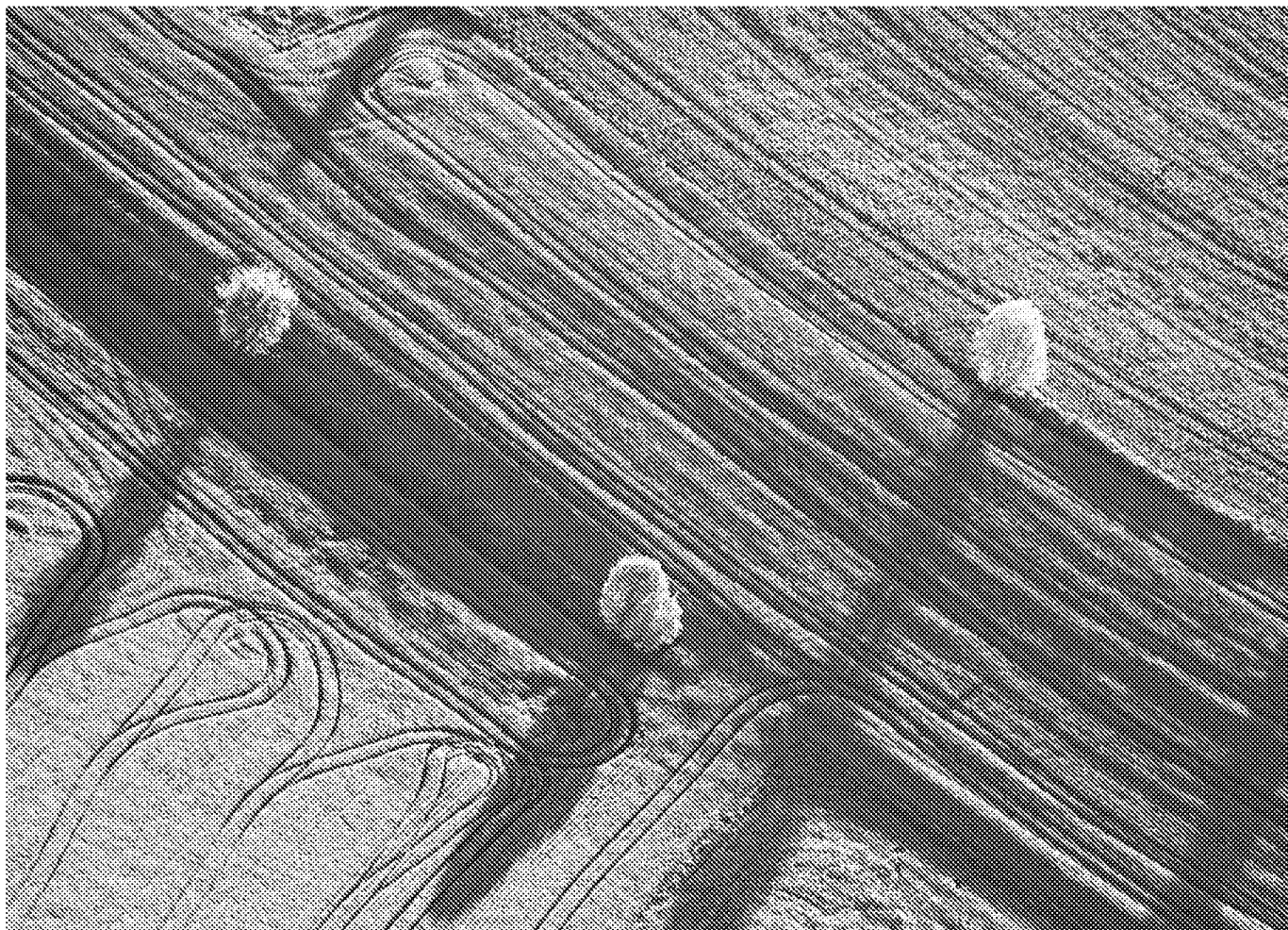




Wates Development

Land East of Tye Lane, Walberton, Arundel

Preliminary Risk Assessment

Project no. 29182-R01 (00)

JUNE 2017





RSK GENERAL NOTES

Project No: 29182-R01 (00)

Title: Preliminary Risk Assessment: Land East of Tye Lane, Walberton, Arundel

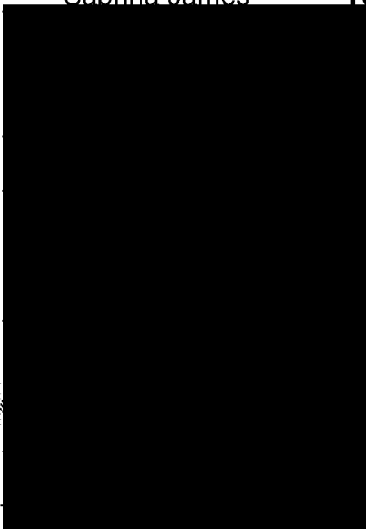
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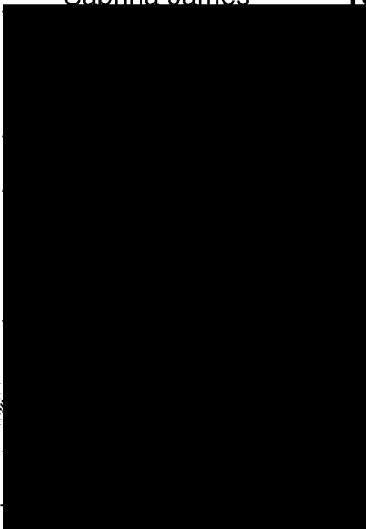
Date: 16th June 2017

Office: RSK Environment Limited, 18 Frogmore Road, Hemel Hempstead, Herts, HP3 9RT172 tel: 44 01442 437500, contact: Andrew Kent

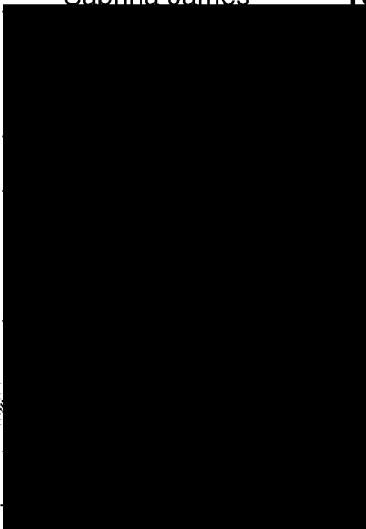
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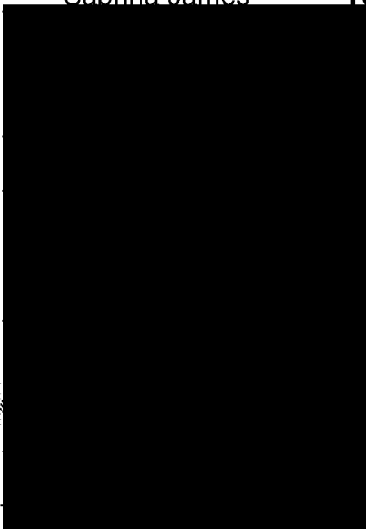
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Project manager		Quality reviewer	
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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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Appendix B	Summary of legislation and policy relating to contaminated land
Appendix C	Site photographs and walkover checklist
Appendix D	Risk assessment methodology
Appendix E	Envirocheck report
Appendix F	Enquiry to Local Authority

1 INTRODUCTION

RSK Environment Limited (RSK) was commissioned by Wates Development to carry out a Preliminary Risk Assessment of land East of Tye Lane, Walberton, Arundel. It is understood the site is being considered for the redevelopment with a new build residential led scheme together with associated infrastructure.

This report is subject to the RSK service constraints given in **Appendix A**.

1.1 Objective

The objective of the work is to support a planning application for the proposed redevelopment of the site with a new build residential led scheme together with associated infrastructure.

This report will outline our approach for the assessment of possible environmental concerns pertaining to the previous and current use of the site.

1.2 Scope

The scope of the investigation and layout of this report has been designed with consideration of CLR11 (Environment Agency, 2004) and BS 10175: 2013 (BSI, 2013) and guidance on land contamination reports issued by the Environment Agency (EA) (2010a).

The project was carried out to an agreed brief as set out in RSK's proposal (Ref. 29182-01AK dated 28th March 2017). The scope of works for the assessment included:

- The history of development and industry on the site, including a study of archival Ordnance Survey mapping and other sources of historical information as appropriate, e.g. local archives, trade directories and planning records;
- A study of local geology, hydrogeology and surface water setting;
- The identification of potential geological hazards, including radon;
- A review of relevant environmental data held by appropriate statutory authorities, e.g. the local environmental Health Department and the Environment Agency, obtained in the form of an environmental database report (Envirocheck Report) and, where appropriate, through direct contact;
- A site reconnaissance survey;
- Liaison where possible with current/previous owners/occupiers of the site;
- A preliminary conceptual model of contamination on the site identifying possible pollutant linkages;
- An assessment of the environmental risks and liabilities associated with site ownership; and
- Recommendations for further investigations, if required.

1.3 Limitations

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

The study was designed generally to meet the objectives of a preliminary (Phase 1) investigation, as defined by BS 10175:2011 "Code of Practice for the Investigation of Potentially Contaminated Sites.

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

The "vicinity" of the site for the purposes of this report is defined as locations situated within an approximate 250m radius of the site, although certain sources and/or sensitive targets further than 250m may also have been considered.

The opinions expressed in this report, and the comments and recommendations given, are based on the information obtained from the desk assessment and the site reconnaissance survey. No intrusive investigations have been undertaken to confirm the actual ground conditions and hence the environmental status of the site.

2 THE SITE

2.1 Site location and description

The site is comprised of an irregular shaped arable field north of Walberton town at a National Grid reference 497164, 106059 as shown on **Figure 1**. Two roads, Tye Lane and the B2132 (Yapton Lane), define the eastern and western boundaries of the site respectively. A golf course is adjacent to the north side of the site, along with Avisford Hotel and Country Park. Beyond this is the A27 Arundel Road orientated east to west.

The site can be accessed by a car park to the north east of the site via the B2132 Road. The area surrounding the site in Walberton town consists of predominantly residential buildings as detailed in **Table 1**.

Table 1: Site setting

To the north:	A golf course and golf club are situated directly north of the site. Beyond this is the A27 Arundel Road which separates the golf course from green space and residential housing.
To the east:	Residential houses occupy the land directly east of the site. Further east of this is the B2132 (Yapton Lane) which forms the boundary of the eastern most extent of the site. Fields are present beyond this to the east.
To the south:	Walberton and Binstead Primary School marks the southern boundary of the site. This school is located directly north of Walberton village which comprises of residential housing, village hall and a cricket club. The Street road runs directly through the middle of Walberton village. Fields are present south of the village.
To the west:	Tye Lane defines the boundary on the western side of the site with an arable field and residential houses beyond the road. Additional fields are situated further west, beyond this.

The site covers an area of approximately 11.3 hectares at an elevation ranging between 18.0m and 16.0m above Ordnance Datum (AOD) with ground levels dropping slightly towards the east.

The site comprises of a large, irregular shaped arable field, surrounded by residential houses to the south and defined to the west by Tye Lane. Several large mature oak trees are present within the site boundaries most notably in eastern areas, as shown in **Figure 2**.

2.2 Proposed development

The site in question is being considered for redevelopment with a new build residential led scheme together with associated infrastructure. The planned layout of the site is shown on **Figure 3**.

3 PRELIMINARY RISK ASSESSMENT (PRA)

3.1 Site walkover

The site was visited on the 27th April 2017 to undertake a site walkover. Photographs and the site walkover checklist are provided in **Appendix C**. No potentially significant ground contamination or geotechnical issues were identified during the site reconnaissance survey.

The site comprises of a large arable field, which appears to have been used for agricultural purposes for a long period of time. The site survey revealed several mature oak trees in the south and southeast of the site whilst hedgerows are frequent along the southern boundary with occasional conifers, oak, beach and ash trees surrounding the site.

Potentially contaminative activities in the vicinity of the site include potential asbestos containing materials forming a shed adjacent to the southwest sites boundary, although there was no obvious signs of structural damage to the sheds.

An ecology survey carried out at the site by Ecological Planning & Research Ltd has not identified the presence of Japanese Knotweed or other invasive species.

3.2 Ground conditions

3.2.1 Geology

Published geological records (British Geological Survey, 1996) for the area indicated the geology of the site to be characterised by the succession recorded in **Table 2**.

Table 2: Geology at the site

Geological unit	Description	Estimated thickness (m)
River Terrace Deposits	Sand and gravel, locally with lenses of silt, clay or peat.	Up to 3.0m
Head Deposits	Yellowish dark brown, silty slightly mottled clay mottled sub-rounded to angular white flint pebbles and chalk.	Up to 5.0m
Raised Beach Deposits	Shingle, sand, silt and clay; may be bedded or chaotic; beach deposits may be in the form of dunes, sheets or banks	Up to 3.0m
London Clay Formation	This comprises of poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It may consist of a few thin beds of shells, fine sand partings and flint gravel.	~ 60m
Source: British Geological Survey (1996), Sheet Number 317/332 Solid & Drift, 1:50 000		

Several borehole records were downloaded from the British Geological Survey website to provide further information regarding ground conditions in the vicinity of the site, one of which was located adjacent to the sites southern boundary.

The borehole records indicate that a superficial covering of topsoil is present within the site area, overlying gravely clay deposits containing gravels of flint and chalk to depths in the order of 3.0mbgl. Beneath these deposits, suspected Head Deposits comprising of variable gravely clays or very clayey gravels of chalk and flint were encountered to depths in the order of 8.0mbgl where Raised Beach Deposits were encountered. These comprised fine sands with occasional pebbles and shells.

Several shallow boreholes have also been advanced on site by Geo-Environmental Ltd as part of a groundwater monitoring exercise. These boreholes essentially mirror the BGS boreholes, encountering topsoil deposits overlying gravely silty clays to depths of 3.0mbgl.

3.2.2 Radon

The environmental database report (Envirocheck report, June 2017) provides an assessment of radon risk equivalent to a stage 2 assessment undertaken by the British Geological Survey. This indicates that more than 1% of homes in the area are above the Action Level as defined by the Documents of the National Radiological Protection Board (Radon Atlas of England and Wales, NRPB-W26-2002) and that no radon protective measures are required within new dwellings at the site.

3.2.3 Mining and quarrying

Evidence has been sought to identify any mining and quarrying operations, past and present, which have taken place in the vicinity of the site. The sources of information referenced in this element of the desk study include:

- An environmental database report;
- Records held by the Local Authority/Environment Agency;
- Old Ordnance Survey maps and plan; and
- Geological maps.

With reference to the above data there are no recorded mines or quarries within a 500m radius of the site.

Within the Environmental database report, a natural cavity is noted approximately 1km north east of the site. The cavity is in the form of a sinkhole and solution pipe in within the White Chalk Sub-group bedrock deposits, which outcrop in this area. This natural cavity is not considered to represent a significant risk owing to its proximity to the site.

3.2.4 Landfilling and land reclamation

Evidence has been sought to identify any landfilling or land reclamation operations, past and present, which have taken place in the vicinity of the site. The sources of information referenced in this element of the desk study include:

- An environmental database report;
- Records held by the Local Authority/Environment Agency;

- Old Ordnance Survey maps and plan; and
- Geological maps.

There are records of five historical landfill sites within a 1km radius of the site the closest of which is located approximately 376m north-west of the site at Tye Lane, Walberton where inert, household and commercial waste was deposited from the 31st December 1955 till 31st December 1960. The four remaining landfills are all located in a similar area to the north of the site.

Given the proximity of the landfills to the site, and the intervening geology, these features are not considered to represent a significant potential risk to the site from the generation and migration beneath the site of landfill gases and/or leachate.

3.3 Hydrogeology

3.3.1 Aquifer characteristics

Based on the published geological map referred to above, the hydrogeology of the site is likely to be characterised by the presence of a shallow unconfined aquifer principally associated with the superficial River Terrace Deposits and underlying Head and Raised Beach Deposits. These deposits overlie the London Clay Formation which is likely to act as an aquiclude, preventing the downwards migration of groundwater.

Confined by the London Clay Formation is a deep aquifer, comprising a sequence of deposits consisting of the lower part of the Lambeth Group and Thanet Sands (Basal Sands) and the White Chalk. These units are expected to be in hydraulic continuity.

Based upon borehole records for the site area, groundwater is anticipated to be present at depths in the order of 8.0mbgl, within the granular Raised Beach Deposits, although perched water may also be present within the shallower cohesive strata.

The presence of low permeability superficial clay deposits at relatively shallow depths beneath the site, while restricting downwards migration, may increase the potential for lateral migration of shallow groundwater (and therefore mobile contamination, if present).

