Land South of Allington Lane, Eastleigh

Geo-Environmental Phase 1 Desk Study

Hallam Land Management

Brookbanks

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1 Introduction

1.1 Brookbanks Consulting Ltd is appointed by Hallam Land Management Ltd to complete a Phase 1 Geo-Environmental Desk Study for a proposed mixed use development on Land South of Allington Lane, Eastleigh.

1.2 The objective of the study is to research the likely geotechnical and chemical characteristics of the soil and ground water environment.

2 Background Information

Location & Details

2.1 The proposed development lies south of Allington Lane. The north-east of the Site is bound by an existing railway line. The M27 is south of the proposed Site, with Moorgreen Road to the east of the Site. Quob Lane and Moorgreen Road run through the proposed development, which divides the proposed development.

2.2 The Site location and boundary are shown below on Figure 2a:

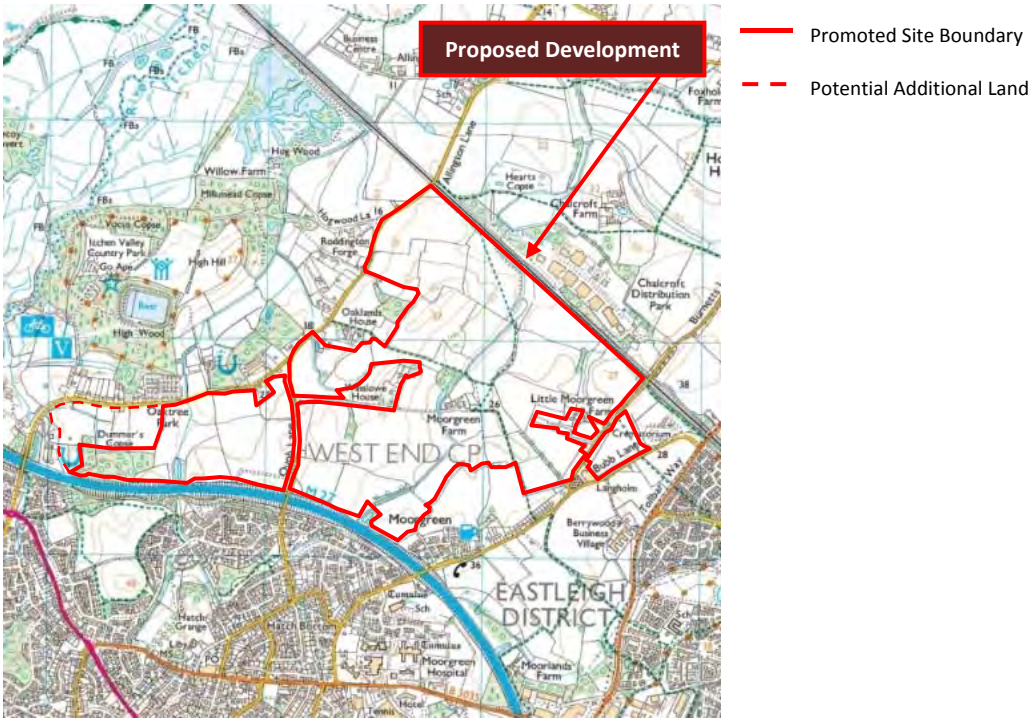

Figure 2a: Site Location

Development Criteria

2.3 The Proposed Development is to comprise up to 2,500 homes, 10,000m^2 of B1 Employment, two 2 Form Entry Schools and a Local Centre, which can deliver a broad range of house types, tenures and amenities to meet the future needs of the Local Planning Authority, Eastleigh Borough Council.

Sources of Information

2.4 The following bodies were consulted during the study:

- Environmental Matters - Environment Agency

2.5 The following information has been gathered during the study:

- Environmental Search - Landmark Envirocheck Report, October 2016

- Published Geology - British Geological Survey

3 Historical Site Uses

3.1 In appraising the Site history, published Ordnance Survey maps have been reviewed dating from 1871 up to the present day. A selection of large scale maps used in this report are contained within the Appendix.

3.2 Inspection of the Ordnance Survey maps has revealed that since 1871, the Site has largely remained undeveloped and in agricultural use. Quob Lane is shown to intersect the Site since 1871 to the present day. Moorgreen Farm and an access road are present within the east of the Site since 1871. By 1897, a lodge is shown adjacent to Quob Lane in the centre of the Site, and by 1910, Home Covent has been present in the centre of the Site. A mast is shown in the south of the Site since 2016.

3.3 The historical activities described above and further activities shown within the surrounding area are presented in Table 3a:

Site Use / Activity	Date first shown	Date last Shown	Approximate Distance (m)	Direction
Quob Lane	1871	Still Present	Intersects Site	Intersects
Moor Green Farm and Access Road	1871	Still Present	On Site	East and Centre
Lodge	1897	Still Present	On Site	Centre
Home Covent	1910	Still Present	On Site	Centre
Mast	2016	Still Present	On Site	South
Winslow House	1871	Still Present	In-between Site	Centre
Allington Lane	1871	Still Present	Bounds	North
M27	Late 1980's	Still Present	Bounds	South
Railway	1871	Still Present	Bounds	East
Burnetts Lane	1871	Still Present	Bounds	South East
Little Morgreen Farm	1871	Still Present	Adjacent	East
Moorgreen Road	1871	Still Present	10	South East
Moorgreen Expansion	1962	Still Present	25	South West
Oaktree Caravan Park	1989	Still Present	25	North West
Poultry Houses	Early 1990's	Still Present	25	North West
West End Expansion	1960's	Still Present	75 (Closest Extent)	South
Caravan Site	1983	Still Present	125	South East
Depot	1968	1983	250	North East
Old Gravel Pit	1897	1963	275	West
West End Brick Works	1931	1980's (Disused by 1963)	350	South West
Itchen Waterworks	1980's	Still Present	425	West
Hedge End Expansion	1990's	Still Present	450 (Closest Extent)	South East
Clay Pit	1978	1984	475	South West
Hospital	1897 (Expands in 1960's)	Still Present	500	South
Works	1963	2000	550	South West
Union Workhouse	1871	1960's	550	South

Table 3a: Historical Activities – On & Off-site

Site Use / Activity	Date first shown	Date last Shown	Approximate Distance (m)	Direction
Pit	1897	1963	700	South West
Sand Pits	1897	1931	700	South West
Brickworks	1897	1931	750	South West
Depot	1968	Still Present	750	South
Works	1963	1968	800	West
Factory	1963	1990	800	West
Depot	2016	Still Present	900	South East
Ageas Bowl (Hampshire Cricket Ground)	2000	Still Present	975	South

Table 3a (Continued): Historical Activities – On & Off-site

3.4 The Site and wider area to the north and east has remained largely undeveloped and in agricultural use, however major infrastructure developments have taken place to the south of the Site, with the construction of the M27. The neighbouring areas of Moorgreen and West End have expanded over the years, along with the associated infrastructure.

3.5 Potentially significant contaminative land uses within the wider surrounding area includes: Railway Line, Poultry Houses, expansions of West End, Hedge End and Moorgreen, Old Gravel/clay/sand Pits, Former Works and Workshouse, Former Factories, Former Brickworks and Depot.

3.6 The following potentially significant contaminative land uses are on or within close proximity of the site and will be further assessed within Section 10: **agricultural, roads (Quob Lane, Allington Lane, M27, Moorgreen Road and Burnetts Lane), Poultry Houses, Former Gravel/Clay/Sand Pits, Former Works/Factories, Former Brickworks and Depot.**

4 Recent & Current Site Usage

4.1 The Site is currently largely undeveloped, with the exception of Moor Green Farm with associated Access Road, Home Covent, a lodge and a mast.

4.2 A review of the historical maps suggest that the land has previously been set for agricultural use.

5 Ground Conditions

Geology

5.1 With reference to the British Geological Survey map, the majority of the Site is shown to be underlain by sand, silt and clays of the Earnley Sand Formation, with areas to the west and north underlain by sand, silt and clay of the Wittering Formation.

