

Desk Study, Site Investigation & Risk Assessment Report



Desk Studies | Risk Assessments | Site Investigations | Geotechnical | Contamination Investigations | Remediation Design and Validation

Site: Land South of Maringdean Acres, Billingshurst, West
Sussex

Client: A2Dominion New Homes Ltd.

Report Date: 1st November 2016

Project Reference: J12785

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FS 29280

EMS 506775

OHS 506776



SUMMARY

The site, which extends to about 3.86ha, comprises 2 sloping agricultural fields meeting at a common boundary on the lowest part of the site, where there is a tree lined ditch. It is proposed to redevelop the site with 45 detached, semi-detached and terraced houses.

Geological records indicate the site to be underlain by the Weald Clay Formation.

A historical Ordnance Survey map search and desk study was carried out and indicates that the site has a history of agricultural use.

A single phase of intrusive investigation was carried out following an earlier Desk Study, DS2600 dated November 2015.

The soils encountered generally comprised stiff silty clay overlying interbedded clay/mudstone overlying mudstone.

Groundwater was only encountered as a slight seepage in one location on the lower ground at around 2.9m. Groundwater levels may rise and an allowance for periodic pumping from sumps within the main excavation should be made.

The sulphate content of the fill and natural soil was found to fall within Class DS-1. The ACEC classification for the site is AC-1s.

An allowable bearing capacity of 125kPa is recommended. NHBC High Volume Change Potential precautions will apply.

Suspended floor slabs are advised.

The site has locally steep slopes and some additional investigation is recommended to help assess the risks and requirements for any remediation/slope stability measures that might be required.

There is no evidence of any soil/groundwater or landfill gas contamination. The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

A formal remediation strategy and verification plan should be agreed with the regulatory authorities prior to commencement of any remedial works, should any hitherto undiscovered contamination come to light.

The site investigation was conducted and this report has been prepared for the sole internal use and reliance of A2Dominion New Homes and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.



Phase 1A and 1B, Ridgewood Farm, Uckfield

Ground Investigation Report

For

Taylor
Wimpey

October 2017

Hydrock Ref: RWF-HYD-XX-GI-RP-GE-1000-S2-P4

Contract No.: C161399



Executive Summary and Conceptual Site Model

SITE INFORMATION AND SETTING	
Report Purpose	Phase 2 interpretative ground investigation and risk assessment.
Client	Taylor Wimpey.
Site Name and Location	Phase 1A and 1B Ridgewood Farm, Off Lewes Road, Uckfield, East Sussex, TN22 5TB
Proposed Development	Residential housing with associated gardens, public open space and infrastructure.
PHASE 1 (DESK STUDY + WALK-OVER)	
Current Land Use and Description	Historically farmland. Currently used as open land with some corn crops grown in the west.
Previous Site Data	WSP Ground Investigation Report, for Taylor Wimpey, November 2014.
PHASE 2 – GROUND INVESTIGATION	
Hydrock Site Works	The Hydrock ground investigations (2016-2017) comprised: • 4 cable percussive borehole to 6.5m-15.5m bgl; • 4 window sample boreholes to a maximum depth of 4.0m bgl; • 13 trial pits to a maximum depth of 3.0m bgl; • 3 infiltration tests; • chemical testing of soils, and geotechnical testing of soils; • 3 installations of gas and groundwater monitoring; and • 6 monitoring visits over the course of 12 weeks of gas and groundwater levels.
Ground Conditions Encountered (All Data)	Ground conditions below the site to comprise: • Topsoil – to between ground level and 0.25m below ground level (bgl), comprising clay with occasional bands of gravel, sand, roots and rootlets. • Made Ground – in localised areas, to between ground level and 0.8m below ground level (bgl), typically comprising sandy clay with gravel of brick, chalk, flint, glass and mudstone; over • Tunbridge Wells Sand Formation – to between 0.25m-5.0m, comprising, sands, silts, gravels and clays, limestones and mudstones (in the north of the site above 40mOD). • Wadhurst Clay Formation – proven to between 0.80m and 15.50m bgl, comprising clay becoming mudstone as weathering decreases, with calcareous and iron nodules and fossilised wood fragments.
Groundwater Encountered (All Data)	Groundwater is present in the Wadhurst Clay Formation at shallow depths (typically approximately 1.6m). Groundwater levels have been monitored at depths of around 2.4m to 6.2m. A stream passes through the site. Drainage trends towards the stream. Due to the underlying geology, infiltration rates to the underlying strata is limited and so soakaways to control surface water are likely to be ineffective. There is no visual or olfactory evidence of contamination in any of the soils investigated at the site.
GEO-ENVIRONMENTAL ASSESSMENT AND CONCLUSIONS	
Conclusions of Contamination Generic Risk Assessment (All Data)	Ground gases or vapours: 6 rounds of ground gas monitoring data have been undertaken. The site is considered low risk from ground gases and CS2 or Green conditions apply. Radon: • The site is not in a Radon Affected Area.



(Including Guidance on Gas Protection Measures)	Water supply pipes: standard pipework is envisaged subject to confirmation with the water supply company.
Proposed Mitigation Measures	No remedial measures are considered necessary at the site in respect of contamination.
Waste Management	Testing carried out indicated the presence of hydrocarbons in the soils. Subject to further testing, it would be reasonable to assume that the soil would be classified as inert or non-hazardous for waste purposes.
GEOTECHNICAL CONCLUSIONS	
Obstructions	The site had been ploughed restricting some of the tests to areas of harder ground areas. The only obstructions encountered were possible services and land drains should be anticipated.
Groundworks and Earthworks	Excavation to proposed founding depth generally should be achievable with standard excavation plant. Trial pit faces generally remained vertical and stable. Water seepages into excavations are likely to be adequately controlled by sump pumping. Excavated soils should be reuseable as follows: • Topsoil – reuseable as landscaping material only; • Made Ground – reuseable as landscaping material only. • Natural soils – reusable subject to an earthworks specification.
Foundations	Traditional strip or trench fill foundations are considered suitable for the proposed development. Based on the design soil parameters provided in earlier sections of this report, as a guide, an allowable net bearing pressure of 120kN/m² should be available for a strip or trench fill foundation bearing at least 300mm into the natural Wadhurst Clay Formation and Lower Tunbridge Wells Sand (fine) soils for foundations up to 1m wide. The Wadhurst Clay and Tunbridge Wells Sand Formations should be considered as of high volume change potential. A minimum foundation depth of 1.00m below final ground level is required, and extending to below any Made Ground or Fill, to a competent horizon in the underlying natural ground. Deepening of foundations will be required where they are in influence distance of trees. Accordingly some foundations will be deeper than 2.50m and piled foundations should be considered for these. Piled foundations. Where piles are adopted, these should penetrate to below the zone of shrinkage / swelling and to a suitable embedment depth depending on the pile design. Bored or driven piles should be suitable.
Ground Floor Slabs	As clay soils of high volume change potential are present at the site, it is recommended that suspended floor slabs should be adopted, in accordance with NHBC Standards.
Road Pavement Design (CBR)	An equilibrium CBR of 3% is recommended for preliminary design, subject to <i>in situ</i> testing.
Soakaways	Soakaway drainage is not considered suitable for the site.
Buried Concrete	Design Sulfate Class - DS-1 and ACEC Class AC-2z. Equivalent to Design Chemical Class DC-2z for a 50 year design life.
FUTURE CONSIDERATIONS	
Further Work	The following further works will be required: • discussions with piling contractors regarding their method for emplacing piles; • discussions with service providers regarding the materials suitable for pipework etc.;



	• discussions with regulatory bodies regarding the conclusions of this report; • foundation depth in relation to trees assessment, following a tree survey to BS 5837:2012; and • detailed design of foundations.
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This Executive Summary forms part of Hydrock Consultants Limited report number RWF-HYD-XX-GI-RP-GE-1000-S2-P2.1 and should not be used as a separate document.



Barratt Homes

Cuckoo Fields and Ersham Park

Phase 2 Supplementary Geo-environmental Site Investigation

1921129-R01 (00)

December 2020



UPDATED GROUND INVESTIGATION REPORT

for the land off

GOLDRIDGE ROAD, NEWICK,

LEWES, BN8 4QP

on behalf of

THAKEHAM HOMES



EXECUTIVE SUMMARY		
Site Details	Site Address	Land off Goldridge Road, Newick, Lewes, BN8 4QP
	National Grid Reference	542220, 121190
	Site Area	3.68Ha (approx.)
	Form of Development	The development is understood to comprise of the construction of residential properties with private gardens amenity soft landscaping car parking, access road and associated development infrastructure.
Encountered Conditions	Scope of works	The investigation included a desk study and preliminary investigation coupled with intrusive investigations (undertaken in two phases, July 2016 and February 2017) and laboratory testing to inform a geotechnical and geo-environmental assessment.
	Ground Conditions	The ground conditions generally comprised a mantle of Topsoil overlying sand, silt and clay of the Upper Tunbridge Wells Sand Formation.
	Groundwater	Perched water was encountered within WS10 during the intrusive investigation works at 1.03m and 2.55m bgl and within WS7 and WS12 during the return gas and groundwater monitoring visits at depths between 1.95m and 2.26m bgl. Groundwater was not encountered within any of the additional trial pits undertaken TP101-112 within the Phase 2 investigation undertaken in Feb 2017.
Geotechnical Considerations	Foundations	Conventional foundations are considered to be suitable for the ground conditions encountered within the exploratory holes. The minimum founding depth of 0.75m is recommend based on the volume change potential of the soils (excluding the data obtained from WS7 which is now located outside (and to the east) of the proposed development area initially investigated, inclusion of this areas would require a minimum founding depth of 0.90m bgl as previously advised in version 2.0 of the report. However, foundations will also need to extend through any root zones identified. A net allowable bearing capacity of 100kPa is recommended for the clay, silt and sand of the Upper Tunbridge Wells Sands.
	Floor Slabs	Suspended floor slabs are recommended due to the presence of shrinkable soils at shallow depth over many areas of the site.
	Excavations	Shallow excavations are likely to remain marginally stable in the short term. Deeper excavations and any which encounter water are likely to become unstable rapidly. Under no circumstances should personnel be permitted to enter excavations during construction or maintenance.
	Pavements	A CBR value of 2% is recommended based on the geology encountered, in situ testing and laboratory testing.
	Drainage	Whilst soakaways may be suitable for areas underlain by the more sandy horizons of the Upper Tunbridge Wells Sand Formation, soakaways are less likely to function in more silty horizons and alternative means of rainfall run-off disposal should be considered.
	Buried Concrete	Buried concrete for shallow foundations should be designed to Class DS1 (AC1).
Environmental Considerations	Human Health	Pesticides including Dieldrin, DDT and DDE have been identified at low levels within the shallow Topsoil on site, given the limited testing undertaken and the banned nature of DDT and DDE it was considered that further analysis was required across the wider site to determine the lateral and vertical extent and concentrations on the contaminants to determine the level of any remediation measures required. The further testing undertaken in Feb 2017 has demonstrated that the concentrations of DDE and DDT are present within the wider topsoil across the site but in low concentrations and are not present within the natural soils underlying the site. Dieldrin has also been identified at low levels within the topsoil only but is noted to be below respective standards. Based on

		the wider analysis of the site it is considered that whilst low levels of the contamination DDT and DDE are present for which no comparison standards exist, the risk to controlled water and human health from the wider site is low and as such it is considered that no specific remediation measure are required in this respect.
	Groundwater	In the absence of any specific pollutant linkages, no risk mitigation measures are considered to be required.
	Ground Gases	An offsite source of ground gases has been identified to the north of the site. Gas monitoring on the site has shown that gas protection measures in line with CS2/Amber 2 are required for the site.
	Radon Gas	No radon protection measures are required.
	Built Environment	It is anticipated that standard water supply pipe would be suitable on this site.
	Waste Disposal	Waste Acceptance Criteria testing was outside the scope of the works undertaken. Once soils for disposal have been identified WAC testing should be undertaken.
Further Action: • Provision of a Remediation Method Statement (RMS) for the site to detail proposed gas protection measures. • Installation of gas protection measures in line with CS2/Amber 2. These works should be independently overseen and validated at key stages by Geo-Environmental. • If abnormal conditions are encountered, Geotechnical/Geo-Environmental advice should be sought to determine a suitable source of action. • Provision of a Validation Report to verify the works undertaken in line with the RMS with respect to gas protection measures.		
<i>This Executive Summary is intended to provide a brief summary of the main findings and conclusions of the investigation. For detailed information, the reader is referred to the main report ref. GE15497/GIRv3.0/NOV22.</i>		



Report
Title: **Phase 1 Geo-Environmental
Desk Study**

Project
Name: **Cuckoo Fields and Ersham
Park, Land south of Hailsham**



Report Reference: **BRD2323-OR3-C**
Date: **January 2019**

SUMMARY REPORT

SUBJECT	COMMENTS
CURRENT USE & DESCRIPTION	The site totals 27.0 hectares and is located south of the existing built development of Hailsham. It comprises a number of agricultural fields which is divided by the Cuckoo Trail, a permissive path running north south through the site, creating two distinct parcels of land. The eastern parcel is referred to as Cuckoo Fields. The western parcel is referred to as Ersham Park.
PROPOSED USE	Outline application for the erection of up to 400 residential dwellings including affordable housing, provision of new vehicular access from Ersham Road and the upgrading of the existing vehicular access from Station Road. Provision of new pedestrian and cycle access and the provision of open spaces, sustainable urban drainage systems, associated landscaping, infrastructure and earthworks.
HISTORICAL SUMMARY	The site has remained as undeveloped agricultural fields throughout its history. The exception being the small section of the Cuckoo Trail which connects the two land parcels which was a former railway that predates the historical mapping. Adjacent to the north west boundary of Cuckoo Fields, the current industrial estate is the location of a former infilled brick works which was operating from the early 1900s until it was redeveloped in the 1970s.
PUBLISHED GEOLOGY	The site is shown to be devoid of superficial deposits in published geology maps, however, limited Alluvial deposits are possible around the watercourses. The site is underlain by the bedrock geology of the Tunbridge Wells Sand Formation and the Weald Clay Formation. A geological fault is indicated to be running through both the southern and northern areas of the site.
RADON GAS	The site is in an area where no radon protection measures are required in new dwellings.
HYDROGEOLOGY	The underlying bedrock geology of the Tunbridge Wells Sand Formation is designated a Secondary A Aquifer while the Weald Clay Formation is designated as Unproductive Strata. The site is not located within a groundwater Source Protection Zone.
HYDROLOGY	The closest water features to the site are a number of ponds, a stream and ditches located across the site. The site is not in an area indicated to be at risk of flooding.
PREVIOUS GROUND REPORTS	BRD is not aware of any previous ground investigations having been conducted at the site.

