Outline Remediation Strategy

at: New Place Farm, Pulborough, RH20 1AT

for: Barratt Homes

Report Reference: 3750605/ORS/1

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LEAP ENVIRONMENTAL GENERAL NOTES

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

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EXECUTIVE SUMMARY

The site currently comprises a plant/tree nursery with associated structures, which extends to about 14.7 Ha, and is situated in the northeast corner of Pulborough. It is proposed to redevelop the site with up to 100 residential dwellings with associated infrastructure.

Historically the majority of the site was an undeveloped field with a number of buildings in the northwest, then the nursery was constructed in the 1970s including a reservoir and pump house which was further expanded to the current layout in the early 2000s.

A conceptual site model was developed based on a review of the previous third party investigation reports, and this identified a number of potential sources of contamination associated with the site's former use, together with some potential for localised TPH contamination. The site is not affected by radon gas.

A geo-environmental risk assessment has been carried out. Contamination testing of the soils identified one made ground sample with an exceedance of lead and one made ground sample with exceedances of benzo(a)pyrene and naphthalene, with both locations in the northwest corner of the site. Elevated concentrations of arsenic were detected in one stockpile mound M1.

Given that no contamination encountered in other locations in the northwest of the site, the exceedances of lead and PAHs are considered to be hotspots. The Outline Remediation Strategy considered that further intrusive investigation was required in the pre-construction phase to: delineate the extent of the hotspots; assess the footprint of the pump house; former above ground heating oil tank room; and inaccessible areas such as buildings footprints and areas of dense vegetation. Following the further investigations and risk assessments this outline remedial strategy should be updated.

At the construction phase where hotspots of contamination are identified these should be excavated and removed to a suitably licensed waste receiving facility, following waste classification. Sidewall validation is required, base validation may be required if made ground remains. The excavation void should be backfilled with chemically compliant material. Remediation in other areas may be required subject to the findings of the further investigations. Although hotspots of contamination were only identified in two areas, it was considered that made ground soils were unlikely to be suitable to remain in soft landscaped areas including private gardens due to coarse and sharps content. Where present the material should be removed to 0.60 m bgl or to natural soils, whichever is shallower and replaced with chemically compliant material.

A procedure is in place in the event that previously unidentified contamination is identified.

1 INTRODUCTION

1.1 Authority

RSK Environment Ltd trading as Leap Environmental (hereafter referred to as LEAP) were engaged by Barratt Homes Southern Counties (a trading name of BDW Trading Ltd) of Barratt House, Walnut Tree Close, Guildford, Surrey, GU1 4SW (herein referred to as the "Client") to carry out a Phase III investigation for the land at New Place Farm, London Road, Pulborough RH20 1AT.

The works were undertaken by means of LEAP's fee proposal letter reference LPQ11314 dated 21-03-24 and LPQ11314 including RSK Standard Terms and Conditions [Issue No12 July 2023], which forms the appointment between LEAP and the Client.

References in this report to 'we', 'us' or 'our' shall mean Leap Environmental as a trading name of RSK Environment Limited (company no.SC115530) at registered address 65 Sussex Street Glasgow G41 1DX.

The report should be read and used in accordance with the limitations and constraints identified in the report text, and at **Appendix A** – Service Constraints.

The site is approximately 14.7 Ha in size and is approximately centred on National Grid Reference (NGR) TQ057193 (Drawing LP3646-LW-111-XX-D-G-11101-C01, **Appendix B**).

LEAP understands that the site is currently owned by Newey Group and it is proposed to redevelop the site with up to 100 residential dwellings with associated infrastructure as per the attached conceptual planning layout in **Appendix B**, referenced: edp3037_d042f.

1.2 Previous studies

The site has been the subject of previous site investigations by GRM Development Solutions (GRM) and others. Copies of the reports supplied by the client are detailed below and should be read in conjunction with this report:

- GRM '*Phase I Site Appraisal (Desk Study)*' Dated January 2016 (ref: GRM/P7298/DS.1).
- GRM 'Re: Soakaway Testing at Drovers Lane, Pulborough' Dated 10 March 2016 (ref P7298 – SA1).
- TSA Asbestos 'Asbestos Survey Report at New Place Nursery' Dated 9 Match 2016.
- GRM '*Phase II Site Appraisal*' Dated April 2016 (ref: GRM/P7298/F.1).
- GRM 'Re: Gas Addendum Letter for Land north east of Glebelands, Pulborough' Dated 26 July 2016 (ref: P7298\GAL).
- GRM '*Phase I Site Appraisal (Desk Study)*' Dated August 2020 (ref: GRM/P7298/DS.1/RevA) NOTE: This desk study provides an update of the previous desk study undertaken in 2016 following expansion of the site boundary to include the northern portion of the site.
- GRM '*Soakaway Testing Letter Report*' ref P7298 SA.2 - April 2021.

- GRM 'Land Off Drovers Lane, Pulborough: Phase II Site Appraisal report' Dated August 2022 (ref: GRM/P7298/F.2).
- LEAP '*Technical Appraisal Form'* Dated 26 January 2024 (ref: LPTA3601).
- LEAP '*Phase III Site Investigation Report'* dated 10 July 2024 (ref:3750605/PIII/1).

1.3 Limitations

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

This report was prepared in accordance with good practice guidance at the time of issue. Consideration should be considered in the light of changes in legislation, statutory requirements, or industry practices subsequent to the date of issue.

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

Several areas across the site were inaccessible during the site walkover due to vegetation and therefore risks associated with these areas could not be assessed. Although asbestos may not have been encountered in the soil samples as part of these works, asbestos could be present in soil in discrete areas and may be encountered in future ground investigation.

A detailed survey of invasive plant species is outside the scope of this investigation therefore detailed comments with regards to such species have been omitted from this report.

The comments relating to the review of the previous site investigations given in this report and the opinions expressed are primarily based on third party data and investigations. While RSK have undertaken a review of the information provided RSK cannot be held liable for the quality of the data provided. There may be conditions pertaining to the site that have not been disclosed by the investigations and therefore could not be taken into account.

In particular, it should be noted that there may be areas of made ground and potential contamination not detected due to the limited nature of the investigations or the thickness and quality of made ground and concentrations of contamination across the site may be variable. In addition, groundwater levels and groundwater concentrations may vary from those reported due to seasonal, or other, effects.

2 ENVIRONMENTAL SETTING

The sections below provide a summary of the environmental and historical setting of the site, based on information obtained from the previous reports and additional third-party sources alongside the site reconnaissance. It should be noted that an initial walkover was carried out by GRM in the Phase I carried out in 2016.

Site Location and Description	The site is located approximately 1.1 km north-east of Pulborough town centre in West Sussex as shown in Drawing 11101, **Appendix B**. The approximate National Grid Reference of the site is TQ057193. The site lies at an estimated elevation of 36 m to 50 m Above Ordnance Datum (mAOD). The 14.7 Ha site comprised agricultural/horticultural land used for producing container grown shrubs and trees. The northeast corner of the site comprised a grass covered field with an approximate area of 1.9 Ha. Two waste stockpiles were noted in the northern half of the field during by LEAP during the Phase 2 site investigation. The remainder of the site in the east and south-east corner of the site was occupied by a series of rectangular geotextile sheets approximately 110 m in length by 15 m width secured to the ground. The centre of the site was occupied by part demolished polytunnels with some dense vegetation in the western half. An area to the east of the centre of the site was used for the storage of water for irrigation. The southern half of the site was occupied by a grass covered field of approximately 0.6 Ha, with dense vegetation to the west. The northern and south-western areas of the site occupy areas of approximately 0.90 Ha and 0.55 Ha, respectively, each accommodating two rows of polytunnels. In the north-westernmost corner, a storage area was present containing an above ground gas oil (red diesel) storage tank, an empty Intermediate Bulk Container (IBC), a galvanised steel tank marked “not in use” and various loose materials. The site is bounded by a densely wooded parcel of land with a railway cutting to the north/northwest, fenced paddocks/fields to the east with a further part of the nursery outside the southern part of the eastern boundary, residential development to the south and open space and residential development to the west. The boundaries are formed by trees and hedgerows that include mature poplar, silver birch, oak and conifer. Several drainage ditches run north/south along the lines of trees and boundaries.
Site History	The Phase I report notes the earliest historical OS maps in 1876 show the site to be predominantly an open field bounded by hedgerows to the east, south-east and west. A collection of buildings were also present in the northeast corner labelled as ‘New Place’. Maps dated from 1972 onwards indicate a covered reservoir and pump house in the centre of the site, with long buildings labelled as ‘New Place Farm’. New buildings were present on historical maps from 2002, and the site was labelled as a nursery. The site remained unchanged from 2002 to the present day. In the surrounding area open fields are present since at least 1876 with two sand pits, recorded between 1895 and 1909, 300 m to the southwest and 250 m to the

	south. By 1970 an orchard is recorded to the east of the site, a reservoir and pump house immediately north and residential area to the south-west. The residential area has undergone expansion to present day.
Published Geology	The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey sheet 317/332 'Chichester and Bognor', solid and drift edition, the BGS Geoindex Onshore web viewer[1] and the previous ground investigations for the site. The site is mapped as being underlain by Hythe Formation (Sandstone) with superficial Head Deposits in the southernmost corner. The Head Deposits to the south extend approximately east to west in a 270 m wide band, then cutting to the north of the site following the railway track. No superficial deposits are mapped across the rest of the site.
Hydro-geology	The superficial Head Deposits soils mapped beneath the southernmost corner of the site are classified as a secondary A aquifer whilst the underlying Hythe Formation is classed as a principal aquifer. The site is not situated within a groundwater Source Protection Zone (SPZ). According to the Environment Agency, the site is not located within a flood zone, and has a very low risk of surface water flooding as well as from the rivers and sea.

