



Technical Note

Site: Parcel R10, Waterloo Road, Wokingham,
Berkshire, RG40 3BZ

Ref: GE22990-TN01-250214

Client: Miller Homes

Date: February 14, 2025

Further to your request, we write to provide a parcel specific summary relating to parcel R10 of the wider South Wokingham Strategy Development Location. This technical note summarises the relevant information and findings of a desk study, intrusive investigation and contamination assessments reported in Ground Investigation Report ref. GE20219/GIRv3.0/JUL22, dated 11th July 2022. The report was prepared for the benefit of Miller Homes for a large portion of the South Wokingham Strategy Development Location. For further details the original report should be referred to directly.

A plan showing parcel R10's location is presented in Figure 1.

Planning

The proposed development is understood to comprise houses, apartments, private gardens, soft landscaping, access roads, attenuations ponds and associated infrastructure.

This note has been prepared to address Condition 44 on the Outline Planning Permission for the wider site granted by Wokingham Borough Council (ref.191068, dated 19/07/2024):

Contaminated land

44. No development other than that required to be carried out as part of an approved scheme of remediation shall take place in each phase of the development until conditions a-d (below) have been complied with. If unexpected contamination is found after development has begun that is not addressed by the methodology detailed within the approved remediation scheme, development must be halted on that part of the site affected by the unexpected contamination to the extent specified by the Local Planning Authority in writing until d) has been complied with in relation to that contamination.

a) Site Characterisation

An investigation and risk assessment, in addition to any assessment provided with the planning application, must be completed in accordance with a scheme to assess the nature and extent of any contamination on the site, whether or not it originates on the site. The contents of the scheme are subject to the approval in writing of the Local Planning Authority. The investigation and risk assessment must be undertaken by competent persons and a written report of the findings must be produced. The written report is subject to the approval in writing of the Local Planning Authority.

The report of the findings must include:

i. a survey of the extent, scale and nature of contamination;

ii. an assessment of the potential risks to:

- human health,*
- property (existing or proposed) including buildings, crops, livestock, pets, woodland and service lines and pipes,*
- adjoining land,*
- groundwaters and surface waters,*
- ecological systems,*

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- *archaeological sites and ancient monuments;*

iii. an appraisal of remedial options, and proposal of the preferred option(s).

This must be conducted in accordance with DEFRA and the Environment Agency's 'Model Procedures for the Management of Land Contamination, CLR 11'.

b) Submission of Remediation Scheme

A detailed remediation scheme to bring the site to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historical environment must be submitted to and approved in writing by the Local Planning Authority. The scheme must include all works to be undertaken, proposed remediation objectives and remediation criteria, timetable of works and site management procedures. The scheme must ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation.

c) Implementation of Approved Remediation Scheme

The approved remediation scheme must be carried out in accordance with its terms prior to the commencement of development other than that required to carry out remediation, unless otherwise agreed in writing by the Local Planning Authority. The Local Planning Authority must be given two weeks written notification of commencement of the remediation scheme works.

Following completion of measures identified in the approved remediation scheme, a verification report that demonstrates the effectiveness of the remediation carried out must be submitted to and approved in writing by the Local Planning Authority.

d) Reporting of Unexpected Contamination

In the event that contamination is found at any time when carrying out the approved development that was not previously identified it must be reported in writing immediately to the Local Planning Authority. An investigation and risk assessment must be undertaken in accordance with the requirements of a), and where remediation is necessary a remediation scheme must be prepared in accordance with the requirements of b), which is subject to the approval in writing of the Local Planning Authority. Following completion of measures identified in the approved remediation scheme a verification report must be prepared, which is subject to the approval in writing of the Local Planning Authority in accordance with c).

Reason: To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors in accordance with Core Strategy policy CP1.

Site Setting

At the time of the investigation, parcel R10 comprised two trapezoidal shaped fields, divided east/west by a ditch and hedgerow. Both fields were covered by tall grass and weeds. The northern field sloped downhill to the south whilst the southern field was approximately level.