5.2 A slither of superficial clay, silt, sand and gravel Alluvium is shown running through the east of the Site.

5.3 There are no areas of Artificial Ground/ Made Ground / Infilled Ground or Landslip areas reported on Site.

5.4 The Site geology is illustrated on Figure 5a.

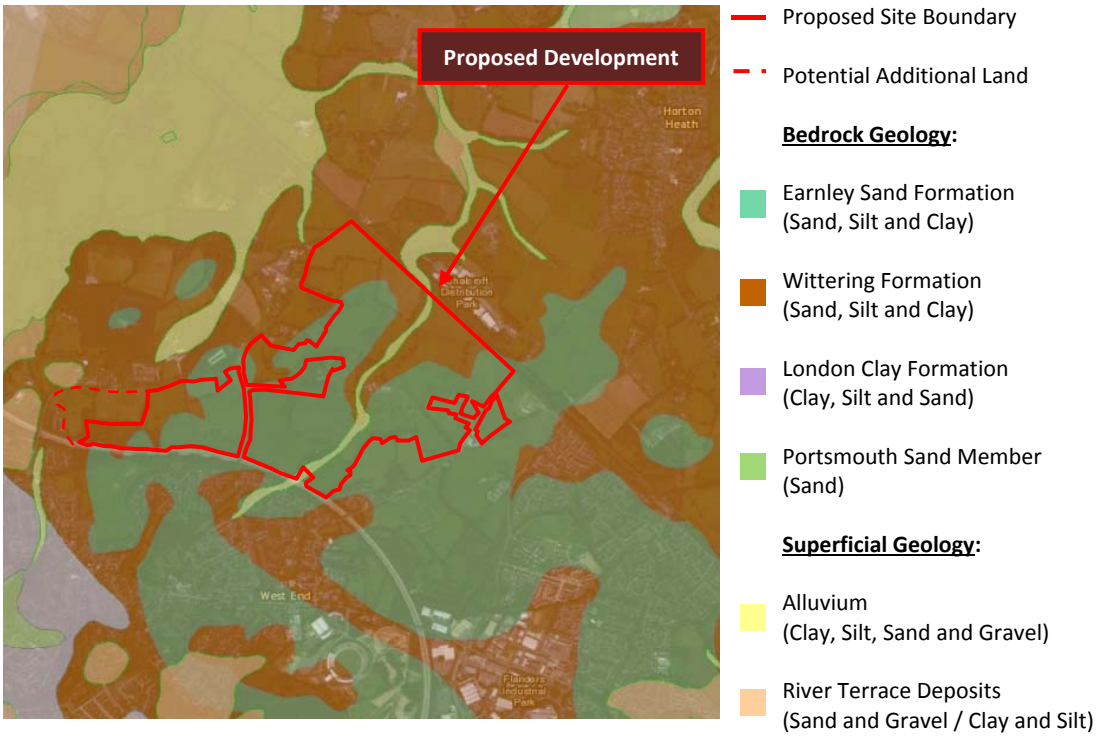

Figure 5a: BGS Published Geology

5.5 BGS records include the following ratings for a number of potential ground stability hazards on or within 250m of the Site boundary:

- Collapsible ground stability: No Hazard */ Very Low*
- Compressible ground: No Hazard* / Very Low/ Moderate*
- Ground Dissolution: No Hazard*
- Landslide: Very Low* / Low
- Running Sand: Very Low* / Low*
- Shrinking & Swelling Clay: Low* / Moderate*

*stability hazard on Site

Mining

5.6 The Site is not reported to be in an area affected by coal mining, Man-Made Mining Cavities or Natural Cavities.

5.7 There are four **BGS Recorded Mineral Site** within 1,000m of the Site boundary and these are further illustrated below in Table 5b:

Site Name – Location	Status	Commodity	Type	Distance (m)	Direction
New Farm, Gravel Pit – West End, Southampton	Ceased	Sand and Gravel	Opencast	285	North West
West End Brick Works – West End, Southampton	Ceased	Common Clay and Shale	Opencast	457	South West
West End Sand Pit – West End, Southampton	Ceased	Sand	Opencast	668	South West
West End Brick Works – West End, Southampton	Ceased	Common Clay and Shale	Opencast	688	South

Table 5c: BGS Recorded Mineral Site

Radon

5.8 The Site is shown to be situated within a low probability area affected by radon, where less than 1% of homes are above the action level.

5.9 It is reported that no radon protection measures are necessary for the construction of new developments within the Site.

Estimated Soil Chemistry

5.10 DEFRA/EA Soil Guideline Values (SGVs) are indicators of levels of contamination in the soil that may present unacceptable risks to human health (should there be any contact), as well as providing guidance to Local Authorities to determine contaminated land under Part 2A. However, these are merely indicative values in which exceedance may simply require further site-specific investigation as opposed to definitive remedial works.

5.11 Table 5c below summarises the estimated soil chemistry on Site in comparison to the Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values:

Heavy Metal	Estimated Site Concentration (mg/kg) *	CLEA SGV – Residential (mg/kg)	CLEA SGV – Commercial & Industrial (mg/kg)	Year SGV Published
Arsenic	<15	32	640	2009
Cadmium	< 1.8	10	230	2009
Chromium	60 - 90	130	5000	2002
Lead	< 100	450	750	2002
Nickel	15 - 30	130	1800	2009

Table 5c: Estimated Soil Chemistry & CLEA SGVs

**The British Geological Survey (BGS) Estimated Soil Chemistry dataset provides modelled estimates of ambient background concentrations of Potentially Harmful Elements (PHE) in topsoil: Arsenic (As), Cadmium (Cd), Chromium (Cr), Nickel (Ni) and Lead (Pb). The data has been created by combining high resolution geochemical data (from the BGS G-BASE and Imperial College Wolfson geochemical survey database) and the soil parent material maps derived from the BGS DiGMapGB geological data and covers the whole of Great Britain (excluding London).*

5.12 The estimated heavy metal concentrations on Site are all shown to be below the published CLEA SGVs and may be confirmed should a soil assessment be required at the detailed design stage.

6 Hydrology

Flooding

6.1 The Environment Agency's (EA) National Generalised Modelling (NGM) Flood Zones Plan indicates predicted flood envelopes of Main Rivers across the UK. In many circumstances, the NGM is based on basic catchment characteristic data and modelling techniques. Where appropriate, more accurate Section 105 / SFRM models are produced using more robust analysis techniques.

6.2 The surrounding area includes a network of land drains and watercourses which flow into the River Itchen, situated approximately 500m to the north-west of the site.

6.3 The nearest water feature to the Site are three watercourses, tributaries of the River Itchen (which include Townhill Stream and Lower Itchen), which run through the west, the centre and east of the Site. These are recorded as Tertiary Rivers by the EA, as illustrated in Figure 6a.

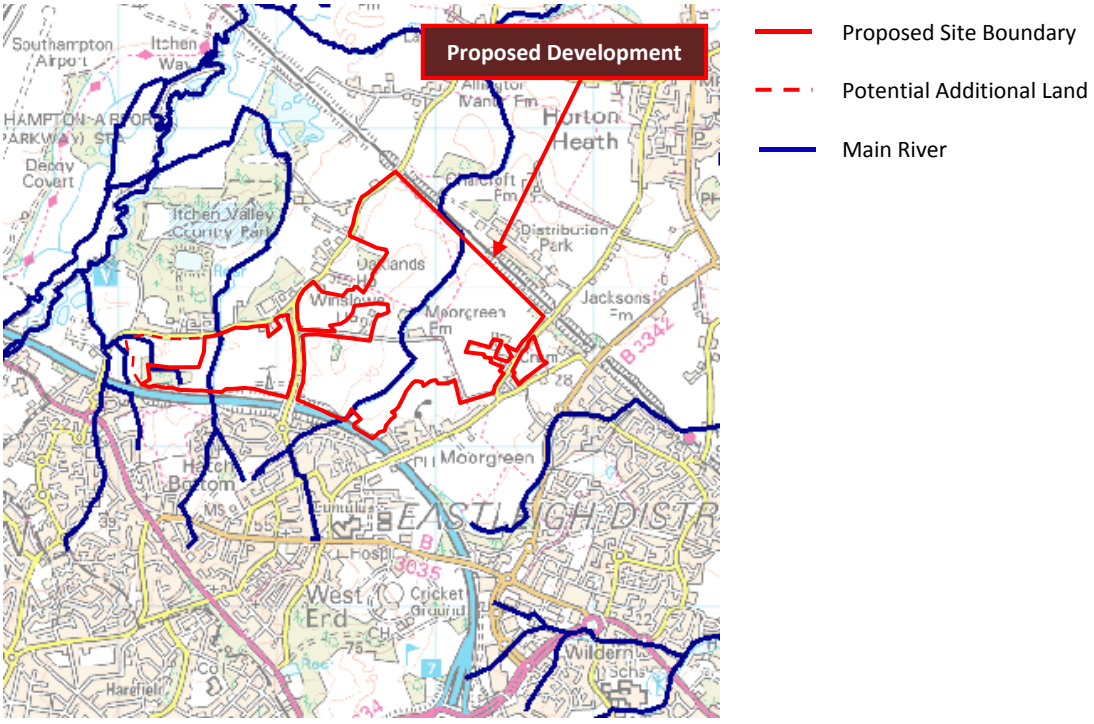

Figure 6a: EA Main River Consultation Map

6.4 As illustrated on Figure 6b, the EA mapping shows that the majority of the Site lies within Flood Zone 1, which comprises land that is outside Zones 2 and 3 and therefore appropriate for all proposed uses of land. However, there are small areas adjacent to the watercourse in the east of the Site that are shown to lie within Flood Zone 3.