2.1 Ground conditions encountered

The ground conditions encountered during the investigation by LEAP are described in detail in Phase III investigation report dated July 2024. Table 1 below provides a summary the soil conditions encountered during this and the previous investigations by GRM.

Table 1: Summary of soils encountered across the site by LEAP

Depth From (m)	Depth To (m)	Soil Type	Description
GL (GL)	0.1/0.7 (0.1/0.7)	**TOPSOIL/RE WORKED TOPSOIL**	TOPSOIL comprising brown silty gravelly sand, silty sand and slightly gravelly sandy clay. Occasional fragments of brick and plastic.
GL/0.1 (GL/0.5)	0.1/0.55 (0.1/1.6)	**MADE GROUND**	MADE GROUND variable, comprising grey and brown silty sandy GRAVEL (predominantly roadstone), silty gravelly SAND, sandy SILT or sandy CLAY. Gravel comprising flint, red brick, blacktop, concrete and rare plastic in varying proportions
GL/0.1 (0.15/0.6)	0.4/0.7 (0.75/>3.0*)	**HEAD DEPOSITS**	Orangish brown and brown silty slightly gravelly SAND and firm dark greenish grey sandy CLAY. Gravel comprising flint, sandstone and occasional

[1] British Geological Survey (BGS) GeoIndex **https://www.bgs.ac.uk/map-viewers/geoindex-onshore**

			quartzite (only encountered in WS305, WS310 and WS314 during the LEAP investigation).
GL />3.0	0.8/3.45*	**HYTHE FORMATION**	Soft to firm orangish brown sandy sometimes gravelly CLAY. Gravel is fine to coarse sub-angular to angular of sandstone. Underlain by loose to medium dense orangish brown silty sometimes gravelly SAND, becoming dense to very dense clayey silty gravelly SAND with depth. Gravel is fine to coarse sub-rounded to angular of sandstone.

( ) Previous investigations

** Maximum depth of exploration*

The soils encountered during the recent investigation were generally similar to the earlier investigations, with topsoil or made ground underlain by natural soils. In many places the topsoil was considered to have been reworked due to the entrainment of some anthropogenic fragments.

Made ground soils were recorded within around half the exploratory holes generally to a maximum depth of 0.8 m. One area of deeper made ground (1.6 m thick) was encountered adjacent to the reservoir in the centre of the site.

A shallow thickness of blacktop (5 cm) overlying a shallow thickness of concrete (5 cm) and subbase materials comprising sandy gravel and gravelly sand was encountered in the northwest of the site.

LEAP identified silty sand and sandy clay soils considered to form part of the Head Deposits due to the inclusions of flint gravel in the south of the site. Previous investigations interpreted Head Deposits to be present in more trial holes across the site, with a greater thickness of Head Deposits in the southern portion of the site.

In a number of locations LEAP recorded a sandy clay soil beneath the topsoil and made ground considered to form a weathered section of the Hythe Formation. In the remaining locations the natural soils comprised clayey silty gravelly sand, sometimes sandy gravel, considered part of the Hythe Formation which generally became very dense with depth. The very dense sand becoming extremely weak sandstone was encountered at varying depths between 0.8 m and 3.45 m bgl.

2.2 Previous Investigations

The site has been the subject of Phase I and II Site Appraisals, soakage testing and gas monitoring by GRM Development Solutions between 2016 and 2022. Reports relevant to this outline remediation strategy are summarised below. The full set of previous reports are summarised within the LEAP's Phase III report, with relevant information to the report below.

2.2.1 GRM Phase I Site Appraisal (Desk Study) ref GRM/P7298/DS January 2016

GRM were appointed by Catesby Estates Limited to undertake a Phase I Site Appraisal. The site was proposed to be developed with up to 100 dwellings and associated infrastructure.

Significant features identified during the inspection included potential pesticide contamination from the current site use as a plant nursery, drainage ditches as possible receptors and tress requiring deepening of foundations.

The CSM identified pesticides as a potential risk to human health and controlled waters concluding that the risk was considered low.

2.2.2 GRM Phase II Site Appraisal project ref GRM/P7298/F.1 April 2016

The GRM Phase II investigation encountered a shallow depth of made ground comprising red brown, grey and brown clayey gravelly sand within four exploratory holes on the access routes between the growing beds of the nursery. The made ground ranged in depth from 0.3 to 0.4 m bgl. The made ground was found to be underlain by Head Deposits to depths between 0.9 to 2.7 m bgl and was on average 1.4 m thick.

The underlying Hythe Formation comprising medium dense orange brown, grey brown and red brown silty sand with sandstone gravel, becoming extremely weak to weak sandstone with depth, was encountered to the terminal depth of each exploratory hole.

No visual or olfactory evidence of potential contamination was encountered during the fieldwork or the following period of gas/groundwater monitoring.

Gas and groundwater monitoring wells were installed in seven of the exploratory holes. Due to the absence of any significant depth of made ground, the response zones were installed within the underlying natural strata.

One gas and groundwater monitoring visit was carried out on 17 March 2016. Standing water was recorded at a depth of 1.67 m bgl in monitoring well WS5. All other monitoring wells were dry.

No methane was detected in any of the monitoring wells, carbon dioxide concentrations of between 0.0% v/v and 4.5% v/v were recorded. No VOCs were detected by the PID. No gas flows were recorded.

Made ground had been identified as a potential source of contamination of controlled waters and so soil leachate testing was conducted. Leachate testing of soil samples taken during the intrusive investigation recorded concentrations of all contaminations of concern as being below relevant threshold values when compared against UKDWS and EQS values, and the risk to controlled waters determined to be negligible.

2.2.3 GRM Gas Addendum Letter ref P7298\GAL July 2016

Gas monitoring post site works was carried out fortnightly over a two-month period between 17 March and 25 May 2016.

No methane was detected. Carbon dioxide concentrations of between 0.0% v/v and 7.0% v/v were recorded. No gas flows were recorded. Groundwater was encountered in WS5 in the east-southeast of the site between 1.67 and 1.95 m bgl, however the remainder of the wells were generally dry up to 3 m bgl.

The gas risk assessment derived a GSV (Gas Screening Value) of 0.007 l/hr for carbon dioxide, based on the maximum recorded steady state carbon dioxide concentration of 7.0% v/v and the default flow rate of 0.1 l/hr which is adopted when no gas flow is recorded.

Although the GSV is less than 0.07 l/hr, which would indicate that a Characteristic Situation CS1 was appropriate, due to the maximum concentration of carbon dioxide recorded being greater than 5.0% v/v, further consideration was given as to whether CS1 was appropriate for the site.

GRM's detailed logging of the soils encountered during the site investigation did not reveal any high ground gas potential source such as paper, timber, refuse etc. and on the basis of the low number of carbon dioxide readings exceeding 5.0% v/v (5/42), and the absence of any gas flow, a Characteristic Situation CS1 was deemed appropriate.

2.2.4 GRM Phase I Site Appraisal (Desk Study) ref GRM/P7298/DS.1/RevA – 2020-12-08 (updated to larger site area) August 2020

The GRM 2016 Phase I and II reports were completed for the southern area of the site only. The northern part of the site was subsequently included within an updated Phase I in 2020.

The 2020 Phase I report identified the presence of the bonfire stockpile and the stockpile of discarded plants and pots in the northeast of the site (mistakenly reported as northwest of the site in the report). These are identified as stockpiles M1 and M2 (Section 2.1.1.8 above) on the site plans (**Appendix B** drawings LP3646-LW-111-XX-D-G-11101-C01 and LP3646-LW-222-XX-D-G-22202-C01).

Small stockpiles of general waste were identified across the site, although no potentially contaminative materials were noted.

The presence of the pump house associated with the centrally located reservoir was noted.

The presence of suspected asbestos containing corrugated cement roof panels on the pesticide store in the northwest of the site was noted, as was the bunded oil tank.

Both pesticide contamination and localised TPH contamination were considered likely based on the former and current land use. Soil capping and/or localised removal of any contaminated soils, including hotspot removal for the bonfire area, were recommended.

A number of geotechnical/general hazards were identified and these are detailed within the report.

2.2.5 GRM Phase II Site Appraisal report ref GRM/P7298/F.2 August 2022

A further 25 exploratory holes were excavated for the purposes of confirming ground conditions and contamination levels across the site. The contamination assessment recommendations suggested that no remediation of the site was required, but careful management and disposal of mounded soils (M1 – the bonfire stockpile area) would be required due to an elevated arsenic concentration in one sample of the mounded soils of 87 mg/kg against the generic assessment criteria (GAC) of 37 mg/kg for the Residential with Home Grown Produce ($RESI_{HGP}$) and 79 mg/kg for the Public Open Space Residential (POS_{RESI}) end-use scenarios.

