48-50 London Road
Crawley
West Sussex

Preliminary Ground Contamination Risk Assessment Report

Report Beneficiary:
Danish Living Limited
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EXECUTIVE SUMMARY

The following presents a summary of the main findings of the report. It is emphasised that no reliance should be placed on any individual point until the whole of the report has been read as other sections of the report may put into context the information contained herein.

It is proposed to construct a residential development at the land to the east of no. 48-50 London Road, Crawley. The development is to comprise a mix of flats and houses, with a new access road and areas of private and communal soft landscaping. No. 48 London Road will be demolished to facilitate construction of the access road.

The site is currently occupied by a dilapidated house and overgrown garden in the south west, with the remainder comprising an area of open land, largely laid to lawn.

At the time of the earliest inspected historical map, dated 1874, a watercourse ran north south through the middle of the site. A house on the footprint of no. 48 was first shown during the 1930s, with the watercourse no longer shown after the 1950s. A number of outbuildings have been shown within the currently open area on the historical maps and more recent aerial photographs.

Reference to geological datasets indicates that the site is expected to be underlain by the Alluvium overlying the Weald Clay Formation.

The Alluvium is classed as a Secondary A Aquifer, whilst the Weald Clay Formation is classed as an Unproductive Stratum.

The site does not lie within a SPZ.

The preliminary contamination risk assessment identified potential pollutant linkages relating to proposed end users of the site.

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FIGURES AND APPENDICES

1. INTRODUCTION

It is proposed to construct a residential development at the land to the east of no. 48-50 London Road, Crawley. The development is to comprise a mix of flats and houses, with a new access road and areas of private and communal soft landscaping. No. 48 London Road will be demolished to facilitate construction of the access road. A copy of the proposed development layout is presented in Appendix A.

Ashdown Site Investigation Ltd was requested to undertake a preliminary ground contamination risk assessment for the proposed development to assist with the planning application.

The specific objectives of the works were to:

a) Establish the expected geology, hydrogeology and hydrology at the site;
b) Ascertain the development history and current site use; and
c) Develop a preliminary conceptual model of the site identifying potential pollutant linkages relating to end users of the proposed development works, to controlled waters beneath and in the vicinity of the site, or to other off-site sensitive receptors, if identified.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q14415Rev2, dated 6th September 2024. The instruction to proceed was received from the client.

Copies of the historical maps and geo-environmental data referred to in this report are presented within Appendix D.

2. SITE CONTEXT

2.1 Walkover Survey

The site is located to the east of nos. 48-50 London Road, Crawley, West Sussex and is centred on the approximate Ordnance Survey national grid reference 526970, 137640. A site location plan is presented as Figure 1.

The site comprises a broadly 'L' shaped parcel of land, with a derelict house (no. 48) and garden in the south west, and the remainder comprising an area of open land to the rear (east) of the properties 48-50 London Road. The rear garden of No. 48 was heavily overgrown and contained two domestic sheds, one of which was in a very poor state of disrepair. The more structurally sound shed, adjacent to the rear of the dwelling, was full of miscellaneous household items and building materials.

The open area of land was laid to lawn and was divided in two, with the eastern half at a level some 0.50m-1.00m higher than that of the western half. It is understood from the client that a historical watercourse ran between the two areas which has been infilled. A greenhouse was located in the north west of the open grassed area.

Rear of No. 48 London Road.	Shed adjacent to No. 48 London Road.
	
Open area of lawn, facing east.	**Elevation difference between the east (left) and west (right) areas of lawn with route of historical watercourse between the two.**
	

2.2 Geological Data Review

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site has been established by reference to British Geological Survey (BGS) mapping and the BGS Lexicon of Named Rock Units. The expected stratigraphy is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	Alluvium	Secondary A Aquifer
Bedrock	Weald Clay Formation	Unproductive Stratum

Although not mapped to directly overly the site, an area of Made Ground is shown 7m to the west of the site at its closest point, extending away to the north-west of the site.

Alluvium is a term for any material that has been transported and laid down by rivers. It can variably comprise sand and gravel, and, where deposited on flood plains may include compressible organic clay and silt. Peat and sand horizons may be present within the deposits, indicating localised changes within the depositional regime.

The Weald Clay Formation forms part of the Wealden Group. The formation is of Hauterivian to Barremian age (126.3 to 133.9 million years old; Early Cretaceous). The Weald Clay Formation comprises dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine to medium grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones. The formation is recorded by the BGS to range in thickness up to 460m.

