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Wokingham Borough Council
Land to the North of Mereoak Park and Ride, Grazeley

Preliminary Risk Assessment

January 2026

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Document distribution

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Prepared for

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1. Introduction

1.1 Terms of reference

WSP UK Limited (WSP) was commissioned by Wokingham Borough Council to undertake a Preliminary Risk Assessment (PRA) for redevelopment of Land to the North of Mereoak Park and Ride, Grazeley, Wokingham, RG7 1PB (hereafter referred to as “the Site”).

The Site is bounded by Mereoak Lane to the northwest, and the A33 Basingstoke Road to the southeast, which then runs north of the Site. Mereoak Park and Ride lies immediately southwest of the Site with open land to the northeast.

This assessment supports proposals for the development of an open storage facility and comprises the construction of a new access road, permeable surfacing with drainage, the construction of a small site office and the construction of a two-storey welfare block, security fencing, flood lighting and the installation of CCTV. The site currently comprises approximately 1.71 ha of undeveloped land.

The site location and layout are presented in **Figure1** and **Figure 2** in **Appendix A**.

1.2 Development plans

The proposed redevelopment of the Site is for a new open storage facility immediately north of Mereoak Park and Ride. Key features include:

- Site entrance and exit located onto Mereoak Lane (northwest of the Site);
- An access road with a turning circle running through the centre of the Site; and,
- The majority of the Site is to be permeable surfaced.

The Proposed Site Plan and Boundary is provided as **Figure 3** and **Figure 4** in **Appendix A**.

1.3 Assessment aims and objectives

The Preliminary Risk Assessment (PRA) is required to support the baseline understanding of the ground conditions for the proposed scheme to support the application for planning permission.

To address the identified aim, the key objectives include:

- Developing a preliminary Conceptual Site Model (CSM) to identify potential contamination risks associated with the proposed development of the site; and,
- Evaluate likely contaminated land exposure pathways and their potential significance to identified receptors to support the proposed development.

1.4 Scope of works

To meet the aims and objectives identified in **Section 1.3**, the following scope of works has been undertaken:

- A site walkover;
- Purchasing and review of a Groundsure report;
- Review of publicly available historical maps and plans to understand former land uses and potential contaminative activities on, and surrounding the site;
- Review of relevant regulatory databases;
- Contact relevant regulators (Environment Agency, Local Authority);
- Review of relevant publicly available information relating to hydrological features, hydrogeology, neighbouring land use, ecologically sensitive uses and geology in order to establish the environmental setting of the Site;
- Development of a preliminary conceptual site model via the source-pathway-receptor contaminant linkage approach;
- Describe the environmental risks and or opportunities surrounding ground, groundwater and ground gas conditions, which have the potential to arise associated with the future uses of the site; and,
- Production of a Preliminary Risk Assessment (PRA) report.

1.5 Legislative context

The assessment was undertaken in the legislative context of:

- Part 2A of The Environmental Protection Act (1990); and,
- The National Planning Policy Framework (2024).

The following good practice and statutory guidance was considered, and the assessment was undertaken in general accordance with:

- Environment Agency 'Land Contamination Risk Management' (LCRM) (2025);
- CIRIA C552 'Contaminated Land Risk Assessment. A Guide to Good Practice' (2001);
- British Standard 'Investigation of Potentially Contaminated Sites – Code of Practice', BS EN 10175:2011 + A2: 2017; and,
- Defra 'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance', PB13735 (2012).

1.6 Sources of information

The following relevant sources of information were used in the production of this report.

Table 1.1 Sources of information

Source	Report
Previous Reports	WSP, Archaeological Desk-Based Assessment – Land adjacent to Mereoak Park and Ride, Mereoak Lane, Grazeley, December 2025.
Public Information	British Geological Survey Onshore GeoIndex. (https://mapapps2.bgs.ac.uk/geoindex/home.html), accessed January 2026. Zetica UXO Risk Maps (https://zeticauxo.com/downloads-and-resources/risk-maps/), accessed January 2026. Google Earth (https://earth.google.com/web), accessed December 2025. Public Health England UK Maps of Radon. (https://www.ukradon.org/information/ukmaps), accessed January 2026. Environment Agency Catchment Data Explorer. (https://environment.data.gov.uk/catchment-planning/), accessed January 2026. Flood Maps for Planning Service (https://flood-map-for-planning.service.gov.uk/), accessed January 2026. MAGIC Map (https://magic.defra.gov.uk/MagicMap.aspx), accessed January 2026. Mining Remediation Authority Map Viewer (https://datamine-cauk.hub.arcgis.com), accessed January 2026.
WSP Obtained Information	Site walkover completed on 14 January 2026 (photolog presented in **Appendix D).** Groundsure Report (Site Sensitivity, Historical Mapping, Ground Stability), dated December 2025, Order Ref: WSP-VUT-6TL-EF2-RYH. Please note that the Groundsure report was commissioned using an earlier, larger site boundary. As the current proposed boundary is smaller, some features now lie farther from the site than indicated in the original Groundsure dataset. Accordingly, distances referenced in this assessment may be greater than those reported in the Groundsure output.
Notes:	The report contains British Geological Survey materials ©NERC 2017 and Environment Agency information ©Environment Agency and database right.

1.7 Understanding risk

It is important to understand that any risks identified during a preliminary assessment, such as the one presented in this document, are perceived risks based on the information reviewed. A more detailed assessment of the actual risks can only be assessed following further intrusive investigations.

The preliminary assessments presented herein are qualitative based on professional judgements following the review of available data and within the context of the existing/proposed use. Those risk categories presented (very low, low, low to moderate, moderate, high and very high) follow guidance presented in CIRIA Publication C552, Contaminated Land Risk Assessment – A Guide to Good Practice. CIRIA states that the risk levels should be based on an understanding of both the probability (likelihood) of a risk occurring and the magnitude of the potential consequence (severity) of a risk.