The geology below parcel R10 comprised London Clay Formation as mapped by the British Geological Survey (BGS). These strata were recorded as Unproductive Strata (negligible significance for water supply or river base flow). An area of ancient woodland lay approximately 20m south of the parcel beyond Waterloo Road.

The parcel was mapped in an area where less than 1% of homes are above the radon Action Level as defined by Public Health England and the BGS. Radon mapping has been updated since the production of the original report however,

freely available mapping at UKRadon.org was viewed on 13/02/2025 which confirmed the mapped risk remained unchanged.

No potential sources of ground gases were identified within 250m of the parcel.

Historical mapping from 1898 was reviewed and found that parcel R10 comprised open land with the only notable change being the construction of electricity cables on pylon crossing the north of the parcel in the 1970s which were subsequently removed by the 2020s. The site was historically surrounded by farmland with a railway line to the north and Waterloo Road to the southwest, minimal changes took place in the site surroundings except residential expansion of Wokingham to the north of the railway line.

Preliminary Risk Assessment

Review of the information gathered by the desk study identified the following potential contamination sources:

- Limited areas of Made Ground and general shallow soils might contain contaminants;
- Shallow soils may be impacted by pesticides;
- Aerial deposition of contaminants from surrounding land uses, particularly the railway to the north;
- Elevated sulphate concentrations in natural strata may damage building foundations;
- Ground gases only if deep putrescible Made Ground was present on site.

A number of potential contamination pathways were identified:

- Direct contact (ingestion, inhalation of dust, dermal contact and consumption of home grown produce where contaminants have bioaccumulated);
- Inhalation of indoor and outdoor dust and gases/vapours in buildings;
- Vertical and lateral migration of mobile contaminants through permeable strata and pathways such as service trenches;
- Movement of mobile contaminants within shallow groundwater;
- Attack on plastics and concrete constructed in the soils.

The following receptors were identified:

- End users of the proposed residential development;
- Soft landscaping;
- Concrete foundations and plastic water pipes;
- Adjacent land users;
- Groundwater;
- Surface water.

The following receptors were discounted:

- Ecological receptors were discounted as no significant areas of sensitive ecology were identified;
- Although not specifically addressed in the original report, no Scheduled Ancient Monuments were recorded within 250m of the site.

A qualitative risk assessment was undertaken which concluded very low or low risks relating to the majority of potential contamination linkages. However, moderate/low risk ratings were assigned relating to the linkages between potential contamination in soils, including any Made Ground, and end users and soft landscaping.

Intrusive investigation was recommended to refine the Preliminary Risk Assessment.

Investigation

Intrusive investigation in parcel R10 was undertaken on 18th, 19th and 22nd November 2021. The investigation comprised 24No. machine excavated trial pits up to depths of 3.2m bgl (TP075-TP094 & SA21-SA24) and 6No. dynamic sampler boreholes to a depth of 5.0m bgl (WS31-WS36). Three of the boreholes were installed with gas and groundwater monitoring standpipes (WS32-WS34).

The exploratory holes were positioned to provide a general coverage of the subject site. Their locations are shown in Figure 2.

Ground and Groundwater Conditions

The ground conditions encountered in the exploratory holes comprised a mantle of clay-based Topsoil overlying River Terrace Deposits overlying London Clay Formation. The River Terrace Deposits were absent in WS33.

The Topsoil ranged in depth between 0.25m and 0.40m bgl typically comprising dark brown clay, with varying sand and gravel content and rootlets. The River Terrace Deposits ranged in depth between 0.55m to 1.60m bgl and typically comprised clays, with low to moderate sand and gravel content. Granular soils were recorded within a limited number of locations. The London Clay Formation comprised clay with low to moderate silt and/or sand content, and was recorded to the maximum depth of the investigation (5.0m bgl).

Groundwater monitoring was undertaken in the three monitoring boreholes on six occasions between 2nd December 2021 and 31st January 2022. Groundwater was recorded at depths between 0.10m and 1.60m bgl during the monitoring.

Soil Contamination Sampling

In order to assess the general chemical quality of the strata encountered, samples of soils recovered from the exploratory holes were submitted for analysis for a range of potential contaminants selected on the basis of the findings of the desk study and supported by CLR publication CLR8 and Environment Agency R&D66 publication.