No concentrations of petroleum hydrocarbons were reported in exceedance of their respective GACs. Where pesticides were recorded above the limit of detection of the test

the recorded concentrations were below their threshold values. Asbestos screening of soil samples did not reveal the presence of asbestos in any of the samples analysed.

Further ground gas monitoring summarised in GRM/P7298/F.2 recorded the following data for monitoring wells installed within the made ground;

- maximum gas flow below limit of detection,
- methane concentration 0% to 5% v/v (WS202),
- carbon dioxide concentration 2.3% to 2.5% v/v, and
- oxygen concentration 16.1% to 17.4% v/v.

The following data was recorded for monitoring wells installed within the natural strata;

- maximum gas flow -0.4 l/hr (this is a negative gas flow, and no positive gas flows were recorded),
- methane concentration below limit of detection,
- carbon dioxide concentration 0.0% to 7.3% v/v, and
- oxygen concentration 7.7% to 20.3% v/v.

Based on the maximum gas flow rates and concentrations, following the guidance in BS8485:2015+A1:2019 *Code of practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings*, the ground gas risk assessment placed the site within Characteristic Situation CS1, for which no gas protection measures are required. Whilst one well found methane at a concentration of up to 5% v/v, this was an isolated occurrence and no other wells recorded methane levels above detection limits on any monitoring occasion. Based on the isolated nature of this methane detection and the overall gas screening value being well below that needed to bring the site into a higher risk band the conclusion of CS1 was maintained.

A recommendation was made for additional testing in areas previously not investigated due to existing structures/vegetation.

Made ground had previously been identified as a potential source of contamination of controlled waters. Report GRM/P7298/F.2 referred back to the leachate testing carried out for GRM/P7298/F.1 and repeated the conclusion that the risk to controlled waters was determined to be negligible.

With respect to water supply pipes, the investigation report considered that at the concentrations of contaminants recorded to date (report date August 2022), and based on UKWIR guidance, the standard water supply pipes should be suitable for the site. However, it was recommended that the local water supply company be approached for confirmation of their requirements.

2.2.6 Asbestos Survey

TS Asbestos carried out a HSG264 (2010) Asbestos Management Survey into the presence of asbestos containing material at the site in March 2016, report no. Si 1382. The survey identified asbestos containing materials within the fabric of the workshop/warehouse/storage building in the western part of the site. The materials comprised:

- Asbestos cement Mill Board internal cladding containing crocidolite/chrysotile.

- Asbestos cement corrugated roof panels throughout containing chrysotile.
- Asbestos cement Mill Board external cladding containing crocidolite/chrysotile.
- Asbestos cement rainwater gutter and downpipes containing chrysotile.

The asbestos management survey report made recommendations to apply "asbestos beware" labels, maintain an asbestos register, repair or remove broken panels and manage asbestos which is to remain in place. A comment was made that the asbestos management plan must advise incoming tradesmen of the location of the asbestos.

During the site reconnaissance/walkover carried out for the LEAP's Phase III investigation it was apparent that no significant repair work had been carried out on the building which remains in a poor condition.

2.2.7 LEAP's Phase III Site Investigation ref LP3646 dated July 2024

LEAP's Phase III Investigation comprised of 52 locations including 28 hand pits and 24 windowless boreholes carried out between 22 and 25 April 2024. 44 soil samples were submitted for laboratory analysis, including heavy metals, speciated polycyclic aromatic hydrocarbons and asbestos screening. Four samples were tested for total petroleum hydrocarbons and eight samples were tested for organochloride and organophosphorus pesticides.

Chemical analysis identified that two made ground samples (HA301 and HA303) in the northwest corner of the site contained concentrations of contaminants in exceedance of their respective GACs for a $RESI_{HGP}$ end-use scenario; namely an exceedance of lead in HA301 and PAHs in HA303.

No further contamination was encountered by LEAP in the made ground across the wider site, nor was any contamination encountered in the topsoil and underlying natural soils.

Elevated arsenic was detected in stockpile M1 in a previous investigation. Following the stockpile removal from the site, the report indicated that the underlying soils should be inspected to confirm sufficient removal of the waste material.

The insecticide DDT and its derivatives were detected above the LOD in two samples from the north and centre of the site. Based on the assessment criterion for DDT previously derived by LEAP for a previous site, the concentration of DDT detected was not considered to pose a significant risk to human health.

Whilst ground gas monitoring to date identified a low risk from ground gases and characterised the site as CS1, the report noted that the presence of buildings and dense vegetation limited the spacing of the monitoring well installation. Should any further made ground or organic rich soils be encountered in these areas then further gas risk assessment may be required.

The report recommended that further investigation would be required in the footprint of existing buildings following demolition; that the elevated lead and PAH impacted soils should be removed.

Prior to development, the report recommended consideration should be given to any on-site materials and their potential for re-use as part of, or during construction of, the proposed development. Where made ground soil is to be re-used on site then it is

recommended that this is carried out under the CL:AIRE Definition of Waste Industry Code of Practice (DoWCoP) for re-use of soils[2].

[2] The Definition of Waste: Development Industry Code of Practice. Version 2 2011. CL:AIRE

3 CONCEPTUAL SITE MODEL

3.1 Geoenvironmental conceptual site model

3.1.1 Approach

A risk-based approach is used in the UK to assess contaminated or potentially contaminated land. For a potential risk to exist, there must be a contaminant linkage in place, i.e. there must be a source of contamination, a potential receptor, and a pathway linking the two. The purpose of this preliminary conceptual site model (CSM) was to systematically identify all of the potential contaminant linkages using the information provided in **Section 2** of this report. The preliminary CSM was then used to enable uncertainties and further assessment requirements to be identified.

3.1.2 Sources of contamination

Based on the information obtained from the investigations reported in Section 2, Table 2 provides a summary of the current and historical on- and off-site sources with the anticipated nature and distribution of the sources:

Table 1: Potential sources of contamination

Potential Source	Contaminants of Concern	Anticipated Distribution
Made Ground in north-west of the site	Lead was detected in made ground soils in HA301 at 0.20 m and PAHs were detected in HA303 at 0.25 m.	Made ground in HA301 extended to 0.55 m and to 0.40 m in HA303. A black material was identified in HA303 at 0.30 m, which may be the PAH source. The contaminant distribution is anticipated to be localised and limited to the shallow made ground. Testing in the vicinity of HA301 and HA303 by Leap and GRM did not report elevated concentrations of Lead or PAHs.
Above ground storage heating oil tanks in north-west of site	Heating oil range hydrocarbons	Trial holes in the vicinity by GRM in 2021 (WS114, SS205) did not report olfactory or visual evidence of hydrocarbons. A shallow hand pit in the vicinity was excavated in 2024 (HA301) and no olfactory or visual evidence of hydrocarbons. Potential for localised hydrocarbons beneath the footprint of the former heating oil tank store, although not considered a significant risk in the LEAP Phase III Investigation Report (ref:3750605 dated 10/07/24).
Pump house containing diesel powered pump	Diesel contaminated soils	WS315 in close proximity to the pump house did not record any made ground or visual/olfactory evidence of hydrocarbons.

Potential Source	Contaminants of Concern	Anticipated Distribution
		Laboratory testing did not detect petroleum hydrocarbons above analytical limits of detection. Potential for localised hydrocarbons beneath the footprint of the pump house, although not considered a significant risk in the LEAP Phase III Investigation Report (ref:3750605 dated 10/07/24)
Mounded soils in stockpile M1	Moderately high arsenic concentrations detected in stockpile M1	Potential for arsenic to have leached M1 and impacted surficial soils beneath the footprint of the stockpile.
Building in west of site	Asbestos – chrysotile and crocidolite were identified by the TAKESTOCK asbestos survey.	Potential for localised contamination of soils within the vicinity of the building or wider spread contamination of soils due to tracking and or following demolition.
Silt trap/sump in washdown area outside workshop in west of site	Petroleum hydrocarbons, polycyclic aromatic hydrocarbons, solvents.	Localised to area around silt trap/sump and associated pipework.
Areas not investigated: polytunnels, existing structures and in areas of dense vegetation	Heavy metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, asbestos containing materials, pesticide/herbicides.	Limited investigation has been undertaken in areas where polytunnels and structures are present. Contamination, if present likely to be limited to near surface soils and made ground.

3.1.2.1 Discounted sources

The LEAP Phase III Investigation Report (ref:3750605 dated 10/07/24) and earlier GRM Reports classified the gas situation value (GSV) at the site as very low risk or characteristic situation 1 (CS1). Noting that the limitations of the investigations listed in RCL6 (Section 3.1.4), if deep made ground or organic rich soils are identified the GSV will require re-appraisal.

An off-site historic landfill and electrical substation were discounted from further assessment based on distance from site. The off-site historic landfill is separated from the site by the railway cutting and there is not considered to be a plausible contamination pathway.

3.1.3 Potential receptors

In the context of the proposed future land use, the following potential receptors of ground contamination were identified:

3.1.3.1 Human health

- Future residents/site users
- Construction workers

3.1.3.2 Controlled waters

- Superficial Head Deposits (Secondary A aquifer)
- Hythe Formation (Principal aquifer)
- Drains around the boundary of the site.