PRELIMINARY CONTAMINATION RISK ASSESSMENT

Generally, the site vast majority of the site should be considered as uncontaminated, however the following localised sources of contamination have been identified:

- In Cuckoo Fields, the onsite area of imported construction waste used for vehicle storage next to New Barn Farm and the offsite former brick works / industrial estate.
- In Ersham Park, the onsite reworked ground / earthworks associated with the drainage infrastructure and the offsite cemetery.

In respect of the onsite sources, these are considered to only result in potential risks to future residents and water supply pipes with no risks to the groundwater environment being identified. However, the offsite sources do have the potential to result in the migration of gases as well as the migration of potentially contaminated groundwater to the future development site.

PRELIMINARY GEOTECHNICAL ASSESSMENT

In general, the anticipated ground conditions are typically suitable for conventional foundations. Depending on the variability of the underlying soils, there may be some plots that require deepened foundations and/or nominal mesh reinforcement where different strata are encountered.

On the basis of the anticipated geological strata, it is considered that soakaways may be feasible in select areas of the site if granular deposits are encountered within the Tunbridge Wells Sand Formation. It is unlikely that the Weald Clay Formation in the southern area of the site will be feasible for soakaways as it is usually quite cohesive.

New development adjacent to the infilled brick pit and the railway cutting may need to consider the stability of slopes where the buildings are constructed in close proximity.

RECOMMENDATIONS

The majority of the site is considered to be uncontaminated, however, localised areas of the site have been identified to offer potential contamination risks to on-site receptors. These risks could be easily addressed as part of any future site investigation. It should be noted that a geotechnical ground investigation will be required for the site in any case and a Phase 2 Contamination Assessment is considered necessary to assess the significance of the identified potential pollutant linkages.

1. INTRODUCTION TO TECHNICAL REPORT

1.1. CONTRACT DETAILS

CLIENT	Gleeson Strategic Land Ltd and Rydon Homes Ltd trading as Gleeson Strategic Land and Rydon Homes.
SITE	Land situated at Cuckoo Fields and Ersham Park, Land south of Hailsham, Hailsham, East Sussex.
CLIENT'S ADVISORS	BRD Environmental Limited (BRD) has been commissioned directly by the Client.
REPORT CONTEXT	It is understood that the Client is seeking to gain outline planning permission to redevelop the site for residential housing.
REPORT TYPE	Factual and interpretative geo-environmental desk study.
REPORT OBJECTIVES	Two previous preliminary geo-environmental assessments were completed by BRD for the Client for two adjacent land parcels in June 2015. However, the two parcels have now been combined along with further additional boundary changes to form a new planning application site. The purpose of this report is therefore to produce an updated preliminary geo-environmental assessment in order to support a planning application that reflects the proposed new development site. This Version C report issue reflects a change to the site boundary and an increase in the overall application site area.

1.2. SCOPE OF WORKS

The agreed scope of works was:

- Review of initial desk study reports.
- Review of the Envirocheck database report and historical Ordnance Survey plans from both of the previous desk study reports.
- Interpretation of the geological, hydrogeological and hydrology setting of the site from published sources.
- A site walkover survey by a suitably experienced Geo-Environmental Consultant involving the inspection of the site and the surrounding area for indications of contamination and other ground related issues.
- Prepare a factual and interpretative report based on the information collected to identify and assess any geotechnical or contamination hazards. Where appropriate, it shall provide detailed recommendations for further work.

5 GEO-ENVIRONMENTAL ASSESSMENT

5.1 Supplementary conceptual site model (CSM)

Based on RSK's supplementary works, the following potential complete pollutant linkages could be present on site within the area of interest which could cause a risk to the proposed development (i.e. proposed receptors).

It is noted that proposed receptors at risk based on this supplementary assessment are:

- Future site users and adjacent site users (residents and visitors);
- Future vegetation;
- Proposed building structures (i.e. foundations and potable water supply pipes); and
- Underlying secondary A aquifer within the natural soils (Tunbridge Wells Sand Formation).

Based on the above identified receptors at risk, the following pollutant linkages might be present on site within areas of interest.

- Oral, dermal and inhalation exposure with impacted soil, soil vapour and dust by future residents, visitors and adjacent site users;
- Inhalation exposure of future residents, visitors and adjacent site users to asbestos fibres;
- Uptake of contaminants by proposed vegetation potentially impacting plant growth (phytotoxicity);
- Chemical attack of impacted soils via direct contact to proposed building structures (potable water supply pipes and foundation); and
- Leaching of soil contaminants and dissolved phase migration to the underlying secondary aquifer.

5.2 Linkages for assessment

As described in LCRM (Environment Agency, 2020), there are two stages of quantitative risk assessment (QRA), Tier 2 generic (GQRA) and Tier 3 detailed (DQRA). The GQRA comprises the comparison of soil, groundwater, soil gas and ground gas results with generic assessment criteria (GAC) that are appropriate to the linkage being assessed. This comparison can be undertaken directly against the laboratory results or following statistical analysis depending upon the sampling procedure that was adopted. This assessment relates to LCRM Stage 1, Tier 2 generic quantitative risk assessment

The potentially complete contaminant linkages (identified in **Section 5.1**) that require further assessment and the methodology of assessment are presented in **Table 8**.

20 April 2022
1921129L02 (00)

Mr S Singh
Barratt David Wilson
Via email

HAILSHAM – CUCKOO FIELDS AND ERSHAM PARK – REMEDIATION STRATEGY

Dear Sir,

Background

RSK Environment Limited (RSK) were commissioned by Barratt David Wilson Limited (BDW) to produce a Remediation Strategy for the above site.

This letter report is subject to the Service Constraints given in Appendix A.

Previous Site Investigation

RSK have produced a site Investigation report ref 1921129 R01 (01) dated 24 December 2021 which details the findings of intrusive works undertaken to date.

The findings of the site investigation identified 4 Areas of Interest (AOI) in terms of potential remediation. These are discussed in detail within Section 7 and shown on Figures 2 and 4 of the report but summarised as follows:

A01 – situated within RM2

Including trial pits 101-109. Area of hardcore hardstanding. In this area the made ground material is to be removed offsite to a suitably licenced landfill, or potentially (subject to handpicking of asbestos fragments) if there are areas upon the development site where this material is required to increase levels and then not disturbed, then this material may be placed at a minimum depth of 600 mm below final ground level.

Once removed verification testing should be carried out to ensure that the remaining soils are acceptable for their intended proposed end use.

A02 – situated within RM2

Including trial pits 110-112. Stockpile of degraded haybales and banded soil. The soils were assessed as being uncontaminated and therefore re-use on site was possible. However, the haybales will require composting by intermixing with site derived topsoil before placement in development areas.



**INVESTORS
IN PEOPLE**

A03 – situated within partly in RM1 and partly in RM2

Including trial pits 113-114. Change in elevation associated with vehicle access track. It is proposed that this area is remediated by placing a layer of clean inert material (minimum 450 mm) over the access track as the levels are due to be raised locally.

A04 – situated within RM1

Including trial pits 115-116. Change in elevation associated with a drainage feature. The soils were assessed as being uncontaminated and therefore re-use on site is possible. However the levels are due to be raised throughout this area and therefore this material will remain in situ.

Should any undiscovered contamination and/or differing ground conditions be encountered then work should cease in that area until an assessment has been made by the geo-environmental consultant and, if necessary agreement made with relevant parties to the appropriate remediation.

We trust this is sufficient for your immediate needs however if further information is required please do not hesitate to contact myself.

Yours sincerely

For RSK Environment Ltd



Nigel Austin
Director

Enclosed:

Appendix A Service Constraints

Appendix B RSK Site Investigation Report ref 1921129 R01 (01)

APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for BDW (the "Client") in accordance with the terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the Client. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):
 - a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.
 - b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.

- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.
11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.
12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B
RSK SITE INVESTIGATION REPORT REF 1921129
R01 (01)



Barratt Homes

Cuckoo Fields and Ersham Park

Phase 2 Supplementary Geo-environmental Site Investigation

1921129-R01 (01)

December 2020





RSK GENERAL NOTES

Project No.: 1921129

Title: Phase 2 Supplementary Geo-environmental Site Investigation: Cuckoo Fields and Ersham Park, East Sussex, Hailsham BN27 3PN

Client: Barratt Homes

Date: 24th December 2020

Office: RSK Environment Limited, RSK c/o ADAS, Battlegate Road, Boxworth, Cambridge, CB23 4NN. Tel 01954 268200

Status: Rev 01

Author

Hazel Salkeld

Technical reviewer

Mark Steward

Signature

Signature

Project manager

Verity Macfarlane

Signature

Revision control sheet

Revision ref	Date	Reason for revision	Amended by:	Approved by:
Rev 00	21 st December 2020	First issue	n/a	See above
Rev 01	24 th December 2020	Detailed asbestos quantification testing complete	Verity Macfarlane	Mark Steward

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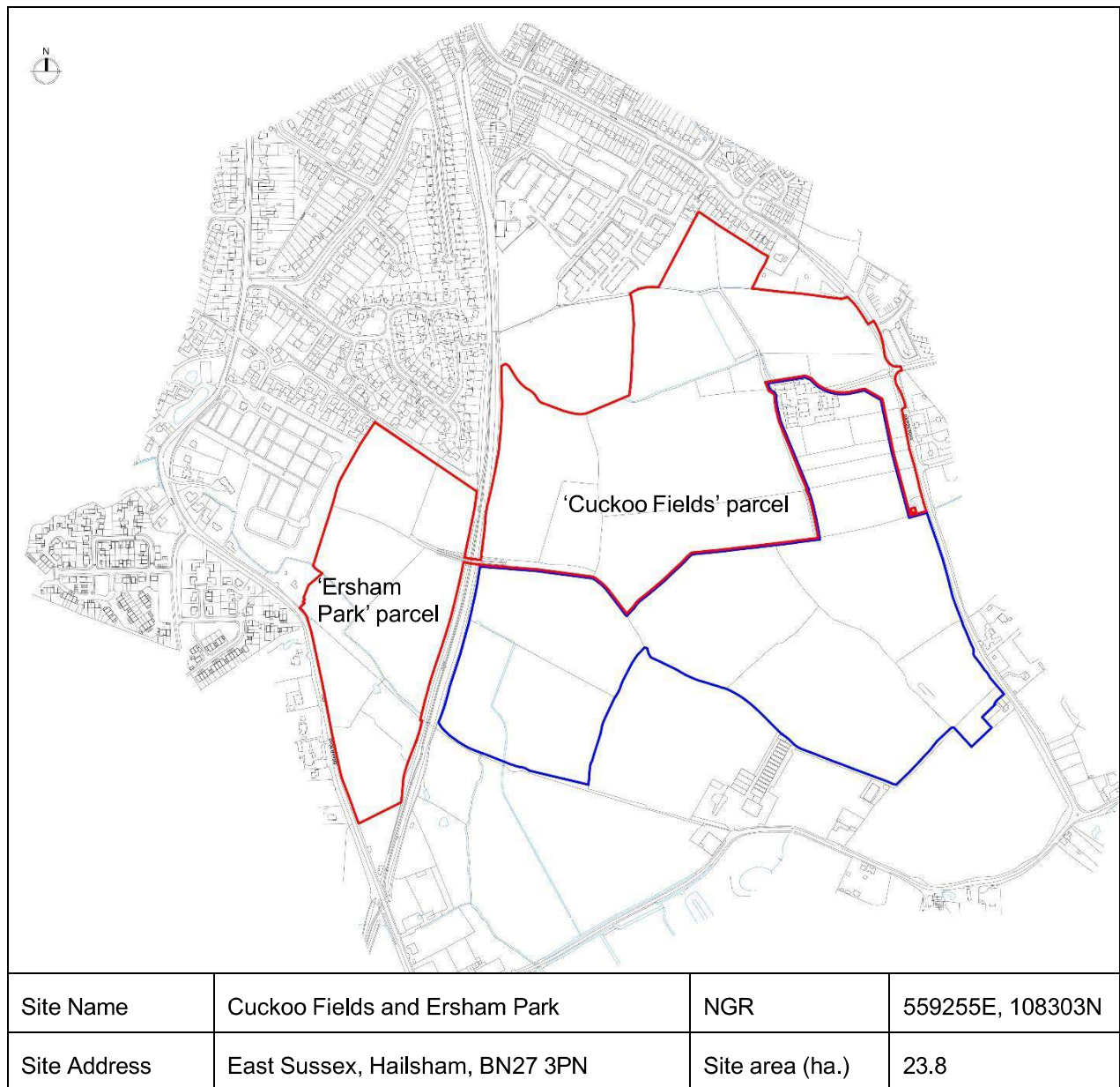
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1 INTRODUCTION

1.1 Commissioning

RSK Environment Limited (RSK) was commissioned by Barratt Homes carry out a Phase 2 Supplementary Geo-environmental Site Investigation of the land at Cuckoo Fields and Ersham Park East Sussex, Hailsham BN27 3PN.

The project was carried out to an agreed brief as set out in RSK's proposal (via email, dated 26th November 2020).

RSK conducted a walkover with the client on site on 30th November where a total of four areas of interest were identified agreed between RSK and the client to be investigated. It is noted that this differs slightly from the original proposal sent via email on 26th November 2020. The four areas of interest are summarised in **Section 2.2.1**.

RSK's service constraints are shown in **Appendix A**.

The Site in question is being considered for development for residential use.

1.2 Objectives

The objective of the work is:

- To identify any land contamination constraints to the proposed development and to support discharge of relevant planning conditions and relevant building control requirements; and
- To identify the need for any additional investigation or remediation works to demonstrate that the site is suitable for its proposed use.

1.3 Scope of works

The scope of this assessment has been developed in accordance with relevant British Standards and authoritative technical guidance as referenced through the report. The assessment of the contamination status of the site is in line with the technical approach presented in Land Contamination Risk Management (LCRM) (Environment Agency, 2020) – which supersedes CLR11 Model Procedures for Land Contamination – and in general accordance with BS 10175: 2011 + A2 2017 (BSI, 2017). It is also compliant with relevant planning policy and guidance.

The scope of the intrusive investigation has been designed in line with the recommendations of BS5930:2015+A1:2020 Code of practice for ground investigations (BSI, 2020), which maintains compliance with BS EN 1997-1 and 1997-2 and their related standards. It has also been developed in general accordance with BS 10175: 2011 + A2 2017. Ground gas assessment has been undertaken in general accordance with BS8576: 2013 and BS 8485:2015+A1:2019.