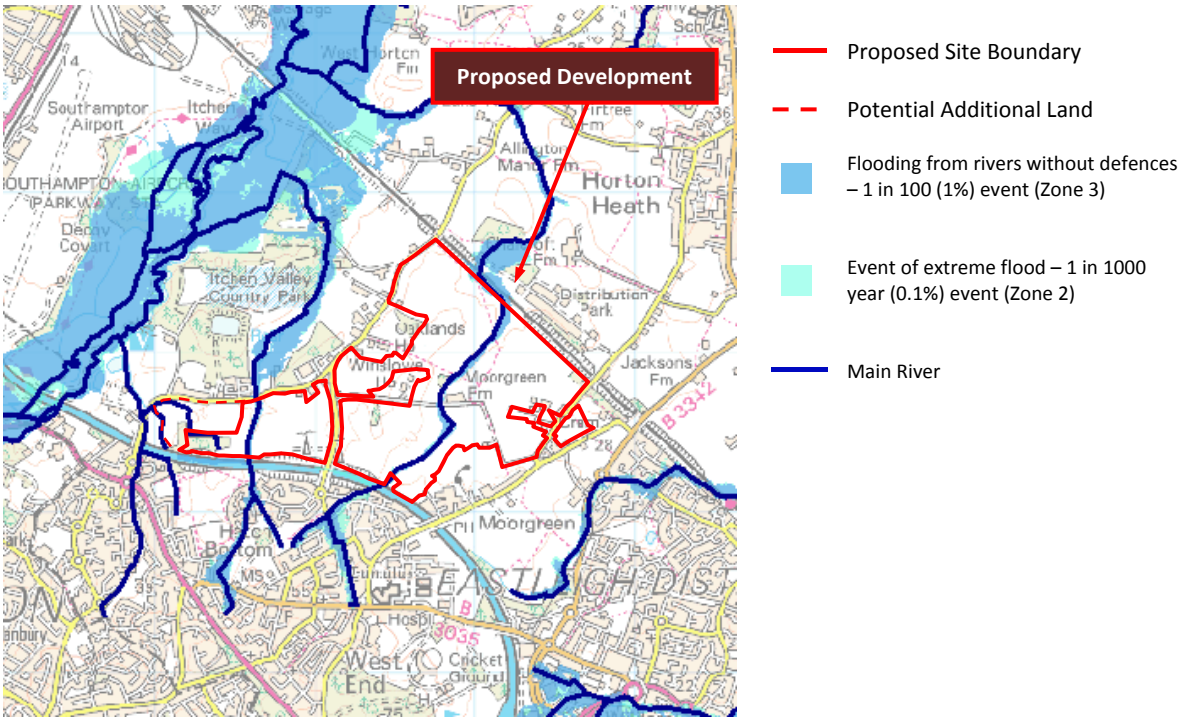

Figure 6b: EA Flood Zone Plan showing 1 in 100 & 1 in 1,000 year floodplains

6.5 The risk of surface water flooding has been mapped by the EA, using information provided by Eastleigh Borough Council, the Lead Local Flood Authority. Figure 6c illustrates areas of low to high risk of surface water flooding on Site, which correlate to the pathways of the watercourses and the lower topography on Site.

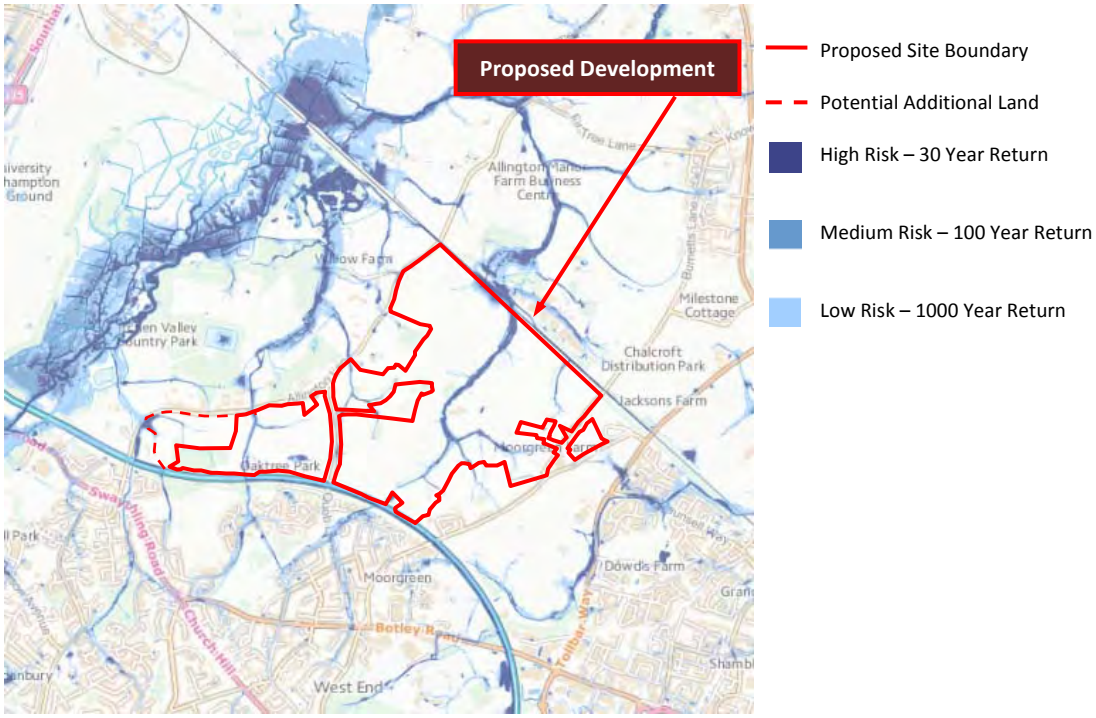

Figure 6c: EA Risk of Flooding from Surface water

6.6 According to the **BGS Groundwater Flooding Susceptibility** records the majority of the Site is shown to have 'Limited Potential for Groundwater Flooding' to occur. A small slither in the east of the Site, running north to south, is shown as having the 'Potential for Groundwater Flooding' to occur at the surface.

Discharge Consents

6.7 There are sixty-one **Discharge Consents** recorded within 1,000m of the proposed Site. However, it is recorded that sixteen have since lapsed, two failed to transfer and one has since been surrendered.

6.8 There are three Discharge Consents issued on site, however two of these have since lapsed. The remaining Discharge Consent is to Mrs Gloria Brown, at Moorgreen Farm, Burnetts Lane in the north-east of the Site. This is for a Domestic Property (single) which has a current status of New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) with an effective date of July 2008. It discharges to an unnamed ditch which is a tributary to the River Itchen.

6.9 There are eleven Discharge Consents issued between up to 250m from the Site, however three of these have since lapsed and one has been surrendered. The remaining seven Discharge Consents are further illustrated in Table 6d.

Operator – Property Type	Status	Effective Date	Receiving Water	Discharge Type	Distance (m)	Direction
Mr Luis Martinez - Domestic Property (Single)	New Consent *	April 2009	A Trib of the River Itchen	Sewage Discharges – Final Treated Effluent – Not Water Company	9	North East
Kevin Charles Homer – Metal Recycling Sites (Vehicle Dismantlers)	New Consent*	September 2004	Into Land	Trade Effluent Discharge – Site Drainage	136	South West
Miss Nichola Wright – Dealing in Scrap Metals	New Consent*	November 2004	Ditch to Trib of the Itchen	Trade Effluent Discharge – Site Drainage	165	South West
Miss Kim Wright – Dealing in Scrap Metals	New Consent*	November 2004	Ditch to Trib of the Itchen	Trade Effluent Discharge – Site Drainage	165	South West
Mrs Alison Trewin – Dealing in Scrap Metals	New Consent*	November 2004	Ditch to Trib of the Itchen	Trade Effluent Discharge – Site Drainage	165	South West
W.A.Adams Esq – Undefined or Other	Pre National Rivers Authority Legislation **	January 1964	Freshwater River	Unknown	194	West
Messrs E & R Bastian – Domestic Property (Single)	Post National Rivers Authority Legislation ***	August 1990	Into Land	Sewage Discharges – Final Treated Effluent – Not Water Company	206	East

Table 6d: New and Existing Discharge Consents

* Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995
** Where issue date < 01/09/1989
*** Where issue date > 31/08/1989

6.10 The remaining forty-seven Discharge Consents are issued between 260m and 1,000m from the Site boundary. Of these, eleven have since lapsed and two failed to transfer. Of the remaining thirty four Discharge Consents, these generally relate to the following:

- Public Sewage: Storm Sewage Overflow
- Trade Discharges - Process Effluent - Water Company (Wtw)
- Non Water Company (Private) Sewage
- Agriculture - Livestock Farming
- Sewage Discharges - Final/Treated Effluent - Not Water Company
- Discharge Of Other Matter-Surface Water
- Agriculture - Site Drainage
- Discharge Of Other Matter-Surface Water

Water Quality

6.11 The Environment Agency monitor 40,000km of rivers across England. To help protect these areas each stretch of river is monitored and given a river quality grade. This is based upon the chemical quality of the water. The rivers are then graded from A to E with A representing a river with very good water quality and E, a river with very poor water quality.