3.1.3.3 Other

- material construction of buildings and infrastructure
- neighbouring properties

3.1.4 Relevant contaminant linkages (RCLs)

Based on the relevant sources of contamination identified above the following are taken forward for remediation or further evaluation:

RCL	Potential Source	Pathway	Receptor
RCL1	Made ground in the vicinity of HA301 and HA303, where lead and PAHs concentrations exceed assessment criteria	Direct contact, soil ingestion, ingestion of soil attached to home grown produce, dust inhalation (indoor/outdoor), indoor/outdoor vapour inhalation (PAHs only) Direct contact with buried potable water pipes (PAHs)	Future site users, construction/maintenance workers, buried pipework
RCL2	Localised heating oil contamination in footprint of above ground fuel tank store	Direct contact, soil ingestion, ingestion of soil attached to home grown produce, dust inhalation (indoor/outdoor), indoor/outdoor vapour inhalation (PAHs only) Direct contact with buried potable water pipes (TPH)	Future site users, construction/maintenance workers, buried pipework, groundwater
RCL3	Localised diesel contamination in footprint	Direct contact, soil ingestion, ingestion of soil attached to home grown produce, dust inhalation	Future site users, construction/maintenance

RCL	Potential Source	Pathway	Receptor
	of above ground pump room	(indoor/outdoor), indoor/outdoor vapour inhalation (TPH only) Direct contact with buried potable water pipes (TPH)	workers, buried pipework, groundwater
RCL4	Contaminated soils (arsenic) beneath footprint of waste stockpiles	Direct contact, soil ingestion, ingestion of soil attached to home grown produce, dust inhalation (indoor/outdoor),	Future site users, construction/maintenance workers, groundwater
RCL5	Areas with limited investigation, in particular polytunnel areas in the west of the site two warehouse type sheds in the north-west of the site; poly tunnel structures in the north of the site; and areas of dense vegetation in the south-west of the site. Contaminants include heavy metals, PAHs, fuel oils, herbicides/pesticides; asbestos containing materials	Direct contact, soil ingestion, ingestion of soil attached to home grown produce, dust inhalation (indoor/outdoor), indoor/outdoor vapour inhalation (hydrocarbons) Direct contact with buried potable water pipes (hydrocarbons)	Future site users, construction/maintenance workers, buried pipework, groundwater
RCL6	Previously unidentified contamination. It was noted in the LEAP Phase III Investigation Report (ref:3750605 dated 10/07/24) that the site scope of investigations commissioned to date did not meet the requirements of a detailed investigation following BS10175:2011+A2:2017 or the Clients own specification for ground investigation for a residential development. Contaminants include heavy metals, PAHs, fuel oils, herbicides/pesticides; asbestos containing materials	Direct contact, soil ingestion, ingestion of soil attached to home grown produce, dust inhalation (indoor/outdoor), indoor/outdoor vapour inhalation (hydrocarbons) Direct contact with buried potable water pipes (hydrocarbons)	Future site users, construction/maintenance workers, buried pipework, groundwater

4 REMEDIATION STRATEGY

4.1 Remediation objectives and constraints

4.1.1 Objectives

The primary objective of the remediation activities will be for the safe redevelopment of the site that is suitable for the proposed end use.

Considering the relevant contaminant linkages the options chosen will either:

1. Manage (remove, destroy, modify or immobilise) the source;
2. Interrupt the pathway; or
3. Modify the receptor or behaviour of the receptor.

Option 3 is unlikely to be a feasible route, as such remedial options will consider management or interruption. Management typically involves removal, destruction or transformation of the source(s); pathway interruption involves blocking of the pathway, destruction or removal of the contaminants along a pathway.

This can be achieved via permanent reduction of the contaminant concentrations to acceptable limits; source removal; or pathway interruption.

4.1.2 Constraints

There are a number of constraints at the site that affect the proposed remediation works/options, namely:

- At time of writing site is still in use as a nursery and a number of structures and areas of the site that have had limited site investigation. The risk to receptors is not known.
- Demolition works has not been undertaken.
- It is not known at this stage whether there will be any proposed level changes i.e. whether there is a significant cut and fill exercise that could influence remedial options.
- Development time scales are not known.
- Final site layout is not known.

4.2 Initial Outline Remediation Options

4.2.1 Pre-construction activities

Further ground investigation will be needed prior to the site being developed. All RCL identified above would benefit from further investigation, as outlined below:

4.2.1.1 Lead and PAH contaminated soils

- RCL1 – shallow hand pitting to determine the extent of lead and PAH contaminated soils. It is anticipated that the contaminated soils are localised and are likely to be limited in depth and lateral extent.

4.2.1.2 Stockpile M1 and M2 removal

- RCL4 – following removal and disposal of waste material to a licensed facility the ground within the footprint of stockpile M1 and M2 should be inspected for gross contamination and shallow soils beneath stockpile M1 should be sampled and tested for arsenic .
- The material in stockpiles M1 and M2 will require direct off-site disposal to a suitable waste facility. Further comments are provided in Section 4.2.3.

4.2.1.3 Post demolition

- RCL2 & 3 – site investigation following demolition and slab removal – trial hole to extend through any made ground soil in the building footprints to at least 2 m into natural soils. Testing to include petroleum hydrocarbon analysis.
- RCL2 & 3 – where there are historical drainage or utility runs in the vicinity of the heating oil tank area or pump house these should be inspected and bedding material screened for hydrocarbons using a PID.
- RCL5 – further ground investigation should be undertaken to determine ground conditions and chemical composition of soils in the previously restricted areas.

4.2.2 Construction Phase

4.2.2.1 RCL1 Lead and PAH contaminated soils- hotspot removal

- After the further site investigation is completed to determine the extent of lead and PAH impacted soils the material should be excavated and disposed from site as a waste. Due to the shallow nature of made ground at these locations it is anticipated that the full depth of made ground should be removed (up to max depth of 0.60 m). If made ground extends below 0.60 m then it may remain, but subject to base verification testing.
- Excavated made ground material should be classified as hazardous or non-hazardous, based on chemical testing prior to disposal to a suitable waste facility. Further comments are provided in Section 4.2.3.
- Verification samples should be collected from each side wall face – at 5 m centres and from the base one per 25 m^2. Samples from the hotspot associated with HA301 should be tested for lead and from the hotspot associated with HA303 should be tested for PAHs and screened against relevant HH GACs for a residential with homegrown produce land use.
- Where a verification sample exceeds the GAC a further 0.50 m depth of the sidewall should be removed and re-tested and in case of base samples it is anticipated that the base extends to natural ground. If this fails a further 0.25 m should be removed from the base of the excavation.

4.2.2.2 RCL2-5

The remediation requirements for RCL 2-5 are subject to the findings of any further investigation and as such this section will require updating once complete.

4.2.2.3 RCL6 -previously unidentified contamination

It is considered possible that as yet unidentified contamination may be encountered during construction works. Where additional contamination is identified during works this will be subject to further assessment and documented accordingly. It may be necessary to recommend the removal of additional soils or to propose alternative remedial solutions.

In the context of 'contamination' this may be determined initially by visual or olfactory cues, including but not limited to the following examples:

- Strong odours e.g. egg smell/rotten vegetables/sewage/petroleum fuel odours/sweet solvent odours etc.
- PID readings >5 ppm.
- Strong discoloured soils e.g. black staining; blue or highly discoloured soils.
- Non-aqueous phase liquids/oils or fuels.
- Asbestos containing materials or fibrous materials.
- Coal/clinker/asphalt gravels.
- Buried materials (domestic/commercial/industrial wastes; buried wood/plant waste/animal waste etc).

Verification engineers are to be informed if any material suspected to be contaminated is encountered during the course of the development, so that appropriate revisions to remedial strategy can be implemented as required.

4.2.2.4 Soft Landscaped Areas

To date, with the exception of locations HA301 and HA303 made ground in areas tested has not been found to pose a risk to future land users for a residential land use. The made ground soils have not been tested for compliance with British Standard for Topsoil/Subsoil (BS3882:2015 or BS8601:2013) they are unlikely to be initially suitable for use in gardens or soft landscaping due to the coarse fragment content and rare sharps (brick/concrete/asphalt gravels, on occasion whole bricks and rare glass, metal, wood).

On this basis and subject to confirmation with the landscape architect the following is recommended where made ground soils are present in:

4.2.2.4.1 Private gardens (front and rear gardens)

An allowance should be made for the removal of sufficient made ground to make space for a thickness of 600 mm of clean cover soil or removal of made ground to natural soils if encountered sooner, with inspections at strip formation (both in areas where made ground is suspected and where it is not to confirm absence of made ground).

The 600 mm cover system should comprise a minimum of 150 mm certified clean topsoil and 450 mm certified clean subsoil. This may be shallower if made ground thickness is less than 600 mm.

Where asbestos containing materials is encountered at strip formation inspection, then further excavation will be required to allow the inclusion of an engineered clean cover system to comprise:

- Further excavation to 1000 mm below finish level;
- Placement of a geotextile marker layer at 1000 mm below finish level;

- Placement of 150 mm verified clean crush as an 'anti-dig' layer;
- Placement of a second geotextile marker; and
- Placement of 750 mm verified clean cover soils (including at least 150 mm topsoil)

4.2.2.4.2 Soft landscaped areas

An allowance should be made for the removal of 300 mm of made ground material within proposed soft landscaped areas of public open space (or shallower if natural soils are encountered sooner), with inspections at reduced formation in all areas.