A brief summary of relevant legislation and policy relating to land contamination is given in **Appendix B**.

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

- Design and implementation of an intrusive investigation, soil sampling, and laboratory geo-environmental testing;
- Interpretation of data to develop a supplementary conceptual site model (CSM);
- Generic quantitative risk assessment (GQRA) of relevant contaminant linkages identified from the supplementary CSM;
- Preliminary assessment of the potential waste classification (hazardous / non-hazardous) implications of soil arisings; and
- Preparation of this factual and interpretative report with recommendations for further works (i.e. undertake a remedial options appraisal to identify appropriate mitigation measures/produce a remedial implementation and verification plan) and/or remediation as necessary.

1.4 Existing reports

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

- Idom Merebrook, Geo-environmental Assessment, ref: GEA-17627-18-44, dated March 2018;
- CGMS Heritage, Geophysical Survey Reports, dated January 2018 and June 2018;
- BRD Environmental Ltd, Phase 1 Geo-Environmental Desk, ref: BRD2323-OR3-C, dated January 2019; and
- IDOM Merebrook, Ersham Road, Hailsham – Investigation of Soft Ground Letter Report, ref: L-17627ag-2.4.2-19-S427-DCE, dated 2nd September 2019.

1.5 Limitations

This report is subject to the RSK service constraints given in **Appendix A** and limitations that may be described through this document.

The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

2 SITE DETAILS

2.1 Site location

Site location details are presented in **Table 1** and a site location plan is provided on **Figure 1**.

Table 1 Site location details

Site name	Cuckoo Fields and Ersham Park
Full site address and BN27 3PN	East Sussex, Hailsham BN27 3PN
National Grid reference (centre of site)	559255E, 108303N

2.2 Site description

The Site covers an area of c. 23.8 hectares and is currently occupied by agricultural farmland. The site comprises a number of agricultural fields which is divided by the Cuckoo Trail, a permissive path running north to south through the site, creating two distinct parcels of land.

The eastern parcel is referred to as 'Cuckoo Fields'. The western parcel is referred to as 'Ersham Park'.

In addition to the above the following features are present of site:

- An area of hardstanding was located in the north east of the site (within the 'Cuckoo Fields' parcel) which comprised imported hardcore and various dismantled vehicles along with some staining of hydrocarbons at the surface;
- A large stockpile of degraded haybales intermixed with soils is located within the 'Cuckoo Fields' parcel in the north of the site;
- Changes in site levels associated with a vehicle access track located either side of the Cuckoo Trail which is situated within the central part of the site (in both land parcels); and
- Change in site levels associated with a drainage feature installed within the western corner of the site (in the 'Ersham Park' parcel).

2.2.1 Areas of interest (AOI)

Based on the walkover conducted on 30th November 2020, the following areas of interest (AOI) were identified between RSK and the client. These areas would be investigated within the supplementary works to assess their potential contaminative status and risks to the proposed development.

The four areas of interest are summarised **Table 2**. Locations of these areas are presented in the post walkover plan shown in **Figure 2**.

Table 2 Area of interest (AOI)

area name	location of site	Parcel	Description
AOI#1	North east	'Cuckoo Fields' parcel	Imported of hardcore
AOI#2	North	'Cuckoo Fields' parcel	Stockpiles of degraded haybales and banded soils
AOI#3	Centre	Both parcels ('Cuckoo Fields' parcel and 'Ersham Park' parcel)	Change in elevation associated with vehicle access track
AOI#4	North western corner	Ersham Park' parcel	Change in elevation associated with drainage feature

2.3 Surrounding land uses

The Site is located in Hailsham, within a predominantly residential setting. Immediate surrounding land uses are described in **Table 3**.

Table 3 Surrounding land uses

North	Residential development with Station Road Industrial Estate to the north-west.
East	Station Road is adjacent to the east, beyond which there is Hailsham Household Waste Recycling Site and sewage works to the north-east and caravans / mobile homes to the east.
South	Agricultural Farmland.
West	Hailsham Cemetery with a new residential development to the north-west.

2.4 Development plans

The proposed development of the site is to include the erection of up to 400 residential dwellings with provision of new vehicular access from Ersham Road and upgrading of existing vehicular access from Station Road. In addition, the proposed development will also include the provision of new pedestrian and cycle access and open spaces along with sustainable urban drainage systems associated soft landscaping, infrastructure and earthworks.

According to Wealdon District Council planning portal; there is an active planning application pertaining to the site (WD/2018/0475/MAO).

The proposed layout of the site is shown in **Figure 3**.

3 SITE INVESTIGATION STRATEGY & METHODOLOGY

3.1 Introduction

RSK carried out intrusive investigation works between 3rd and 4th December 2020.

3.2 Objectives

The specific objectives of the investigation were as follows:

- To establish the ground conditions underlying the four areas of interest including the extent and thickness of any made ground;
- To determine groundwater depths; and
- To investigate specific potential sources of contamination from areas of interest that could be a risk to the proposed development.

3.3 Selection of investigation methods

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

Mechanically excavated trial pitting to obtain a number of investigation locations and achieve greater visibility of the Made Ground in targeted areas of the site.

3.4 Investigation strategy

The ground investigation was carried out using intrusive ground investigation techniques in general accordance with the recommendations of BS5930:2015+A1:2020, which maintains compliance with BS EN 1997-1 and 1997-2 and their related standards. Whilst every attempt was made to record full details of the strata encountered in the boreholes, techniques of hole formation and sampling will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

The investigation strategy involved targeted trial pits within the four areas of interest.

The constraints to the investigation were as follows:

- Services – pumped water drainage and foul sewage through fields, buried electrics and the new drainage feature installed to the far west of 'Ersham Park' parcel (AOI#4); and
- Stockpiled material (AOI#2) was significantly higher than the excavator could reach and would also cause instability. Therefore, the bottom of the stockpile was sampled.

Details of the investigation locations, installations and rationale are presented in **Table 4**. Sixteen machine excavated trial pits were dug to a maximum depth of 1.70m m bgl before being backfilled with soil arisings. An exploratory hole location plan is shown on **Figure 4**.

Table 4 Exploratory hole and monitoring well location rationale

Investigation Type	Number	Designation	Rationale Examples below
Trial-pits excavated by mechanical excavator	16	TP101 to TP116	To accurately log the upper strata and determine potential contamination in targeted locations beneath the areas of interest: - imported hardcore area (AOI#1 - TP101 to TP109) - stockpiled soil (AOI#2 - TP110 to TP112) - earthworks associated with vehicle access track (AOI#3 TP113 and TP114) - Earthworks associated with drainage feature (AOI#4 - TP115 and TP116). Collect samples from the shallow made ground soils and natural strata beneath to confirm lateral migration of potential contaminants.

3.4.1 Implementation of investigation works

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

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

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

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

Exploratory hole records are presented in **Appendix C**.

3.4.2 Health, safety and environment considerations

Service drawings were obtained for the site and specialist service clearance surveyors were on site to clear all positions before excavation works began.

3.5 Laboratory testing

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

3.5.1 Chemical analysis of soil samples

The soil sampling strategy was designed to characterise made ground and/or natural strata within the areas of interest to determine potential contamination and potential for contaminant migration from relevant sources of identified within are the areas of interest.

The programme of chemical tests undertaken on soil samples obtained from the intrusive investigation is presented in **Table 5** with the laboratory testing results contained in **Appendix D**.

Table 5 Summary of chemical testing of soil samples

Stratum	AOI	Tests undertaken	No. of tests
Made ground	AOI#1 (hardcore area)	pH, heavy metals (As, Cd, Cr, Cu, Hg, Pb, Ni, Se, Zn), water soluble and acid soluble sulphate, solid organic matter (SOM), asbestos screen, Poly Aromatic Hydrocarbons (Speciated PAH-16MS), Total Petroleum Hydrocarbons (TPH), BTEX and MTBE	9
		Asbestos ID and detailed quantification on positive identified asbestos	1
Made ground	AOI#3 (vehicle access track)	pH, heavy metals, water soluble and acid soluble sulphate, SOM, asbestos screen, PAH, TPH, BTEX and MTBE	2
Made ground	AOI#4 (drainage feature)		1
Topsoil	AOI#4 (drainage feature)		1
Soils within the stockpile	AOI#2		3
Natural soils beneath the stockpile	AOI#2	pH, heavy metals, water soluble and acid soluble sulphate, SOM, PAH, TPH, BTEX and MTBE	1
Natural soils	AOI#1 (hardcore area)		3

4 SITE INVESTIGATION FACTUAL FINDINGS

The results of the intrusive are detailed below.

4.1 Ground conditions encountered

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

Photographic records showing the excavation of each exploratory hole is presented in **Appendix E**.

The exploratory holes revealed that the site is underlain by a variable thickness of made ground over the Tunbridge Wells Formation encountered at depth. This appears to confirm the stratigraphical succession described within the previous geo-environmental investigation carried out by Idom Merebrook.

For the purpose of discussion, the ground conditions encountered during the fieldworks are summarised in **Table 6** with the strata discussed in subsequent subsections.

Table 6 General succession of strata encountered

Stratum	Exploratory holes encountered	Depth to top of stratum m bgl	Proven thickness (m)
Stockpiled soils (AOI#2)	TP110 to TP112	Above ground level	Estimated the stockpile is 0.9m tall
Made ground	TP101 to TP109, TP113 to TP115	Ground level	0.1 to 1.2
Topsoil	TP116	Ground level	0.10
Tunbridge Wells Sand Formation	All exploratory locations	From ground level at TP110 to TP112. From 0.1 to 1.2 (beneath made ground)	Confirmed to a maximum depth of 1.70m bgl

4.1.1 Stockpiled soils (AOI#2)

Stockpiled soils were encountered within TP110 to TP112 (AOI#2) and predominantly comprised brown sandy silty clay with fragments of brick, concrete, plastic, wire and timber. Hay bales were noted on top of the stockpile; however, these could not be reached by the excavator.

4.1.2 Made ground

4.1.2.1 *Made ground in AOI#1*

Made ground was proven in TP101 to TP109 (in AOI#1) from ground level to a depth ranging between 0.1m bgl and 0.5m bgl. The Made ground in this area generally comprised grey brown and black sandy clayey gravel with significant amounts of anthropogenically derived materials including concrete, clinker, brick, plastic, electric wires, tiles, metal, timber, cloth, horse manure and glass with occasional cobbles of concrete.

It was noted that slight hydrocarbon odours were identified within the made ground soils in TP101, TP104

4.1.2.2 *Made ground in AOI#3*

The two trial pits advanced along the raised vehicular access track either side of Cuckoo Trail (i.e. AOI#3) were dissimilar. The eastern access track (TP113) comprised dark brown sandy clayey gravel with inclusion of clinker from ground level to a maximum depth of 0.2m bgl. The track to the west (TP114) comprised grey and brown clayey sandy gravel with inclusions of concrete and brick as well as yellowish brown gravelly clayey silt with brick and concrete fragments. The made ground in TP114 was encountered at ground level and advanced to a maximum depth of 1.2m bgl.

4.1.2.3 *Made ground in AOI#4*

The two trial pits within AOI#4 encountered made ground soils only within TP115. The made ground within this exploratory hole was present from ground level and advances to a maximum depth of 0.3m bgl. This stratum comprised light brown gravelly clayey silt with fragments of brick. This soil is likely to be natural soils which have been reworked.

4.1.3 Topsoil

Topsoil was only encountered within TP116 (within AOI#4) from ground level to a maximum depth of 0.1m bgl. This stratum comprised brown sandy clayey silt.

4.1.4 Tunbridge Wells Sand Formation

This stratum was encountered beneath made ground and topsoil at depths ranging between 0.10m bgl and 1.2m. Exploratory holes terminated within this stratum and therefore the full thickness was not established. It is noted however that this stratum was confirmed to a maximum depth of 1.7m bgl. This stratum generally comprised firm to stiff, light yellowish-brown mottled light orange clayey silt. Rare coarse fragments of sandstone were noted in TP115 (AOI#4).

4.1.5 Visual/olfactory evidence of soil contamination

Various anthropogenic materials (detailed above) were identified within the shallow made ground soils within AOI#1, AOI#3 and in one exploratory hole from AOI#4 (i.e. TP115). It is also noted that anthropogenic materials were encountered within the stockpiled soils in AOI#2.

Trial pits TP101 and TP104 (within AOI#1) were noted to have slight olfactory evidence of hydrocarbons within the made ground. During headspace testing of soil samples from the made ground within these trial pits, both returned photo ionisation detectors (PID) results of below detection limits 0.0 parts per million (ppm).

PID headspace testing of made ground from all remaining trial pits returned no elevated PID results i.e. 0.0 ppm.

No visual evidence of asbestos was noted within any of the exploratory holes during the intrusive works.

4.2 Groundwater and surface water

4.2.1 Groundwater encountered during intrusive works

Groundwater was encountered during the intrusive investigation works as detailed on the logs in **Appendix C** and summarised in **Table 6**.

Table 7 Groundwater encountered

Exploratory hole ID	Area	Depth of groundwater seepages (m bgl)	Stratum
TP101	AOI#1	1.2	Tunbridge Wells Sand Formation
TP102	AOI#1	0.5	
TP104	AOI#1	0.7	
TP106	AOI#1	0.4	
TP108	AOI#1	0.5	
TP109	AOI#1	0.8	
TP110 to TP112	AOI#2	0.7	
TP114	AOI#3	1.7	

Based on the above table, groundwater seepages were encountered within the natural soils (Tunbridge Wells Sand Formation) and no perched groundwater was noted within the made ground soils or within the stockpiled soils.

It is noted that groundwater was not encountered within TP103, TP105, TP107, TP113 and TP115.

4.2.2 Visual/olfactory evidence of groundwater contamination

No visual or olfactory evidence of contamination of groundwater was noted during the site investigation works.

During the trial pitting investigation works there was heavy rainfall and visual evidence of hydrocarbons was noted on surface water on the hardstanding in AOI#1 (hardcore area), which appeared to originate from a partly dismantled vehicle.

5 GEO-ENVIRONMENTAL ASSESSMENT

5.1 Supplementary conceptual site model (CSM)

Based on RSK's supplementary works, the following potential complete pollutant linkages could be present on site within the area of interest which could cause a risk to the proposed development (i.e. proposed receptors).

It is noted that proposed receptors at risk based on this supplementary assessment are:

- Future site users and adjacent site users (residents and visitors);
- Future vegetation;
- Proposed building structures (i.e. foundations and potable water supply pipes); and
- Underlying secondary A aquifer within the natural soils (Tunbridge Wells Sand Formation).