6.12 To improve the quality of water bodies, European legislation known as the Water Framework Directive (WFD) was introduced in 2009 to promote a new approach to water management through river basin planning. One aim of the Water Framework Directive was to improve the ecological health of inland and coastal waters and to prevent further deterioration. A requirement was placed on nearly all inland and coastal waters to achieve 'Good' status by 2015. However, for many local authorities this has been extended until 2027.

6.13 Allington Lane Stream located onsite was given a river quality grade B in 2000, for its stretch between Itchen Confluence and Quob Farm. The River Itchen approximately 722m north-west of the Site, was given a river quality Grade A in 2000, for its stretch between Woodmill and D/S British Rail Outfalls.

6.14 There is one **River Quality Biology Sampling Points** situated within 1,000m of the Site boundary. This is to Allington Lane Stream for the River Itchen Confluence to Quob Farm Reach approximately 204m east of the Site. A GQA Grade D – Fair was provided for the Reach in 2009.

6.15 There is one **River Quality Chemistry Sampling Points** situated within 1km of the Site Boundary. This is to the River Itchen for the Woodmill to Downstream British Rail Outfalls Reach, approximately 755m west of the Site. A GQA Grade A – Very Good was provided for the Reach in 2009.

Surface Water Abstraction

6.16 There are eight **Surface Water Abstractions** permits recorded within 2,000m of the Site boundary, and these are further illustrated in Table 6e:

Operator – Location	Abstraction	Permit Start Date	Permit End Date	Distance (m)	Direction
Portsmouth Water Ltd – Gaters Mill Intake	Public Water Supply: Potable Water Supply – Direct	May 2011	Not Supplied	765	West
Portsmouth Water Ltd – Gaters Mill Intake	Public Water Supply: Potable Water Supply – Direct	June 2009	Not Supplied	765	West
Portsmouth Water Co - Gaters Mill Intake	Public Water Supply: Potable Water Supply – Direct	July 1969	Not Supplied	765	West
G A Arturi – Tributary of Rivert Itchen at Allington Manor Farm	General Agriculture: Spray Irrigation – Direct	March 2016	Not Supplied	898	North
G A Arturi – Fairoak Lodge	Spray Irrigation	Not Supplied	Not Supplied	927	North
The Plant Director – Itchen Carrier At Rail Workshop	Transport: General Use (Medium Loss)	March 2005	**Not** Supplied	1509	North
The Plant Director – Itchen Carrier At Rail Workshop	Transport: General Use (Medium Loss)	July 2002	Not Supplied	1509	North
The Plant Director – Itchen Carrier At Rail Workshop	Transport: General Use (Medium Loss)	September 1995	Not Supplied	1509	North

Table 6e: Surface Water Abstractions

7 Hydrogeology

Bedrock and Superficial Aquifer Designations

7.1 The underlying Mudstone bedrock and the superficial Alluvium geology which crosses the Site both form a Secondary A Aquifer. These are further illustrated in Figures 7a and 7b.

7.2 The EA provides the following definitions for Secondary Aquifers:

"These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types:

Secondary A - 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. These are generally aquifers formerly classified as minor aquifers;

Secondary B - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Undifferentiated - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type."

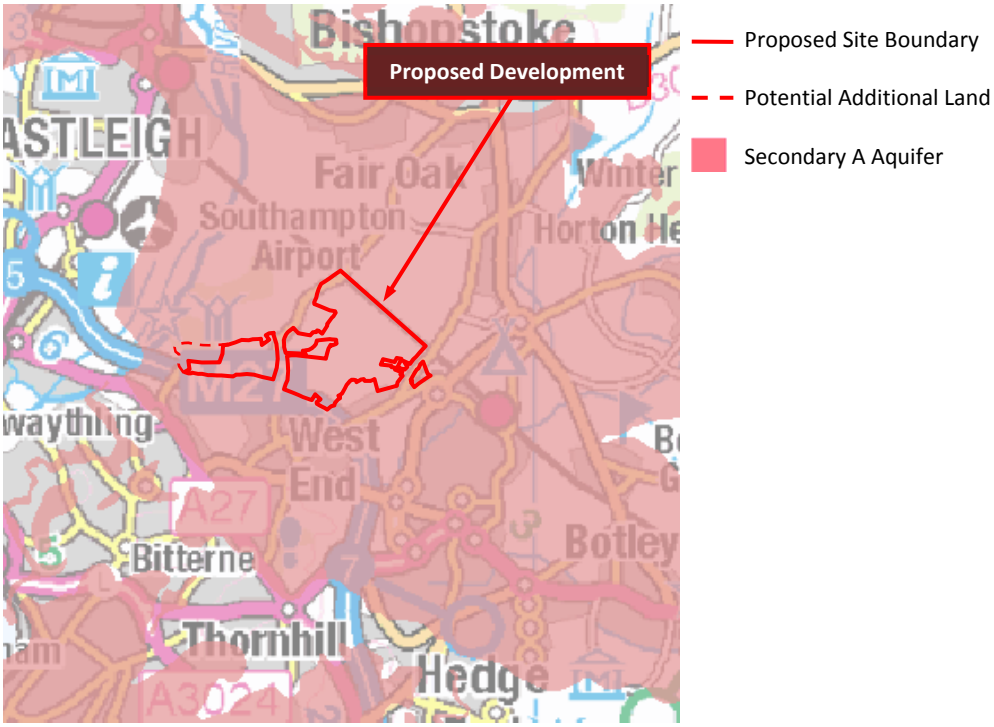

Figure 7a: BGS Bedrock Designation

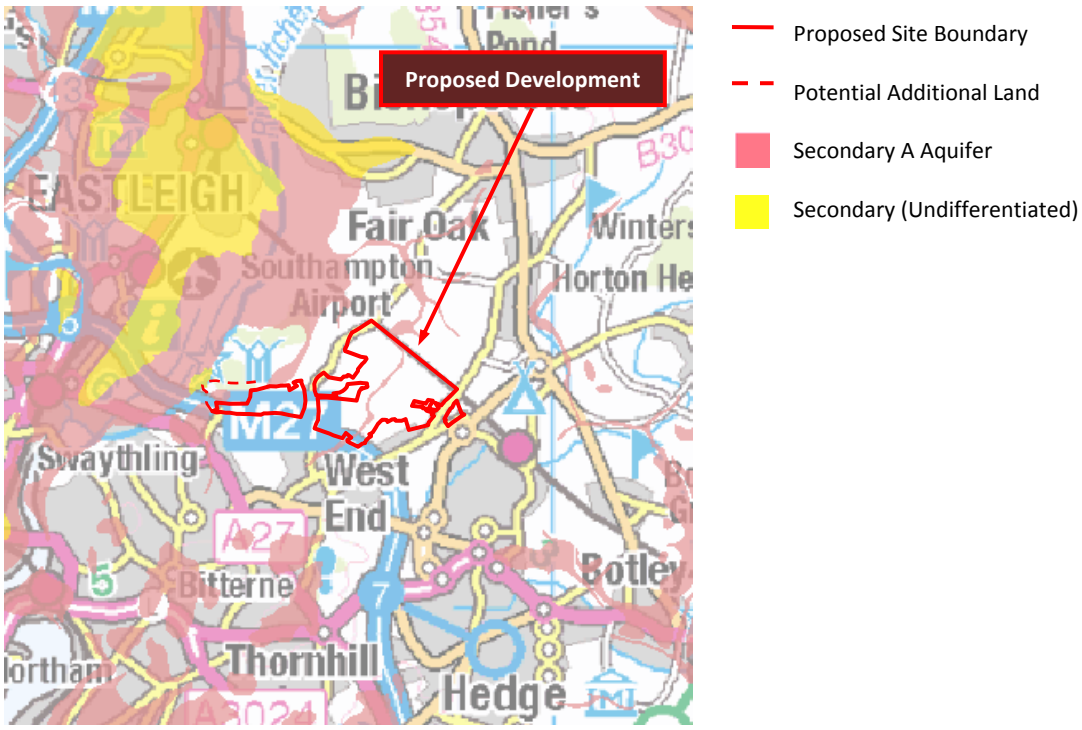

Figure 7b: EA Superficial Deposits Designation

Groundwater Vulnerability

7.3 In terms of groundwater vulnerability, the majority of the Site forms a Non-Aquifer, with an area running through the centre of the Site, forming a Minor Aquifer, with Intermediate Leaching Potential and the north-east of the Site forming a Minor Aquifer, with soils of High Leaching Potential as illustrated below in Figure 7c:

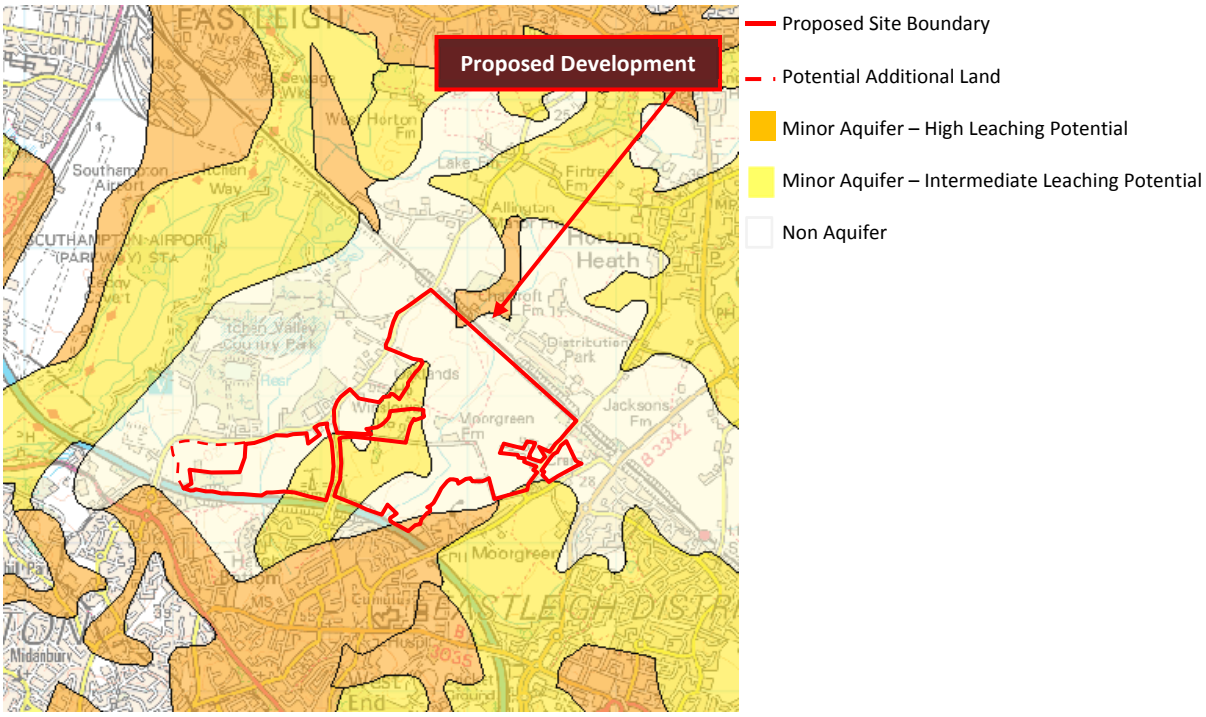

Figure 7c: Groundwater Vulnerability

7.4 Minor Aquifers are fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits. Although not producing large quantities of water for abstraction, they are important for local supplies and in supplying base flow to rivers.

7.5 Non Aquifers are formations of negligible permeability, usually regarded to contain insufficient quantities of groundwater. However, groundwater flow through non-aquifers is a possibility even if a low one.

Groundwater Abstractions

7.6 There are no **Groundwater Abstraction** permits recorded within 2,000m of the Site boundary.

Source Protection Zones

7.7 The Site does not lie within any **Source Protection Zones**.

8 Potential Contaminative Uses & Statutory Registers

8.1 There are three **Local Authority Pollution Preventions and Controls** recorded within 1,000m of the Site boundary, these are further detailed in Table 8a.

Name – Location	Description	Status	Dated	Distance (m)	Direction
Wessex Vale Crematorium – Bubb Lane, Hedge End	Crematoria	Permitted	September 2009	265	North East
Somerfield Service Station – Swaythling Road, West End	Petrol Filling Station	Permitted	December 1998	266	West
Moorgreen Service Station – Botley Road, West End	Petrol Filling Station	Revoked	December 1998	695	South West

Table 8a: Local Authority Pollution Preventions and Controls

8.2 There are thirty-three **Pollution Incidents to Controlled Waters** recorded within 1,000m of the Site boundary. Two of these are identified on Site, and these are further highlighted below in Table 8b.

Property Type – Location	Pollutant	Receiving Water	Incident Severity	Distance (m)	Direction
Restaurant/Hotels/Pubs – Burgess Road, Swaythling	Miscellaneous – Fire Water/Foam	Not Given	Category 3 – Minor Incident	On Site	East
Other Transport – Lorry Yard, Opposite H M Victualling, Burnetts Lane	Oils – Other Oils	Not Given	Category 3 – Minor Incident	On Site	South West

Table 8b: Pollution Incidents to Controlled Water On Site

8.3 Of the remaining thirty-one **Pollution Incidents to Controlled Waters** eleven of these are identified within 500m of the Site boundary and these are further highlighted below in Table 8c.

Property Type – Location	Pollutant	Receiving Water	Incident Severity	Distance (m)	Direction
Road (Road Traffic Accident) – Twix Junction 5 & 7 of M27	Oils – Petrol	Not Given	Category 3 – Minor Incident	149	North West
Petrol/Fuelling Stations – Gleneagles Riding Stables, Allington Lane	Miscellaneous – Fire Water/Foam	Not Given	Category 3 – Minor Incident	152	North East
Industrial: Other – Texaco Petrol Station	Oils – Petrol	Not Given	Category 3 – Minor Incident	201	West
Industrial; Other – D G Autos, Burnetts Lane	Oils – Other Oils	Not Given	Category 3 – Minor Incident	232	North East
Other General Premises – D/S A27 West End	Oils – Waste Oils	Not Given	Category 3 – Minor Incident	287	West
Other General Premises – Track Between Kings School & Brookside Way, West End	Crude Sewage	Not Given	Category 3 – Minor Incident	293	East
Crown Exempt – Leading from HM Victualling Depot, Burnetts Lane	Oils – Diesel (Including Agricultural)	Not Given	Category 3 – Minor Incident	293	South East
Construction – Field Opposite Burnetts Lane	Sewage – Septic Tank Effluent	Not Given	Category 3 – Minor Incident	350	North East
Agricultural – Berry Wood Farm, Tollbar Way	Agricultural: Slurry – Store and Tank Discharges	Not Given	Category 3 – Minor Incident	408	South East
Domestic/Residential – Windermere Road, Townhill	Surcharged Sewage	Not Given	Category 3 – Minor Incident	499	West
Domestic/Residential – Townhill Park	Surcharged Sewage	Not Given	Category 3 – Minor Incident	500	West

Table 8c: Pollution Incidents to Controlled Water between 1m and 500m

8.4 A further twenty **Pollution Incidents to Controlled Waters** recorded between 501 – 1,000m from the Site boundary. These are located between 550m south-west of the Site and 973m south of the Site. All are given a Category 3 (Minor Incident) incident severity and are mainly for Sewage, Oils or Miscellaneous.

8.5 There is one **Prosecution Relating to Authorised Processes** recoded within 1,000m of the Site boundary. This is at Roddington Forge Industrial Estate, Hogwood Lane, West End approximately 135m south west. This is for Scrap Vehicles Sorted on land without a Waste Management License. The verdict was guilty and a fine of £100 was issued.

8.6 There are two **Prosecutions Relating to Controlled Waters** recorded within 1,000m of the Site boundary and these are further highlighted below in Table 8d.

Location	Prosecution Text	Hearing Date	Verdict - Fine	Distance (m)	Direction
Botleigh Grange Stream, Tollbar Way, Hedge End	Disposing of milk into a surface water drain	September 2004	Guilty - £4000	580	South East
Allington Lane Stream, Chalcroft Distribution Park, Hedge End	A fault at an oil storage depot led to over 4,000 litres of red diesel contaminating watercourse	November 2004	Guilty - £6000	920	North

Table 8d: Local Authority Pollution Preventions and Controls

8.7 None of the following have been recorded within 1,000m of the Site boundary:

- Contaminated Land Register Entries and Notices
- Enforcement and Prohibition Notices
- Integrated Pollution Controls
- Integrated Pollution Prevention And Controls
- Local Authority Integrated Pollution Prevention And Control
- Local Authority Pollution Prevention and Control Enforcements
- Registered Radioactive Substance
- Substantiated Pollution Incident Register
- Water Industry Act Referrals

Hazardous Substances

8.8 There are no records of the following on or within a 1,000m radius of the Site boundary:

- Control of Major Accident Hazards Sites (COMAH)
- Explosive Sites
- Notification of Installations Handling Hazardous Substances (NIHHS)
- Planning Hazardous Substance Consents
- Planning Hazardous Substance Enforcements

8.9 There are one-hundred and six **Contemporary Trade Directory Entries** recorded within 1,000m of the Site boundary. One of these is located on site. This is to Mr R. Brown, located at Burnetts Lane, West End in the north-west of the Site, with the entry for Sand, Gravel and Other Aggregates. The current status is Inactive.