CIRIA defines four levels of probability and four levels of severity with relation to contaminated land, as presented in **Appendix B.**

1.8 Confidentiality and limitations

This report is addressed to and may be relied upon by Wokingham Borough Council. The report may not be relied upon or transferred to any other parties without the express written authorisation of WSP. This report should be read in full. No responsibility will be accepted where this report is used, either in its entirety or in part by any other party.

Third party information used in the production of this report has been taken in good faith as being accurate. WSP cannot and will not accept any liability for errors and/or omissions in data provided by others and WSP cannot warrant the work of others.

General limitations of the assessment are included in **Appendix C.**

2. Site Background Information and Setting

2.1 Site description and current use

Site location and current layout plans are presented in **Figures 1** and **Figure 2**.

A site walkover was undertaken on 14 January 2026 by a WSP representative. The key observations from the walkover are presented in **Table 2.1**. Site walkover photos are presented in **Appendix D**.

Table 2.1 Summary of site details

Detail	Comment
Name and Address of Site	Land to the North of Mereoak Park and Ride, Mereoak Lane, Grazeley, RG7 1PB.
National Grid reference	Easting: 471204, Northing: 168143
Site Description and Current Use	The site is currently an undeveloped piece of land, which is not currently used. It is bound by Mereoak Lane to the northwest and southeast the A33 Basingstoke Road. Further to the east is the village of Three Mile Cross. Mereoak Park and Ride is to the south of the Site. Further south and west of the Site lies agricultural countryside.
Area	Approximately 1.71 hectares (Ha)
On-site Activities	The site is currently unutilised and comprises open grassland with shrubs and trees growing. From the site walkover there appears no evidence of recent contaminative activities was identified.
Site Setting and Surrounding Land Uses	The Site is situated in a semi-rural setting, with agricultural land to the west and south, and residential and commercial properties to the east and north. No significant contaminative land uses are present in the immediate vicinity. Historical records indicate presence of two obsolete petrol stations and several garages within 500 m, but none are on-Site. Groundsure data confirms there are no local authority landfill sites or registered waste transfer stations in the immediate area. Nine waste exemptions are recorded within 500 m, the closest being approximately 296 m southwest, primarily for agricultural and construction-related activities; all are historical. Industrial land use within 250 m includes both recent and historical features such as electricity substations, a sewage pumping station, and Airport Engineering Solutions Ltd. Two historical pollution incidents have been recorded within 250 m (asbestos and biodegradable materials), both categorised as minor or no impact. No significant sources of contamination are identified in close proximity to the Site.
Topography and Ground Cover	The site is generally flat, with minor undulations laying at 41 m Ordnance Datum (OD) in the south and 42 m OD in the north. Ground cover is

Detail	Comment
	predominantly grassland, with some areas of scrub and isolated trees. No significant hardstanding is present.
Boundaries	The site boundaries are defined by Mereoak Lane to the northwest and southeast the A33 Basingstoke Road. Mereoak Park and Ride is to the southwest of the Site and undeveloped land is to the north east. The site is fenced with timber post and rail fencing present along the north west boundary.
Drainage & Flooding	Drainage ditches were observed along the Site's southeast and northwest boundaries, containing standing water at the time of inspection. These features show signs of vegetation overgrowth, siltation, and limited maintenance. No engineered drainage infrastructure (e.g., culverts, headwalls, gullies, or pipe inlets/outlets) was observed within the Site into the ditches. It was also noted that in some areas of the site the ground was waterlogged. The site lies within the valley of the Foudry Brook, which is situated 800 m to the west, and the River Loddon, situated 1 km to the east. These two rivers are tributaries of the River Kennet, located 3 km to the north.
Embankments & Slopes	The site is predominantly flat. There is an embankment approximately 2 m in height rising from the southeast boundary supporting the A33 Basingstoke Road.
Trees & Vegetation (including invasive species)	The Site comprises overgrown grassland with extensive scrub, bramble thickets across much of the central and peripheral areas and vegetation is unmanaged. Several young to semi-mature trees are present throughout the Site, along with a large mature tree located toward the central east part of the Site.
Foundations, Retaining Walls & Basements Evident on site	A WWII pillbox is located on the Site.
Visual Observations of Contamination or Ground Subsidence	No visual evidence of contamination, ground subsidence, or significant made ground was observed.
Asbestos Containing Materials	No ACMs were observed on Site.

2.2 Summary of Previous Reports

2.2.1 WSP, Archaeological Desk-Based Assessment – Land adjacent to Mereoak Park and Ride, Mereoak Lane, Grazeley. Dated December 2025

A comprehensive desk-based assessment was undertaken to evaluate the archaeological potential and heritage constraints of the site. Below is a summary of their main findings:

- The site historically comprised agricultural fields and remained largely undisturbed until the construction of a Second World War Type 24 GHQ pillbox, which caused localised ground disturbance. Further disturbance occurred when most of the site was topsoil-stripped and used for material stockpiling during A33 road improvement works (2008–2010). Two archaeological investigations within the site boundary revealed moderate to high potential for late Iron Age to early Roman settlement remains, with additional evidence of prehistoric and Roman activity in the immediate vicinity. The wider 500 m study area also contains evidence of prehistoric, Roman, medieval, and early medieval features, suggesting multi-period activity in the landscape;
- The Site is underlain by River Terrace Gravels overlying London Clay Formation, The River Terrace Gravels may contain paleoenvironmental remains. Historic boreholes indicate shallow topsoil over gravelly clay, with archaeological features typically found below the stripped topsoil;
- No nationally designated heritage assets are present on Site, but seven Grade II listed buildings are located within 500 m. The site contains a non-designated WWII pillbox of local historic interest. The main archaeological risks relate to the potential presence of late Iron Age to early Roman settlement remains, paleoenvironmental deposits, and possible medieval and post-medieval agricultural features. The proposed development is anticipated to result in partial or total loss of significance for any buried remains within the footprint of construction activities; and,
- The assessment identified moderate to high archaeological potential and recommended preliminary field evaluation (e.g., trial trenching) to clarify the nature and extent of buried assets. Demolition of the pillbox may require historic building recording, as agreed with the local authority.

WSP Ground and Water Comments

- Some areas of Site were not accessible for inspection, and the archaeological findings are preliminary pending further fieldwork;
- No geotechnical or geoenvironmental data was presented in the study.