Based on the above identified receptors at risk, the following pollutant linkages might be present on site within areas of interest.

- Oral, dermal and inhalation exposure with impacted soil, soil vapour and dust by future residents, visitors and adjacent site users;
- Inhalation exposure of future residents, visitors and adjacent site users to asbestos fibres;
- Uptake of contaminants by proposed vegetation potentially impacting plant growth (phytotoxicity);
- Chemical attack of impacted soils via direct contact to proposed building structures (potable water supply pipes and foundation); and
- Leaching of soil contaminants and dissolved phase migration to the underlying secondary aquifer.

5.2 Linkages for assessment

As described in LCRM (Environment Agency, 2020), there are two stages of quantitative risk assessment (QRA), Tier 2 generic (GQRA) and Tier 3 detailed (DQRA). The GQRA comprises the comparison of soil, groundwater, soil gas and ground gas results with generic assessment criteria (GAC) that are appropriate to the linkage being assessed. This comparison can be undertaken directly against the laboratory results or following statistical analysis depending upon the sampling procedure that was adopted. This assessment relates to LCRM Stage 1, Tier 2 generic quantitative risk assessment

The potentially complete contaminant linkages (identified in **Section 5.1**) that require further assessment and the methodology of assessment are presented in **Table 8**.

Table 8 Linkages for GQRA

Potentially relevant contaminant linkage	Assessment method
1. Oral, dermal and inhalation exposure with impacted soil, soil vapour and dust by future residents, visitors and adjacent site users	Human health GAC in Appendix F for a proposed residential end use with home-grown produce since the proposed end use includes residential gardens. Given that supplementary works were undertaken within targeted areas the use of the Statistical Assessment is unable to be used. Therefore, laboratory testing results should only be directly compared within the GAC.
2. Inhalation exposure of future residents, visitor and adjacent site users to asbestos fibres	Qualitative assessment based on the asbestos minerals present, their form, concentration, location and the nature of the proposed development.
3. Uptake of contaminants by vegetation potentially impacting plant growth (phytotoxicity)	Comparison of soil data to GAC in Appendix G for phytotoxicity.
4. Chemical attack of impacted soils via direct contact to proposed building structures (potable water supply pipes)	Comparison of soil data to GAC in Appendix H for plastic water supply pipes using UKWIR (2010) guidance.
5. Chemical attack of impacted soils via direct contact to proposed building structures (foundations)	Assessment of the potential for chemical attack on buried concrete is based on the water-soluble sulphate results compared with the guidance presented in BRE Special Digest 1: Concrete in aggressive ground. A Design Sulphate Class and Aggressive Chemical Environment for concrete classifications is derived from this assessment.
5. Leaching of soil contaminants and dissolved phase migration	Since no leachate data is available the potential for leaching has been considered qualitatively using soil results.

5.3 Methodology and assessment of soil results

The analysis of laboratory results relating to soil samples submitted for testing is included in the following sections.

5.3.1 Oral, dermal and inhalation exposure with impacted soil by future occupants/site users, visitors and adjacent site users

In order to assess the soil results against the appropriate GAC (presented in **Appendix F**), the soil results have been split into appropriate data sets relevant to the different areas of interest (i.e. AOI#1 to AOI#4) and stratum encountered (i.e. Stockpiled soils, made ground, topsoil and natural soils).

The datasets being considered are shown in **Table 6**.

Table 9 Datasets

Dataset No.	Dataset name	Area	Data set Size	SOM range (%)	Selected SOM (%)	Rationale
1	Made ground from hardcore area	AOI#1	9	0.8 to 18.8	1*	Targeted
2	Stockpiled soils	AOI#2	3	5.3 to 10.3	2.5*	
3	Made ground from associated earthworks (vehicle access track and drainage feature)	AOI#3 and AOI#4	3	2.5 to 12.9	2.5*	
4	General Topsoil	AOI#4	1	1.3	1	
5	Natural Strata below made ground and stockpile	AOI#1 to AOI#2	4	0.4 to 2.2	1*	
* most conservative						

As an initial assessment of each dataset, all soil results in each dataset have been directly compared against the GAC for residential with home-grown produce end use.

All sample results have been compared with the relevant GAC. A soil organic matter (SOM) of either 1%, 2.5% or 6% have been selected from each dataset based on the average laboratory testing results as shown in **Table 9**.

The ratio of soil contaminant concentrations of genotoxic PAHs (benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(ah)anthracene, indeno(123-cd)pyrene and benzo(ghi)perylene) against benzo(a)pyrene have been compared against lower and upper limits set out in C4SL project methodology (CL:AIRE, 2014). All genotoxic PAH ratios were within the upper and lower bounds of the underlying toxicological study. Therefore, and in accordance with HPA guidance (HPA, 2010), the assessment of genotoxic PAHs has been based on the use of benzo(a)pyrene as a surrogate marker. Therefore, a risk from genotoxic PAHs is only considered likely if the respective benzo(a)pyrene concentrations exceed the relevant GAC.

5.3.1.1 Datasets 1 and 3 – Made ground

Assessment of the results indicates exceedances of the GAC for the contaminants shown in **Table 10**. These are highlighted in red on the screening output spreadsheet in **Appendix I**.

Table 10 Data summary table – human health

Determinand	No. of samples tested	GAC (mg/kg)	No of exceedances	Maximum concentration (mg/kg)	
				Value	Location / depth (m bgl)
Dataset 1 – from hardcore area					
Visual asbestos	9	Detected & >0.001%	1 (>0.001%)	Cement bonded chrysotile (8.327% by weight)	TP102 (0.2)
Microscopic asbestos	9	Detected & >0.001%	1 (>0.001%)	Microscopic loose fibres of chrysotile in soil (0.011% by weight)	TP102 (0.2)
Lead	9	200	1	508	TP102 (0.20)
Benzo(a)anthracene	9	7	2	19.9 7.73	TP103 (0.2) TP109 (0.3)
Benzo(a)pyrene	9	5	4	7.75 5.98 17.8 8.72	TP101 (0.2) TP102 (0.2) TP103 (0.2) TP109 (0.3)
Benzo(b)fluoranthene	9	2.6	4	7.87 6.06 20.4 9.98	TP101 (0.2) TP102 (0.2) TP103 (0.2) TP109 (0.3)
Chrysene	9	15	1	19.2	TP103 (0.2)
Dibenzo(ah)anthracene	9	0.24	5	0.91 0.71 2.27 0.28 1.06	TP101 (0.2) TP102 (0.2) TP103 (0.2) TP105 (0.2) TP109 (0.3)
Aromatic hydrocarbons (C12-C16)	9	140	1	346	TP103 (0.2)
Aromatic hydrocarbons (C16-C21)	9	260	2	1480 338	TP103 (0.2) TP109 (0.3)
Aromatic hydrocarbons (C21-C35)	9	110	1	3640	TP109 (0.3)

Determinand	No. of samples tested	GAC (mg/kg)	No of exceedances	Maximum concentration (mg/kg)	
				Value	Location / depth (m bgl)
Dataset 3 – made ground from associated earthworks (vehicle access track and drainage feature)					
Lead	3	200	1	201	TP113 (0.05)
Benzo(b)fluoranthene	3	3.3	1	4.12	TP114 (0.5)
Dibenzo(ah)anthracene	3	0.28	2	0.31	TP113 (0.50)
				0.44	TP114 (0.5)

On the basis of the above, the following has been identified:

- elevated concentrations of lead, various PAH compounds and aromatic hydrocarbons within shallow made ground soils within the hardcore area (dataset 1);
- Visual asbestos (cement bound) and microscopic loose fibres were detected within one sample in the hardcore area (dataset 1), (TP102 at 0.2m) (further details in **Section 5.3.2**); and
- marginally elevated concentrations of lead and PAH compounds were detected within the made ground soils associated the vehicular access track (dataset 3)

Based on the above findings, the linkage is complete within these areas of the site and would therefore require localised remedial works to break the active pollutant linkage.

5.3.1.2 Dataset 2 – stockpiled soils

All targeted samples are below the GAC indicating the stockpiled soils are suitable for reuse for the redevelopment. Advice from the CL:AIRE website and *The Definition of Waste: Development Industry Code of Practice* (CL:AIRE, 2011) (DoW CoP) should be taken into consideration when reusing soils that are not naturally occurring. Further background information is provided in **Appendix J**.

5.3.1.3 Dataset 4 – Topsoil

The sample is below the GAC indicating the topsoil is suitable for use. Based on the above assessment, no potentially significant risks associated with the soil contamination have been identified and it is considered that the soils may be regarded as suitable for the proposed end use.

5.3.1.4 Dataset 5 – Natural Strata

All targeted samples are below the GAC indicating the natural material underlying the made ground is suitable for use. Based on the above assessment, no potentially significant risks associated with the soil contamination have been identified and it is considered that the soils may be regarded as suitable for the proposed end use.

5.3.2 Inhalation exposure of future occupants/site users, visitors and adjacent site users to asbestos fibres

The laboratory screening for asbestos identified the presence of visual cement bound chrysotile asbestos along with the presence of microscopic loose fibres of chrysotile within the soil matrix in one sample of the made ground from the hardcore area (AOI#1), (TP102 at 0.2m).

This sample was then further analysed for detailed quantification testing and recorded a maximum of 8.327% by weight of the visual cement bonded asbestos and a maximum weight of 0.011% by weight of the microscopic fibres within the soil matrix.

Based on these results, the relevant pollutant linkage is complete and therefore localised remediation is required to break this linkage.

5.3.3 Uptake of contaminants by vegetation potentially inhibiting plant growth (phytotoxicity)

The results have been compared with the GAC presented in **Appendix G** for this linkage. Datasets identified in **Table 9** have also been used within this assessment.

Assessment of the results indicates exceedances of the GAC for the contaminants shown in **Table 10**. These are highlighted in red on the screening output spreadsheet in **Appendix I**.

Table 11 Data summary table – phytotoxicity

Determinand	No. of samples tested	GAC (mg/kg)	No of exceedances	Maximum concentration (mg/kg)	
				Value	Location / depth (m bgl)
Dataset 1 – from hardcore area					
Lead	9	300	1	508	TP102 (0.2)
Mercury	9	1	6	1.2	TP102 (0.2)
				1.37	TP103 (0.2)
				1.33	TP104 (0.2)
				2.11	TP105 (0.2)
				2.08	TP106 (0.1)
				1.69	TP109 (0.3)
Zinc	9	300	1	2460	TP104 (0.2)
Dataset 3 – made ground from associated earthworks (vehicle access track and drainage feature)					
Mercury	3	1	1	1.19	TP114 (0.5)

On the basis of the above, elevated concentrations of lead, mercury and zinc have been recorded within shallow made ground soils within the hardcore area (AOI#1, dataset 1). In addition, elevated concentrations of mercury have been detected within the made ground soils associated the vehicular access track (AOI#3, dataset 3).

Based on the above findings, the linkage is complete within these areas of the site and would therefore require localised remedial works to break the active pollutant linkage.

5.3.4 Impact of organic contaminants on potable water supply pipes

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

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

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

5.3.5 Impact of sulphates on buried concrete (proposed foundations)

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

For the purposes of assessing the aggressive chemical environment of the site within the areas of interest, these areas should be considered to comprising natural ground unlikely to contain pyrite and brownfield ground unlikely to contain pyrite.

Based on testing results in **Appendix D**, **Table 12** gives the characteristic pH, water-soluble and total sulphate content values for soils from each area of interest and stratum encountered.

Table 12 Characteristic pH, water soluble sulphate and total sulphate values

Stratum	Area	pH ranges	Characteristic value of water soluble sulphate (mg/l)
Made ground	AOI#1	7.99 to 8.6	1200**
Stockpiled soils	AOI#2	7.56 to 8.05	320*

Stratum	Area	pH ranges	Characteristic value of water soluble sulphate (mg/l)
Made ground from associated earthworks (vehicle access track and drainage feature)	AOI#3 and AOI#4	6.41 to 8.56	50*
General Topsoil	AOI#4	7.89	40*
Natural Strata below made ground and stockpile in AOI#1 to AOI#2	AOI#1 to AOI#4	7.33 to 8.36	100*
* highest value from the dataset taken as the characteristic value (for <5 samples in the dataset) ** the characteristic value is derived from the mean of the highest two results in the dataset (as the dataset contained between 5 and 9 results)			

Based on the results above and following the steps outlined in the BRE guidance, the Design Sulphate Classes and Aggressive Chemical Environment for Concrete classifications are summarised in **Table 13**, on the basis of water soluble sulphate. The classes are advised to be used if each of the listed strata comes into contact with any proposed foundations.

Table 13 Concrete design class

Stratum	Groundwater	Water soluble sulphate	
		DC class	AC class
Made ground in AOI#1	Mobile	DS-2	AC-1
Stockpiled soils in AOI#2	Mobile	DS-1	AC-1
Made ground from associated earthworks (vehicle access track and drainage feature) in AOI#3 and AOI#4	Mobile	DS-1	AC-1
General Topsoil in AOI#4	Mobile	DS-1	AC-1
Natural Strata below made ground and stockpile in AOI#1 to AOI#2	Mobile	DS-1	AC-1

5.3.6 Leaching of contaminants and dissolved phase migration to wider secondary aquifer

Elevated concentrations of aromatic hydrocarbons and PAH compounds were detected above the limit of detection within the made ground soils however, the compound identified are predominantly long chain hydrocarbons which have lower solubility limits and therefore unlikely to leach in significant concentrations to groundwater. This is confirmed by the concentrations of the natural soils being below limit of detection.

5.4 Uncertainties and implications in refined CSM and GQRA

In accordance with good practice, data gaps and uncertainties in the refined CSM have been identified at this stage. These are summarised in **Table 14** along with the likely implications.

Table 14 Data gaps and uncertainties

Data gap/ uncertainty	Details	Implications
Asbestos was found in made ground in only one sample tested	Asbestos containing material (ACM) could still be present in discrete locations around the imported hardcore area	Vigilance should be maintained for any potential ACM or fibrous material during below ground works
Unknown made ground within stockpile	Only the outside of the stockpile could be sampled. There could be unknown material buried with the excavator unable to reach the hay bales on top of the stockpile.	Although not proven, it is unlikely that the implications of this data gap would alter the report conclusions

6 PRELIMINARY WASTE ASSESSMENT

In accordance with the definition provided in the Waste Framework Directive (WFD), materials are only considered waste if ‘they are discarded, intended to be discarded or required to be discarded, by the holder’. Naturally occurring soils are not considered waste if reused on the site of origin for the purposes of development. Soils such as made ground that are not of clean and natural origin (irrespective of whether they are contaminated or not) and other materials such as recycled aggregate, do not become waste until the criteria above are met. Further background information is provided in **Appendix J**.

