

GENERAL NOTES

Figured dimensions only to be taken from this drawing.
Do not scale. If in doubt ask.

This plan is an estimated $\frac{1}{4}$ dimensioned layout plan, based on an Ordinance Survey Plan, it will not be exact and is intended to provide a rough guide of plot layouts.

Exact dimensions should be completed in accordance with a topographical survey which has not yet been completed.

The layout and plot position of this drawing is still subject to local authority comments and is subject to change.

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No.	Revision/Issue	Date

Client Name
Dylan White

Project Name
Proposed 8 Dwellings

Project Address
**2 Woodside View
Bolton upon Dearne
S63 8GZ**

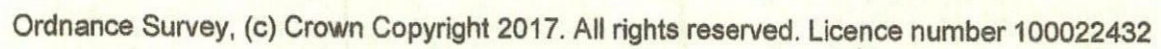
Drawing Title
Dimensioned Site Plan

Drawn By JW	Checked By N/A
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Office Ref
Drop/A17.035

Project Number A17.035	Drawing Number 02C
Date 15/03/2018	
Scale 1/200 @ A3	

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CON29M Non-Residential Mining Report

This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

Castledine & Co

Enquiry address

LOWFIELD FARM LOWFIELD FARM CLOSE, BOLTON
UPON DEARNE, BARNSLEY, S63 8GY

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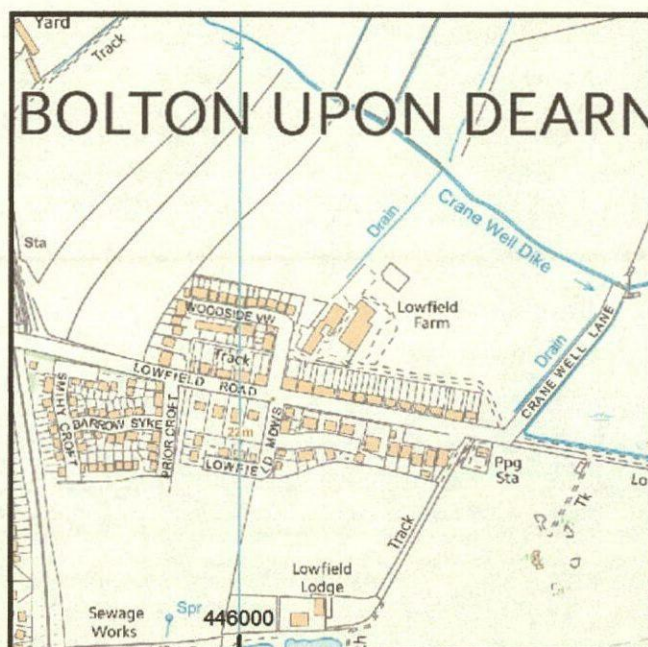
200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

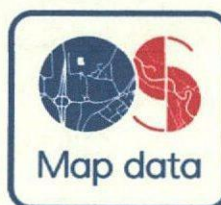
 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Approximate position of property



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Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	Yes
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 5 seams of coal at 220m to 680m depth, and last worked in 1980.

Any movement in the ground due to coal mining activity should have stopped.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support

The property is in an area where a notice to withdraw support was given in 1982.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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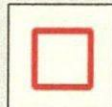
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



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**Phase 1 Land Contamination
Risk Assessment**
for
Residential development
on the site of
**Lowfield Farm, Lowfield Road,
Bolton Upon Dearne, Rotherham
S63 8GZ**

Date: April 2018

Status:

Final Report

Reference:

1278G P1 White - Rotherham - Appendix

Date:

28/04/2018

EXECUTIVE SUMMARY

The site is currently a mostly cleared site occupied by 1 farm building and a stockpile of demolition rubble

The site has historic agricultural uses and surrounding sites have had potentially contaminative uses. Many historic agricultural practices may have caused contamination to have occurred.

Based on the information contained in this report, it is the opinion of Castledine & Co that the site represents a Moderate to low risk with respect to the proposed development.

It is recommended that the Buildings on site should be subject to an asbestos survey and removal by appropriately qualified personal prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

It is recommended that a remediation in line with section 11.0 is undertaken.

A watching brief should be had during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material) development should stop and Castledine & Co should be contact to determine if further assessment or changes to the remediation scheme are required.

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1.0 QUALITY ASSURANCE

Castledine & Co. confirm that all reasonable efforts have been made to ensure that the information outlined within this report is accurate.

Castledine & Co. would further confirm that due care, attention and technical skill were used in the creation of this report.

For and on behalf of Castledine & Co.

Kevin Castledine

(Proprietor)

2.0 LIMITATIONS

The conclusions and recommendations made in this report are limited to those based on the findings of the investigation. Where comments are made based on information obtained from third parties, Castledine & Co. assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties. The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at the time.