2.2.2 Natural Ground Subsidence

Table 2. Natural Ground Subsidence from Groundsure Data

Section	Groundsure Comment (Hazard Rating)
Soil Volume Change Potential (Shrink-Swell)	Low
Running Sands	Very Low - Alluvium Negligible – Weald Clay Formation
Compressible Deposits	Moderate - Alluvium Negligible – Weald Clay Formation
Collapsible Deposits	Negligible - Alluvium Very Low – Weald Clay Formation
Landslides	Very Low
Ground Dissolution of Soluble Rocks	Negligible

2.2.3 Ground Cavities and Sinkholes

Table 3. Ground Cavities and Sinkholes from Groundsure Data

Section	Groundsure Comment
Natural Cavities	No records are identified within 500m of the site.
Mining Cavities	No records are identified within 500m of the site.
Reported Recent Incidents	No records are identified within 500m of the site.
Historical Incidents	No records are identified within 500m of the site.
National Karst Database	No records are identified within 500m of the site.

2.2.4 Mining and Ground Workings

Table 4. Mining and Ground Workings from Groundsure Data

Section	Groundsure Comment
BritPits	No BritPits are identified within 500m of the site.
Surface Ground Workings	A pool and cuttings are identified 218m and 247m to the south-east and north, respectively. Given the distance from the site these are not considered to represent potential sources of contamination.
Underground Workings	No underground workings are identified within 1km of the site.
Historical Mineral Planning Areas	No records are identified within 500m of the site.
Non-Coal Mining	The site is identified to be in an area where underground mine workings for iron ore are uncommon.
JPB Mining Areas	No records are identified within 500m of the site.
The Coal Authority – Non-Coal Mining	No records are identified within 500m of the site.
Researched Mining	No records are identified within 500m of the site.
Mining Record Office Plans	No records are identified within 500m of the site.
BGS Mine Plans	No records are identified within 500m of the site.
Coal Mining	No records are identified on the site.
Brine Areas	No records are identified on the site.
Gypsum Areas	No records are identified on the site.
Tin Mining	No records are identified on the site.
Clay Mining	No records are identified on the site.

The geological units of the Wealden Group, including the Weald Clay Formation, were locally mined for iron during the early Roman period, the Medieval period and significantly between the 15th and 18th centuries. The mining activities were associated with hammer and furnace ponds, and forges. The locations of many of the workings are unknown, the works mostly having been dismantled and sites overgrown with woodland. Many of the old ponds in the Weald may be representative of old hammer or furnace ponds.

The historical extraction was mostly from open pits excavated from surface, but during the Medieval period, extraction in the eastern Weald was increasingly from mine pits. These mine pits were typically five metres in diameter and up to twelve metres deep. The pits were worked

in sequence with spoil from one pit used to in-fill the one before. In the western part of the Weald, the principal method of extracting iron ore was also the mine pit but smaller in scale; the pits consisted of a vertical shaft up to 2.5 metres in diameter and the base of the shaft would have been widened out.

The British Geological Survey GeoIndex Onshore viewer does not record any mines or quarries within 1km of the site. A search of the Wealden Iron Research Group database (www.wirgdata.org) revealed 10no. records of iron workings within 1km of the site, generally Bloomeries and Bloomery slab scatter. The records are broadly shown towards the town centre of Crawley to the south of the site, with the closest record some 360m to the south-east. The risk posed to the development is considered to be negligible to very low.

Further assessment of the natural ground and mining hazards can be undertaken, if required, to provide more detailed comment specific to the site.

2.2.5 Radon

Table 5. Radon

Section	Groundsure Comment
Radon Affected Areas	The site is reported to be within an area where less than 1% of properties are at or above the action level requiring radon gas protection measures to be installed in new buildings.
Radon Protection Measures	No radon protection measures are reported by the British Geological Survey to be necessary in the construction of new dwellings or extensions.

2.2.6 Soil Chemistry

Table 6. BGS Estimated Background Soil Chemistry

Contaminant	Estimated Value (mg/kg)
Arsenic	15 – 25
Bioaccessible Arsenic	No data
Lead	100
Bioaccessible Lead	60
Cadmium	1.8
Chromium	60 – 90
Nickel	15 - 30

2.3 Hydrogeological and Hydrological Data

2.3.1 Groundwater Abstractions

No active groundwater abstraction licences are indicated within 2km of the site.

2.3.2 Surface Water Abstractions

No active surface water abstraction licences are indicated within 2km of the Site.

2.3.3 Potable Abstractions

No potable abstraction licences are indicated within 2km of the site.