Provision and placement of 300 mm verified clean cover soils comprising a minimum of 150 mm topsoil.

If further previously unidentified of contaminants of concern or the presence of asbestos are recorded at reduced formation level, then further soils will need to be removed and/or an engineered cover system (including anti-dig layer), may be required.

4.2.2.4.3 Private gardens and soft landscaped areas where made ground is not present

In gardens (front/rear) and soft landscaped areas where made ground was not identified these are likely to require 150 mm of chemically suitable topsoil, which should be tested as chemically suitable at the rates detailed in Section 5.1.1. Prior to backfilling these areas should also be checked to be free from made ground and building materials including piling mats, waste materials, brick, glass, concrete etc.

4.2.2.4.4 Other considerations

In order to meet the requirements of the warrantor, a minimum of 450 mm freely diggable soils (free from obstructions and construction wastes) and a minimum of 150 mm of topsoil (maximum of 300 mm) to create a suitable 'growing medium' for plants, must be placed within all private gardens and areas of public open space.

For all areas of the site, a watching brief must be maintained during construction in the event that any further contamination is identified, with measures in place to assess suspect soils appropriately and deal with them accordingly.

All remediation works will be verified by a validation engineer by a process of regular site inspections and as appropriate soil sampling and laboratory analysis. The validation engineer will thereby maintain a watching brief, although the ultimate responsibility for delivery of the remediation strategy remains with the developer.

On completion, a verification report will be provided, documenting the results of the site inspections and laboratory testing. Details of soils -re-used on site or imported to complete the remediation will also be included within the verification report. Further details are provided within Section 5.

4.2.3 Protection of Incoming Services

Given the limited ground contamination identified to date, protection of new utilities such as potable water pipes may not be required. It is recommended that confirmation is obtained by the water supply company.

Ultimately the local water supply company will have their own specification and they should be consulted to confirm whether they will require protection measures to be adopted.

4.2.4 Waste Disposal

It is anticipated that the proposed development will generate waste soils and materials will need to be removed from site as part of the construction process. In this instance, waste soils are anticipated from where reduced formations within private gardens and areas of soft landscaping is required and in addition from the existing stockpiles in the northeast of the site.

In line with current European Commission Regulations including the Waste Framework Directive 2014 and The Waste (England and Wales) (Amendment) Regulations 2012, and Environment Agency Guidance (WM3 2015), waste holders and their advisors (producer, carrier or disposal facility) are required to make an assessment of waste materials and classify them as hazardous, non-hazardous waste or inert.

Once the waste has been classified as either hazardous or non-hazardous and prior to disposal, further analysis may be needed to confirm whether soils to be exported meet the proposed receiver landfill site's Waste Acceptance Criteria. Where a waste is classified as non-hazardous a Waste Acceptance Classification test (WAC) is required to determine whether the material can be accepted at either an inert or non-hazardous landfill. Where the WAC test results exceed hazardous waste WAC limits that waste cannot be accepted at a hazardous landfill site without prior treatment.

Where soils are to be disposed off-site, it is the duty of the waste producer, to ensure that all waste is disposed of appropriately and that any that is sent to landfill is sent to an appropriately licensed one.

Where made ground soil is to be re-used on site or natural clean soils (topsoil or subsoil) may be suitable for re-use on another site, then it is recommended that this is carried out under the CL:AiRE Code of Practise for re-use of soils.

WM3 also recommends various forms of pre-treatment that are acceptable to try and reduce hazardous classifications to non-hazardous/inert.

Waste soils awaiting testing, classification and disposal will be placed on plastic sheeting, segregated by fencing and labelled appropriately. Any potentially hazardous or inert soils will require WAC testing.

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

4.2.5 CLAiRE Development Industry Waste Code of Practice

It is anticipated that clean natural soils generated from foundation and/or drainage excavations may be suitable for re-use on site within the cover layer system or as part of the ground relevelling.

Excavated made ground may be suitable for re-use for ground relevelling in hard landscaped areas subject to it meeting the geotechnical requirements for re-use and provided that it is free of asbestos.

If made ground soils are to be reused on-site then it is recommended that this is undertaken in accordance with the DoWCoP. The Guidance presents key principals for demonstrating compliance with DoWCoP to reuse of soils as non-waste, this needs to be lines of evidence based to demonstrate that soils are not waste. Lines of evidence must be set out in the

Material Management Plan. Key principals to be met when reusing soils as non-waste are as follows:

- Reuse of material will not create unacceptable risk to human health or other identified receptors – i.e. risk assessment confirming suitability for reuse
- Suitability for reuse without further treatment – suitable chemically and geotechnically – must meet relevant specification – e.g. use as backfill beneath cover systems buildings or hardstanding or for site regrading
- Certainty of Use – must demonstrate that material will actually be used and is not just a probability – i.e. there is planning for the scheme and that backfill is required to make up levels or clean soils required for cover systems
- Quantities – materials used should only be in the quantities required – i.e. use of excessive material will = landfill on site as disposing waste soils that aren't required

A Material Management Plan should be submitted to a 'Qualified Person' (QP) for review and if appropriate the QP will sign a declaration that proposals within the MMP are in accordance with CoP. The QP must be independent from and have had no prior involvement with the project.

On completion a verification report must be produced documenting whether proposals set out in MMP were implemented on site – confirming volumes of material reused, reuse locations, and compliance with specifications.

5 VERIFICATION

5.1 Site Works

During the re-development works, the verification engineer will observe and verify the following on a part time/on call basis (subject to suitable notice) :

- Visual inspection of the formation level soils following site strip;
- Verification of the chemical nature and thickness of the applied clean cover soils; and
- Verification of excavations where contaminated soils are deemed present.

The engineer will also be available to visit site and provide guidance should any previously undiscovered contamination be encountered.

5.1.1 Verification testing of imported soils or site won soils

As stated in the remediation strategy above, the verification engineer will approve imported soil sources prior to use, based on site investigation and/or test results.

Once a source has been approved for importation the verification engineer will complete onsite inspections and verification testing. Imported topsoil and subsoil will be tested at a frequency of a **minimum of one sample per 150 m^3 of imported soil/site won with a minimum of three samples per source of material**. Testing will be undertaken at a UKAS and MCERTS accredited laboratory.

All imported soils will be required to meet the specification as given in **Appendix C** irrespective of the depth at which they are to be placed. Any unsuitable material will be removed from site.

Where site won soils are used they shall meet the specification as for imported soils, with the exception that contamination levels should be lower than the residential with home-grown produce GACs used for the risk assessment previously completed.

The re-use of any imported topsoil or subsoil 'site-won' from another site or 'site- won' made ground will require a Materials Management Plan (MMP) with a declaration signed by a Qualified Person (QP) in accordance with the CL:AiRE Definition of Waste Code of Practice (DoW CoP). Manufactured topsoil with appropriate end of waste certification is exempt from the CoP. The CoP **cannot** be used to import Made Ground.

5.1.2 Strip Formation Inspections

The remediation strategy states that strip formation inspections are required to confirm the absence of gross contamination in soft landscaped areas (private front / rear gardens; public open spaces and soft landscaped verges), through visual inspections and confirmatory testing (if required i.e. in hotspot areas or where gross contamination is observed). This must be completed by the verification engineer prior to placement of any clean cover to determine if an anti-dig layer is required.

At this stage where further investigations are outstanding and where made ground is still present at strip formation (300 mm or 600 mm below finish level) confirmatory testing for contaminants of concern is recommended, and should be completed at a frequency of:

- 1 per 3 plots or every circa. 20 m^2 in areas of public open space unless asbestos or gross contamination is identified.

Where made ground is not recorded garden and soft landscaped areas require visual inspection only at the above rates to confirm that no deleterious materials are present prior to topping up with suitable growing medium soils.

5.1.3 Depth of Clean Cover

The depth of the placed topsoil and subsoil layers in rear gardens and soft landscaped areas will be verified by the excavation of hand dug holes through completed areas. This depth will be specified to meet the requirements of this strategy as well as those of the regulators and warrantors. The frequency of inspection will be at the discretion of the engineer. Noting warrantor expectations, the standard frequency of inspections is anticipated to be:

- 1 per 3 plots at the site or every circa. 20 m^2 in areas of public open space unless asbestos or gross contamination is identified

5.1.4 Verification Report

All verification works will be presented in a final verification report upon completion. This report will comprise source certificates, delivery notes and test results of imported soils and photographic records showing any stockpiling areas and demonstrating the location and thickness of the applied clean cover soils. On receipt, the verification report should be submitted to the Local Planning Authority and Building Control Warrantors to enable the discharge of conditions related to contaminated land.