3.3.2 Vulnerability of groundwater resources

The site has been classified by the EA website to overlie the following aquifers:

- Secondary A aquifer: comprising the River Terrace Deposits, Head Deposits and Raised Beach Deposits, which comprise permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers; and
- 'Unproductive' strata: In the form of The London Clay Formation, which comprises low permeability deposits with negligible significance for water supply or river base flow.

The soils beneath most of the site are classified as generally having an intermediate (I) leaching potential, albeit with areas in the north-west corner of the site designated as having a high leaching potential. These designations can be classified as follows:

- I – soils that have a moderate ability to attenuate diffuse source pollutants or where some non-adsorbed diffuse source pollutants and liquid discharges could penetrate the soil layer; and
- H – soils of high leaching potential are those with little ability to attenuate diffuse source pollutants and where non-adsorbed diffuse source pollutants and liquid discharges can move rapidly to underlying strata or shallow groundwater.

3.3.3 Licensed groundwater abstraction

The environmental database report indicates that there are four current licensed groundwater abstractions within a 1km radius of the site, as summarised in **Table 3**.

Table 3: Groundwater abstractions

Reference	Distance and orientation from site	Comment
10/41/542212	823m North West (496840, 107170)	Operator: W P Wyatt & Son Location: Woodlands Farm, Slindon Use: General Agriculture: Spray Irrigation Source: Groundwater
27/194a/R01	849m South (497640,105180)	Operator: Walberton Nursery Llp Location: Walberton Nurseries, Walberton Use: General Agriculture: Spray Irrigation Source: Groundwater
27/194a	849m South (497640, 105180)	Operator: D Tristram T/A Walberton Nurseries Location: Walberton Nurseries, Walberton Use: Horticulture and Nurseries- spray irrigation Source: Groundwater
10/41/542209	991m South West (496740,105160)	Operator: Toddington Nurseries and Kirin Agribo Location: Lake Lane, Barnham Use: Spray Irrigation Source: Groundwater

Information available on the EA website indicates that the site does not lie within a currently designated groundwater Source Protection Zone.

3.4 Hydrology

3.4.1 Surface watercourses

There are no ponds, streams or drainage ditches within the site boundaries.

The nearest off-site water features comprise a small pond to the immediate south of the site in the grounds of the school, and a series of linked ponds in the grounds of the golf course from 30m north of the site.

The nearest watercourse of any note comprises a linear drainage channel orientated north to south approximately 200m east of the site and flowing in a southerly direction. This watercourse ultimately discharges into the River Arun approximately 3.5km southeast of the site.

Two active discharge consents are located within 300m of the site with the nearest situated 38m northeast of the site at Avisford Park Golf Club, Walberton. This is operated by W W Smart for sewage discharges. A second discharge consent is located 263m north east of the site at Hedgers Hill, Walberton which is operated by Mr A Benton for sewage discharges.

Within the environmental database report, five pollution incidents to controlled waters are noted within a 1km radius of the site. The nearest is situated 217m east of the site at Avisford Golf, Club Binstead. This was categorised as a category 3 (minor) incident in 1999 with the relevant pollutant not having been noted. Another pollution incident to controlled waters occurred at Walberton Mill Lane approximately 300m west of the site. This related to the release of organic industrial waste in 1992 and also comprised a category 3 (minor) incident.

3.4.2 Surface water abstractions

The environmental database report indicates that there are two currently licensed surface water abstractions within a 1.5km radius of the site. The nearest is located approximately 1.3km to the south of the site and is operated by Star Nurseries at Todhurst Rife, Star Nurseries, Barnham for spray irrigation purposes. The second entry is for the same purpose located 1.4km south of the site at Fresh Acres Nurseries Ltd.

3.4.3 Site drainage

Given that the site comprises an arable field, then site drainage comprises natural infiltration into the ground.

3.4.4 Preliminary flood risk assessment

The indicative floodplain map for the area, published by the EA, shows that the site does not lie within the designated floodplain of any identified surface watercourses.

This report is not intended to replace a full hydrological study and it is recommended that additional specialist studies be conducted to confirm flood risks at the site.

3.5 History of site and surrounding area

The history of the land-use and development of the site and surrounding area has been assessed based on the following sources:

- Historical maps within the environmental database from 1875 to 2017;
- Internet search;
- Historical maps of London; and