2.3.4 Groundwater Vulnerability

The level of groundwater vulnerability, as reported within the Groundsure data, is negligible to Medium.

2.3.5 Groundwater Source Protection Zones (SPZ)

The Environment Agency defines SPZs as those areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. SPZs are primarily a policy tool used to control activities close to water supplies intended for human consumption.

The site does not lie within a SPZ.

2.3.6 Surface Water Features

No significant surface water features are recorded within 250m of the site.

2.3.7 Flood Risk

The table below summarises the flood risk data provided by the Groundsure report. It is noted that this does not constitute a flood risk assessment.

Table 7. Flood Risk

Section	On Site	Within 50m of the Site
Risk of Flooding from Rivers and Seas (RoFRaS)	None Identified	None Identified
Historical Flood Events	None Identified	None Identified
Flood Defences	None Identified	None Identified
Areas Benefitting from Flood Defences	None Identified	None Identified
Flood Storage Areas	None Identified	None Identified
Environment Agency Flood Zone 2	None Identified	12m East
Environment Agency Flood Zone 3	None Identified	None Identified
Surface Water Flooding	Highest Risk: 1 in 30 year, 0.3-1.0m	Highest Risk: 1 in 30 year, 0.3-1.0m
Groundwater Flooding	Highest Risk: Low	Highest Risk: Moderate-High

3. GEO-ENVIRONMENTAL DATA

3.1 Historical Industrial Sites

The following table summarises past land uses of the site and the surrounding area extracted by Groundsure from historical maps.

Table 8. Historical Industrial Sites

Section	Remarks
Historical Industrial Land Uses	A nursery is present some 36m to the south-west of the site. Given the distance from the site this is not considered to represent a potential source of contamination.
Historical Tank Database	No historical tanks are identified within 100m of the site.
Historical Energy Features	An electricity substation is located 54m to the south-west of the site. Given the age and proximity from the site, this is not considered to represent a potential source of contamination.
Historical Petrol Stations	No historical petrol stations are identified within 100m of the site.
Historical Garages	No historical garages are identified within 100m of the site.
Historical Military Sites	No historical military sites are identified within 100m of the site.

3.2 Landfill and Other Waste Sites

The following table summarises the location of waste sites either on the site or within the surrounding area (within 250m of the site).

Table 9. Landfill and Other Waste Sites

Section	Groundsure Comments
Active or Recent Landfills	No active or recent landfills are identified within 250m of the site.
Historical Landfill (BGS Records/LA/Mapping Records EA Records)	No historical landfills are identified within 250m of the site.
Historical Waste Sites	No historical waste sites are identified within 250m of the site.
Licensed Waste Sites	No licensed waste sites are identified within 250m of the site.
Waste Exemptions	No waste exemptions are identified within 250m of the site.

3.3 Current Industrial Land Use

The relevant current industrial land uses are discussed in the table below.

Table 10. Current Industrial Land Uses

Section	Groundsure Comments
Recent Industrial Land Use	No recent industrial land uses are identified within 100m of the site.
Current or Recent Petrol stations	No current or recent petrol stations are identified within 100m of the site.
Electricity Cables / Gas Pipelines	No underground high voltage cables or high-pressure pipes are identified within 100m of the site.

Section	Groundsure Comments
Sites determined as Contaminated Land	No sites determined as contaminated land are identified within 100m of the site.
Control of Major Accident Hazards (COMAH) Sites	No COMAH sites are identified within 100m of the site.
Regulated Explosive Sites	No regulated explosive sites are identified within 100m of the site.
Hazardous Substance Storage/Usage	No consents have been granted for hazardous substance storage/usage within 100m of the site.
Historical Licensed Industrial Activities (IPC)	No records are identified within 100m of the site.
Licensed Industrial Activities (Part A(1))	No records are identified within 100m of the site.
Licensed Pollutant Release (Part A(2)/B)	No records are identified within 100m of the site.
Radioactive Substance Authorisations	No records are identified within 100m of the site.
Licensed Discharges to Controlled Waters	No records are identified within 100m of the site.
Pollutant Release to Surface Water / Public Sewer	No records are identified within 100m of the site.
List 1 / List 2 Dangerous Substances	No records are identified within 100m of the site.
Pollution Incidents (EA/NRW)	No pollution incidents are identified within 100m of the site.
Pollution Inventory Substances / Waste Transfers / Radioactive Waste	No records are identified within 100m of the site.

3.4 Sensitive Land Use

No sensitive land uses at risk from contamination are identified on the site.

3.5 Railway Infrastructure and Projects

No current railway or associated features are identified within 250m of the site.