All relevant information shall be collected during the remediation works and a validation report compiled on completion and comprise as a minimum:

- A summary of the background site information and the RMS;
- Parties involved in the works;
- Details of any hitherto undiscovered contamination along with its remediation and verification;
- Waste classification and management documents to include as a minimum:
- Volumes and source of any materials removed from site, along with transfer tickets and acceptance notes at the relevant facilities.
- Laboratory validation test results and transfer notes for any imported materials;
- Records of earthworks including as built drawings, photographs and quantities of materials;
- Records of any specialist remediation contractors works as a technical appendix if relevant (i.e. Japanese Knotweed/gas protection); and,
- Records of any variation from this strategy including details of correspondence with statutory authorities.

APPENDIX A – SERVICE CONSTRAINTS

APPENDIX A
SERVICE CONSTRAINTS

1. Service Constraints for all Reports

1.1. This Report (the “Report”) and any study, inspection, investigation, sampling, testing and or interpretation carried out in connection with the Report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) trading as Carbon Zero Consulting, Leap Environmental or RSK Geosciences, for the Client named in the first paragraph of the Report (the "Client") in accordance with the terms of an RSK Fee Proposal including RSK Environment Standard Terms and Conditions (the “Appointment”) between RSK and the Client, unless otherwise stated in the first paragraph of the Report. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by a geo-environmental consultant at the time the Services were performed. Nothing in this Report shall be construed as imposing any fitness for purpose obligation. 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.

1.2 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. RSK shall not be liable in respect of any action or proceedings arising out of or in connection with this Report whether in contract, in tort, for breach of statutory duty or otherwise after the expiry of six (6) years from either (i) the date of the Report or (ii) such earlier date as prescribed by law, unless varied in the terms of the Appointment.

1.3 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 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 geo-environmental consultant and/or lawyer.

1.4 The Client shall not, without the prior written consent of RSK, assign, transfer, charge, mortgage, subcontract, or deal in any other manner with all or any of the benefits provided in this Report. Unless specified in the Appointment, RSK shall not be obliged to assign the benefit of the Report whether by collateral warranty, third party rights pursuant to the Contracts (Rights of Third Parties) Act 1999, letter of reliance or otherwise. If RSK agrees to any assignment of the benefit of this Report, in whatever form, benefits to third parties through collateral warranties, third party rights or letters of reliance shall not be provided unless a fee for each right, warranty or letter is agreed. The form of wording used in the warranty or letter shall be provided by RSK for agreement by the Client. Any reasonable changes to the form of wording will be implemented by mutual agreement, however the terms in the warranty or letter cannot offer the third party any greater benefit than the Appointment offered to the Client.

1.5 It is the understanding of RSK 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 the review and advice of RSK shall be at the Client's sole and own risk. RSK shall not be liable for any use of this Report for any purpose other than that for which it was provided.

1.6 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.

1.7 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 Appointment 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, fuel storage, persistent bio-accumulative or toxic chemicals (including PFAS and related compounds) or other radioactive or hazardous materials, unless specifically identified in the Services.

1.8 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 desk based publicly available 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 and the limitations below:

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.

d. The Client has identified in writing to RSK, the information, reports, findings, surveys and preliminary works RSK may not rely upon when providing 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 Appointment between the Client and RSK.

1.9 Any site drawing(s) provided in this Report is (are) not meant to be an accurate base plan for scale measurement 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 accurate setting out and should be considered indicative only.

1.10 Should RSK be requested to review the Report after the date of issue of this Report, RSK shall be entitled to additional payment at the existing rates, or such other terms as agreed between RSK and the Client.

2. Service Constraints where the Report provides an intrusive assessment of ground conditions:

2.1 The intrusive environmental ground investigation aspects of the Services are a limited sampling of soil from 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 agreed 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 (not tested) are not present.

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

2.3 Where the Services include Investigation of an exploratory nature or relating to physical ground works, any costings and prices provided in the Report are estimated and provided for guidance purposes only. The actual cost and time quantities shall be remeasured and shall be dependent upon the ground or other conditions, constraints present, and number and depth of the investigation locations, which shall influence the number of samples and tests required, and the quantities of soil being classified.

2.4 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. However, this Report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

2.5 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. Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this Report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7, although this is subject to the restrictions imposed on the investigation, as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this Report will not meet the requirements of a Geotechnical Design Report (GDR) and should therefore be used for preliminary guidance only.

3. Service Constraints where the Report relates to Surface Water Management:

3.1 The Surface Water Management Inspection (SWMI) Report, documents provided, observations, actions, and recommendations, with respect to the management of potential pollution issues to surface waters, made during the site Inspection visit, are those present at the time of the visit, and may not represent those recorded by others on the same day.

3.2 The comments given in this Report and the opinions expressed are based on the weather, ground and ground water 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 inspection and therefore could not be taken into account. In addition, groundwater levels and flows, may vary from those Reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

3.3 RSK places a degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this Report was prepared.

3.4 This Report is a live document, to be continually reviewed and updated as the development progresses or other changes occur on site. RSK can only maintain the currency of this Report through the Client requesting support with supplementary site visits or attendance at meetings ahead of key stages of the development in relation to surface water management. Our risk rating assesses a number of risk factors in line with the source-pathway- receptor model and is therefore subject to constant change.

3.5 Standard design drawings are indicative. Material types, dimensions and construction details will need to be adjusted by the Client to suit the specific conditions / flows on Site.

3.6 The full responsibly for implementing the site-specific protection and maintenance measures to protect the surface water system as stated in this Report, remains with the Client and their site management team. Additional control measures may be required to achieve the objectives set out in the Surface Water Management Plan to be implemented and financed by the Client.

4. Service Constraints where the Report relates to Waste Management:

4.1 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 re-used 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 necessarily become waste until the criteria above are met. Excavation arisings from the development may therefore be classified as waste if surplus to requirements and/or unsuitable for re-use.

4.2 It is the duty of the waste producer, to ensure that all waste is accurately classified prior to waste disposal. Technical Guidance WM3 (EA, 2018) sets out in its Appendix D 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. Unless otherwise stated, the waste assessment presented in this Report should be considered as preliminary and further testing and assessment of the waste under the provisions of a Waste Sampling Plan may be required to obtain the necessary level of data required for basic characterisation of the waste in support of disposal.

4.3 Unless stated otherwise in the Report, information relating to historical operations at the site was not reviewed as part of the assessment by RSK. In addition, unless otherwise stated in the Services, RSK was not present during the collection of the samples nor had any input on the chemical testing suite. Therefore, the waste assessment and classification detailed in this Report are based solely on any information that were provided to RSK (e.g., laboratory chemical data, exploratory hole records) and were completed without prejudice for our Client.

4.4 RSK's assumes that any ground investigation data, chemical testing results etc., that were provided by the Client to inform the waste assessment and supporting review were carried out in accordance with current best practice and relevant guidance/ standards, where applicable. Thus, the comments given in this Report and the opinions expressed are based solely on the information provided by the Client. However, it is noted that there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account as part of the RSK assessment.

5. Service Constraints for Construction Environmental Management Plan Reports:

5.1 This Report should be considered in the light of any changes in legislation, statutory requirement or industry practices that may have occurred subsequent to the date of issue.

5.2 The measures and comments outlined in this Report and any opinions expressed are based on the plans provided at the time and discussions with relevant parties. However, there may be conditions pertaining to the site that have not been disclosed by investigations and therefore could not be taken into account.

5.3 This CEMP is a live document and is subject to change throughout the project, as and when necessary, to ensure management of environmental aspects remains relevant, and to ensure continued compliance with legislation and commitments as they may change. RSK understands that this CEMP will be reviewed by the Client every six months and updated as and when necessary.

5.4 It is the full responsibility of the Principal Contractor/ Client to ensure that their works do not contravene legal requirements, and adherence to this CEMP alone cannot be a full defence regarding legal action against the Principal Contractor.

6. Service Constraints where the Report relates to Ground Gas Membrane Verification:

6.1 This Report is limited to the verification of the gas resistant membrane/vapour membrane/ radon barrier after installation and no inspections were undertaken of the substrate (i.e. prepared ground). The Report therefore does not constitute as a full verification of ground gas protection system.

6.2 The comments given in this Report and the opinions expressed, are based on the condition of the ground gas membrane as encountered at the time of inspection by suitably qualified personnel. RSK cannot accept liability for any subsequent change to the status of the gas membrane by follow-on trades or other construction activity.

6.3 Where not designed by RSK, the verification of protection measures is carried out with reference to the gas protection design provided by the Client. RSK assume the scope of gas protection measures as determined by third parties to be correct and to have achieved any required approval from authorities.

6.4 The Ground Gas Design Report/Remediation Strategy and Verification Plan contains details of the procedures to be adopted for inspection and validation of the works. However, it should be noted that responsibility for the correct implementation of the strategy lies with the appointed contractor. RSK cannot be held responsible for any remedial works that are carried out without the agreed procedures involving either direct supervision by RSK, or inspection and validation of the works by a representative from RSK.

7. Service Constraints for Environmental Due Diligence (EDD)Reports:

7.1 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the site, therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information.

7.2 This Report describes the results of the EDD exercise. The scope of this EDD Report, where appropriate, covers legal or regulatory compliance with respect to UK or international regulations associated with environmental matters.

7.3 As with any EDD exercise, there is a certain degree of dependence upon information provided by the target company. The EDD does not include a site walkover / visit or liaison with site representatives unless identified in the Services. Therefore, the assessment is based on the available desk study information. Also, there is a certain degree of dependence upon oral information provided

by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this EDD exercise was performed.