Excavation arisings from the development may therefore be classified as waste if surplus to requirements or unsuitable for reuse. The following assessments assume the material tested is classified subsequently as waste.

6.1 Hazardous waste assessment

Technical Guidance WM3 (EA, 2018) sets out in its Appendix E requirements for waste sampling. It is a legal requirement to correctly assess and classify waste. The level of sampling should be proportionate to the volume of waste and its heterogeneity. The preliminary assessment provided below is based only upon the available sample results and may not be sufficient to adequately classify the waste.

6.1.1 Chemical contaminants

EnviroLab, an RSK company, has developed a waste soils characterisation assessment tool (HASWASTE), which follows the guidance within Technical Guidance WM3. The analytical results have been assessed using this tool to assess the hazardous properties to support potential off-site disposal of materials in the future. Note that it is ultimately for landfills to confirm what wastes they are able to accept within the constraints of their permit.

The results are summarised in **Table 15** and presented in full in **Appendix K**.

Table 15 Results of waste soils characterisation assessment (HASWASTE)

Sample ref (depth m bgl)	Area	Hazardous properties identified
TP101 (0.20)	Made ground in AOI#1	Yes – Carcinogenic HP7 and Mutagenic HP11
TP102 (0.20)		Yes – Asbestos (visual and microscopic)
TP103 (0.20)		Yes – Carcinogenic HP7 and Mutagenic HP11
TP104 (0.20)		Yes – Ecotoxic HP14
TP109 (0.30)		Yes – Carcinogenic HP7 and Mutagenic HP11
TP110 to TP112	Stockpiled soils in AOI#2	Unlikely to have hazardous properties

Sample ref (depth m bgl)	Area	Hazardous properties identified
TP113 (0.05), TP114 (0.5), and TP115 (0.1)	Made ground from associated earthworks (vehicle access track and drainage feature) in AOI#3 and AOI#4	Unlikely to have hazardous properties
TP116 (0.2)	General Topsoil in AOI#4	Unlikely to have hazardous properties
TP101 (0.6), TP104 (0.6), TP105 (0.55) and TP11 (0.3)	Natural Strata below made ground and stockpile in AOI#1 to AOI#2	Unlikely to have hazardous properties

Samples TP101, TP102, TP103, TP104 and TP109 representing made ground in the imported hardstanding area (AOI#1) are classified as having hazardous properties. This suggests that all of the waste would require disposal at a suitably permitted hazardous waste landfill or treatment facility.

Remaining tested samples for the other areas of interest are unlikely to contain hazardous properties based on the HASWASTE assessment. Therefore, any waste generated from these areas (that if applicable) would require disposal at a suitably permitted inert or non-hazardous waste landfill.

6.1.2 Asbestos within waste soils

Technical Guidance WM3 requires that within a mixed waste the separately identifiable wastes be assessed separately. For instance, where waste soil contains identifiable pieces of asbestos (visible to the naked eye) the asbestos should, where feasible, be separated from the soil and classified separately. This should be disposed of within a hazardous, stable non-reactive hazardous waste landfill or a special cell in a non-hazardous waste landfill.

A total of 15 no. samples of made ground were collected across the areas of interest on site and analysed for the presence of asbestos, the results of which are presented in **Appendix D**. Analysis confirmed that microscopic loose fibres of chrysotile asbestos was present within one sample (TP102 at 0.20m in AOI#1). Visible asbestos containing material was not identified on-site but it was however identified within the laboratory setting in one sample (TP102 at 0.2m). The visual pieces comprised of cement bounded chrysotile asbestos.

The sample was then analysed for detailed quantification testing which identified the percentage of different asbestos types by weight, the results of which are presented in **Appendix D**.

Analysis confirmed that the percentage of visual pieces (8.327%) is greater than 0.1% by weight in the sample and the percentage of microscopic loose fibres in soil (0.011%) is less than 0.1% by weight.

It should be noted that the Technical Guidance WM3 states that mixed waste should be segregated where feasible. Therefore, visual pieces of cement asbestos are recommended to be handpicked from the made ground soil in TP102 prior to disposal. Photographic evidence of the visual asbestos detected in the laboratory (as shown in **Appendix E**) confirms that the visual pieces are suitable to be handpicked.

Handpicked pieces of visual asbestos should be disposed of separately within a hazardous, stable non-reactive hazardous waste landfill or a special cell in a non-hazardous waste landfill.

The remaining soils after handpicking contain microscopic loose fibres with a maximum weight of less than 0.1% and therefore, the waste can be disposed of within a non-hazardous waste landfill which is able to accept asbestos at non-hazardous concentrations'.

6.2 WAC assessment

Samples that are not anticipated to be classified as 'hazardous waste' could be disposed within an inert or non-hazardous waste landfill. WAC testing would be required to determine this.

RSK recommends that a Sampling Plan be prepared to support any waste classifications and hazardous waste assessments, prior to any material being excavated. Given the level of data obtained, scale of the development and heterogeneity of the site soils, the following assessment should be considered indicative and further assessment should be undertaken following the preparation of a waste sampling plan.

It is recommended that all the laboratory results should be forwarded to the receiving landfill; as such classifications are often at their own discretion.

7 CONCLUSIONS AND RECOMMENDATIONS

RSK conducted supplementary geo-environmental works on four main areas of interest (AOI#1 to AOI#4). These areas have been investigated within the supplementary works to assess their potential contaminative status and risks to the proposed development on site (i.e. residential end use).

7.1 Geo-environmental assessment

Based on the results of the site investigation and GQRA, the following the contaminant linkages that have been identified to be potentially complete (relevant contaminant linkages) are detailed below.

AOI#1:

- Oral, dermal and inhalation exposure with impacted soil (made ground soils in AOI#1) by future residents, visitors and adjacent site users;
- Inhalation exposure of future residents, visitors and adjacent site users to asbestos fibres identified only within made ground soils in AOI#1);
- Uptake of contaminants by proposed vegetation potentially impacting plant growth (phytotoxicity) within made ground soils in AOI#1;
- Chemical attack of impacted soils via direct contact to proposed building structures (foundations)
 - A Design Sulphate class of DS-2 and Aggressive Chemical Environment for Concrete of AC-1 should be used if foundations come into contact with made ground soils in AOI#1.
 - A Design Sulphate class of DS-1 and Aggressive Chemical Environment for Concrete of AC-1 should be used if foundations come into contact with natural soils in AOI#1.

Based on the above identified complete linkages within these areas of the site, localised remedial works to break the active pollutant linkages is required.

AOI#2:

- Stockpiled soils in AOI#2 are below the GAC indicating the stockpiled soils are suitable for reuse for the redevelopment and advise from the CL:AIRE website and DoW CoP (CL:AIRE, 2011) should be taken into consideration when reusing soils that are not naturally occurring.
- A Design Sulphate class of DS-1 and Aggressive Chemical Environment for Concrete of AC-1 should be used if foundations come into contact with natural soils in AOI#2 or if stockpiled soils are reused.

AOI#3:

- Oral, dermal and inhalation exposure with impacted soil (made ground soils in AOI#3) by future residents, visitors and adjacent site users;
- Uptake of contaminants by proposed vegetation potentially impacting plant growth (phytotoxicity) within made ground soils in AOI#3
- A Design Sulphate class of DS-1 and Aggressive Chemical Environment for Concrete of AC-1 should be used if foundations come into contact with made ground soils in AOI#3

Based on the above identified complete linkages within these areas of the site, localised remedial works to break the active pollutant linkages is required.

AOI#4:

- The made ground and topsoil in AOI#4 is below the relevant GAC. Therefore, no potentially significant risks associated with the soil contamination have been identified and it is considered that the soils may be regarded as suitable for the proposed end use.
- A Design Sulphate class of DS-1 and Aggressive Chemical Environment for Concrete of AC-1 should be used if foundations come into contact with made ground soils and topsoil in AOI#4.

Additional remarks

It is noted that the initial assessment of suitable potable water supply pipes indicated that a relevant linkage may exist associated with organic contaminants (across the areas of interest on site) and therefore pollutant polyethylene (PE) and/or polyvinyl chloride (PVC) water supply pipes are expected to be unsuitable for use on the development unless remedial measures are implemented that mitigate the risk.

Should unforeseen contamination be encountered during the development then specialist advice should be sought to determine the appropriate course of action. Imported material (e.g. topsoil, subsoil) should be validated before use on-site to confirm its suitability.

7.2 Preliminary waste assessment

HASWASTE assessment has identified the made ground soils in AOI#1 contain hazardous properties. This suggests that all of the waste would require disposal at a suitably permitted hazardous waste landfill or treatment facility.

It is noted that visual pieces of asbestos located in the made ground soils from sample location TP102 at 0.2m in AOI#1 are suitable to be handpicked.

Handpicked pieces of visual asbestos should be disposed of separately within a hazardous, stable non-reactive hazardous waste landfill or a special cell in a non-hazardous waste landfill.

The remaining soils after handpicking contain microscopic loose fibres with a maximum weight of less than 0.1% and therefore, the waste can be disposed of within a non-hazardous waste landfill which is able to accept asbestos at non-hazardous concentrations’.

In addition, the assessment confirmed that stockpiled soils in AOI#2, made ground soils in AOI#3 & AOI#4, topsoil in AOI#4 and natural soils in AOI#1 and AOI#2 are unlikely to have hazardous properties. Therefore, any waste generated from these areas (that if applicable) would require disposal at a suitably permitted inert or non-hazardous waste landfill.

7.3 Recommendations

Based on the findings of the geo-environmental assessment, localised remedial works to break the active pollutant linkages is required (within AOI#1 and AOI#3). In the first instance, it is recommended that a Remedial Method Statement (RMS) report is prepared to establish remedial options to ensure the site would be suitable for its end use.

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

Following the preliminary waste assessment, samples that are not anticipated to be classified as ‘hazardous waste’ could be disposed within an inert or non-hazardous waste landfill. WAC testing would be required to determine this.

RSK recommends that a Sampling Plan be prepared to support any waste classifications and hazardous waste assessments, prior to any material being excavated. Given the level of data obtained, scale of the development and heterogeneity of the site soils, the following assessment should be considered indicative and further assessment should be undertaken following the preparation of a waste sampling plan.

It is recommended that all the laboratory results should be forwarded to the receiving landfill; as such classifications are often at their own discretion.

REFERENCES

Previous SI reports and other site related information

BRD Environmental Ltd, Phase 1 Geo-Environmental Desk, ref: BRD2323-OR3-C, January 2019

CGMS Heritage, Geophysical Survey Reports, dated January 2018 and June 2018

Idom Merebrook, Geo-environmental Assessment, ref: GEA-17627-18-44, dated March 2018

Idom Merebrook, Ersham Road, Hailsham – Investigation of Soft Ground Letter Report, ref: L-17627ag-2.4.2-19-S427-DCE, dated 2nd September 2019

<http://mapapps.bgs.ac.uk/geologyofbritain/home.html> – BGS website accessed 14th Dec 2020

Standards and guidance

AGS Interim Guidance (2013), 'Site investigation and asbestos risk assessment for the protection of site investigation and geotechnical laboratory personnel', February.

Baker, K., Hayward, H., Potter, L., Bradley, D. and McLeod, C. (2009), CIRIA Report C682. The VOCs Handbook. Investigating, assessing and managing risks from inhalation of VOCs at land affected by contamination.

British Standards Institution (BSI) (1990), 'BS 1377:1990. Methods of test for soils for civil engineering purposes'.

British Standards Institution (BSI) (2020), 'BS 5930:2015+A1:2020. Code of practice for ground investigations'.

British Standards Institution (BSI) (2011), 'BS 10175:2011 + A2:2017. Investigation of potentially contaminated sites: Code of practice'.

Environment Agency (2018), 'Technical Guidance WM3. Guidance on the classification of and assessment of waste, 1st Edition, v.1.1, May 2018.

Environment Agency (2020), Land contamination risk management, <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>, 8 October 2020

National House Building Council (NHBC) (2016), Technical Extra, April 2016.

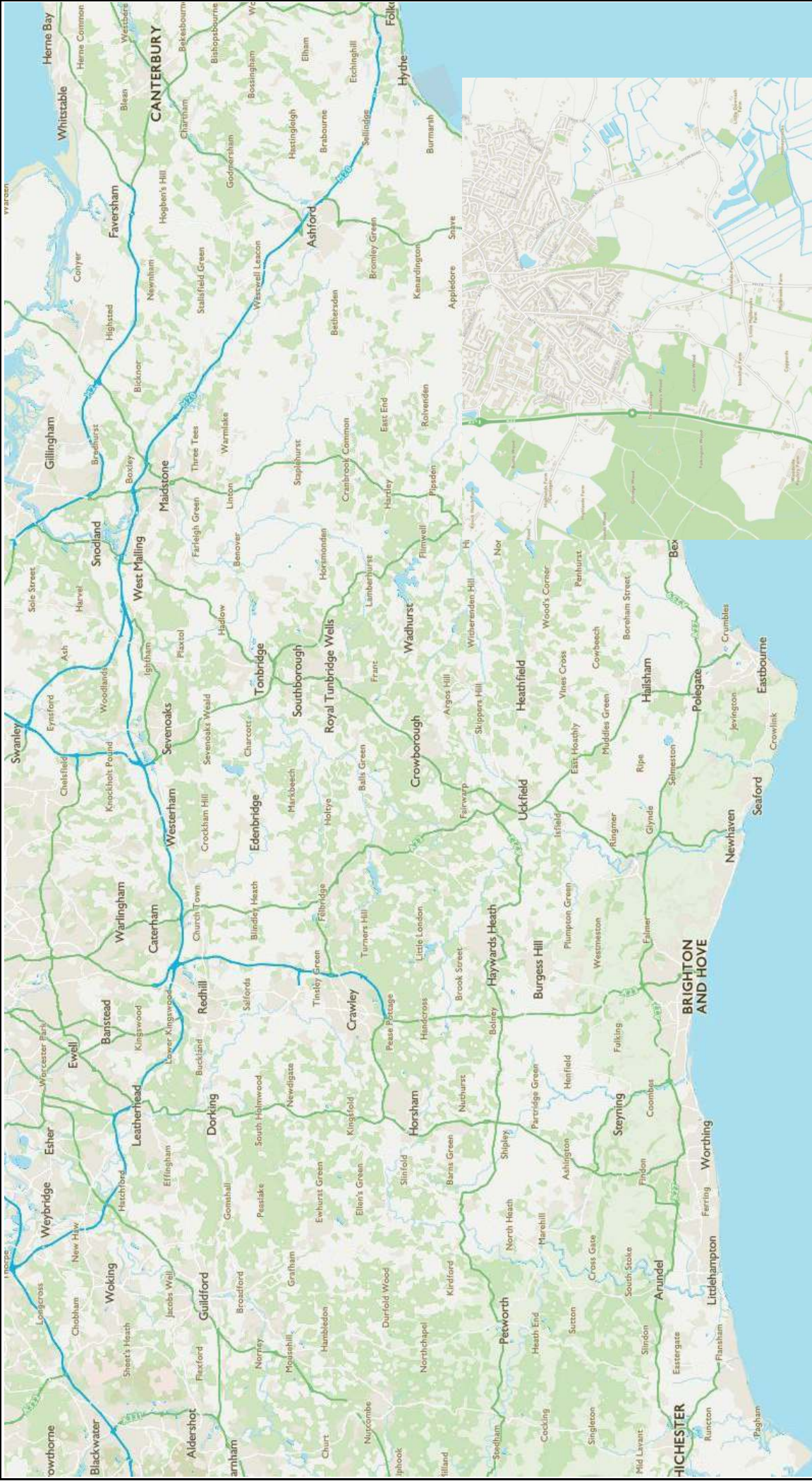
Norbury, D. (2010), Soil and Rock Description in Engineering Practice.