3. Historical Land Use

A review of the Site history has been undertaken by reference to available third-party reports and historical maps obtained as part of the recent Groundsure report **(Appendix F).** The historical maps were reviewed to identify potential former sources of contamination.

3.1 On-site history

A summary of pertinent on-site history is provided in **Table 3.1** below.

Table 3.1 Summary of On-Site History

Period	On-Site
1872–1937	The site comprised undeveloped agricultural land, forming part of the wider Great Lea Farm estate. Mapping from this period shows the Site as open fields, with boundary hedgerows and no evidence of built development or significant land use change. A footpath runs diagonally across the site from south-east to north-west. A pond is shown to the north of the footpath in the centre of the Site. Mereoak Lane is present along the northwest boundary, serving as a local access route. No features indicative of contaminative activity (e.g., tanks, pits, industrial structures) are recorded.
1965–1968	The Site remains as open land, with field boundaries and agricultural use persisting. The diagonal footpath discussed in earlier OS editions continues to cross the Site, and Mereoak Lane remains as the primary access road along the northwest edge of the Site. The pond to the north of the Site appears to have been infilled. South of the footpath a feature is shown, this is considered to be the WWII pill box.
1994–2003	The Site continues to be shown as undeveloped. Aerial imagery and mapping confirm the absence of any further structures (apart from the pill box) or hardstanding. Mereoak Lane remains in place, and the surrounding area begins to show increased infrastructure development, particularly along the A33 corridor, but the Site itself remains unchanged.
2010–Present	The Site remains as open, undeveloped land. The July 2010 aerial photograph shows the park and ride scheme to the southwest being constructed and the Site appears to have been stripped of topsoil and soil stockpiles formed. Recent aerial imagery confirms the site is grassland. Mereoak Lane continues to provide access along the western boundary, and the Site boundaries remain consistent. No significant changes in land use are recorded.

Figure 3-1 overleaf shows an extract of an aerial image from 2010, which is in the Groundsure report, the Site is stripped of topsoil and stockpiles of soils are located across the southeast section of the Site.

Figure 3-1 Extract of 2010 aerial image



3.2 History of surrounding land use

A summary of pertinent surrounding land use history is provided in **Table 3.2**.

Table 3.2 Summary of Off-site History

Period	Off-Site
1872–1937	The surrounding area is predominantly rural and agricultural, with Great Lea Farm to the immediate west and scattered farmsteads and cottages in the wider area. Woodcock Lane is shown to the southwest of the Site. No significant industrial or contaminative land uses are recorded within 500 m.
1960–1980s	Gradual infrastructure development is observed, including the construction of the A33 Basingstoke Road, which forms the southeast Site boundary, with Woodcock Lane further to the southeast and noted to be a grassed lane. Some residential development occurs to the north and east, but the immediate vicinity remains largely agricultural, with active farms and the introduction of a riding stable to the south. Historical mapping records the presence of a small number of garages and obsolete petrol stations between 234 m and 342 m

Period	Off-Site
	southeast of the site, but none are located on-site. No evidence of landfill, or significant industrial activity is recorded within 250 m.
1990s–Present	The area to the east and north becomes increasingly suburban, with further residential and commercial development. The Mereoak Park and Ride facility is constructed to the south in circa 2010 with realignment of the A33 undertaken just before. Several electricity substations and a sewage pumping station are present within 250 m. No active or historical landfill sites are recorded within 250 m, although a small number of waste exemptions (storage/treatment) are noted approximately 419 m southeast and 436 m east. The wider area remains a mix of agricultural, residential, and infrastructure uses, with farms still present in the vicinity.

Key Observations: The review of historical mapping and Groundsure data confirms that the Mereoak PRA Site has not been significantly developed and in agricultural use until the park and ride scheme was constructed to the southwest circa 2010 and the A33 to the southeast was realigned in circa 2008. There is no evidence of contaminative land use on-Site apart from stockpiling of soils whilst construction activities were taking place in circa 2010. The surrounding area is predominantly agricultural and residential, with limited commercial and infrastructure development. No significant sources of contamination have been identified within close proximity to the site, and the nearest historical potential sources (garages, petrol stations) are located off-site and at sufficient distance to present a low risk of impact.

4. Environmental Setting

4.1 Published geology

The Site is underlain by superficial deposit of River Terrace Deposits, 2, which is formed of sand and gravel, locally with lenses of silt, clay or peat, formed during the Pleistocene period roughly 2.6 million to 11,700 years ago (BGS, 2025). The underlying bedrock is of the London Clay Formation, a sedimentary bedrock comprised of clay, silt and sand, formed between 56 and 47.8 million years ago during the Palaeogene period. Artificial/made ground is recorded adjacent to the southeast of the Site along the alignment of the A33, which is constructed on a raised embankment. There are no mapped bedrock faults or landslips within 500 m of the Site.

Ten BGS boreholes are recorded within 250 m, confirming the local geological sequence. Notably, five historic boreholes (SU76NW131–135) are located 25 m east of the site, drilled in 1974 for the construction of the A33 By-Pass (A10). The borehole data corresponds with the BGS geology mapping and shows that the area surrounding the site has a very thin layer of topsoil (on average <0.2 m thickness) which lies above a thicker subsoil deposit of 'Brown Gravelly Clay' (on average <0.6 m thickness), which interfaces with the River Terrace Deposits that lay at 0.8–1 m bgl and with the top of London Clay Formation sitting at approximately 1.9 m bgl.

For details of historical mining and quarrying features, refer to ***section 4.11.***

4.2 Soil Chemistry

The BGS Estimated Background Soil Chemistry dataset provides likely background concentrations of potentially harmful elements (PHEs) in topsoil, including arsenic, cadmium, chromium, lead, and nickel. For the site, the estimated values are as follows:

- Arsenic: 15–25 mg/kg
- Lead: 100 mg/kg
- Cadmium: 1.8 mg/kg
- Chromium: 60–90 mg/kg
- Nickel: 15–30 mg/kg

These values are based on rural topsoil and stream sediment data and represent typical background concentrations for the area. They are used as a baseline for comparison with any site investigation results to help distinguish between natural and anthropogenic contamination.