The testing rationale included sampling and analysis to provide a general coverage of the subject site. Testing was undertaken for a broad range of commonly occurring contaminants including metals, metalloids, inorganic compounds, speciated TPH, PAH, asbestos and pesticides, as identified from the desk study and included analysis of the Topsoil (17No. samples) and River Terrace Deposits (5No. samples).

Soil Contamination Assessment

Human Health

A Preliminary Quantitative Risk Assessment was undertaken by comparing the results of the laboratory chemical testing of shallow soils against Tier 1 screening criteria in the first instance. These criteria comprise the Atkins ATRISK soil screening values (SSVs), the Suitable for Use Levels (S4ULs) published by LQM (Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3453. All rights reserved) and the Category 4 Screening Levels (C4SLs) published by DEFRA.

The results of the sample analysis were compared to the Tier 1 screening criteria for a proposed residential land use with plant uptake. No exceedances of these criteria were recorded with the exception of Barium.

Barium concentrations ranged between 26mg/kg and 110mg/kg and seven out of seventeen samples exceeded the SSV of 56.8mg/kg (1% SOM). However, the concentration range was noted to be well below the UK Soils Observatory

recorded background concentration for the site of 224mg/kg. As such, the Barium concentrations were considered to represent naturally occurring background concentrations and are not considered to be indicative of contamination which would require remedial action to protect end users.

Geochemical testing of the shallow soils across the site has not returned any positive identification for asbestos. Nonetheless, the absence of asbestos in samples analysed does not mean that asbestos might not be present at locations remote from exploratory holes.

Three selected samples of Topsoil were screened for pesticides. No pesticide concentrations were recorded above the laboratory limit of detection in any of the samples tested.

Based on the above, it was considered that no specific measures are required in terms of soil contamination across the parcel in terms of end users and adjacent users. This assessment would also be considered to be protective of pets and livestock.

Soft Landscaping, Plants and Crops

British Standard BS3882:2015 *Specification for topsoil and requirements for use* provides generic assessment criteria (GAC) for a number of potentially phytotoxic contaminants in terms of new planting. The results of the chemical analysis for determinands known to pose a potential phytotoxic risk to plant growth were assessed against these criteria. No exceedances against the GAC were recorded however, Copper was recorded equal to the relevant GAC (200mg/kg for pH>7.0) in one sample of Topsoil. However, statistical assessment of Copper concentrations in all the Topsoil samples from the parcel indicated that the true mean of the dataset would be below the GAC with greater than 95% confidence. As such, no remediation is required in this respect.

Groundwater and Surface Water

The investigation did not identify any mobile contamination and thus in the absence of a pollutant linkage, no further action is warranted.

Built Environment

No sources of contamination which could adversely affect water supply pipework were identified by the desk study or intrusive investigation. It is considered that specific protection measures are unlikely to be required for potable water supply.

Geotechnical testing and assessment identified that any concrete constructed within the soils of the River Terrace Deposits and up to 3.0m bgl in the London Clay Formation, should be designed to Design Sulphate Class DS-1 and Aggressive Chemical Environment for Concrete Class AC-1 as defined within BRE Special Digest 1. Such a classification is considered to be representative of a low risk of sulphate attack on buried concrete.

Ground Gases

No viable sources of ground gases were identified on or in close proximity to parcel R10. The ground investigation did not identify any significant depth of Made Ground or highly organic/putrescible material across the site that could present a potential gas risk.

Nevertheless, spot monitoring was undertaken within wells installed within WS32, WS33 and WS34. These locations were selected to provide general coverage of the site. A period of 'spot' gas monitoring was undertaken to assess the gas regime on the site. Six gas monitoring visits were undertaken on 2nd, 13th and 21st December 2021, and 5th, 18th and 31st January 2022.

The spot monitoring undertaken in parcel R10 has not detected the presence of methane. Carbon dioxide has been detected at concentrations in the range of 0.0% to 3.7% and oxygen in the range 10.0% to 20.6%. No positive borehole flows were measured during the monitoring occasions to date. VOCs were recorded up to 0.6ppm during the monitoring. Atmospheric pressure was recorded in the range of 1004mb to 1030mb during the visits undertaken.