Part IIA of the Environmental Protection Act (Contaminated Land Regulations (England)) 2002.

Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001), CIRIA C552. Contaminated Land Risk Assessment: A Guide to Good Practice.

FIGURES

FIGURE 1 SITE LOCATION PLAN



	Site location plan		Client: Barratt Homes	Figure No: 1
			Site: Cuckoo Fields & Ersham Park	Job No: 1921129 R01 (01)

FIGURE 2 POST WALKOVER PLAN AND AREAS OF INTEREST

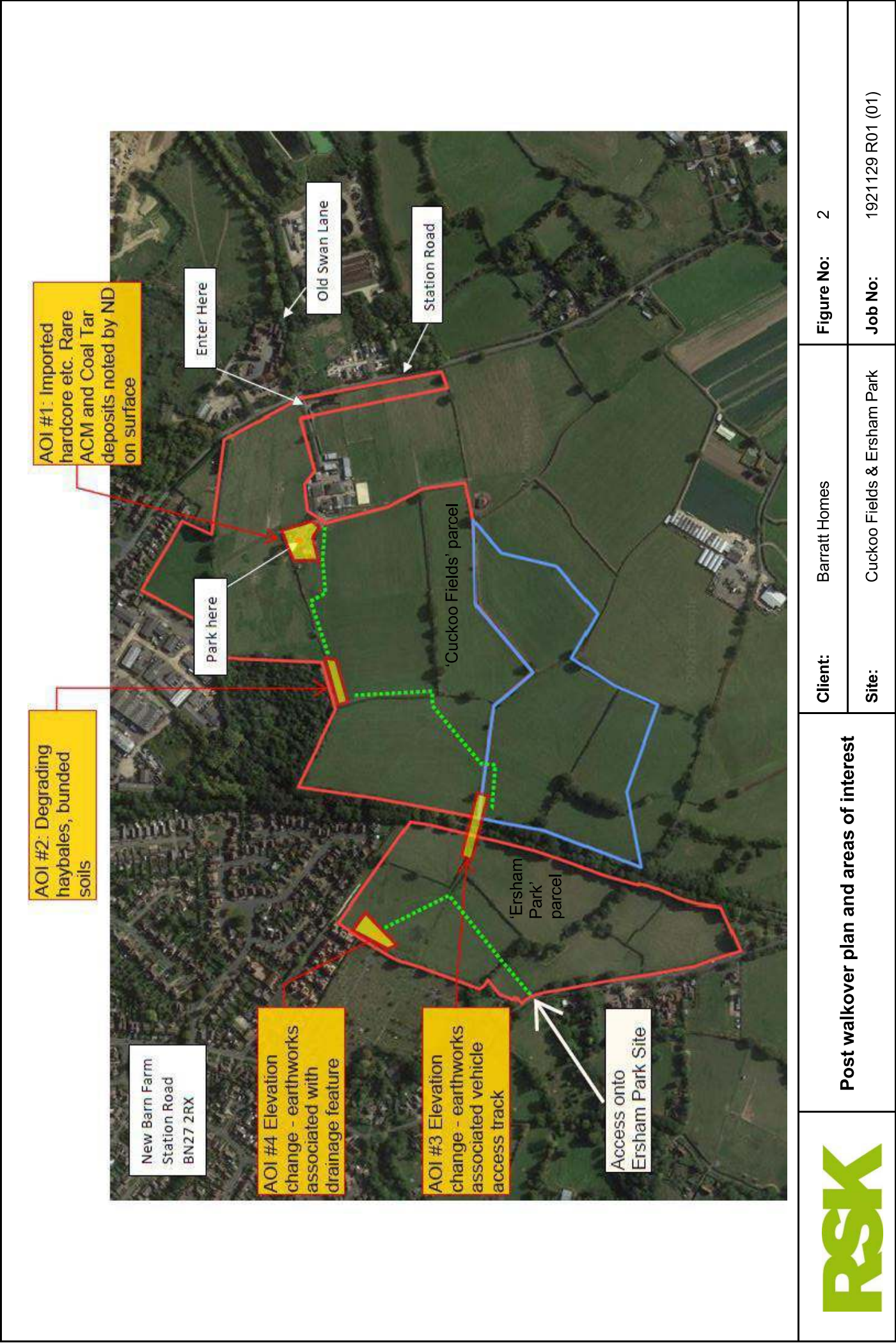
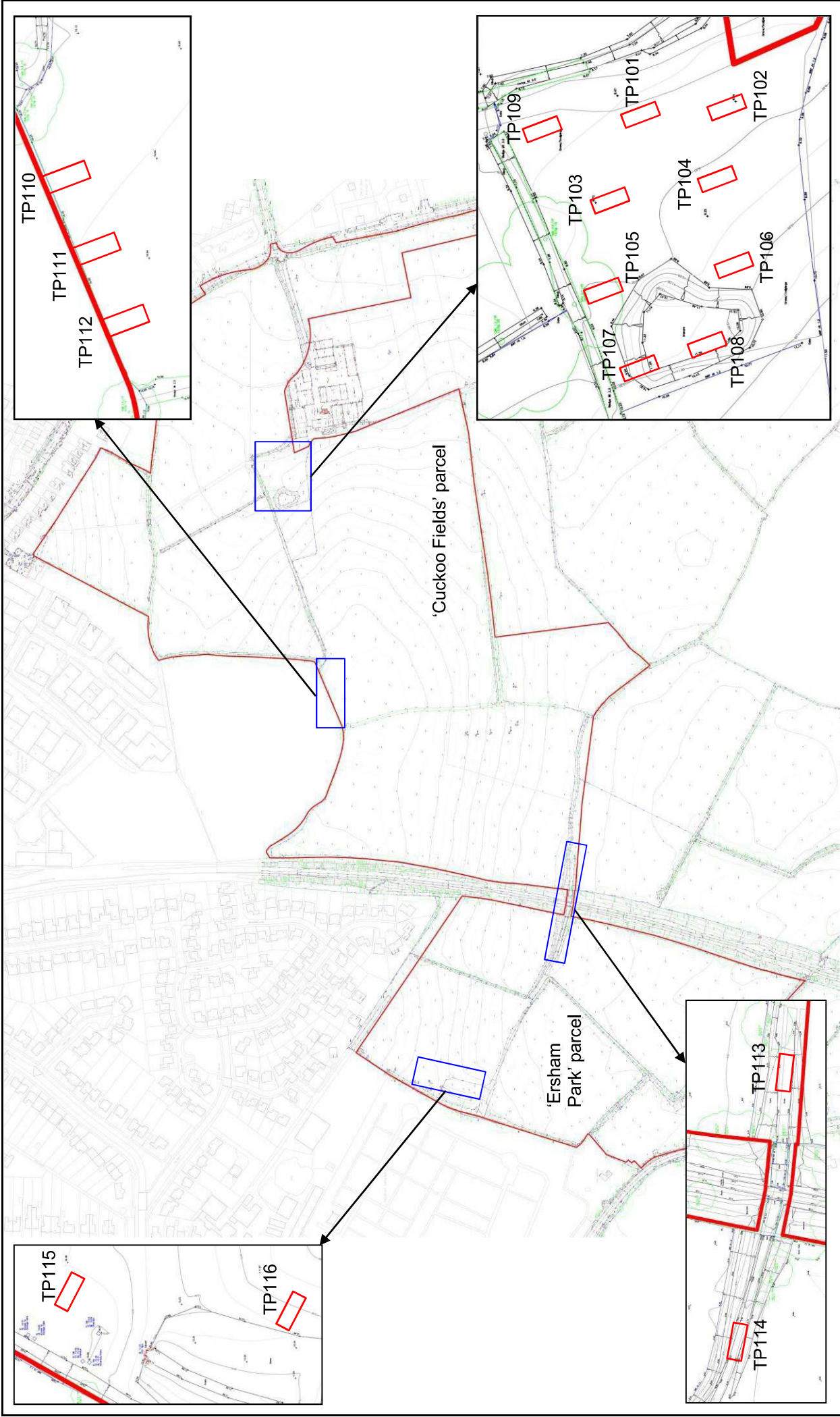


FIGURE 3 PROPOSED DEVELOPMENT PLAN



Proposed development plan	Client:	Barratt Homes	Figure No:	3
	Site:	Cuckoo Fields & Ersham Park	Job No:	1921129 R01 (01)

FIGURE 4 EXPLORATORY HOLE LOCATION PLAN



		Exploratory hole location plan		Client: Barratt Homes	Figure No: 4
		Site: Cuckoo Fields & Ersham Park		Job No: 1921129 R01 (01)	

APPENDICES

APPENDIX A SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) Barratt Homes (the "Client") in accordance with the terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the Client, dated 26th November 2020. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, persistent, bioaccumulative or toxic chemicals (including PFAS/ PFOS) or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site,

unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):

- a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.
- b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.
- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.
11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.
12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B SUMMARY OF LEGISLATION AND POLICY RELATING TO LAND CONTAMINATION

Part IIA of the Environmental Protection Act 1990

Part IIA of the Environmental Protection Act 1990 (Part IIA) and its associated Contaminated Land Regulations 2000 (SI 2000/227), which came into force in England on 1 April 2000, formed the basis for the current regulatory framework and the statutory regime for the identification and remediation of contaminated land. Part IIA of the EPA 1990 defines contaminated land as 'any land which appears to the Local Authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that significant harm is being caused, or that there is significant possibility of significant harm being caused, or that pollution of controlled waters is being or is likely to be caused'. Controlled waters are considered to include all groundwater, inland waters and estuaries.

In August 2006, the Contaminated Land (England) Regulations 2006 (SI 2006/1380) were implemented, which extended the statutory regime to include Part IIA of the EPA as originally introduced on 1 April 2000, together with changes intended chiefly to address land that is contaminated by virtue of radioactivity. These have been replaced subsequently by the Contaminated Land (England) (Amendment) Regulations 2012, which now exclude land that is contaminated by virtue of radioactivity.

The intention of Part IIA is to deal with contaminated land issues that are considered to cause significant harm on land that is not undergoing development (see Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, April 2012). This document replaces Annex III of Defra Circular 01/2006, published in September 2006 (the remainder of this document is now obsolete).

Planning Policy

Contaminated land is often dealt with through planning because of land redevelopment. This approach was documented in Planning Policy Statement: Planning and Pollution Control PPS23, which states that it remains the responsibility of the landowner and developer to identify land affected by contamination and carry out sufficient remediation to render the land suitable for use. PPS23 was withdrawn early in 2012 and has been replaced by much reduced guidance within the National Planning Policy Framework (NPPF), reference ISBN: 978-1-5286-1033-9, February 2019.

The new framework has only limited guidance on contaminated land, as follows:

Chapter 11. Making effective use of land

- 117 Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land.
118. Planning policies and decisions should:
- c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land.

Chapter 15. Conserving and enhancing the natural environment

170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Ground conditions and pollution

178. Planning policies and decisions should ensure that:

a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);

b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.

179. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

Water Resources Act (WRA)

The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 updated the Water Resources Act 1991, which introduced the offence of causing or knowingly permitting pollution of controlled waters. The Act provides the Environment Agency with powers to implement remediation necessary to protect controlled waters and recover all reasonable costs of doing so.

Water Framework Directive (WFD)

The Water Framework Directive 2000/60/EC is designed to:

2. enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands that depend on the aquatic ecosystems
3. promote the sustainable use of water
4. reduce pollution of water, especially by 'priority' and 'priority hazardous' substances
5. ensure progressive reduction of groundwater pollution.

The WFD requires a management plan for each river basin be developed every six years.

Groundwater Directive (GWD)

The 1980 Groundwater Directive 80/68/EEC and the 2006 Groundwater Daughter Directive 2006/118/EC of the WFD are the main European legislation in place to protect groundwater. The 1980 Directive is due to be repealed in December 2013. The European legislation has been transposed into national legislation by regulations and directions to the Environment Agency.

Priority Substances Directive (PSD)

The Priority Substances Directive 2008/105/EC is a 'Daughter' Directive of the WFD, which sets out a priority list of substances posing a threat to or via the aquatic environment. The PSD establishes environmental quality standards for priority substances, which have been set at concentrations that are safe for the aquatic environment and for human health. In addition, there is a further aim of reducing (or eliminating) pollution of surface water (rivers, lakes, estuaries and coastal waters) by pollutants on the list. The WFD requires that countries establish a list of dangerous substances that are being discharged and EQS for them. In England and Wales, this list is provided in the River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010. In order to achieve the objectives of the WFD, classification schemes are used to describe where the water environment is of good quality and where it may require improvement.

Environmental Permitting Regulations (EPR)

The Environmental Permitting (England and Wales) Regulations 2016 (as amended) provide a single regulatory framework that streamlines and integrates waste management licensing, pollution prevention and control, water discharge consenting, groundwater authorisations, and radioactive substances regulation. Schedule 22, paragraph 6 of EPR 2016 states: 'the regulator must, in exercising its relevant functions, take all necessary measures - (a) to prevent the input of any hazardous substance to groundwater; and (b) to limit the input of non-hazardous pollutants to groundwater so as to ensure that such inputs do not cause pollution of groundwater.'