7.4 This Report, including all supporting data and notes (collectively referred to hereinafter as "information"), was prepared or collected by RSK for the benefit of its Client.

7.5 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment and the site inspection visit. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the Site therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information and observations collected during the site inspection visit.

8. Service Constraints for Ground source heat energy Reports:

8.1 It is understood that this is a desktop survey only and that there are no requirements for a site walkover, service utility survey, or provision of service plans. These services can be provided upon request if required.

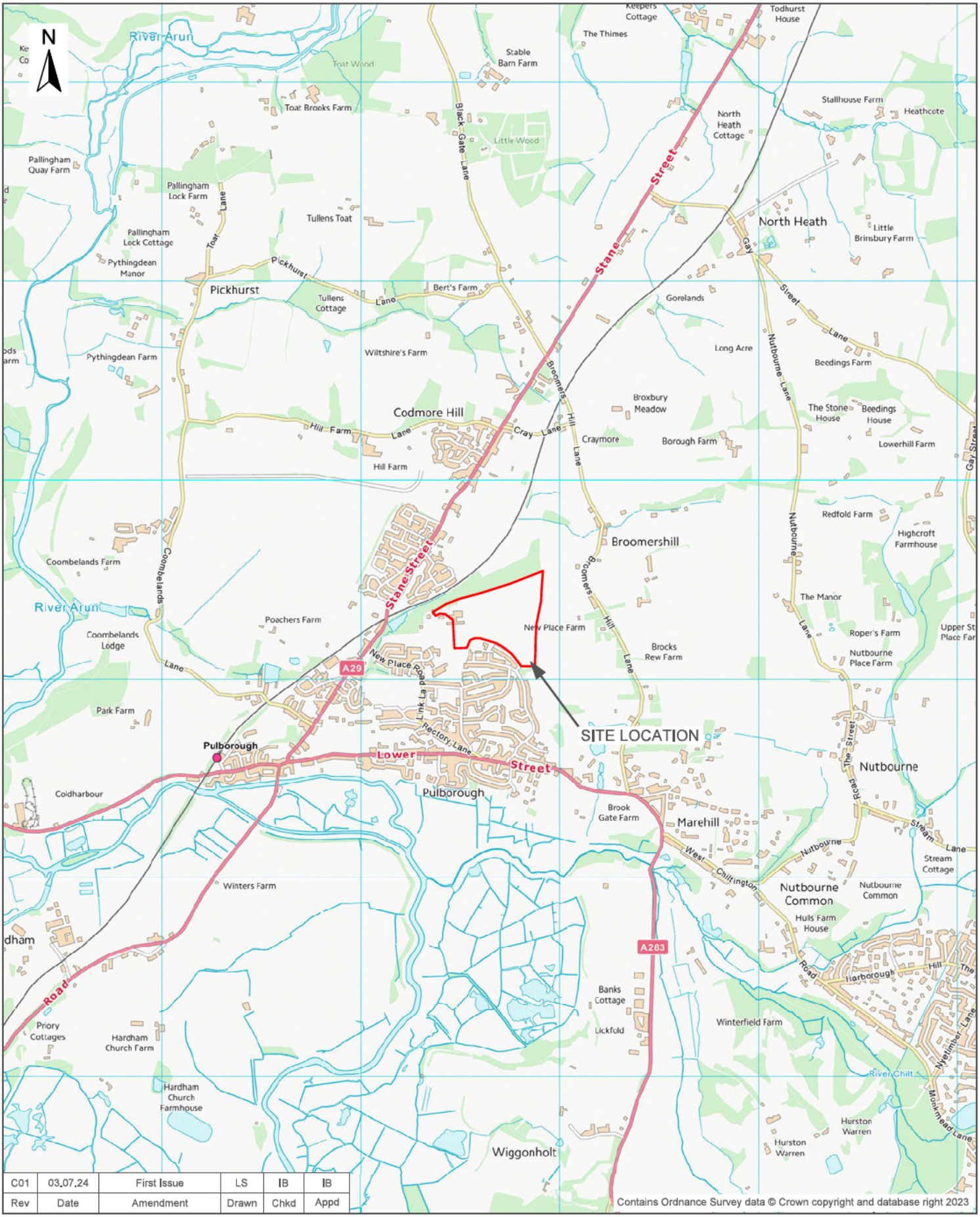
8.2 At a later stage, it is possible that a thermal response test (TRT) will need to be completed, for which a test borehole will have to be drilled, and these would be costed at the time. RSK can provide all aspects of subsequent site work for a GSHP system if required.

9. Service Constraints for Water Abstraction Borehole Reports:

9.1 The Report aims principally to only identify and assess the suitability of the site for a water abstraction borehole. This Report should be considered in the light of any changes in legislation, statutory requirements, and industry practices, that have occurred subsequent to the date of the Report.

9.2 Unless stated in the Report, the opinions expressed in this Report including all comments and recommendations provided are on the basis of the information obtained from a desk-based assessment.

APPENDIX B – FIGURES AND DRAWINGS



Rev	Date	Amendment	Drawn	Chkd	Appd
C01	03.07.24	First Issue	LS	IB	IB

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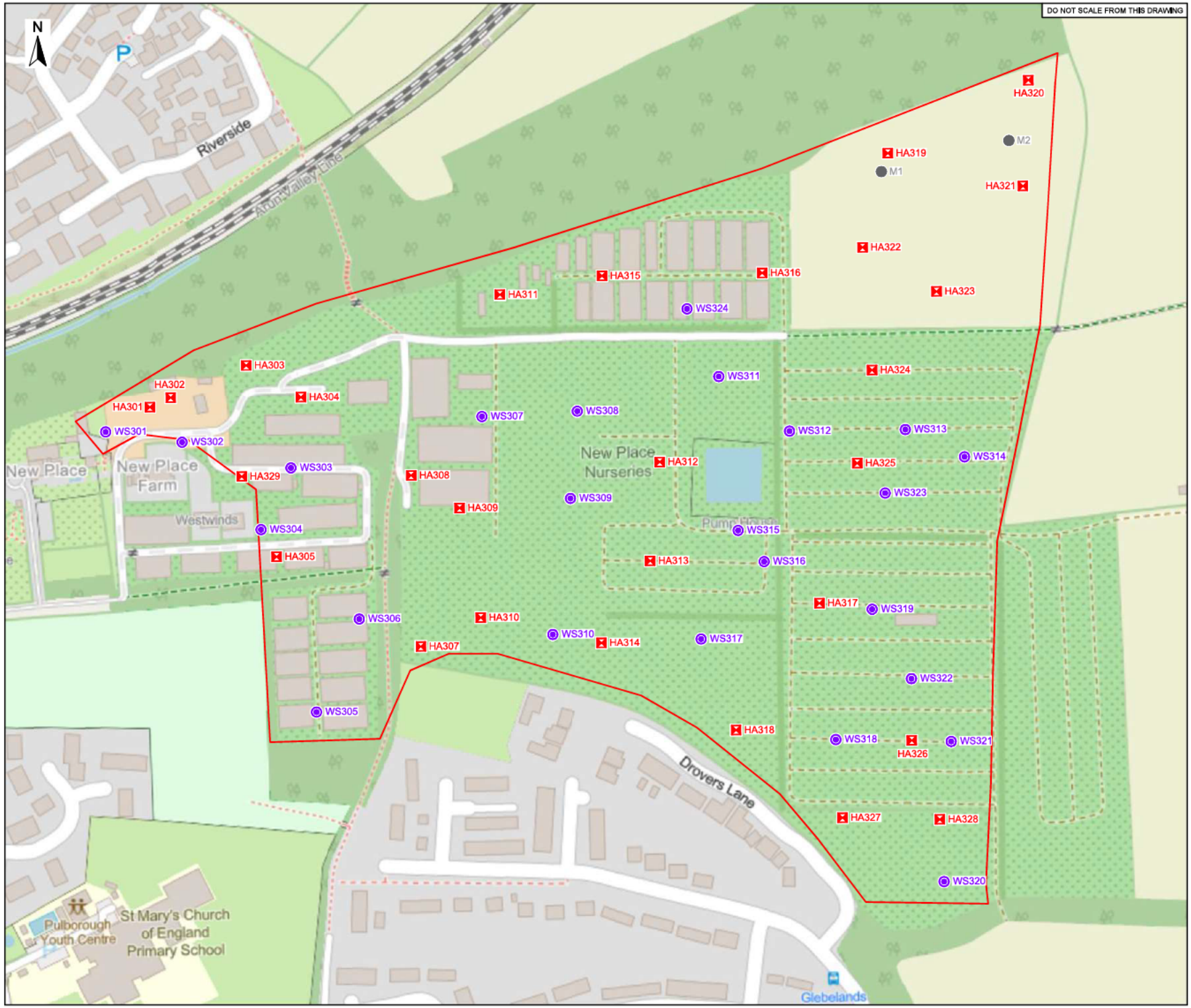
leap environmental an RSK company
2nd Floor, Book House, Glebelands Centre, Vincent Ln, Dorking, RH4 3HW

Client: Barratt Homes Southern Counties

Project Name: New Place Farm, Pulborough

Description: Site Location Plan

Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	505649,119356	LP3646	11101	C01	LP3646-LW-111-XX-D-G-11101-C01