The spot monitoring undertaken has indicated the site's gassing regime, based on both hazardous gas flow and limiting concentrations, to be Characteristic Situation 1 for which no gas protection measures would be required.

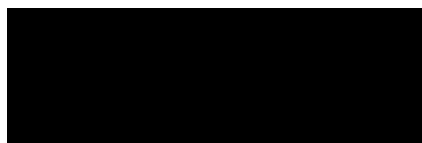
Conclusions

This technical note has provided a summary of the relevant information specific to parcel R10 from a desk study and ground investigation undertaken for the wider South Wokingham Strategy Development Location. The original report supported by this note are considered to have sufficiently characterised the site as requiring no remediation in terms of risk to any identified receptor. This is considered sufficient to address Condition 44a of Outline Planning Permission ref.191068. As no remediation is required, Condition 44b and 44c would not be applicable. Condition 44d refers to encountering unexpected contamination during redevelopment and, as at all sites, the developer must follow the Discovery Strategy included in Appendix A in this regard.

Closure

We trust we have provided sufficient information for your current requirements. Should you have any queries please do not hesitate to contact us.

For and on Behalf of Geo-Environmental



SHAUN ARMITAGE BSc (Hons), FGS
Principal Engineer



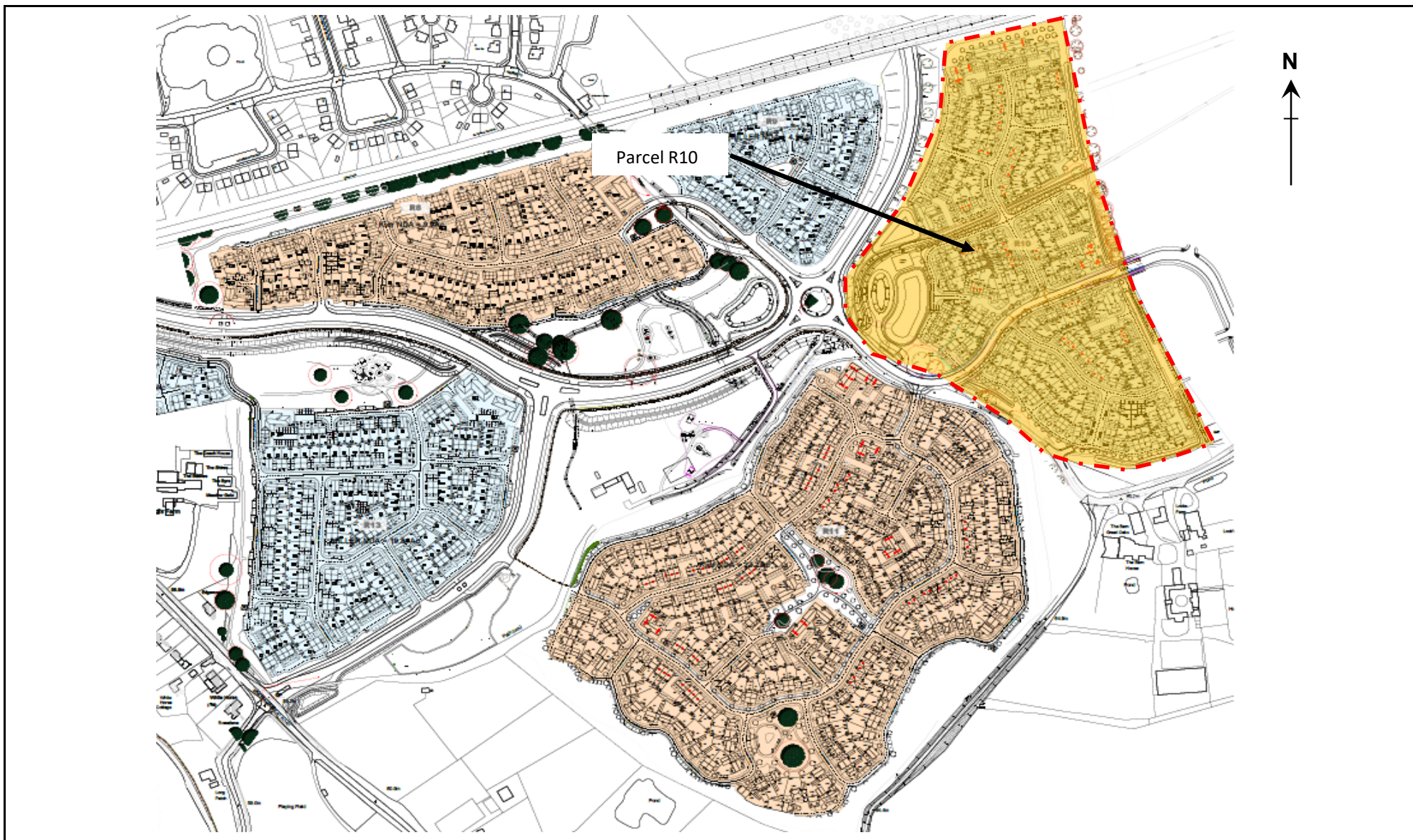
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| Figure 1 | Parcel R10 Location Plan |
| Figure 2 | R10 Exploratory Hole Location Plan |
| Appendix A | Discovery Strategy |