4.3 Hydrogeology

4.3.1 Aquifer status

Superficial Aquifer: The site is underlain by River Terrace Deposits (sand and gravel), which are classified as a Secondary A aquifer. Secondary A aquifers comprise permeable layers capable of supporting water supplies at a local rather than strategic scale and may contribute base flow to rivers. These aquifers are generally considered minor, but their permeability means they can be sensitive to pollution.

Bedrock Aquifer: The underlying bedrock is the London Clay Formation, which is classified as an Unproductive aquifer. Unproductive aquifers are rock layers or drift deposits with low permeability and negligible significance for water supply or river base flow. Groundwater movement in these strata is limited, and they do not typically act as significant receptors for abstraction.

Groundwater Vulnerability: Groundsure data indicates the site is classified as having high groundwater vulnerability. This is attributed to the presence of well-connected fractures within the superficial deposits and the absence of low permeability layers. Areas of high vulnerability are able to easily transmit pollution to groundwater, typically characterised by high leaching soils and limited protection from overlying deposits. The site's vulnerability is further increased by the thin cover of topsoil and subsoil, with recharge potential rated as high.

4.3.2 Groundwater abstractions

The site does not lie within a Source Protection Zone (SPZ), and there are no active or historic groundwater abstractions within 1 km of the site boundary.

Groundsure records indicate 23 licensed groundwater abstractions within 2 km, primarily associated with agricultural and industrial uses. The closest abstractions are located at Reading International Business Park (557 m north), and Berkshire Brewery (seven license 624 – 1374 m north and northwest). The majority of the abstractions historical relate to general farming, process water, and general use, with no potable abstractions recorded within 2 km.

No groundwater abstraction points are present on-site, and the absence of SPZs and potable abstractions reduces the sensitivity of the site in terms of water supply protection.

4.4 Hydrology

4.4.1 Surface water features

The site is situated within the catchment of the Foudry Brook, which flows approximately 800 m west of the site. An inland watercourse is present within the site and multiple watercourses are adjacent to the site, including several watercourses within 50–200 m. These features are not tidally influenced, are not culverted or lined, and contain water year-round under normal circumstances. A pond is to the north east of the Site within 250 m.

The Groundsure report confirms the site falls within the Water Framework Directive (WFD) surface water body catchment of the River Foudry Brook (West End Brook to M4, Water body ID: GB106039017380). The overall rating for this water body is recorded as poor for 2019, with chemical status rated as fail and ecological status as poor.
The site also lies within the WFD groundwater body associated with the London Clay Formation, which is rated poor overall and poor chemical status, with quantitative status recorded as good (2019).

4.4.2 Surface water abstractions and discharges

According to the Groundsure report:

- No licensed surface water abstractions or discharges are present on-site;
- Two historical licensed surface water abstractions are recorded within 2 km of the Site. The closest is located approximately 970 m west at Foudry Brook (Hartley Court Farm), and the second is 1,448 m northwest at Burghfield Brook (Hartley Court Farm). Both abstractions are associated with spray irrigation for agricultural use and are no longer active;
- Licensed discharges to controlled waters are recorded within 500 m of the Site. These include historical consents for the discharge of treated effluent and site drainage to local watercourses, with the nearest discharge point approximately 245 m northwest at Great Lea Farm and others within 350 m; and,
- Licensed pollutant releases (Part A(2)/B) are also present within 500 m, associated with historical and current permits for activities such as waste oil burning and unloading of petrol into storage at service stations, the closest being approximately 298 m and 325 m southeast.

4.5 Flooding

The Groundsure Report confirms the Site is within Flood Zones 2 and 3, indicating significant flood risk from rivers and the sea.

Flood Zone 3: High probability— land has 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea. Developments require a flood risk assessment.

Flood Zone 2: Medium probability— land between Flood Zone 3 and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year. Flood risk assessments are also required for development.

Within the Site and 50 m buffer, fluvial flood risk is high. Surface water flooding is most likely during a 1 in 30-year event, with predicted depths of 0.3–1.0 m. The Ambiental Risk Analytics map highlights these areas as vulnerable to extreme rainfall.

Groundwater flooding risk is high on-site and within 50 m, due to permeable superficial deposits and a high water table.

No formal flood defences or flood storage areas are recorded within 250 m of the site, and there are no historical flood events within the same distance according to the Environment Agency records.

4.6 Preliminary hydrogeological model

The hydrogeology of the Site is characterised by superficial River Terrace Deposits (sand and gravel), which are classified as a Secondary A aquifer. The underlying London Clay Formation is considered an unproductive aquifer, restricting downward groundwater movement.

The superficial deposits are of high permeability and classified as having high vulnerability, with a high leaching class and infiltration value. This means that contaminants at ground level could readily migrate to groundwater.

The Site is located within the WFD surface water body catchment “Foudry Brook (West End Brook to M4)”, which is designated as a Nitrate Vulnerable Zone (NVZ) for surface water (NVZ ID 459, status: existing). This designation, as shown in the Groundsure report, identifies the area as being at risk from agricultural nitrate pollution under the EC Nitrate Directive (91/676/EEC). Land within this NVZ drains into waters already affected by elevated nitrate concentrations, and farmers must follow mandatory rules to manage and reduce nitrate loss from agricultural activities.

The WFD catchment is rated poor overall and poor ecological status, with chemical status recorded as fail (2019), highlighting the sensitivity of local surface waters to nutrient and chemical contamination.

