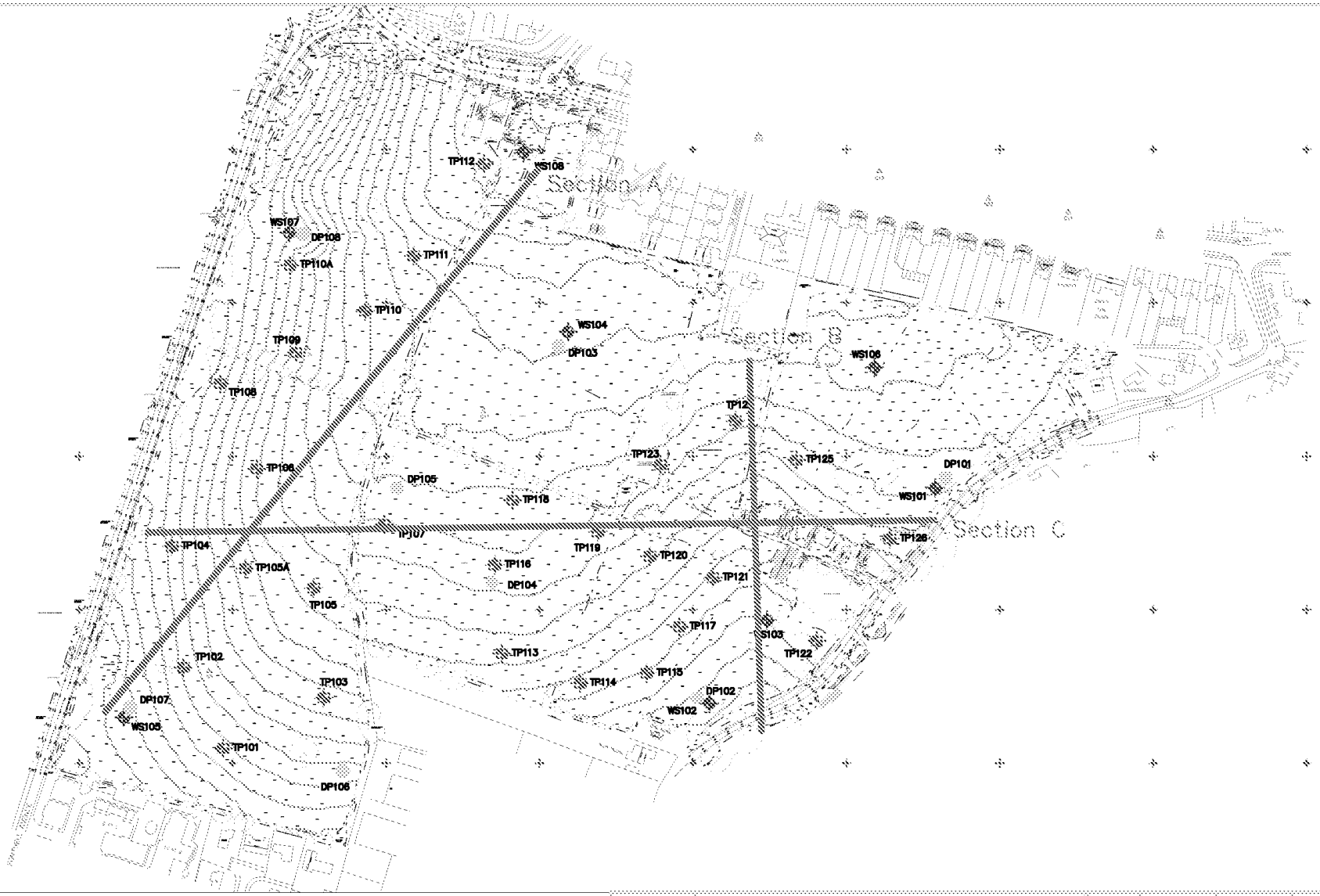
Drwg. No.: LN31 | Rev.: SK10

ARUN DISTRICT COUNCIL WA/99/29/OOC



Client	Dandara Properties Ltd	Date	25/05/18	Project Ref.	LP1649
Project	Northfield Cottages, Fontwell	Scale at A4	NTS	Fig No.	1
Title	Existing Site Layout Plan				

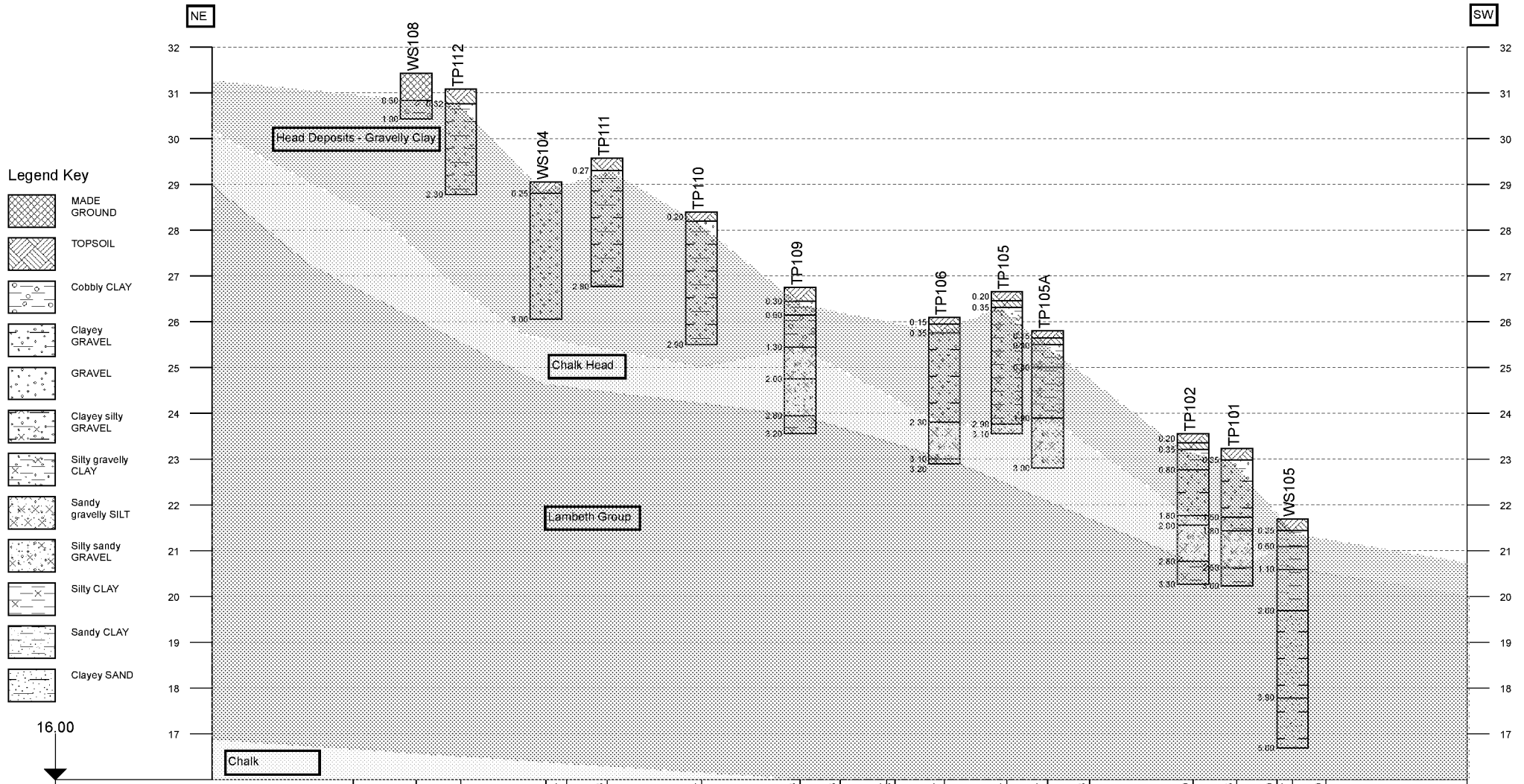
ARUN DISTRICT COUNCIL WA/99/20/DOC



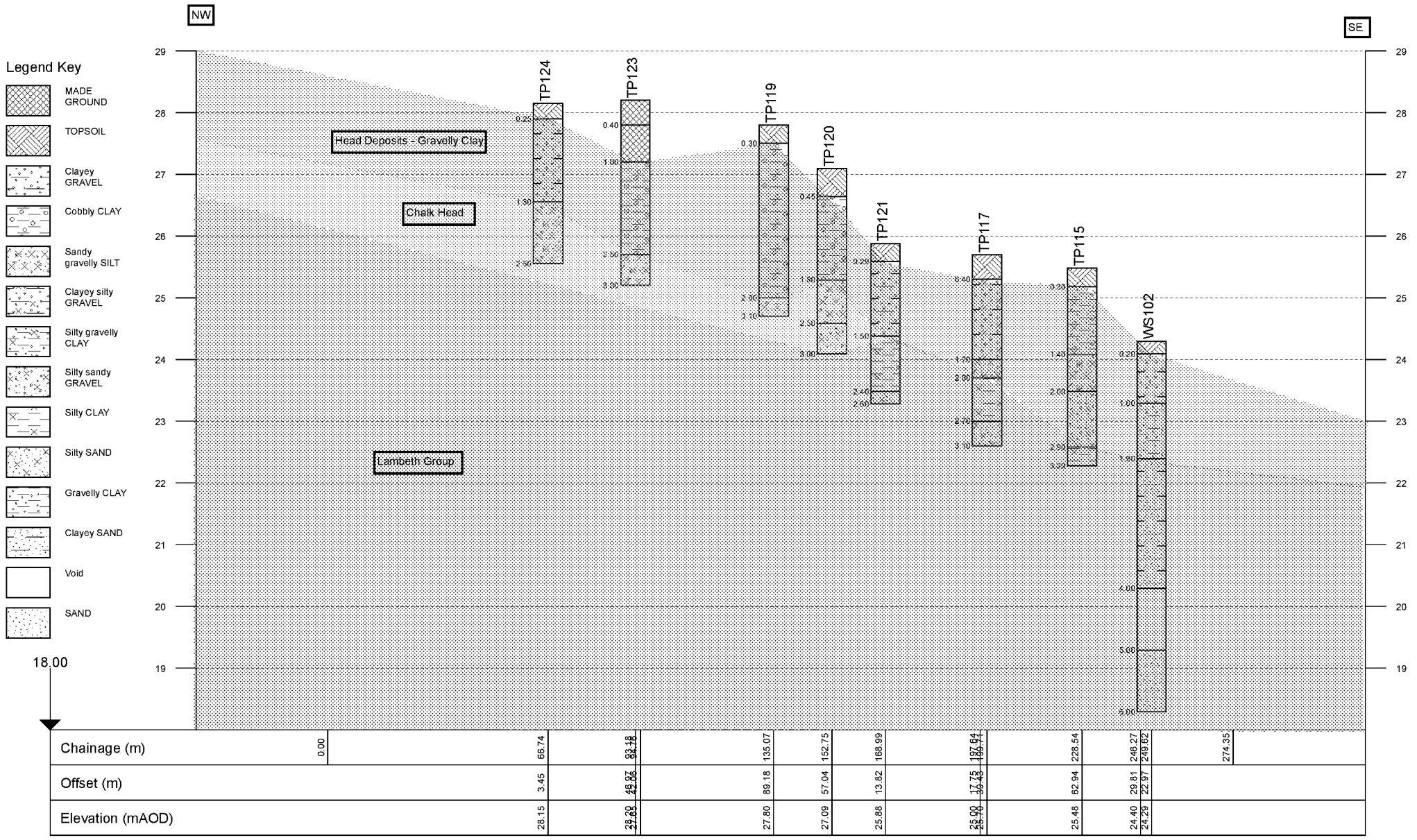
Client	Dandara Properties Ltd	Date	25/05/18	Project Ref.	LP1649
Project	Northfield Cottages, Fontwell	Scale at A4	NTS	Fig No.	2
Title	Conducted Positions				

ARUN DISTRICT COUNCIL WA/99/20/DOC

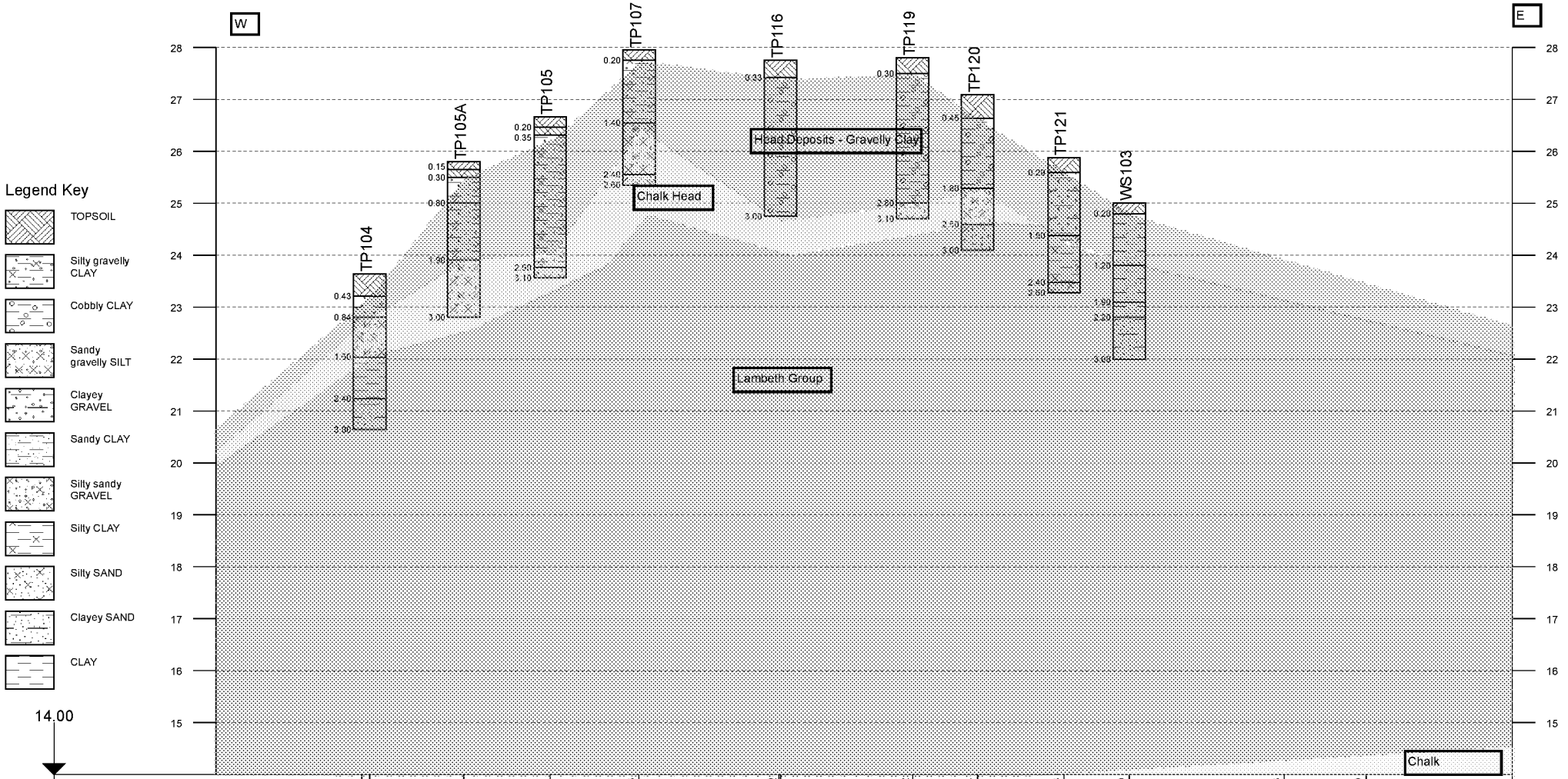
Project Id: LP01649	Title: Figure 3 - Section A	Leap Environmental Ltd
Project Title: Northfield Cottages, Fontwell	Vertical Scale: 1:123	The Atrium, Curtis Road
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Horizontal Scale: 1:2874	Dorking, Surrey RH4 1XA
Client: Dandara Commercial Ltd.	Engineer: JB	Tel: 01306 646510
		www.leapenvironmental.com



Project Id: LP01649	Title: Figure 4 - Section B	Leap Environmental Ltd
Project Title: Northfield Cottages, Fontwell	Vertical Scale: 1:85	The Atrium, Curtis Road
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Horizontal Scale: 1:1590	Dorking, Surrey RH4 1XA
Client: Dandara Commercial Ltd.	Engineer: JB	Tel: 01306 646510
		www.leapenvironmental.com

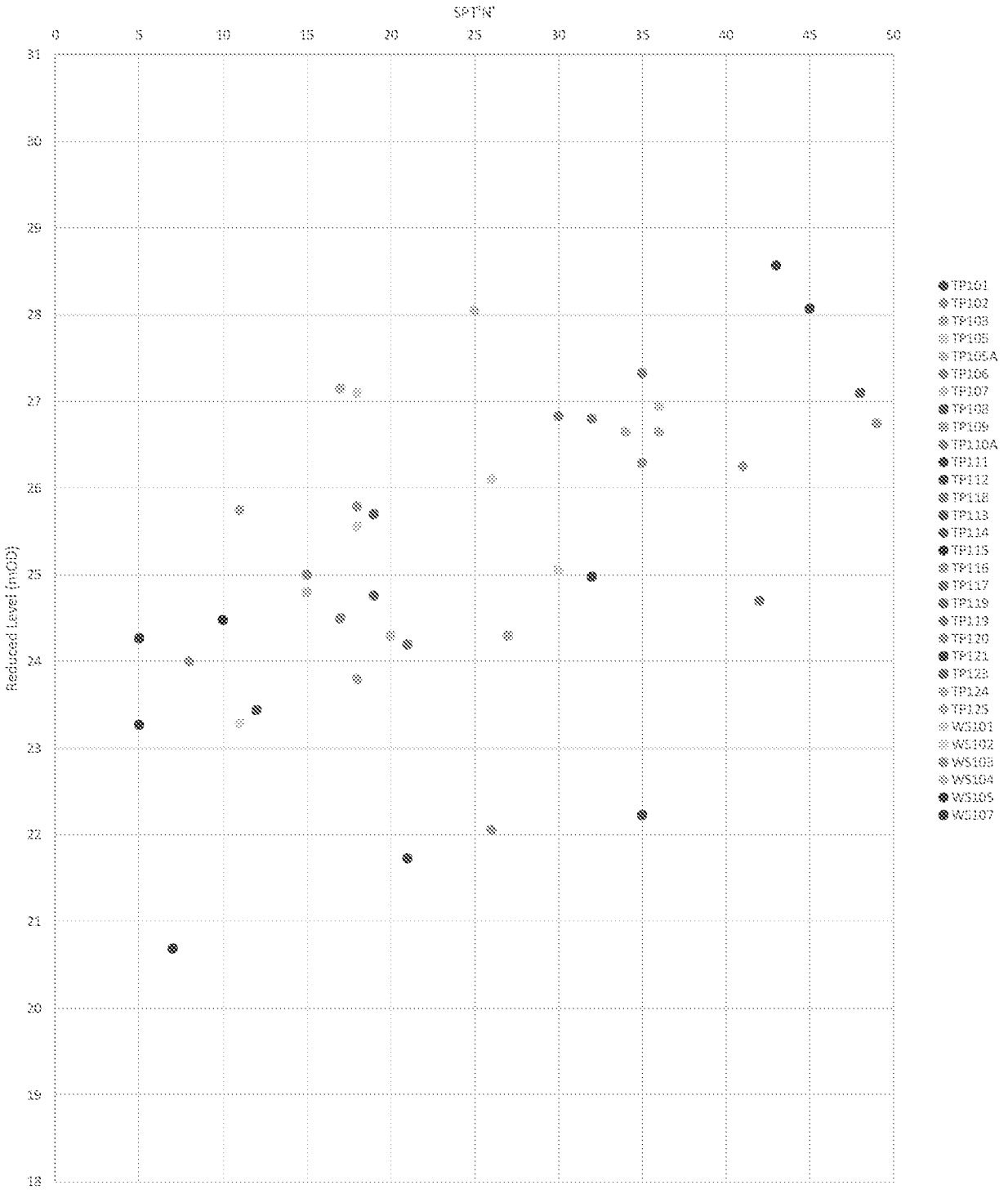


Project Id: LP01649	Title: Figure 5 - Section C	Leap Environmental Ltd
Project Title: Northfield Cottages, Fontwell	Vertical Scale: 1:112	The Atrium, Curtis Road
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Horizontal Scale: 1:2977	Dorking, Surrey RH4 1XA
Client: Dandara Commercial Ltd.	Engineer: JB	Tel: 01306 646510
		www.leapenvironmental.com



ARUN DISTRICT COUNCIL WA/99/20/DOC

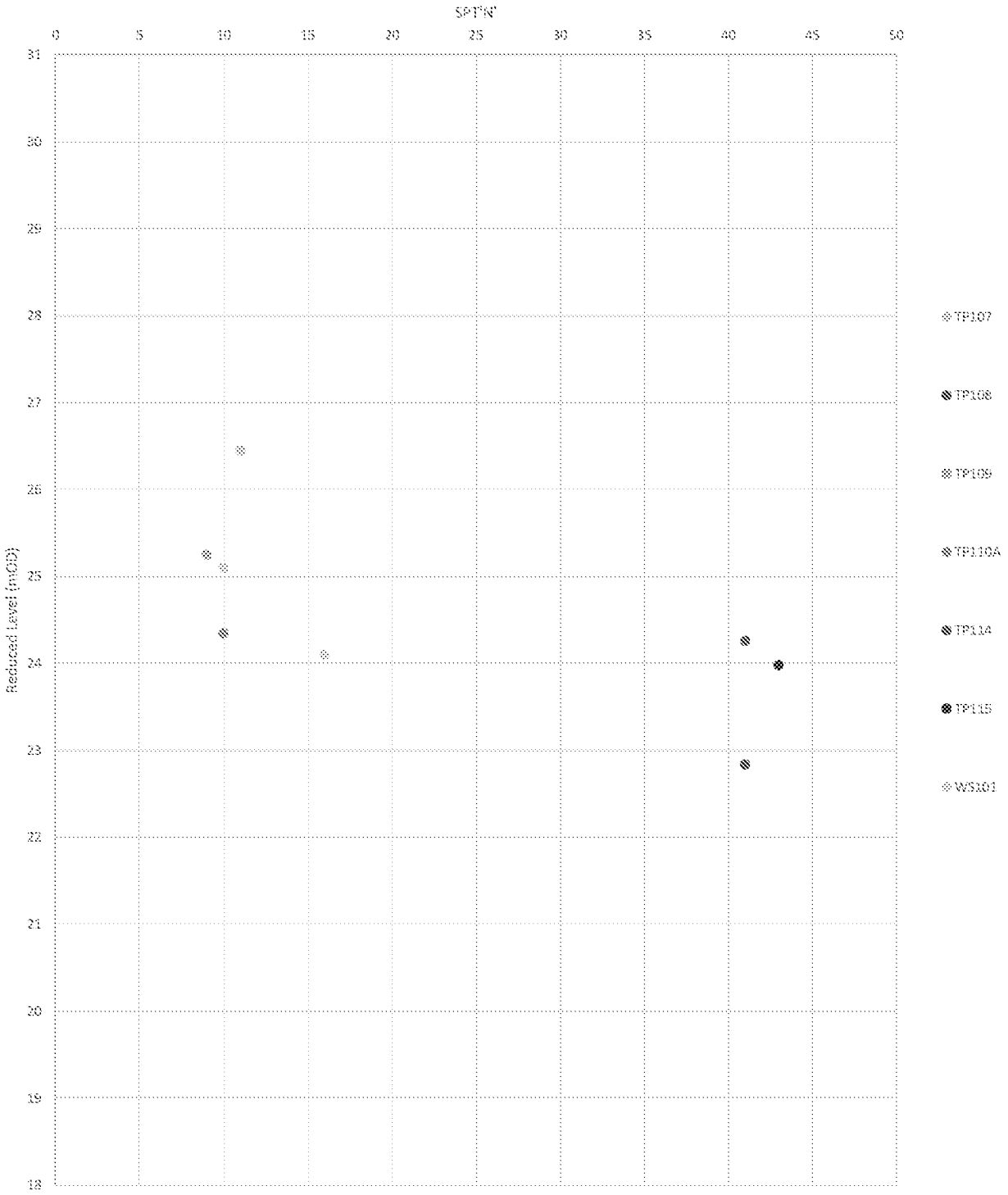
SPT 'N'Values Vs Reduced Level - Head Deposits (Gravelly Clays)



Project Ref.LP1649 Fontwell
Client. Dandara Commercial Ltd
Date: 19/06/2018

Chart 1: SPT 'N' values vs Reduced Level
Head Deposits (Gravelly Clays)

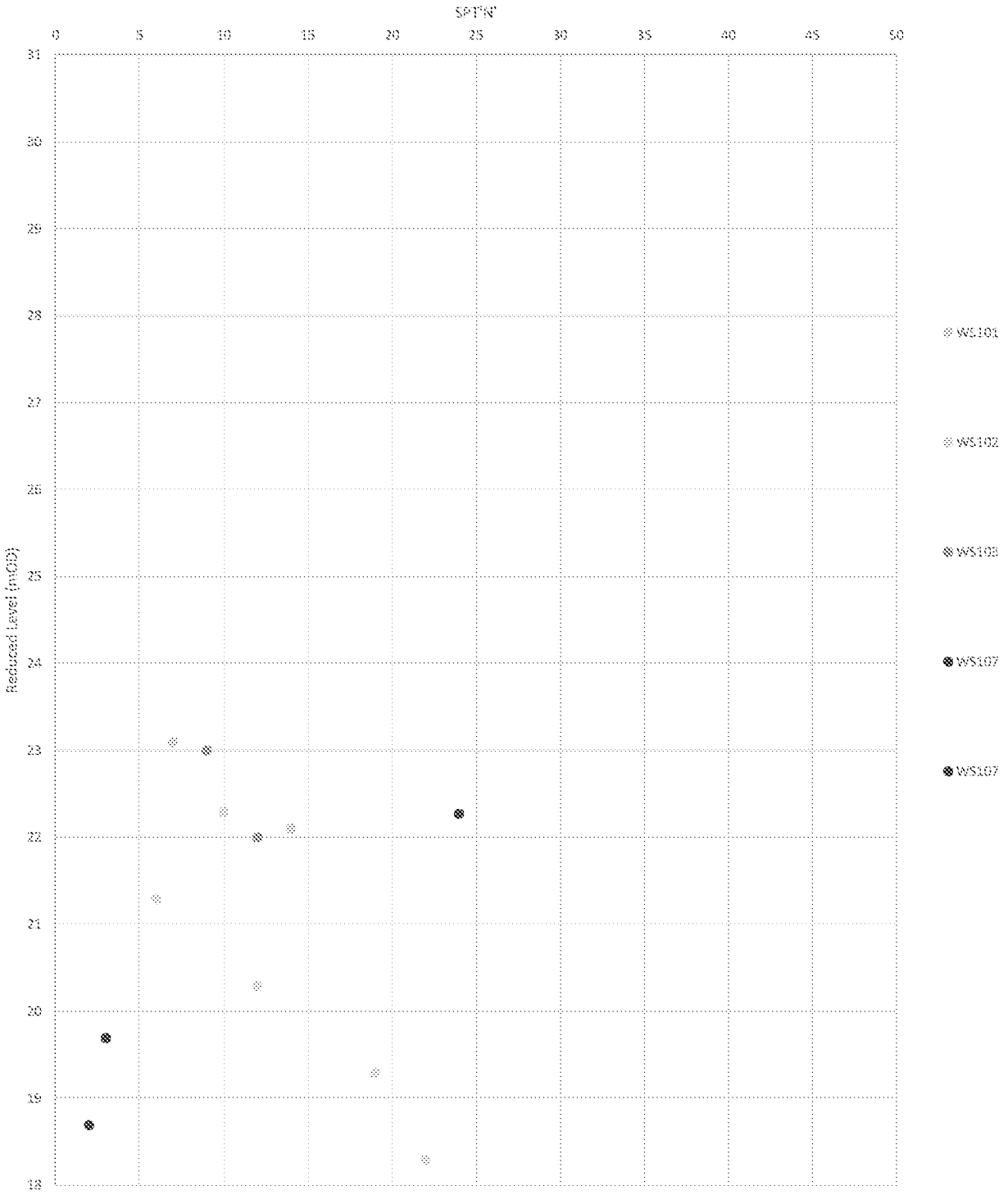
SPT 'N'Values Vs Reduced Level - Head Deposits (Weathered chalk)



Project Ref.LP1649 Fontwell
Client. Dandara Commercial Ltd
Date: 19/06/2018

Chart 2: SPT 'N' values vs Reduced Level
Head Deposits (Weathered chalk)

SPT 'N'Values Vs Reduced Level - Lambeth Group

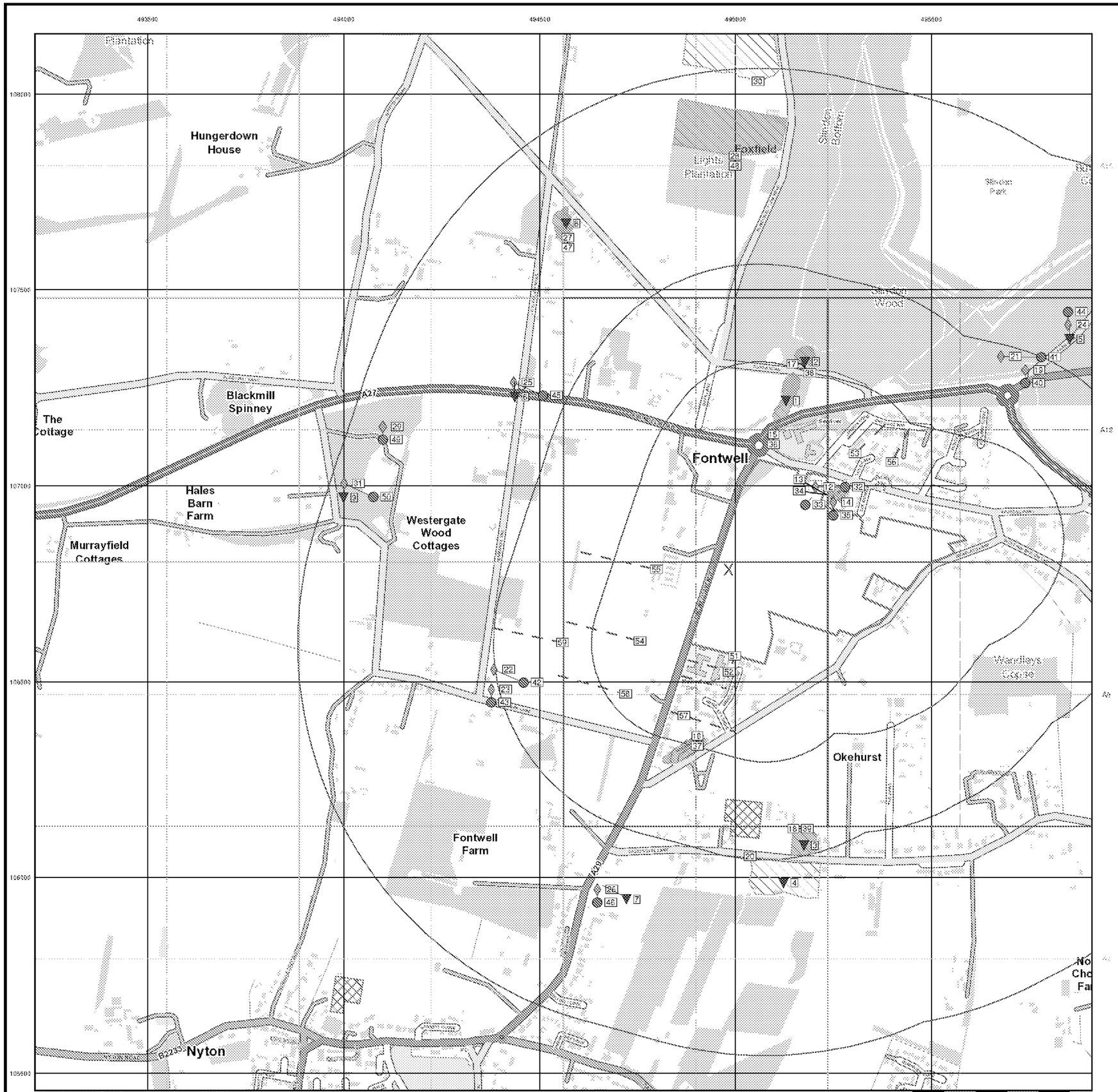


Project Ref.LP1649 Fontwell
Client. Dandara Commercial Ltd
Date: 19/06/2018

Chart 3: SPT 'N' values vs Reduced Level Lambeth Group

APPENDIX C – ENVIROCHECK GROUND STABILITY REPORT

Envirocheck Ground Stability Report



Envirocheck®

LANDMARK INFORMATION GROUP®

Historical Land Use Information (1:10,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Potentially Contaminative Industrial Uses (Past Land Uses - Mining)

	Point	Line	Polygon
Air Shafts	◇	·····	▱
Disturbed Ground	◆	·····	▨
General Quarrying	◆	·····	▨
Heap, unknown constituents	◆	·····	▨
Mineral Railway	◇	·····	▱
Mining and Quarrying General	◆	·····	▨
Mining of Coal & Lignite	◆	·····	▨
Quarrying of Sand and Clay, Operation of Sand and Gravel Pits	◆	·····	▨

Historical Land Use

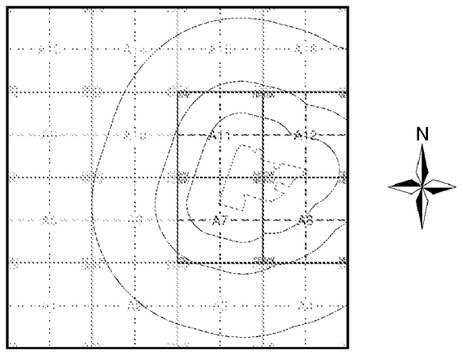
	Point	Line	Polygon
Potentially Infilled Land (Non-Water)	●	~~~	▩
Potentially Infilled Land (Water)	●	~~~	▩
Former Marsh	⧓		

Mining Data

Potential Mining Area

BGS Recorded Mineral Site

Mining and Ground Stability - Slice A



Order Details

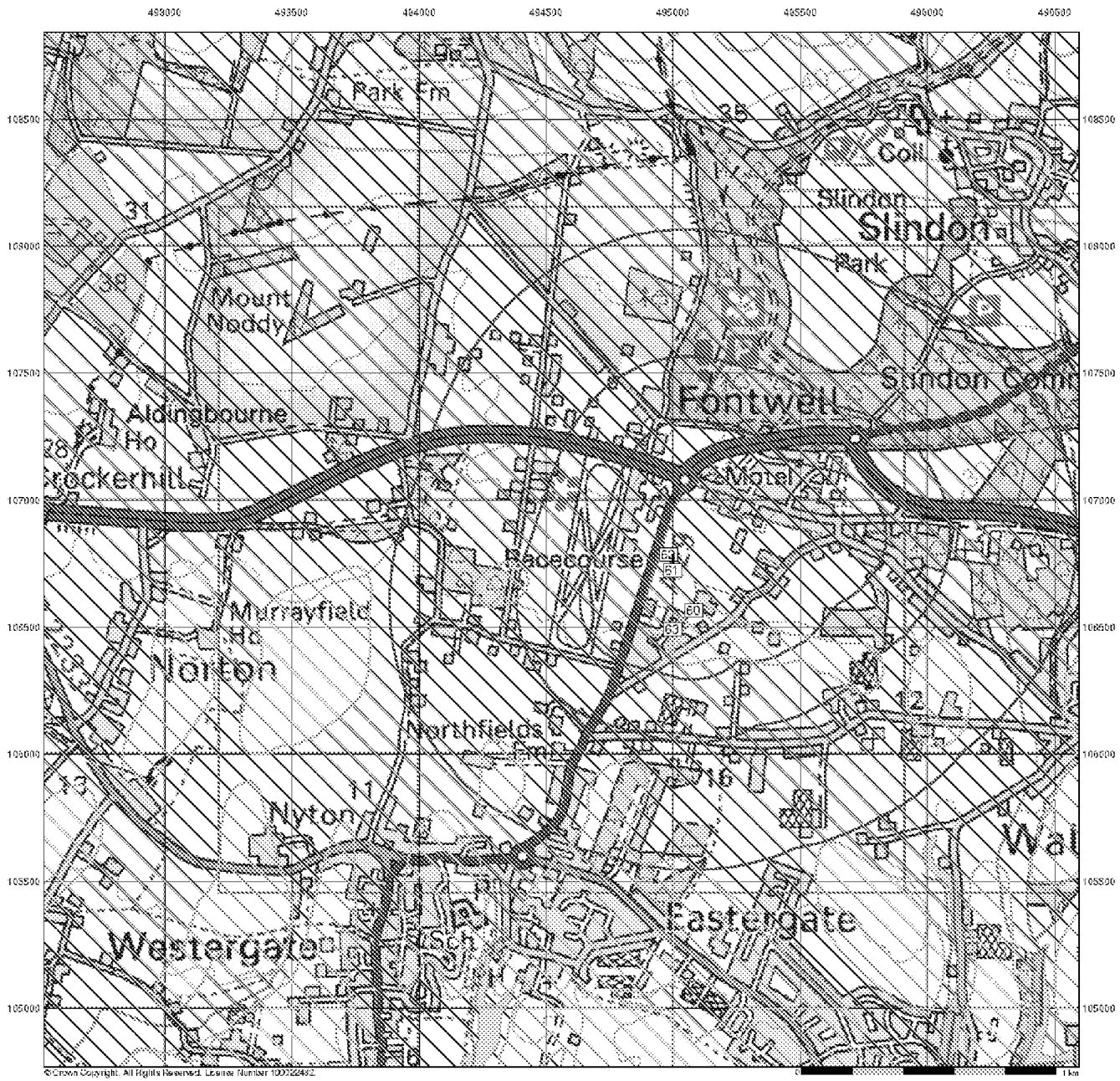
Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

