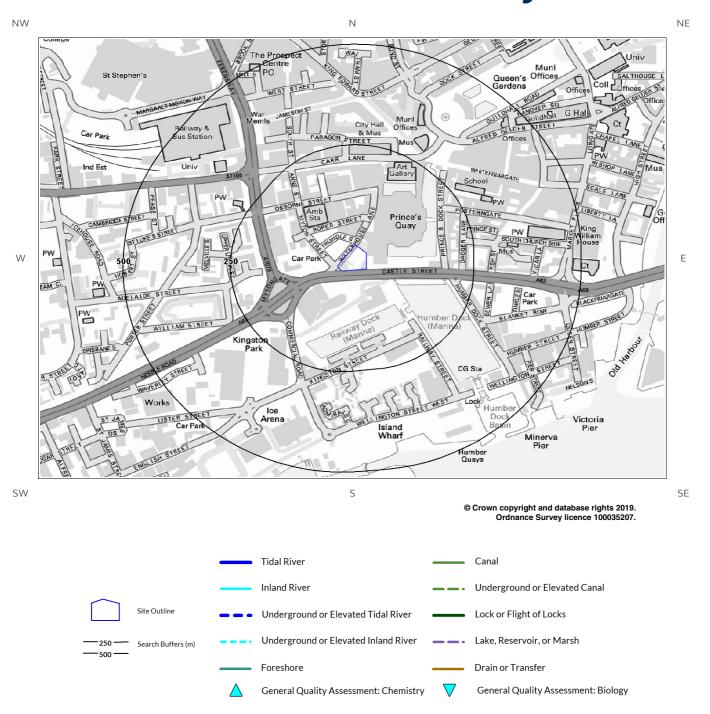




6e. Hydrology – Watercourse Network and River Quality







6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property

Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distanc e (m)	Direction	Designation Description	
1	0	On Site	These are rock layers or drift deposits with low permeability that have negligi significance for water supply or river base flow	
2	460	Е	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.2 Aguifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property

Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distanc e (m)	Direction	Designation	Description
1	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	460	E	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers





6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site

Identified

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not show n	882	NW	508950 429200	Status: Active Licence No: 2/26/32/423 Details: Non-Evaporative Cooling Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - SPRING STREET - HULL Data Type: Point Name: Hull Truck Theatre Co Ltd	Annual Volume (m³): 33600 Max Daily Volume (m³): 168 Original Application No: - Original Start Date: 07/05/2008 Expiry Date: 31/03/2025 Issue No: 2 Version Start Date: 13/11/2012 Version End Date:
Not show n	1022	SW	508660 427850	Status: Historical Licence No: 2/26/32/049 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - NEPTUNE STREET Data Type: Point Name: SMITH & NEPHEW MEDICAL LTD	Annual Volume (m³): 221686 Max Daily Volume (m³): 607 Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 101 Version Start Date: 01/04/2006 Version End Date:
Not show n	1022	SW	508660 427850	Status: Historical Licence No: 2/26/32/049 Details: Dust suppression Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - NEPTUNE STREET Data Type: Point Name: SMITH & NEPHEW MEDICAL LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 101 Version Start Date: 10/05/2005 Version End Date:
Not show n	1022	SW	508660 427850	Status: Historical Licence No: 2/26/32/049 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: SMITH & NEPHEW MEDICAL LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 14/12/1965 Version End Date:
Not show n	1963	N	509981 430429	Status: Historical Licence No: NE/026/0032/038 Details: Dust Suppression Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - FOSTER STREET RECYCLING CENTRE - HULL Data Type: Point Name: Robin Concrete & Waste Disposal Ltd	Annual Volume (m³): 35000 Max Daily Volume (m³): 250 Original Application No: - Original Start Date: 07/06/2013 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 07/06/2013 Version End Date:
Not show n	1963	N	509981 430429	Status: Historical Licence No: NE/026/0032/038 Details: Mineral Washing Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - FOSTER STREET RECYCLING CENTRE - HULL Data Type: Point Name: Robin Concrete & Waste Disposal Ltd	Annual Volume (m³): 35000 Max Daily Volume (m³): 250 Original Application No: - Original Start Date: 07/06/2013 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 07/06/2013 Version End Date:



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ID	Distance (m)	Direction	NGR	Details	;
Not show n	1964	N	509980 430430	Status: Historical Licence No: 2/26/32/405 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - FOSTER STREET RECYCLING CENTRE - HULL Data Type: Point Name: Robin Concrete & Waste Disposal Ltd	Annual Volume (m³): 70000 Max Daily Volume (m³): 250 Original Application No: - Original Start Date: 01/09/2005 Expiry Date: 31/03/2013 Issue No: 2 Version Start Date: 26/05/2011 Version End Date:
Not show n	1964	N	509980 430430	Status: Historical Licence No: 2/26/32/405 Details: Dust Suppression Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - FOSTER STREET RECYCLING CENTRE - HULL Data Type: Point Name: Robin Concrete & Waste Disposal Ltd	Annual Volume (m³): 70000 Max Daily Volume (m³): 250 Original Application No: - Original Start Date: 01/09/2005 Expiry Date: 31/03/2013 Issue No: 3 Version Start Date: 27/04/2012 Version End Date:
Not show n	1964	N	509980 430430	Status: Historical Licence No: 2/26/32/405 Details: General Use Relating To Secondary Category (Low Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - CHALK - FOSTER STREET RECYCLING CENTRE - HULL Data Type: Point Name: Robin Concrete & Waste Disposal Ltd	Annual Volume (m³): 70000 Max Daily Volume (m³): 250 Original Application No: - Original Start Date: 01/09/2005 Expiry Date: 31/03/2013 Issue No: 3 Version Start Date: 27/04/2012 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site