8.10 Twenty-four of the **Trade Directory Entries** are situated within 250m of the Site boundary, and of these two are outlined to be Active. The first is to S. T. W. Motor Services Ltd at Unit 25 Seddul Bahr Industrial Estate, Allington Lane, West End approximately 186m south-east of the Site for the entry of Garage Services. The second is to Ian Wall Furniture Restoration at Unit 1 White Harmony Industrial Estate, Allington Lane, West End approximately 205m north-east of the Site for the entry of Furniture (Repairing and Restoring).

8.11 Six of the **Trade Directory Entries** are situated between 251m to 500m from the Site boundary. Of these, six are shown to be Active, and further highlighted below in Table 8e:

Name - **Location**	Classification	**Distance (m)**	**Direction**
Panel Care – 42 Hickory Gardens, West End	Car Body Repairs	282	South East
Wessex Vale Crematorium – Bubb Lane, West End	Cemeteries & Crematoria	300	North East
Hampshire Insulations – Unit 10, Chalcroft Distribution Park, Burnetts Lane, West End	Insulation Materials	318	South East
L C M Environmental – Unit 14, Chalcroft Distribution Park, Burnetts Lane, West End	Waste Disposal Services	322	South East
G Palmer Mobile Mechanic – Flat 11, The Gatehouse, Barnsland, West End	Garage Services	391	South West
H & H Motors – Forge Cottage, Swaythling Road, West End	Car Body Repairs	479	West

Table 8e: Contemporary Trade Directory Entries between 251 and 500m

8.12 The remaining sixty-one **Trade Directory Entries** are situated between 501m and 1,000m from the Site boundary and these are further illustrated within Table 8f.

Active	Inactive
Cleaning Services – Domestic	Scaffolding & Work Platforms
Car Dealers	Tyre Repairs & Retreading
Catering Equipment – Servicing & Repairs	Cleaning Services – Domestic (x3)
Recycling Services	Cleaning Services – Commercial (x3)
Boilers – Servicing, Replacements & Repairs	Electric Motor Sales & Service
Hospitals	Bus & Coach Operators & Stations
Agricultural Merchants	Medical & Dental Laboratories
Commercial Vehicle Dealers	Car Customisation & Conversion Specialists
Lift Manufacturers	Hospitals (x2)
Road Haulage Services	Garage Services (x5)
Commercial Cleaning Services	Car Dealers (x3)
Industrial Services	Distribution Services
Paint Manufacturers	Boilers – Servicing, Replacements & Repairs
Garage Services (x2)	Industrial Services
Aviation Engineers	Ironing & Home Laundry Services
Car Body Repairs	Road Haulage Services
Metal Finishing Services	Petrol Filling Stations
Hydraulic Engineers	Car Dealers - Used
-	Machinery – Industrial & Commercial
-	Electronic Equipment – Manufacturers & Assemblers
-	Oil Companies
-	Car Paint & Lacquer Manufacturers & Suppliers
-	Gate Manufacturers (x2)
-	Car Body Repairs
-	Boatbuilders & Repairers
-	Laundry Equipment – Sales & Services
-	Metal Finishing Services
-	Car Painters & Sprayers
-	Glass Fibre Manufacturers
-	Fascias and Soffits

Table 8f: Contemporary Trade Directory Entries between 501 and 1,000m

8.13 There are two **Fuel Station Entries** within 1,000m of the Site Boundary. Applegreen West End Petrol Station, off Swaythling Road, West End is situated approximately 266m west of the Site. The second, now obsolete, is Moorgreen Service Station off Botley Road, West End and was situated approximately 695m south-west of the Site.

Waste

8.14 There are two **Historical Landfill Sites** recorded within 1,000m of the Site Boundary. The first landfill is recorded on Site in the east at Quobb Farm/Hatch Farm. No information has been supplied in terms of First Input Date and Last Input Date. The second landfill is at Moorlands off Botley Road, West End approximately 718m south of the Site. As previously, no information has been supplied in terms of First Input Date and Last Input Date.

8.15 There are five **Licensed Waste Management Facilities (Locations)** within 1,000m of the Site Boundary, and these are further detailed in Table 8g.

Operator Name - Location	Site Category	Issued	Status	Distance (m)	Direction
Wright Rodney William – Roddington Forge, Allington Lane, West End	Metal Recycling Sites (Mixed)	September 1993	Expired	99	South West
J M A Salvage Ltd – Roddington Forge, Allington Lane, West End	Metal Recycling Sites (Mixed)	May 2008	Surrendered	131	South West
Ms Kim Wright, Ms Nichola Wright & Mrs Alison Trewin – Roddington Forge, Allington Lane, West End	End of Life Vehicles	January 2008	Issued	143	South West
Abbot Healthcare Products Ltd (Formally Solvay Healthcare Ltd) – Hamilton House, Mansbridge Road, West End	In-house Storage Facilities	May 1997	Surrendered	635	West
Biogenie Site Remediation Ltd – Not Supplied	Mobile Plant	February 2002	Surrendered	809	East

Table 8g: Licensed Waste Management Facilities (Locations)

8.16 The site falls within the **Local Authority Landfill Coverage** of Eastleigh Borough Council and Hampshire County Council, however only the latter has landfill data to supply.

8.17 There are five areas of **Potentially Infilled Land (Non-Water)** within 1,000m of the Site Boundary. These are all listed as 'Unknown Filled Ground' (pit, quarry, etc.) and are located approximately between 269m north-west and 945m south of the Site.

8.18 There are twenty-three areas of **Potentially Infilled Land (Water)** within 1,000m of the Site Boundary. These are all listed as 'Unknown Filled Ground' (pond, marsh, river, stream, dock etc.). One is located within the east of the Site from the date of mapping in 1938. The remaining twenty-two areas are located approximately 204m north-west and 980m north-west of the Site.

8.19 There are three **Registered Waste Transfer Sites** located within 1,000m of the Site Boundary and are further detailed below in Table 8h:

License Holder - Location	Max Input Rate	Authorised Waste	Prohibited Waste	Distance (m)	Direction
J. M. A. Salvage – Land at Roddington Forge, Allington Lane, West End	Small *	Scrap Metal	Biodegradable Waste Drums (Unless Open & Contents Comply) Food/Vegetable Matter Hazardous Wastes Liquid/Slurry/Sludge Wastes Paper/Cardboard/Packaging Phenols/Mat'L Cont. Phenol Poisonous, Noxious, Polluting Wastes Rubble Ex Prems Storing Chem/Toxic Mat Special Wastes Waste N.O.S..	122	South West
R. W. Wright – Roddington Forge, Allington Lane, West End	Very Small **	Scrap Metal	Biodegradable Waste Drums (Unless Open & Contents Comply) Food/Vegetable Matter Hazardous Wastes Liquid/Slurry/Sludge Wastes Paper/Cardboard/Packaging Phenols/Mat'L Cont. Phenol Poisonous, Noxious, Polluting Wastes Rubble Ex Prems Storing Chem/Toxic Mat Special Wastes Waste N.O.S.	147	South West
Roddington Fabrications Ltd – Allington Lane, West End	Undefined	Wooden Cable Drums Ex Pirelli	Not Provided	147	South West

Table 8h: Registered Waste Transfer Sites

8.20 There are no provided reports of the following within 1,000m of the Site boundary:

- BGS Recorded Landfill Sites
- Integrated Pollution Control Registered Waste Sites
- Licensed Waste Management Facilities (Landfill Boundaries)
- Local Authority Recorded Landfill Sites
- Registered Landfill Sites
- Registered Waste Treatment or Disposal Sites

9 Environmental Setting

9.1 There are eleven Ancient Woodlands located within 1,000m of the Site boundary, and these are further illustrated in Table 9a:

9.2

Name	Area (Ha)	Distance (m)	Direction
Not Supplied	0.55	0	West
Dummers Copse	3.79	0	North East
Bushy/Withybed Copses	4.56	41	North East
Not Supplied	3.27	129	North East
Not Supplied	0.56	134	North
Not Supplied	0.38	195	North
River/High Wood/ Vocus Copses	16.71	304	North
Paynes Row	9.55	418	North
Paynes Row	1.59	442	North East
Not Supplied	3.61	563	South West
Marlhill Copse	4.19	844	West

Table 9a: Ancient Woodlands

9.3 Nitrate Vulnerable Zones are areas designated (from 2013) as being at risk from agricultural nitrate pollution and includes about 58% of land in England. Guidance on the use of nitrogen fertilisers and storage of organic manures in Nitrate Vulnerable Zone is available from DEFRA and the EA.