Notes:

- 1. The above information is provided for background but does not constitute site-specific advice*
- 2. The above summary applies to England only. Variations exist within other countries of the United Kingdom*

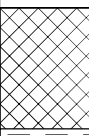
APPENDIX C EXPLORATORY HOLE RECORDS

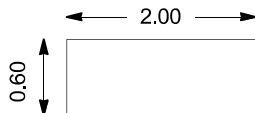
Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP101
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 8.00	National Grid Co-ordinate: E:559449.0 N:108458.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20 0.20	101	ES PID	0.0ppm			MADE GROUND: Grey brown and black slightly fine to coarse sandy clayey GRAVEL with low cobble content. Gravel is fine to coarse sub-angular to sub-rounded concrete brick clinker plastic sandstone cobbles sub-rounded concrete. Sand is fine. Slight hydrocarbon odour. (MADE GROUND)	(0.50) 0.50	
0.60 0.60	102	ES PID	0.0ppm			Firm greyish brown clayey SILT (TUNBRIDGE WELLS SAND FORMATION)	(0.40) 0.90	
1.10 1.10	103	ES PID	0.0ppm			Stiff light yellowish brown mottled greyish brown silty CLAY (TUNBRIDGE WELLS SAND FORMATION)	(0.30) 1.20	
						Trial pit terminated at 1.20 m depth.		

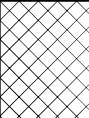
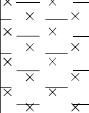
Plan (Not to Scale)		General Remarks			
		1. Groundwater seepage at 1.20 m 2. Trial pit unstable from ground level to 0.50 m bgl			
All dimensions in metres				Scale:	1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By:		

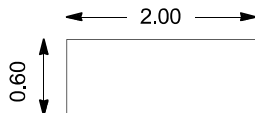
Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP102
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 9.00	National Grid Co-ordinate: E:559448.0 N:108436.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20 0.20	101	ES PID	0.0ppm			MADE GROUND: Grey brown and black slightly sandy clayey GRAVEL with low cobble content. Gravel is fine to coarse sub-angular to sub-rounded concrete brick sandstone wires. Cobbles of sub-rounded concrete. (MADE GROUND)	(0.40)	
						Very stiff light yellowish brown mottled greyish brown silty CLAY (TUNBRIDGE WELLS SAND FORMATION)	0.40	
						Trial pit terminated at 0.50 m depth.	0.50	

Plan (Not to Scale)		General Remarks			
		1. Groundwater seepage at 0.50 m 2. Trial pit unstable from ground level to 0.40 m bgl			
		All dimensions in metres		Scale:	1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By: 		

Contract: Hailsham		Client: BDW Southern Counties		Trial Pit: TP103
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 9.00	National Grid Co-ordinate: E:559430.0 N:108455.0	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20 0.20	101	ES PID	0.0ppm			MADE GROUND: Grey brown and black slightly sandy clayey GRAVEL with low cobble content. Gravel is fine to coarse sub-angular to sub-rounded brick concrete chalk ceramic tiles sandstone. Cobbles of sub-rounded concrete. Sand is fine to coarse. (MADE GROUND)	(0.40) 0.40	
						Firm grey clayey SILT with occasional pockets of organic matter (TUNBRIDGE WELLS SAND FORMATION)	(0.40) 0.80	
						Trial pit terminated at 0.80 m depth.		

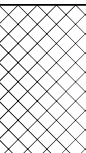
Plan (Not to Scale) 		General Remarks 1. No groundwater encountered 2. Trial pit unstable from ground level to 0.40 m bgl	
Method Used: Machine dug		Plant Used: Tracked excavator	
Logged By: HSalkeld		Checked By: AGS	
All dimensions in metres		Scale: 1:25	

Contract: Hailsham		Client: BDW Southern Counties		Trial Pit: TP104
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 10.00	National Grid Co-ordinate: E:559433.0 N:108440.0	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20 0.20	101	ES PID	0.0ppm			MADE GROUND: Grey black and brown slightly sandy clayey GRAVEL with low cobble content. Gravel is fine to coarse sub-angular to sub-rounded brick concrete sandstone clay and ceramic tiles wires cloth glass metal cobbles of sub-rounded concrete and timber sleeper. Slight hydrocarbon odour. Sand is fine to coarse (MADE GROUND)	(0.50) 0.50	
0.60 0.60	102	ES PID	0.0ppm			Firm light yellowish brown mottled light orange clayey SILT. (TUNBRIDGE WELLS SAND FORMATION)	(0.30) 0.80	
						Trial pit terminated at 0.80 m depth.		

Plan (Not to Scale) 		General Remarks 1. Groundwater seepage at 0.70 m 2. Trial pit unstable from ground level to 0.50 m bgl	
Method Used: Machine dug		Plant Used: Tracked excavator	
Logged By: HSalkeld		Checked By: AGS	
All dimensions in metres		Scale: 1:25	



Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20 0.20	101	ES PID	0.0ppm			MADE GROUND: Grey brown and black slightly sandy clayey GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded brick concrete ceramic tiles wire and horse manure. Sand is fine to coarse. (MADE GROUND)	(0.50)	
0.55	102	ES				Stiff light greyish brown slightly fine sandy clayey SILT (TUNBRIDGE WELLS SAND FORMATION) Trial pit terminated at 0.60 m depth.	0.60	

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JGIM LIBRARY_V10_01.GLB LibVersion: v8.07.001 PdfVersion: v8.07 | Log TRIAL PIT LOG - A4P | 1921129-HALLSHAM.GPJ - v10_01.
JGIM LIBRARY_V10_01.GLB LibVersion: v8.07.001 PdfVersion: v8.07 | Log TRIAL PIT LOG - A4P | 1921129-HALLSHAM.GPJ - v10_01.



TRIAL PIT LOG

Contract: Hailsham		Client: BDW Southern Counties		Trial Pit: TP106	
Contract Ref: 1921129		Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 10.00	National Grid Co-ordinate: E:559418.0 N:108439.0	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.10 0.10	101	ES PID	0.0ppm			MADE GROUND: White and brown slightly sandy clayey GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded chalk brick concrete and sandstone. Sand is fine. (MADE GROUND)	0.20	
0.40	102	ES				Firm light orangish brown clayey SILT (TUNBRIDGE WELLS SAND FORMATION) Trial pit terminated at 0.40 m depth.	0.40	

Plan (Not to Scale) 		General Remarks	
		1. Groundwater seepage at 0.40 m 2. Trial pit unstable from ground level to 0.20 m bgl	
All dimensions in metres		Scale: 1:25	
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By:



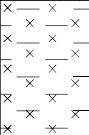
TRIAL PIT LOG

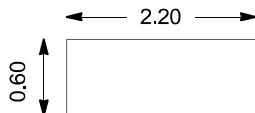
Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP107
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 11.00	National Grid Co-ordinate: E:559398.0 N:108453.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.05	101	ES				MADE GROUND: Brown slightly sandy silty CLAY wih fragments of brick. Sand is fine. (MADE GROUND)	0.10	
0.05		PID	0.0ppm					
0.20	102	ES				Firm brown clayey SILT (TUNBRIDGE WELLS SAND FORMATION)	0.30	
0.20		PID	0.0ppm					
						Firm yellowish brown mottled light orange silty CLAY (TUNBRIDGE WELLS SAND FORMATION)	(0.40)	
							0.70	
						Trial pit terminated at 0.70 m depth.		

Plan (Not to Scale) 		General Remarks			
		1. No groundwater encountered 2. Trial pit unstable from ground level to 0.10 m bgl			
		All dimensions in metres		Scale:	1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By:		

Contract: Hailsham		Client: BDW Southern Counties		Trial Pit: TP108	
Contract Ref: 1921129		Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 11.00	National Grid Co-ordinate: E:559404.0 N:108440.0	Sheet: 1 of 1

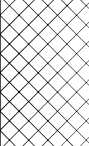
Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.10 0.10	101	ES PID	0.0ppm			MADE GROUND: Black brown and grey slightly sandy clayey GRAVEL of fine to coarse sub-angular to sub-rounded chalk brick concrete and sandstone. Sand is fine to coarse. (MADE GROUND)	0.20	
0.40 0.40	102	ES PID	0.0ppm			Firm yellowish brown mottled light orange clayey SILT (TUNBRIDGE WELLS SAND FORMATION)	(0.50)	
						Trial pit terminated at 0.70 m depth.	0.70	

Plan (Not to Scale) 		General Remarks 1. Groundwater seepage at 0.50 m 2. Trial pit unstable from ground level to 0.20 m bgl	
Method Used: Machine dug		Plant Used: Tracked excavator	
Logged By: HSalkeld		Checked By: AGS	
All dimensions in metres		Scale: 1:25	

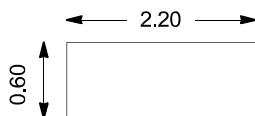


TRIAL PIT LOG

Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP109
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 9.00	National Grid Co-ordinate: E:559444.0 N:108470.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.30 0.30	101	ES PID	0.0ppm			MADE GROUND: Grey black and brown slightly sandy clayey GRAVEL with low cobble content. Gravel is fine to coarse sub-angular to sub-rounded brick concrete plastic clinker and cobbles of sub-rounded concrete. Sand is fine to coarse. (MADE GROUND)	(0.50) 0.50	
0.70 0.70	102	ES PID	0.0ppm			Firm greyish brown clayey SILT (TUNBRIDGE WELLS SAND FORMATION)	(0.30) 0.80	
						Trial pit terminated at 0.80 m depth.		

Plan (Not to Scale)



General Remarks

1. Groundwater seepage at 0.80 m
2. Trial pit unstable from ground level to 0.50 m bgl

All dimensions in metres

Scale: **1:25**

Method Used:

Machine dug

Plant Used:

Tracked excavator

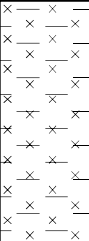
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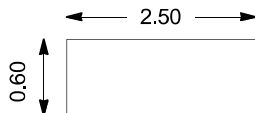
HSalkeld

Checked By:



Contract: Hailsham		Client: BDW Southern Counties		Trial Pit: TP110
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 16.00	National Grid Co-ordinate: E:559238.0 N:108415.0	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.00 0.00	101	ES PID	0.0 ppm			Stiff yellowish brown mottled light orange clayey SILT	(0.80)	
						Trial pit terminated at 0.80 m depth.	0.80	

Plan (Not to Scale) 		General Remarks - Stockpile located at exploratory hole, 0.90 m above ground level - Stockpiled soils contains MADE GROUND: Brown slightly sandy silty CLAY with fragments of brick concrete and plastic. Sand is fine. - Environmental sample of the stockpiled soils was collected. - Groundwater seepage at 0.70 m - Trial pit remained stable throughout excavation	
Method Used: Machine dug		Plant Used: Tracked excavator	
Logged By: HSalkeld		Checked By: 	
All dimensions in metres		Scale: 1:25	

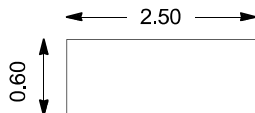
Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP111
Contract Ref: 1921129	Start: 04.12.20 End: 04.12.20	Ground Level (m AOD): 16.00	National Grid Co-ordinate: E:559216.0 N:108407.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.00	101	ES				Firm yellowish brown mottled orange slightly sandy clayey SILT. Sand is fine.		
0.30	102	ES					(0.80)	
						Trial pit terminated at 0.80 m depth.	0.80	

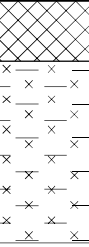
Plan (Not to Scale)		General Remarks			
		- Stockpile located at exploratory hole, 0.90 m above ground level - Stockpiled soils contain MADE GROUND: Brown slightly sandy silty CLAY with fragments of brick and concrete. Sand is fine. - Environmental sample of the stockpiled soils was collected - Groundwater seepage at 0.70 m - Trial pit remained stable throughout excavation			
		All dimensions in metres		Scale:	1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By:		

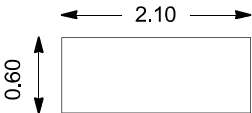
Contract: Hailsham		Client: BDW Southern Counties		Trial Pit: TP112
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 17.00	National Grid Co-ordinate: E:559199.0 N:108402.0	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.00	101	ES				Firm yellowish brown and grey slightly sandy clayey SILT.	(0.80)	
						Trial pit terminated at 0.80 m depth.	0.80	

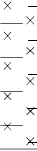
Plan (Not to Scale) 		General Remarks - Stockpiled soils located at exploratory hole, 0.90 m above ground level. - Stockpiled soils contain MADE GROUND: Brown slightly sandy silty CLAY with fragments of concrete wire and timber. Sand is fine. - Environmental sample of the stockpiled soils was collected. - Groundwater seepage at 0.70 m - Trial pit remained stable throughout excavation	
Method Used: Machine dug		Plant Used: Tracked excavator	
Logged By: HSalkeld		Checked By: AGS	
All dimensions in metres		Scale: 1:25	

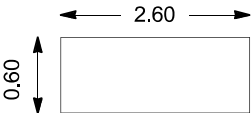
Contract: Hailsham		Client: BDW Southern Counties		Trial Pit: TP113
Contract Ref: 1921129	Start: 04.12.20 End: 04.12.20	Ground Level (m AOD): 8.00	National Grid Co-ordinate: E:559049.0 N:108176.0	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.10	101	ES				MADE GROUND: Dark brown slightly sandy clayey GRAVEL. Gravel is fine sub-angular hardcore (SSti) with live rootlets to 0.10 m. Sand is fine. (MADE GROUND) Yellowish brown and light orange clayey SILT (TUNBRIDGE WELLS SAND FORMATION)	0.20 (0.60) 0.80	
						Trial pit terminated at 0.80 m depth.		