Identified

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Deta	ils
Not shown	1881	N	509400 430400	Status: Historical Licence No: 2/26/32/008 Details: General use relating to Secondary Category (High Loss) Direct Source: SURFACE WATER Point: BARMSTON DRAIN Data Type: Point Name: QUIBELL & SON (HULL) LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1965 Version End Date:
Not shown	1881	N	509400 430400	Status: Historical Licence No: 2/26/32/008 Details: General use relating to Secondary Category (High Loss) Direct Source: SURFACE WATER Point: BARMSTON DRAIN Data Type: Point Name: QUIBELL & SON (HULL) LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1965 Version End Date:





6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site

None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site

Identified

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (6c):

ID	Distanc e (m)	Direction	Zone	Description
1	0	On Site	3	Total catchment
2	460	E	3	Total catchment

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site

None identified

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site

None identified

Database searched and no data found.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site

Identified





Database searched and no data found.

6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (6e):

				-		Chemi	ical Quality	Grade	
ID	Distanc e (m)	Direction	NGR	River Quality Grade	2005	2006	2007	2008	2009
Not shown	1235	N	509970 429670	River Name: Beverley & Barmston Drain Reach: Beverley Beck River Hull End/Start of Stretch: End of Stretch NGR	Е	F	E	E	E

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

Database searched and no data found.

6.11 Surface Water Features

Surface water features within 250m of the study site

Identified

The following surface water records are not represented on mapping:

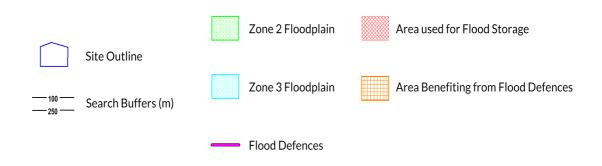
Distance (m)	Direction
48	E
76	SE
108	SE
139	NE
165	NE
139	NE





7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)

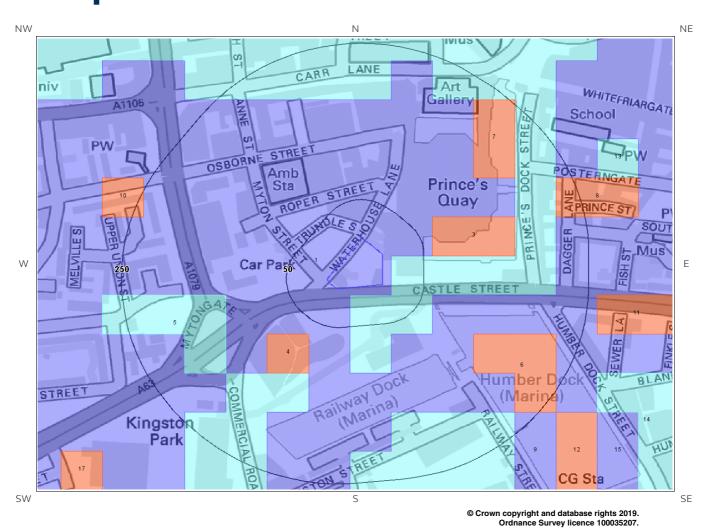








7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



RoFRaS Rating
Very Low
Site Outline
Low
Medium
High





7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m

Identified

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Туре
1	0	On Site	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
2	151	SE	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
3	163	Ν	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
4	180	SW	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
5	206	SW	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
6	219	SW	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m

Identified

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a - Flood Map for Planning.

ID	Distance (m)	Direction	Update	Туре
1	0	On Site	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)
2	0	On Site	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)
3	20	S	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)
4	153	W	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)





7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

Highest risk of flooding onsite

Medium

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Medium (greater than 1 in 100 but less than 1 in 30) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRas flood Risk
1	0.0	On Site	Medium
2	9.0	S	Low

7.4 Flood Defences

Flood Defences within 250m of the study site

None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site

Identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site

None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the und	derlying geological
conditions	

Not Prone

The area is not considered to be prone to groundwater flooding based on rock type.