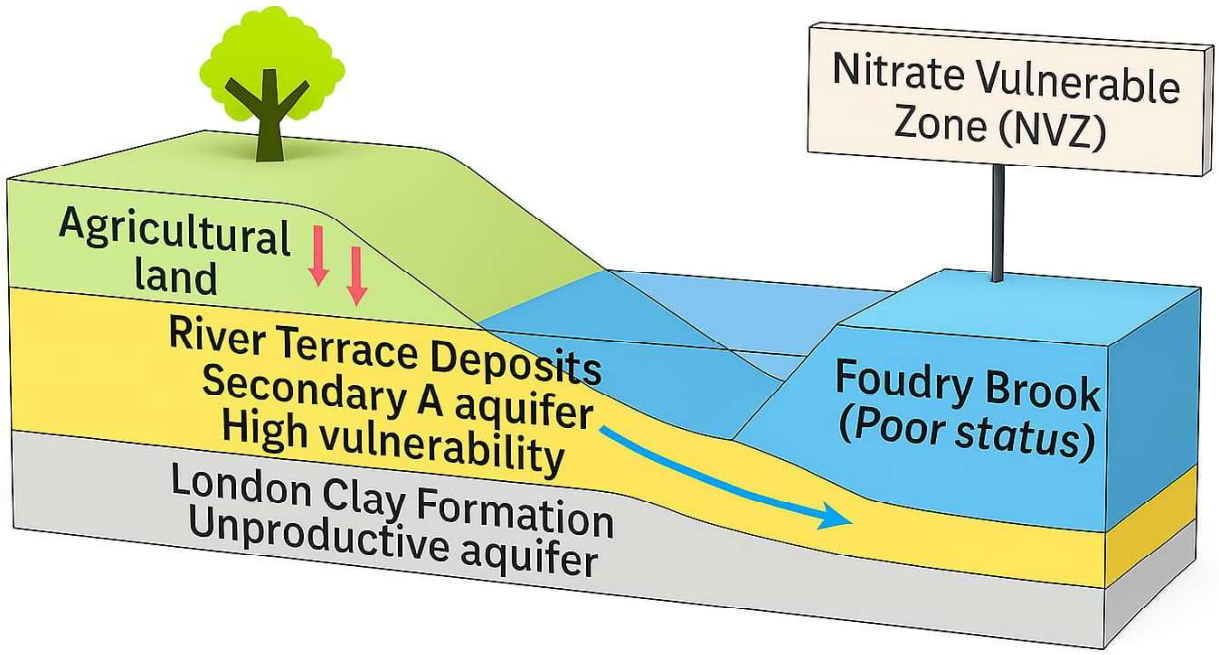
Groundwater flow is expected to be towards local surface water receptors, primarily Foudry Brook, which is adjacent to the Site. The brook is a natural watercourse, and hydraulic connectivity between groundwater and surface water is likely, given the high permeability of the superficial deposits and the proximity of the brook.

No potable groundwater abstractions are recorded within 2 km of the site, and there are no Source Protection Zones (SPZs) within 500 m.

There are no basements or below-ground structures on-site that would significantly alter groundwater flow.

Summary: The hydrogeological regime comprises a shallow, permeable aquifer with high vulnerability, direct connectivity to nearby surface waters, and sensitivity to contamination risks—particularly from nitrate and other agricultural contaminants. Controlled waters should therefore be considered key receptors in any future assessment, and the NVZ status reinforces the need for careful management of potential contaminant sources on-site.

Figure 4.1 – Preliminary Hydrogeological Model



4.7 Ecology & archaeology

The Groundsure Report confirms that:

- There are no Special Scientific Interest (SSSI) units, Ramsar sites, Special Areas of Conservation (SAC), Special Protection Areas (SPA), Local Nature Reserve (LNR) or National Nature Reserves (NNR) within 2 km of the Site.
- Five ancient and semi-natural woodland areas are present within 2 km of the Site, the nearest being Nores Hill (1637 m northeast).
- Nearest traditional orchard is approximately 189 m west of the Site and the nearest deciduous woodland is 29–67 m southeast.
- Two grade II listed buildings are located within 250 m of the Site – Milestone At Three Mile Cross (128 m east) and Great Lea Farmhouse (233 m west), respectively.
- No Scheduled Ancient Monuments, Conservation Areas, or Registered Parks and Gardens are recorded within 250 m of the Site.
- The Site is not within a Green Belt, Area of Outstanding Natural Beauty, or National Park.

The National Planning Policy Framework (NPPF) indicates that consideration should be given to ecology and archaeology as part of planning policies and decisions. In this instance, it is assumed that these elements will be addressed under separate reports.

4.8 Climate change

4.8.1 Future climate change under RCP8.5 scenario

Sea Level Rise/Flood Risk

The site is currently located approximately 70 km inland from the English Channel and is at an elevation of approximately 40 m AOD. Under RCP8.5 sea level along the coast in proximity to the site is projected to rise by up to 0.7 m by 2100 (Met Office Marine Climate Change Projections website). Given the site's inland location and elevation, sea level rise is not expected to bring the sea within proximity of the Site.

The Site is located partially within Flood Zones 2 and 3, indicating a high risk of flooding from the rivers. Note that climate change may result in changes to the frequency of extreme weather events and associated flooding. The highest surface water flood risk on-Site is associated with a 1 in 30-year event (depth 0.3–1.0 m). Groundwater flooding risk is considered high on-Site and within 50 m.

Projected Changes to Groundwater Level

The Groundsure Report does not identify the site as being within a named groundwater catchment or WFD groundwater body. No projections for future groundwater recharge or groundwater level changes are provided for this location.

4.9 Unexploded Ordnance (UXO)

A Pre-Desk Study Assessment (PDSA) was commissioned from Zetica for the Site (Ref: PA025829, dated 16 January 2026). The PDSA and risk map of the site is included in **Appendix G**.

The report indicated no significant military activity directly affecting the Site. Although a WWII Type 24 pillbox is present on the Site, this reflects defensive military construction rather than evidence of bombing or UXO hazard. Historical records for both WWI and WWII show no documented bombing on or adjacent to the Site, and there are no recorded UXO incidents on or adjacent to the Site. One bombing decoy was located approximately 4.2 km east, but this does not elevate the Site-specific UXO risk. Based on the PDSA, no obvious UXO hazard sources have been identified. While always prudent, detailed desk study is not considered to be essential for the site by Zetica.

4.10 Radon

Groundsure data indicate the site is in an area where less than 1% of properties are above the Radon Action Level. Radon protection measures are not required.