4. HISTORICAL MAP AND IMAGERY REVIEW

Historical Ordnance Survey maps and imagery covering the area of the site have been reviewed and are summarised in the following table.

It is noted that maps and images present information applicable at the time of production of the maps or image captures, that maps are subject to surveying and cartographic errors and images to atmospheric conditions at the time of their capture. It is possible that significant developments may have taken place on or within the vicinity of the site that are not shown on the inspected maps and images.

'In the Vicinity of the Site' generally refers to features of relevance within approximately 250m of the site boundary but may also include more distant features if considered to be pertinent to the assessment of the development history.

Table 11. Summary of Significant Features Identified on Historical Maps and Images

Map/Image Details	On-Site	In the Vicinity of the Site
1874 1:2,500	A watercourse runs across the centre of the site in a north south orientation. To the west of the watercourse the site is indicated to be an orchard or covered by trees.	A house, on the approximate footprint of no. 50, is present to the west. A road, on the route of London Road, runs north south immediately to the west of the site.
1932-37 1:2,500	A house and an outbuilding are shown in the south-west of the site.	Further housing is shown to the west and south of the site.
1946 1:2,500	A small building is shown in the north-east corner of the site	
1959-60 1:1,250	The watercourse is no longer present. An additional outbuilding is present in the south of the site.	Further housing is shown to the east of the site.
1999 Aerial Photograph	There appear to be a number of outbuildings in the north-west corner of the site. Some large trees are present across the middle of the site, in the area of the former watercourse.	
2012 Aerial Photograph	The trees in the middle of the site are no longer shown. The building in the north west corner may have been removed, though there is still evidence of ground disturbance in this area.	The area immediately to the north is now a car park.
2021 Aerial Photograph	There still appears to be a small outbuilding in the area where the greenhouse was observed during the walkover survey.	

5. PRELIMINARY CONTAMINATION RISK ASSESSMENT

5.1 Introduction

The risk assessment considers the potential sources of contamination identified, the receptors that may be present in view of the development proposals and the contaminant pathways by which these may be linked. A complete pollutant linkage is only deemed to exist where all three are present and a site is considered suitable for use where no complete pollutant linkages are identified.

Where a complete pollutant linkage is deemed to be present, an assessment of the level of risk associated with the pollutant linkage has been carried out in line with current guidance[1].

The level of risk is determined using the risk matrix presented in the following table. Classifications of probability, consequence and risk are presented in Appendix B.

Table 12. Risk Assessment Matrix

		Probability			
		Very Low	**Low**	**Moderate**	**High**
Consequence	**Very Minor**	Negligible	Very Low	Low	Low/Moderate
	Minor	Very Low	Low	Low/Moderate	Moderate
	Moderate	Low	Low/Moderate	Moderate	High
	Severe	Low/Moderate	Moderate	High	Very High

5.2 Contaminant Pathways Identified

The development is to comprise new residential buildings together with areas of both private garden and communal soft landscaping.

Pathways associated with gas and vapour intrusion into new buildings are considered to be valid, along with direct contact and dust related pathways, and pathways associated with the consumption of home grown produce.

Should the proposed development plans be altered, a revised risk assessment may be required.

It is noted that an asbestos survey of existing structures and infrastructure[2] was beyond the brief of this report. The risk assessment assumes that, should asbestos be identified within buildings or infrastructure, any such materials will be managed in accordance with current legislation and guidance, to ensure this does not represent an ongoing risk to end users and, specifically, to ensure that asbestos materials are not introduced into the underlying soils.

Whilst superficial deposits associated within the Alluvium, classed as a Secondary A Aquifer are present, no ground or surface water abstractions are noted within 2km of the site, and the site is not located within a SPZ. Any leachable contaminants that could be present would therefore be unlikely to come into contact with sensitive groundwater receptors. As such, there are not considered to be viable pathways linking potential contamination on the site with sensitive groundwater.

[1] Contaminated Land Risk Assessment: A guide to good practice, CIRIA C552, 2001.
[2] As defined under Section 5(a) of the Control of Asbestos Regulations, 2012.

5.3 Potential Contamination Source Identified

The following potential source of contamination has been identified by the preliminary contamination risk assessment:

- Made Ground within the centre of the site from backfilling of the former watercourse, and within the north western part of the site from the construction and removal of various outbuildings.

Whilst backfilled pits and ponds etc. can be a theoretical source of ground gas generation, given the shallow depth of fill anticipated from the backfilling of the small watercourse, this is not considered to represent a viable source of ground gas.