7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result

Not Applicable

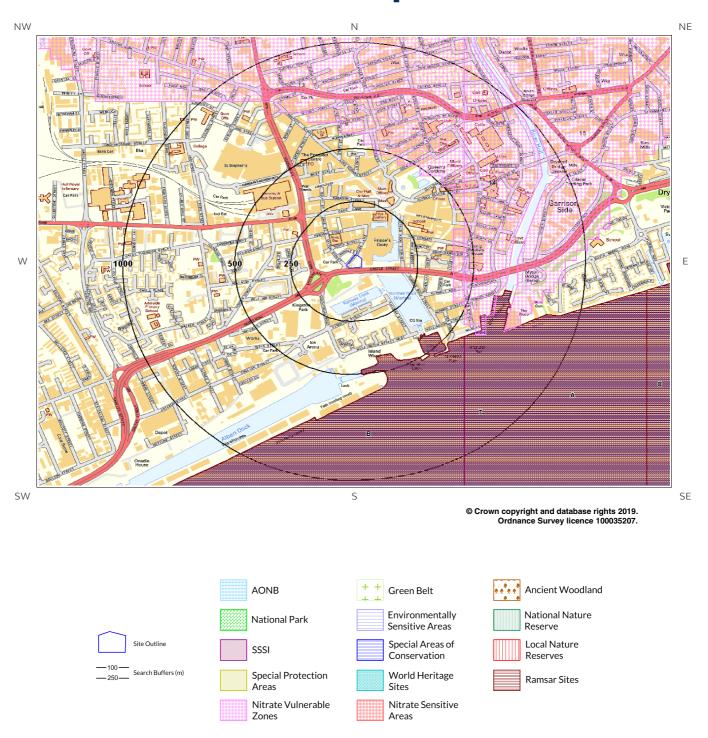
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.





8. Designated Environmentally Sensitive Sites Map







8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site

Identified

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

2

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
5B	414	SE	Humber Estuary	Natural England
6A	564	SE	Humber Estuary	Natural England

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

2

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Directio n	SAC Name	Data Source
1	414	SE	Humber Estuary	Natural England
2A	564	SE	Humber Estuary	Natural England





8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

2

The following Special Protection Area (SPA) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Directio n	SPA Name	Data Source
3B	414	SE	Humber Estuary	Natural England
4A	564	SE	Humber Estuary	Natural England

8.5 Records of Ramsar sites within 2000m of the study site:

6

The following Ramsar records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Directio n	Ramsar Site Name	Ramsar Site Status	Data Source
7	414	SE	Humber Estuary	Listed	Natural England
8	1279	Е	Humber Estuary	Listed	Natural England
Not shown	1430	S	Humber Estuary	Listed	Natural England
Not shown	1678	SW	Humber Estuary	Listed	Natural England
Not shown	1848	SW	Humber Estuary	Listed	Natural England
Not shown	1919	SE	Humber Estuary	Listed	Natural England

8.6 Records of Ancient Woodland within 2000m of the study site:

Database searched and no data found.

0

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.





8.8 Records of World Heritage Sites within 2000m of the study site:

0 Database searched and no data found. 8.9 Records of Environmentally Sensitive Areas within 2000m of the study site: 0 Database searched and no data found. 8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site: 0 Database searched and no data found. 8.11 Records of National Parks (NP) within 2000m of the study site: 0 Database searched and no data found. 8.12 Records of Nitrate Sensitive Areas within 2000m of the study site: 0 Database searched and no data found. 8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
13	410	E	Existing	DEFRA
14	460	E	Existing	DEFRA
15	694	E	Existing	DEFRA
Not shown	1478	N	Existing	DEFRA

Report Reference: EMS-530230_713174 Client Reference: EMS_530230_713174 7





ID	Distance (m)	Direction	NVZ Name	Data Source
Not shown	1556	N	Existing	DEFRA
Not shown	1675	NE	Existing	DEFRA
Not shown	1822	N	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

Database searched and no data found.

0





9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **Groundsure Geo Insight**, available from **our website**. The following information has been found:

9.1.1 Shrink Swell

Maximum Shrink-Swell** hazard rating identified on the study site

Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site

Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

^{*} This indicates an automatically generated 50m buffer and site.



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9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site

Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

Maximum Running Sand** hazard rating identified on the study site

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

^{*} This indicates an automatically generated 50m buffer and site.





9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing

ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary.





10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site

None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary

None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site Guidance: No Guidance Required.

None identified





Contact Details

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British Geological Survey Enquiries

Kingsley Dunham Centre Keyworth, Nottingham NG12 5GG Tel: 0115 936 3143. Fax: 0115 936 3276. Email:

Web:www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries:

enquiries@bgs.ac.uk

Environment Agency

National Customer Contact Centre, PO Box 544 Rotherham, S60 1BY Tel: 03708 506 506

Web: www.environment-agency.gov.uk Email: enquiries@environment-agency.gov.uk

Public Health England

Public information access office Public Health England, Wellington House 133-155 Waterloo Road, London, SE1 8UG www.gov.uk/phe

Email:enquiries@phe.gov.uk
Main switchboard: 020 7654 8000

The Coal Authority

200 Lichfield Lane Mansfield Notts NG18 4RG Tel: 0345 7626 848 DX 716176 Mansfield 5

www.coal.gov.uk

Ordnance Survey

Adanac Drive, Southampton SO16 0AS Tel: 08456 050505

Local Authority

Authority: Hull City Council
Phone: 01482 300 300
Web: http://www.hullcc.gov.uk/
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