9.4 The site lies within a **Eutrophic Nitrate Vulnerable Zone**, and this is further illustrated in Figure 9b.

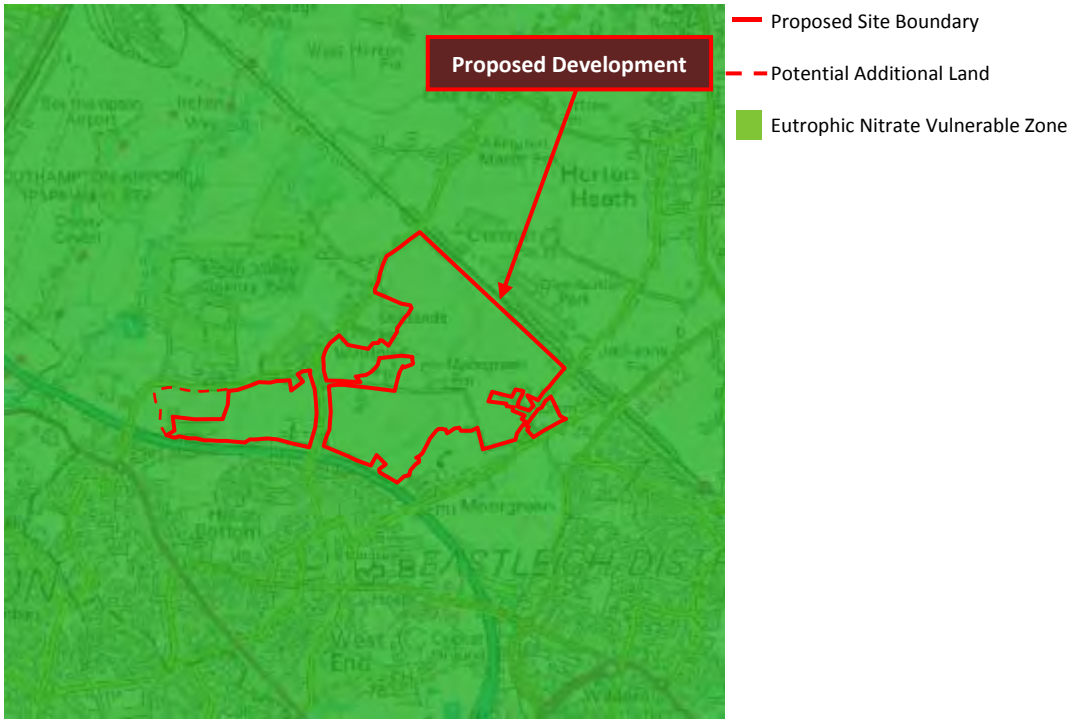

Figure 9b: Nitrate Vulnerable Zones

9.5 There are two **Sites of Special Scientific Interest** located within 1,000m from the Site boundary. One is to Moorgreen Meadows, located approximately 310m east of the Site boundary covering approximately 14.3ha since the 25th August 1982. The second is to the River Itchen, located approximately 615m north-west of the Site boundary covering approximately 748.5ha since the 16th August 2000.

9.6 One **Special Area of Conservation** is located within 1,000m of the Site boundary. The River Itchen, located approximately 647m north-west of the Site boundary, covering 303.99ha has been designated a Special Area of Conservation.

9.7 None of the following are reported within 1,000m of the Site boundary:

- Areas of Adopted Green Belt
- Areas of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Areas
- Forest Parks
- Local Nature Reserves
- Marine Nature Reserves
- National Nature Reserves
- National Parks
- Nitrate Sensitive Areas
- Ramsar Sites
- Special Protection Areas
- World Heritage Sites

10 Site Conceptual Model

10.1 Guidance has been published by the Department of the Environment, Transport and the Regions (DETR Circular 02/2000) 'Environmental Protection Act 1990: Part 11A – Contaminated Land (20th March 2000) which promotes the 'suitable for use approach'. This has since been replaced by the DEFRA: Contaminated Land Statutory Guidance (April 2012). The DEFRA note 'The "suitable for use" approach focuses on the risks caused by land contamination. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Risks therefore need to be assessed on a site-by-site basis.

10.2 The "suitable for use" approach consists of three elements:

- Ensuring that land is suitable for its current use - in other words, identifying land where contamination is causing unacceptable risks to human health and the environment, assessed on the basis of the current use and circumstances of the land, and returning such land to a condition where such risks no longer arise ("remediating" the land): the new contaminated land regime provides general machinery to achieve same.

- Ensuring that land is made suitable for any new use, as planning permission is given for that new use - in other words, assessing the potential risks from contamination, on the basis of the proposed future use and circumstances, before official permission is given) for the development and, where necessary to avoid unacceptable risk to human health and the environment, remediating the land before the new use commences; this is the role of the town and country planning and building control regimes.

- Limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land for which planning permission is being sought - in other words, recognising that the risks from contaminated land can be satisfactorily assessed only in the context of specific uses of the land (whether current or proposed), and that any attempt to guess what might be needed at some time in the future for other uses is likely to result either in premature work (thereby risking distorting social, economic and environmental priorities) or in unnecessary work (thereby wasting resources).

10.3 Also addressed within the DEFRA guidance is the issue of 'contaminated land'. 'Before the **Local Authority** can make the judgement that any land appears to be **Contaminated Land** on the basis that **Significant Harm** is being caused, or that there is a **Significant Possibility** of such harm being caused, the authority must therefore identify a **Significant Pollutant Linkage**.

10.4 This means that each of the following has been identified:

- A Contaminant Source
- A Pathway
- A Receptor

and that:

- The **Contaminant** is causing **Significant Harm** to **that Receptor.**

Or

- There is a **Significant Possibility** of such harm being caused by the **Contaminant to the Receptor**.

10.5 Where any of the three elements of the Source-Pathway-Receptor (SPR) are not present, there is no risk and therefore land cannot be classified as statutory 'contaminated land'.

10.6 In terms of controlled waters, DEFRA: Contaminated Land Statutory Guidance (April 2012) notes the following:

"A.35 Section 78A (9) defines the pollution of controlled waters as: 'The entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter'.

A.36 Before determining that pollution of controlled waters is being, or is likely to be, caused, the local authority should be satisfied that a substance is continuing to enter controlled waters or is likely to enter controlled waters. For this purpose, the local authority should regard something as being "likely" when they judge it more likely than not to occur.

A.37 Land should not be designated as contaminated land where:
(a) A substance is already present in controlled waters;
(b) Entry into controlled waters of that substance from land has ceased; and
(c) It is not likely that further entry will take place.

A.38 Substances should be regarded as having entered controlled waters where:
(a) They are dissolved or suspended in those waters; or
(b) If they are immiscible with water they have direct contact with those waters on or beneath the surface of the water.

A.39 The term "continuing to enter" should be taken to mean any entry additional to any which has already occurred."

10.7 In 2004 the Environment Agency published the 'Model Procedures for the Management of Land Contamination', CLR11, which provides the technical framework for applying a risk management process, based on the 'suitable for use' approach, when dealing with land affected by contamination.

10.8 In 2008, to enable the practical application of good practice of the EA's Model Procedures CLR11, R&D Publication 66 'Guidance for the Safe Development of Housing on Land Affected by Contamination' was published by the National House Builders Council (NHBC), the EA and the Chartered Institute of Environmental Health. Whilst written to be relevant to housing development it is also applicable to other forms of development where sites are land affected by contamination. The guidance describes in detail the process and activities involved for the identification and assessment of hazards for a Phase 1 assessment.

10.9 At Phase 1 stage, it is necessary to develop an initial conceptual site model to understand the possible relationships between contaminants, pathways and receptors. If a hazardous source, via an exposure pathway to a potential receptor can be established then there is a 'pollutant linkage', which is preliminarily risk assessed using parameters summarised in Table 10a. At this stage, the conceptual model is prepared without site specific soils, groundwater or gas testing and as such, the findings should be treated only as first and general indications of possible SPR linkages.