This survey has not included asbestos within existing structures, invasive plant species or any elements unconnected with potential ground contamination at the site. If required, such surveys should be undertaken by suitably accredited organisations.

There may be other conditions prevailing at the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

3.0 INTRODUCTION

Castledine & Co. have been appointed by Dylan White to undertake a Phase 1 Desk study on Lowfield Farm, Lowfield Road, Bolton Upon Dearne, Rotherham S63 8GZ

4.0 SCOPE

Castledine & Co. have prepared this report for the sole use and reliance of Dylan White and his appointees for the purpose of ensuring compliance with:

- paragraphs 120 and 121 of the NPPF,
- part C1 of the building regulations.

This report may not be used or relied upon by any unauthorised third party, or for any other proposed use than that specified above, without the explicit written agreement of Castledine & Co.

The report consists of a preliminary risk assessment in accordance with BS10175:2011+A1:2013 and CLR11 "Model Procedures for the Management of Land Contamination".

The objectives of the report are:-

- To assess historical activities at the site with respect to their potential impact on the site environment.
- To characterise the environmental setting of the site, identify migration pathways and vulnerable receptors for contamination originating at the site, focusing on potential soil and groundwater liabilities.
- To assess historical and current surrounding land use in relation to known or potential off site contamination issues that may impact on the subject site and
- To develop a preliminary conceptual site model (CSM).

5.0 SITE DESCRIPTION

The site is located on the outskirts of Bolton upon Dearne at National Grid 446094,402622 and is approximately 0.52ha in area.

The site is a former farm yard. There is one agricultural building on site. There is large stockpile of demolition rubble. There are no obvious signs of contamination on site

Photos of the site are present in Appendix C

6.0 REGULATORY AUTHORITY AND OTHER ENVIRONMENTAL DATA

An environmental search listing historical and environmental factors likely to affect the property has been reviewed.

The most pertinent information is summarised in the following sections.

A copy is presented in Appendix A

Additional geological and hydrological data was obtained from the British Geological Survey.

6.1 HYDROLOGICAL**6.1.1 AQUIFER****6.1.1.1 SUPERFICIAL GEOLOGY**

No superficial deposits on site

6.1.1.2 BEDROCK GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	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

6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES

None within 250m

6.1.3 SOURCE PROTECTION ZONE

Not in a source protection source

6.1.4 GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL

Minor Aquifer/Low Leaching Potential L Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

6.1.5 POTENTIAL SURFACE WATER

Distance (m)	Direction
25	N
156	NE
163	NE
174	NE
188	N
193	E
209	SE
211	N
216	N

6.1.6 DISCHARGE CONSENTS

ID	Distance (m)	Direction	NGR	Description
8	201	SE	446300 402500	Address: SSO AT LOWFIELD ROAD PUMPING STATION, N, BOLTON ON DEARNE (EMERGENCY O, VERFLOW) Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 3599 Permit Version: 3 Receiving Water: TRIB OF CRANE WELL DIKE Status: MODIFIED - (WRA 91 SCHED 10 – AS AMENDED BY ENV ACT 1995) Issue date: 31/03/2003 Effective Date: 31-Mar-2003 Revocation Date: -

6.2 PERMITTED PROCESSES

ID	Distance (m)	Direction	NGR	Description	
11	88	SW	446002 402513	Address: Process: Status: Permit Type: Enforcement: Date of Enforcement: Comment:	Addspace Furniture Limited, Lowfield Road, Bolton On Dearne, Rotherham, S63 8JE Timber process Historical Permit Part B No Enforcements Notified No Enforcements Notified No Enforcements Notified
12	233	W	445820 402534	Address: Process: Status: Permit Type: Enforcement: Date of Enforcement: Comment:	Coltran Ltd, Lowfield Rd, Bolton Upon Dearne, Rotherham, S63 8JT timber process Historical Permit Part B No Enforcements Notified No Enforcements Notified No Enforcements Notified

6.3 POLLUTION INCIDENTS

ID	Distance (m)	Direction	NGR	Description	
1	27	S	446094 402553	Incident Date: Incident Identification: Pollutant: Pollutant Description: Water Impact: Land Impact: Air Impact:	30-Aug-2002 104291 Atmospheric Pollutants and Effects Smoke Category 4 (No Impact) Category 4 (No Impact) Category 3 (Minor)

6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS

None within 250m.

6.5 WASTE**6.5.1 LICENSED WASTE MANAGEMENT FACILITIES (LOCATIONS)**

None within 250m

6.5.2 LANDFILL SITES

None within 250m

6.5.3 REGISTERED WASTE TREATMENT OR DISPOSAL SITES

None within 250m

6.6 HAZARDOUS SUBSTANCES

None within 250m

6.7 ECOLOGICAL RECEPTORS

None within 250m

6.8 SOILS AND GEOLOGY

"Contains British Geological Survey materials © NERC 2018" obtained from <http://www.bgs.ac.uk/data/mapViewers/home.html> under the [Open Government Licence](#)

6.8.1 SUPERFICIAL DEPOSITS

No superficial geology data

6.8.2 BEDROCK

Mexborough Rock - Sandstone. Sedimentary Bedrock formed approximately 310 to 315 million years ago in the Carboniferous Period. Local environment previously dominated by rivers.

Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone. Sedimentary Bedrock formed approximately 310 to 318 million years ago in the Carboniferous Period. Local environment previously dominated by swamps, estuaries and deltas.

6.8.3 COAL MINING

The property is in a surface area that could be affected by underground mining in 5 seams of coal at 220m to 680m depth, and last worked in 1980. Any movement in the ground due to coal mining activity should have stopped

The property is not within a surface area that could be affected by present underground mining

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

6.8.4 NON-COAL MINING

No non-coal mining areas within 50m

6.8.5 RADON

The site is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level. No radon protective measures are necessary as described in publication BR211:2015 by the Building Research Establishment

6.9 AERIAL PHOTOGRAPHY

Aerial photography shows the following

6.9.1 BING

Site is a farm occupied by several buildings.

6.9.2 GOOGLE MAPS

Site is a farm occupied by several buildings.

6.9.3 GOOGLE EARTH

5 images are held in the historic imagery dataset, as follows:

Date	Description
2002	Site is a farm occupied by several buildings .
2003	Site is a farm occupied by several buildings .
21/9/2008	Site is a farm occupied by several buildings
2009	Site is a farm occupied by several buildings
18/06/2017	Site is a farm occupied by several buildings

6.9.4 ENVIRONMENTAL SEARCH

Image taken 07/06/2013

Site is a farm occupied by several buildings

6.10 GOOGLE STREET VIEW

There is one set of images for the site available the site consists of a farm house and several farm buildings. No additional information can be discerned

6.11 HISTORIC MAPPING

The following historic maps have been reviewed as part of this assessment. Castledine and Co. do not hold a license for the reproduction and/or distribution of this data.

Map	Onsite	Offsite
OS County Series: YORKSHIRE (partial) 1854-1855 1:10,560	Site is an agricultural field	Site is surrounded by agricultural fields
OS County Series: YORKSHIRE 1892 1:2,500	No discernable change	No discernable change
OS County Series: YORKSHIRE (partial) 1893-1894 1:10,560	No discernable change	No discernable change
OS County Series: YORKSHIRE 1903 1:2,500	No discernable change	No discernable change
OS County Series: YORKSHIRE (partial) 1905-1906 1:10,560	No discernable change	No discernable change

Map	Onsite	Offsite
OS County Series: YORKSHIRE 1930 1:2,500	Some buildings have been erected on site	Allotments are shown to the west
OS County Series: YORKSHIRE (partial) 1938 1:10,560	No discernable change	No discernable change
OS Plan 1956 1:10,560	No discernable change	No discernable change
OS Plan 1962 1:2,500	Additional buildings are shown onsite	No discernable change
OS Plan 1966-1967 1:10,560	No discernable change	No discernable change
OS Plan (partial) 1972 1:2,500	No discernable change	No discernable change
OS Plan 1976-1980 1:10,000	No discernable change	No discernable change
OS Plan 1988-1989 1:10,000	No discernable change	No discernable change

6.12 CURRENT LAND USE DATA

ID	Distance [m]	Direction	Company	Activity	Category
1	200	SE	Water Pumping Station	Water Pumping Stations	Industrial Features

6.13 PETROL AND FUEL SITES

None within 250m

6.14 HISTORICAL PETROL AND FUEL SITE DATABASE

None within 250m

6.15 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING

ID	Distance [m]	Direction	Use	Date
1A	111	W	Unspecified Factory	1974
2A	111	W	Unspecified Factory	1986

6.16 HISTORICAL TANK DATABASE

None within 250m

6.17 HISTORICAL ENERGY FACILITIES

None within 250m

6.18 HISTORICAL GARAGE AND MOTOR VEHICLE REPAIR DATABASE

None within 250m

6.19 POTENTIALLY INFILLED LAND

None within 250m

7.0 POLLUTANT LINKAGE ASSESSMENT

The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.

The following sections discuss all the identified potential on and off site sources, pathways and receptors in the context of the proposed development and plausible pollutant linkages which may represent a risk to identified receptors from the data gained from the desk study. At this stage the assessment is qualitative and aimed to determine all pollutant linkages, irrespective of significance or allowing for uncertainty.

Three impact potentials exist for any given site, these are:

- The site impacting upon itself;
- The site impacting on its surroundings; and
- The surroundings impacting on the site.

All three impacts need to be considered in a risk assessment.

7.1 SOURCES

The following potential sources of contamination have been identified.