Plan (Not to Scale) 		General Remarks 1. No groundwater encountered 2. Trial pit remained stable throughout excavation	
		All dimensions in metres	Scale: 1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By: 

Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP114
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 9.00	National Grid Co-ordinate: E:558991.0 N:108183.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20	101	ES				MADE GROUND: Grey and brown slightly clayey slightly sandy GRAVEL and COBBLES. Gravel is fine to coarse cobbles sub-angular to sub-rounded concrete with brick. (MADE GROUND)	(0.30)	
0.50	102	ES				MADE GROUND: Yellowish brown and brown slightly gravelly clayey SILT. Gravel is fine to coarse sub-angular to sub-rounded brick and concrete (MADE GROUND)	(0.90)	
1.40	103	ES				Stiff yellowish brown mottled orange and light grey clayey SILT (TUNBRIDGE WELLS SAND FORMATION)	(0.50)	
						Trial pit terminated at 1.70 m depth.	1.70	

Plan (Not to Scale)		General Remarks			
		1. Slight groundwater seepage at base of trial pit (at 1.70 m) 2. Trial pit unstable from ground level to 1.20 m bgl			
		All dimensions in metres		Scale:	1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By: 		



TRIAL PIT LOG

Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP115
Contract Ref: 1921129	Start: 04.12.20 End: 04.12.20	Ground Level (m AOD): 13.00	National Grid Co-ordinate: E:558854.0 N:108304.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.10	101	ES				MADE GROUND: Light brown slightly gravelly clayey SILT. Gravel is fine sub-angular flint and sandstone with fragments of brick (MADE GROUND)	(0.30) 0.30	
						Firm yellowish brown mottled light orange clayey SILT with rare coarse sub-angular sandstone fragments (TUNBRIDGE WELLS SAND FORMATION)	(0.40) 0.70	
						Trial pit terminated at 0.70 m depth.		

Plan (Not to Scale) 		General Remarks 1. No groundwater encountered 2. Trial pit remained stable throughout excavation			
		All dimensions in metres		Scale:	1:25
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: HSalkeld	Checked By:		

Contract: Hailsham			Client: BDW Southern Counties		Trial Pit: TP116
Contract Ref: 1921129	Start: 03.12.20 End: 03.12.20	Ground Level (m AOD): 11.00	National Grid Co-ordinate: E:558861.0 N:108266.0		Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20	101	ES				Firm brown slightly fine sandy clayey SILT (TOPSOIL)	0.10	
						Firm yellowish brown mottled light orange clayey SILT with rare coarse sub-angular sandstone fragments (TUNBRIDGE WELLS SAND FORMATION)	(0.50)	
						Trial pit terminated at 0.60 m depth.	0.60	

Plan (Not to Scale) 2.70 0.60		General Remarks 1. No groundwater encountered 2. Trial pit remained stable throughout excavation							
		All dimensions in metres		Scale: 1:25					
		Method Used: Machine dug		Plant Used: Tracked excavator		Logged By: HSalkeld		Checked By:	

APPENDIX D LABORATORY CERTIFICATES FOR SOIL ANALYSIS

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/10620/2

Amendments: Request for Additional Analysis

Envirolab Job Number: 20/10620
Issue Number: 3

Date: 22 December, 2020

Client: RSK Environment Ltd Cambridge
Battle Gate Road
Boxworth
Cambridge
CB23 4NN

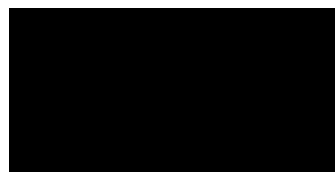
Project Manager: Hazel Salkeld/Verity Macfarlane
Project Name: Cuckoo Fields & Ersham Park, Hailsham
Project Ref: 1921129
Order No: N/A
Date Samples Received: 08/12/20
Date Instructions Received: 09/12/20
Date Analysis Completed: 22/12/20

Prepared by:



Melanie Marshall
Laboratory Coordinator

Approved by:



Sophie France
Client Service Manager

Envirolab Job Number: 20/10620

Client Project Name: Cuckoo Fields & Ersham Park,
Hailsham

Client Project Ref: 1921129

Lab Sample ID	20/10620/1	20/10620/2	20/10620/3	20/10620/4	20/10620/5	20/10620/6	20/10620/7	Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	MG	MG	MG			
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP107			
Depth to Top	0.2	0.2	0.2	0.2	0.2	0.1	0.05			
Depth To Bottom										
Date Sampled	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid	Soil - ES			
Sample Matrix Code	6AE	6A	7	6AE	2AE	7	5A			
% Stones >10mm _A	26.3	<0.1	24.0	16.7	12.0	10.2	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	8.30	8.13	8.26	8.02	8.46	8.29	8.22	pH	0.01	A-T-031s
Asbestos in soil % composition (1st visually identified Matrix) _D	-	8.327	-	-	-	-	-	% w/w	0.001	A-T-054
Asbestos in soil % composition (1st microscope identified Matrix) _D	-	0.011	-	-	-	-	-	% w/w	0.001	A-T-054
Asbestos in soil % composition - TOTAL _D	-	8.338	-	-	-	-	-	% w/w	0.001	A-T-054
Sulphate (water sol 2:1) _D ^{M#}	0.17	0.46	0.84	1.35	0.79	0.09	<0.01	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	1100	2200	4800	11000	3400	740	230	mg/kg	200	A-T-028s
Organic matter _D ^{M#}	5.1	5.4	3.6	12.5	4.7	2.5	0.8	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	1	6	4	5	3	<1	4	mg/kg	1	A-T-024s
Cadmium _D ^{M#}	<0.5	0.7	<0.5	2.7	0.6	0.5	0.7	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	15	23	26	50	13	12	10	mg/kg	1	A-T-024s
Chromium _D ^{M#}	15	28	18	31	12	17	24	mg/kg	1	A-T-024s
Lead _D ^{M#}	36	508	98	136	55	20	16	mg/kg	1	A-T-024s
Mercury _D	0.53	1.20	1.37	1.33	2.11	2.08	<0.17	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	10	13	10	17	9	11	14	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1	1	mg/kg	1	A-T-024s
Zinc _D ^{M#}	69	173	97	2460	135	57	53	mg/kg	5	A-T-024s

Envirolab Job Number: 20/10620

Client Project Name: Cuckoo Fields & Ersham Park,
Hailsham

Client Project Ref: 1921129

Lab Sample ID	20/10620/1	20/10620/2	20/10620/3	20/10620/4	20/10620/5	20/10620/6	20/10620/7	Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	MG	MG	MG			
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP107			
Depth to Top	0.2	0.2	0.2	0.2	0.2	0.1	0.05			
Depth To Bottom										
Date Sampled	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid	Soil - ES			
Sample Matrix Code	6AE	6A	7	6AE	2AE	7	5A			
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil [#]	NAD	-	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	-	N/A	N/A	N/A	N/A	N/A			A-T-045
Asbestos in Soil (incl. detailed matrix)										
Asbestos fibre type in soil (1st visually identified Matrix) _D [#]	-	Chrysotile	-	-	-	-	-			A-T-045
ACM type (1st visually identified Matrix) _D	-	Cement	-	-	-	-	-			A-T-045
ACM - Suitable for Water Absorption Test? (1st visually identified Matrix) _D	-	Yes	-	-	-	-	-			A-T-045
Asbestos fibre type in soil (1st microscope identified Matrix) _D [#]	-	Chrysotile	-	-	-	-	-			A-T-045
ACM type (1st microscope identified Matrix) _D	-	Loose fibres	-	-	-	-	-			A-T-045

Envirolab Job Number: 20/10620

Client Project Name: Cuckoo Fields & Ersham Park,
Hailsham

Client Project Ref: 1921129

Lab Sample ID	20/10620/1	20/10620/2	20/10620/3	20/10620/4	20/10620/5	20/10620/6	20/10620/7	Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	MG	MG	MG			
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP107			
Depth to Top	0.2	0.2	0.2	0.2	0.2	0.1	0.05			
Depth To Bottom										
Date Sampled	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid	Soil - ES			
Sample Matrix Code	6AE	6A	7	6AE	2AE	7	5A			
PAH-16MS										
Acenaphthene _A ^{M#}	0.53	0.57	6.53	0.01	0.18	<0.01	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.58	0.28	0.51	0.04	0.10	0.01	<0.01	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	2.54	1.46	10.7	0.09	0.54	0.03	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	6.79	4.87	19.9	0.32	1.88	0.13	0.06	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	7.75	5.98	17.8	0.43	2.20	0.16	0.07	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	7.87	6.06	20.4	0.58	2.43	0.20	0.09	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	3.94	3.13	8.50	0.29	1.16	0.10	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	2.89	2.08	8.97	0.17	0.81	<0.07	<0.07	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	6.11	4.53	19.2	0.35	1.77	0.14	<0.06	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.91	0.71	2.27	0.07	0.28	<0.04	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	14.6	11	41.6	0.61	3.88	0.23	0.11	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.65	0.52	7.54	0.01	0.21	<0.01	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	4.66	3.70	9.86	0.33	1.38	0.12	0.05	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.15	0.10	1.92	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	7.40	5.33	30.1	0.22	1.68	0.09	<0.03	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	13.2	10	35.9	0.59	3.37	0.21	0.10	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	80.6	60.3	242	4.11	21.9	1.42	0.48	mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/10620

Client Project Name: Cuckoo Fields & Ersham Park,
Hailsham

Client Project Ref: 1921129

Lab Sample ID	20/10620/1	20/10620/2	20/10620/3	20/10620/4	20/10620/5	20/10620/6	20/10620/7	Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	MG	MG	MG			
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP107			
Depth to Top	0.2	0.2	0.2	0.2	0.2	0.1	0.05			
Depth To Bottom										
Date Sampled	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid	Soil - ES			
Sample Matrix Code	6AE	6A	7	6AE	2AE	7	5A			
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<10	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<10	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	3	1	13	2	2	<1	<1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	7	4	31	19	7	<1	<1	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	50	93	218	454	166	8	6	mg/kg	1	A-T-055s
Total Aliphatics _A	61	98	263	475	175	8	6	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	2	2	<10	2	9	2	2	mg/kg	1	A-T-055s
Aro >C10-C12 _A	2	2	29	1	19	1	1	mg/kg	1	A-T-055s
Aro >C12-C16 _A	25	12	346	4	77	2	2	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	186	81	1480	21	168	3	2	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	790	490	3640	107	416	27	21	mg/kg	1	A-T-055s
Total Aromatics _A	1010	588	5510	136	689	36	29	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	1070	686	5770	611	863	44	36	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 20/10620

Client Project Name: Cuckoo Fields & Ersham Park,
Hailsham

Client Project Ref: 1921129

Lab Sample ID	20/10620/8	20/10620/9	20/10620/10	20/10620/11	20/10620/12	20/10620/13	20/10620/14	Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	MG	MG	MG			
Client Sample ID	TP108	TP109	TP113	TP114	TP115	TP110	TP111			
Depth to Top	0.1	0.3	0.05	0.5	0.1	0	0			
Depth To Bottom										
Date Sampled	03-Dec-20	03-Dec-20	04-Dec-20	04-Dec-20	04-Dec-20	03-Dec-20	04-Dec-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	6AE	2AE	6AE	6AE	6A	6AE			
% Stones >10mm _A	10.9	35.2	50.1	12.2	<0.1	<0.1	2.9	% w/w	0.1	A-T-044
pH _D ^{M#}	7.99	8.60	8.15	8.56	6.41	7.68	7.56	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	1.05	0.05	<0.01	0.05	<0.01	<0.01	0.32	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	3400	680	600	400	460	630	2400	mg/kg	200	A-T-028s
Organic matter _D ^{M#}	18.8	2.1	12.9	2.6	2.5	5.4	10.3	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	9	<1	11	3	<1	<1	7	mg/kg	1	A-T-024s
Cadmium _D ^{M#}	0.5	<0.5	1.2	0.7	<0.5	0.5	1.0	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	22	8	70	25	12	15	70	mg/kg	1	A-T-024s
Chromium _D ^{M#}	26	7	16	22	22	24	37	mg/kg	1	A-T-024s
Lead _D ^{M#}	33	21	201	146	39	32	190	mg/kg	1	A-T-024s
Mercury _D	0.59	1.69	0.48	1.19	<0.17	<0.17	0.57	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	11	5	20	13	7	13	17	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	1	1	<1	mg/kg	1	A-T-024s
Zinc _D ^{M#}	86	36	236	60	45	69	196	mg/kg	5	A-T-024s

Envirolab Job Number: 20/10620

Client Project Name: Cuckoo Fields & Ersham Park,
Hailsham

Client Project Ref: 1921129

Lab Sample ID	20/10620/8	20/10620/9	20/10620/10	20/10620/11	20/10620/12	20/10620/13	20/10620/14	Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	MG	MG	MG			
Client Sample ID	TP108	TP109	TP113	TP114	TP115	TP110	TP111			
Depth to Top	0.1	0.3	0.05	0.5	0.1	0	0			
Depth To Bottom										
Date Sampled	03-Dec-20	03-Dec-20	04-Dec-20	04-Dec-20	04-Dec-20	03-Dec-20	04-Dec-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	6AE	2AE	6AE	6AE	6A	6AE			
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil [#]	NAD	NAD	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045

Envirolab Job Number: 20/10620

Client Project Name: Cuckoo Fields & Ersham Park,
Hailsham

Client Project Ref: 1921129

Lab Sample ID	20/10620/8	20/10620/9	20/10620/10	20/10620/11	20/10620/12	20/10620/13	20/10620/14	Units	Limit of Detection	Method ref
Client Sample No	MG	MG	MG	MG	MG	MG	MG			
Client Sample ID	TP108	TP109	TP113	TP114	TP115	TP110	TP111			
Depth to Top	0.1	0.3	0.05	0.5	0.1	0	0			
Depth To Bottom										
Date Sampled	03-Dec-20	03-Dec-20	04-Dec-20	04-Dec-20	04-Dec-20	03-Dec-20	04-Dec-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	6AE	2AE	6AE	6AE	6A	6AE			
PAH-16MS										
Acenaphthene _A ^{M#}	0.12	0.71	0.06	0.03	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.09	0.56	0.22	0.32	<0.01	0.02	0.04	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.28	2.65	0.45	0.67	<0.02	<0.02	0.09	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.93	7.73	2.18	3.42	<0.04	0.07	0.40	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	1.49	8.72	2.33	3.33	<0.04	0.11	0.45	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	1.77	9.98	2.87	4.12	0.06	0.15	0.56	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	1.08	4.36	1.14	1.50	<0.05	0.07	0.27	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.54	3.54	1.02	1.39	<0.07	<0.07	0.19	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	1.00	7.11	2.30	3.02	<0.06	0.10	0.41	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.21	1.06	0.31	0.44	<0.04	<0.04	0.07	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	2.18	16.4	5.22	6.91	0.11	0.15	0.73	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.15	0.78	0.07	0.11	<0.01	<0.01	0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	1.16	5.35	1.41	1.92	<0.03	0.09	0.31	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.08	0.15	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.86	8.07	2.02	3.04	<0.03	0.05	0.29	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	1.63	14.7	4.35	5.69	0.08	0.12	0.63	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	13.6	91.9	25.9	35.9	0.25	0.93	4.45	mg/kg	0.01	A-T-019s