4.11 Mining / Natural cavities

According to the Groundsure report, there are no BritPits records, surface ground workings, underground workings, mining cavities, or natural cavities identified within 500 m of the Mereoak PRA site. The available BGS and Groundsure datasets confirm the absence of coal, brine, gypsum, tin, or clay mining activity on or near the site. No mineral planning areas, non-coal mining, or historical mineral extraction features are recorded in the immediate vicinity.

Historical Ordnance Survey mapping and Groundsure data do not indicate the presence of quarries, heaps, mineral veins, or other mining-related features on-site or within close proximity. The borehole and geological records confirm that the ground beneath the site is consistent with undisturbed superficial deposits and London Clay Formation, with no evidence of instability or ground disturbance attributable to past mining activity.

A Coal Authority or Cheshire Brine Search report has not been procured for this site. Overall, the available data indicates a low risk from mining or natural cavities for this location, and ground conditions are unlikely to be significantly affected by historical mineral extraction or subsidence.

4.12 Ground stability

Ground stability hazards identified in the Groundsure report (in **Appendix F**) are summarised in the **Table 4.1** below.

Table 4.1 Ground stability hazards

Stability Hazard	Hazard Risk Level
Potential for collapsible ground	Very low
Potential for compressible ground	Negligible
Ground dissolution of soluble rocks	Negligible
Potential for landslides	Very low
Potential for running sands	Very low
Potential for swelling or shrinking clays*	Low

Note * WSP consider that the low risk rating applied by Groundsure for shrink swell clay potential may not truly represent the Site where London Clay Formation is encountered on Site and may comprise clay geology which may be more plastic than assumed by Groundsure.

4.13 Mine gas

No evidence of coal mining or deep workings; mine gas risk is negligible.

5. Regulatory Information and Consultation

5.1 Regulatory database

The Groundsure Report (**Appendix F**) includes information and data collected from several organisations including the Environment Agency, the Local Authority, the British Geological Survey, Department for Environment, Food and Rural Affairs (DEFRA) and Health and Safety Executives (HSE). **Table 5.1** summarises this information.

Table 5.1 Summary of database searches

Descriptor	On-site	0-50 m	50-250 m	250-500m	Details
Historical landfill (EA/NRW records)	0	0	0	1	One record at 390 m SW (Grazeley Road, inert and industrial waste, last recorded 1986).
Waste Exemptions	0	0	0	9	Nine records located between 296–436 m from the site, mainly southwest and east, relating to activities such as storage, use, and disposal of waste on farms and construction sites (e.g., spreading waste, incineration, chipping plant matter).
Recent industrial land uses	0	0	4	0	Four records within 250 m, including Airport Engineering Solutions Ltd (114 m SE), Electricity Sub Station (189 m SE), Sewage Pumping Station (194 m E), and another Electricity Sub Station (239 m NE).
Current or recent petrol stations	0	0	1	1	Two records: 234 m SE (Obsolete status, Three Mile Cross) and 342 m SE (BP, Open status).
Licensed pollutant release (Part A(2)/B)	0	0	0	2	Two records under Part B permit are located southeast of the site, one at 298 m SE (historical waste oil burning, Hearn & Bailey) and one at 325 m SE (current permit for unloading petrol at Three Mile Cross Service Station).
Licensed Discharges to controlled waters	0	0	1	4	Five records located between 245–349 m from the site, mainly northwest, north and southwest, all revoked, surrendered, or lapsed; past discharges included agriculture – fish farming, sewage, and trade effluent.
Pollution incidents (EA/NRW)	0	0	2	0	Two pollution incidents recorded: 226 m SE (asbestos, minor land impact, 2003) and 232 m SE (vegetable cuttings, no significant impact, 2002).

5.2 Planning history

A review of the Wokingham Borough Council planning portal identified no previous planning applications relating to the Site.

5.3 Local authority enquiry

A request for information was made, and the response is awaited at the time of writing this report.

5.4 Environment Agency enquiry

The Environmental Agency (EA) was contacted on 23rd December 2025, and a request was made for information on potential contaminative land uses on and surrounding the site. The information provided by EA is summarised below and presented in **Appendix I**.

- There is no record of any contaminated land within 250 m of the Site.
- There is no record of any landfilling within 250 m of the Site, and no associated issues with contamination or ground gas migration.
- There is no record of any site investigations at the subject Site

5.5 Sensitive land uses

The Groundsure Report identifies the following environmentally sensitive land uses within 500 m of the site:

- No statutory ecological or heritage designations recorded directly on the Site.
- No Special Scientific Interest (SSSI) units, Ramsar sites, Special Areas of Conservation (SAC), Special Protection Areas (SPA), Local Nature Reserve (LNR) or National Nature Reserves (NNR) within 500 m of the Site.
- Ancient Woodland: None within 500 m.
- Priority Habitats: Nearest traditional orchard is approximately 189 m west and nearest deciduous woodland is 29–67 m southeast, contributing to local ecological connectivity.
- The Site is located within a designated NVZ, which requires compliance with agricultural and water quality regulations.
- The Site falls within two SSSI Impact Risk Zones, meaning activities such as construction, drainage works, discharge of water, or use of chemicals may require consultation with Natural England.
- Two Grade II listed buildings within 250 m of the Site – Milestone at Three Mile Cross (128 m east) and Great Lea Farmhouse (233 m west).
- Nine records located between approximately 296 m and 436 m from the Site, mainly southwest and east, relating to storage, use, and disposal of waste on farms and construction sites.
- Two historical incidents recorded within 250 m (minor impact).

- No COMAH sites or licensed waste facilities within 500 m of the Site, reducing major hazard risk.

Relevance to Proposed Use:

Nearby deciduous woodland and Grade II listed buildings require consideration during design and construction to avoid ecological and heritage impacts. The site lies within two SSSI Impact Risk Zones, so activities such as earthworks, drainage works, water discharge, and chemical use may require consultation with Natural England. NVZ designation requires compliance with nitrate management rules during soil handling and landscaping to protect controlled waters. Overall, environmental limitations are moderate, and standard good practice measures should be implemented to safeguard biodiversity and groundwater.