FIGURES





Project:	Parcel R10, South Wokingham Strategy Development Location			Title	Parcel R10 Location Plan	
Client:	Miller Homes			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental	
Ref No:	GE22990	Revision:	0			
Drawn:	SA	Date:	13/02/2025			
Figure:	1	Scale:	Not To Scale			





Legend

	TP001	Trial pit
	SA01	Trial pit with soakage test
	WS01	Dynamic sampler borehole (*with standpipe)
	BH01	Cable percussion borehole

Project:	Parcel R10, South Wokingham Strategy Development Location			Title	R10 Exploratory Hole Location Plan	
Client:	Miller Homes			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental	
Ref No:	GE22990	Revision:	0			
Drawn:	SA	Date:	13/02/2025			
Figure:	2	Scale:	Not To Scale			



Appendix A

Discovery Strategy



Discovery Strategy

Whilst an intrusive investigation has been undertaken on the site, it remains possible that unexpected ground and/or groundwater conditions may be encountered during the process of construction.

Should previously undiscovered contamination or unforeseen ground conditions be encountered during construction by the ground workers, this must be reported to the Site Manager immediately in order that the Consultant is notified.

Where deemed necessary, the Consultant shall attend the site to inspect the discovery and provide recommendations on the further actions required, if any. Where necessary the regulatory authority shall be informed. Post any additional investigation or laboratory testing the results and any proposed remedial measures shall be reported to the regulatory authority or other appropriate organisation for consent, before proceeding or implementing the remedial measures.

A copy of the discovery strategy must be lodged on site, and provisions made to ensure that all workers are made aware of their responsibility to observe, report, and act on any potentially suspicious, abnormal, unforeseen or contaminated ground and/or groundwater conditions they may encounter.

Depending on the type, nature and extent of any such 'discovery', it may be necessary to halt works in that location until such time as the assessment has been completed. This shall be reviewed on a 'discovery' specific basis and in conjunction with consultation with the client, other technical personnel and/or regulatory/approval organisations.

As a general guide, where such unexpected conditions are encountered the following approach is required as a minimum:

- All discoveries are to be reported to the Site Manager immediately and works at that location are to halt until further notice;
- The Site Manager is to report any such discoveries to the Client and the Consultant;
- Following notification from the Site Manager, the Consultant shall discuss the discovery with the Local Authority and/or other relevant parties and if considered necessary, arrange to meet on site to view the discovery;
- The Consultant shall attend the site to record the location, extent and nature of the discovery and implement an appropriate sampling and analysis regime, taking due account of the type and nature of the discovery, known and probable land uses in that area of the site;
- Where remedial action is required, regulatory consultation and approval will be sought;
- A record will be produced by the Consultant and held on site (with copies held by the Consultant, Client and Local Authority/other relevant organisation), detailing the discovery, assessment works undertaken, findings thereof, confirmation either of no action required or detailing the remedial action taken and validation thereof.

The process is summarised below:

