Homes England

The Housing and Regeneration Agency

West of Ifield, Crawley
Phase 1 Environmental Site Assessment (Ground Conditions)

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WEST OF IFIELD
PHASE I ENVIRONMENTAL SITE ASSESSMENT (GROUND CONDITIONS)

RAMBOLL

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WEST OF IFIELD

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Made by	**Elliot Craggs**
Checked by	**Zoe Woodland**
Approved by	**Matt Royall**

Made by: 

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EXECUTIVE SUMMARY

Ramboll UK Limited (Ramboll) was instructed by Turner and Townsend Project Management Ltd (the "Client") on behalf of Homes England, to undertake a Phase I Environmental Site Assessment (ground conditions) for the site at West of Ifield (the "Site"). It is understood that the Site is to be redeveloped to provide a residential-led mixed use development (the "Proposed Development"). This report has been produced to support a hybrid planning application.

The review was undertaken by desk-based research, review of previous reports and regulatory enquiries. The Site is located to the west of Ifield and to the west of the town of Crawley. The Site occupies an area of approximately 171 hectares (ha), and is currently occupied predominantly by agricultural land, with a golf course present in the south.

Available historic mapping data showed the Site to have remained mostly unchanged since 1920. The Dumfries Pump House was present in the eastern central area of the Site between 1920 and 1992, however no other significant development has been noted.

The surrounding area has been utilised for predominantly residential and agricultural purposes, with residential developments expanding to the east and south of the Site. Several areas of farm buildings (not included within the Site area), exist in close proximity of the Site, and an off-Site historic tank associated with Ifield Court Farm was present between 1897 and 1963 in the vicinity of the northern area of the Site.

An environmental database search identified two historical landfills within 250m of the Site. The Site is predominantly underlain by bedrock of the Weald Clay, with limited areas of superficial alluvium recorded in the area of watercourses (the River Mole and its tributaries) running across the Site. The Weald Clay Formation predominantly comprises mudstones which are classified as an unproductive aquifer, however the underlying superficial deposits and limited areas of the Weald Clay Formation that comprise limestone and ironstone are classified as Secondary A aquifers.

Information from a third party report confirmed the presence of hazardous chemicals storage on an off-Site farm off Rusper Road, in the vicinity of the Site.

In the UK, a risk-based approach is used to assess the potential impact associated with ground contamination. The potential for residual contamination to be present from current /former Site uses (groundskeeping on the golf-course within the southern area of the Site, agricultural uses in the central and northern areas and the historic presence of a Pump House in the eastern central area of the Site) cannot be ruled out and may be capable of affecting buildings and Site-users on and in the vicinity of these potential sources on Site and also nearby controlled surface waters. Risks associated with these sources are predominantly **low**, with areas of localised **low to moderate** risk. The potential off-Site contamination relating to the off-Site agricultural uses may also be capable of affecting adjacent areas of the Proposed Development, however it is not expected that the concentrations of contaminants (if present) would pose a significant risk to building structures at greater distances due to the potential for attenuation during migration.

Given that geotechnical site investigation is expected to be required to finalise foundation design / development layouts, this site investigation should include limited and targeted elements of contamination assessment. This would primarily comprise targeting shallow soils in close proximity of identified on-Site and adjacent potential sources of contamination and also soils in close proximity of surface watercourses. Furthermore, given the potential for agricultural and naturally occurring sources of ground gas, the site investigation should include targeted ground gas monitoring based on future detailed layouts of proposed buildings. Based on the findings of this site investigation appropriate mitigation measures should be devised. In addition, during the construction phase, sampling of on-Site surface watercourses should also be undertaken up and downstream of the Site if possible.

In summary, the identified potential sources of contamination appear to be relatively limited in extent and would be relatively manageable, in the context of the Proposed Development. However, it is likely that additional work (standard ground conditions mitigation measures) will be required to satisfy the requirements of the local planning authority (as part of future reserved matter applications) to permit the Proposed Development (which are outlined in Section 7.1 of this report). Suggested mitigation measures are included in Section 7.2 of this report.

1. INTRODUCTION

1.1 Background

1.1.1 This report presents the objectives, scope, findings and conclusions of a Phase I Environmental Site Assessment (ground conditions) undertaken at West of Ifield (the "Site", as illustrated in Appendix 1). The review was undertaken in connection with the proposed development of the Site (the "Proposed Development" as outlined in Section 1.2).

1.1.2 This report was prepared by Ramboll UK Limited ("Ramboll") following instruction from Turner and Townsend Project Management Ltd (the "Client") on behalf of Homes England (the "Applicant").

1.1.3 This assessment has been undertaken assuming the Site will be redeveloped to provide a residential-led mixed use development.

1.2 Objectives

1.2.1 The main objective of this assessment was to assess the potential for significant soil or groundwater contamination, both at and in the immediate vicinity of the Site, and its likely implications to the planned redevelopment scenario. No sampling or analysis of soils, waters or other materials was undertaken as part of this assessment. Review of compliance with environmental legislation is outside the scope of this assessment.

1.3 Scope of Works

1.3.1 The scope of the Phase I Environmental Site Assessment has included the following:

- examination of historic, recent and current Ordnance Survey plans to identify activities which might have led to contamination of soil or groundwater (for example, from manufacturing processes, from storage activities or waste disposal practices) both on the Site and on adjacent sites;
- examination of published records and plans on the shallow and deeper geology (up to 100 m depth beneath the site) and hydrogeology of the Site to assess the vulnerability and sensitivity of groundwater and surface water resources to contamination, if present, and the possible direction of movement off Site, if mobile;
- search of a proprietary database of environmental permits, records and incidents at the Site and surrounding area; and
- enquiries of the Local Authority Planning and Environmental Health Departments to obtain information on environmental conditions, incidents and known contamination risks and on the Local Authority's Contaminated Land Strategy.

Scope of Works Notable Exceptions and Restrictions

1.3.2 No sampling or analysis of soils, waters or other materials has been carried out as part of the Phase I Environmental Site Assessment.

1.3.3 The assessment did not include an audit of operational environmental compliance issues or environmental compliance requirements associated with on-Site operations.

1.3.4 The assessment specifically excluded a detailed assessment as to the presence and condition of asbestos or asbestiform containing materials at the Site.

1.3.5 A Site visit was not carried out as part of the assessment.

1.4 The Proposed Development

1.4.1 Homes England intends to submit a hybrid planning application (part outline and part full planning application) for a phased, mixed-use development comprising:

1.4.2 A full element covering enabling infrastructure including the Crawley Western Multi-Modal Corridor (Phase 1, including access from Charlwood Road and crossing points) and access infrastructure to enable servicing and delivery of secondary school site and future development, including access to Rusper Road, supported by associated infrastructure, utilities and works, alongside

1.4.3 An outline element (with all matters reserved) including up to 3,000 residential homes (Class C2 and C3), commercial, business and service (Class E), general industrial (Class B2), storage or distribution (Class B8), hotel (Class C1), community and education facilities (Use Classes F1 and F2), gypsy and traveller pitches (sui generis), public open space with sports pitches, recreation, play and ancillary facilities, landscaping, water abstraction boreholes and associated infrastructure, utilities and works, including pedestrian and cycle routes and enabling demolition.

1.4.4 This hybrid planning application is for a phased development intended to be capable of coming forward in distinct and separable phases and/or plots in a severable way.

1.4.5 The Proposed Development includes provision for water abstraction boreholes which would provide potable water for residents and occupants of the Site.

1.4.6 The land use parameter plan for the Proposed Development is illustrated in Figure 1-1 below. The areas shaded in colours according to their use class (see legend of Figure 1-1) indicate built development plots included in the outline element of the hybrid planning application. The area and extent of the proposed Crawley Western Multi-Modal Corridor (CWMMC) is illustrated in dark grey, labelled as 'Area Applied for in Detail'.

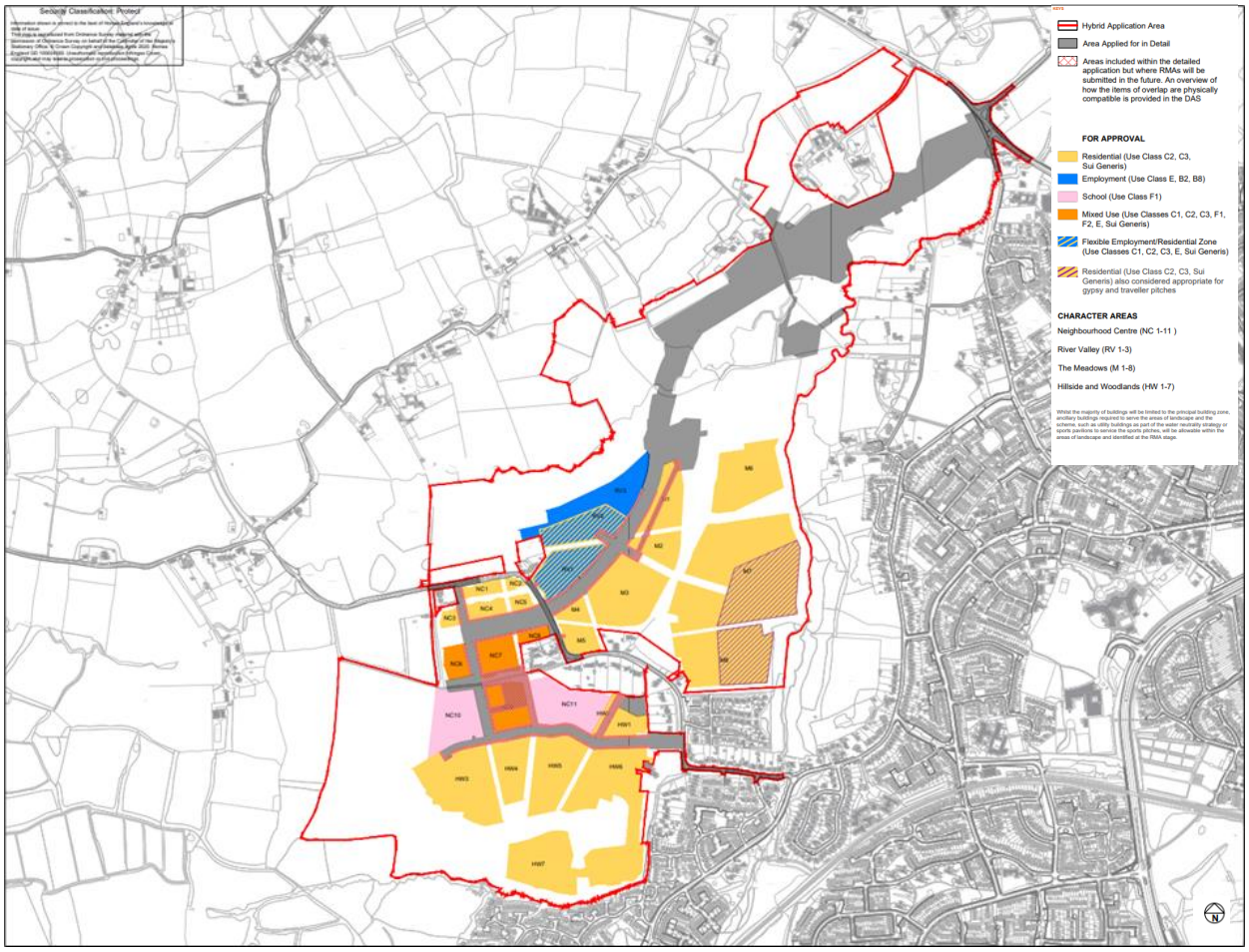


Figure 1-1: Land Use Parameter Plan (WOI-HPA-PLAN-PP03-01)

1.5 General Limitations and Reliance

1.5.1 This report has been prepared by Ramboll exclusively for the intended use by the Client in accordance with the agreement between Ramboll and the Client defining, among others, the purpose, the scope and the terms and conditions for the services. No other warranty, expressed or implied, is made as to the professional advice included in this report or in respect of any matters outside the agreed scope of the services or the purpose for which the report and the associated agreed scope were intended or any other services provided by Ramboll.

1.5.2 In preparation of the report and performance of any other services, Ramboll has relied upon publicly available information, information provided by the Client and information provided by third parties.

Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate, complete and available to Ramboll within the reporting schedule.

1.5.3 Ramboll's services are not intended as legal advice, nor an exhaustive review of Site conditions and/or compliance. Ramboll neither owes nor accepts any duty to any third party, unless formally agreed by Ramboll through that party entering into, at Ramboll's sole discretion, a written reliance agreement.

1.5.4 Ramboll's scope of services for this assignment did not include collecting samples of any environmental media. Ramboll cannot rule out the existence of conditions, including, but not limited to, contamination not identified and defined by the data and information available to and/or obtained by Ramboll. Specifically, this assessment must not be considered as an asbestos survey (whether in built structures, waste, soils, etc.).

2. SITE DESCRIPTION

2.1.1 The following information was derived from information obtained from publicly available information sources or reported by the Client. Ramboll has not undertaken a Site visit for the purposes of this assessment. This assessment has included results from intrusive ground investigations undertaken by Arcadis Consulting (UK) Ltd (Arcadis) in September 2023. The investigation works were undertaken within the Phase 1 land (detailed component) only, with results recorded in 'West of Ifield – Phase 1a Infrastructure Ground Investigation and Geotechnical Design Report' (10051123-ARC-010-1A-TR-GE-00001).

2.1.2 Figures showing the location of the Site and Site setting are presented in Appendix 1.

2.1.3 The Site is located on land to the west of Ifield near Crawley in West Sussex, centred approximately at National Grid Reference TQ 23679 36673. The Site is approximately 171 ha in size.

2.1.4 The Site is predominantly occupied by a mixture of arable and pastoral fields and includes the Ifield Golf Course and Country Club in its far southern portion. The River Mole is present across the northern part of the Site and flows from south-west to north-east.

2.1.5 The surrounding area is occupied by agricultural land uses, light industrial, commercial and residential land-uses. An extensive network of public footpaths provides for pedestrian access and recreation across the rural area, both within and the outside the Site, and includes good connections with the urban area. The surrounding land supports a variety of individual residential houses and farmhouses.

2.1.6 Current access to the Site is via Charlwood Road in the north and Rusper Road to the south.

3. HISTORICAL & REGULATORY INFORMATION

3.1 Map History

3.1.1 Ramboll has undertaken a review of historical mapping and aerial imagery (where available) obtained from a proprietary environmental database which is summarised below.

The Site

3.1.2 The map edition of 1897 showed the Site to mostly comprise agricultural fields with areas of woodland. The majority of the Site has undergone no significant changes between 1897 and the present day. The map edition of 1927 showed the southern area of the Site to be in use as a Golf Course, with several small buildings added within this area. A number of drainage channels are shown to have been added to the golf course in the map edition of 1932.

3.1.3 Dumfries Pump House is shown to have been added near to the Site boundary in the east of the Site, near Rusper Road, by 1920, no longer being shown on the maps by 1992.

3.1.4 The Surrounding Area

3.1.5 The map edition of 1897 showed the surrounding area to predominantly comprise agricultural fields and woodland. The area in the north not included within the Site boundary is occupied by Ifield Court Farm, comprising multiple buildings and a labelled tank of unknown use. This tank is no longer shown to be present from 1963 onwards.

3.1.6 Ifield village was shown to be present to the east of the Site, undergoing significant expansion with housing being added between 1920 and 1940. Further housing development occurred up to the southern boundary of the Site between 1979 and 1992.

3.2 Environmental Database Records

3.2.1 The following information has been obtained from a search of a publicly available third-party environmental database (dated March 2023):

- There are no contaminated land register entries/notices within a 1km radius of the Site.
- There are no current landfill sites recorded within a 1km radius of the Site, however two (2) historical landfill sites are recorded, to be present, one being approximately 50m to the west of the Site, recorded to have been operated between 1981 and 1987, the second is approximately 180m to the north of the Site, operated between 1984 and 1986, both sites are recorded to have been authorised to receive inert waste.
- There are seven (7) facilities within the Site recorded to hold current Environmental Permits for waste management activities[1], with a further twelve (12) sites recorded within 1km of the Site. The permits for on-Site activities variously relate to the storage of sludge on a farm, burning of agricultural waste, aerobic composting of agricultural waste, spreading of agricultural waste on fields, use of waste in construction and the deposition of waste from dredging to inland waters.
- There are no Environmental Permits to operate Part A(1) Installations issued under the Industrial Emissions Directive[2] within 1km of the Site.
- There are no recorded (1) Environmental Permits to operate Part A(2) Installations issued under the Industrial Emissions Directive[3], within 1km of the Site.
- There are no current Environmental Permits to operate Part B Installations issued under the Industrial Emissions Directive[4] within 1km of the Site. Four (4) historical permits are recorded within 1km of the Site, the nearest relating to a location approximately 220m to the north-east where respraying of road vehicles occurred.

[1] Excluding Part A(1) and Part B permitted waste installations.
[2] Formerly referred to as Integrated Pollution Prevention and Control (IPPC) Authorisations, or Pollution Prevention and Control (PPC) Authorisations.
[3] Formerly referred to as Local Authority IPPC Authorisations.
[4] Formerly referred to as Local Air Pollution Prevention and Control Authorisations

- There are no Radioactive Consents registered within 1km of the Site. *NB Due to public security restrictions, certain information on closed or mobile radioactive substance authorisations has been removed from the public register and is not available to Ramboll.*
- There are no Control of Major Accident Hazard (COMAH) facilities, explosive sites, or Planning Hazardous Substance Consents within 1km of the Site.
- There have been no prosecutions relating to authorised processes within 1km of the Site.
- There are four (4) Environmental Permits held with the Environment Agency for water discharge activities (formerly referred to as Discharge Consents) carried out on Site, with fourteen (14) further Permits recorded to be held within a 500m radius of the Site. The on-Site permits are recorded to be for the discharge of either treated effluent or sewage discharges from a water company pumping station. Permits in the vicinity of the Site are for the same uses, for miscellaneous discharge of surface water, or sewer storm overflow discharges.
- There are no Environmental Permits held with the Environment Agency for Groundwater Activities (previously referred to as Discharge Consents) within 1km of the Site.
- There have been five (5) pollution incidents recorded within 1km of the Site. The nearest of these was located 5m south of the Site and related to the release of dyes and inks to controlled waters. The incident occurred in March 2003, and was classified by the Environment Agency as a Category 3 - Minor Incident.
- There is one (1) fuel station entries within a 1km radius, located approximately 440m to the south-east, being a Shell branded petrol filling station.
- There are two (2) ecologically sensitive sites within a 1km radius of the Site. Willoughby Fields Local Nature Reserve is located approximately 10m to the north-east and House Copse Site of Special Scientific Interest (SSSI) is located 620m to the south-west.

3.2.2 According to the environmental database the Site partially lies in a "Radon Affected Area" as defined by Public Health England. An area of the north-west of Site is recorded as being located in an area where between 1% and 3% of residential properties are projected to contain radon above the residential action threshold.

3.2.3 Under Health and Safety legislation, employers have a duty to manage workplace risks including the potential for radon exposure. Health and Safety Executive guidance recommends radon monitoring for workplaces located in radon Affected Areas. If the workplace radon threshold is exceeded, the Ionising Radiations Regulations 1999 require employers to take action to reduce risks.

3.2.4 According to BRE Report BR211 (2015) Radon: Protective Measures for New Buildings, radon protection measures are not required under building regulations for new buildings at this location.

3.2.5 The LinesearchbeforeUdig database, which lists pipelines distributing crude oil and refined hydrocarbon products owned and/or operated by a number of UK pipeline operators indicates that there are no records of underground oil or refined hydrocarbon product pipelines on the Site or within 250m.

3.3 Regulatory Authority Enquiries

Local Authority Environmental Health Department (EHD)

3.3.1 The Environmental Health Department of the Local Authority has provided the following information[5]:

- The Site has not been identified for inspection or review under Council's Contaminated Land Strategy (or other Part IIA undertaking).
- No records are held relating to any known contamination issues associated with the Site or in the near vicinity.
- No records are held relating to any landfills located within a 250m radius of the Site.

[5] Response provided through an email from the EHD of Horsham District Council to Ramboll on 23 June 2023.

- The UK Radon Atlas identifies that the maximum radon potential of the Site is 1-3%. Further assessment of the radon risk to new development will be required.
- There are no records of any actionable or continuing nuisance issues, prosecutions or enforcements associated with the Site or adjoining properties within the last 5 years.
- There are no registered Private Water Supplies active within 2km of the Site.
- There are no fixed installations permitted under Past A(2) or Part B Environmental Permits by the authority. A mobile crusher is based at Burlands Farm, Charlwood Road, Ifield, Crawley, West Sussex, RH11 0JZ operated by PJ Brown Limited, permit reference PPC53.

3.4 Historical Potential for Ground Contamination

The Site

3.4.1 The following potentially contaminative activities have been identified as having taken place on Site:

- The historic and ongoing use of the majority of the Site as agricultural land is potentially likely to have involved the long term, diffuse use of chemical fertilisers, pesticides and herbicides, which may remain within the shallow soils in limited quantities.
- The historic and ongoing use of the southern area of the Site as a golf course is likely to have involved groundskeeping using machinery. Chemicals relating to this are likely to have been stored and used on Site, presenting a potential source of contamination relating to fuels, lubricating oils, pesticides, herbicides and fertilisers.
- Dumfries Pump House was present in the eastern central area of the Site between 1920 and 1992, it is assumed to have been the site of pumping machinery and as such presents a potential source of contamination relating to the use of fuel and lubricating oils.

The Surrounding Area

3.4.2 The following potentially contaminative activities have been identified as having taken place in the surrounding area:

- The use and decommissioning method of the historic tank located within Ifield Court Farm in the northern area (outside of the Site boundary) is unknown. Due to this it presents a potential source of hydrocarbon contamination.
- Two historic landfill sites are present within 250m of the Site, while these are recorded to have been used for inert waste only, given their age (the first beginning operation in 1981), the possibility remains for these to act as potential sources of leachable volatile contaminants.

3.4.3 The above activities represent potential off-Site sources of contamination that (if present) could potentially migrate beneath the Site.

3.4.4 The potential for off-Site contamination (if present) to migrate beneath the Site would be dependent on the underlying geological conditions, which are discussed in Section 4.

4. ENVIRONMENTAL SETTING

4.1.1 Desk-based research of the local geology, hydrogeology and hydrology was carried out in order to establish the potential for migration of contamination onto or away from the Site, and to assess the sensitivity and vulnerability of the Site's setting with respect to surface water, groundwater and ecological resources.

4.1.2 Information was obtained from a number of sources, including:

- examination of published geological maps produced by the British Geological Survey (BGS);
- review of publicly available BGS borehole logs for the Site or near vicinity;
- a proprietary environmental database procured by Ramboll; and
- Regulatory Authority websites including the Environment Agency (EA).

4.2 Geology and Hydrogeology

4.2.1 According to BGS 1:50,000 mapping of the area, the Site geology and hydrogeology is presented in Table 4.1 below.

Table 4.1: Summary of Geology and Hydrogeology

Formation	Description	Thickness	EA Aquifer Designation	Hydrogeological Significance
Alluvium	Clay, silt, sand and gravel	Over 10m (where present)	Secondary A	Permeable formations with potential to support localised abstractions.
River Terrace Deposits	Sand and gravel	Over 10m (where present)	Secondary A	Permeable formations with potential to support localised abstractions.
Weald Clay Formation – Mudstones	Mudstone	Unknown	Unproductive Strata	Formations with low permeability that have negligible significance for water supply or river base flow
Weald Clay Formation – Clays and Ironstones	Clays and Ironstones	Unknown	Unproductive Strata	Formations with low permeability that have negligible significance for water supply or river base flow
Weald Clay Formation - Limestone	Limestone	Unknown	Secondary A	Permeable formations with potential to support localised abstractions.

4.2.2 Information on ground conditions on Site, within the Phase 1 (detailed component) boundary, has been provided from a ground investigation undertaken by Arcadis in September of 2023. These conditions are summarised below.

4.2.3 A Layer of made ground is sporadically present, up to 0.90m thick in one location (BH03), but generally around 0.4m in thickness where present. This is underlain by a layer of alluvium present to depths of between 1.25m and 3.7m below ground level (bgl). This material was generally slightly graded, with alluvial sands present at shallow depth, underlain by silts followed by clays. River Terrace Deposits were not recorded, with the Alluvium being directly underlain by clays and mudstones of the Weald Clay.

4.2.4 According to records no Water Framework Directive (WFD) groundwater body is recorded to be present directly underlying the Site, however the closest recorded groundwater body is the Copthorne Tunbridge Well Sands, which the Environment Agency (EA) currently classifies as being of 'good' chemical quality and of 'good' quantitative status under the WFD classification scheme.

4.2.5 According to EA information provided by a commercial environmental regulatory database provider, there are no current licensed groundwater abstractions within a 2km radius of the Site.

4.2.6 The Site is not situated within an EA designated groundwater Source Protection Zone.

There are no private (unlicensed) abstractions (that are generally of smaller scale) within 2 km of the Site.

4.3 Hydrology

4.3.1 The nearest identified surface water body is the River Mole, an inland river passing through the Site from the west to the east, with several tributaries either originating on Site or passing through the Site. The EA currently classifies the River Mole as being of 'moderate' ecological quality and 'fail' chemical quality under the Water Framework Directive classification scheme.

4.3.2 According to an independent, third-party environmental database, there are no licensed surface water abstractions within a 2km radius of the Site.

4.4 Designated Ecological Sites

4.4.1 There are four ecologically sensitive sites within a 2km radius of the Site. Willoughby Fields Local Nature Reserve (LNR) is located approximately 10m to the north-east and House Copse Site of Special Scientific Interest (SSSI) is located approximately 600m to the south-west. Buchan Hill Ponds SSSI is located approximately 1,600m to the south of the Site and Target Hill Park Local Nature Reserve is located approximately 1,800m to the south.

4.5 Environmental Sensitivity and Vulnerability

4.5.1 The Site is considered to be situated in an area of low sensitivity with respect to groundwater resources due to the underlying Secondary A Aquifer in relation to the Weald Clay Formation Limestones. There are no licensed groundwater abstractions within 2km of the Site; the EA does not recognise any shallow underlying groundwater body but classified the closest groundwater body's quantitative quality as 'Good' under the Water Framework Directive, with the chemical status also being 'Good'.

4.5.2 The vulnerability of the groundwater in the vicinity of the Site is considered to be low due to the low permeability Weald Clay Formation geology across the Site which limits the potential for contaminants to migrate to depth in the area.

4.5.3 The sensitivity of the hydrological receptor can be considered as moderate to high as the River Mole (the nearest surface watercourse) passes through the Site. The EA currently classifies the River Mole as being of 'moderate' ecological quality and 'fail' chemical quality under the Water Framework Directive classification scheme. There are no licensed surface water abstractions within 2km of the Site.

4.5.4 The Site is considered to be in an area of moderate vulnerability with respect to surface water resources as while it is in close proximity to surface watercourses, the rivers passing through the Site are of moderate to low quality and given the lack of proximate surface water abstractions, low levels of contamination released from the Site (if present) are unlikely to reach sensitive receptors without undergoing attenuation.

4.5.5 There are four statutory designated ecologically sensitive areas within 2km. These are considered to be of low vulnerability given the aforementioned low probability of contaminant migration.

5. PREVIOUS REPORTS

5.1.1 The following reports have been provided to Ramboll for review:

- Arcadis, August 2018: Phase I Geo-Environmental Desk Study (Ref 10020728-ARC-XX-XX-RP-GE-01); and
- Arcadis: West of Ifield – Phase 1a Infrastructure. Ground Investigation and Geotechnical Design Report (10051123-ARC-010-1A-TR-GE-00001).

5.2 2018 Phase I Geo-Environmental Desk Study

5.2.1 This report summarises the findings of a Phase I Desk Study undertaken by Arcadis Consulting (UK) Limited on behalf of Homes England for the purposes of an initial assessment of the feasibility of the Site for residential development. The site area boundaries used for this report were slightly larger than the current Site being considered, including areas excluded from the current Site boundary (such as Ifield Court Farm). The report identified potential sources of contamination associated with the farm buildings (outside of the current Site boundary), the golf course in the south of the Site, a nursery at Furlong Farm, off Rusper Road (outside of the current Site boundary), a historical Pump House (mentioned above as Dumfries Pump House), the alluvium deposits in the vicinity of the watercourses passing through Site and the two historic landfills within 250m of the Site (as outlined earlier in this Ramboll report). The report did not offer an assessment of the relative risks posed by each of these sources.

5.3 Ramboll Comments

5.3.1 Ramboll considers that the data from the Arcadis site walkover relating to hazardous material storage at Furlong Farm can be taken to indicate the presence of an additional source of contamination, otherwise the report provides confirmation of previously identified potential sources of contamination, although it does not offer an assessment of the risks relating to these. On this basis, only the factual data provided has been considered in this assessment.

6. QUALITATIVE RISK ASSESSMENT

6.1 Legislative Framework

6.1.1 The regime for contaminated land was set out in Part 2A (ss.78A-78YC) of the Environmental Protection Act 1990 (EPA), as inserted by S.57 of The Environment Act 1995 and came into effect in England on 1st April 2000 as The Contaminated Land (England) Regulations 2000 (SI 2000/227). These regulations were subsequently revoked with the provision of The Contaminated Land (England) Regulations 2006 (SI 2006/1380) (as amended), which came into force in August 2006, and consolidated the previous regulations and amendments. Revised statutory guidance ("the Guidance") for local authorities on how to implement the regime, including the decision-making process on whether land is contaminated land in the legal sense, has been published by Defra and entered into force in April 2012.

6.1.2 Under Part 2A of the EPA Section 78A(2), "*contaminated land*" is defined as "*land which appears… to be in such a condition, by reason of substances in, on or under the land, that:*

a) significant harm is being caused or there is a significant possibility of such harm being caused[6]*; or*
b) *significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused*".

6.1.3 The pollution of controlled waters is defined in Section 78A(9) of the Act as "the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter".

6.2 Sustainability

6.2.1 Identifying potential land contamination contributes to broader sustainability objectives. By using risk based approaches to assess potential land contamination, use of natural resources, carbon and social impacts can be minimised. The assessments in this report may contribute to a number of UN Sustainable Development Goals (SDGs) including SDG 3: Good Health and Wellbeing, SDG 11: Sustainable Cities and Communities, and SDG 6: Clean Water and Sanitation.

6.3 Risk Assessment Framework

6.3.1 "*Significant harm*" or "*significant pollution of controlled waters*" is defined in the Guidance on risk-based criteria and must be the result of one or more relevant 'contaminant linkages' relating to the land.

6.3.2 The presence of a contaminant linkage relies on the Source-Pathway-Receptor concept, where all three factors must be present and potentially or actually linked for a potential risk to exist. For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- A source – a substance that is capable of causing pollution or harm;
- A receptor – something which could be adversely affected by the contaminant; and
- A pathway – a route by which the contaminant can reach the receptor.

6.3.3 If one of these elements is absent there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway. The potential severity of the risk and the probability of the risk occurring have been combined in accordance with the following matrix in order to give a level of risk for each potential hazard.

Table 6.1: Classification of Risk (after NHBC/EA 2008)

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very high	High	Moderate	Low
	Likely	High	Moderate	Moderate/Low	Low
	Low Likelihood	Moderate	Moderate/ Low	Low	Very low
	Unlikely	Moderate/ Low	Low	Very low	Very low

[6] Water Act 2003 (Commencement No. 11) Order 2012

6.3.4 It has been assumed that the Site will be redeveloped with a mixed use development comprising predominantly residential housing with associated amenities.

6.4 Preliminary Risk Assessment

6.4.1 A preliminary conceptual site model has been developed and a qualitative risk assessment undertaken to identify and assess the potential risks associated with environmental conditions at and in the vicinity of the Site based on the available information. This is presented in Table 6.2.

Table 6.2: Conceptual Site Model

Source	Pathway	Receptor	Risk of Contaminant Linkage
Current uses of the Site as agricultural land and as a golf course. Potential for use of fertilisers, pesticides and herbicides across the Site and use of fuels and oils in association with farm plant.	Dermal contact / ingestion.	Site buildings, users and neighbours.	**Low:** Agricultural contamination is unlikely to be present at significantly elevated concentrations and no major fuel spills have been reported on or in the vicinity of the Site. General use of herbicides, pesticides and fertilisers is not expected to lead to the release of concentrations of contaminants harmful to human health.
	Vapours and ground gases.		**Moderate/Low:** No significant sources of volatile contamination are anticipated on Site, however long term agricultural usage may have led to a build-up of organic matter within the soil. Due to this and the possibility of small-scale unreported spills and localised leakage of fuels and oils, the possibility remains for agriculturally related or naturally occurring ground gas generation on Site.
	Leaching to Groundwater & Groundwater Flow.	Groundwater within the underlying Secondary A aquifer.	**Low:** Agricultural contamination is unlikely to be present at significantly elevated concentrations and no major fuel spills have been reported on or in the vicinity of the Site. The underlying geology is relatively impermeable across much of the Site (the majority of the Site is immediately underlain by mudstones of the Weald Clay Formation, classified as an Unproductive Aquifer) and the potential for contaminants to migrate within groundwater is expected to be minimal.
		Surface waters as controlled waters.	
	Surface water run-off.		**Moderate/Low:** Given the moderate to high sensitivity of surface watercourses and their proximity to the Site, the potential exists for shallow contamination (if present) to adversely affect surface waters.
Historic presence of Dumfries Pump House in the eastern central area of the Site between 1920 and 1992. Potential for use of oils and fuel.	Dermal contact / ingestion.	Site buildings, users and neighbours in close proximity to the area of the former Pump House.	**Moderate/Low:** Localised contamination may be present due to the historic presence of machinery on Site.
	Vapours.		**Moderate/Low:** The potential for the release of volatile contaminants cannot be ruled out based on the known history of the Pump House.

Source	Pathway	Receptor	Risk of Contaminant Linkage
	Leaching to Groundwater & Groundwater Flow.	Groundwater within the underlying Secondary A aquifer near the area of the former Pump House.	**Low:** The underlying geology is relatively impermeable across much of the Site (the majority of the Site is immediately underlain by mudstones of the Weald Clay Formation, classified as an Unproductive Aquifer) and the potential for contaminants to migrate within groundwater is expected to be minimal.
	Surface water run-off.	Surface waters as controlled waters near the area of the former Pump House.	**Moderate/Low:** Given the moderate to high sensitivity of surface watercourses and their proximity to the historic pump house location, the potential exists for shallow contamination present to adversely affect surface waters.
Off-Site storage and use of fuels and oils at Ifield Court Farm within off-Site areas adjacent to the northern areas of the Site.	Vapours.	Site buildings and users in close proximity of Ifield Court Farm.	**Low:** The potential for the release of volatile contaminants cannot be ruled out based on currently available information, however no building structures are proposed in the vicinity of Ifield Court Farm and it is not expected that the concentrations of contaminants anticipated would pose a significant risk to structures at greater distances due to the potential for attenuation during migration.
Off-Site storage and use of fuels and oils at Furlong Farm within off-Site areas adjacent to the southern areas of the Site.	Vapours.	Site buildings and users in close proximity of Furlong Farm.	**Moderate/Low:** The potential for the release of volatile contaminants cannot be ruled out based on currently available information, however it is expected that the concentrations of contaminants anticipated would pose a limited risk to building structures within the vicinity of Furlong Farm.
Historic landfills in the vicinity of the Site	Vapours.	Site buildings and users	**Low:** The potential for the release of volatile contaminants cannot be ruled out based on currently available information, however the nearest landfill is approximately 50m off-Site and horizontal mobility within the underlying geology is expected to be minimal.

7. CONCLUSIONS AND RECOMMENDATIONS

The Site has historically contained an area of agricultural fields, with the current golf course use in the south beginning in the 1920s (the majority of the Site remaining in use as agricultural fields over the duration of available mapping data). The Site is predominantly underlain by mudstones of the Weald Clay Formation, which are expected to minimise potential migration of contamination (if present) within the shallow groundwater on Site. A historic Pump House was present in the eastern central area of the Site between 1920 and 1992 and is thought to present a potential source of contamination. Historic landfilling and current use of agricultural plant is known to have taken place in the vicinity of the Site, however given the low permeability of the underlying geology, only immediately adjacent land uses are considered likely to significantly affect the Site.

The potential for residual contamination to be present from current /former Site uses (groundskeeping on the golf-course within the southern area of the Site, agricultural uses in the central and northern areas and the historic presence of a Pump House in the eastern central area of the Site) cannot be ruled out and may be capable of affecting buildings and Site-users on and in the vicinity of these potential sources on Site and also nearby controlled surface waters. Risks associated with these sources are predominantly **low**, with areas of localised **low to moderate** risk. The potential off-Site contamination relating to the off-Site agricultural uses may also be capable of affecting adjacent areas of the Proposed Development, however it is not expected that the concentrations of contaminants (if present) would pose a significant risk to building structures at greater distances due to the potential for attenuation during migration.