6. Preliminary Conceptual Site Model

6.1 Introduction

The Conceptual Site Model (CSM) is based upon the environmental conditions of the site as described in the previous sections. The methods used in this assessment followed a risk-based approach with the potential environmental risk assessed qualitatively using the 'source-pathway-receptor' contaminant linkages concept introduced in the guidance document (principally the Environment Agencies LCRM Guidance) on the practical implementation of the Environmental Protection Act 1990.

Environmental risk can be defined as the combination of the consequence of a harmful effect and the probability of its occurrence. The existing of a contaminant linkage is primarily dependant on site usage and environmental conditions.

The environmental risk assessment has been carried out identifying and evaluating the significance of the following:

- Potential Sources of Contamination: these include any actual or activities of concern, located either on or in the vicinity of the site;
- Potential Pathways: these are the routes or mechanisms by which CoC may migrate from the source to the receptor; and
- Potential Receptors: these include current or future land users, activities or persons at the site that could be harmed by CoC.

6.2 Potential sources of contamination

Table 6.1 provides a summary of the potential sources of contamination that may be present at the Site, as well as the likely distribution of such sources.

Table 6.1 Potential sources of contamination

Potential Source	Potential Contaminants of Concern	Likely / Anticipated Distribution
ON-SITE		
Historic agricultural use (fertilisers, agrochemicals) Spreading of sewage sludge	Nitrates, phosphates, herbicides, pesticides, heavy metals	Site-wide in topsoil/subsoil; potential shallow hotspots from historical field management
Localised made ground from past activities (A33 or adjacent park and ride site when being constructed and using the site for	Metals, PAH, TPH, asbestos containing materials, sulphates	Localised lenses/mounds in former material handling areas

Potential Source	Potential Contaminants of Concern	Likely / Anticipated Distribution
stockpiling materials/haul routes)		
OFF-SITE		
Made Ground related to industrial uses within 250 m of the site	Metals, PAH, TPH, asbestos containing materials, sulphates	Adjacent to the southeast boundary of the Site
Historic agricultural use (fertilisers, agrochemicals) Spreading of sewage sludge	Nitrates, phosphates, herbicides, pesticides, heavy metals	Towards the perimeter of the Site

We have discounted surface water run off (containing tyre wear contamination and etc.) from the A33 highway as a potential source of contamination as the highway drainage system will be regularly maintained and will lead contamination away from Site.

6.3 Potential pathways

In the context of the proposed development of the Site as open storage, the following potential exposure or migration pathways associated with the identified potential source(s) have been identified:

- Pathways to Human Health receptors:
  - Dermal contact with soils (shallow soils during construction and maintenance activities);
  - Ingestion of dusts/soil particles;
  - Inhalation of dusts and fibres (on and off-Site receptors); and
  - Inhalation and potential migration of hazardous ground gases/vapours (on and off-Site receptors).
- Pathways to Controlled Water receptors:
  - Leaching of contaminants through the unsaturated zone and subsequent impact to groundwater within the underlying aquifers; and
  - Lateral migration of contaminants within groundwater and subsequent impact of surface water receptors.
  - Overland flow of surface water runoff and migration to the surface water receptor
- Pathways applicable to site infrastructure:
  - Direct contact with contaminants (e.g., sulphates and hydrocarbons) in the soil and groundwater with below ground structures (buried services/concrete); and
  - Accumulation of hazardous gases within below ground structures in the future development (explosive risk).
- Pathways applicable to site plant life:

- Direct contact with contaminants within soils and shallow groundwater.

6.4 Potential receptors

In line with R&D66 and LCRM guidance, the following potential receptors have been identified for the site, considering both the current and proposed development scenarios:

Human Health

- Future Site users;
- Construction workers and maintenance workers; and,
- Third party neighbours.

Controlled Waters

- Secondary A aquifer ((River Terrace Deposits; high vulnerability); and,
- Surface watercourses within the Foudry Brook (West End Brook to M4) catchment area.

Services and Building Fabric

- Future below ground services (e.g. potable water supply pipes); and,
- Future building structures.

Flora

- Plant life in landscaped areas (if included in final design).

Discounted Receptors:

- The deeper London Clay bedrock aquifer is discounted due to its low permeability (unproductive aquifer) preventing downward migration;
- Source Protection Zones are discounted as none are present within 500 m;
- Potable abstractions are discounted as none are recorded within 1 km; and,
- If the proposed development does not include soft landscaping, risks to flora may be discounted for those areas.

6.5 Preliminary conceptual site model

The CSM identifies the potential contamination sources, receptors, and the exposure pathways by which they may be linked. A Source-Pathway-Receptor linkage (SPRL) is present if a viable pathway exists between a potential source and an identified receptor.

The CSM includes potential risks which may exist to the site during the construction and maintenance. However, it is assumed that mitigation procedures during construction will be implemented in accordance with the Code of Construction Practice (CoCP).

The preliminary CSM and explanation of the risk characterisation process is presented as **Appendix C**. A summary of potential contaminant linkages identified in the preliminary CSM is provided **Table 6.2**.

Table 6.2 SPRLs based on proposed end use

SPRL	Potential Source	Pathway	Receptor	Probability	Severity	Preliminary Risk Rating	Comments
ON-SITE							
SPRL1	Historic agricultural use (fertilisers, manure, sewage sludge agrochemicals)	Direct contact with soil; ingestion/inhalation of dusts, fibres and vapours in confined spaces	HH1	Unlikely	Mild	**Very Low**	The Site has remained agricultural/grassland with no contaminative land uses. Shallow soils may contain diffuse residues of fertilisers and trace pesticides, but risks to future site users are low due to the outdoor commercial nature of activities. Construction workers may encounter impacted soils during the groundworks phase of the contract; this could be managed through standard CoCP/CEMP controls. Impacts to Neighbours should remain minimal with dust suppression measures undertaken during the construction of the Site. Although the underlying Secondary A aquifer is highly vulnerable, contaminants are likely to be of a low magnitude. With permeable ground cover, infiltration is possible, but good drainage, silt control and pollution prevention keep risks low. NVZ designation requires appropriate soil and runoff management.
			HH2	Low likelihood	Mild	**Low**	
			HH3	Unlikely	Mild	**Very Low**	
		Leaching through unsaturated zone; lateral migration within shallow groundwater	CW1	Low likelihood	Medium	**Low / Moderate**	
		Overland flow to drains/ditches and local watercourses	CW2	Low likelihood	Medium	**Low / Moderate**	
SPRL2	Localised made ground from past activities	Dermal contact, ingestion, inhalation of vapours/dusts	HH1	Unlikely	Mild	**Very Low**	The Site has been used to assist construction activities on adjacent sites when they have been developed. There is the potential for remnants of made ground may exist from historic A33 or adjacent
			HH2	Low likelihood	Mild	**Low**	