5.4 Preliminary Conceptual Model

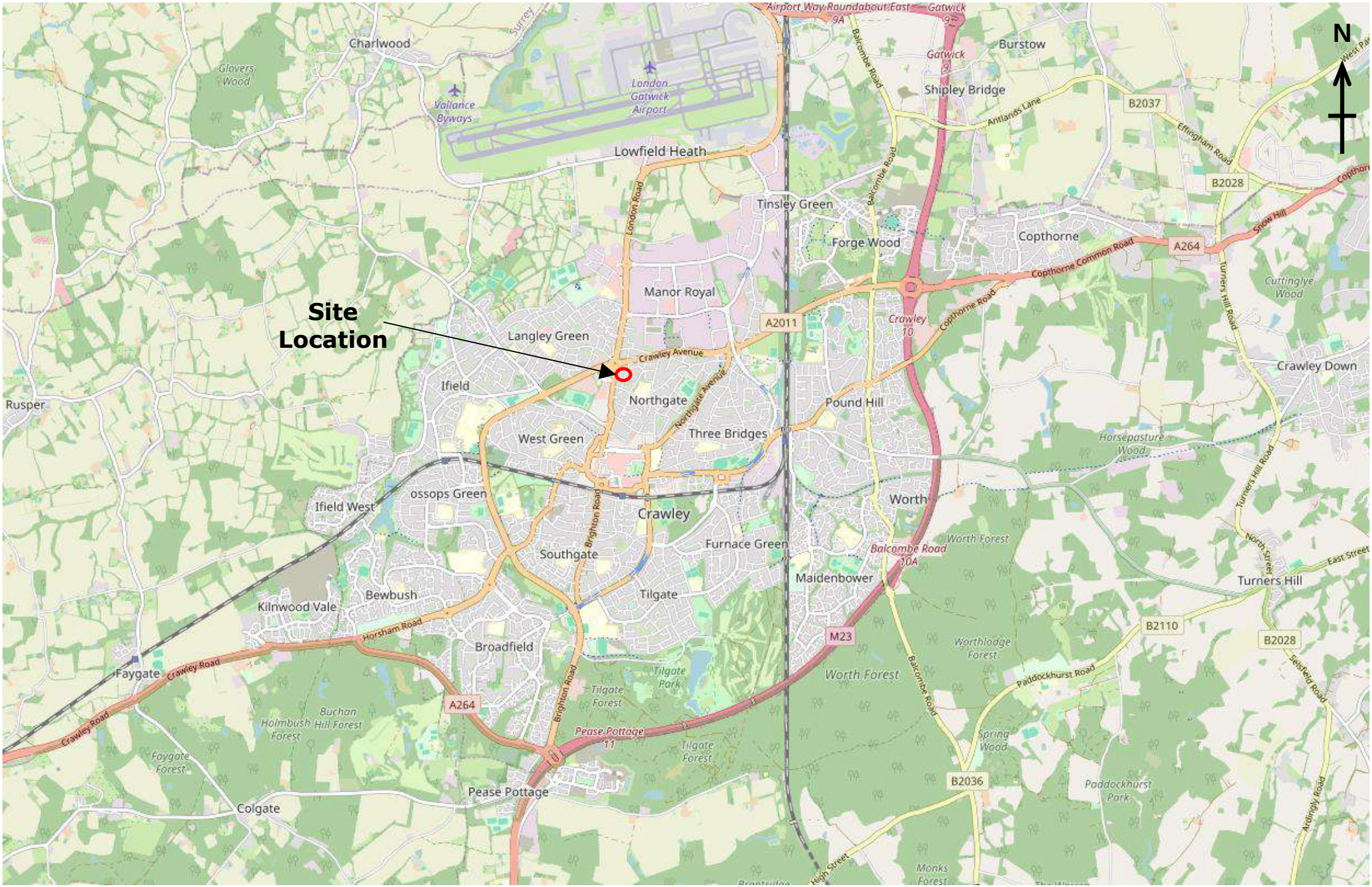
The preliminary conceptual model for the proposed development is presented in Appendix C.

5.5 Recommendations

Potential pollutant linkages have been identified by the preliminary risk assessment. It is therefore recommended that an intrusive ground investigation should be undertaken to allow a quantitative assessment to be made of the risks posed to end users.

Ashdown Site Investigation Ltd.

FIGURES



ASHDOWN SITE INVESTIGATION LIMITED	Site Location Plan	Site Name	Figure No.	Project Reference
		48-50 London Road, Crawley, West Sussex	1	P16797