Given that geotechnical site investigation is expected to be required to finalise foundation design / development layouts, this site investigation should include limited and targeted elements of contamination assessment. This would primarily comprise targeting shallow soils in close proximity of identified on-Site and adjacent potential sources of contamination and also soils in close proximity of surface watercourses. Furthermore, given the potential for agricultural and naturally occurring sources of ground gas, the site investigation should include targeted ground gas monitoring based on future detailed layouts of proposed buildings. Based on the findings of this site investigation appropriate mitigation measures should be devised. In addition, during the construction phase, sampling of on-Site surface watercourses should also be undertaken up and downstream of the Site if possible.

7.1 Recommendations

7.1.1 Based on the findings of the desk-based assessment, the following additional measures are likely to be required to enable the future development of the Site.

Acute Human Health Risks during Development Activities

7.1.2 Construction workers should use appropriate personal protective equipment during construction work, to prevent contact with potentially contaminated soils and potentially hazardous gases, vapours and dust (particularly relevant in areas where localised potential sources of contamination have been identified). Dust suppression measures should be employed at the Site if contaminated materials are exposed during construction, to prevent off-Site migration of contaminants via this pathway.

Risks to underlying groundwater resources from on-Site groundwater abstraction boreholes

7.1.3 As part of the excavation and installation of abstraction boreholes the drilling methods will ensure that the sections within the overlying Weald Clay Formation will be cased and sealed to avoid creation of preferential pathways and also minimise the risk of any 'short circuiting' of groundwater to the underlying aquifer formations. This will also mitigate for the risk of chloride rich groundwater in the Weald Clay Formation impacting on the underlying aquifers. All works associated with creation of abstraction boreholes would accord with good practice 'clean drilling' methods. These mitigation measures would be covered under Environment Agency requirements necessary for the abstraction licence associated with any on-Site abstraction borehole.

7.1.4 During the construction phases of the Proposed Development any groundwater abstraction boreholes which comprise a potable water source should be protected from accidental release of contaminants. Ideally any fuels, oils and / or hazardous materials associated within construction works should not be

stored within 50m of any abstraction borehole. If this is not feasible, as well as adhering to all legislative requirements regarding containment, these potential contamination sources should be subject to strict secondary containment, management and inspection. Any accidental releases during the construction phase should be rapidly addressed with appropriate spill kit provision stored on-Site. These mitigation requirements will be outlined in the detailed construction environmental management plan (CEMP) prepared for any phase of the Proposed Development which is within 50m of a groundwater abstraction borehole.

7.1.5 During operational phases of the Proposed Development any groundwater abstraction boreholes which comprise a potable water source should be protected from accidental release of contaminants. Ideally any fuels, oils and / or hazardous materials associated within operational activities should not be stored within 50m of any abstraction borehole. Given the nature of the Proposed Development significant quantities of hazardous material storage is not envisaged. If this is not feasible (for example certain chemicals are required for water treatment and will be located close to an abstraction borehole), as well as adhering to all legislative requirements regarding containment, these potential contamination sources should be subject to strict secondary containment, management and inspection. Any accidental releases during the operational phase should be rapidly addressed with appropriate spill kit provision stored on-Site. These mitigation requirements will be outlined in the relevant reserved matters application details prepared for any phase of the Proposed Development which is within 50m of a groundwater abstraction borehole.

Potential As-Yet-Unidentified Contamination

7.1.6 It is always possible that additional sources of contamination could be present, which have not yet been identified. Based on available information, the likelihood that significant additional contamination is present is considered to be low. However, if a contractor identifies any potential contamination an appropriately qualified specialist should be contacted to determine appropriate measures.

Ground Gas

7.1.7 A Gas Risk Assessment is recommended following finalisation of the location and footprint of the proposed buildings to be constructed at the Site. This will assist in the consideration of possible gas protection requirements on a building by building basis. This assessment should include consideration of any risks of radon (considering all radon guidance applicable at the time of construction).

Water Supply

7.1.8 From the proposed limited scope intrusive site investigation soil analytical data should be taken into account during the selection of water supply pipe materials. A specific type of water supply pipe may potentially be required to prevent contamination of the supply. Further information can be obtained by the local water supply company (Southern Water).

Soils / Imported Material

7.1.9 Wherever possible soils should be re-used on Site in accordance with appropriate management measures. Soils which will comprise 'cover' for proposed landscaping / garden areas should be assessed to demonstrate that they are suitable for use, both in terms as a plant growing medium and not comprising any significant contamination. This is a typical requirement for any residential development.

7.1.10 Should there be a requirement to import soils for use in areas of proposed soft landscaping / garden areas, any imported fill material should be inert, uncontaminated and comply with all applicable environmental legislation. It should not lead to any impact or degradation of the soil (and groundwater) quality underlying the Site. Any proposed source of soil materials to be placed within areas of soft landscaping should be approved prior to import to Site.

7.1.11 Any material imported to Site (whether for landscaping or to address further development requirements) should be of a verifiable origin and where applicable (soils etc) should be supported by appropriate analytical data. A suitable testing frequency for imported materials shall be determined by the contractor through liaison with an appointed environmental consultant. The agreed testing frequency may vary depending upon the source of the material and shall be suitably protective of the intended end users. The importance of adopting a sampling frequency that is suitably protective of end users will need to be taken into consideration.

7.1.12 Any imported soils should be inert and free from contamination, including being free from all deleterious materials (which includes not comprising detectable asbestos containing materials, to a detection limit of 0.001%). Any material failing to meet the above criteria will not be deemed suitable and will require removal from Site.

7.1.13 Imported soils should in no way include anything which is classified as a 'waste' material (as defined within current waste management legislation or have an applicable waste code). Where recycled materials are proposed to be used on-Site, the contractor should obtain documentary evidence that the materials are a 'product' and not a 'waste'. Where the material was a former 'waste' and has been treated to become a 'product', the contractor should obtain documentary evidence from the relevant regulatory body that the treatment process is appropriate and hence the material is no longer legally a 'waste' material and hence waste management legislation requirements are not applicable.

7.1.14 Any material imported to Site should accord with BCO 2011 guidance 'Good Practice in the Selection of Construction Materials 2011'. The contractor shall retain all records pertaining to the classification, delivery and placement of imported materials.

Miscellaneous

7.1.15 Prior to development consideration should be given to decommissioning of any groundwater exploration boreholes installed as part of intrusive site investigation works. The decommissioning should be in accordance with Environment Agency[7] guidance.

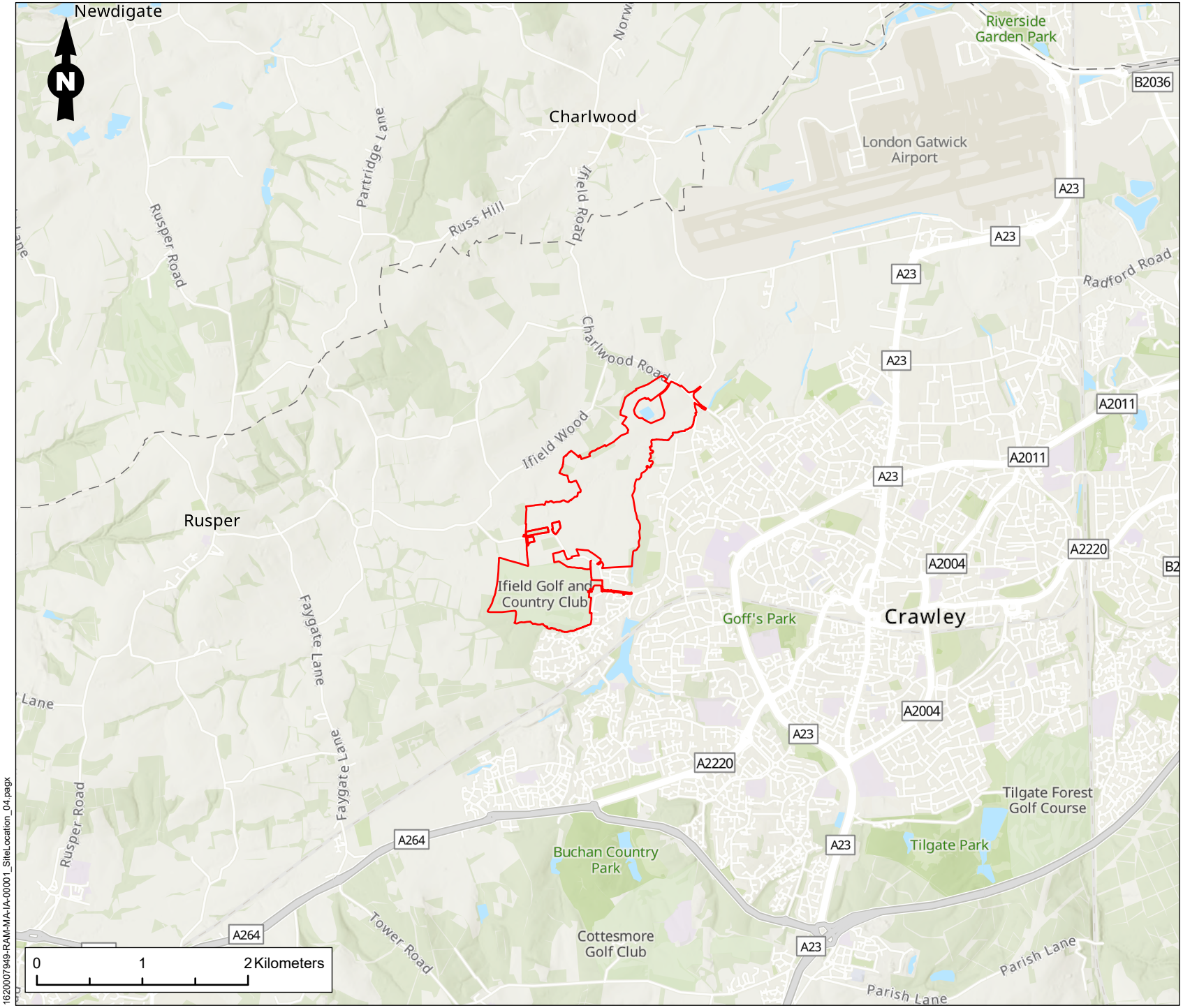
7.1.16 The above assessment is based on the assumption that the majority of soils are to remain in situ and relatively undisturbed. Disposal of any materials deemed unsuitable for Site retention, or surplus to requirement (e.g. foundation excavation arising) should comply with all relevant waste management regulations (where applicable). Screening of the excavated material by a suitably qualified contractor will allow the waste to be classified for disposal purposes and reduce the amount of material requiring disposal at landfill sites. This should be in accordance with the Outline Site Waste Management Plan (OWMP) for the Proposed Development.

7.1.17 The use of plant equipment on Site during the construction phase can result in the potential for the release of contaminants to ground, such as fuel, oils, coolants and lubricants. To avoid the accidental leakage of fuel, oils and/or lubricants, all construction machines should be maintained to a safe and efficient working condition at all times and any oils or fuels should be contained in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001. This should be in accordance with the detailed CEMP for the Proposed Development

7.1.18 In accordance with standard good practice the construction phase works, where applicable, should be undertaken in line with the withdrawn however still relevant guidance provided within Environment Agency publication 'Working at Construction and Demolition Sites: PPG6, Pollution Prevention Guidelines'.

[7] Environment Agency. Good Practice Guidance for Decommissioning Redundant Boreholes and Wells. October 2012.

APPENDIX 1
FIGURES



Legend

Site Boundary

Figure Title
Site Location

Project Name
West of Ifield

Project No.
1620007949-003

Date	Figure No.	Revision
May 2025	1	2.0

Prepared By	Scale
MB	1:50,000 @A4

Client
Homes England

RAMBOLL

1620007949-RAM-MA-IA-00001_SiteLocation_04.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.

Legend

Site Boundary

Figure Title
Site Setting

Project Name
West of Ifield

Project No.
1620007949-003

Date	Figure No.	Revision
May 2025	2	2.0

Prepared By	Scale
MB	1:15,000 @A4

Client
Homes England

RAMBOLL

1620007949-RAM-MA-IA-00002_SiteLayout_04.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.