10.10 The primary potential sources of contamination on Site are indicated below:

Agricultural use and associated infrastructure (Lodge, Farm, Access Road) - Soil and Water Contamination

10.11 The primary potential sources of contamination off Site are indicated below:

Agricultural Use	-	Soil and Water Contamination
Existing Roads	-	Soil and Water Contamination
Poultry Farming	-	Soil and Water Contamination
Former Pits	-	Soil and Water Contamination
Former Works/Factories	-	Soil and Water Contamination
Former Brickworks	-	Soil and Water Contamination
Depot	-	Soil and Water Contamination

10.12 The potential receptors at the site are:

- End users / site occupiers
- Adjacent users / occupiers
- Controlled waters
- Flora and fauna
- Buildings & construction materials

10.13 The potential pathways at the site are primarily:

- Direct ingestion of soil / water / fruit or vegetable
- Inhalation of dust / vapours
- Direct skin contact with the ground / water
- Regression of plant growth due to phytotoxic contamination
- Vertical and lateral migration of contamination

10.14 While limited information is available at this stage methodology has been developed to help identify the potential contamination risk and linkages. The severity of damaging effects and the likelihood of any linkage have been considered.

10.15 Given the potential consequence and likelihood, a risk rating is given, based on the following matrix:

Probability (Likelihood)	Consequence			
	Severe	**Moderate**	**Mild**	**Minor**
Highly Likely	Very High	High	Medium	Low
Likely	High	Medium	Medium/Low	Low
Possible	Medium	Medium/Low	Low	Very Low
Unlikely	Medium/Low	Low	Very Low	Very Low

Table 10a: Risk ratings

10.16 The risk ratings are described as follows:

Very High: There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action.

High: Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action.

Medium: It is possible that without appropriate remediation action harm could arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild.

Low: It is possible that harm could arise to a designated receptor from an identified hazard. It is likely that, at worst if any harm was realised any effects would be mild.

Very Low: The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

10.17 A summary of the potential SPR linkages on site and within close proximity of the site are detailed in Table 10b.

Source	Pathway	Receptor	Comment	Risk Rating	Potential Mitigation
Contaminated soils On-site: • Agricultural and associated infrastructure Off-site: • Agricultural • Existing Roads • Poultry Farming • Former Pits • Former Works/ Factory • Depot	Direct Ingestion & contact	Site workers & occupiers	Historically undeveloped Site, with the exception of agricultural purposes, a lodge and an access road which may have included the use of pesticides and fertilizers. An assessment of the soils may be required at the detailed design stage as the agricultural uses and potential demolition of the building may pose minor potential contamination risks.	Low	-
	Inhalation of dust			Low	-
	Direct skin contact			Low	-
	Vertical & lateral migration	Controlled waters	The Site is situated on a Secondary A Aquifer. In terms of Groundwater vulnerability the majority of the Site is situated on a Non Aquifer, with areas of superficial geology in the centre forming a Minor Aquifer with Intermediate Leaching Potential, and an outcrop in the north-east forming a Minor Aquifer with High Leaching Potential.	Low	-
	Direct uptake	Flora	Historically undeveloped Site, with the exception of agricultural purposes, a lodge and an access road. On-site use discourages plant growth.	Very Low	-
	Direct contact	Building materials	Historically undeveloped Site, with the exception of agricultural purposes, a lodge and an access road. Agricultural land uses are not considered to have a detrimental impact on building materials.	Low	-
Contaminated Groundwater On-site: • Agricultural and associated infrastructure Off-site: • Agricultural • Existing Roads • Poultry Farming • Former Pits • Former Works/Factory • Depot	Direct Ingestion & contact	Site workers & occupiers	Historically undeveloped Site, with the exception of agricultural purposes, a lodge and an access road which may have included the use of pesticides and An assessment of the soils may be required at the detailed design stage as the agricultural uses and potential demolition of the building may pose minor potential contamination risks.	Low	-
	Direct skin contact			Low	-
	Vertical & lateral migration	Controlled waters	The Site is situated on a Secondary A Aquifer. In terms of Groundwater vulnerability the majority of the Site is situated on a Non Aquifer, with areas of superficial geology in the centre forming a Minor Aquifer with Intermediate Leaching Potential, and an outcrop in the north-east forming a Minor Aquifer with High Leaching Potential.	Low	-
	Direct uptake	Flora		Low	-
	Direct contact	Building materials		Low	-

Table 10b – Site SPR Summary

Source	Pathway	Receptor	Comment	Risk Rating	Potential Mitigation
Elevated gas **On-site:** None **Off-site:** None	Vertical & lateral migration	Site workers & occupiers	Historically undeveloped Site, with the exception of agricultural purposes, a lodge and an access road. The Site is situated on a Secondary A Aquifer and no potential sources for gassing have been identified within an influencing distance of the proposed development.	Very Low	-
		Adjacent occupiers		Very Low	-

Table 10b Continued – Site SPR Summary

11 Discussion & Summary

Discussion

11.1 A review of readily available Site environmental data, including historical mapping and statutory registers and consultation with appropriate authorities has identified the following:

11.2 The Site comprises **agricultural Land with associated infrastructure** which may include the following typical contaminants: Nitrogen, potassium and phosphorous contained within fertilisers; chemicals from pesticides and herbicides; coliform and non-coliform bacteria from livestock waste and manure application; and hydrocarbons from oil and fuel leakages from machinery. Taking into consideration the existing underlying geology and aquifer, this feature generally provides a ***low*** rating for risk. However, this may vary depending on persistence of the chemicals used and further assessment of the Site's soils may be required at the detailed design stage to establish baseline ground conditions.

11.3 There are five roads within proximity of the Site **(Quob Lane, Allington Lane, M27, Moorgreen Road and Burnetts Lane)**. Potential contaminants from leakages and spillages from vehicles on the roads may include: heavy metals, oils, fuels and Polycyclic Aromatic Hydrocarbons. Further assessment of the Site's soils may be required at the detailed design stage to establish baseline conditions. However, the five roads are separated from the Site by agricultural hedges, with Moorgreen Road separated from the Site by residential dwellings also. It is therefore considered to be a ***Low*** risk rating.

11.4 A **Poultry Farm** is shown approximately 25m north-west of the proposed development since the early 1990's. Poultry production is associated with a number of pollutants which include: oxygen-demanding substances (e.g. sewage), ammonia, solids, nutrients (specifically nitrogen and phosphorus), pathogens, trace elements, antibiotics, pesticides, hormones, and odour and other airborne emissions. Taking into consideration the existing underlying geology and aquifer, this feature generally provides a ***low*** rating for risk. However, further assessment of the Site's soils may be required at the detailed design stage to establish baseline ground conditions.

11.5 A number of **Former Pits** are situated within approximately 1,000m of the Site boundary. An Old Gravel Pit is shown approximately 275m west of the Site between 1897-1963, a Pit approximately 700m south-west between 1897 and 1963 and Sand Pits approximately 700m south-west of the Site between 1897 and 1931. Potential contaminants may include: metals, acids, highly corrosive mineralised waters, metal sulphides and hazardous / non-hazardous chemicals. Further assessment of the site's soils may be required at the detailed design stage to establish baseline conditions. However, the former pits have not been identified since the 1960's, and have since been built on. The Pits are therefore considered to be a ***low*** risk rating.

11.6 A couple of **Former Works and a Factory** were situated within 1,000m of the Site. Potential contaminants may include: diesel fuels, solvents and oils. One **Former Works** is situated 550m south-west of the Site between 1963 and 2000 and the second is shown approximately 800m west of the Site between 1963 and 1968. The first has since been built over by residential dwellings and the second is separated from the Site by agricultural fields and residential developments. The former factory was situated approximately 800m west of the Site from the early 1960s to 1990. As these are no longer active and have since been redeveloped, they are considered to be a ***Low*** risk rating.

11.7 A **Former Brickworks** is shown approximately 750m south-west of the proposed development between 1897 and 1931. Potential contaminants may include: diesel fuels, solvents and oils. Due to the time since the Brickworks was active and the distance from the proposed development, it is considered to be a ***low*** risk rating.

11.8 Two **Depots** are shown approximately 750m south since 1968 and 900m south-east since 2016. Potential contaminants may include: leachate containing iron, aluminium, chlorides and sulphates. However, due to the vast distance from the proposed development these are considered to be a ***low*** risk rating.

Summary

11.9 After reviewing the historical mapping, geological data, hydrological data, sensitive land uses, industrial land uses, waste and hazardous substances, there are no uses identified on or within close proximity of the Site that are potentially contaminative and are likely to be prohibitive to the planned development. The overall contaminative risk at the Site is therefore considered to be ***Low***.

11.10 However, further assessment of the Site's soils may be required at the detailed design stage to confirm the baseline ground conditions.

12 Limitations

12.1 The benefits of this report are provided solely to Hallam Land Management Ltd. The conclusions and recommendations contained herein are limited to those given the general availability of background information and the planned usage of the Site. Brookbanks Consulting Ltd do not confer any third party rights for the information contained in the report.

12.2 All distances referred to in this report are measured from the boundary of the planned development Site unless otherwise advised.

12.3 Third party information has been used in the preparation of this report, which Brookbanks Consulting Ltd, by necessity assume is correct at the time of writing.