SPRL	Potential Source	Pathway	Receptor	Probability	Severity	Preliminary Risk Rating	Comments
	(A33 or adjacent park and ride site when being constructed and using the site for stockpiling materials/haul routes)		HH3	Unlikely	Mild	**Very Low**	park and ride site works, potentially containing metals, PAH/TPH or asbestos containing materials. The Site is to be resurfaced, limited direct soil contact given the nature of the proposed Site use it is considered low risk. Construction workers may encounter isolated material during the groundworks phase of the Site construction. Dust impacts off-site remain very low with dust suppression techniques are undertaken during the redevelopment of the Site. Impacts to underground services are considered low. Infiltration through isolated pockets is possible but minor, with risks to controlled waters remaining low when drainage and silt controls are applied.
		Surface water runoff, leaching, migration through soils or drainage	CW1	Low likelihood	Medium	**Low / Moderate**	
			Below ground structures and services (existing and future)	Low likelihood	Mild	**Low**	
			CW2	Unlikely	Medium	**Low**	
OFF-SITE							
SPRL3	Made ground related to industrial uses within 250 m. Historic agricultural use (fertilisers,	Lateral migration of contaminants within groundwater to the Site	HH1 HH2	Unlikely	Medium	**Low**	Given the separation distances, small source magnitudes, and expected groundwater flow toward nearby surface waters, significant migration of contaminants to the Site is considered unlikely. Any exposure to construction or maintenance workers would only reasonably occur if perched water or impacted soils were encountered at the Site's boundary, which can be effectively managed through RAMS, PPE, and a watching brief.
			Below ground structures and services (existing	Low likelihood	Mild	**Low**	

SPRL	Potential Source	Pathway	Receptor	Probability	Severity	Preliminary Risk Rating	Comments
	agrochemicals)		and future)				Risks to future site users are low due to the outdoor commercial nature of activities.
	Spreading of sewage sludge		CW1	Unlikely	Medium	**Low**	Impacts to underground services are also considered low given attenuation with distance
			CW2	Unlikely	Medium	**Low**	For controlled waters (CW1/CW2), off-site sources are too remote and weak to pose a meaningful risk.
		Migration of ground gas / vapours and subsequent inhalation on Site	HH2	Unlikely	Medium	**Low**	Ground-gas and vapour migration from off-site sources, closest potential source is the made ground used to form the raised A33. This is unlikely to have used putrescible materials in its construction as the fill would have been selected for its construction properties and engineered.
							Overall, off-site sources represent a low-risk pathway under the proposed open-storage use.

Key

HH1 – Future site users (Open storage/ancillary buildings)

HH2 – Construction & Maintenance Workers (Commercial)

HH3 – Adjacent Site Users (Residential/Commercial)

CW1 – Secondary A Aquifer (River Terrace Deposits)

CW2 – Surface waters (local drains/ditches → Foudry Brook)

7. Conclusions and Recommendations

Based on a comprehensive review of site history, environmental setting, regulatory information, groundsure data, and a site walkover, WSP makes the following conclusions and recommendations in relation to the proposed open-storage development at Land to the North of Mereoak Park and Ride, Mereoak Lane, Grazeley.

7.1 Conclusions

- The Site has historically comprised undeveloped agricultural land and grassland. In 2008 to 2010 the site was used for construction activities during the realignment of the A33 and the construction of the park and ride centre to the southwest of the Site. As a result, only low-level diffuse agricultural residues (fertilisers, pesticides, trace metals) along with metals, TPHCWG, PAH's and asbestos containing materials are anticipated in shallow soils.
- The Site is underlain by Secondary A superficial aquifer (River Terrace Deposits) with high groundwater vulnerability, but the potential on-site contaminant sources are low magnitude and predominantly natural/agricultural in origin.
- The preliminary CSM identified plausible but low-risk SPRLs, including minor soil contact risk, infiltration to groundwater through permeable surfacing, and limited off-site sources. All assessed risks are Low for human health and Low to Low/Moderate for controlled waters.
- Future site users remain Low risk due to the outdoor nature of commercial open-storage activities and the absence of significant sources. Construction workers may encounter shallow soils or isolated made-ground pockets, but exposure can be managed through standard construction controls.
- Off-site sources are sufficiently distant that they pose Low risk to the Site under the proposed use.
- There is a Low risk of encountering UXB relating to WWII bombing on-Site based on the Zetica online UXB risk map for the Site. A Pre-Desk Study Assessment, undertaken by Zetica, recommends that a detailed UXO desk study is not considered essential for the Site.

7.2 Recommendations

WSP recommends that a ground investigation compliant with BS10175:2011+A2:2017 and a Generic Quantitative Risk Assessment (GQRA) are undertaken to establish if the historic farming activities or site being used for construction activities when developing the park and ride site and the A33 realignment works has impacted the ground and allow the assessment of identified plausible contaminant linkages. It is recommended that a ground investigation is designed based on the following technical objectives:

- Characterisation of the underlying ground and groundwater via intrusive investigation;
- Undertake soil and groundwater sampling for contamination analysis;

- Undertake ground gas and groundwater monitoring; and,
- Provide an assessment of risks to human health and controlled waters.

The geo-environmental intrusive investigation can be combined with an investigation for geotechnical design properties for the proposed redevelopment of the Site.