1, Fontwell Close, Fontwell, ARUNDEL, BN18 0SW

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Potential for Compressible Ground Stability Hazards

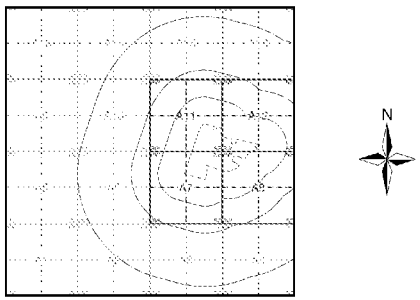
High | Low | Moderate | Very Low

Potential for Collapsible Ground Stability Hazards

High | Low | Moderate | Very Low

Brine Pumping and Salt Mining	Point	Polygon
Brine Pumping Related Feature	▲	
Salt Mining Related Feature	▲	

Mining and Ground Stability - Slice A



Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

1, Fontwell Close, Fontwell, ARUNDEL, BN18 0SW

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Web: www.envirocheck.co.uk



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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

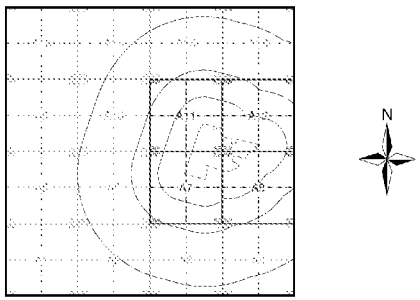
Potential for Landslide Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Ground Dissolution Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice A



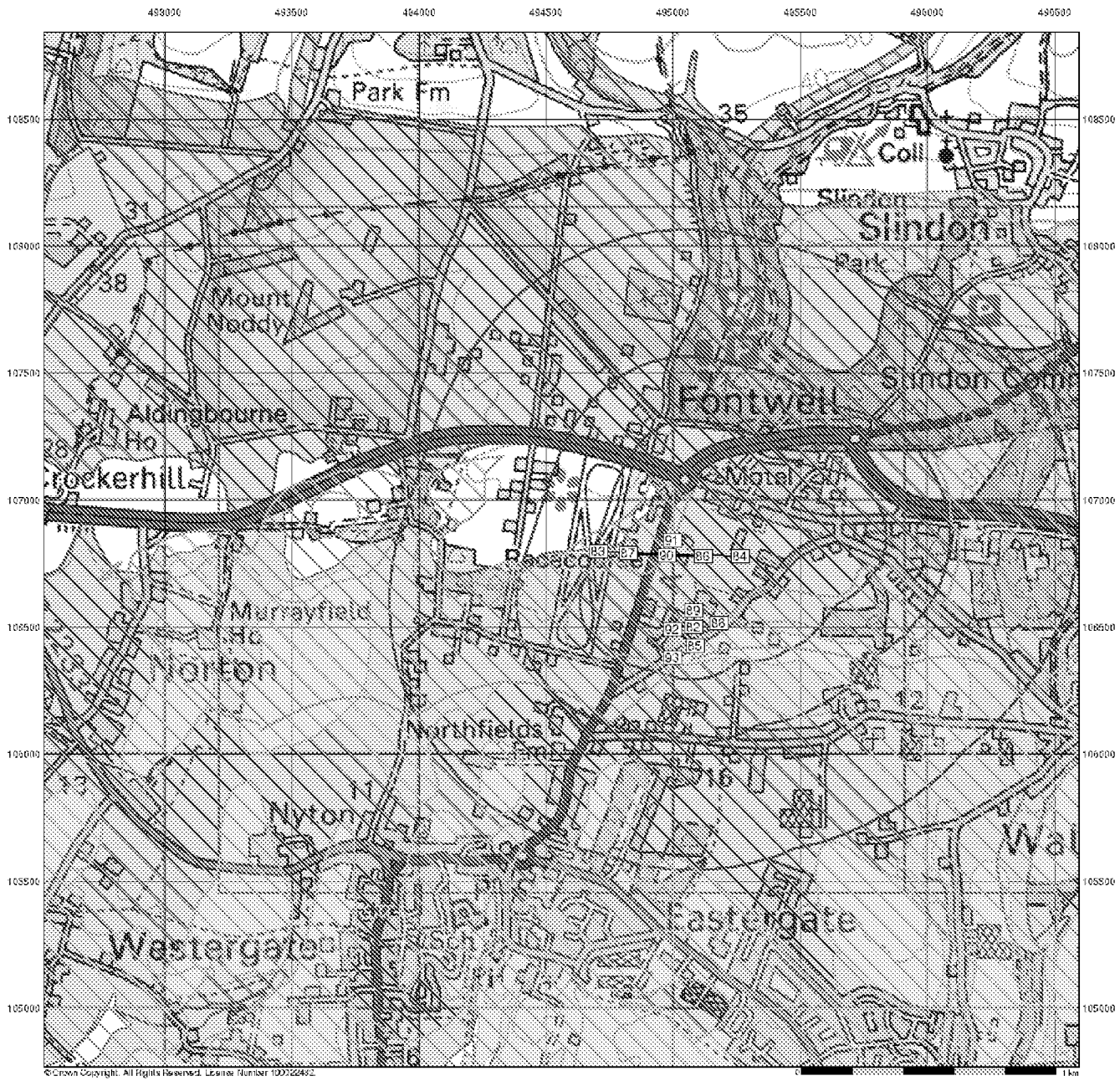
Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

1, Fontwell Close, Fontwell, ARUNDEL, BN18 0SW

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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

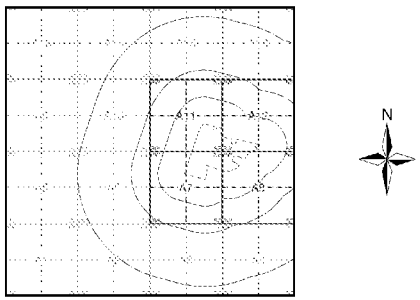
Potential for Running Sand Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Shrinking or Swelling Clay Ground Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice A



Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

1, Fontwell Close, Fontwell, ARUNDEL, BN18 0SW

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Envirocheck® Report:

Mining and Ground Stability Datasheet

Order Details:

Order Number:
168733634_1_1

Customer Reference:
LP1649 v2

National Grid Reference:
494980, 106790

Slice:
A

Site Area (Ha):
17.99

Search Buffer (m):
1000

Site Details:

1, Fontwell Close
Fontwell
ARUNDEL
BN18 0SW

Client Details:

Mrs H Smith
Leap Environmental Ltd
The Atrium Business Centre
Curtis Road
Dorking
Surrey
RH4 1XA

Landmark
INFORMATION GROUP

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Contents

Report Section and Details	Page Number
Summary	-
The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer selected. For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cavities Data, Historical Land Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data (1:50,000).	
Mining and Natural Cavities Data	1
The Mining and Natural Cavities Data section features data sets related to the existence of mining areas and their potential hazards; and details of naturally formed cavities. Data sets within this section are not plotted, with the exception of BGS Recorded Mineral Sites and Potential Mining Areas which feature on the Historical Land Use Information (1:10,000) map.	
Historical Land Use Information (1:2,500)	3
The Historical Land Use Information (1:2,500) section contains data captured from analysis carried out by Landmark of 1:1,250 and 1:2,500 scale historical Ordnance Survey mapping, identifying areas where, historically, the land uses were potentially contaminative. For the purpose of this Envirocheck module, only historical data relating to mining and ground stability has been included and plotted on the corresponding Historical Land Use Information (1:2,500) map. This section also includes the Subterranean Features data set, which details various man-made and man-used underground spaces obtained from the Subterranea Britannica society.	
Historical Land Use Information (1:10,000)	4
The Historical Land Use (1:10,000) section covers data captured from the systematic analysis carried out by Landmark of 1:10, 560 and 1:10,000 scale historical Ordnance Survey mapping dating back to the mid-19th century, identifying potentially contaminative past industrial land uses. For the purpose of this Envirocheck module, only data relating to mining and ground stability has been included and plotted on the accompanying Historical Land Use Information (1:10,000) map.	
Ground Stability Data (1:50,000)	7
The Ground Stability (1:50,000) section includes the BGS Geosure data suite, reporting features to 250m and plotted onto 3 separate maps. Also reported is brine subsidence, brine mining and salt mining data sets, of which Brine Pumping and Salt Mining Related Features are plotted, and subsidence insurance claims and insurance investigations data, which is not plotted.	
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The Motion Map Data (1:2,500) section contains data which is plotted to indicate long-term stability trends from analysis of satellite radar data.	
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The Historical Map List section details the historical mapping that has been analysed for your site, in relation to the Historical Land Use Information sections.	
Data Currency	15
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The brine subsidence data relating to the Driotwich area as provided in this report is derived from JPB studies and physical monitoring undertaken annually over more than 35 years. For more detailed interpretation contact enquiries@jpb.co.uk. JPB retain the copyright and intellectual rights to this data and accept no liability for any loss or damage, including in direct or consequential loss, arising from the use of this data.

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Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Mining and Natural Cavities Data					
BGS Recorded Mineral Sites	pg 1		1	2	6
Coal Mining Affected Areas			n/a	n/a	n/a
Man Made Mining Cavities					
Mining Instability			n/a	n/a	n/a
Natural Cavities	pg 2		1		
Non Coal Mining Areas of Great Britain	pg 2	Yes		n/a	n/a
Potential Mining Areas					
Historical Land Use Information (1:2,500)					
Extractive Industries or Potential Excavations from 1855-1909 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1906-1937 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1924-1949 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)	pg 3		2	n/a	n/a
Subterranean Features (100m)				n/a	n/a
Historical Land Use Information (1:10,000)					
Air Shafts					
Disturbed Ground					
General Quarrying					
Heap, unknown constituents					
Mineral Railway					
Mining & quarrying general					
Mining of coal & lignite					
Quarrying of sand & clay, operation of sand & gravel pits	pg 4	2	4	5	10
Former Marshes					
Potentially Infilled Land (Non-Water)	pg 5	2	4	4	9
Potentially Infilled Land (Water)	pg 5		8	1	

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Ground Stability Data (1:50,000)					
CBSCB Compensation District			n/a	n/a	n/a
Brine Pumping Related Features					
Brine Subsidence Solution Area					
Potential for Collapsible Ground Stability Hazards	pg 7	Yes	Yes	n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 7	Yes		n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 7	Yes	Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 8	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 8	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 8	Yes	Yes	n/a	n/a
Salt Mining Related Features					
Subsidence Insurance Claims				n/a	n/a
Subsidence Investigations				n/a	n/a
Motion Map Data (1:2,500)					
Motion Map (100m)	pg 9	1	91	n/a	n/a

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**BGS Recorded Mineral Sites** Site Name: The Hermitage Gravel Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157594 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A11NE (N)	168	1	495128 107221
2	**BGS Recorded Mineral Sites** Site Name: Slidon Bottom Gravel Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157593 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A11NE (N)	276	1	495176 107320
3	**BGS Recorded Mineral Sites** Site Name: Northfields Farm Gravel Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157596 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A3NE (S)	470	1	495174 106086
4	**BGS Recorded Mineral Sites** Site Name: Northfields Farm Gravel Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157597 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A3NE (S)	557	1	495121 105990
5	**BGS Recorded Mineral Sites** Site Name: Slindon Wood Gravel Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157599 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12NE (NE)	604	1	495852 107410
6	**BGS Recorded Mineral Sites** Site Name: Westergate House Chalk Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157591 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Cretaceous Geology: White Chalk Subgroup Commodity: Chalk Positional Accuracy: Located by supplier to within 10m	A10NE (NW)	641	1	494436 107266

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	**BGS Recorded Mineral Sites** Site Name: Northfields Farm Gravel Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157595 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A3NW (S)	657	1	494660 105980
8	**BGS Recorded Mineral Sites** Site Name: Westfield Sand Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157592 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A15SW (NW)	784	1	494566 107673
9	**BGS Recorded Mineral Sites** Site Name: Westergate House Chalk Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157590 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Cretaceous Geology: White Chalk Subgroup Commodity: Chalk Positional Accuracy: Located by supplier to within 10m	A10SW (W)	967	1	493998 107001
	Coal Mining Affected Areas In an area which may not be affected by coal mining				
	Natural Cavities Cavity Type: Sinkhole x 70 Solid Geology Detail: Chalk Group Superficial Geology Detail: Brickearth/head, Raised beach and marine deposits	A12SE (E)	36	2	495600 106900
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	495000 106786
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	494983 106786

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
10	**Extractive Industries or Potential Excavations from 1950-1980** Use: Reservoir (Disused) First Map Published Date: 1974 Last Map Published Date: N/A	A11SE (NE)	1	-	495227 106972
11	**Extractive Industries or Potential Excavations from 1950-1980** Use: Pond First Map Published Date: 1974 Last Map Published Date: N/A	A8NW (E)	57	-	495416 106618

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A11SE (NE)	0	-	495203 106998
12	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A11SE (NE)	0	-	495194 106971
13	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951 - 1961	A11SE (NE)	8	-	495231 106976
14	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A12SW (NE)	17	-	495248 106958
15	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1899	A11SE (N)	72	-	495096 107130
16	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1914	A7SE (S)	224	-	494902 106361
17	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1899	A11NE (N)	265	-	495167 107311
18	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A3NE (S)	427	-	495147 106124
19	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A12NE (NE)	455	-	495739 107296
20	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1914 - 1992	A3NE (S)	493	-	495037 106053
21	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A12NE (NE)	500	-	495779 107329
22	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A6NE (SW)	505	-	494383 106531
23	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A6NE (SW)	521	-	494375 106480
24	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1899	A12NE (NE)	604	-	495848 107411
25	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1880	A10NE (NW)	644	-	494433 107264
26	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1880	A3NW (S)	671	-	494646 105970
27	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1899 - 1914	A15SW (NW)	750	-	494571 107633
28	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1914 - 1961	A15NE (N)	779	-	494998 107842
29	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	A10NW (W)	919	-	494099 107151
30	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1979	A15NE (N)	967	-	495057 108033
31	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1899	A10SW (W)	967	-	493999 107006

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
32	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11SE (NE)	0	-	495203 106998
33	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11SE (NE)	0	-	495194 106971
34	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11SE (NE)	8	-	495231 106976
35	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A12SW (NE)	17	-	495248 106958
36	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11SE (N)	72	-	495096 107130
37	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A7SE (S)	224	-	494902 106361
38	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11NE (N)	265	-	495167 107311
39	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A3NE (S)	427	-	495147 106124
40	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A12NE (NE)	455	-	495739 107296
41	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A12NE (NE)	500	-	495779 107329
42	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A6NE (SW)	505	-	494383 106531
43	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A6NE (SW)	521	-	494375 106480
44	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A12NE (NE)	604	-	495848 107411
45	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A10NE (NW)	644	-	494433 107264
46	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A3NW (S)	671	-	494646 105970
47	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A15SW (NW)	750	-	494571 107633
48	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A15NE (N)	779	-	494998 107842
49	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A10NW (W)	919	-	494099 107151
50	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1979	A10SW (W)	967	-	493999 107006
51	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1880	A7NE (S)	3	-	494996 106565
52	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1880	A7NE (S)	44	-	494983 106525

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
53	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1951	A12SW (NE)	93	-	495305 107083
54	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1880	A7NW (SW)	128	-	494755 106603
55	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1880	A7NW (W)	140	-	494798 106786
56	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1951	A12SW (NE)	144	-	495398 107060
57	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1880	A7SW (S)	181	-	494867 106413
58	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1880	A7NW (SW)	208	-	494719 106469
59	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1880	A6NE (SW)	326	-	494557 106600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	CBSCB Compensation District The site does not fall within the brine compensation area.				
	Brine Subsidence Solution Area The site does not fall within the brine subsidence solution area.				
60	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	0	1	495082 106565
61	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	495000 106786
62	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	494983 106786
63	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	74	1	495000 106490
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	494983 106786
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	495000 106786
64	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	0	1	494998 106858
65	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	0	1	495000 106864
66	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	0	1	495000 106857
67	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	0	1	495003 106855
68	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: High Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	0	1	495041 107014
69	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	23	1	495000 107016
70	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	24	1	494951 106895
71	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: High Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	41	1	495000 107051
72	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	85	1	494891 106940
73	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11NE (N)	122	1	495000 107189
74	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	134	1	494912 107086
75	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11NE (N)	135	1	495103 107194
76	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11NE (N)	138	1	494991 107189

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
77	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11NE (N)	181	1	494932 107192
78	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11NE (N)	183	1	495160 107228
79	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11NE (NE)	210	1	495198 107246
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	494983 106786
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	495000 106786
80	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	494983 106786
81	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	495000 106786
82	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	0	1	495082 106565
83	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	494983 106786
84	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	495000 106786
85	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	74	1	495000 106490
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	85	1	494880 106931
86	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	494983 106786
87	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (E)	0	1	495000 106786
88	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	0	1	495183 106516
89	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	0	1	495082 106565
90	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A7NE (NW)	0	1	494976 106789
91	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A11SE (N)	0	1	495000 106841
92	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	74	1	495000 106490
93	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7SE (S)	179	1	495000 106380
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	125	1	494827 106948

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
94	**Motion Map** Average Velocity Gradient (mmyear): -1.1	A11SE (NE)	0	-	495189 107028
95	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A7NE (S)	7	-	495037 106549
95	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A7NE (S)	10	-	495037 106545
95	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A7NE (S)	14	-	495038 106541
96	**Motion Map** Average Velocity Gradient (mmyear): 0.9	A7NE (S)	10	-	494993 106558
96	**Motion Map** Average Velocity Gradient (mmyear): 0.6	A7NE (S)	14	-	494991 106554
97	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A12SW (E)	14	-	495338 106914
98	**Motion Map** Average Velocity Gradient (mmyear): -0.1	A8NW (E)	14	-	495355 106716
99	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A12SW (NE)	16	-	495240 106974
99	**Motion Map** Average Velocity Gradient (mmyear): 0.7	A12SW (NE)	21	-	495244 106973
100	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A7NE (S)	18	-	495040 106537
100	**Motion Map** Average Velocity Gradient (mmyear): 0.0	A7NE (S)	22	-	495038 106533
101	**Motion Map** Average Velocity Gradient (mmyear): -0.5	A12SW (E)	19	-	495450 106920
102	**Motion Map** Average Velocity Gradient (mmyear): -0.3	A12SW (E)	21	-	495377 106938
102	**Motion Map** Average Velocity Gradient (mmyear): -0.1	A12SW (E)	25	-	495381 106942
103	**Motion Map** Average Velocity Gradient (mmyear): 1.7	A12SW (E)	25	-	495360 106942
104	**Motion Map** Average Velocity Gradient (mmyear): 0.8	A8NW (E)	26	-	495361 106727
104	**Motion Map** Average Velocity Gradient (mmyear): 0.6	A8NW (E)	30	-	495364 106731
105	**Motion Map** Average Velocity Gradient (mmyear): 2.2	A11SE (NE)	27	-	495160 107067
106	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A8NW (E)	27	-	495365 106739

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
107	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A12SE (E)	29	-	495605 106885
108	**Motion Map** Average Velocity Gradient (mmyear): 1.2	A12SW (NE)	30	-	495358 106947
109	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A8NW (E)	30	-	495410 106710
110	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A12SE (E)	32	-	495616 106847
110	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A12SE (E)	33	-	495618 106850
110	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A12SE (E)	34	-	495620 106854
110	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A12SE (E)	35	-	495621 106854
110	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A12SE (E)	40	-	495623 106845
111	**Motion Map** Average Velocity Gradient (mmyear): 0.7	A8NW (E)	32	-	495564 106796
111	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A8NW (E)	35	-	495564 106793
111	**Motion Map** Average Velocity Gradient (mmyear): 0.3	A8NW (E)	36	-	495565 106792
111	**Motion Map** Average Velocity Gradient (mmyear): 0.3	A8NW (E)	37	-	495562 106789
112	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A8NW (E)	32	-	495405 106642
113	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A12SE (E)	34	-	495621 106858
113	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A12SE (E)	35	-	495622 106866
114	**Motion Map** Average Velocity Gradient (mmyear): 1.0	A11SE (NE)	38	-	495143 107082
115	**Motion Map** Average Velocity Gradient (mmyear): 0.8	A12SE (E)	38	-	495615 106887
116	**Motion Map** Average Velocity Gradient (mmyear): 0.6	A12SW (E)	40	-	495492 106932
117	**Motion Map** Average Velocity Gradient (mmyear): -1.1	A11SE (NE)	45	-	495187 107077
117	**Motion Map** Average Velocity Gradient (mmyear): -1.1	A11SE (NE)	46	-	495184 107078

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
117	**Motion Map** Average Velocity Gradient (mmyear): -1.4	A11SE (NE)	48	-	495181 107082
117	**Motion Map** Average Velocity Gradient (mmyear): -0.7	A11SE (NE)	49	-	495183 107082
118	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A12SW (E)	45	-	495515 106931
118	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A12SW (E)	49	-	495517 106935
119	**Motion Map** Average Velocity Gradient (mmyear): 0.6	A12SW (E)	46	-	495425 106953
119	**Motion Map** Average Velocity Gradient (mmyear): 1.1	A12SW (E)	46	-	495417 106955
120	**Motion Map** Average Velocity Gradient (mmyear): 1.0	A12SW (E)	48	-	495487 106941
121	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A7NE (SE)	50	-	495166 106597
121	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A7NE (SE)	53	-	495172 106591
121	**Motion Map** Average Velocity Gradient (mmyear): 0.6	A7NE (SE)	54	-	495168 106592
121	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A7NE (SE)	59	-	495164 106589
122	**Motion Map** Average Velocity Gradient (mmyear): 1.6	A11SE (NE)	51	-	495198 107083
122	**Motion Map** Average Velocity Gradient (mmyear): 2.9	A11SE (NE)	53	-	495191 107085
123	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A7NE (SE)	55	-	495144 106593
123	**Motion Map** Average Velocity Gradient (mmyear): 0.0	A7NE (SE)	55	-	495143 106589
124	**Motion Map** Average Velocity Gradient (mmyear): -0.9	A11SE (NE)	57	-	495187 107089
124	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A11SE (NE)	61	-	495191 107093
125	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A11SE (NE)	62	-	495162 107103
125	**Motion Map** Average Velocity Gradient (mmyear): 1.2	A11SE (NE)	66	-	495165 107106
125	**Motion Map** Average Velocity Gradient (mmyear): 1.4	A11SE (NE)	70	-	495166 107110

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
126	**Motion Map** Average Velocity Gradient (mmyear): -0.4	A11SE (NE)	64	-	495181 107099
127	**Motion Map** Average Velocity Gradient (mmyear): -0.7	A7NE (SE)	68	-	495176 106574
127	**Motion Map** Average Velocity Gradient (mmyear): 0.3	A7NE (SE)	69	-	495173 106575
127	**Motion Map** Average Velocity Gradient (mmyear): 0.0	A7NE (SE)	72	-	495176 106570
127	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A7NE (SE)	73	-	495171 106571
127	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A7NE (SE)	73	-	495168 106572
127	**Motion Map** Average Velocity Gradient (mmyear): -0.1	A7NE (SE)	77	-	495170 106568
127	**Motion Map** Average Velocity Gradient (mmyear): -0.1	A7NE (SE)	77	-	495168 106568
128	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A7NE (SE)	68	-	495178 106574
129	**Motion Map** Average Velocity Gradient (mmyear): 0.7	A12SE (E)	75	-	495648 106905
129	**Motion Map** Average Velocity Gradient (mmyear): 1.2	A12SE (E)	76	-	495646 106909
130	**Motion Map** Average Velocity Gradient (mmyear): 0.5	A7NE (S)	81	-	494978 106488
131	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A12SW (E)	82	-	495568 106957
131	**Motion Map** Average Velocity Gradient (mmyear): 0.3	A12SE (E)	86	-	495573 106960
131	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A12SW (E)	86	-	495569 106961
131	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A12SW (E)	90	-	495567 106965
132	**Motion Map** Average Velocity Gradient (mmyear): 0.8	A12SW (E)	84	-	495501 106975
132	**Motion Map** Average Velocity Gradient (mmyear): 1.3	A12SW (E)	88	-	495503 106978
133	**Motion Map** Average Velocity Gradient (mmyear): -0.3	A11SE (N)	85	-	494928 106999
134	**Motion Map** Average Velocity Gradient (mmyear): 0.3	A7NW (S)	88	-	494872 106510

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
135	**Motion Map** Average Velocity Gradient (mmyear): 0.3	A7NE (S)	89	-	494978 106480
135	**Motion Map** Average Velocity Gradient (mmyear): 0.4	A7NE (S)	89	-	494974 106481
135	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A7NE (S)	93	-	494975 106477
136	**Motion Map** Average Velocity Gradient (mmyear): 0.7	A7NW (S)	92	-	494871 106506
136	**Motion Map** Average Velocity Gradient (mmyear): 1.2	A7NW (S)	100	-	494869 106498
137	**Motion Map** Average Velocity Gradient (mmyear): -0.5	A11SE (NE)	93	-	495151 107137
137	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A11SE (NE)	96	-	495152 107141
138	**Motion Map** Average Velocity Gradient (mmyear): 0.6	A11SE (N)	94	-	494930 107031
139	**Motion Map** Average Velocity Gradient (mmyear): 0.0	A12SE (E)	95	-	495585 106966
140	**Motion Map** Average Velocity Gradient (mmyear): -0.1	A12SW (NE)	96	-	495386 107014
140	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A12SW (NE)	100	-	495390 107017
141	**Motion Map** Average Velocity Gradient (mmyear): 1.6	A7NW (S)	96	-	494869 106502

The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Ordnance Survey Plan	SU9406	1974
Ordnance Survey Plan	SU9406	1974
Ordnance Survey Plan	SU9407	1974
Ordnance Survey Plan	SU9506	1974
Ordnance Survey Plan	SU9506	1974
Ordnance Survey Plan	SU9506	1974
Ordnance Survey Plan	SU9506	1974
Ordnance Survey Plan	SU9507	1974
Ordnance Survey Plan	SU9507	1974

The following mapping has been analysed for Historical Land Use Information (1:10,000):

1:10,560	Mapsheet	Published Date
Sussex	049_00	1880
Sussex	062_00	1880
Sussex	049_SE	1899
Sussex	049_SW	1899
Sussex	062_NE	1899
Sussex	062_NW	1899
Sussex	049_SE	1914
Sussex	049_SW	1914
Sussex	062_NE	1914
Sussex	062_NW	1914
Sussex	062_NE	1951
Sussex	062_NW	1951
Ordnance Survey Plan	SU90NE	1961
Ordnance Survey Plan	SU90NW	1961
1:10,000	**Mapsheet**	**Published Date**
Ordnance Survey Plan	SU90NW	1979
Ordnance Survey Plan	SU90NE	1992

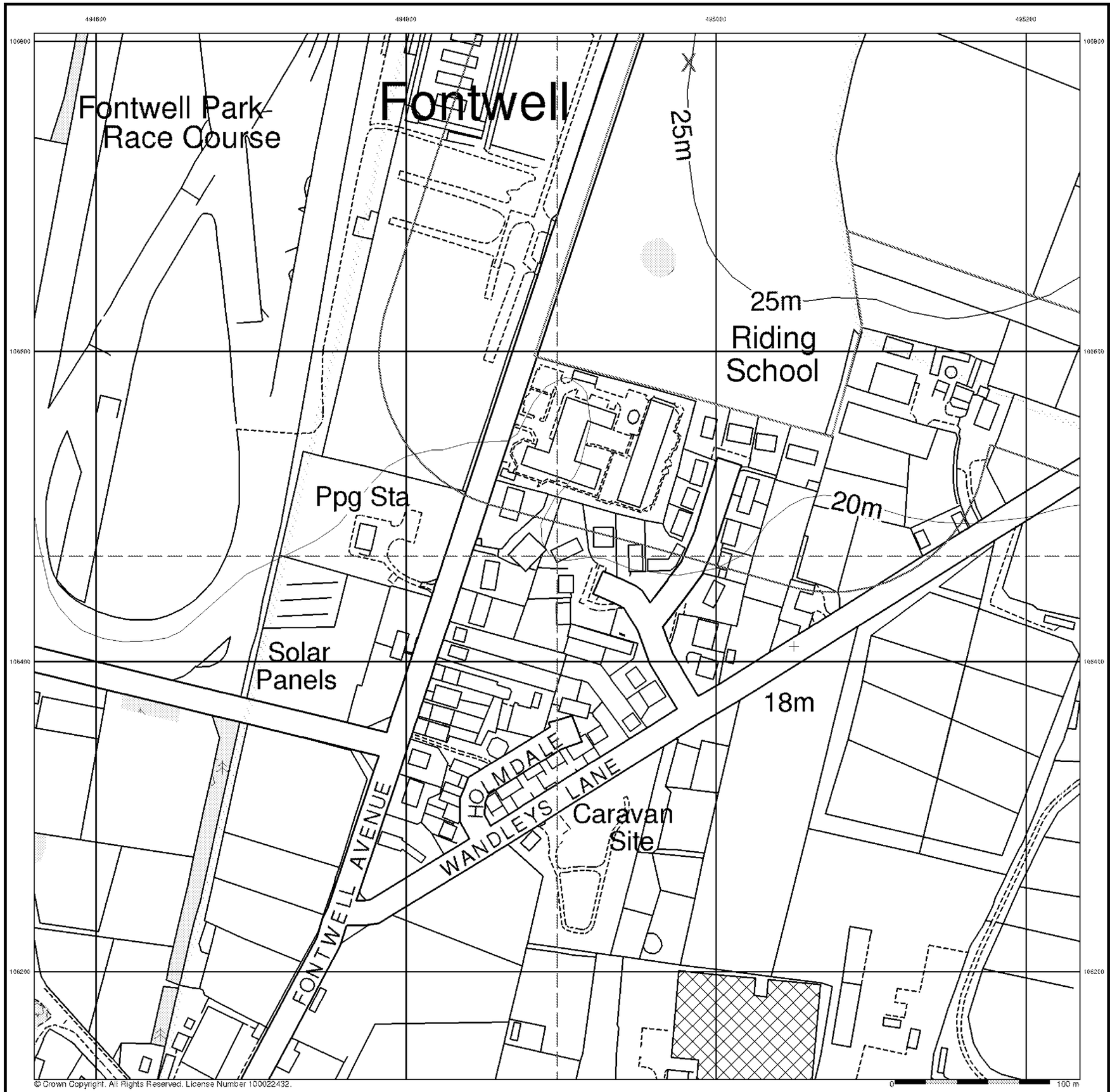
Mining and Cavities Data	Version	Update Cycle
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	May 2018	Bi-Annually
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Man Made Mining Cavities Peter Brett Associates	May 2018	Bi-Annually
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Natural Cavities Peter Brett Associates	May 2018	Bi-Annually
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Historical Land Use Information (1:2,500)	**Version**	**Update Cycle**
Subterranean Features Landmark Information Group Limited	February 2018	Bi-Annually
Ground Stability Data (1:50,000)	**Version**	**Update Cycle**
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Subsidence Insurance Claims SP Property Services	February 2018	Quarterly
Subsidence Investigations CET Structures Ltd	February 2018	Quarterly
Brine Subsidence Solution Area Johnson Poole & Bloomer	January 2015	As notified

Motion Map Data (1:2,500)	Version	Update Cycle
Motion Map		
Nigel Press Associates - Hampshire	February 2011	As notified
Nigel Press Associates - Cambridge	January 2011	As notified
Nigel Press Associates - Ipswich	January 2011	As notified
Nigel Press Associates - Norwich	January 2011	As notified
Nigel Press Associates - Peterborough	January 2011	As notified
Nigel Press Associates - Barnstaple	July 2010	As notified
Nigel Press Associates - Derbyshire	July 2010	As notified
Nigel Press Associates - Humberside	July 2010	As notified
Nigel Press Associates - Kent	July 2010	As notified
Nigel Press Associates - Lincolnshire	July 2010	As notified
Nigel Press Associates - Nottinghamshire	July 2010	As notified
Nigel Press Associates - Birmingham	May 2009	As notified
Nigel Press Associates - Bournemouth	May 2009	As notified
Nigel Press Associates - Brighton	May 2009	As notified
Nigel Press Associates - Bristol	May 2009	As notified
Nigel Press Associates - Cardiff	May 2009	As notified
Nigel Press Associates - Central London	May 2009	As notified
Nigel Press Associates - Cheltenham	May 2009	As notified
Nigel Press Associates - Coventry	May 2009	As notified
Nigel Press Associates - Crawley	May 2009	As notified
Nigel Press Associates - Edinburgh	May 2009	As notified
Nigel Press Associates - Exeter	May 2009	As notified
Nigel Press Associates - Glasgow	May 2009	As notified
Nigel Press Associates - Isle of Wight	May 2009	As notified
Nigel Press Associates - Leeds	May 2009	As notified
Nigel Press Associates - Leicester	May 2009	As notified
Nigel Press Associates - Liverpool	May 2009	As notified
Nigel Press Associates - Manchester	May 2009	As notified
Nigel Press Associates - Milton Keynes	May 2009	As notified
Nigel Press Associates - Newcastle	May 2009	As notified
Nigel Press Associates - Northwich	May 2009	As notified
Nigel Press Associates - Nottingham	May 2009	As notified
Nigel Press Associates - Oxford	May 2009	As notified
Nigel Press Associates - Plymouth	May 2009	As notified
Nigel Press Associates - Portsmouth	May 2009	As notified
Nigel Press Associates - Preston	May 2009	As notified
Nigel Press Associates - Reading	May 2009	As notified
Nigel Press Associates - Sheffield	May 2009	As notified
Nigel Press Associates - Stoke	May 2009	As notified
Nigel Press Associates - Swindon	May 2009	As notified
Nigel Press Associates - Tonbridge	May 2009	As notified
Nigel Press Associates - North London	November 2008	As notified
Nigel Press Associates - Head Office	September 2008	As notified

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
British Geological Survey	
The Coal Authority	
Ove Arup	
Peter Brett Associates	
Wardell Armstrong	
Johnson Poole & Bloomer	

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	[redacted]
2	**Peter Brett Associates** Caversham Bridge House, Waterman Place, Reading, Berkshire, RG1 8DN	
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	



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Historical Land Use Information (1:2,500)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID | Several of Type at Location

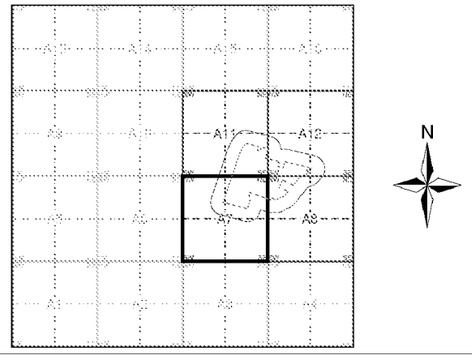
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

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Extractive Industries Activity from 1855 - 1909	▲	—	▭
Extractive Industries Activity from 1893 - 1915	▲	—	▭
Extractive Industries Activity from 1906 - 1937	▲	—	▭
Extractive Industries Activity from 1924 - 1949	▲	—	▭
Extractive Industries Activity from 1950 - 1980	▲	—	▭

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	—	▭

Mining and Ground Stability - Segment A7



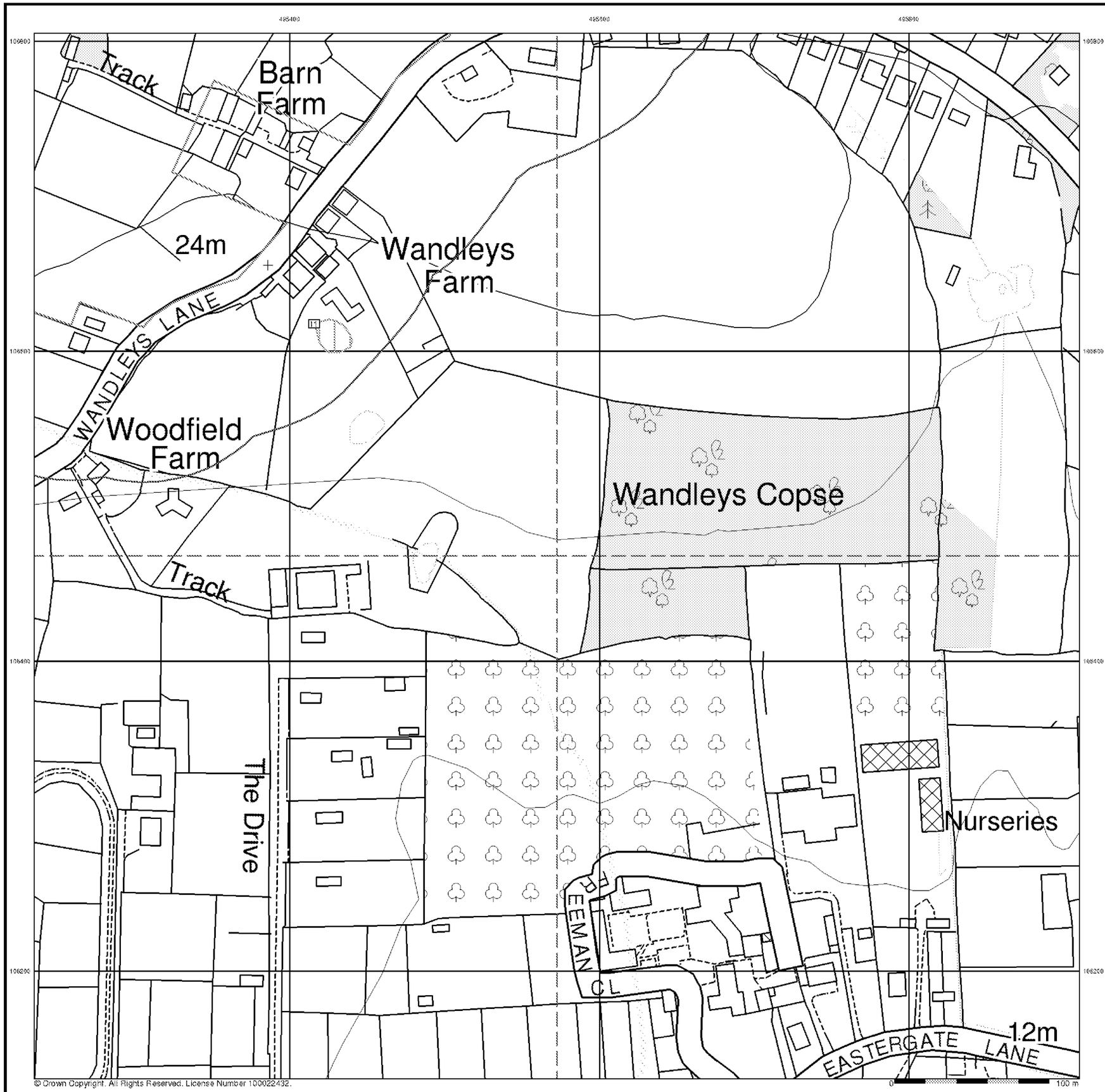
Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

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Historical Land Use Information (1:2,500)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID | Several of Type at Location

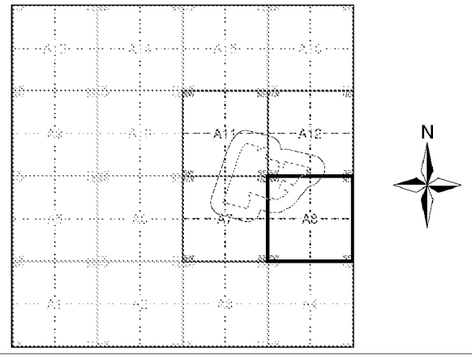
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▨
Extractive Industries Activity from 1893 - 1915	▲	—	▨
Extractive Industries Activity from 1906 - 1937	▲	—	▨
Extractive Industries Activity from 1924 - 1949	▲	—	▨
Extractive Industries Activity from 1950 - 1980	▲	—	▨

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	—	▨

Mining and Ground Stability - Segment A8



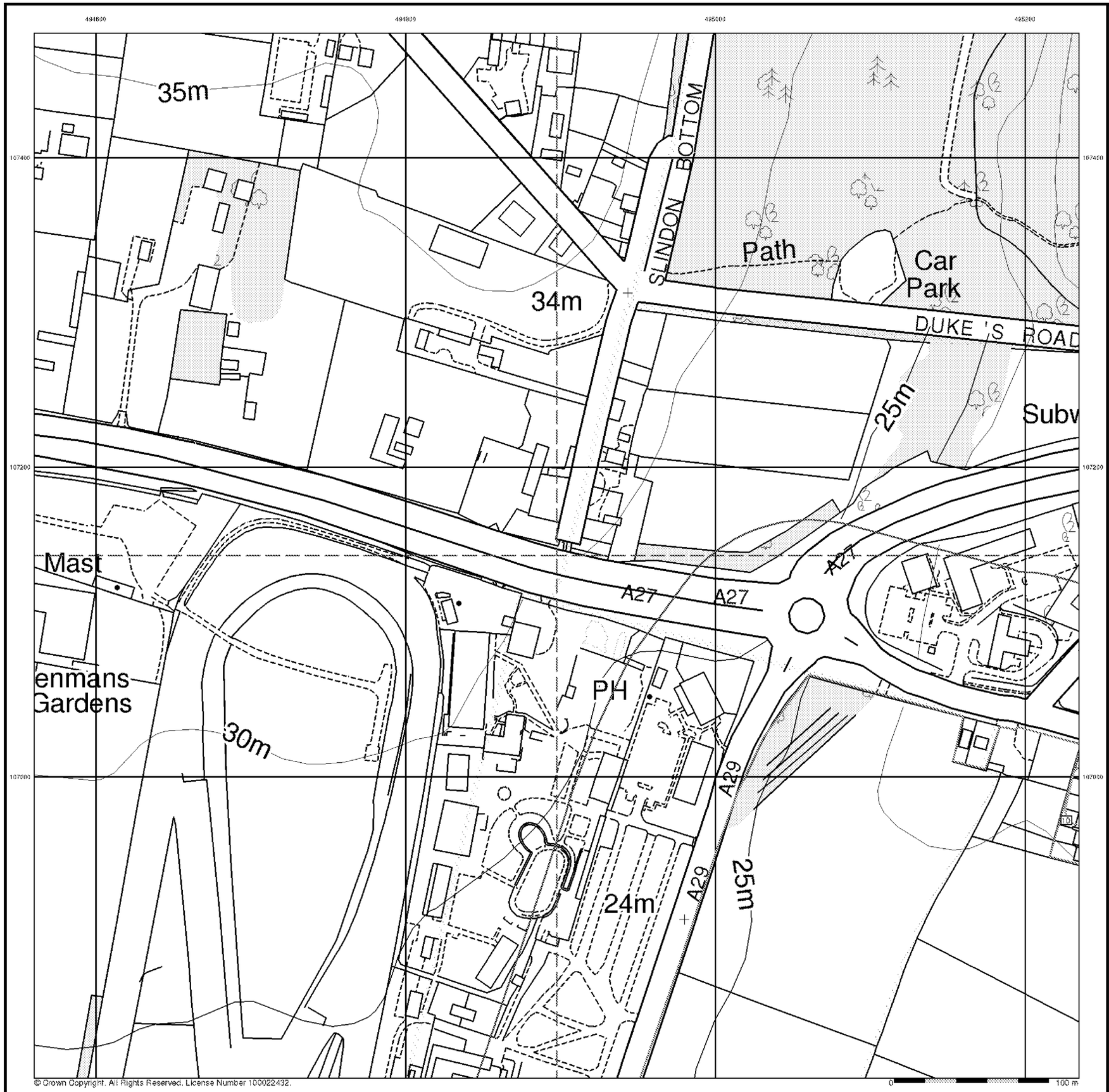
Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

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General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID | Several of Type at Location

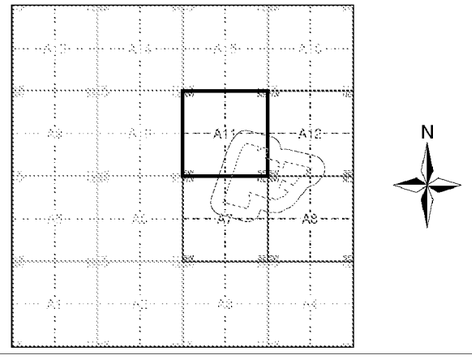
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▭
Extractive Industries Activity from 1893 - 1915	▲	—	▭
Extractive Industries Activity from 1906 - 1937	▲	—	▭
Extractive Industries Activity from 1924 - 1949	▲	—	▭
Extractive Industries Activity from 1950 - 1980	▲	—	▭

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	—	▭

Mining and Ground Stability - Segment A11



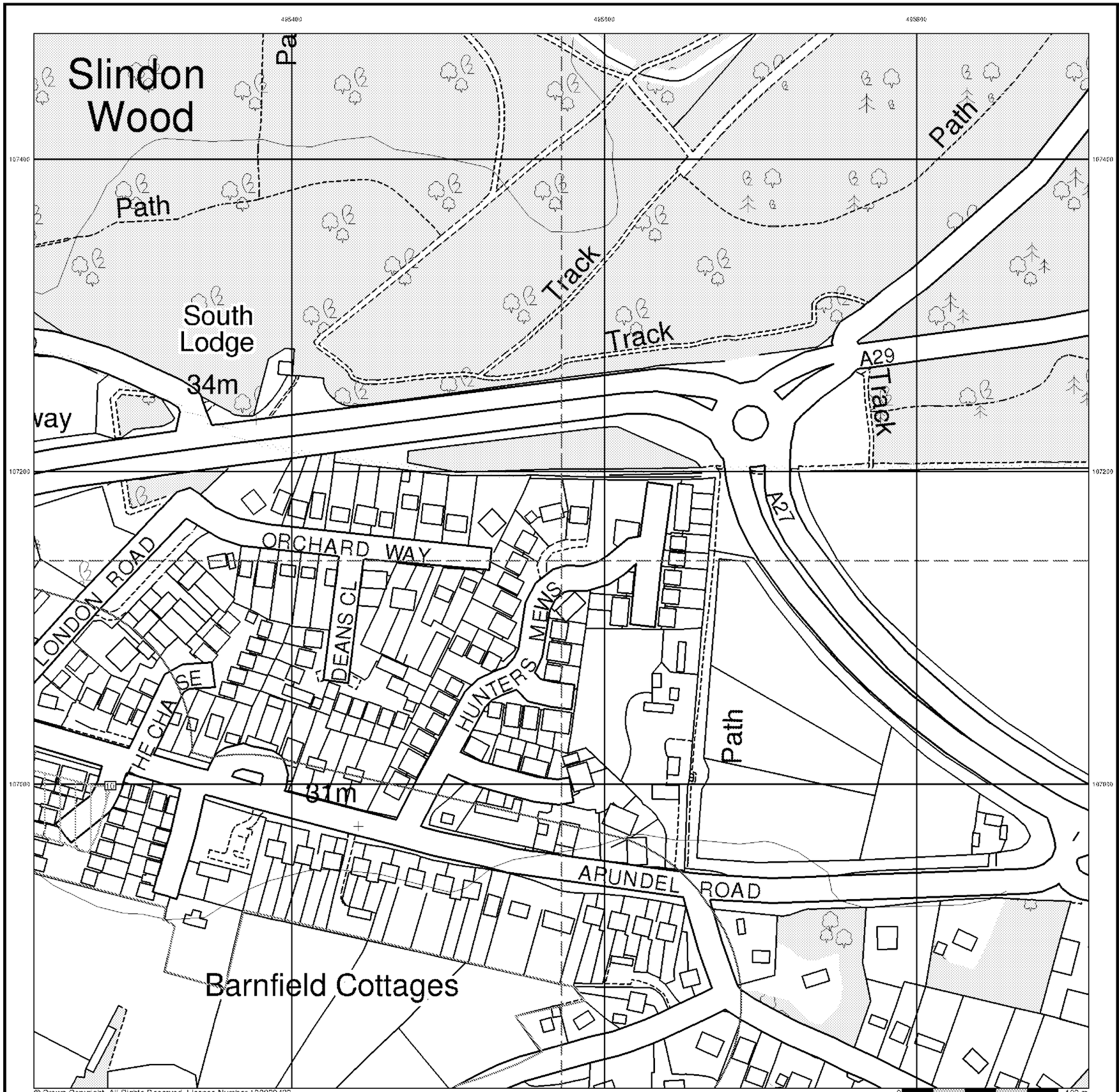
Order Details

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Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

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Historical Land Use Information (1:2,500)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID | Several of Type at Location

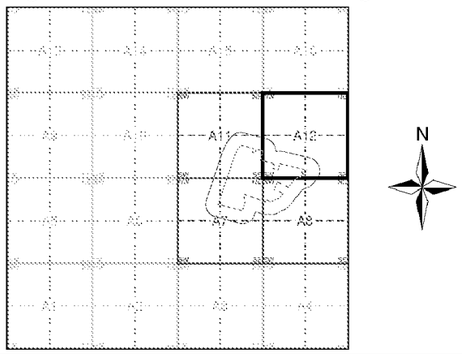
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
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Extractive Industries Activity from 1893 - 1915	▲	—	▨
Extractive Industries Activity from 1906 - 1937	▲	—	▨
Extractive Industries Activity from 1924 - 1949	▲	—	▨
Extractive Industries Activity from 1950 - 1980	▲	—	▨

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	~~~	▨

Mining and Ground Stability - Segment A12



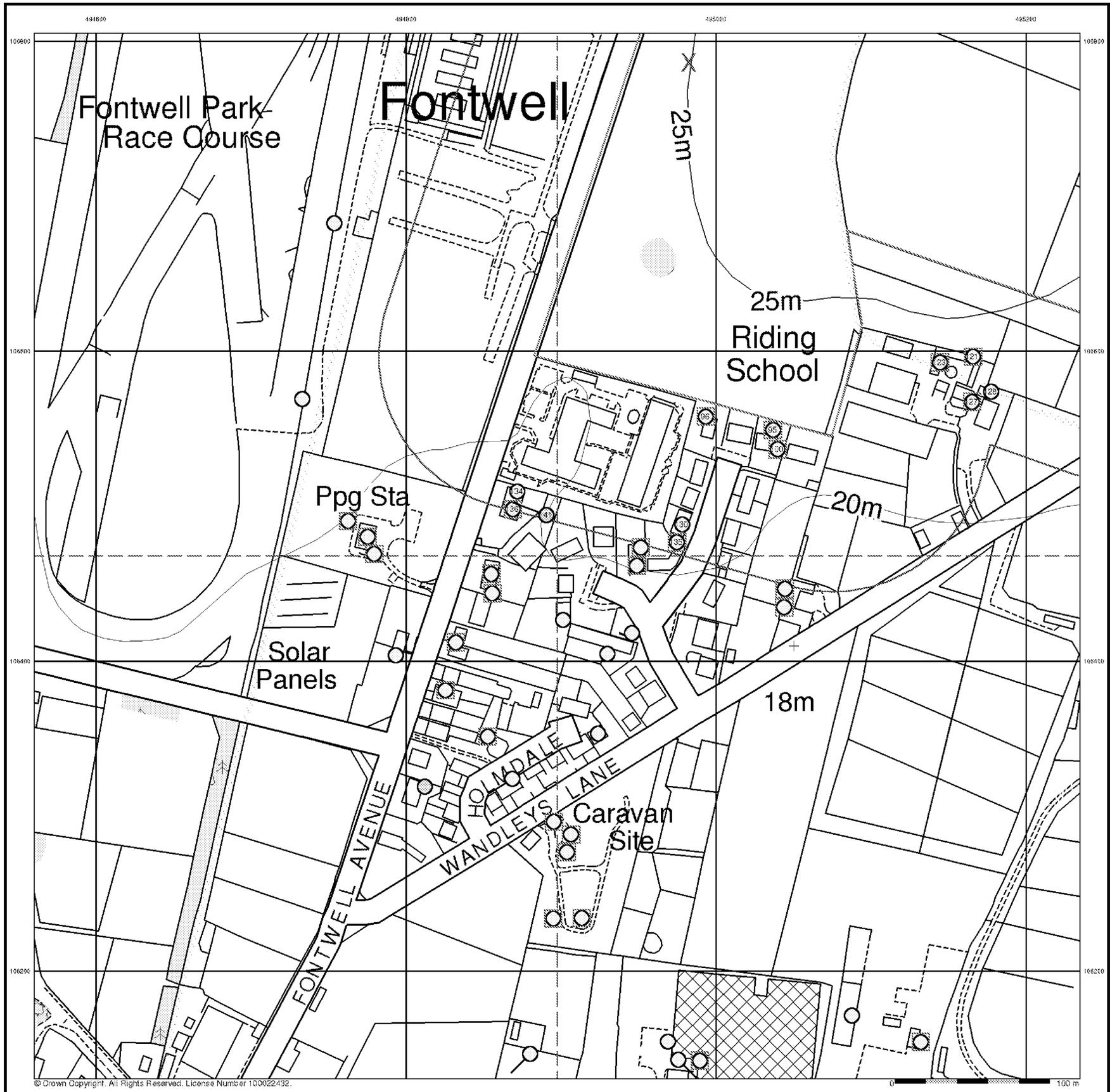
Order Details

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Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

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Motion Map Data (1:2,500)

General

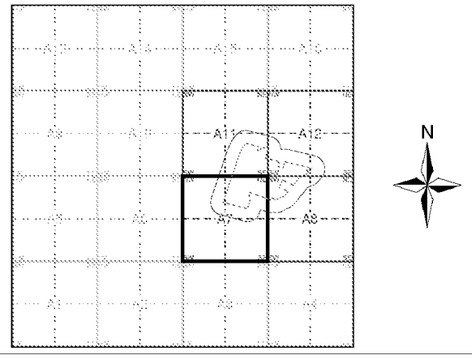
Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Average Velocity Gradient

Upward Movement > 3.5mm per year	
Upward Movement 1.5mm to 3.5mm per year	
Stable 1.5mm to -1.5mm per year	
Downward Movement -1.5mm to -3.5mm per year	
Downward Movement > -3.5mm per year	

Mining and Ground Stability - Segment A7



Order Details

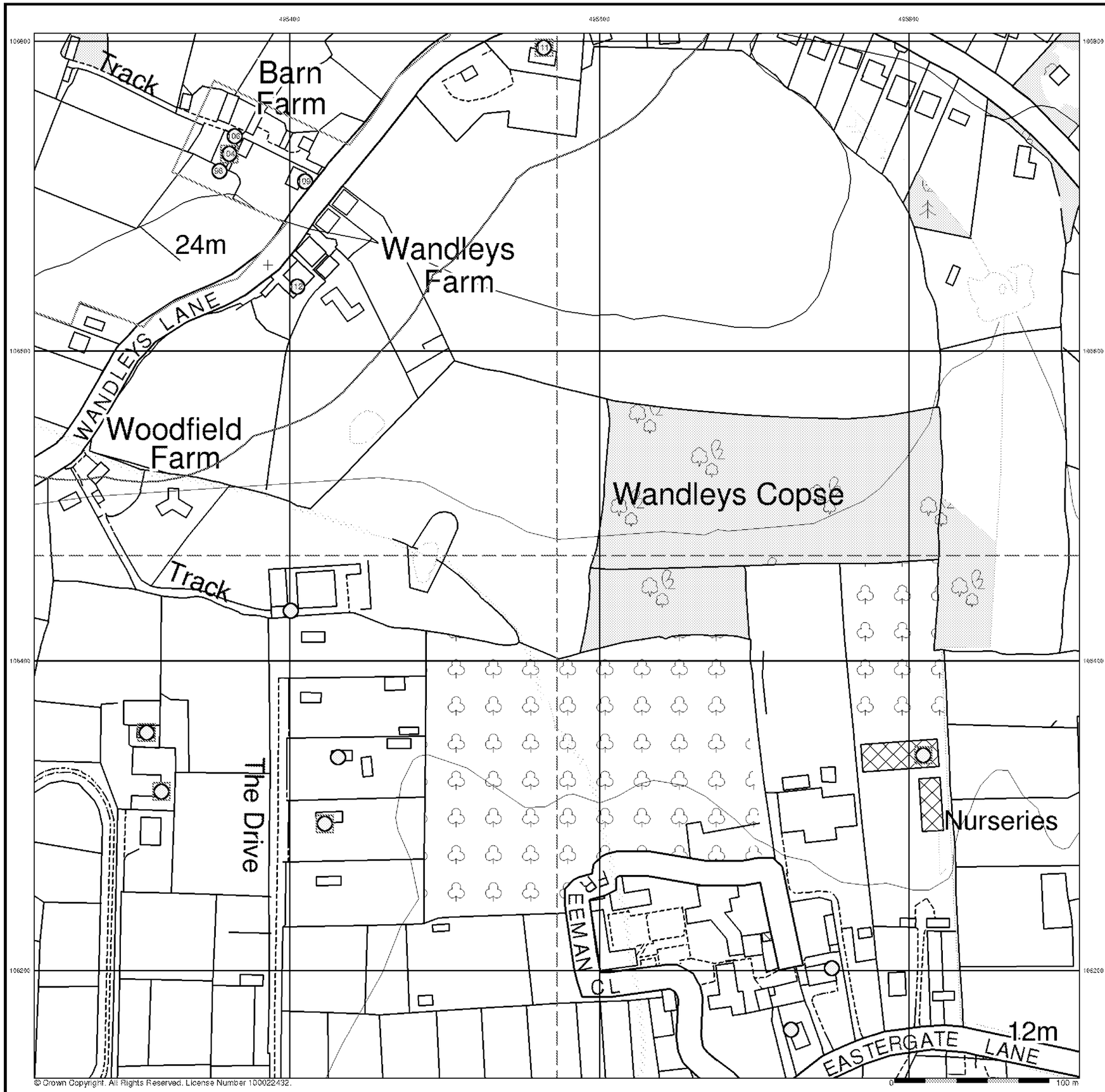
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Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

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Motion Map Data (1:2,500)

General

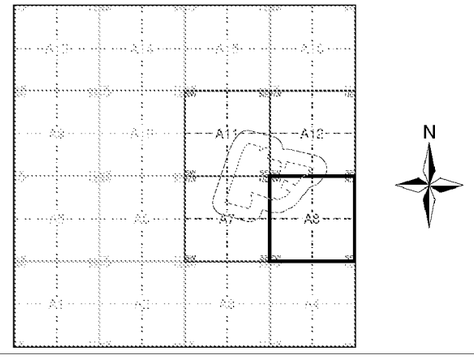
Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Average Velocity Gradient

Upward Movement > 3.5mm per year	
Upward Movement 1.5mm to 3.5mm per year	
Stable 1.5mm to -1.5mm per year	
Downward Movement -1.5mm to -3.5mm per year	
Downward Movement > -3.5mm per year	

Mining and Ground Stability - Segment A8



Order Details

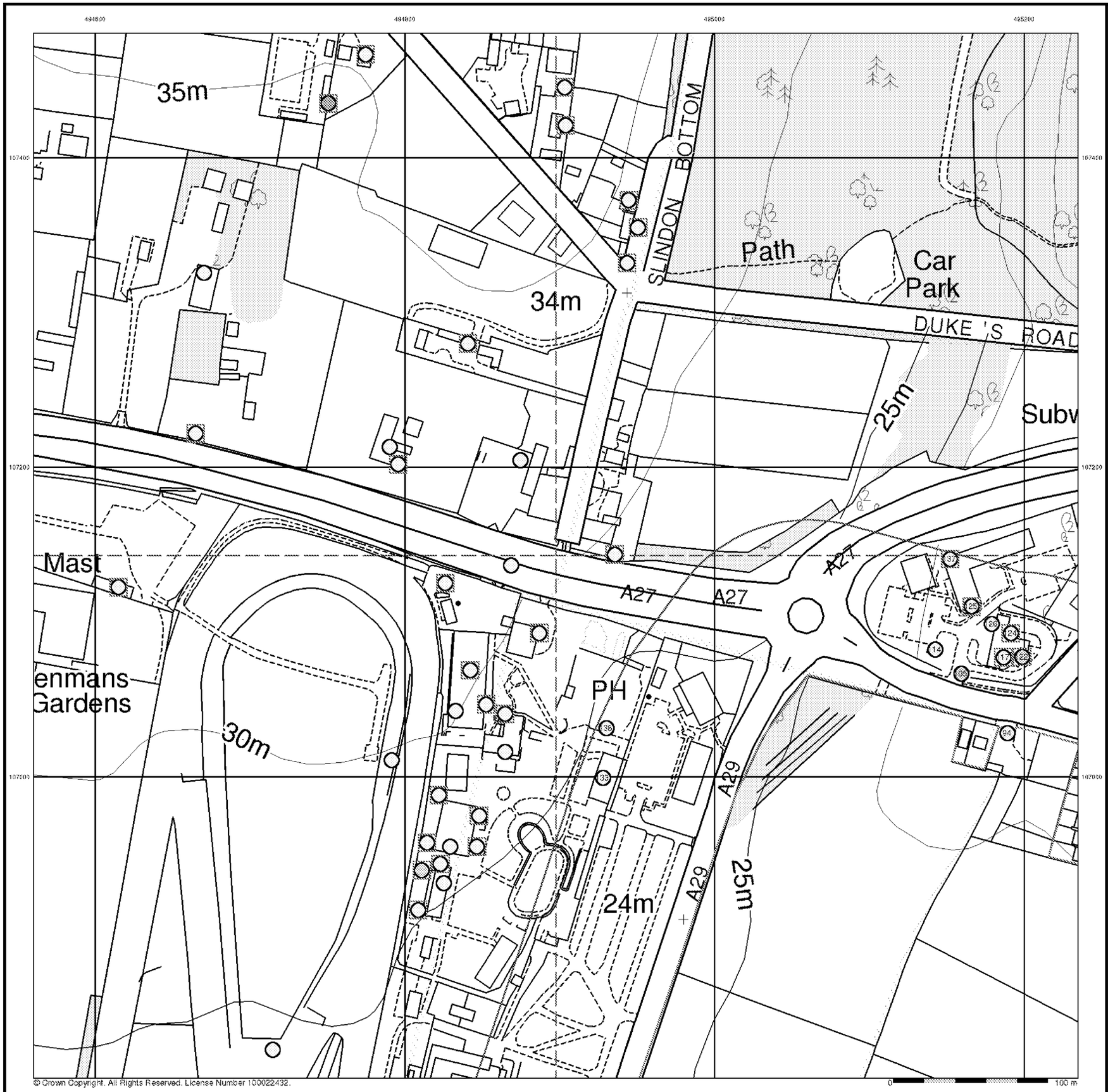
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Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

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Motion Map Data (1:2,500)

General

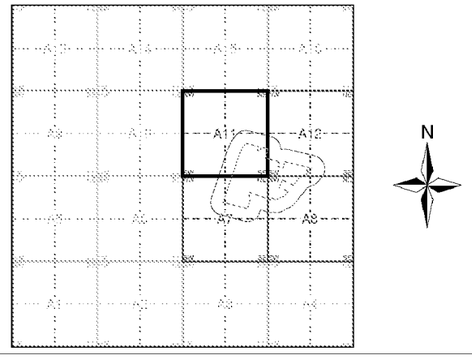
Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Average Velocity Gradient

Upward Movement > 3.5mm per year	
Upward Movement 1.5mm to 3.5mm per year	
Stable 1.5mm to -1.5mm per year	
Downward Movement -1.5mm to -3.5mm per year	
Downward Movement > -3.5mm per year	

Mining and Ground Stability - Segment A11



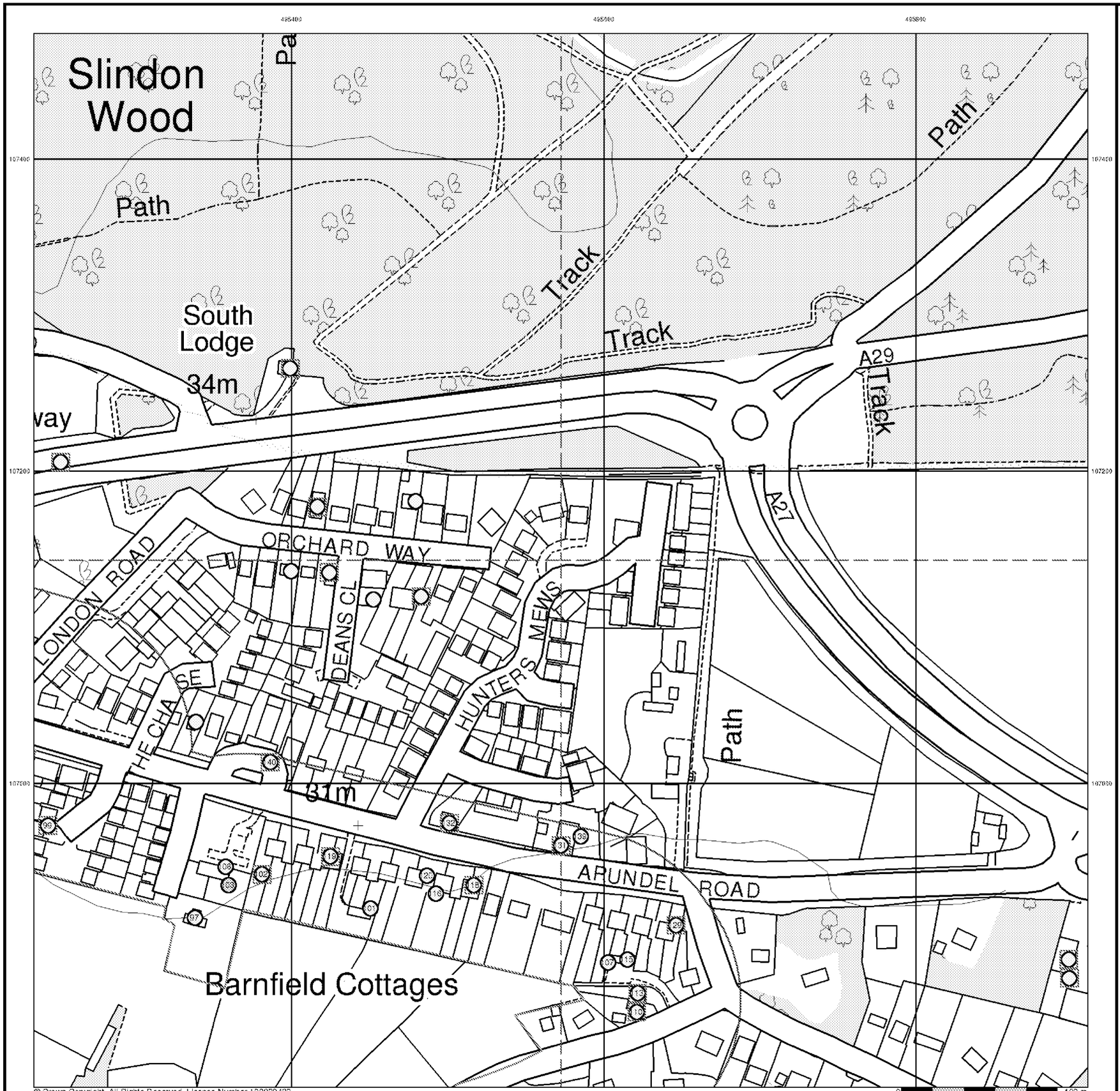
Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

1, Fontwell Close, Fontwell, ARUNDEL, BN18 0SW

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Motion Map Data (1:2,500)

General

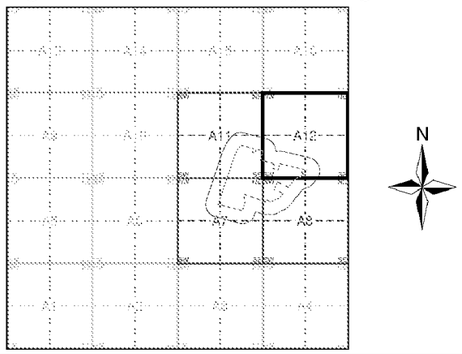
Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Average Velocity Gradient

Upward Movement > 3.5mm per year	
Upward Movement 1.5mm to 3.5mm per year	
Stable 1.5mm to -1.5mm per year	
Downward Movement -1.5mm to -3.5mm per year	
Downward Movement > -3.5mm per year	

Mining and Ground Stability - Segment A12



Order Details

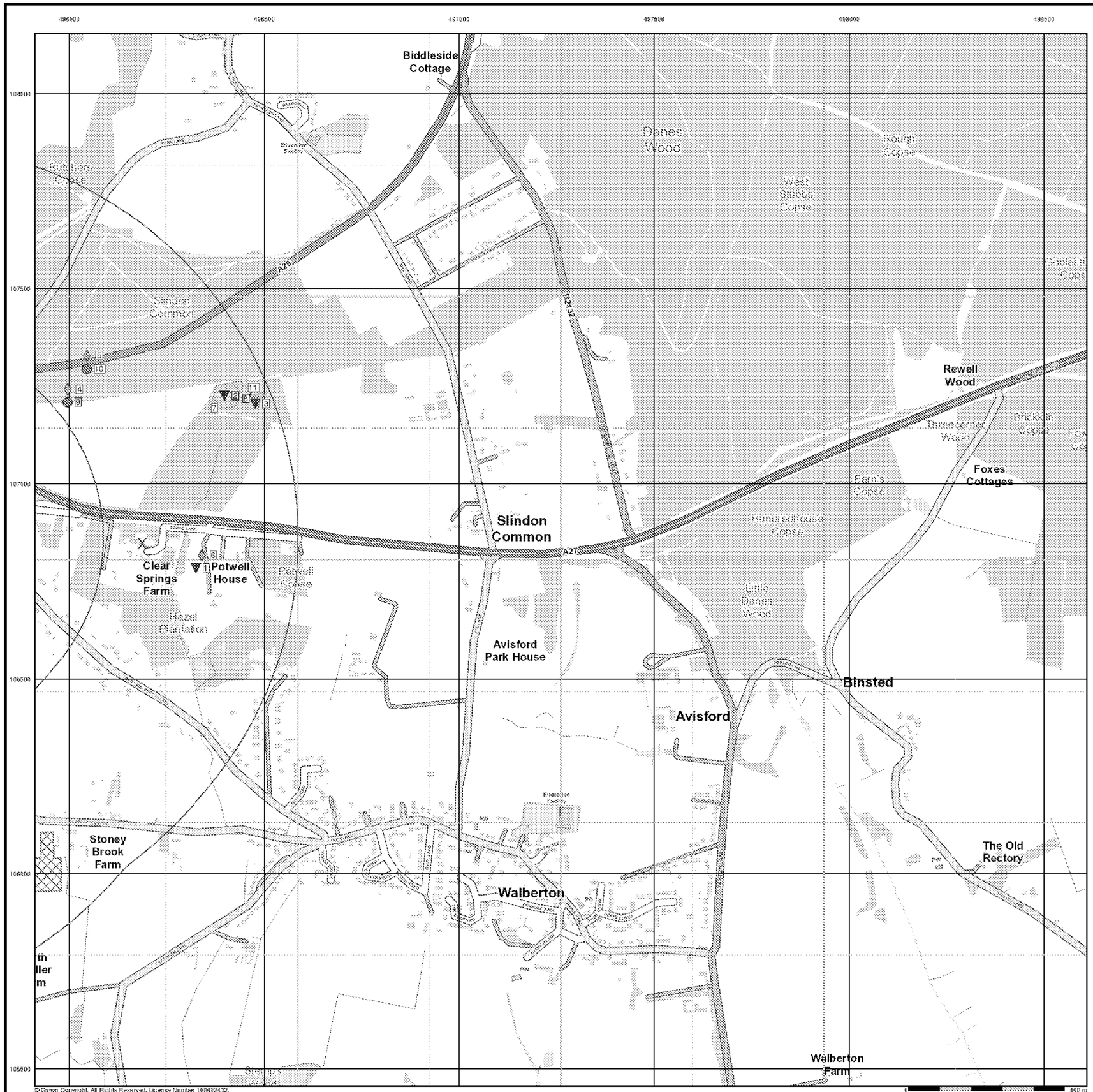
Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	494980, 106790
Slice:	A
Site Area (Ha):	17.99
Plot Buffer (m):	100

Site Details

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Historical Land Use Information (1:10,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Potentially Contaminative Industrial Uses (Past Land Uses - Mining)

	Point	Line	Polygon
Air Shafts	◇	·····	▱
Disturbed Ground	◆	·····	▨
General Quarrying	◆	·····	▨
Heap, unknown constituents	◆	·····	▨
Mineral Railway	◇	·····	▱
Mining and Quarrying General	◆	·····	▨
Mining of Coal & Lignite	◆	·····	▨
Quarrying of Sand and Clay, Operation of Sand and Gravel Pits	◆	·····	▨

Historical Land Use

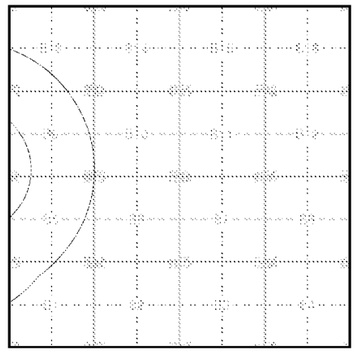
	Point	Line	Polygon
Potentially Infilled Land (Non-Water)	●	~~~	▩
Potentially Infilled Land (Water)	●	~~~	▩
Former Marsh	✠		

Mining Data

Potential Mining Area

BGS Recorded Mineral Site

Mining and Ground Stability - Slice B



Order Details

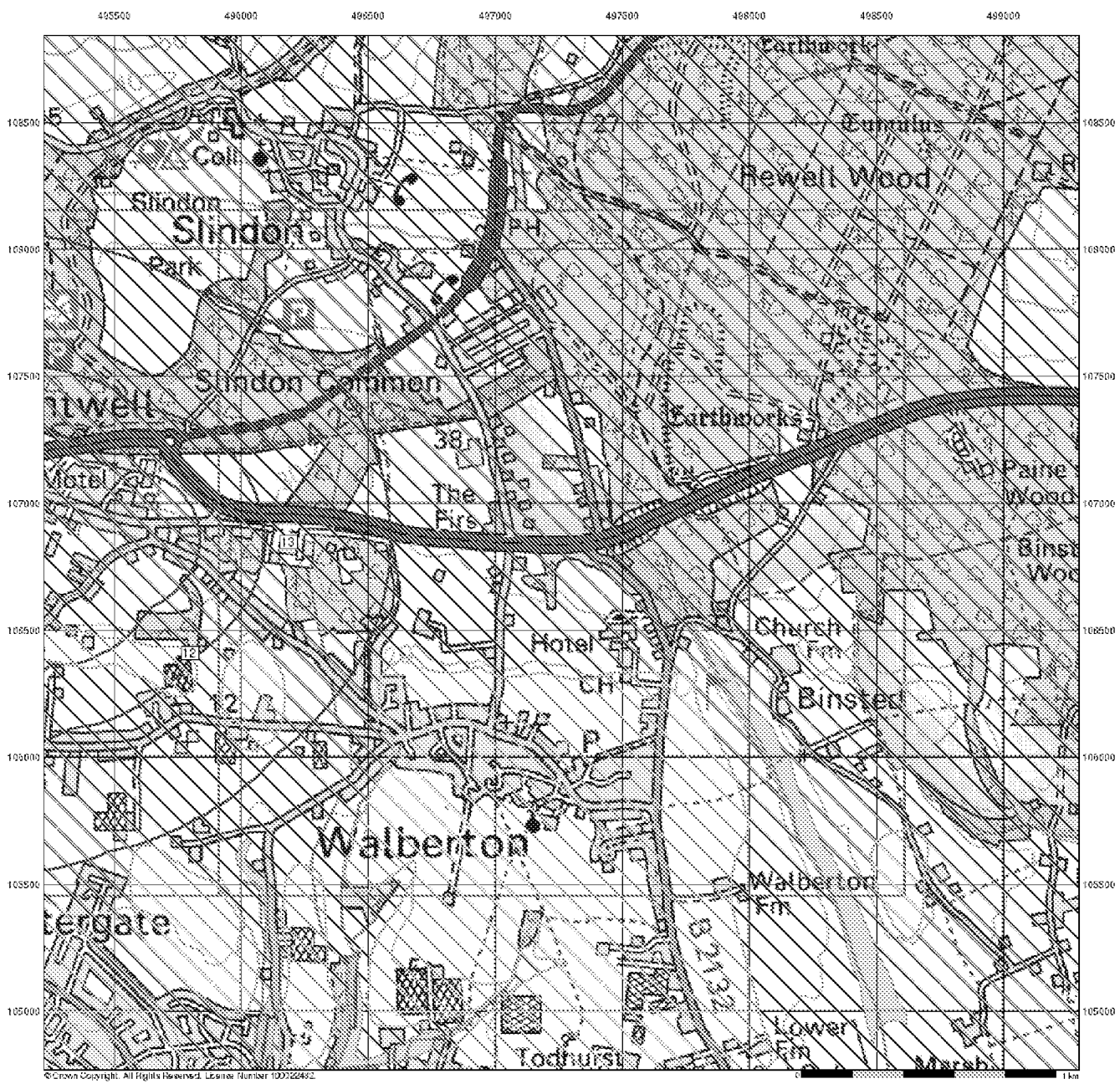
Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	496190, 106850
Slice:	B
Site Area (Ha):	17.99
Search Buffer (m):	1000

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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Potential for Compressible Ground Stability Hazards

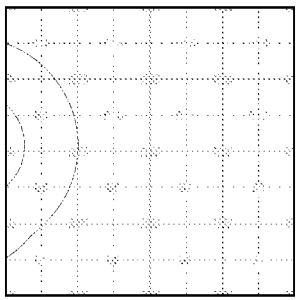
High | Low | Moderate | Very Low

Potential for Collapsible Ground Stability Hazards

High | Low | Moderate | Very Low

Brine Pumping and Salt Mining	Point	Polygon
Brine Pumping Related Feature	▲	▨
Salt Mining Related Feature	▲	▨

Mining and Ground Stability - Slice B



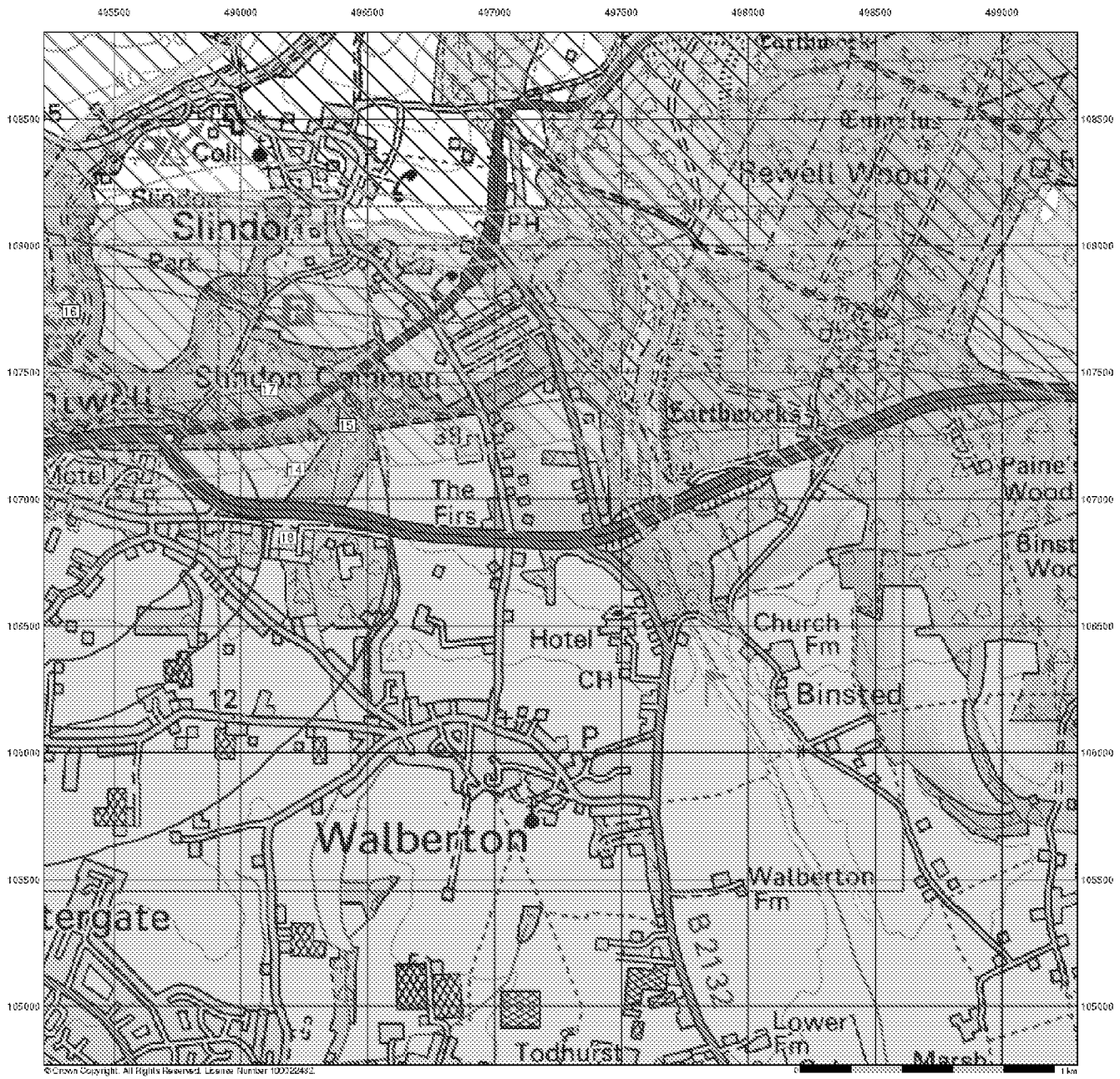
Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	496190, 106850
Slice:	B
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

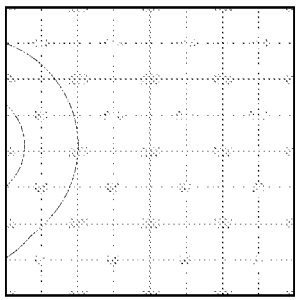
Potential for Landslide Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Ground Dissolution Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice B



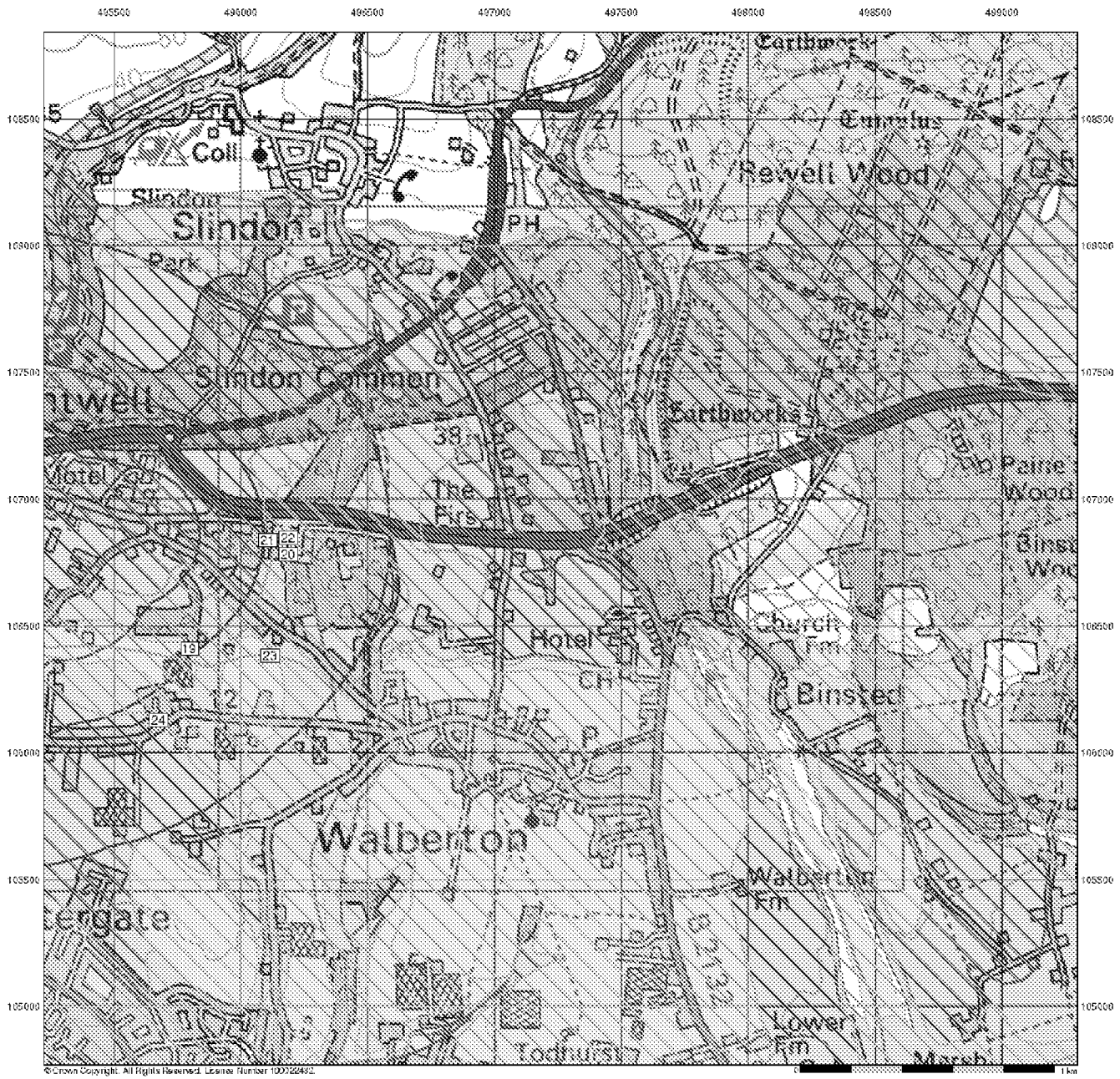
Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	496190, 106850
Slice:	B
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

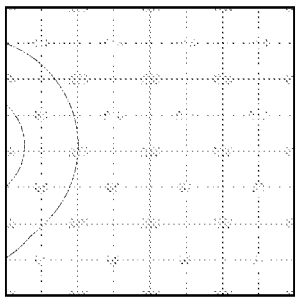
Potential for Running Sand Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Shrinking or Swelling Clay Ground Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice B



Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	496190, 106850
Slice:	B
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

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Envirocheck® Report:

Mining and Ground Stability Datasheet

Order Details:

Order Number:
168733634_1_1

Customer Reference:
LP1649 v2

National Grid Reference:
496190, 106850

Slice:
B

Site Area (Ha):
17.99

Search Buffer (m):
1000

Site Details:

1, Fontwell Close
Fontwell
ARUNDEL
BN18 0SW

Client Details:

Mrs H Smith
Leap Environmental Ltd
The Atrium Business Centre
Curtis Road
Dorking
Surrey
RH4 1XA

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Contents

Report Section and Details	Page Number
Summary	-
The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer selected. For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cavities Data, Historical Land Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data (1:50,000).	
Mining and Natural Cavities Data	1
The Mining and Natural Cavities Data section features data sets related to the existence of mining areas and their potential hazards; and details of naturally formed cavities. Data sets within this section are not plotted, with the exception of BGS Recorded Mineral Sites and Potential Mining Areas which feature on the Historical Land Use Information (1:10,000) map.	
Historical Land Use Information (1:2,500)	-
The Historical Land Use Information (1:2,500) section contains data captured from analysis carried out by Landmark of 1:1,250 and 1:2,500 scale historical Ordnance Survey mapping, identifying areas where, historically, the land uses were potentially contaminative. For the purpose of this Envirocheck module, only historical data relating to mining and ground stability has been included and plotted on the corresponding Historical Land Use Information (1:2,500) map. This section also includes the Subterranean Features data set, which details various man-made and man-used underground spaces obtained from the Subterranea Britannica society.	
Historical Land Use Information (1:10,000)	2
The Historical Land Use (1:10,000) section covers data captured from the systematic analysis carried out by Landmark of 1:10, 560 and 1:10,000 scale historical Ordnance Survey mapping dating back to the mid-19th century, identifying potentially contaminative past industrial land uses. For the purpose of this Envirocheck module, only data relating to mining and ground stability has been included and plotted on the accompanying Historical Land Use Information (1:10,000) map.	
Ground Stability Data (1:50,000)	3
The Ground Stability (1:50,000) section includes the BGS Geosure data suite, reporting features to 250m and plotted onto 3 separate maps. Also reported is brine subsidence, brine mining and salt mining data sets, of which Brine Pumping and Salt Mining Related Features are plotted, and subsidence insurance claims and insurance investigations data, which is not plotted.	
Motion Map Data (1:2,500)	-
The Motion Map Data (1:2,500) section contains data which is plotted to indicate long-term stability trends from analysis of satellite radar data.	
Historical Map List	4
The Historical Map List section details the historical mapping that has been analysed for your site, in relation to the Historical Land Use Information sections.	
Data Currency	5
Data Suppliers	6
Useful Contacts	7

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The brine subsidence data relating to the Driotwich area as provided in this report is derived from JPB studies and physical monitoring undertaken annually over more than 35 years. For more detailed interpretation contact enquiries@jpb.co.uk. JPB retain the copyright and intellectual rights to this data and accept no liability for any loss or damage, including in direct or consequential loss, arising from the use of this data.

The Mining Instability data was obtained on licence from Ove Arup & Partners Limited (for further information, contact mining.review@arup.com). No reproduction or further use of such Data is to be made without the prior written consent of Ove Arup & Partners Limited. The supplied Mining Instability data is derived from publicly available records and other third party sources and neither Ove Arup & Partners nor Landmark warrant the accuracy or completeness of such information or data.

Report Version v53.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Mining and Natural Cavities Data					
BGS Recorded Mineral Sites	pg 1				3
Coal Mining Affected Areas			n/a	n/a	n/a
Man Made Mining Cavities					
Mining Instability			n/a	n/a	n/a
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 1	Yes		n/a	n/a
Potential Mining Areas					
Historical Land Use Information (1:2,500)					
Extractive Industries or Potential Excavations from 1855-1909 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1906-1937 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1924-1949 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)				n/a	n/a
Subterranean Features (100m)				n/a	n/a
Historical Land Use Information (1:10,000)					
Air Shafts					
Disturbed Ground					
General Quarrying					
Heap, unknown constituents					
Mineral Railway					
Mining & quarrying general					
Mining of coal & lignite					
Quarrying of sand & clay, operation of sand & gravel pits	pg 2				5
Former Marshes					
Potentially Infilled Land (Non-Water)	pg 2				3
Potentially Infilled Land (Water)					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Ground Stability Data (1:50,000)					
CBSCB Compensation District			n/a	n/a	n/a
Brine Pumping Related Features					
Brine Subsidence Solution Area					
Potential for Collapsible Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Salt Mining Related Features					
Subsidence Insurance Claims				n/a	n/a
Subsidence Investigations				n/a	n/a
Motion Map Data (1:2,500)					
Motion Map (100m)				n/a	n/a

Report Version v53.0

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**BGS Recorded Mineral Sites** Site Name: Potwell Copse Gravel Pit Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157616 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Palaeocene Geology: Lambeth Group Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	B5NE (SE)	741	1	496324 106788
2	**BGS Recorded Mineral Sites** Site Name: Ashbeds Clay Pits Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157602 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	B9NE (NE)	891	1	496398 107230
3	**BGS Recorded Mineral Sites** Site Name: Ashbeds Clay Pits Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 157603 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Head Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	B9NE (NE)	955	1	496476 107210
	Coal Mining Affected Areas In an area which may not be affected by coal mining				
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	B9SW (NE)	0	1	496188 106847

Historical Land Use Information (1:10,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	B9NW (NW)	556	-	495994 107242
5	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	B9NW (N)	652	-	496045 107328
6	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1899	B9SE (E)	753	-	496339 106817
7	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1951	B9NE (NE)	851	-	496372 107194
8	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1880 - 1899	B9NE (NE)	938	-	496459 107219
9	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	B9NW (NW)	556	-	495994 107242
10	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	B9NW (N)	652	-	496045 107328
11	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	B9NE (NE)	938	-	496459 107219

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	CBSCB Compensation District The site does not fall within the brine compensation area.				
	Brine Subsidence Solution Area The site does not fall within the brine subsidence solution area.				
12	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	(SW)	0	1	495799 106409
13	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9SW (NE)	0	1	496188 106847
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9SW (NE)	0	1	496188 106847
14	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	B9SW (N)	0	1	496217 107117
15	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: High Source: British Geological Survey, National Geoscience Information Service	B9NE (NE)	0	1	496418 107290
16	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	(W)	183	1	495198 107246
17	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	B9NW (N)	210	1	496112 107434
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9SW (NE)	0	1	496188 106847
18	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9SW (NE)	0	1	496188 106847
19	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	(SW)	0	1	495799 106409
20	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9SW (NE)	0	1	496188 106847
21	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9SW (W)	0	1	496124 106838
22	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	B9SW (NE)	0	1	496188 106847
23	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	B5SW (S)	0	1	496114 106382
24	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	(SW)	179	1	495675 106130

No Historical Land Use information available.

The following mapping has been analysed for Historical Land Use Information (1:10,000):

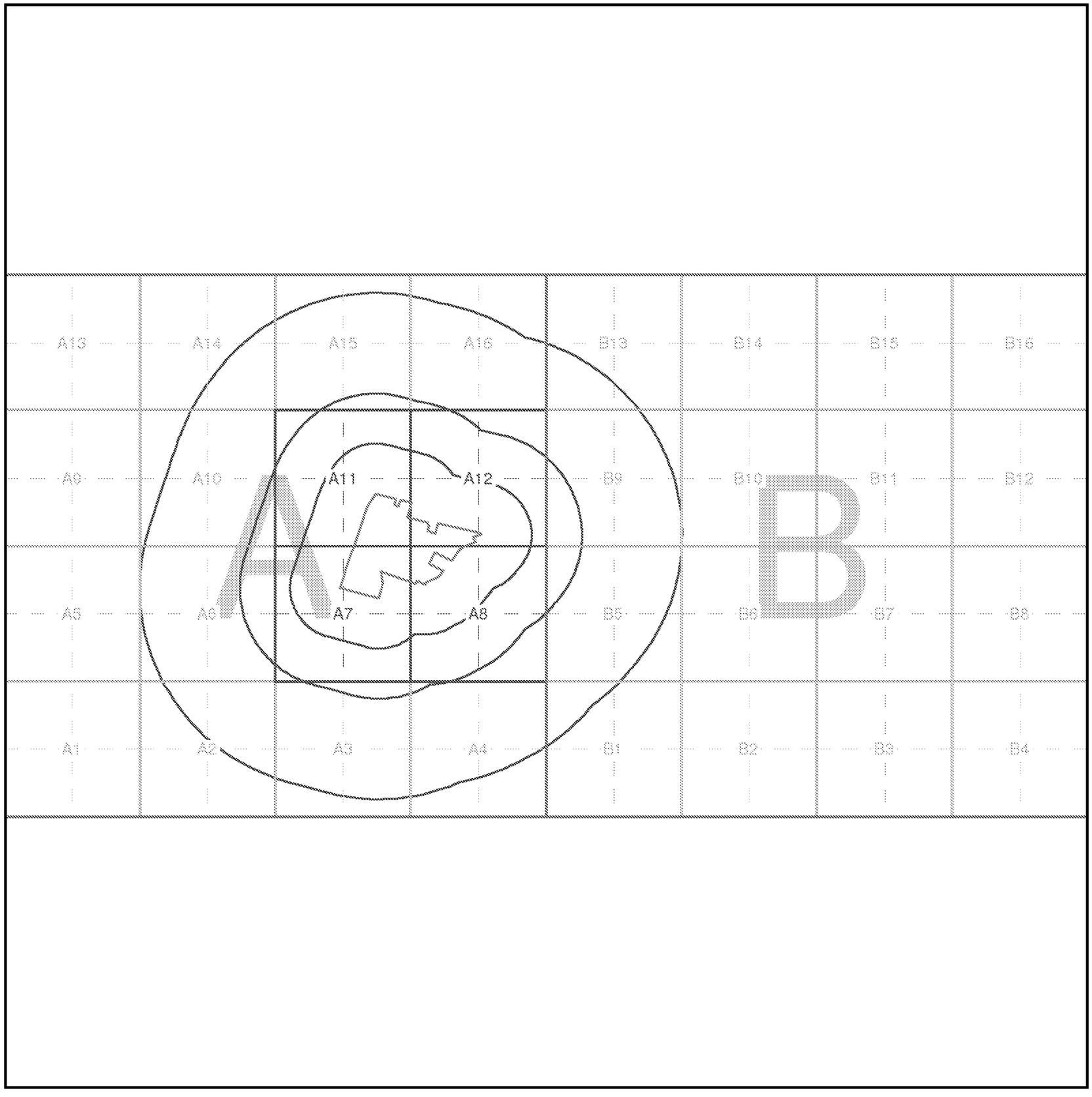
1:10,560	Mapsheet	Published Date
Sussex	049_00	1880
Sussex	062_00	1880
Sussex	049_SE	1899
Sussex	062_NE	1899
Sussex	049_SE	1914
Sussex	062_NE	1914
Sussex	062_NE	1951
Ordnance Survey Plan	SU90NE	1961
1:10,000	**Mapsheet**	**Published Date**
Ordnance Survey Plan	SU90NE	1992

Mining and Cavities Data	Version	Update Cycle
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	May 2018	Bi-Annually
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Man Made Mining Cavities Peter Brett Associates	May 2018	Bi-Annually
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Natural Cavities Peter Brett Associates	May 2018	Bi-Annually
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Historical Land Use Information (1:2,500)	**Version**	**Update Cycle**
Subterranean Features Landmark Information Group Limited	February 2018	Bi-Annually
Ground Stability Data (1:50,000)	**Version**	**Update Cycle**
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Subsidence Insurance Claims SP Property Services	February 2018	Quarterly
Subsidence Investigations CET Structures Ltd	February 2018	Quarterly
Brine Subsidence Solution Area Johnson Poole & Bloomer	January 2015	As notified

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
British Geological Survey	
The Coal Authority	
Ove Arup	
Peter Brett Associates	
Wardell Armstrong	
Johnson Poole & Bloomer	

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	[redacted]
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	



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Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Ordnance Survey Map data

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

NATURAL ENGLAND

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Mrs H Smith, Leap Environmental Ltd, The Atrium
Business Centre, Curtis Road, Dorking, Surrey, RH4 1XA

Order Details

Order Number:	168733634_1_1
Customer Ref:	LP1649 v2
National Grid Reference:	495170, 106800
Site Area (Ha):	17.99
Search Buffer (m):	1000

Site Details

1, Fontwell Close, Fontwell, ARUNDEL, BN18 0SW

Full Terms and Conditions can be found on the following link:
http://www.landmarkinfo.co.uk/Terms/Show/515

Landmark® INFORMATION GROUP
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Fax: 0844 844 9951
Web: www.envirocheck.co.uk

APPENDIX D – QUALITATIVE RISK ASSESSMENT MODEL

Qualitative Risk
Assessment Model

Preliminary Geotechnical Risk Register

Geotechnical risk is the risk to building and construction work created by the site ground conditions. The Preliminary Geotechnical Risk Register has been compiled to provide an assessment of the likely risks that may impact on the proposed development based on the results of the desk study, and should be used to specify the type and extent of the intrusive investigation and testing undertaken, and to identify potential mitigation measures to control the risk to an acceptable level.

The inclusion of a risk in the register does not indicate that the risk is present, rather the likelihood of mitigation measures being required due to that risk, based on the available data. Equally, a risk classified as low indicates that mitigation measures are unlikely to be required for the hazard identified based on the available data.

The risk register should be developed and refined throughout the design process such that it will enable the management of geotechnical risk.

The Geotechnical Risk Register has been developed in accordance with the guidance presented in ICE/DETR Document "Managing Geotechnical Risk" (2002). The degree of risk (R) is determined by assessing the likelihood of a hazard (L) occurring and the effect of the hazard (E) on the project (R=LxE). The effect may be measured in one or more aspect e.g. increased cost, delays in the program, health and safety etc. The scale of the likelihood, effect and risk are determined as follows:-

Likelihood of Occurrence		
Scale	Likelihood	Chance
4	Probable	>1 in 2
3	Likely	1 in 10 to 1 in 2
2	Unlikely	1 in 100 to 1 in 10
1	Negligible	<1 in 100

x

Effect of Hazard		
Scale	Effect	Increase in cost or time
4	Very High	>10%
3	High	4-10%
2	Low	1-4%
1	Very Low	<1%

=

Degree of Risk		
Degree of Risk	Risk Level	Action required
1-4	Trivial	None
5-8	Significant	Consider cost effective solutions or improvements at no extra cost
9-12	Substantial	Work must not start until risk has been reduced. Additional resource required
13-16	Intolerable	Work must not start until risk has been reduced. If risk can not be reduced, project should not proceed.

Hazard	Effect	Likelihood of Occurrence	Effect of Hazard	Risk Classification	Notes
Made Ground	Deepened foundations	Unlikely	High	Significant	Localised deep made ground is anticipated in the northern area of the site where the historic brick barn and infilled sand and gravel pits and reservoir were located.
	Unstable excavations	Unlikely	High	Significant	
Compressible Ground	Bearing capacity failure	Unlikely	High	Significant	Soft / loose soils may be associated with the head deposits on site, and in any infilled natural cavities.
	Excessive settlement	Unlikely	High	Significant	
High Groundwater Table	Unstable excavations/ running sands	Unlikely	High	Significant	The natural soils comprise head deposits overlying the Lambeth Group and Chalk at depth. Localised perched groundwater may be encountered within the granular head deposits, resulting in potential running sands / unstable excavations, particularly in the lower lying areas of the site
	Dewatering	Unlikely	High	Significant	
	Contamination	Unlikely	Low	Slight	
Deep Excavations	Deepened foundations	Negligible	High	Slight	Absence of deep excavations on-site
Working in highway	Traffic Management	Negligible	Very low	Slight	N/A
Shrinkable soils	Deepened foundations	Likely	Low	Significant	Large trees on the perimeter and scattered across the site which could result in soil heave if clay soils within the head deposits are encountered at shallow depths. Localised deepening of foundations near trees may be required.
	Heave	Likely	Low	Significant	
Frost Susceptible soils	Road Design	Likely	Low	Significant	Depending on the fine and coarse fractions of the variable head deposits at formation level, the soils at formation level may be considered frost susceptible
Aggressive ground conditions for Concrete	Concrete design	Unlikely	Low	Slight	The natural soils comprise head deposits overlying the Lambeth Group at depth which are not typically associated with pyritic ground
Slope Stability/Retaining Structure	Local stability	Unlikely	High	Significant	Moderately steep slope on the western and southern areas, inclined trees noted on slopes.
	Global stability	Unlikely	High	Significant	
Mining	Suitability for development	Negligible	High	Slight	N/A

Ground dissolution/ Natural cavities	Remedial measures	Likely	Very high	Severe	The site is located on ground conditions where solution features can be prevalent (Head over Lambeth Group over Chalk). 70No. sinkholes are reported 36m east of the site. A moderately steep 1.5-2.0m high E-W topographic depression was observed on the south west extent of the north west field of the site, and the tree in this area were noted to be slightly bent. On site the geological boundary between the Lambeth Group and the Chalk is located in the north west corner of the site overlain by the Head Deposits. The boundary then extends to the NE, away from the site and parallel to the A27. Solution features are most commonly encountered in the vicinity of the boundary between the two strata, where frequent fissures in the chalk are anticipated, and where surface water tends to accumulate (i.e. valleys or other topographic depressions). The potentiaal for ground dissolution features is therefore identified
Landfill	Land gas	Likely	Low	Significant	Deep made ground associated with the backfilled pits/reservoir immediately north of the site is a potential source of landgas, and the potential for radon gas has been identified on site.
Contaminated land	Remedial measures	Unlikely	High	Significant	Localised areas of potential contamination associated with the site's former use, as well as the widespread use of pesticides across the site. However, such sources are anticipated at this stage to be limited to near surface soils, and unlikly to result in deep excavations.
Surface Water Drainage	Deep borehole soakaways/SUDs/piped off site	Likely	High	Severe	Given the high risk of solution fesutres on site, conventional soakaways >20m from buildings. Borehole soakaways may be required.
Archaeological remains	Remedial measures	Negligible	High	Slight	N/A
UXO	UXO supervision	Negligible	Very high	Slight	N/A

Contaminant	Receptor	Route[1]	Pathway[1]	Likelihood of Occurrence[2]	Severity of Consequence[2]	Risk Classification[3]	Notes
Polyaromatic Hydrocarbons and Petroleum Hydrocarbons, VOCs and SVOCs	Future Residents	1	Ingestion of soil	Low likelihood	Medium	Moderate/low risk	The proposed development is to include residential units and private gardens, as well as public open space. Several localised potential sources of contamination were identified across the site including the disused brick barn and historic infilled sand and gravel pits to the north of the site; the discarded farm machinery in the central area of the site and the identified burnt ground area in the eastern area of the site. Off site sources include the petrol fuel station and historic garages north of the site, farm vehicle storage, garage and areas of blacktop hardstanding and a possible AST in the Barn Farm area east of the site. These sources are considered to have a localised effect and the risk is reduced. The site has a history of use as agricultural land. there is therefore a risk of PAHs associated with pesticide use on site.
		2	Ingestion of household dust	Low likelihood	Medium	Moderate/low risk	
		3	Ingestion of contaminated vegetables	Low likelihood	Medium	Moderate/low risk	
		4	Ingestion of soil attached to vegetables	Low likelihood	Medium	Moderate/low risk	
		5	Dermal contact with soil	Low likelihood	Medium	Moderate/low risk	
		6	Dermal contact with household dust	Low likelihood	Medium	Moderate/low risk	
		7	Inhalation of fugitive soil dust	Low likelihood	Medium	Moderate/low risk	
		8	Inhalation of fugitive household dust	Low likelihood	Medium	Moderate/low risk	
		9	Inhalation of vapours and gases outside	Low likelihood	Minor	Very low risk	
		10	Inhalation of vapours and gases inside	Low likelihood	Medium	Moderate/low risk	
	Construction workers	1	Ingestion of soil	Unlikely	Mild	Very low risk	Use of PPE and good working practices will mitigate the risks to construction workers
		5	Dermal contact with soil	Likely	Minor	Low risk	
		7	Inhalation of fugitive soil dust	Likely	Minor	Low risk	
		9	Inhalation of vapours and gases outside	Low likelihood	Minor	Very low risk	
		10	Inhalation of vapours and gases inside	Low likelihood	Mild	Low risk	
	Groundwater	11	Intergranular flow of free product	Low likelihood	Medium	Moderate/low risk	The site is underlain by a Secondary A aquifer overlying a Principal aquifer of high leaching potential. There is potential for any contamination on site to leach in to the aquifer. From the BGS logs the depth to the Principal aquifer is likly to be in excess of 10m, which will afford some protection from surface sources. It is noted a pollution incident involving diesel was reported 20m north of the site.
		12	Rainwater infiltration or leaching of contaminated soils	Low likelihood	Medium	Moderate/low risk	

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Contaminant	Receptor	Route[1]	Pathway[1]	Likelihood of Occurrence[2]	Severity of Consequence[2]	Risk Classification[3]	Notes
	Material construction of buildings and infrastructure	13	Contact of building materials, including water supply pipes with contaminated soils and/or contaminated groundwater	Low likelihood	Medium	Moderate/low risk	There may be contamination in the soil onsite but most of the sources are historic and localised, with only the petrol filling station north of the site still active. Therefore the volume and concentration is unlikely to be a significant threat to supply pipes
Heavy Metals	Future Residents	1	Ingestion of soil	Low likelihood	Medium	Moderate/low risk	The proposed development is to include residential units and private gardens, as well as public open space. Heavy metals are less mobile but more persistent in the environment. Potential localised sources onsite include made ground associated with the brick barn and infilled sand and gravel pits and reservoir in the north area of the site as well as discarded farm machinery in the central field. Heavy metals have also been historically used as pesticides.
		2	Ingestion of household dust	Low likelihood	Medium	Moderate/low risk	
		3	Ingestion of contaminated vegetables	Low likelihood	Medium	Moderate/low risk	
		4	Ingestion of soil attached to vegetables	Low likelihood	Medium	Moderate/low risk	
		5	Dermal contact with soil	Likely	Medium	High risk	
		6	Dermal contact with household dust	Likely	Medium	High risk	
		7	Inhalation of fugative soil dust	Low likelihood	Medium	Moderate/low risk	
		8	Inhalation of fugative household dust	Likely	Medium	High risk	
	Construction workers	1	Ingestion of soil	Unlikely	Mild	Very low risk	Use of PPE and good working practices will mitigate the risks to construction workers
		5	Dermal contact with soil	Unlikely	Mild	Very low risk	
		7	Inhalation of fugative soil dust	Unlikely	Mild	Very low risk	
	Groundwater	11	Rainwater infiltration and leaching, intergranular flow via groundwater to controlled waters	Unlikely	Medium	Low risk	The site is underlain by a Secondary A aquifer overlying Principal aquifers of high leaching potential. Based on the findings of the desk study, the depth to the chalk (Principal aquifer) is likely to be in excess of 10m, which will afford the aquifer some protection from any surface sources of contamination.
		12	Surface water run-off	Unlikely	Medium	Low risk	
Ground Gas	Future residents	16	Migrate via service trenches	Low likelihood	Medium	Moderate/low risk	Localised potential for inhalation of ground gas in the northern area of the site where the infilled sand and gravel pits and reservoir are located
		17	Accumulate in confined spaces	Unlikely	Medium	Moderate/low risk	

Contaminant	Receptor	Route[1]	Pathway[1]	Likelihood of Occurrence[2]	Severity of Consequence[2]	Risk Classification[3]	Notes
	Construction workers	18	Inhalation of ground gas	Low likelihood	Medium	Moderate/low risk	risks to construction workers readily mitigated through correct use of PPE.
	Material construction of buildings and infrastructure	19	accumulation of ground gas in confined spaces	Unlikely	Severe	Moderate/low risk	Accumulation likelihood small given that site is not a landfill
Radon	Future residents	16	Migrate via service trenches	Low likelihood	Medium	Moderate/low risk	According to the Radon interactive mapping available on the Public Health England Website the site is in an intermediate probability radon area, as between 5 and 10% of homes are above the action level. Therefore, special protective measures may be required in the construction of buildings on this site, in respect of radon gas.
		17	Accumulate in confined spaces	Unlikely	Medium	Moderate/low risk	
	Construction workers	18	Inhalation of ground gas	Low likelihood	Medium	Moderate/low risk	
	Material construction of buildings and infrastructure	19	accumulation of ground gas in confined spaces	Unlikely	Severe	Moderate/low risk	
Asbestos	Future Residents	7	Inhalation of fugitive soil dust	Low likelihood	Severe	Moderate risk	Whilst the possibility of inhalation of asbestos fibres is low, the potential for harm is high for a low exposure to asbestos and so a moderate risk is appropriate. Localised potential sources of contamination include any made ground and derelict buildings. Asbestos may also be burned on farm sites.
		8	Inhalation of fugitive household dust	Low likelihood	Severe	Moderate risk	
	Construction workers	7	Inhalation of fugitive soil dust	Low likelihood	Severe	Moderate risk	
Pesticide and Herbicide compounds	Future Residents	2	Ingestion of household dust	Low likelihood	Medium	Moderate/low risk	The vast majority of the site has been and is currently used for agricultural purposes and so there is a potential risk from herbicide and pesticide compounds.
		5	Dermal contact with soil	Low likelihood	Medium	Moderate/low risk	
		6	Dermal contact with household dust	Low likelihood	Medium	Moderate/low risk	
		7	Inhalation of fugitive soil dust	Low likelihood	Medium	Moderate/low risk	
		8	Inhalation of fugitive household dust	Likely	Mild	Moderate/low risk	
	Construction Workers	1	Ingestion of soil	Low likelihood	Mild	Low risk	
		5	Dermal contact with soil	Low likelihood	Mild	Low risk	
		7	Inhalation of fugitive soil dust	Low likelihood	Mild	Low risk	

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Contaminant	Receptor	Route[1]	Pathway[1]	Likelihood of Occurrence[2]	Severity of Consequence[2]	Risk Classification[3]	Notes
	Groundwater	I1	Intergranular flow of free product	Likely	Mild	Moderate/Low risk	
		I2	Rainwater infiltration and leaching of contaminated soils	Likely	Mild	Moderate/Low risk	

1. Classification of human exposure pathways (routes) from The CLEA model, Research and Development Publication CLR10.

2. Classification of Probability and Consequence from CIRIA C552 Contaminated land risk assessment, a guide to good practice 2001

3. Risk Classification from DETR Guidelines for Environmental Risk Assessment and Management, 2000

APPENDIX E – SITE PHOTOGRAPHS

Site Photographs



Photo 1 – Location of the E-W topographic depression in the northern area of the site



Photo 2 – Slightly inclined trees on the southern area of the site

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Photo 3 – General appearance of the fields at the time of the investigation

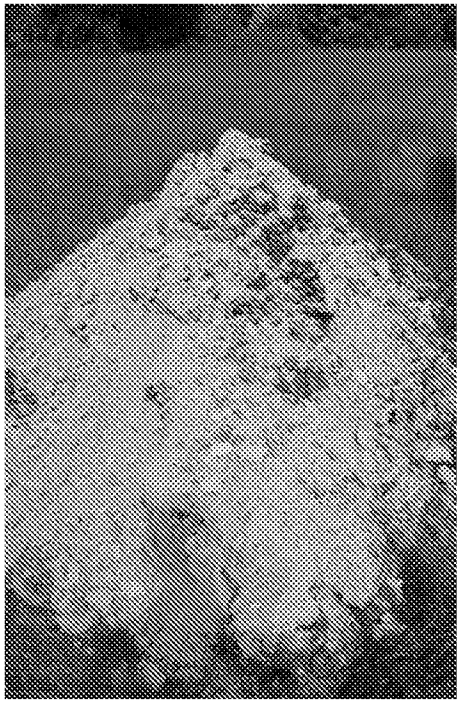


Photo 4 – Appearance of the chalk head encountered across the site

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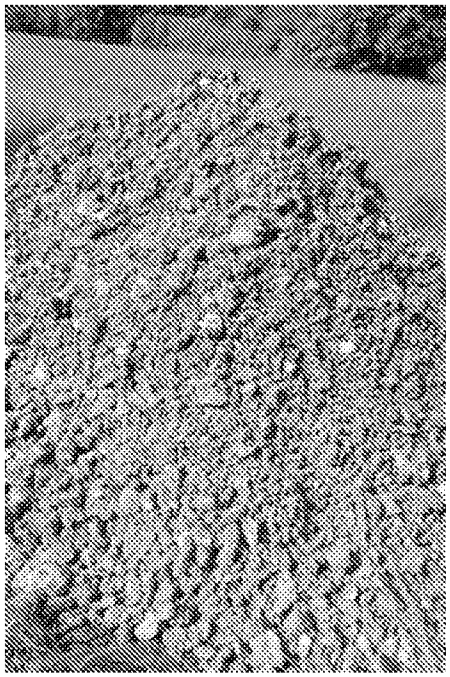


Photo 5 – Appearance of the gravelly clay head deposits encountered across the site



Photo 6 – Trial pit profile, showing gravelly clay head deposits over chalk head

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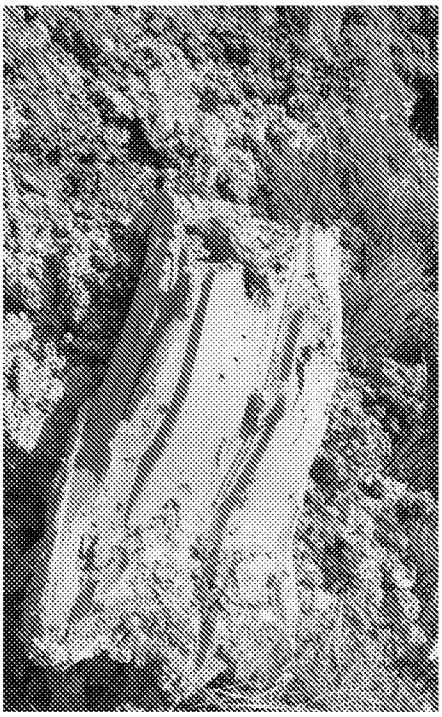


Photo 7 – Lambeth Group soils – Stiff clays, as encountered on site

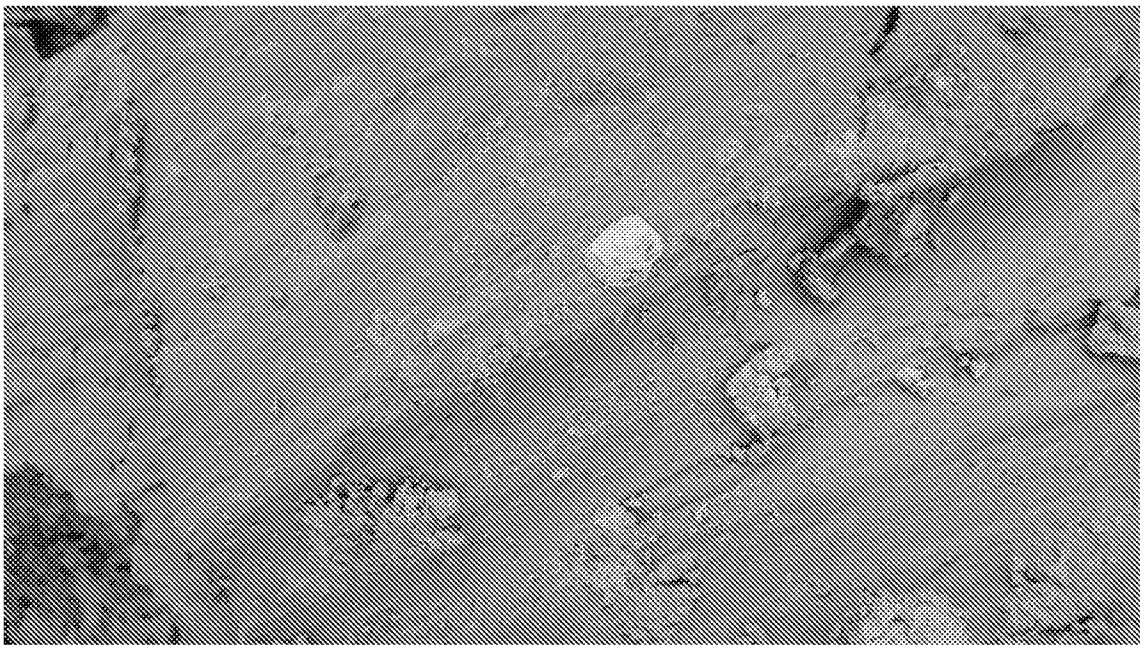


Photo 8 – Shells within the stiff clays of the Lambeth Group

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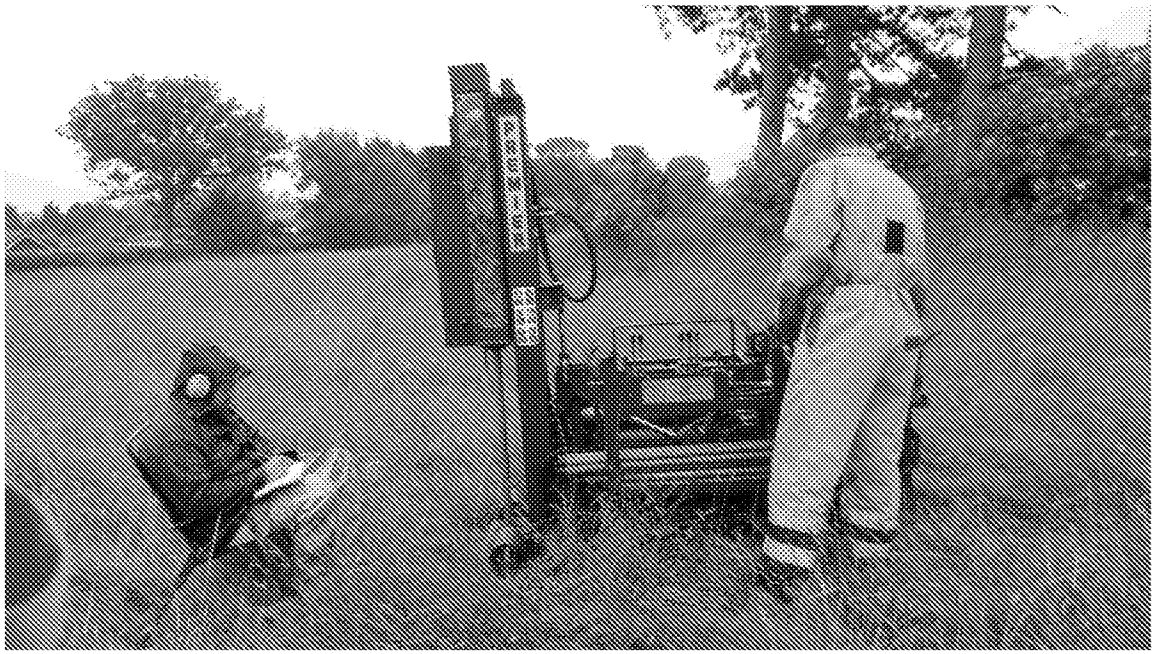


Photo 9 – Dynamic probing example – DP106



Photo 10 – Wet sands encountered at depth below the clays. Example from WS105

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Photo 11 – Barn farm – equipment storage



Photo 12 – Barn farm – Possible above ground storage tank

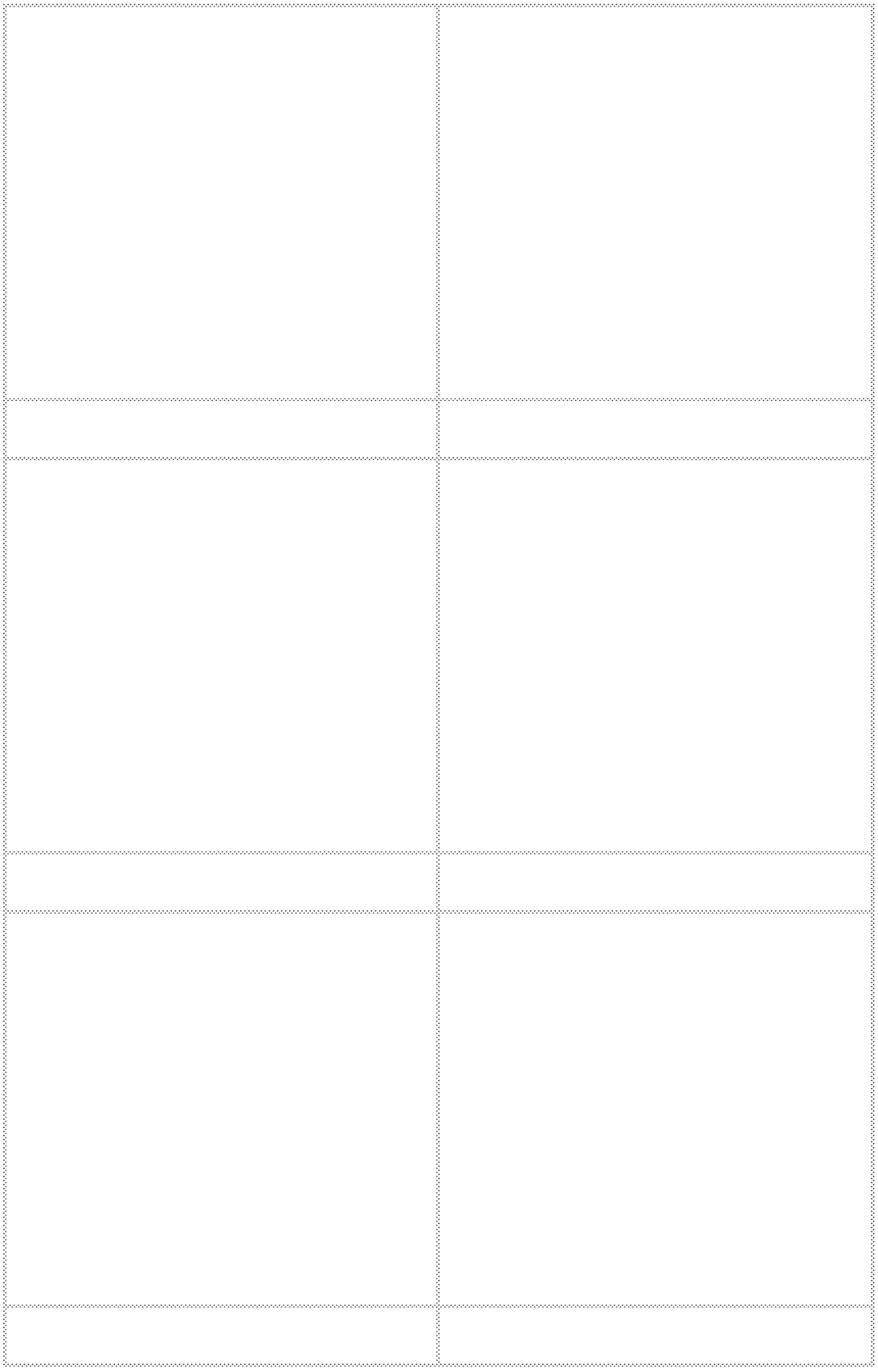
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Photo 13 – Barn Farm - Stables



Photo 14 – Burnt ground area NE of Barn farm



APPENDIX F – TRIAL HOLE AND BOREHOLE LOGS

Trial Hole and
Borehole Logs

Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA
[redacted]

Trial Pit Log

Trialpit No
TP101
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 494993 - 106609 Level: 23.23	Date 21/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.00	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.25	22.98		Grey silty gravelly TOPSOIL with fine-coarse sub-angular flints, occasional cobbles and frequent rootlets.
	0.50	ES					Medium dense brown very silty clayey GRAVEL of angular to sub rounded fine to coarse flint with frequent rootlets
							Hand Pen at 0.6m = 180kPa
	0.80	B					*Becoming very gravelly CLAY below 0.8m*
			N=35				
	1.50	D	N=21	1.50	21.73		Firm to stiff brown and mottled orange very gravelly CLAY
							Hand Pen at 1.5m = 120kPa
				1.80	21.43		Reworked pale grey chalk recovered as pale grey slightly gravelly SILT of chalk. Matrix is silt. Clasts are low density fine chalk and occasional gravel of medium to coarse rounded to sub rounded flint.
	2.20	D					*Becoming sandy and mottled orange red at 2.1m with some moisture*
				2.60	20.63		Stiff grey and mottled red brown orange thinly laminated silty CLAY with occasional gravel of fine rounded flint and occasional fine fragments of chalk
	2.70	D					*Hand Pen at 2.7m = 210kPa*
				3.00	20.23		*Hand Pen at 3m = 210kPa*
							End of pit at 3.00 m

Remarks: Soils moist at 2.1m

Stability: Stable

AGS

Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA
[redacted]

Trial Pit Log

Trialpit No
TP102
Sheet 1 of 1

Project Name: [redacted]	Project No. LP01649	Co-ords: 494968 - 106662 Level: 23.56	Date 21/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.30	Scale 1:25
Client: Dandara Commercial Ltd.			Logged SN

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.00			Dark brown silty TOPSOIL with frequent rootlets.
	0.20	ES		0.20	23.36		Dark brown silty slightly gravelly SUBSOIL with frequent rootlets. Gravel is of medium to coarse, sub-round to sub-angular flint.
	0.40	ES		0.35	23.21		Firm to stiff dark reddish brown very gravelly silty friable CLAY. Gravel is of angular to sub-rounded fine to coarse and cobbles of flint.
							Hand Pen at 0.5m = 180kPa
				0.80	22.76		Dense dark brown red brown very clayey silty GRAVEL of fine to coarse, angular to sub-angular flint.
	1.00	B	N=59				
			N=26				*Hand Pen at 1.4m = 270kPa*
				1.80	21.76		Firm to stiff dark reddish brown very gravelly silty friable CLAY. Gravel is of angular to sub-rounded fine to coarse and cobbles of flint.
	1.90	D		2.00	21.56		*Hand Pen at 1.9m = 160kPa*
							Reworked white grey light brown chalk recovered as slightly gravelly SILT of chalk. Matrix is slightly sandy silt. Clasts are low density fine chalk.
	2.40	D					*Clasts becoming fine to medium at 2.3m.*
							Occassional yellow orange brown staining at 2.4 m.
							Becoming more gravelly at 2.5m with occasional gravel of flint
	2.80	D		2.80	20.76		Stiff pale grey orange brown mottled silty CLAY. Occasional fragments of fine sub-angular chalk and rare gravel of sub angular fine to coarse flint
							Hand Pen at 2.8m = 290kPa
	3.20	D					*Hand Pen at 3.2m = 330kPa*
				3.30	20.26		End of pit at 3.30 m

1 2 3 4 5

Remarks: Trial hole remained dry

Stability: Stable

AGS

Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA
[redacted]

Trial Pit Log

Trialpit No
TP103
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495059 - 106642 Level: 25.30	Date 21/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.20	Scale 1:25
Client: Dandara Commercial Ltd.			Logged SN

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES		0.10	25.20		Light brown, pale gravelly silty TOPSOIL with frequent rootlets. Gravel is of fine to coarse, sub-angular flints.
	0.40	ES					Pale light grey brown, very gravelly silt MADE GROUND. Gravel is of fine gravel to cobble sub-angular flints with rare brick fragments.
				0.60	24.70		Firm to stiff dark reddish brown very gravelly silty friable CLAY. Gravel is of angular to sub-rounded fine to coarse and cobbles of flint.
							Hand Pen at 0.8m = 280kPa
	1.00	D	N=27				
			N=18				*Becoming clayey gravel below 1.6m*
	1.80	D					*Hand Pen at 1.8m = 100kPa*
				2.00	23.30		Reworked white grey light brown chalk recovered as slightly gravelly SILT of chalk. Matrix is slightly sandy silt. Clasts are low density fine chalk.
				2.40	22.90		Stiff pale grey brown mottled orange thinly laminated CLAY with occasional fragments of fine chalk
	2.50	D					*Hand Pen at 2.5m = 430kPa*
							Hand Pen at 2.8m = 390kPa
	3.00	D					
				3.20	22.10		End of pit at 3.20 m

Remarks: Trial hole remained dry

Stability: Stable

AGS

Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA
[redacted]

Trial Pit Log

Trialpit No
TP104
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 494960 - 106741 Level: 23.64	Date 21/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.00	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged SN

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES					Brown grey very gravelly silt TOPSOIL with rootlets. Gravel is fine to coarse and cobbles of angular to sub rounded flint
	0.50	ES		0.43	23.21		Stiff / medium dense brown very gravelly silty CLAY / very clayey GRAVEL of fine to coarse and cobbles of angular to sub rounded flint with frequent rootlets
	0.80	D		0.84	22.80		*Hand Pen at 0.8m = 220kPa*
			N=22				Reworked white pale grey light brown mottled orange yellow chalk recovered as slightly gravelly sandy SILT of chalk. Matrix is slightly sandy silt. Clasts are low density fine to medium chalk.
	1.50	D	N=36	1.60	22.04		Stiff pale grey stained orange very silty thinly laminated silty CLAY with occasional fine fragments of chalk
							Hand Pen at 1.7m = 300kPa
	2.00	D					*Partings of orange silt noted below 1.9m*
	2.30	D					*Hand Pen at 2.2m = 180kPa*
							Becoming sandier below 2.3m
				2.40	21.24		Loose to medium dense pale grey brown and mottled orange yellow very silty clayey fine SAND
	2.70	D					*Soils moist below 2.4 m*
							Becoming brown orange below 2.8m with occasional gravel of fine rounded flint
	3.00	D		3.00	20.64		End of pit at 3.00 m

Remarks: Soils moist below 2.4m in the sands

Stability: Stable

AGS

Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA
[redacted]

Trial Pit Log

Trialpit No
TP105
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495052 - 106714 Level: 26.66	Date 21/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.10	Scale 1:25
Client: Dandara Commercial Ltd.			Logged SN

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.25	ES		0.20	26.46		Brown grey very gravelly silt TOPSOIL with rootlets. Gravel is fine to coarse and cobbles of angular to sub rounded flint
	0.40	ES		0.35	26.31		Pale grey/brown very silty gravel SUBSOIL. Gravel is of fine to coarse and cobbles of angular to sub-rounded flints.
							Stiff / medium dense brown very gravelly silty CLAY / very clayey GRAVEL of fine to coarse and cobbles of angular to sub rounded flint with occasional rootlets
	1.00	B	N=18				*Hand Pen at 1m = 300kPa*
			N=30				*Hand Pen at 1.5m = 170kPa*
							Becoming more gravelly at 1.8 m
	2.00	D					*Occasional very large cobbles of sub-rounded to sub-angular flint and becoming more clast dominated below 2.2m*
							Hand Pen at 2.5m = 270kPa
	3.00	D		2.90	23.76		Reworked white pale grey brown chalk recovered as sandy gravelly SILT of chalk. Matrix is sandy silt. Clasts are low density fine to medium chalk with occasional gravel of medium sub angular flint
				3.10	23.56		End of pit at 3.10 m

Remarks: Trial hole remained dry. Chalk outcropping on northern side of pit only

Stability: Stable

AGS

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[redacted]

Trial Pit Log

Trialpit No
TP105A
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495008 - 106726 Level: 25.80	Date 21/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.00	Scale 1:25
Client: Dandara Commercial Ltd.			Logged SN

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15	25.65		Dark brown silty TOPSOIL with frequent rootlets.
	0.20	ES		0.30	25.50		Pale grey/brown very silty gravel SUBSOIL. Gravel is of fine to coarse and cobbles of angular to sub-rounded flint.
	0.40	ES					Firm to stiff reddish brown very silty CLAY with fine-coarse sub-angular gravel of flint. *Hand Pen at 0.4m = 270kPa*
				0.80	25.00		Medium dense / stiff dark reddish brown very gravelly, silty friable CLAY. Gravel is of fine to coarse and cobbles of sub-rounded flint.
	1.00	B	N=15				
			N=20				
							Becoming lighter brown in colour below 1.8 m *Hand Pen at 1.8m = 120kPa*
	1.90	D		1.90	23.90		Reworked white pale grey, mottled orange / brown chalk recovered as very gravelly SILT of chalk. Matrix is silt. Clasts are low density fine to coarse chalk.
	2.30	D					*Becoming more clast dominated below 2.2m.*
							Clasts dominated below 2.5m. Grade Dc
	3.00	D		3.00	22.80		End of pit at 3.00 m

Remarks: Trial hole remained dry. Chalk outcroping on east side of pit at 1.9m and elsewhere at 2.2m

Stability: Stable

AGS

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[redacted]

Trial Pit Log

Trialpit No
TP106
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495015 - 106791 Level: 26.10	Date 21/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.20	Scale 1:25
Client: Dandara Commercial Ltd.			Logged SN

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15	25.95		Dark brown silty TOPSOIL with frequent rootlets.
	0.20	ES					Pale brown grey slightly sandy gravelly silt SUBSOIL. Gravel is of fine to coarse flint with occasional flint cobbles and rootlets.
	0.40	ES		0.35	25.75		Medium dense red brown very clayey silty GRAVEL of fine to coarse and cobbles of angular to sub-angular flint.
							Becoming more red in colour at 0.8 m
	1.00	B	N=15				
							Hand Pen at 1.2m = 140kPa
			N=17				
							Hand Pen at 1.8m = 100kPa
	2.00	D					
				2.30	23.80		Reworked pale grey white brown chalk recovered as pale grey white brown very silty GRAVEL of chalk. Matrix is silt. Clasts are low density fine to coarse sub-angular chalk.
	2.40	D					*Occassional yellow orange brown staining, very weathered and becoming matix dominated (Grade Dm) from 2.7 m*
	3.00	D					*Hand Pen at 3m = 280kPa*
				3.10	23.00		Stiff grey black dark orange brown very silty friable CLAY
	3.20	D		3.20	22.90		End of pit at 3.20 m

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP107
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495098 - 106755 Level: 27.95	Date 22/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 2.60	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES		0.20	27.75		Brown grey sandy gravelly silt TOPSOIL. Gravel of fine to coarse and cobbles of angular to sub-rounded flint with frequent rootlets.
	0.40	ES					Dense brown very silty clayey GRAVEL. Gravel is fine to coarse and cobbles of angular to sub-rounded flint. Partings of very gravelly CLAY. Frequent rootlets.
	1.00	D	N=36				
			N=11	1.40	26.55		Reworked pale grey white stained yellow light brown chalk recovered as gravelly SILT. Matrix is silt. Clasts are fine to coarse low density chalk. *Hand Pen at 1.5m = 200kPa* *Hand Pen at 1.6m = 120kPa*
	1.90	D					*Becoming clast dominated below 2.1m*
	2.50	D		2.40	25.55		Reworked pale grey white stained yellow chalk recovered as silty gravel of low density chalk.
				2.60	25.35		End of pit at 2.60 m

Remarks: Trial hole remained dry. No further progress below 2.6m as chalk was too hard to proceed. Scraping from 2.3-2.6m for 15 minutes

Stability: Stable

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Trial Pit Log

Trialpit No
TP108
Sheet 1 of 1

Project Name:	North [redacted]	ject No. LP01649	Co-ords: 494991 - 106847 Level: 24.34	Date 21/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.00	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged SN

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	24.14		Dark brown silty TOPSOIL with frequent rootlets.
	0.30	ES		0.40	23.94		Pale grey/brown very silty gravel SUBSOIL. Gravel is fine to cobbles of angular to sub-rounded flints.
	0.50	ES					Firm to stiff dark brown very gravelly and silty CLAY. Gravel is fine to coarse with occasional cobbles of angular to sub-rounded flint.
	0.90	D	N=12				*Hand Pen at 0.8m = 120kPa*
				1.10	23.24		Reworked pale grey white, yellow brown chalk recovered as very gravelly SILT. Matrix is silt. Clasts are of low density fine to coarse sub-angular chalk.
	1.50	D	N=41				
				2.50	21.84		Stiff light grey dark brown and orange silty friable fossiliferous CLAY with frequent shell fragments
							Clay noted to be very weathered with a brown/black/yellowish color from 2.5-2.7m
							Hand Pen at 2.8m = 310kPa
	3.00	D		3.00	21.34		*Hand Pen at 3m = 260kPa*
							End of pit at 3.00 m

Remarks: Groundwater inflow at 2.4m. Groundwater at 2.7m after 10 minutes on completion of pitting.

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP109
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495041 - 106867 Level: 26.75	Date 22/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.20	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	26.45		Brown grey very gravelly sandy silty TOPSOIL with frequent rootlets. Gravel of fine to coarse angular to rounded flint.
	0.50	ES		0.60	26.15		Medium dense brown red silty clayey GRAVEL. Gravel is fine to coarse and cobbles of angular to sub-rounded flint.
	0.80	D	N=11				Firm to stiff brown red silty very gravelly CLAY. Gravel is ravel is fine to coarse and cobbles of angular to sub-rounded flint. *Hand Pen at 0.8m = 140kPa*
	1.50	D	N=9	1.30	25.45		Reworked light brown yellow white chalk recovered as slightly gravelly SILT of chalk. Matrix is silt. Clasts are fine to medium low density chalk with rare gravel of medium angular flint. *Hand Pen at 1.5m = 100kPa*
	2.50	D		2.00	24.75		Reworked light brown yellow white chalk recovered as silty GRAVEL of low density chalk.
	3.00	D		2.80	23.95		Stiff brown pale grey mottled red brown yellow very silty thinly laminated CLAY with frequent fine chalk and shell fragments *Hand Pen at 3m = 300kPa*
				3.20	23.55		End of pit at 3.20 m

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP110
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495086 - 106894 Level: 28.40	Date 23/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 2.90	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES		0.20	28.20		Grass over brown gravelly silt TOPSOIL. Gravel of fine to coarse sub-angular to sub-rounded flint. Frequents roots and rootlets.
	0.30	ES					Medium dense to dense brown reddish very silty very clayey GRAVEL. Gravel is of fine to coarse and cobbles of sub-rounded to angular flint.
	0.50	D					*Very silty very gravelly clay at 0.5m*
							Hand Pen at 1m = 220kPa
							Occasional cobbles of angular to sub angular flint below 1.2m
	1.50	B					
	2.60	D					
				2.90	25.50		End of pit at 2.90 m

1 2 3 4 5

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP110A
Sheet 1 of 1

Project Name:	Northfie[redacted]	Project No. LP01649	Co-ords: 495037 - 106924 Level: 25.85
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Dimensions (m): Depth 2.50	Date 22/05/2018 Scale 1:25
Client:	Dandara Commercial Ltd.		Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES		0.20	25.65		Brown grey very gravelly sandy silty TOPSOIL with frequent rootlets. Gravel of fine to coarse angular to rounded flint.
	0.40	ES					Stiff brown red very gravelly silty CLAY with occasional rootlets. Gravel is fine to coarse and cobbles of angular to rounded flint.
	0.50	D		0.60	25.25		Medium dense brown red very clayey GRAVEL / very gravelly CLAY. ravel is fine to coarse and cobbles of angular to rounded flint.
			N=54				*Hand Pen at 0.6m = 200kPa*
				1.40	24.45		Reworked light brown yellow white chalk recovered as slightly gravelly SILT of chalk. Matrix is silt. Clasts are fine to medium low density chalk with rare gravel of medium angular flint.
	1.50	B	N=10				*Hand Pen at 1.5m = 160kPa*
	1.80	D					*Becoming grade Dc below 2.0m*
							Clasts becoming fine to coarse and cobbles of chalk below 2.2m
				2.30	23.55		Reworked light brown yellow white chalk recovered as silty GRAVEL of low density chalk.
				2.50	23.35		*Clasts becoming low to medium density below 2.4m* End of pit at 2.50 m

Remarks: Trial hole remained dry No further progress below 2.5m as chalk was too hard to proceed. Scraping from 2.3-2.5m for 15 minutes

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP111
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495118 - 106930 Level: 29.57	Date 22/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 2.80	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES		0.27	29.30		Brown grey very gravelly sandy silty TOPSOIL with frequent rootlets. Gravel of fine to coarse angular to rounded flint.
	0.45	ES					Dense brown slightly clayey silty GRAVEL. Gravel of fine to coarse and cobbles of rounded to angular flint.
	0.90	D	N=43				
			N=45				
	1.60	B					
	2.80	D		2.80	26.77		End of pit at 2.80 m

1
2
3
4
5

Remarks: Trial hole remained dry. No further progress below 2.8m as gravels were too dense to proceed. Scraping below 2.5m for 15 minutes

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP112
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495163 - 106990 Level: 31.08	Date 22/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 2.30	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.15	ES		0.32	30.76		Brown grey very gravelly sandy silty TOPSOIL with frequent rootlets. Gravel of fine to coarse angular to rounded flint.
	0.50	ES					Dense brown slightly clayey silty GRAVEL. Gravel is of fine to coarse and cobbles of rounded to angular flint.
	0.90	B	N=53				
			N=71				
	1.80	D					
				2.30	28.78		End of pit at 2.30 m

Remarks: Trial hole remained dry. No further progress below 2.3m as gravels were too dense to proceed. Scraping below 2.0m for 15 minutes

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP113
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495175 - 106671 Level: 26.70	Date 23/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.00	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES					Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
				0.40	26.30		Medium dense brown very silty very clayey GRAVEL. Gravel of fine to coarse and cobbles of rounded to sub-rounded flint with occasional rootlets.
	0.60	ES					*Gravelly clay at 0.8m*
			N=19				*Hand Pen at 0.9m = 120kPa*
	1.00	D					
							Hand Pen at 1.8m = 70kPa
	2.40	D		2.40	24.30		Reworked light brown yellow white orange stained chalk recovered as silty GRAVEL of low density chalk. *Bands of medium to coarse and cobbles of angular flint noted within the chalk*
				3.00	23.70		End of pit at 3.00 m

1 2 3 4 5

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP114
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	ect No. LP01649	Co-ords: 495226 - 106652 Level: 25.86	Date 23/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.10	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES					Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
	0.50	ES		0.43	25.43		Dense brown reddish very clayey GRAVEL. Gravel of fine to coarse and cobbles of sub-rounded to angular flint with occasional rootlets.
							Becoming gravelly clay below 0.8m
	1.00	B	N=19				*Hand Pen at 1.1m = 190kPa*
			N=41	1.45	24.41		Reworked pale grey white stained orange brown chalk recovered as gravelly SILT of chalk. Clasts are fine to coarse low density chalk and medium to coarse angular to sub angular flint.
							Becoming clayey gravels below 1.6m
	2.20	B					*Orange yellow staining at 2.4m*
							Becoming more clast dominated and possibly structured below 2.3m
				2.60	23.26		Stiff grey stained orange thinly laminated slightly gravelly silty CLAY. Gravel is fine low density chalk with occasional shell fragments
	3.00	B					*Hand Pen at 2.9m = 320kPa*
				3.10	22.76		End of pit at 3.10 m

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP115
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495269 - 106658 Level: 25.48	Date 23/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.20	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.15	ES					Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
				0.30	25.18		Stiff / medium dense brown and mottled orange very silty gravelly CLAY. Gravel is fine to coarse and cobbles of sub-rounded to angular flint with occasional rootlets.
	0.50	ES					
	1.00	D	N=10				*Hand Pen at 0.9m = 130kPa*
			N=43	1.40	24.08		Reworked pale grey white stained yellow orange chalk recovered as gravelly SILT of chalk. Matrix is silt. Clasts are low density fine to medium chalk and angular medium to coarse flint.
							Becoming Grade Dc below 1.7m
				2.00	23.48		Reworked light brown yellow white chalk recovered as silty GRAVEL of low density chalk.
	2.20	D					*Becoming Structureless Grade Dm at 2.7m*
				2.90	22.58		Stiff pale grey orange brown and dark grey very silty slightly sandy CLAY with fine gravel of low density chalk
	3.00	D					*Hand Pen at 3m = 120kPa*
				3.20	22.28		End of pit at 3.20 m

Remarks: Trial hole remained dry

Stability: Stable

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Trial Pit Log

Trialpit No
TP116
Sheet 1 of 1

Project Name:	Nort[redacted].	Co-ords: 495170 - 106729 Level: 27.75	Date 22/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Dimensions (m): Depth 3.00	Scale 1:25
Client:	Dandara Commercial Ltd.		Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.15	ES		0.33	27.42		Brown grey sandy gravelly silt TOPSOIL. Gravel of fine to coarse and cobbles of angular to sub-rounded flint with frequent rootlets.
	0.50	ES					Dense brown red very silty clayey GRAVEL. Gravel is fine to coarse and cobbles of angular to sub-rounded flint. Partings of very gravelly CLAY. Frequent rootlets.
	1.00	B	N=49				
			N=41				*Becoming lighter in color below 1.5m*
	2.00	D					
	3.00	D		3.00	24.75		End of pit at 3.00 m

Remarks: Trial hole remained dry

Stability: Stable

AGS

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[redacted]

Trial Pit Log

Trialpit No
TP117
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495291 - 106688 Level: 25.70	Date 23/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.10	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.40	25.30		Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
	0.60	ES					Dense brown reddish very clayey GRAVEL. Gravel of fine to coarse and cobbles of sub-rounded to angular flint with occasional rootlets.
	1.00	B	N=42				
			N=21	1.70	24.00		
	1.80	D					Reworked pale grey white and mottled orange chalk recovered as gravelly SILT of chalk. Matrix is silt. Clasts are fine to coarse low density chalk.
				2.00	23.70		Stiff pale grey mottled orange thinly laminated silty CLAY with occasional gravel of low density fine chalk and rare shell fragments
	2.20	D					*Hand Pen at 2.1m = 280kPa*
							Hand Pen at 2.5m = 270kPa
				2.70	23.00		Loose to medium dense pale brown grey and mottled orange very silty fine SAND / very sandy SILT
	3.00	D					*Soils noted to be moist below 2.7.m*
				3.10	22.60		End of pit at 3.10 m

Remarks: Soils were noted to be moist below 2.7m

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP118
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495182 - 106771 Level: 28.33
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Dimensions (m): Depth 3.10	Date 22/05/2018 Scale 1:25
Client:	Dandara Commercial Ltd.		Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES					Brown grey sandy gravelly silt TOPSOIL. Gravel of fine to coarse and cobbles of angular to sub-rounded flint with frequent rootlets.
				0.33	28.00		Firm to stiff brown very silty CLAY with frequent rootlets. Occasional gravel of fine to coarse sub-angular to rounded flint.
	0.50	ES					*Hand Pen at 0.6m = 150kPa*
	0.70	D					
				1.00	27.33		Dense brown and red very gravelly silty CLAY. Gravel is of fine to coarse sub-angular to rounded flint.
			N=35				
			N=30				
	1.50	D					*Hand Pen at 1.5m = 110kPa*
				2.00	26.33		Reworked pale grey stained yellow orange chalk recovered as very gravelly SILT of chalk. Matrix is sandy silt. Clasts are low density fine to medium chalk with occasional gravel of medium to coarse sub angular to sub rounded flint.
	2.20	D					*Becoming more clast dominated (Grade Dc) below 2.3m*
				3.10	25.23		End of pit at 3.10 m

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP119
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495238 - 106750 Level: 27.80	Date 23/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.10	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	27.50		Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
	0.50	ES					Medium dense / stiff brown very silty very gravelly CLAY. Gravel is fine to coarse and cobbles of sub-angular to angular flint with occasional rootlets.
							Hand Pen at 0.5m = 170kPa
							More gravelly below 0.8m
	1.00	D	N=32				
							Clayey gravel at 1.2m
	1.80	B					
				2.80	25.00		Reworked pale grey white stained orange brown chalk recovered as gravelly SILT of chalk. Clasts are fine to coarse low density chalk and medium to coarse angular to sub angular flint.
	3.00	D					
				3.10	24.70		End of pit at 3.10 m

1 2 3 4 5

Remarks: Trial hole remained dry

Stability: Stable

AGS

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[redacted]

Trial Pit Log

Trialpit No
TP120
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495271 - 106734 Level: 27.09	Date 23/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.00	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.15	ES					Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
	0.50	ES		0.45	26.64		Stiff brown very silty very gravelly CLAY. Gravel is fine to coarse and cobbles of angular to sub-rounded flint. Occasional rootlets.
	0.70	D	N=35				*Hand Pen at 0.8m = 130kPa*
							Becoming very clayey gravel with no rootlets at 1.2m
			N=18				
				1.80	25.29		Reworked pale grey white and orange chalk recovered as gravelly SILT of chalk. Matrix is silt. Clasts are fine to coarse low density chalk and occasional gravel of fine to coarse angular to sub angular flint.
	2.00	D					*Becoming more clast dominated below 2.3m*
	2.60	D		2.50	24.59		Reworked light brown yellow white chalk recovered as silty GRAVEL of low density chalk.
				3.00	24.09		End of pit at 3.00 m

1 2 3 4 5

Remarks: Trial hole remained dry

Stability: Stable

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Trial Pit Log

Trialpit No
TP121
Sheet 1 of 1

Project Name:	North [redacted]	Project No. P01649	Co-ords: 495315 - 106720 Level: 25.88	Date 23/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 2.60	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES					Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
	0.35	ES		0.29	25.59		Brown very silty clayey GRAVEL. Gravel is fine to coarse and cobbles of rounded to sub-rounded flint. Occasional rootlets.
	0.80	D	N=32				*Hand Pen at 0.8m = 170kPa*
	1.60	D		1.50	24.38		Stiff pale brown grey orange stained slightly gravelly very silty CLAY. Gravel is fine fragments of chalk and subrounded flint with occasional shell fragments *Hand Pen at 1.6m = 180kPa* *Becoming more gravelly at 2.0m* *Hand Pen at 2.2m = 250kPa*
	2.50	B		2.40	23.48		Loose brown red orange and pale grey very silty clayey fine SAND / sandy SILT. *Soils noted to be moist below 2.4m*
				2.60	23.28		End of pit at 2.60 m

Remarks: Soils were noted to be moist below 2.4. No further progress below 2.6m due to collapsing sides

Stability: Trial pit walls collapsing below 2.3m

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[redacted]

Trial Pit Log

Trialpit No
TP123
Sheet 1 of 1

Project Name: North [redacted]	Project No. LP01649	Co-ords: 495278 - 106794 Level: 28.20	Date 22/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 3.00	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES					Dark brown very silty gravelly sand MADE GROUND. Gravel is fine to coarse angular flint with occasional brick and clinker fragments. Occasional roots, rootlets and organic staining
				0.40	27.80		
	0.60	ES					Brown very silty gravelly reworked clay MADE GROUND with gravel of flint, chalk and occasional brick fragments
			N=48	1.00	27.20		Firm to stiff / dense brown red silty very gravelly CLAY. Gravel is ravel is fine to coarse and cobbles of angular to sub-rounded flint.
	1.30	D					*Hand Pen at 1m = 120kPa* *Hand Pen at 1.3m = 200kPa* *Becoming lighter in color at 1.5m*
	2.00	D					*Becoming very gravelly clay at 2.0m* *Hand Pen at 2.4m = 130kPa*
				2.50	25.70		Reworked light brown yellow white chalk recovered as slightly gravelly SILT of chalk. Matrix is silt. Clasts are fine to medium low density chalk with rare gravel of medium angular flint.
	3.00	D		3.00	25.20		End of pit at 3.00 m

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP124
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	t No. LP01649	Co-ords: 495327 - 106823 Level: 28.15	Date 23/05/2018
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 2.60	Scale 1:25
Client:	Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.15	ES		0.25	27.90		Grass over brown gravelly silt TOPSOIL. Gravel of fine to coarse sub-angular to sub-rounded flint. Frequents roots and rootlets.
	0.40	ES					Medium dense brown reddish very silty very clayey GRAVEL. Gravel of fine to coarse and cobbles of sub-rounded to angular flint.
	1.00	B	N=17				*Hand Pen at 1m = 160kPa*
			N=36				*Occasional partings of very gravelly silty clay below 1.5m*
				1.60	26.55		*Hand Pen at 1.5m = 190kPa*
	1.80	D					Reworked pale grey white pale brown chalk recovered as gravelly SILT of chalk. Clasts are low density fine to coarse chalk with occasional gravel of flint.
							Cobbles of sub rounded to sub angular flint noted within the chalk
							Becoming Grade Dc and possibly structured bvelow 2.3m
	2.60	D		2.60	25.55		End of pit at 2.60 m

Remarks: Trial hole remained dry. No further progress below 2.6m as chalk was too hard to proceed. Scraping from 2.3-2.6m for 15 minutes

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP125
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495367 - 106797 Level: 27.65
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Dimensions (m): Depth 3.00	Date 23/05/2018 Scale 1:25
Client:	Dandara Commercial Ltd.		Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES					Brown grey very gravelly silty sand TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint with frequent rootlets.
				0.35	27.30		
	0.50	ES					Dense brown very silty clayey GRAVEL, interbedded with stiff very gravelly silty CLAY. Gravel is fine to coarse and cobbles of rounded to sub-rounded flint. Occasional rootlets.
	1.00	B	N=34				*Hand Pen at 1m = 100kPa*
							No rootlets below 1.5m *Hand Pen at 1.5m = 220kPa*
	2.00	B					*Becoming red in color at 2.0m*
							Becoming gravelly clay at 2.5m *Hand Pen at 2.5m = 150kPa*
				3.00	24.65		End of pit at 3.00 m

1 2 3 4 5

Remarks: Trial hole remained dry

Stability: Stable

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[redacted]

Trial Pit Log

Trialpit No
TP126
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495428 - 106746 Level: 27.24	Date 24/05/2018
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Dimensions (m): Depth 1.00	Scale 1:25
Client: Dandara Commercial Ltd.			Logged JB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.33	26.91		Brown grey very gravelly silty sand with gravel of fine to coarse and cobbles of flint, brick. With rootlets and rare clinker. MADE GROUND
				1.00	26.24		Medium dense to dense brown reddish very silty very gravelly CLAY. Gravel is of fine to coarse and cobbles of sub-rounded to angular flint.
							End of pit at 1.00 m

Remarks: Trial hole remained dry. Hand dug to 1.0m. No access for Excavator.

Stability: Stable

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Borehole Log

Borehole No.
WS101
Sheet 1 of 2

Project Name:	No[redacted] oject No. 01649	Co-ords: 495458 - 106779	Hole Type WS
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.	Level: 28.10	Scale 1:20
Client:	Dandara Commercial Ltd.	Dates: 25/05/2018 - 25/05/2018	Logged By SN

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	ES		0.25	27.85		Grass over dark brown gravelly silt TOPSOIL. Gravel of fine to coarse angular to sub-rounded flints. Frequent roots and rootlets.	
		0.40	ES					Firm brown slightly gravelly sandy CLAY. Gravel of fine to coarse angular to sub-rounded flint.	
		0.50	D					*Hand Pen at 0.5m =140kPa*	
					0.70	27.40		Firm to stiff reddish brown very gravelly silty CLAY. Gravel is of fine to coarse and occasional cobbles of angular to sub-rounded flint.	
W		1.00		N=18 (5,6/5,5,5,3)				*Becming more gravelly.*	1
		1.50	D					*Hand Pen at 1.7m =215kPa*	
		2.00		N=26 (2,6/6,7,6,7)				*Becming more gravelly.*	2
		3.00		N=10 (1,1/1,1,4,4)	3.00	25.10		Loose to medium dense dark brown and pale yellow brown silty clayey SAND.	3
		3.20	D						
					3.30	24.80		Reworked chalk recovered as pale grey white brown slightly gravelly SILT. Clasts are low density, fine to medium sub-angular chalk.	
		3.80	D						
	▼	4.00		N=16 (5,5/6,4,2,4)	4.00	24.10		Continued on next sheet	4

Remarks
Wet from 4.0m. Borehole remained stable. Well installed with 1m of plain pipe and 3m of slotted pipe with silt stocking.

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[redacted]

Borehole Log

Borehole No. **WS101**
Sheet 2 of 2

Project Name: [redacted] LP01649		Co-ords: 495458 - 106779	Hole Type WS
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 28.10	Scale 1:20
Client: Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018	Logged By SN

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					4.10	24.00		Medium dense brown slightly clayey fine SAND.
								Reworked chalk recovered as pale grey white brown slightly gravelly SILT. Clasts are low density, fine to medium sub-angular chalk.
					4.70	23.40		
		4.80	D					Firm pale grey orange brown mottled very sandy CLAY.
								Hand Pen at 4.8m =145kPa
		5.00		N=7 (0,1/1,2,2,2)	5.00	23.10		Loose to medium dense brown slightly clayey fine SAND. Very wet.
								Becoming less clayey.
		6.00		N=14 (0,0/2,4,4,4)	6.00	22.10		End of borehole at 6.00 m

Remarks
Wet from 4.0m. Borehole remained stable. Well installed with 1m of plain pipe and 3m of slotted pipe with silt stocking.

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Borehole Log

Borehole No. **WS102**
Sheet 1 of 2

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495310 - 106639	Hole Type WS
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 24.29	Scale 1:20
Client: Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018	Logged By SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.10	ES					Grass over dark brown gravelly silt TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint. Frequent roots and rootlets.
					0.20	24.09		Mid brown very clayey silty GRAVEL. Gravel is of fine to coarse and cobbles of angular to sub-rounded flint.
		0.30	ES					
		0.80	D					*Hand Pen at 0.8m =270kPa*
W		1.00		N=11 (1,1/2,2,3,4)	1.00	23.29		Stiff mid brown occasional mottled black very gravelly silty CLAY. Gravel of fine to coarse, angular to sub-rounded flint.
		1.20	D					*Hand Pen at 1m =255kPa*
								Hand Pen at 1.5m =245kPa
					1.90	22.39		Loose to medium dense light brown occasional orange brown and dark brown mottled slightly clayey fine SAND.
		2.00		N=10 (1,2/2,3,2,3)				
								Becoming more clayey.
		2.50	D					
		3.00		N=6 (1,2/1,2,2,1)				
		3.50	D					
	▼	4.00		N=12 (2,2/2,2,3,5)	4.00	20.29		

Continued on next sheet

Remarks
Very wet from 4.0m. Collapsing below 3.0m. Well installed with 1m of plain pipe and 2m of slotted pipe with silt stocking.

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[redacted]

Borehole Log

Borehole No.
WS102
Sheet 2 of 2

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495310 - 106639
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 24.29
Client:	Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018

Hole Type: WS
Scale: 1:20
Logged By: SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
								No recovery *SPT at 4.0m recovered as stiff light grey red and brown mottled slightly sandy CLAY.*
		5.00		N=19 (2,3/3,4,6,6)	5.00	19.29		Medium dense light brown fine SAND with occasional partings of light and dark brown slightly clayey sand. Very wet. Poor recovery.
		6.00		N=22 (3,3/4,4,6,8)	6.00	18.29		End of borehole at 6.00 m

5
6
7
8

Remarks
Very wet from 4.0m. Collapsing below 3.0m. Well installed with 1m of plain pipe and 2m of slotted pipe with silt stocking.

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[redacted]

Borehole Log

Borehole No. **WS103**
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495348 - 106693
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 25.00
Client:	Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018

Hole Type: WS
Scale: 1:20
Logged By: SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.10	ES		0.20	24.80		Grass over dark brown gravelly silt TOPSOIL. Gravel is of fine to coarse angular to sub-rounded flint. Frequent roots and rootlets.
		0.30	ES					Firm mid-brown very gravelly silty CLAY. Gravel is of fine-coarse and occasional cobbles of angular to sub-rounded flint and chalk. Occasional black mottling.
								Hand Pen at 0.6m =207kPa
		0.90	D					
		1.00		N=8 (2,1/2,2,2,2)				
					1.20	23.80		Firm grey mottle brown and white sandy CLAY.
		1.50	D					*Hand Pen at 1.5m =237kPa*
					1.90	23.10		Soft light brown, grey-black mottled very sandy CLAY
		2.00	D					*Hand Pen at 1.9m =87kPa*
	▼	2.00		N=9 (1,2/2,2,2,3)				
					2.20	22.80		Loose to medium dense light grey and orange brown mottled clayey SAND. Wet.
		2.40	D					
		3.00		N=12 (1,3/2,3,4,3)	3.00	22.00		End of borehole at 3.00 m

Remarks
Very wet from 2.2m. Borehole remained stable.

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[redacted]

Borehole Log

Borehole No.
WS104
Sheet 1 of 1

Project Name: [redacted]	No. LP01649	Co-ords: 495218 - 106881	Hole Type WS
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 29.05	Scale 1:20
Client: Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018	Logged By SN

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.25	28.80		Grass over dark brown gravelly silt TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint. Frequent roots and rootlets.
		0.50	ES					Medium dense to dense brown clayey very silty GRAVEL. Gravel is of fine to coarse and cobbles of angular to sub-rounded flint.
		1.00		N=25 (2,5/6,6,6,7)				
		1.60	D					
		2.00		N=31 (7,8/10,7,6,8)				
		2.90	D					
		3.00		N=18 (7,6/5,5,5,3)	3.00	26.05		End of borehole at 3.00 m

Remarks
Dry and Stable.

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Borehole Log

Borehole No. **WS105**
Sheet 1 of 2

Project Name: [redacted]	Project No. LP01649	Co-ords: 494929 - 106629	Hole Type WS
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 21.69	Scale 1:20
Client: Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018	Logged By SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.15	ES					Grass over dark brown gravelly silt TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint. Frequent roots and rootlets.
					0.25	21.44		
		0.40	ES					Firm to stiff brown slightly sandy, slightly gravelly CLAY with occasional rootlets. Gravel is of fine to coarse and cobbles of sub-angular to sub-rounded flint.
								Hand Pen at 0.4m =203kPa
					0.60	21.09		
		0.70	D					Firm to stiff brown very gravelly silty CLAY with gravel of fine to coarse and cobbles of angular to sub-rounded flint.
								Hand Pen at 0.8m =225kPa
W		1.00		N=7 (1,1/1,2,2,2)				
					1.10	20.59		Firm to stiff pale grey orange brown mottled slightly sandy, slightly gravelly, silty CLAY. Gravel is of fine to coarse sub-angular to sub-rounded chalk.
								Hand Pen at 1.6m =183kPa
		2.00		N=3 (1,0/1,0,2,0)	2.00	19.69		Loose to medium dense light brown and grey clayey fine to medium SAND. Occasionally dark brown and mottled. Very wet at 2-2.1 m.
		2.80	D					
	▼	3.00		N=2 (1,0/1,0,1,0)				*Poor Recovery (20%)*
					3.90	17.79		Medium dense grey very clayey fine SAND with
		4.00		N=17 (2,3/4,4,5,4)				

Continued on next sheet

Remarks
Wet from 3m, collapsing from 4m Poor recovery 3-5 m. Well installed with 1m of plain pipe and 3m pipe of slotted with silt stocking. Installed 1m proud of ground level

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[redacted]

Borehole Log

Borehole No.
WS105
Sheet 2 of 2

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 494929 - 106629
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 21.69
Client:	Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018

Hole Type: WS
Scale: 1:20
Logged By: SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
								cobbles of sub-angular flint. *No Recovery*
		5.00		N=11 (1,1/2,2,3,4)	5.00	16.69		End of borehole at 5.00 m

5
6
7
8

Remarks
Wet from 3m, collapsing from 4m Poor recovery 3-5 m. Well installed with 1m of plain pipe and 3m pipe of slotted with silt stocking. Installed 1m proud of ground level

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Borehole Log

Borehole No.
WS106
Sheet 1 of 1

Project Name: Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495418 - 106857	Hole Type WS
Location: Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 29.10	Scale 1:20
Client: Dandara Commercial Ltd.		Dates: 24/05/2018 - 24/05/2018	Logged By JB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES					Grass over dark brown gravelly silt TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint. Frequent roots and rootlets.
					0.30	28.80		Mid brown very clayey silty GRAVEL. Gravel of fine to coarse and cobbles of angular to sub-rounded flint.
		0.50	ES					
					1.00	28.10		End of borehole at 1.00 m

1
2
3
4

Remarks
No access for rig. Hand dug to 1.0m. Dry and Stable.

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[redacted]

Borehole Log

Borehole No. **WS107**
Sheet 1 of 2

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495036 - 106945
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 25.27
Client:	Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018

Hole Type: WS
Scale: 1:20
Logged By: SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.15	ES		0.25	25.02		Grass over dark brown gravelly silt TOPSOIL. Gravel of fine to coarse angular to sub-rounded flint. Frequent roots and rootlets.
		0.40	ES					Stiff brown very silty very gravelly CLAY. Gravel of fine to coarse occasional cobbles of angular to sub-rounded flint. Occasional roots and rootlets.
								Rare brick fragments at 0.35 m
		0.70	D					*Hand Pen at 0.6m =195kPa*
								Becoming more gravelly from 0.9m
		1.00		N=5 (1,1/1,1,2,1)				
								Hand Pen at 1.4m =155kPa
		2.00		N=8 (2,2/1,2,3,2)				
					2.70	22.57		Medium dense pale yellowish-brown / orange-brown gravelly SAND. Gravel of medium to coarse and cobbles of rounded to angular flint and medium to coarse sand.
		3.00		N=24 (6,4/6,6,6,6)				*Becoming less gravelly from 3m*
		3.80	D					
	▼	4.00		N=11 (4,3/3,3,2,3)	4.00	21.27		

Continued on next sheet

Remarks
Wet below 4 m but stable. Poor recovery below 4.0m Borehole terminated at 5.0m due to damaged rods. Well installed with 1 m of plain pipe and 3m of slotted pipe, with silt stocking. Installed 1m proud of ground level.

AGS

Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA

Borehole Log

Borehole No.
WS107
Sheet 2 of 2

Project Name:	No[redacted]	Project No. LP01649	Co-ords: 495036 - 106945
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 25.27
Client:	Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018

Hole Type: WS
Scale: 1:20
Logged By: SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
								Brown sandy slightly silty GRAVEL. Gravels of fine to coarse, occasional cobbles of angular to rounded flints. Wet.
								Poor Recovery and wet from 4 m
					5.00	20.27		End of borehole at 5.00 m

5
6
7
8

Remarks
Wet below 4 m but stable. Poor recovery below 4.0m Borehole terminated at 5.0m due to damaged rods. Well installed with 1 m of plain pipe and 3m of slotted pipe, with silt stocking. Installed 1m proud of ground level.

AGS

Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA
[redacted]

Borehole Log

Borehole No.
WS108
Sheet 1 of 1

Project Name:	Northfield Cottages, Fontwell	Project No. LP01649	Co-ords: 495189 - 106997
Location:	Land at Fontwell, Arundel, West Sussex, BN18 0SW.		Level: 31.43
Client:	Dandara Commercial Ltd.		Dates: 25/05/2018 - 25/05/2018

Hole Type: WS
Scale: 1:20
Logged By: SN

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
								Dark and light brown and grey slightly gravelly very sandy silt MADE GROUND. Gravel of fine to coarse, angular to sub-rounded flints. Occasional roots and rootlets and glass fragments.
					0.60	30.83		Firm brown slightly gravelly very silty CLAY. Friable. Gravel of fine to coarse, sub-angular to sub-rounded flint.
					1.00	30.43		End of borehole at 1.00 m

Remarks
No access for rig. Hand dug to 1.0m. Dry and Stable.

AGS

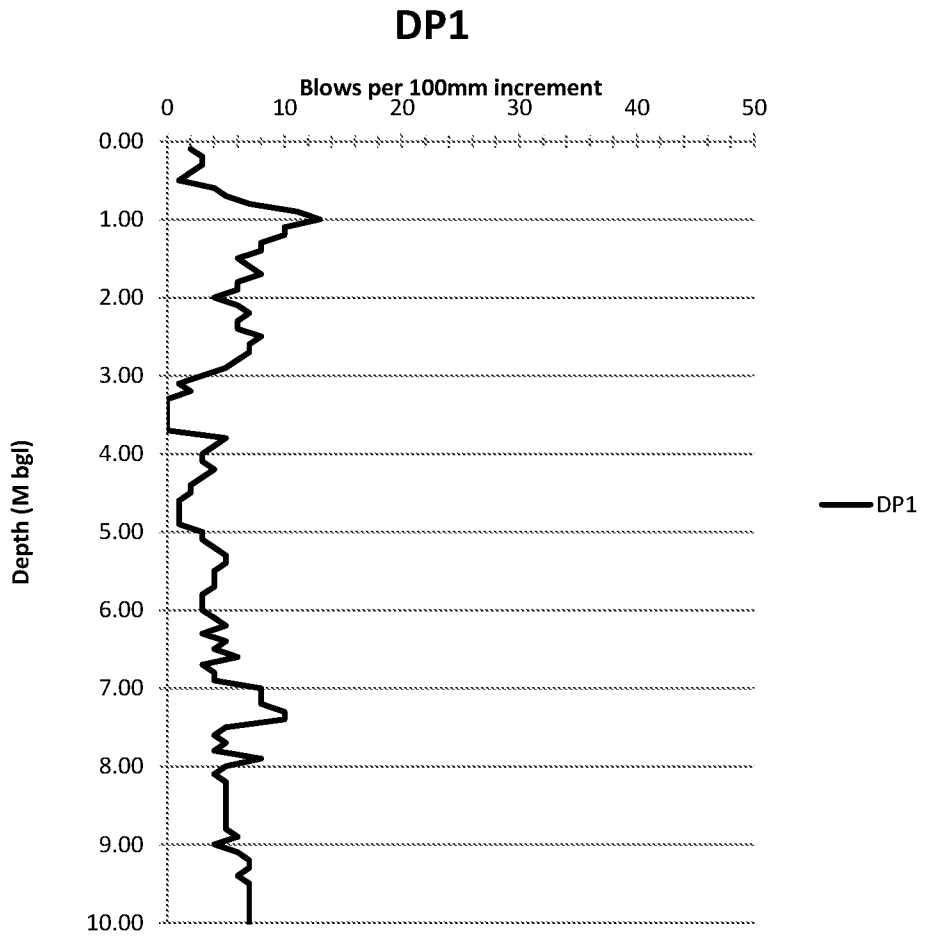
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP1

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	2	3	3	2	1	4	5	7	11	13	
1 - 2m	10	10	8	8	6	7	8	6	6	4	
2 - 3m	6	7	6	6	8	7	7	6	5	3	
3 - 4m	1	2	0	0	0	0	0	5	4	3	
4 - 5m	3	4	3	2	2	1	1	1	1	3	
5 - 6m	3	4	5	5	4	4	4	3	3	3	
6 - 7m	4	5	3	5	4	6	3	4	4	8	
7 - 8m	8	8	10	10	5	4	5	4	8	5	
8 - 9m	4	5	5	5	5	5	5	5	6	4	
9 - 10m	6	7	7	6	7	7	7	7	7	7	
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



Oakland Site Investigation [redacted]
Registered Office Address: Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

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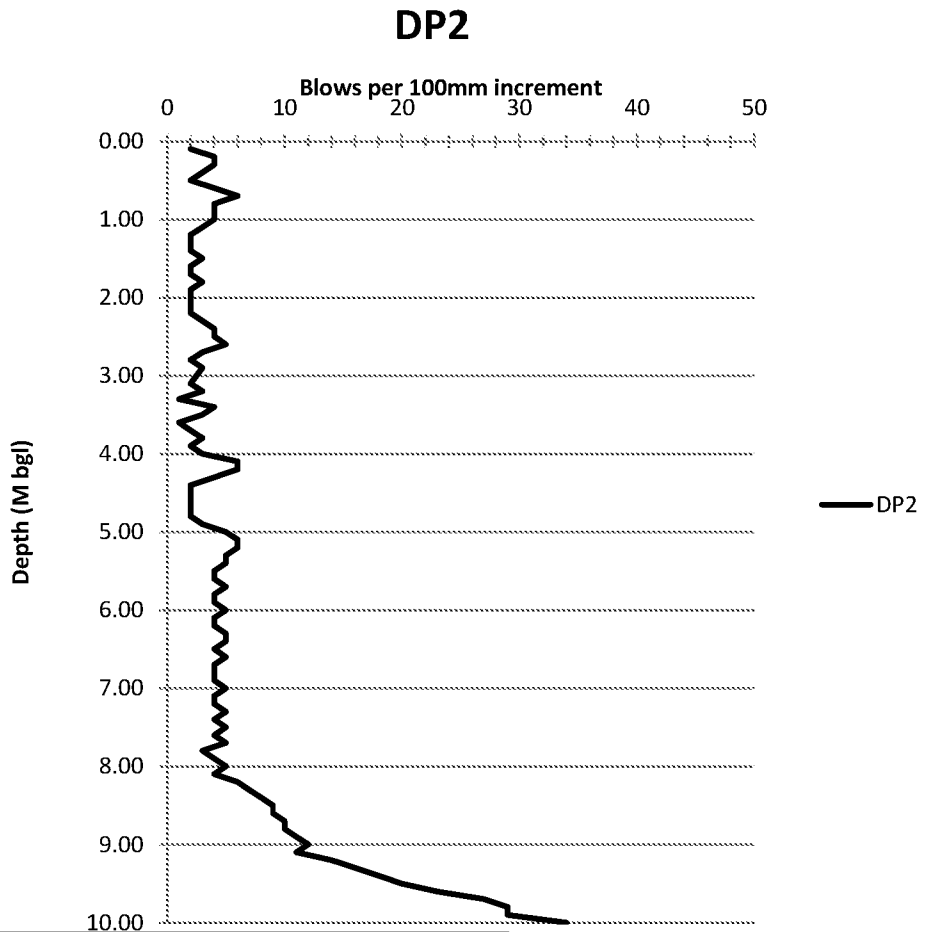
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP2

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	2	4	4	3	2	4	6	4	4	4	
1 - 2m	3	2	2	2	3	2	2	3	2	2	
2 - 3m	2	2	3	4	4	5	3	2	3	2	
3 - 4m	2	3	1	4	3	1	2	3	2	3	
4 - 5m	6	6	4	2	2	2	2	2	3	5	
5 - 6m	6	6	5	5	4	4	5	4	4	5	
6 - 7m	4	4	5	5	4	5	4	4	4	5	
7 - 8m	4	4	5	4	5	4	5	3	4	5	
8 - 9m	4	6	7	8	9	9	10	10	11	12	
9 - 10m	11	14	16	18	20	23	27	29	29	34	
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



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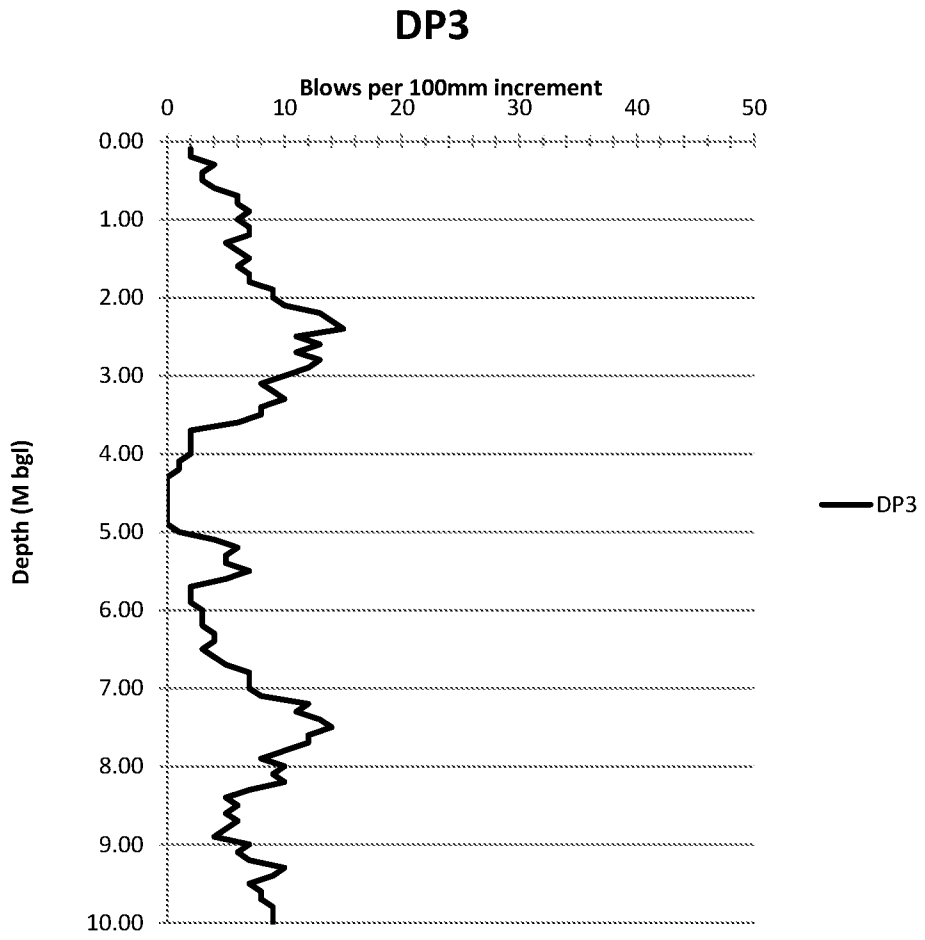
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP3

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	2	2	4	3	3	4	6	6	7	6	
1 - 2m	7	7	5	6	7	6	7	7	9	9	
2 - 3m	10	13	14	15	11	13	11	13	12	13	
3 - 4m	8	9	10	8	8	6	2	2	2	2	
4 - 5m	1	1	0	0	0	0	0	0	0	1	
5 - 6m	4	6	5	5	7	5	2	2	2	3	
6 - 7m	3	3	4	4	3	4	5	7	7	7	
7 - 8m	8	12	11	13	14	12	12	10	8	10	
8 - 9m	9	10	7	5	6	5	6	5	4	7	
9 - 10m	6	7	10	9	7	8	8	9	9	9	
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



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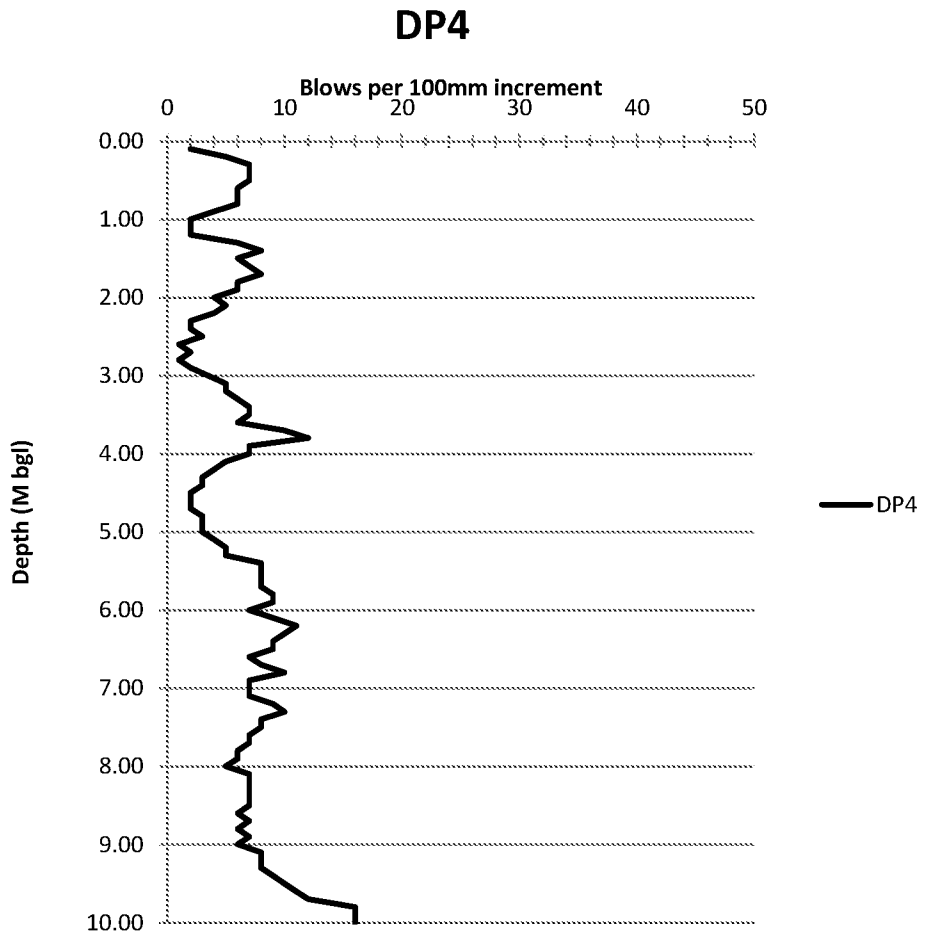
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP4

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	2	5	7	7	7	6	6	6	4	2	
1 - 2m	2	2	6	8	6	7	8	6	6	4	
2 - 3m	5	4	2	2	3	1	2	1	2	3	
3 - 4m	5	5	6	7	7	6	10	12	7	7	
4 - 5m	5	4	3	3	2	2	2	3	3	3	
5 - 6m	4	5	5	8	8	8	8	9	9	7	
6 - 7m	9	11	10	9	9	7	8	10	7	7	
7 - 8m	7	9	10	8	8	7	7	6	6	5	
8 - 9m	7	7	7	7	7	6	7	6	7	6	
9 - 10m	8	8	8	9	10	11	12	16	16	16	
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



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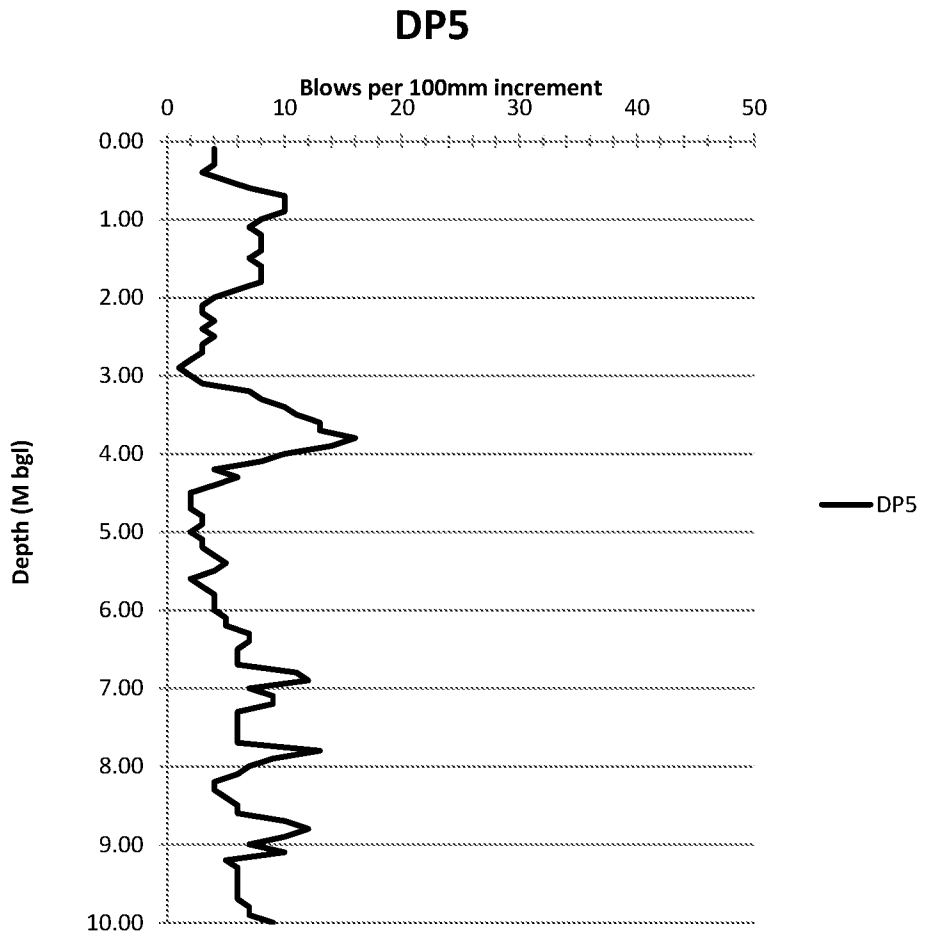
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP5

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	4	4	4	3	5	7	10	10	10	8	
1 - 2m	7	8	8	8	7	8	8	8	6	4	
2 - 3m	3	3	4	3	4	3	3	2	1	1	
3 - 4m	3	7	8	10	11	13	13	16	14	10	
4 - 5m	8	4	6	4	2	2	2	3	3	2	
5 - 6m	3	3	4	5	4	2	3	4	4	4	
6 - 7m	5	5	7	7	6	6	6	11	12	7	
7 - 8m	9	9	6	6	6	6	6	13	9	7	
8 - 9m	6	4	4	5	6	6	10	12	10	7	
9 - 10m	10	5	6	6	6	6	6	7	7	9	
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



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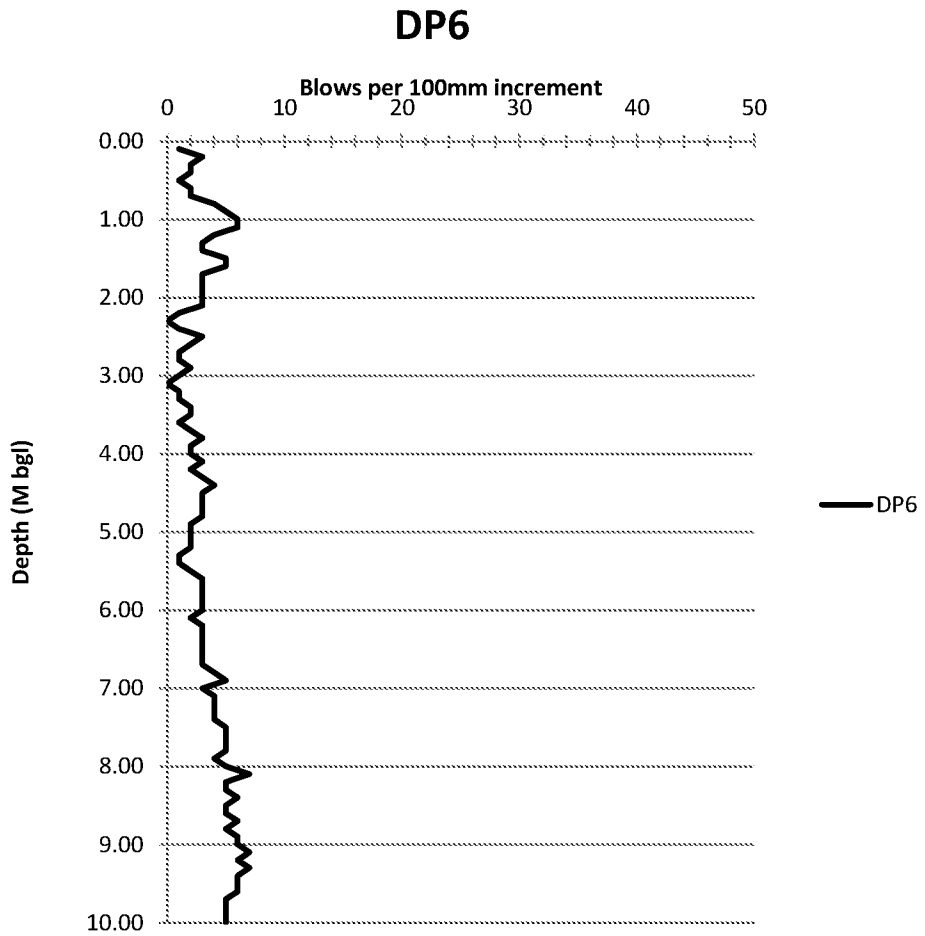
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP6

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	1	3	2	2	1	2	2	4	5	6	
1 - 2m	6	4	3	3	5	5	3	3	3	3	
2 - 3m	3	1	0	1	3	2	1	1	2	1	
3 - 4m	0	1	1	2	2	1	2	3	2	2	
4 - 5m	3	2	3	4	3	3	3	3	2	2	
5 - 6m	2	2	1	1	2	3	3	3	3	3	
6 - 7m	2	3	3	3	3	3	3	4	5	3	
7 - 8m	4	4	4	4	5	5	5	5	4	5	
8 - 9m	7	5	5	6	5	5	6	5	6	6	
9 - 10m	7	6	7	6	6	6	5	5	5	5	
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



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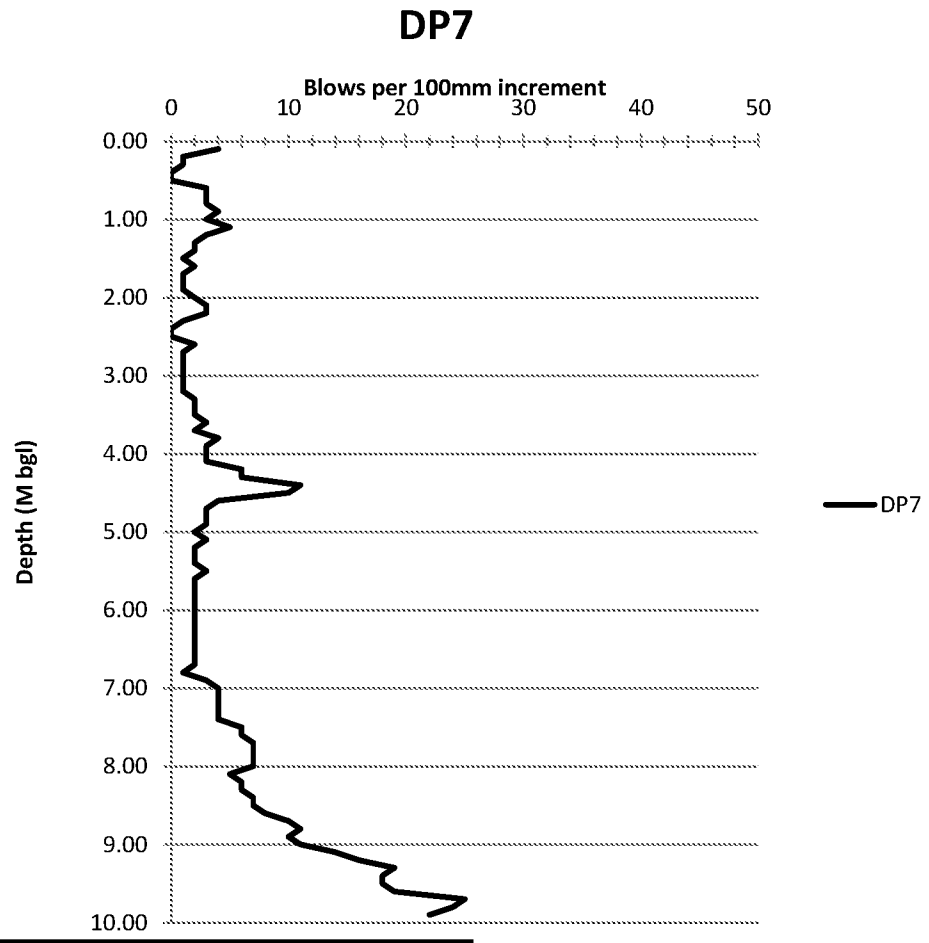
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP7

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	4	1	1	0	0	3	3	3	4	3	
1 - 2m	5	3	2	2	1	2	1	1	1	2	
2 - 3m	3	3	1	0	0	2	1	1	1	1	
3 - 4m	1	1	2	2	2	3	2	4	3	3	
4 - 5m	3	6	6	11	10	4	3	3	3	2	
5 - 6m	3	2	2	2	3	2	2	2	2	2	
6 - 7m	2	2	2	2	2	2	2	1	3	4	
7 - 8m	4	4	4	4	6	6	7	7	7	7	
8 - 9m	5	6	6	7	7	8	10	11	10	11	
9 - 10m	14	16	19	18	18	19	25	24	22		
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



Oakland Site Investigation [redacted]
Registered Office Address: Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

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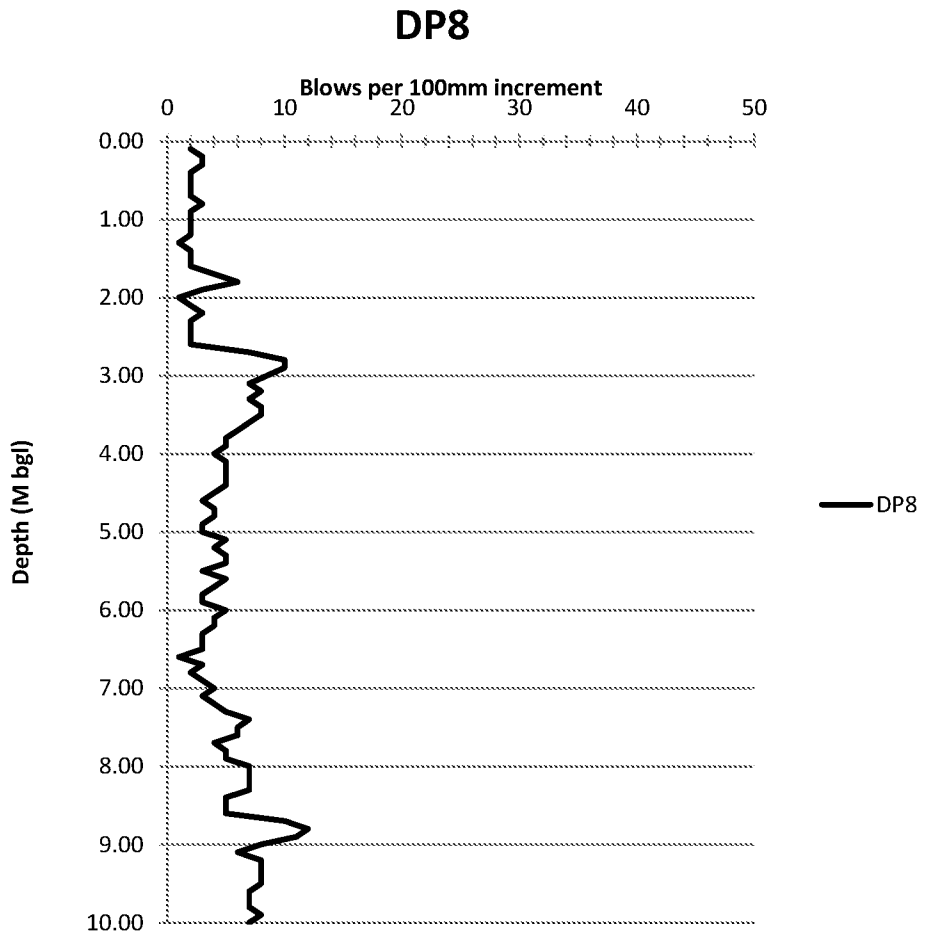
OAKLAND
site investigation

Job Reference:	LP1649
Site Address:	Fontwell
Client:	Leap Environmental

Probe No:
DP8

Probe Type	DPSH	Rig	Dando Terrier
Operator	SB	Date	24/05/2018

	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	Torque
0 - 1m	2	3	3	2	2	2	2	3	2	2	
1 - 2m	2	2	1	2	2	2	4	6	3	1	
2 - 3m	2	3	2	2	2	2	7	10	10	8	
3 - 4m	7	8	7	8	8	7	6	5	5	4	
4 - 5m	5	5	5	5	4	3	4	4	3	3	
5 - 6m	5	4	5	5	3	5	4	3	3	5	
6 - 7m	4	4	3	3	3	1	3	2	3	4	
7 - 8m	3	4	5	7	6	6	4	5	5	7	
8 - 9m	7	7	7	5	5	5	10	12	11	8	
9 - 10m	6	8	8	8	8	7	7	7	8	7	
10 - 11m											
11 - 12m											
12 - 13m											
13 - 14m											
14 - 15m											
15 -16m											
16 - 17m											
17 - 18m											
18 - 19m											
19- 20m											



Oakland Site Investigation [redacted]
Registered Office Address: Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

ARUN DISTRICT COUNCIL WA/99/20/DOC

APPENDIX G – GEOTECHNICAL LABORATORY TEST RESULTS

Geotechnical Laboratory
Test Results

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
TP101		2.70	D	Yellow brown sandy CLAY with rare fine to medium gravel sized chalk.	25.9	61	22	39	96										
TP102		1.00	B	Orange brown very gravelly silty CLAY												7.3	<0.01		Particle Size Distribution
TP102		1.90	D	Yellow brown sandy gravelly CLAY. Gravel is fine to medium.	26.0	58	25	33	62										
TP103		3.00	D													8.3	<0.01		
TP104		3.00	D	Light yellow brown sandy silty CLAY															Particle Size Distribution
TP105		1.00	B	Brown silty clayey GRAVEL															Particle Size Distribution
TP105A		1.00	B	Brown sandy gravelly CLAY. Gravel is fine to medium.	12.2	47	20	27	33							7.5	<0.01		
TP107		1.90	B													8.5	<0.01		
TP112		1.00	B	Brown silty clayey GRAVEL with rare cobbles.	6.5	25	17	8.0	20										Particle Size Distribution
TP113		1.00	B													7.3	<0.01		

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

oject Name:

FONTWELL
LP1649

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ARUN DISTRICT COUNCIL WA/99/20/DOC

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
TP114		3.00	B	Mottled brownish grey and grey CLAY with rare fine to medium gravel.	25.8	62	19	43	98										
TP115		2.20	B	Soft cream and white fine to medium chalk gravel in a structureless CHALK matrix.	14.9														
TP116		2.00	B	Orange brown silty clayey GRAVEL															Particle Size Distribution
TP117		2.20	B	Mottled brownish grey and grey CLAY with rare fine to medium gravel.	25.9	65	19	46	98										
TP117		3.00	B	Light yellow brown clayey sandy SILT															Particle Size Distribution
TP118		0.70	B	Brown sandy CLAY with rare fine to medium gravel and rootlets.	21.5	36	19	17	98										
WS101		4.80	B	Mottled yellow brown and light grey silty CLAY	25.6	49	19	30	100										
WS107		2.80	B	Yellow brown GRAVEL and SAND															Particle Size Distribution

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

ject Name:

FONTWELL
LP1649

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1125 - SMC Summary - 27569.XLSM

BS1377 : Part 2 : 1990 : Clause 3.3

SATURATION MOISTURE CONTENT OF CHALK

Borehole / Trial Pit	Depth m	Sample Ref	Sample Type	Description	Water Content BS EN ISO 17892-1 : 2014 %	Bulk Density Mg/m³	Dry Density Mg/m³	Saturation Moisture Content %	Porosity %
TP107	2.50		D	White CHALK	15.9	2.16	1.86	17	31

Notes

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

Project Name:

FONTWELL
LP1649

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BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

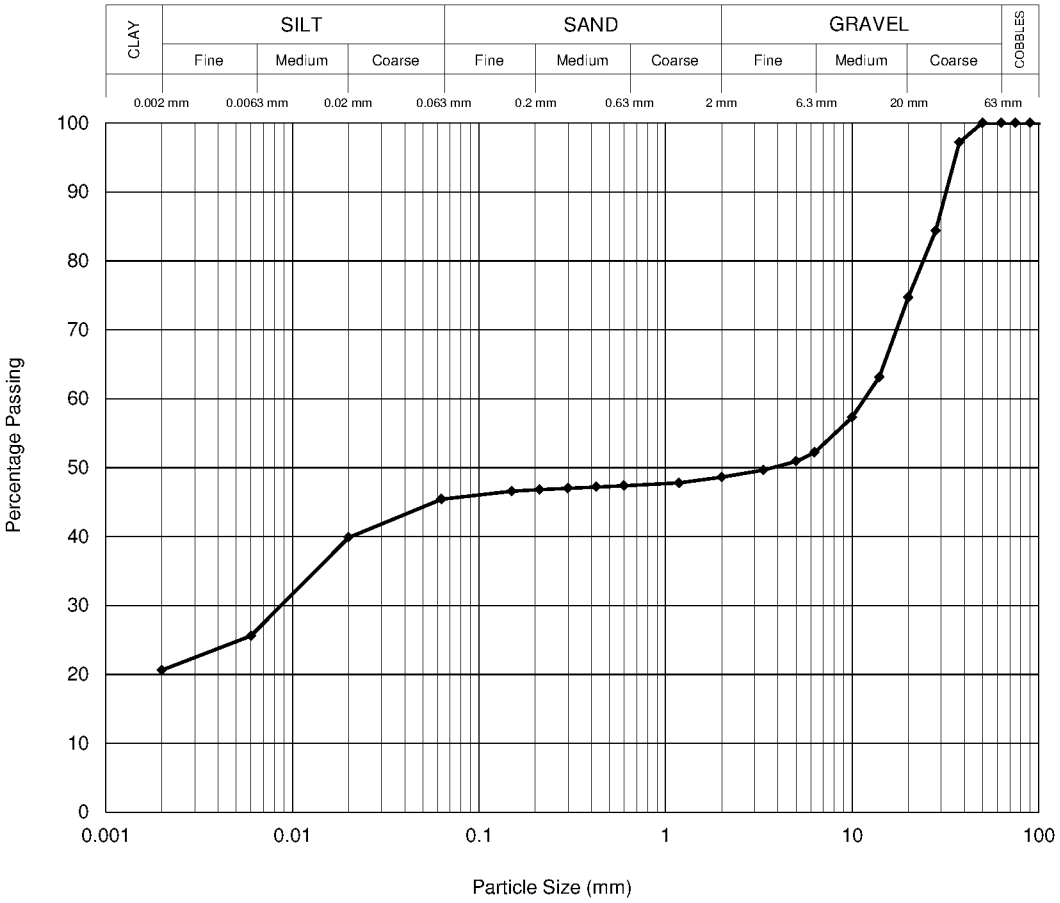
BH / TP No.	TP102
Depth (m)	1.00
Sample Type	B

Description

Orange brown very gravelly silty CLAY

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	97
28.0 mm	84
20.0 mm	75
14.0 mm	63
10.0 mm	57
6.30 mm	52
5.00 mm	51
3.35 mm	50
2.00 mm	49
1.18 mm	48
600 µm	47
425 µm	47
300 µm	47
212 µm	47
150 µm	47
63 µm	45



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	40
6 µm	26
2 µm	21

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0
Gravel	51
Sand	3
Silt	25
Clay	21

Checked and Approved by

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

Project Name:

FONTWELL
LP1649

GEOLABS

UKAS TESTING 7592

ARUN DISTRICT COUNCIL WA/99/20/DOC

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

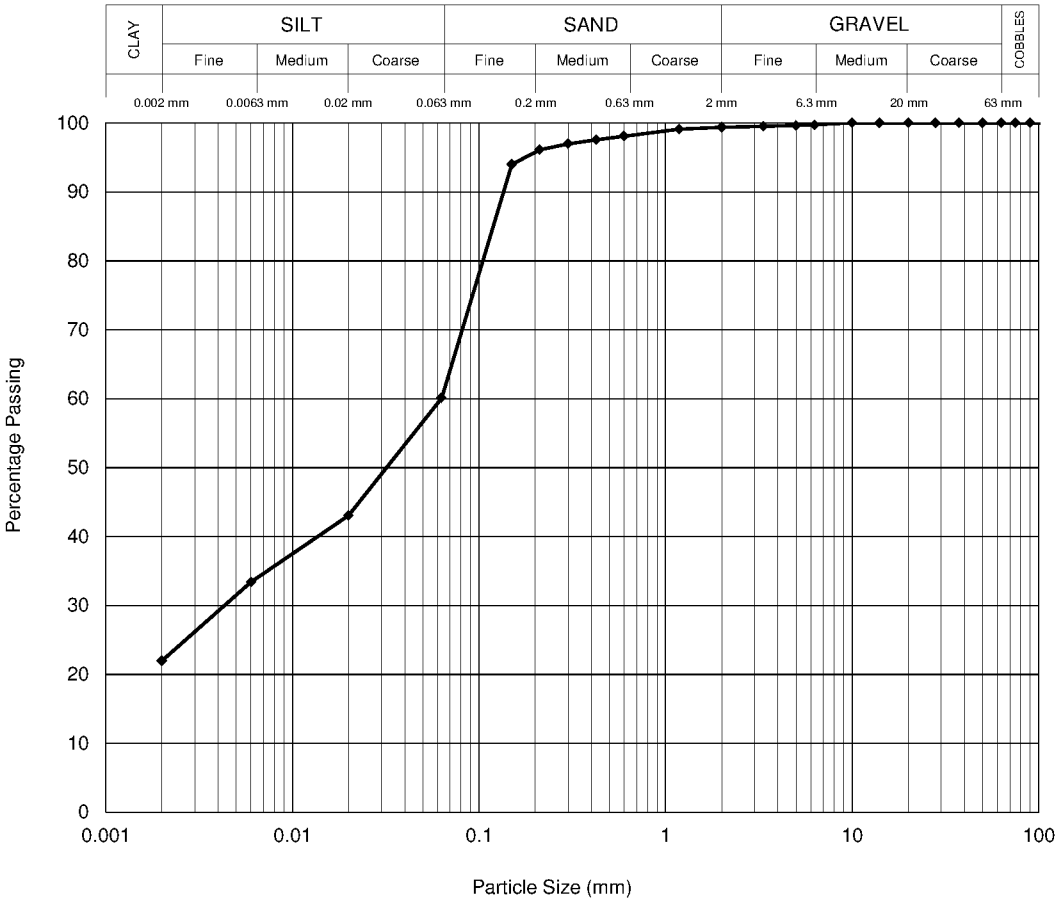
BH / TP No.	TP104
Depth (m)	3.00
Sample Type	D

Description

Light yellow brown sandy silty CLAY

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	98
300 µm	97
212 µm	96
150 µm	94
63 µm	60



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	43
6 µm	33
2 µm	22
Particle Density 2.70(A) Mg/m³	

Particle Proportions	
Cobbles	0
Gravel	1
Sand	39
Silt	38
Clay	22

Checked and Approved by

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

ject Name:

FONTWELL
LP1649

GEOLABS

UKAS
TESTING
7592

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

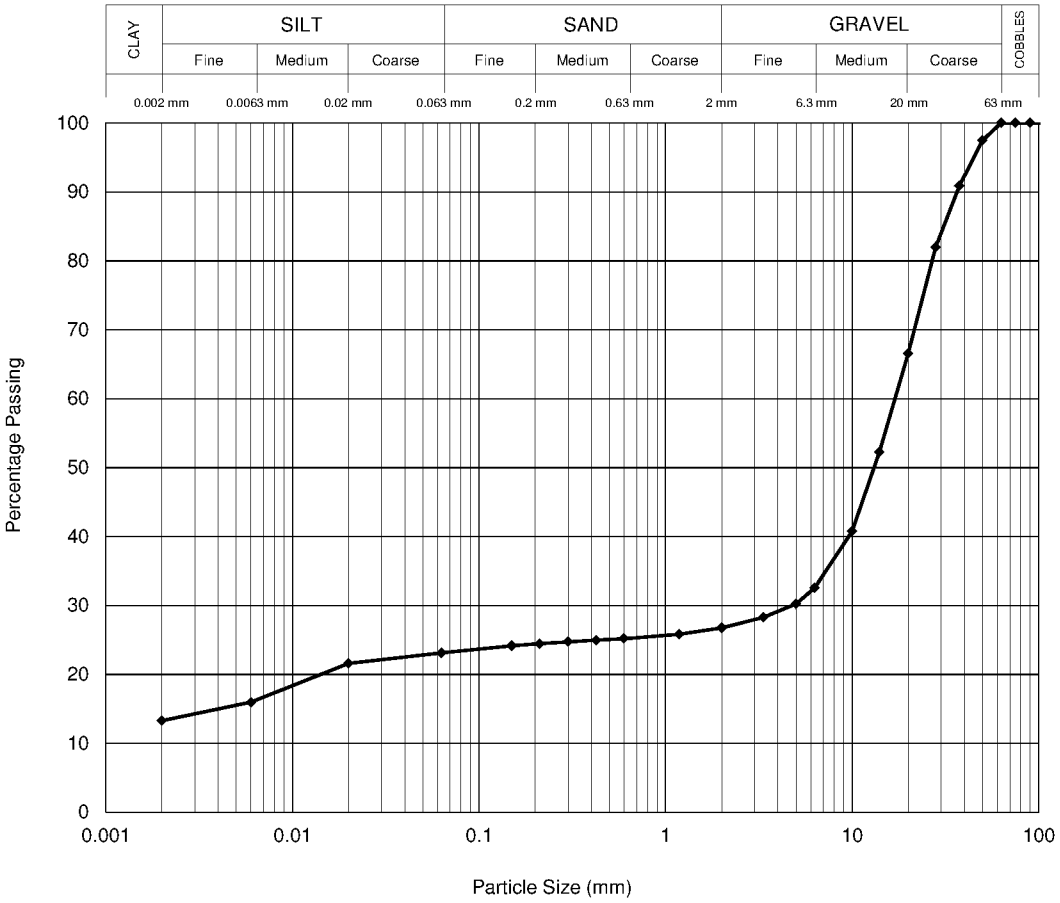
BH / TP No.	TP105
Depth (m)	1.00
Sample Type	B

Description

Brown silty clayey GRAVEL

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	97
37.5 mm	91
28.0 mm	82
20.0 mm	67
14.0 mm	52
10.0 mm	41
6.30 mm	33
5.00 mm	30
3.35 mm	28
2.00 mm	27
1.18 mm	26
600 µm	25
425 µm	25
300 µm	25
212 µm	24
150 µm	24
63 µm	23



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	22
6 µm	16
2 µm	13
Particle Density 2.70(A) Mg/m³	

Particle Proportions	
Cobbles	0
Gravel	73
Sand	4
Silt	10
Clay	13

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

Project Name:

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UKAS TESTING 7592

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

BH / TP No.	TP112
Depth (m)	1.00
Sample Type	B

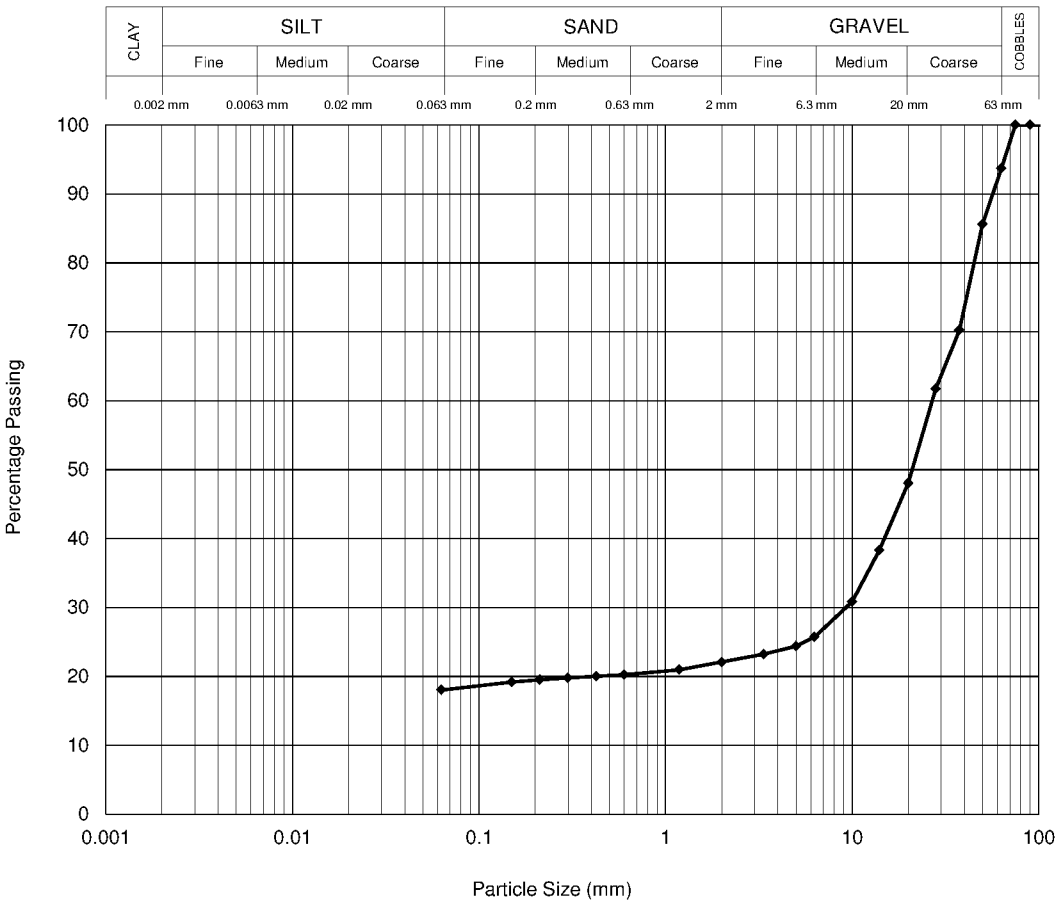
Description

Brown silty clayey GRAVEL with rare cobbles

Remarks: Insuffcient sample supplied to comply with BS EN ISO 17892-4 : 2016 minimum mass requirements

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	94
50.0 mm	86
37.5 mm	70
28.0 mm	62
20.0 mm	48
14.0 mm	38
10.0 mm	31
6.30 mm	26
5.00 mm	24
3.35 mm	23
2.00 mm	22
1.18 mm	21
600 µm	20
425 µm	20
300 µm	20
212 µm	19
150 µm	19
63 µm	18



Particle Proportions	
Cobbles	6
Gravel	72
Sand	4
Silt & Clay	18

Checked and Approved by

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

Project Name:

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ARUN DISTRICT COUNCIL WA/99/20/DOC

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

BH / TP No.	TP116
Depth (m)	2.00
Sample Type	B

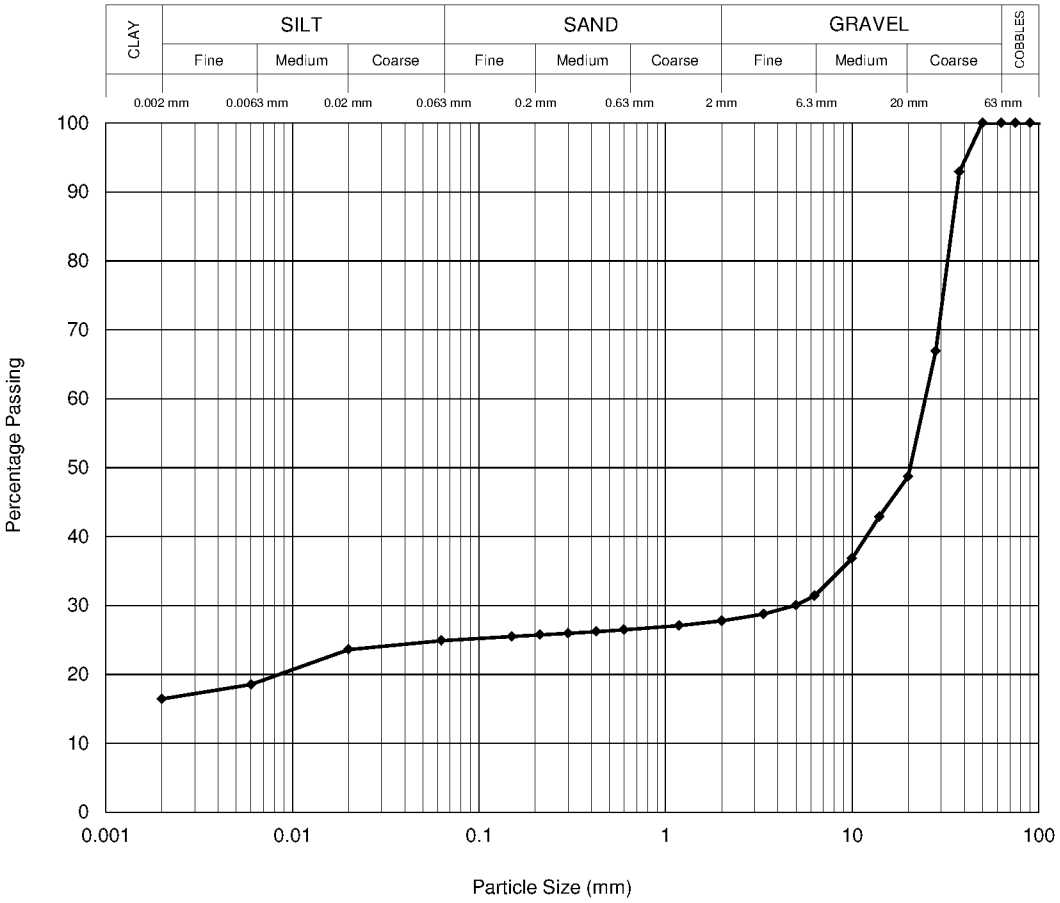
Description

Orange brown silty clayey GRAVEL

Remarks: Insuffcient sample supplied to comply with BS EN ISO 17892-4 : 2016 minimum mass requirements

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	93
28.0 mm	67
20.0 mm	49
14.0 mm	43
10.0 mm	37
6.30 mm	31
5.00 mm	30
3.35 mm	29
2.00 mm	28
1.18 mm	27
600 µm	26
425 µm	26
300 µm	26
212 µm	26
150 µm	25
63 µm	25



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	24
6 µm	19
2 µm	16

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0
Gravel	72
Sand	3
Silt	8
Clay	17

Checked and Approved by

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

Project Name:

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UKAS TESTING 7592

ARUN DISTRICT COUNCIL WA/99/20/DOC

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

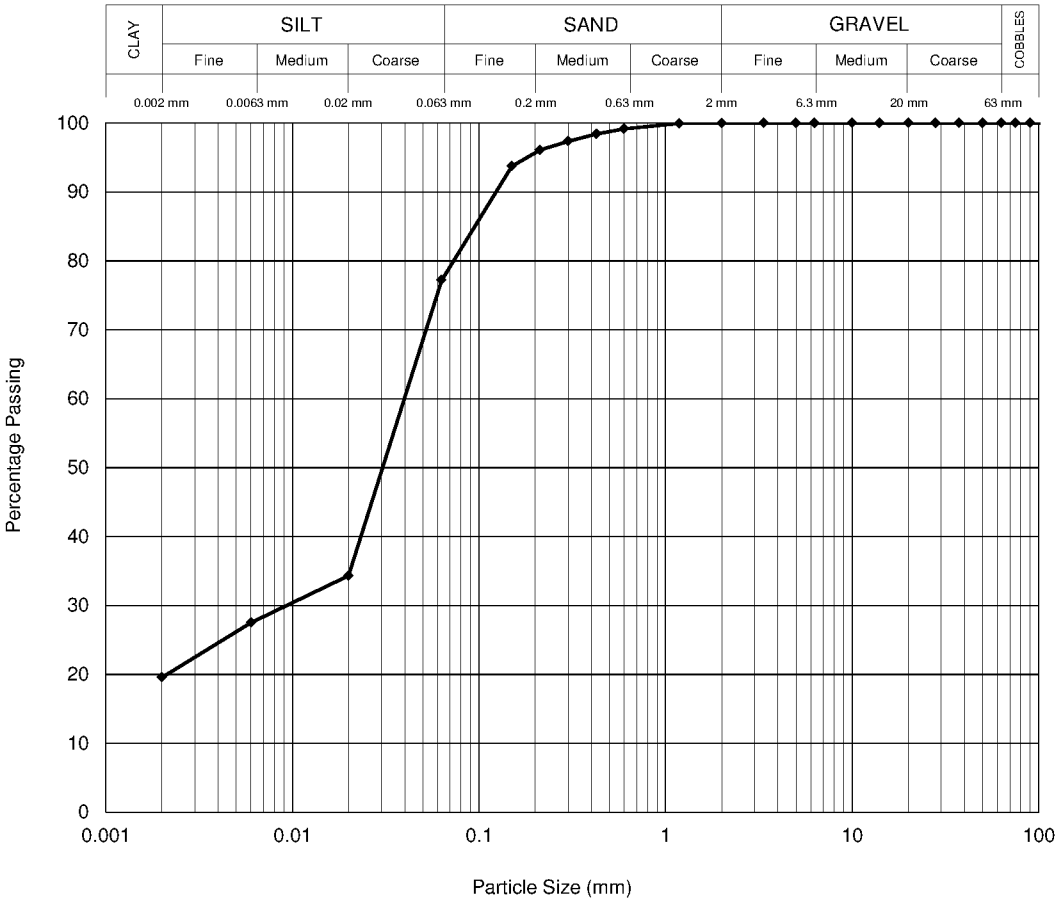
BH / TP No.	TP117
Depth (m)	3.00
Sample Type	B

Description

Light yellow brown clayey sandy SILT

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	98
300 µm	97
212 µm	96
150 µm	94
63 µm	77



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	34
6 µm	27
2 µm	20

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0
Gravel	0
Sand	23
Silt	58
Clay	19

Checked and Approved by

[redacted]

25/06/2018

Project Number:

GEO / 27569

Project Name:

FONTWELL
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UKAS 7592

ARUN DISTRICT COUNCIL WA/99/20/DOC

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

BH / TP No.	WS107
Depth (m)	2.80
Sample Type	B

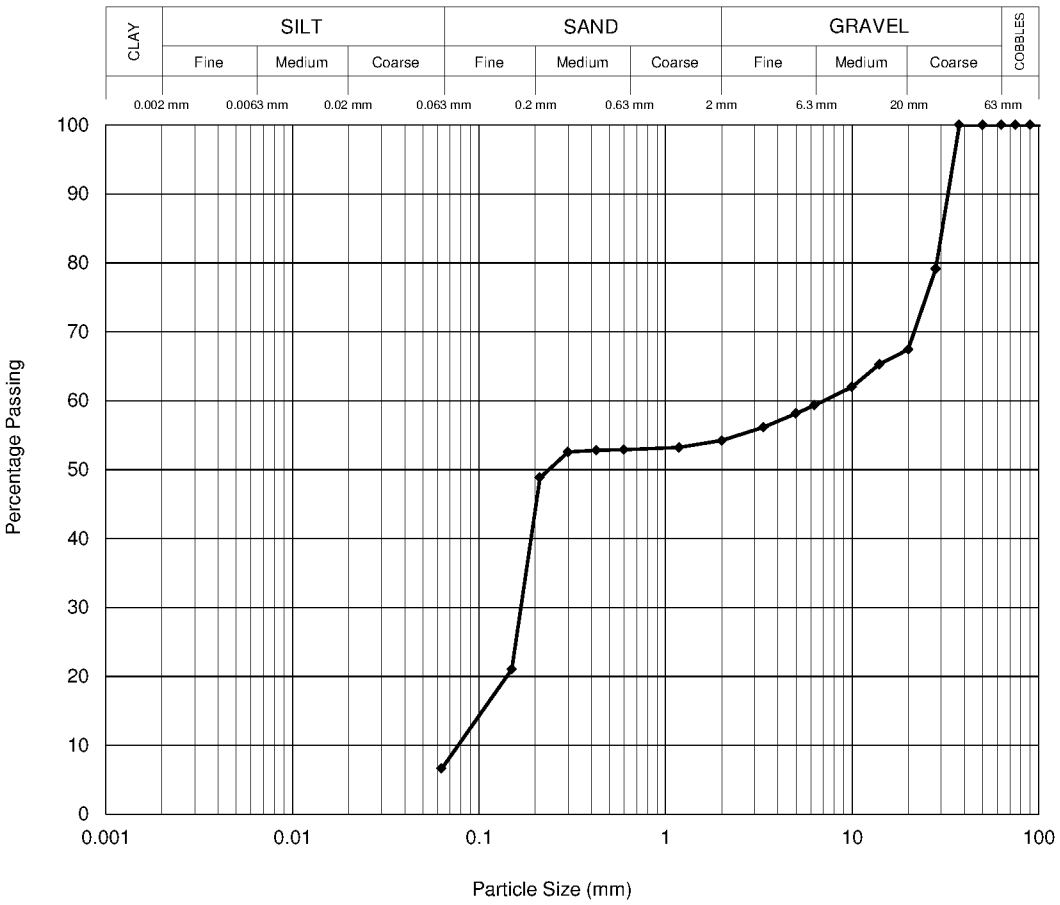
Description

Yellow brown GRAVEL and SAND

Remarks Insuffcient sample supplied to comply with BS EN ISO 17892-4 : 2016 minimum mass requirements

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	79
20.0 mm	67
14.0 mm	65
10.0 mm	62
6.30 mm	59
5.00 mm	58
3.35 mm	56
2.00 mm	54
1.18 mm	53
600 µm	53
425 µm	53
300 µm	53
212 µm	49
150 µm	21
63 µm	7



Particle Proportions	
Cobbles	0
Gravel	46
Sand	48
Silt & Clay	6

Checked and Approved by

[redacted]

S Burke - Senior Technician
25/06/2018

Project Number:

GEO / 27569

Project Name:

FONTWELL
LP1649

GEOLABS

UKAS TESTING 7592

ARUN DISTRICT COUNCIL WA/99/20/DOC

GEOLABS

Client	Leap Environmental Limited
Project No.	27569
Project Name	FONTWELL

TEST RESTRICTION

The following tests have been scheduled on the above project. Those detailed below CANNOT be performed for the reason stated. If alternative samples are available for restricted tests, please supply details.

Laboratory ID	BH / TP No.	Sample Ref.	Depth (m)		Type	Test(s) Scheduled			Reason for restriction	Soil Description
301908	TP115		2.20		B	SMC			UNSUITABLE MATERIAL (no suitable sized lumps)	Soft cream and white fine to medium chalk gravel in a structureless CHALK matrix.

Comments / remarks	

Ref. WS 04 - TERE - Issue 1 (07/13)

ARUN DISTRICT COUNCIL-WA/93/18/DOC

APPENDIX H – CHEMICAL LABORATORY TEST RESULTS

Chemical Laboratory
Test Results

Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
[redacted]

UKAS TESTING
2683

MCERTS

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 18-17719

Issue: 2. Replaces Analytical Report number 18-17719; issue no.1

Date of Issue: 01/06/2018

Contact: Joao Brissos

Customer Details: Leap Environmental Ltd
The Atrium
Curtis Road
Dorking
Surrey
RH4 1X4

Quotation No: Q14-00063

Order No: LPO7665

Customer Reference: LP01649

Date Received: 24/05/2018

Date Approved: 01/06/2018

Details: Northfield Cottages, Fontwell

Approved by: [redacted]

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

ARUN DISTRICT COUNCIL WA/99/20/DOC

ELAB

Sample Summary

Report No.: 18-17719

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
137236	TP101 0.50	21/05/2018	24/05/2018		
137235	TP101 0.20	21/05/2018	24/05/2018	Silty loam	
137234	TP102 0.20	21/05/2018	24/05/2018	Silty loam	
137233	TP124 0.15	21/05/2018	24/05/2018	Silty loam	
137232	TP115 0.15	22/05/2018	24/05/2018	Silty loam	
137231	TP116 0.15	22/05/2018	24/05/2018	Silty loam	
137230	TP110 0.10	21/05/2018	24/05/2018	Silty loam	
137229	TP106 0.15	21/05/2018	24/05/2018	Silty loam	
137228	TP125 0.10	22/05/2018	24/05/2018	Silty loam	
137227	TP123 0.60	22/05/2018	24/05/2018	Silty loam	
137226	TP123 0.20	22/05/2018	24/05/2018	Silty loam	
137225	TP120 0.15	22/05/2018	24/05/2018	Silty loam	
137224	TP118 0.50	22/05/2018	24/05/2018	Silty loam	
137223	TP118 0.10	22/05/2018	24/05/2018	Silty loam	
137222	TP117 0.20	22/05/2018	24/05/2018	Silty loam	
137221	TP114 0.50	22/05/2018	24/05/2018	Silty loam	
137237	TP102 0.40	21/05/2018	24/05/2018		
137238	TP103 0.10	21/05/2018	24/05/2018	Silty loam	
137239	TP103 0.60	21/05/2018	24/05/2018	Silty loam	
137240	TP104 0.10	21/05/2018	24/05/2018	Silty loam	
137241	TP104 0.50	21/05/2018	24/05/2018		
137242	TP105 0.25	21/05/2018	24/05/2018		
137243	TP105 0.40	21/05/2018	24/05/2018		
137244	TP105A 0.20	21/05/2018	24/05/2018		
137245	TP105A 0.40	21/05/2018	24/05/2018		
137246	TP106 0.40	21/05/2018	24/05/2018		
137247	TP107 0.10	22/05/2018	24/05/2018	Silty loam	
137248	TP107 0.40	22/05/2018	24/05/2018	Silty loam	
137249	TP108 0.30	21/05/2018	24/05/2018	Silty loam	
137250	TP108 0.50	21/05/2018	24/05/2018		
137251	TP109 0.20	22/05/2018	24/05/2018		
137252	TP109 0.50	22/05/2018	24/05/2018		
137253	TP110A 0.10	22/05/2018	24/05/2018	Silty loam	
137254	TP110A 0.40	22/05/2018	24/05/2018	Silty loam	
137255	TP111 0.10	22/05/2018	24/05/2018		
137256	TP111 0.45	22/05/2018	24/05/2018		
137257	TP112 0.15	22/05/2018	24/05/2018	Silty loam	
137258	TP112 0.50	22/05/2018	24/05/2018	Silty loam	
137259	TP116 0.50	22/05/2018	24/05/2018		
137260	TP110 0.30	21/05/2018	24/05/2018		
137261	TP113 0.10	21/05/2018	24/05/2018	Silty loam	
137262	TP113 0.60	21/05/2018	24/05/2018		
137263	TP114 0.20	22/05/2018	24/05/2018	Silty loam	
137264	TP115 0.50	22/05/2018	24/05/2018		
137265	TP117 0.60	22/05/2018	24/05/2018		
137266	TP119 0.20	22/05/2018	24/05/2018		
137267	TP119 0.50	22/05/2018	24/05/2018		
137268	TP120 0.50	22/05/2018	24/05/2018		
137269	TP121 0.10	22/05/2018	24/05/2018		
137270	TP121 0.35	22/05/2018	24/05/2018		
137271	TP124 0.40	21/05/2018	24/05/2018		
137272	TP125 0.50	22/05/2018	24/05/2018		

Results Summary

Report No.: 18-17719

ELAB Reference				137221	137222	137223	137224	137225	137226
Customer Reference									
Sample ID									
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				TP114	TP117	TP118	TP118	TP120	TP123
Sample Depth (m)				0.50	0.20	0.10	0.50	0.15	0.20
Sampling Date				22/05/2018	22/05/2018	22/05/2018	22/05/2018	22/05/2018	22/05/2018
Determinand	**Codes**	**Units**	**LOD**						
Metals									
Arsenic	M	mg/kg	1	5.6	4.0	5.3	7.0	4.9	10.4
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	0.7
Chromium	M	mg/kg	5	15.4	10.9	13.8	20.7	10.4	15.5
Copper	M	mg/kg	5	6.3	< 5.0	7.1	8.4	6.5	36.8
Lead	M	mg/kg	5	13.0	12.5	19.9	13.0	15.7	79.2
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	10.1	5.8	9.5	12.1	6.2	24.3
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	35.9	27.5	41.5	45.4	75.8	283
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous									
pH	M	pH units	0.1	6.1	6.4	5.5	6.1	6.4	6.6
Total Organic Carbon	N	%	0.01	0.45	0.46	0.64	0.31	1.1	10
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	0.2	< 0.1	< 0.1	< 0.1	0.2	0.5
Pyrene	M	mg/kg	0.1	0.2	< 0.1	0.1	< 0.1	0.2	0.4
Benzo(a)anthracene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3
Chrysene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	0.1	0.3
Benzo (b) fluoranthene	M	mg/kg	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	0.3
Benzo(k)fluoranthene	M	mg/kg	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	0.8
Benzo (a) pyrene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	0.1	0.3
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	1.4	< 0.4	< 0.4	< 0.4	0.6	3.1

Tests marked N are not UKAS accredited.
The Environmental Laboratory Ltd. Reg. No. 3882193

Results Summary

Report No.: 18-17719

			ELAB Reference	137221	137222	137223	137224	137225	137226
			Customer Reference						
			Sample ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP114	TP117	TP118	TP118	TP120	TP123
			Sample Depth (m)	0.50	0.20	0.10	0.50	0.15	0.20
			Sampling Date	22/05/2018	22/05/2018	22/05/2018	22/05/2018	22/05/2018	22/05/2018
Determinand	**Codes**	**Units**	**LOD**						
OrganoChlorine Pesticides									
alpha-HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
beta_HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
gamma-HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
delta-HCH	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Heptachlor	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Aldrin	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Heptachlor expoxide	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
trans-Chlordane	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
alpha cis-Chlordane	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDE	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Dieldrin	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDD	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endosulfan II	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin aldehyde	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDT	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endosulphan sulphate	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Methoxychlor	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin ketone	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t

Results Summary

Report No.: 18-17719

			ELAB Reference	137227	137228	137229	137230	137231	137232
			Customer Reference						
			Sample ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP123	TP125	TP106	TP110	TP116	TP115
			Sample Depth (m)	0.60	0.10	0.15	0.10	0.15	0.15
			Sampling Date	22/05/2018	22/05/2018	21/05/2018	21/05/2018	22/05/2018	22/05/2018
Determinand	**Codes**	**Units**	**LOD**						
Metals									
Arsenic	M	mg/kg	1	9.5	3.5	3.9	n/t	n/t	n/t
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	n/t	n/t	n/t
Chromium	M	mg/kg	5	17.9	8.5	9.2	n/t	n/t	n/t
Copper	M	mg/kg	5	12.4	< 5.0	< 5.0	n/t	n/t	n/t
Lead	M	mg/kg	5	21.0	14.7	11.0	n/t	n/t	n/t
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	n/t	n/t	n/t
Nickel	M	mg/kg	5	12.7	< 5.0	< 5.0	n/t	n/t	n/t
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	n/t	n/t
Zinc	M	mg/kg	5	58.7	38.7	22.2	n/t	n/t	n/t
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	n/t	n/t	n/t
Miscellaneous									
pH	M	pH units	0.1	7.5	6.5	5.8	n/t	n/t	n/t
Total Organic Carbon	N	%	0.01	1.3	1.0	0.57	n/t	n/t	n/t
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Fluoranthene	M	mg/kg	0.1	< 0.1	0.1	< 0.1	n/t	n/t	n/t
Pyrene	M	mg/kg	0.1	< 0.1	0.1	< 0.1	n/t	n/t	n/t
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Benzo (b) fluoranthene	M	mg/kg	0.1	< 0.1	0.1	< 0.1	n/t	n/t	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	0.4	< 0.1	n/t	n/t	n/t
Benzo (a) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	n/t	n/t
Total PAH(16)	M	mg/kg	0.4	< 0.4	0.7	< 0.4	n/t	n/t	n/t

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Results Summary

Report No.: 18-17719

			ELAB Reference	137227	137228	137229	137230	137231	137232
			Customer Reference						
			Sample ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP123	TP125	TP106	TP110	TP116	TP115
			Sample Depth (m)	0.60	0.10	0.15	0.10	0.15	0.15
			Sampling Date	22/05/2018	22/05/2018	21/05/2018	21/05/2018	22/05/2018	22/05/2018
Determinand	**Codes**	**Units**	**LOD**						
OrganoChlorine Pesticides									
alpha-HCH	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
beta_HCH	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
gamma-HCH	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
delta-HCH	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Heptachlor	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Aldrin	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Heptachlor expoxide	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
trans-Chlordane	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
alpha cis-Chlordane	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
p,p-DDE	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Dieldrin	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Endrin	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
p,p-DDD	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Endosulfan II	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Endrin aldehyde	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
p,p-DDT	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Endosulphan sulphate	M	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Methoxychlor	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10
Endrin ketone	N	ug/kg	10	n/t	n/t	n/t	< 10	< 10	< 10

Results Summary

Report No.: 18-17719

ELAB Reference				137233	137234	137235	137238	137239	137240
Customer Reference									
Sample ID									
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				TP124	TP102	TP101	TP103	TP103	TP104
Sample Depth (m)				0.15	0.20	0.20	0.10	0.60	0.10
Sampling Date				21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Determinand	**Codes**	**Units**	**LOD**						
Metals									
Arsenic	M	mg/kg	1	n/t	n/t	7.3	4.3	10.9	6.2
Cadmium	M	mg/kg	0.5	n/t	n/t	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	n/t	n/t	29.5	16.3	33.3	15.4
Copper	M	mg/kg	5	n/t	n/t	7.1	< 5.0	12.5	5.6
Lead	M	mg/kg	5	n/t	n/t	55.7	9.5	11.6	13.9
Mercury	M	mg/kg	0.5	n/t	n/t	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	n/t	n/t	43.5	19.7	27.5	11.3
Selenium	M	mg/kg	1	n/t	n/t	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	n/t	n/t	42.6	29.4	57.1	34.6
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	n/t	n/t	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous									
pH	M	pH units	0.1	n/t	n/t	6.0	6.3	6.9	6.2
Total Organic Carbon	N	%	0.01	n/t	n/t	1.3	0.47	0.14	1.0
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Benzo (b) fluoranthene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Benzo (a) pyrene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	n/t	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	n/t	n/t	< 0.4	< 0.4	< 0.4	< 0.4

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Results Summary

Report No.: 18-17719

	ELAB Reference	137233	137234	137235	137238	137239	137240
	Customer Reference						
	Sample ID						
	Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Location	TP124	TP102	TP101	TP103	TP103	TP104
	Sample Depth (m)	0.15	0.20	0.20	0.10	0.60	0.10
	Sampling Date	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Determinand	**Codes** / **Units** / **LOD**						
OrganoChlorine Pesticides							
alpha-HCH	M ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
beta_HCH	M ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
gamma-HCH	M ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
delta-HCH	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Heptachlor	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Aldrin	M ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Heptachlor expoxide	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
trans-Chlordane	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
alpha cis-Chlordane	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
p,p-DDE	M ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Dieldrin	M ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Endrin	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
p,p-DDD	M ug/kg 10	< 10	19	n/t	n/t	n/t	n/t
Endosulfan II	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Endrin aldehyde	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
p,p-DDT	M ug/kg 10	< 10	12	n/t	n/t	n/t	n/t
Endosulphan sulphate	M ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Methoxychlor	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t
Endrin ketone	N ug/kg 10	< 10	< 10	n/t	n/t	n/t	n/t

Results Summary

Report No.: 18-17719

			ELAB Reference	137247	137248	137249	137253	137254	137257
			Customer Reference						
			Sample ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP107	TP107	TP108	TP110A	TP110A	TP112
			Sample Depth (m)	0.10	0.40	0.30	0.10	0.40	0.15
			Sampling Date	22/05/2018	22/05/2018	21/05/2018	22/05/2018	22/05/2018	22/05/2018
Determinand	**Codes**	**Units**	**LOD**						
Metals									
Arsenic	M	mg/kg	1	5.5	4.5	4.2	9.7	10.4	6.9
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	16.2	14.8	12.7	25.1	29.5	17.9
Copper	M	mg/kg	5	9.4	7.1	< 5.0	9.6	10.8	8.1
Lead	M	mg/kg	5	14.9	11.1	12.0	31.5	11.8	33.5
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	11.8	10.5	7.7	16.3	21.5	10.2
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	56.5	43.7	29.0	63.0	53.3	55.9
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous									
pH	M	pH units	0.1	6.7	7.0	6.1	5.7	6.1	5.5
Total Organic Carbon	N	%	0.01	0.61	0.58	0.68	3.6	0.29	3.5
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.1
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo (b) fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo (a) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4

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Results Summary

Report No.: 18-17719

	ELAB Reference	137247	137248	137249	137253	137254	137257
	Customer Reference						
	Sample ID						
	Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Location	TP107	TP107	TP108	TP110A	TP110A	TP112
	Sample Depth (m)	0.10	0.40	0.30	0.10	0.40	0.15
	Sampling Date	22/05/2018	22/05/2018	21/05/2018	22/05/2018	22/05/2018	22/05/2018
Determinand	**Codes** / **Units** / **LOD**						
OrganoChlorine Pesticides							
alpha-HCH	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
beta_HCH	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
gamma-HCH	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
delta-HCH	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Heptachlor	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Aldrin	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Heptachlor expoxide	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
trans-Chlordane	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
alpha cis-Chlordane	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDE	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Dieldrin	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDD	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Endosulfan II	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin aldehyde	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDT	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Endosulphan sulphate	M ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Methoxychlor	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin ketone	N ug/kg 10	n/t	n/t	n/t	n/t	n/t	n/t

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Results Summary

Report No.: 18-17719

			ELAB Reference	137258	137261	137263
			Customer Reference			
			Sample ID			
			Sample Type	SOIL	SOIL	SOIL
			Sample Location	TP112	TP113	TP114
			Sample Depth (m)	0.50	0.10	0.20
			Sampling Date	22/05/2018	21/05/2018	22/05/2018
Determinand	**Codes**	**Units**	**LOD**			
Metals						
Arsenic	M	mg/kg	1	4.9	3.8	7.6
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	12.3	11.1	21.1
Copper	M	mg/kg	5	5.8	6.0	10.8
Lead	M	mg/kg	5	8.0	18.1	31.3
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	8.7	6.3	12.2
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	27.6	34.4	71.0
Inorganics						
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8
Miscellaneous						
pH	M	pH units	0.1	7.4	5.8	5.4
Total Organic Carbon	N	%	0.01	1.1	0.62	2.5
Polyaromatic hydrocarbons						
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	0.4	0.2
Pyrene	M	mg/kg	0.1	< 0.1	0.3	0.2
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	0.2	0.1
Chrysene	M	mg/kg	0.1	< 0.1	0.2	0.9
Benzo (b) fluoranthene	M	mg/kg	0.1	< 0.1	0.5	0.4
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	0.2	0.2
Benzo (a) pyrene	M	mg/kg	0.1	< 0.1	0.2	< 0.1
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	< 0.4	1.9	1.7

Tests marked N are not UKAS accredited.

Results Summary

Report No.: 18-17719

	ELAB Reference	137258	137261	137263
	Customer Reference			
	Sample ID			
	Sample Type	SOIL	SOIL	SOIL
	Sample Location	TP112	TP113	TP114
	Sample Depth (m)	0.50	0.10	0.20
	Sampling Date	22/05/2018	21/05/2018	22/05/2018
Determinand	**Codes** / **Units** / **LOD**			
OrganoChlorine Pesticides				
alpha-HCH	M ug/kg 10	n/t	n/t	n/t
beta_HCH	M ug/kg 10	n/t	n/t	n/t
gamma-HCH	M ug/kg 10	n/t	n/t	n/t
delta-HCH	N ug/kg 10	n/t	n/t	n/t
Heptachlor	N ug/kg 10	n/t	n/t	n/t
Aldrin	M ug/kg 10	n/t	n/t	n/t
Heptachlor expoxide	N ug/kg 10	n/t	n/t	n/t
trans-Chlordane	N ug/kg 10	n/t	n/t	n/t
alpha cis-Chlordane	N ug/kg 10	n/t	n/t	n/t
p,p-DDE	M ug/kg 10	n/t	n/t	n/t
Dieldrin	M ug/kg 10	n/t	n/t	n/t
Endrin	N ug/kg 10	n/t	n/t	n/t
p,p-DDD	M ug/kg 10	n/t	n/t	n/t
Endosulfan II	N ug/kg 10	n/t	n/t	n/t
Endrin aldehyde	N ug/kg 10	n/t	n/t	n/t
p,p-DDT	M ug/kg 10	n/t	n/t	n/t
Endosulphan sulphate	M ug/kg 10	n/t	n/t	n/t
Methoxychlor	N ug/kg 10	n/t	n/t	n/t
Endrin ketone	N ug/kg 10	n/t	n/t	n/t

ELAB
UKAS TESTING
2683

Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

Report No.: 18-17719

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
137221	0.50	TP114	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137222	0.20	TP117	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137223	0.10	TP118	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137224	0.50	TP118	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137225	0.15	TP120	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137226	0.20	TP123	Brown soil, stones, clinker	No asbestos detected	n/t	n/t	n/t	n/t
137227	0.60	TP123	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137228	0.10	TP125	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137229	0.15	TP106	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137235	0.20	TP101	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137238	0.10	TP103	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137239	0.60	TP103	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137240	0.10	TP104	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137247	0.10	TP107	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137248	0.40	TP107	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137249	0.30	TP108	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137253	0.10	TP110A	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137254	0.40	TP110A	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137257	0.15	TP112	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137258	0.50	TP112	Brown sandy soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137261	0.10	TP113	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137263	0.20	TP114	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 18-17719

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	29/05/2018	110	Colorimetry
pH	M	Air dried sample	30/05/2018	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	29/05/2018	118	ICPMS
PAH (GC-FID)	M	As submitted sample	29/05/2018	133	GC-FID
Organochlorine Pesticides in solids	M	As submitted sample	29/05/2018	173	GC-MS
Total organic carbon/Total sulphur	N	Air dried sample	30/05/2018	210	IR
Asbestos identification	U	Air dried sample	29/05/2018	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 18-17719

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)
Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
[redacted]

2683

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 18-17774

Issue: 1

Date of Issue: 01/06/2018

Contact: Joao Brissos

Customer Details: Leap Environmental Ltd
The Atrium
Curtis Road
Dorking
Surrey
RH4 1X4

Quotation No: Q14-00063

Order No: LPO7680

Customer Reference: LP01649

Date Received: 29/05/2018

Date Approved: 01/06/2018

Details: Northfield Cottages, Fontwell

Approved by: [redacted]

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

ARUN DISTRICT COUNCIL WA/99/20/DOC

ELAB

Sample Summary

Report No.: 18-17774

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
137610	TP126 0.20	25/05/2018	29/05/2018	Silty loam	
137611	WS6 0.10	25/05/2018	29/05/2018	Silty loam	
137612	HP1 - Burnt Ground 0.10	25/05/2018	29/05/2018	Silty loam	
137613	WS2 0.30	25/05/2018	29/05/2018	Silty clayey loam + Stones	
137614	WS3 0.10	25/05/2018	29/05/2018	Silty loam	
137615	WS1 0.40	25/05/2018	29/05/2018	Silty loam	
137616	WS4 0.20	25/05/2018	29/05/2018	Silty loam	
137617	WS8 0.20	25/05/2018	29/05/2018	Sandy silty loam	
137618	TP26 0.60	25/05/2018	29/05/2018		
137619	WS6 0.50	25/05/2018	29/05/2018		
137620	WS1 0.15	25/05/2018	29/05/2018		
137621	WS2 0.10	25/05/2018	29/05/2018		
137622	WS3 0.30	25/05/2018	29/05/2018		
137623	WS4 0.50	25/05/2018	29/05/2018		
137624	WS5 0.15	25/05/2018	29/05/2018		
137625	WS5 0.30	25/05/2018	29/05/2018		
137626	WS7 0.15	25/05/2018	29/05/2018		
137627	WS7 0.40	25/05/2018	29/05/2018		
137628	WS8 0.70	25/05/2018	29/05/2018		
137629	WS8A 0.00	25/05/2018	29/05/2018		

Results Summary

Report No.: 18-17774

			ELAB Reference	137610	137611	137612	137613	137614
			Customer Reference					
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP126	WS6	HP1 - Burnt Ground	WS2	WS3
			Sample Depth (m)	0.20	0.10	0.10	0.30	0.10
			Sampling Date	25/05/2018	25/05/2018	25/05/2018	25/05/2018	25/05/2018
Determinand	**Codes**	**Units**	**LOD**					
Metals								
Arsenic	M	mg/kg	1	4.4	4.9	20.5	^ 8.1	9.1
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	^ < 0.5	0.5
Chromium	M	mg/kg	5	19.6	12.8	31.9	^ 23.6	14.0
Copper	M	mg/kg	5	13.6	6.8	616	^ 43.7	17.7
Lead	M	mg/kg	5	30.3	20.7	47.5	^ 10.4	21.1
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	^ < 0.5	< 0.5
Nickel	M	mg/kg	5	8.6	7.3	12.8	^ 15.9	10.3
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	^ < 1.0	< 1.0
Zinc	M	mg/kg	5	91.2	40.6	545	^ 62.2	316
Inorganics								
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous								
pH	M	pH units	0.1	6.7	6.1	8.8	^ 7.2	6.4
Total Organic Carbon	N	%	0.01	0.85	0.79	2.1	0.13	0.89
Polyaromatic hydrocarbons								
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	0.2	0.1	< 0.1	^ < 0.1	0.2
Pyrene	M	mg/kg	0.1	0.2	< 0.1	< 0.1	^ < 0.1	0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Chrysene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Benzo (b) fluoranthene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	0.3	< 0.1	< 0.1	^ < 0.1	0.2
Benzo (a) pyrene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	^ < 0.1	0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	^ < 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	0.2	< 0.1	< 0.1	^ < 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	1.6	< 0.4	< 0.4	^ < 0.4	0.8

Tests marked N are not UKAS accredited.
The Environmental Laboratory Ltd. Reg. No. 3882193

Results Summary

Report No.: 18-17774

ELAB Reference		137615	137616	137617
Customer Reference				
Sample ID				
Sample Type		SOIL	SOIL	SOIL
Sample Location		WS1	WS4	WS8
Sample Depth (m)		0.40	0.20	0.20
Sampling Date		25/05/2018	25/05/2018	25/05/2018
Determinand	**Codes**	**Units**	**LOD**	
Metals				
Arsenic	M	mg/kg	1	6.2	4.6	8.6
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	22.1	13.9	17.5
Copper	M	mg/kg	5	11.7	10.0	34.4
Lead	M	mg/kg	5	11.5	14.1	185
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	12.8	7.5	10.8
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	59.4	40.2	138
Inorganics						
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8
Miscellaneous						
pH	M	pH units	0.1	7.0	5.7	6.5
Total Organic Carbon	N	%	0.01	0.23	0.13	0.66
Polyaromatic hydrocarbons						
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	0.2
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	0.8
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	0.7
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	0.4
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	0.5
Benzo (b) fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	0.5
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	0.7
Benzo (a) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	0.4
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	< 0.1	< 0.1	0.3
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	0.3
Total PAH(16)	M	mg/kg	0.4	< 0.4	< 0.4	5.0

Tests marked N are not UKAS accredited.

ELAB
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Results Summary

Report No.: 18-17774

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
137610	0.20	TP126	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137611	0.10	WS6	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137612	0.10	HP1 - Burnt Ground	Brown soil, stones, clinker, twigs, metal	No asbestos detected	n/t	n/t	n/t	n/t
137613	0.30	WS2	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137614	0.10	WS3	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137615	0.40	WS1	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137616	0.20	WS4	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
137617	0.20	WS8	Brown soil, stones, glass	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 18-17774

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	31/05/2018	110	Colorimetry
pH	M	Air dried sample	31/05/2018	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	31/05/2018	118	ICPMS
PAH (GC-FID)	M	As submitted sample	31/05/2018	133	GC-FID
Total organic carbon/Total sulphur	N	Air dried sample	31/05/2018	210	IR
Asbestos identification	U	Air dried sample	31/05/2018	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 18-17774

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)
Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

APPENDIX 1 – GAS MONITORING RESULTS

Gas Monitoring Results

Continuous Gas Monitoring Record

Date	18/06/2018	Engineer	SN
Project No	LP01649	Temp °C	19
Site	Fontwell	Ambient Pressure	1017

WS1

Hole ID

VOC peak (ppm)	0.00
VOC steady (ppm)	0.00
Borehole Depth (mbgl)	4.05
Water level (mbgl)	3.19
Borehole Pressure (Pa)	0.00

Time	Flow (ʃ/h)	CH^4 (%)	CO^2 (%)	O^2 (%)	CO (ppm)	H^2S (ppm)
00:00	0.00	0.00	0.00	20.60	0.00	0.00
00:15	0.00	0.00	0.00	20.80	0.00	0.00
00:30	0.00	0.00	0.00	20.80	0.00	0.00
01:00	0.00	0.00	0.00	20.80	0.00	0.00
01:30	0.00	0.00	0.00	20.70	0.00	0.00
02:00	0.00	0.00	0.00	20.70	0.00	0.00
02:30	0.00	0.00	0.00	20.60	0.00	0.00
03:00	0.00	0.00	0.00	20.60	0.00	0.00
03:30		0.00	0.00	20.60	0.00	0.00
04:00		0.00	0.00	20.60	0.00	0.00
04:30						
05:00						

*Measured as -25/0

WS2

VOC peak (ppm)	2.20
VOC steady (ppm)	0.40
Borehole Depth (mbgl)	2.95
Water level (mbgl)	2.06
Borehole Pressure (mb)	0.00

Time	Flow (ʃ/h)	CH^4 (%)	CO^2 (%)	O^2 (%)	CO (ppm)	H^2S (ppm)
00:00	0.00	0.00	0.00	20.60	0.00	0.00
00:15	0.00	0.00	0.00	20.60	0.00	0.00
00:30	0.00	0.00	0.00	20.60	0.00	0.00
01:00	0.00	0.00	0.00	20.60	0.00	0.00
01:30	0.00	0.00	0.00	20.50	0.00	0.00
02:00	0.00	0.00	0.00	20.50	0.00	0.00
02:30	0.00	0.00	0.00	20.60	0.00	0.00
03:00	0.00	0.00	0.00	20.50	0.00	0.00
03:30		0.00	0.00	20.50	0.00	0.00
04:00		0.00	0.00	20.50	0.00	0.00
04:30						
05:00						

Continuous Gas Monitoring Record

Date	07/06/2018	Engineer	SN
Project No	LP01649	Temp °C	18
Site	Fontwell	Ambient Pressure	1013

WS5

Hole ID

VOC peak (ppm)	2.90
VOC steady (ppm)	2.90
Borehole Depth (mbgl)	3.65
Water level (mbgl)	1.67
Borehole Pressure (Pa)	0.00

Time	Flow (ʃ/h)	CH^4 (%)	CO^2 (%)	O^2 (%)	CO (ppm)	H^2S (ppm)
00:00	0.00	0.00	0.00	20.60	0.00	0.00
00:15	0.00	0.00	3.60	18.60	0.00	0.00
00:30	0.00	0.00	3.80	18.10	0.00	0.00
01:00	0.00	0.00	3.80	18.10	0.00	0.00
01:30	0.00	0.00	3.80	18.00	0.00	0.00
02:00	0.00	0.00	3.80	18.00	0.00	0.00
02:30	0.00	0.00	3.80	18.00	0.00	0.00
03:00	0.00	0.00	3.90	18.00	0.00	0.00
03:30		0.00	3.80	18.00	0.00	0.00
04:00		0.00	3.90	18.00	0.00	0.00
04:30						
05:00						

*Measured as -25/0

WS7

VOC peak (ppm)	4.40
VOC steady (ppm)	4.40
Borehole Depth (mbgl)	4.03
Water level (mbgl)	3.98
Borehole Pressure (mb)	0.00

Time	Flow (ʃ/h)	CH^4 (%)	CO^2 (%)	O^2 (%)	CO (ppm)	H^2S (ppm)
00:00	0.00	0.00	0.00	20.20	0.00	0.00
00:15	0.00	0.00	0.20	20.30	0.00	0.00
00:30	0.00	0.00	0.40	20.20	0.00	0.00
01:00	0.00	0.00	0.60	20.20	0.00	0.00
01:30	0.00	0.00	0.70	19.90	0.00	0.00
02:00	0.00	0.00	0.80	19.80	0.00	0.00
02:30	0.00	0.00	0.90	19.60	0.00	0.00
03:00	0.00	0.00	0.90	19.50	0.00	0.00
03:30		0.00	1.10	19.40	0.00	0.00
04:00		0.00	1.20	19.20	0.00	0.00
04:30		0.00	1.30	19.10	0.00	0.00
05:00		0.00	1.30	19.00	0.00	0.00

Continuous Gas Monitoring Record

Date	18/06/2018	Engineer	SN
Project No	LP01649	Temp °C	19
Site	Fontwell	Ambient Pressure	1017

WS5

Hole ID

VOC peak (ppm)	1.50
VOC steady (ppm)	1.00
Borehole Depth (mbgl)	3.56
Water level (mbgl)	1.76
Borehole Pressure (Pa)	0.00

Time	Flow (ʃ/h)	CH^4 (%)	CO^2 (%)	O^2 (%)	CO (ppm)	H^2S (ppm)
00:00	0.00	0.00	0.00	20.60	0.00	0.00
00:15	0.00	0.00	0.00	21.20	0.00	0.00
00:30	0.00	0.00	0.00	21.00	0.00	0.00
01:00	0.00	0.00	0.00	21.00	0.00	0.00
01:30	0.00	0.00	0.00	21.00	0.00	0.00
02:00	0.00	0.00	0.00	21.00	0.00	0.00
02:30	0.00	0.00	0.00	21.00	0.00	0.00
03:00	0.00	0.00	0.00	21.00	0.00	0.00
03:30		0.00	0.00	21.00	0.00	0.00
04:00						
04:30						
05:00						

*Measured as -25/0

WS7

VOC peak (ppm)	4.10
VOC steady (ppm)	4.00
Borehole Depth (mbgl)	4.08
Water level (mbgl)	4.02
Borehole Pressure (mb)	0.00

Time	Flow (ʃ/h)	CH^4 (%)	CO^2 (%)	O^2 (%)	CO (ppm)	H^2S (ppm)
00:00	0.00	0.00	0.00	21.00	0.00	0.00
00:15	0.00	0.00	1.40	20.50	0.00	0.00
00:30	0.00	0.00	2.10	18.90	0.00	0.00
01:00	0.00	0.00	2.40	18.20	0.00	0.00
01:30	0.00	0.00	2.60	17.90	0.00	0.00
02:00	0.00	0.00	2.70	17.80	0.00	0.00
02:30	0.00	0.00	2.70	17.80	0.00	0.00
03:00	0.00	0.00	2.70	17.80	0.00	0.00
03:30		0.00	2.70	17.70	0.00	0.00
04:00		0.00	2.70	17.70	0.00	0.00
04:30						
05:00						