LEGEND

- Site boundary
- Trial pit location
- Window sample location
- Stockpiles

Notes:

Map data © OpenStreetMap

Rev	Date	Amendment	Drawn	Chkd	Appd
C01	03.07.24	First Issue	LS	IB	IB

leap environmental an RSK company
2nd Floor, Book House, Glebelands Centre, Vincent Ln, Dorking, RH4 3HW

Client: Barratt Homes Southern Counties

Project Name: New Place Farm, Pulborough

Description: Site Investigation Plan

Project ID	Drawing no.	Revision
LP3646	22201	C01

File name: LP3646-LW-222-XX-D-G-22201-C01

Dimensions	Scale	Size
m	1:2000	A3

0 20 40 60 80 100m



Site Boundary

Main Streets

Secondary/Tertiary Streets

Potential Emergency Vehicle Access

Existing Bridleway

Existing PRoW

Existing trees within proposed Country Park

Formal Children's Play Area

Primary Site Access

Emergency Vehicle Access

1. New country park including existing woodland
2. Network of east-west and north-south Green Links
3. Opportunity for long distance views
4. All PRoW retained within green corridors
5. Development structure follows the contour of the land (maximum site gradient 1:14)
6. Development divided into a series of 'character areas', separated by generous landscape infrastructure
7. Undulating eastern edge provides informal interface with wider countryside

client
Catesby Estates Ltd

project title
Land north of Glebelands, Pulborough

drawing title
Concept Masterplan

date	18 JUNE 2019	drawn by	JGo
drawing number	edp3037_d042f	checked	CG
scale	Refer to scale bar	QA	GY

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APPENDIX C – SPECIFICATION FOR IMPORTED SOILS

LEAP SPECIFICATION FOR PLACEMENT OF IMPORTED FILLS AND PROCUREMENT OF IMPORTED TOPSOIL AND SUBSOIL

1 Fills

1.1 General

Filling shall be carried out in accordance with the recommendations of BS 6031:2009[1] and the CL:AIRE Definition of Waste Code of Practice (DoWCoP)[2].

Fill shall be maintained and protected in a satisfactory condition at all times until final completion.

Any material rendered unsuitable or unsatisfactory after being placed in the works shall be repaired or replaced as appropriate so that all the completed filling is in accordance with the specification.

1.2 Dimensions

Fills shall be constructed to achieve the finished levels of the development with an allowance for shrinkage and consolidation of the material subsequent to completion, and in order that the minimum clean cover as specified in the remediation method statement is achieved.

The excavated levels shall be recorded before the commencement of filling. The level of the filled areas shall be taken and recorded after filling.

2 Types of Fill

There are potentially two types of fill to be used. These are as follows:

- Topsoil
- Subsoil

The capping of landscaped areas will comprise a minimum of 150 mm of topsoil and a maximum of 300 mm to finished garden or landscaped area level. Underlying subsoil thicknesses will be as required to achieve the overall finished levels and to provide the required cover layer thicknesses as detailed in the main body of this report.

[1] BS6031:2009 Code of practice for earthworks
[2] CL:AIRE The Definition of Waste: Development Industry Code of Practice Version 2, March 2011

2.1 Topsoil

It is recommended that imported topsoil complies with the requirements of BS 3882:2015[3] for a Multipurpose Purpose Grade material.

The topsoil shall be free from fragments of glass, bricks, concrete, wire or other potentially hazardous matter.

Manufactured topsoil shall not be made from waste materials.

The topsoil shall be subject to the additional limitations set out below.

2.2 Subsoil

Imported manufactured or modified subsoil shall comprise certified clean material which satisfies the conditions set out in BS8601:2013[4]. Subsoil arising from site or from a certified direct transfer (e.g. under DoWCoP) shall comprise clean natural arisings from construction activities which have been confirmed acceptable by the Engineer.

2.3 Sources of Materials

Imported materials may be obtained from any source unless otherwise stated in the Drawings or in the Specification.

It shall remain the responsibility of the Contractor to obtain only fill material complying with the Specification and Method Statement, notwithstanding any tests which may be accepted by the Engineer.

The Contractor shall demonstrate to the Validation Engineer's satisfaction that the fill materials from each source are uncontaminated by submitting to the Validation Engineer a chemical analysis of material or evidence of such other tests as the Validation Engineer may require for all proposed sources of fill, and if necessary sampling and analysing materials as they are delivered to stockpiles or the fill location on site.

Sampling rates shall be a typical of one sample per 150 cubic metres of imported soil – as per the frequencies stated in the main body of the report - with a minimum of three samples per source of material, unless otherwise agreed with the Engineer. Such tests for chemical composition as may be agreed by the Engineer shall be carried out on each sample and the results of tests shall be forwarded to the Engineer. Testing for contamination on samples taken shall be carried out at a testing laboratory approved by the Engineer and shall be to appropriate MCERTS standards. The Contractor shall maintain records of the location in the Works of fill from each source and the date of delivery to the site, and shall submit these records to the Engineer as requested. Chemical analysis on the imported fill material shall

[3] BS3883:2015 Specification for topsoil
[4] BS8601:2013 Specification for subsoil and requirements for use

include testing for the contaminants listed in Table 1 as a minimum. Contaminant concentrations shall be below those listed in Table 1 (attached) unless agreed otherwise by the Engineer. Additional analyses may be requested depending on the source and nature of the material. The concentrations in Table 1 are derived from available assessment criteria which are considered to represent uncontaminated concentrations of soil - Suitable for Use Levels (S4ULs)[5] for a residential land use with private gardens where produce may be grown and, in the case of the phytotoxic metals copper, nickel and zinc, the topsoil specification in BS3883:2015. The concentrations in Table 1 assume that no significant contaminant linkage to controlled waters exists that could pose an unacceptable risk.

The S4ULs represent near-minimal risk to human health. In the case of cadmium, hexavalent chromium and benzo(a)pyrene, Category 4 Screening Levels (C4SLs)[6] also exist which are higher than minimal risk but are still strongly precautionary. In instances of persistent failures of the S4ULs for these chemicals, regulators may allow the C4SL to be used instead. This approach shall require regulatory agreement before being implemented. In addition, the following shall be deemed as unacceptable for replacement fills:

- Peat, materials from swamps, marshes and bogs.
- Logs, stumps and perishable material.
- Materials in a frozen condition.
- Clay having a liquid limit determined in accordance with BS17892-12:2018[7];, exceeding 90% or plasticity index determined in accordance with BS17892-12:2018, exceeding 65%.
- Material susceptible to spontaneous combustion.

2.4 Practical Considerations

2.4.1 Formation Level / Subgrade Testing

Where made ground from previous site usage remains present at formation level then subgrade / formation level testing will be required to confirm the necessary thickness of subsoil and / or topsoil to be placed, as per the agreed remediation method statement. Sufficient time should be allowed in the programme for this testing to be completed prior to the requirement for clean cover to be laid. The standard turnaround for laboratory testing is 5 working days from the date of receipt at the laboratory.

2.4.2 Preparation of Subgrade

All pile mat, scaffold base and/or waste materials must be removed in their entirety from the surface of areas to become gardens or public open space / soft landscaping prior to the

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

[6] Defra 'SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document' December 2014.

[7] BS EN ISO 17892 Geotechnical investigation and testing. Laboratory testing of soil. Determination of liquid and plastic limits

application of clean cover soils. This aspect of the works will be inspected and validated by the Engineer.

2.4.3 Out of Specification Materials

Notwithstanding the specification for maximum allowable contaminant concentrations provided in Table 1, no materials will be accepted that are odorous, stained or contain visible product as is required by DoWCoP.

Should the Contractor proceed with stockpiling or spreading of fill prior to receiving approval from the Engineer of results for the above tests, and the results of such tests show that the fill is contaminated above acceptable levels, the Contractor shall remove all contaminated material and replace it with acceptable material at his own cost as part of the main contract.

2.4.4 Suitability of Materials in Gardens

Materials laid as clean cover in private gardens must not only meet the requirements to be protective against land contamination but they must also be suitable for gardening. Hence, topsoil should not contain more than the British Standard-specified percentage of clay as exceeding this value may result in poor drainage and the failure of turf to establish. Subsoil should contain sufficient nutrition and be of sufficient depth to allow for the establishment of larger shrubs and trees and hence, a subsoil exceeding the British Standard-specified percentage of sand (i.e. an as-dug sand) would be unsuitable.

TABLE 1: CHEMICAL CONTAMINANT SPECIFICATION FOR IMPORTED MATERIALS

Determinant	Assessment Criteria mg/kg
Arsenic	37
Cadmium	11[1]
Trivalent Chromium	910
Hexavalent Chromium	6[1]
Copper	100
Lead	200
Mercury (inorganic)	40
Nickel	60
Selenium	250
Zinc	200
Benzo(a)pyrene[2]	0.79[3]
Naphthalene[2]	2.3[3]
Asbestos	No asbestos detected

Notes to table

1. *C4SL also available.*
2. *Surrogate markers for all PAHs.*
3. *Higher assessment criteria are possible and may be agreed with the regulator on a case by case basis, for example, depending on the Soil Organic Matter content of the imported material.*