7.1.1 ONSITE

- agricultural use of the site
- Unknown use of the buildings

7.1.2 OFFSITE

- Allotments
- Unknown works

7.2 PATHWAYS

A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development are identified as follows:

- Ingestion;
- Skin contact;
- Inhalation;
- Plant uptake,
- Direct contact by buried structures;
- Leaching of soluble contamination into groundwater

7.3 RECEPTORS

Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by contaminant(s).

- Human Health
 - Current users of the site;
 - Future users of the site;
 - Users of neighbouring sites;

- Construction workers; and
- Services personnel working in trenches.
- Construction Materials
- Buried concrete, which may be affected by high concentrations of sulphate and/or low pH, in the soils and groundwater underlying the site; and
- Buried water pipes.
- Controlled Waters
- Ecological Receptors
- Flora and fauna using the proposed development

8.0 CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) is a hypothesis of the nature and sources of contamination, potential receptors that may be the recipient of contamination arising from those sources and any pathways that may exist. It creates a plausible source-pathway-receptor pollutant linkage (hazard), set within the context of the ground and proposed end use of the site.

8.1 PRELIMINARY CONCEPTUAL SITE MODEL

8.1.1 SOIL CONTAMINATION

Site is currently a cleared site with a demolition rubble stock pile formerly used as a farm

Historic agricultural practices and have the potential to have contaminated the site with various substances including

- Metals and metalloids;
- Polycyclic aromatic hydrocarbons (PAH's);
- Petroleum hydrocarbons
- pesticides

There is a requirement to raise ground level across the site.

8.1.2 HAZARDOUS GROUND GAS AND VAPOURS

There are no significant sources of ground gas in the vicinity of the site

As such the protection offered by modern building regulations compliant floor is likely to provide sufficient protection as outlined in CL:AIRE RB17 A Pragmatic Approach to Ground Gas Risk Assessment.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Consequence	Risk	Possible Mitigation
Contaminated Soils	Direct Ingestion & Direct Contact	Site Workers	Lw	Md	M/L	Site workers to wear appropriate PPE for health and safety reasons
Contaminated Soils	Inhalation of Dust	Site Workers	Lw	Md	M/L	
Contaminated Soils	Direct Ingestion & Direct Contact	End Users	Lw	Md	M/L	
Contaminated Soils	Inhalation of Dust	End Users	Lw	Md	M/L	
Contaminated Soils	Direct Ingestion	Flora and Fauna	Lw	Md	M/L	
Contaminated Soils	Vertical and lateral migration	Controlled Waters	Lw	Md	M/L	
Contaminated Soils	Direct contact	Services	Lw	Md	M/L	
Ground Gases (Methane and CO ₂)	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	
Volatile and Semi-volatile Organic Compounds	Vertical and lateral migration	End Users & Building Envelope	Lw	Md	M/L	
Radon	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	

KEY: Probability of pollutant linkage Hi = Highly likely, Li = Likely, Lw = Low Likelihood, UI = Unlikely
 Consequence Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor,
 Overall Risk VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low

Based on the preliminary CSM for the site, an environmental risk assessment has been undertaken. A simple matrix can provide a consistent basis for decision making. It should be used with caution, recognising the over-simplification that it will normally represent. The probability and consequences are defined according to parameters relevant to the situation; the boundaries of risk acceptability (and tolerability, where relevant) indicated on the matrix provided in Table 2, can be tailored to the factors influencing the significance of the risk. Individual situations are mapped onto the matrix to provide a ready and consistent indication of their acceptability or tolerability.

TABLE 2. RISK CLASSIFICATION MATRIX

		Consequence			
		Severe (Sv)	Medium (Md)	Mild (Mi)	Minor (Mr)
Probability	High (Hi)	Very high risk	High risk	Moderate Risk	Moderate/Low Risk
	Likely (Li)	High risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood (Lw)	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely (UI)	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Source: CIRIA Report C552, Contaminated Land Risk Assessment. A Guide to Good Practice, 2001

These attributes are evaluated qualitatively against individual hazard assessments to determine the likelihood of a given hazard occurring. The risk evaluations for each plausible pollutant linkage are given in the last three columns of Table 1.

TABLE 3. CLASSIFICATION OF RISK

Very high risk (Vh)	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High risk (Hi)	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate risk (Md)	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk (Lw)	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk (VI)	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Source: CIRIA Report C552, Contaminated Land Risk Assessment: A Guide to Good Practice, 2001

9.0 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

Based on the information contained in this report, it is the opinion of Castledine & Co that the site represents a moderate to low risk with respect to the proposed development.

It is recommended that remediation in-line with section 11.0 is undertaken

It is recommended that the Buildings on site should be subject to an asbestos survey and removal by appropriately qualified personal prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

This should be Discussed with the Local Planning Authority / Local council Contaminated Land Officer

10.0 FURTHER ENVIRONMENTAL INVESTIGATION

It is not envisaged that further testing will be required.

This should be Discussed with the Local Planning Authority / Local council Contaminated Land Officer

11.0 REMEDIAL ACTIONS AND VERIFICATION

1. There is a requirement for the raising of ground levels across the site therefor the Capping of soft-landscaping areas with a minimum of 600mm of clean material. Prior to the placement of material it should be tested in line with Guidance And Good Practice Verification Of Cover Systems – Testing Criteria For Subsoil And Topsoil, page 10, NHBC Technical Extra Note Issue 8 Nov 2012. (<http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Technical/TechnicalExtra/filedownload.48980.en.pdf>). The chemical testing criteria are presented in Appendix D.

The suitability of the soil should be confirmed with the **Local Planning Authority** prior to its importation.

All transfer notes and/or receipts for the soil should be retained.

The thickness of the soil placed will require evidence either via photographs during its placement or by digging of post placement verification trial holes

2. A watching brief should be had during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material) development should stop and Castledine & Co should be contact to determine if further assessment or changes to the remediation scheme are required.

12.0 REFERENCES**12.1 LEGISLATION AND REGULATIONS****12.1.1 ACTS**

- [1] Environmental Protection Act 1990, Part IIA: inserted by Environment Act 1995, Section 57. See Environment Act 1995 for text of Part IIA.

12.1.2 PLANNING REGULATIONS

- [2] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 SI1999/No.293
- [3] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2000 SI2000/No.2867

12.1.3 CONTAMINATED LAND REGULATIONS

- [4] The Contaminated Land (England) Regulations 2000. SI2000/No.227
- [5] The Contaminated Land (England) (Amendment) Regulations 2001 SI2001/No.663
- [6] The Contaminated Land (England) Regulations 2006 SI2006/No.1380

12.2 STATUTORY GUIDANCE

- [7] Department of Environment, Food and Rural Affairs. 2012. *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance*. Department of Environment, Food and Rural Affairs
- [8] Communities and local Government, 2012: National Planning Policy Framework.

12.3 BRITISH STANDARDS

- [9] BS 5930:1999 Code of practice for site investigations
- [10] BS 10175:2011+A1:2013 Investigation of potentially contaminated sites - Code of practice
- [11] BS 8485:2015 bs 8485 - 2015 - Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings
- [12] BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)

12.4 NON STATUTORY TECHNICAL GUIDANCE**12.4.1 ENVIRONMENT AGENCY**

- [13] Cassella Stranger, 2002. Model Procedures for the Management of Contaminated Land, Contaminated Land Report (CLR) 11, Department for Environment, Food, and Rural Affairs.

12.4.2 CIRIA PUBLICATIONS

- [14] Wilson, S., Oliver, S., Mallett, H., Hutchings, H., and Card, G.. 2007, *C 665 Assessing risks posed by hazardous ground gases to buildings* London: Construction Industry Research and Information Association
- [15] Mallett, H., Cox, L., Wilson, S. and ,Corban M... 2014, *C 735 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases* London: Construction Industry Research and Information Association

12.4.3 CL:AIRE

- [16] Card G, Wilson S, Mortimer S. 2012. *A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17.* CL:AIRE, London, UK. ISSN 2047- 6450 (Online)

13.0 APPENDICES

APPENDIX A

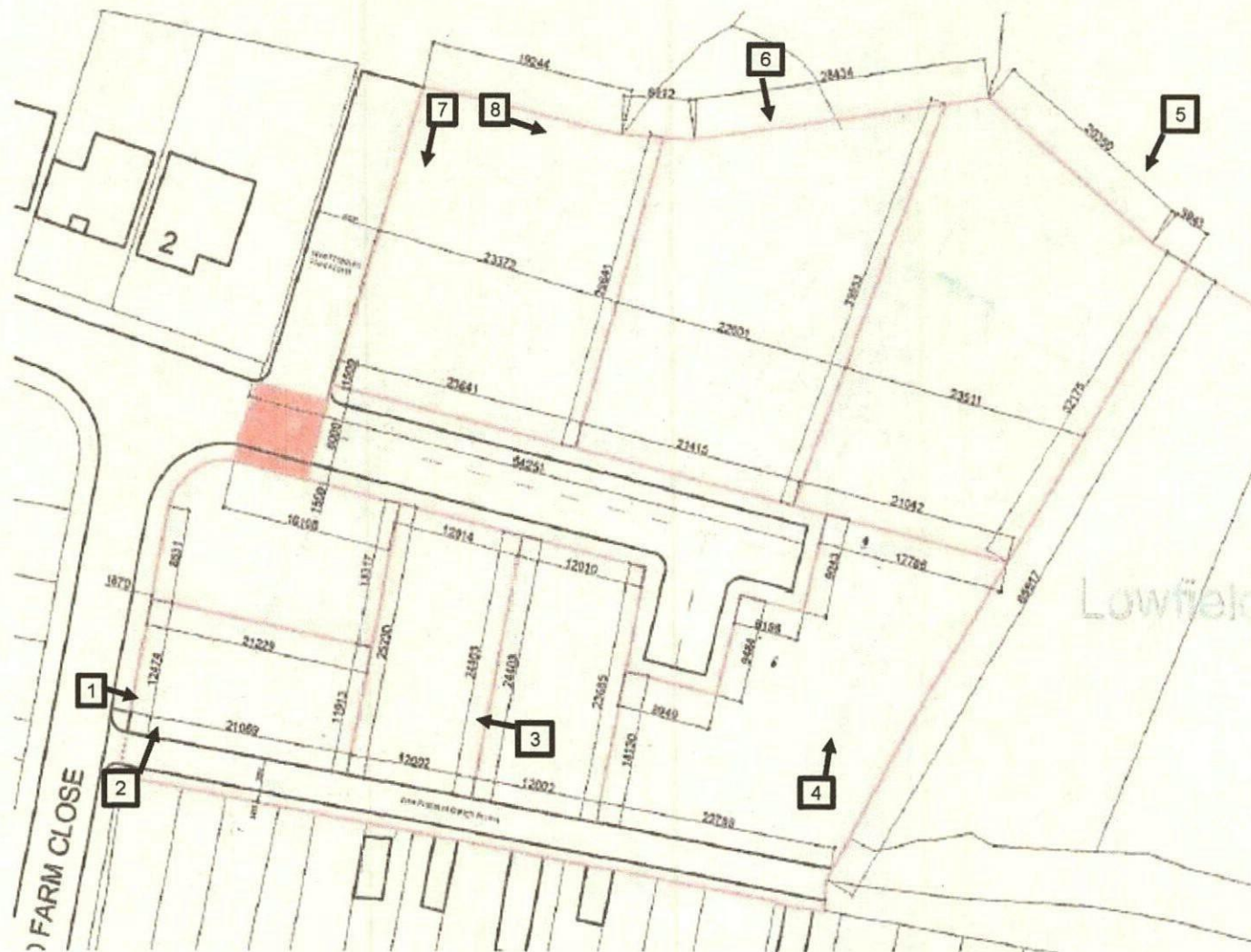
ENVIRONMENTAL SEARCH

APPENDIX B

PROPOSED AND CURRENT SITE PLANS

APPENDIX C

SITE PHOTOS AND LOCATIONS



1.



2.



3.



4.



5.



6.



7.



8.



APPENDIX D SOIL SCREENING CRITERIA

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Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POsresi (1%SOM)	POsresi (2.5%SOM)	POsresi (6%SOM)	POspark (1%SOM)	POspark (2.5%SOM)	POspark (6%SOM)
Default Suite																			
Arsenic	C4SL			40			37			49			640			79			170
Beryllium	S4UL			1.7			1.7			35			12			2.2			63
Boron	S4UL			290			11000			45			240000			21000			46000
Cadmium	C4SL			22			150			3.9			410			220			880
Chromium (III)	S4UL			910			910			18000			8600			1500			33000
Chromium (VI)	C4SL			21			21			170			49			21			250
Copper	S4UL			2400			7100			520			68000			12000			44000
Lead	C4SL			310			200			80			2330			630			1300
Mercury Elemental	S4UL			1.2			1.2			21			58 ^{VAP} (25.8)			16			30 ^{VAP} (25.8)
Mercury inorganic	S4UL			40			56			19			1100			120			240
Mercury methyl	S4UL			11			19			6			320			40			68
Nickel	S4UL			180			180			230			980			230			3400
Selenium	S4UL			250			430			88			12000			1100			1800
Vanadium	S4UL			410			1200			91			9000			2000			5000
Zinc	S4UL			3700			40000			620			730000			81000			170000
Phenol	S4UL	280	550	1100	750	1300	2300	66	140	280	760 ^{DIR} (31000)	1500 ^{DIR} (35000)	3200 ^{DIR} (37000)	760 ^{DIR} (11000)	1500 ^{DIR} (11000)	3200 ^{DIR} (11000)	760 ^{DIR} (8600)	1500 ^{DIR} (9700)	3200 ^{DIR} (11000)
Acenaphthene	S4UL	3000 ^{SOL} (57)	4700 ^{SOL} (141)	6000 ^{SOL} (336)	210	510	1100	34	85	200	84000 ^{SOL} (57.0)	97000 ^{SOL} (141)	100000	15000	15000	15000	29000	30000	30000
Acenaphthylene	S4UL	2900 ^{SOL} (86.1)	4600 ^{SOL} (212)	6000 ^{SOL} (506)	170	420	920	28	69	160	83000 ^{SOL} (86.1)	97000 ^{SOL} (212)	100000	15000	15000	15000	29000	30000	30000

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POsresi (1%SOM)	POsresi (2.5%SOM)	POsresi (6%SOM)	POspark (1%SOM)	POspark (2.5%SOM)	POspark (6%SOM)
Anthracene	S4UL	31000 VAP (1.17)	35000	37000	2400	5400	11000	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000
Benz(a)anthracene	S4UL	11	14	15	7.2	11	13	2.9	6.5	13	170	170	180	29	29	29	49	56	62
Benzo(a)pyrene	S4SL	3.2	3.2	3.2	2.2	2.7	3.0	0.97	2.0	3.5	35	35	36	5.7	5.7	5.7	11	12	13
Benzo(b)fluoranthene	S4UL	3.9	4.0	4.0	2.6	3.3	3.7	0.99	2.1	3.9	44	44	45	7.1	7.2	7.2	13	15	16
Benzo(ghi)perylene	S4UL	360	360	360	320	340	350	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600
Benzo(k)fluoranthene	S4UL	110	110	110	77	93	100	37	75	130	1200	1200	1200	190	190	190	370	410	440
Chrysene	S4UL	30	31	32	15	22	27	4.1	9.4	19	350	350	350	57	57	57	93	110	120
Dibenz(ah)anthracene	S4UL	0.31	0.32	0.32	0.24	0.28	0.3	0.14	0.27	0.43	3.5	3.6	3.6	0.57	0.57	0.58	1.1	1.3	1.4
Fluoranthene	S4UL	1500	1600	1600	280	560	890	52	130	290	23000	23000	23000	3100	3100	3100	6300	6300	6400
Fluorene	S4UL	2800 SOL (30.9)	3800 SOL (76.5)	4500 SOL (183)	170	400	860	27	67	160	63000 SOL (30.9)	68000	71000	9900	9900	9900	20000	20000	20000
Indeno(123cd)pyrene	S4UL	45	46	46	27	36	41	9.5	21	39	500	510	510	82	82	82	150	170	180
Naphthalene	S4UL	2.3	5.6	13	2.3	5.6	13	4.1	10	24	190 SOL (76.4)	460 SOL (183)	1100 SOL (432)	4900	4900	4900	1200 SOL (76.4)	1900 SOL (183)	3000
Phenanthrene	S4UL	1300 SOL (36)	1500	1500	95	220	440	15	38	90	22000	22000	23000	3100	3100	3100	6200	6200	6300
Pyrene	S4UL	3700	3800	3800	620	1200	2000	110	270	620	54000	54000	54000	7400	7400	7400	15000	15000	15000
TPH fractions																			
TPH ali EC05-EC06	S4UL	42	78	160	42	78	160	730	1700	3900	3200 SOL (304)	5900 SOL (558)	12000 SOL (1150)	570000 SOL (304)	590000	600000	95000 SOL (304)	130000 SOL (558)	180000 SOL (1150)
TPH ali >EC06-EC08	S4UL	100	230	530	100	230	530	2300	5600	13000	7800 SOL (144)	17000 SOL (322)	40000 SOL (736)	600000	610000	620000	150000 SOL (144)	220000 SOL (322)	320000 SOL (736)
TPH ali >EC08-EC10	S4UL	27	65	150	27	65	150	320	770	1700	2000 SOL (78)	4800 VAP (190)	11000 VAP (451)	13000	13000	13000	14000 SOL (78)	18000 VAP (190)	21000 VAP (451)

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSteel (1%SOM)	POSteel (2.5%SOM)	POSteel (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
TPH ali >EC10-EC12	S4UL	130 ^{VAP} (48)	330 ^{VAP} (118)	770 ^{VAP} (283)	130 ^{VAP} (48)	330 ^{VAP} (118)	760 ^{VAP} (283)	2200	4400	7300	9700 ^{SOL} (48)	23000 ^{VAP} (118)	47000 ^{VAP} (283)	13000	13000	13000	21000 ^{SOL} (48)	23000 ^{VAP} (118)	24000 ^{VAP} (283)
TPH ali >EC12-EC16	S4UL	1100 ^{SOL} (24)	2400 ^{SOL} (59)	4400 ^{SOL} (142)	110 ^{SOL} (24)	2400 ^{SOL} (59)	4300 ^{SOL} (142)	11000	13000	13000	59000 ^{SOL} (24)	82000 ^{SOL} (59)	90000 ^{SOL} (142)	13000	13000	13000	25000 ^{SOL} (24)	25000 ^{SOL} (59)	26000 ^{SOL} (142)
TPH ali >EC16-EC35	S4UL	65000 ^{SOL} (8.48)	92000 ^{SOL} (21)	110000	65000 ^{SOL} (8.4)	92000 ^{SOL} (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000
TPH ali >EC35-EC44	S4UL	65000 ^{SOL} (8.48)	92000 ^{SOL} (21)	110000	65000 ^{SOL} (8.48)	92000 ^{SOL} (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000
TPH aro EC05-EC07	S4UL	370	690	1400	70	140	300	13	27	57	26000 ^{SOL} (1220)	46000 ^{SOL} (2260)	86000 ^{SOL} (4710)	56000	56000	56000	76000 ^{SOL} (1220)	84000 ^{SOL} (2260)	92000 ^{SOL} (4710)
TPH aro >EC07-EC08	S4UL	860	1800	3900	130	290	660	22	51	120	56000 ^{VAP} (869)	110000 ^{SOL} (1920)	180000 ^{VAP} (4360)	56000	56000	56000	87000 ^{VAP} (869)	95000 ^{SOL} (1920)	100000 ^{VAP} (4360)
TPH aro >EC08-EC10	S4UL	47	110	270	34	83	190	8.6	21	51	3500 ^{VAP} (613)	8100 ^{VAP} (1500)	17000 ^{VAP} (3580)	5000	5000	5000	7200 ^{VAP} (613)	8500 ^{VAP} (1500)	9300 ^{VAP} (3580)
TPH aro >EC10-EC12	S4UL	250	590	1200	74	180	380	13	31	74	16000 ^{SOL} (364)	28000 ^{SOL} (899)	34000 ^{SOL} (2150)	5000	5000	5000	9200 ^{SOL} (364)	9700 ^{SOL} (899)	10000
TPH aro >EC12-EC16	S4UL	1800	2300 ^{SOL} (419)	2500	140	330	660	23	57	130	36000 ^{SOL} (169)	37000	38000	5100	5100	5000	10000	10000	10000
TPH aro >EC16-EC21	S4UL	1900	1900	1900	260	540	930	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800
TPH aro >EC21-EC35	S4UL	1900	1900	1900	1100	1500	1700	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900
TPH aro >EC35-EC44	S4UL	1900	1900	1900	1100	1500	1700	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900
TPH >EC44-EC70	S4UL	1900	1900	1900	1600	1800	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900
VOCs - BTEX & MTBE																			
Benzene	C4SL			0.87			3.3			0.18			98			140			230

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSpas (1%SOM)	POSpas (2.5%SOM)	POSpas (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
Toluene	S4UL	880 ^{VAP} (869)	1900	3900	130	290	660	22	51	120	56000 ^{VAP} (869)	110000 ^{VAP} (1920)	180000 ^{VAP} (4360)	56000	56000	56000	100000 ^{VAP} (869)	100000 ^{VAP} (192)	100000 ^{VAP} (4360)
Ethylbenzene	S4UL	83	190	440	47	110	260	16	39	91	570 ^{VAP} (518)	13000 ^{VAP} (1220)	27000 ^{VAP} (2840)	24000	24000	25000	17000 ^{VAP} (518)	22000 ^{VAP} (1220)	27000 ^{VAP} (2840)
Xylene, o-	S4UL	88	210	480	60	140	330	28	67	160	6600 ^{VAP} (478)	15000 ^{SOL} (1120)	33000 ^{SOL} (2620)	41000	42000	43000	17000 ^{SOL} (478)	24000 ^{SOL} (1120)	33000 ^{SOL} (2620)
Xylene, m-	S4UL	82	190	450	59	140	320	31	74	170	6200 ^{VAP} (625)	14000 ^{VAP} (1470)	31000 ^{VAP} (3460)	41000	42000	43000	17000 ^{VAP} (625)	24000 ^{VAP} (1470)	32000 ^{VAP} (3460)
Xylene, p- (use this for combined m & p)	S4UL	79	180	430	59	130	310	29	69	160	5900 ^{SOL} (576)	14000 ^{SOL} (1350)	30000 ^{SOL} (3170)	41000	42000	43000	17000 ^{SOL} (576)	23000 ^{SOL} (2620)	31000 ^{SOL} (3170)
VOCs – chlorobenzenes																			
Chlorobenzene	S4UL	0.46	1	2.4	0.46	1	2.4	5.9	14	32	56	130	290	11000	13000	14000	1300 ^{SOL} (675)	2000 ^{SOL} (1520)	2800
1,2-Dichlorobenzene	S4UL	24	57	130	23	55	130	94	230	540	2000 ^{SOL} (571)	4800 ^{SOL} (1370)	11000 ^{SOL} (3240)	90000	95000	98000	24000 ^{SOL} (571)	36000 ^{SOL} (1370)	51000 ^{SOL} (3240)
1,3-Dichlorobenzene	S4UL	0.44	1.1	2.5	0.4	1	2.3	0.25	0.6	1.5	30	73	170	300	300	300	390	440	470
1,4-Dichlorobenzene	S4UL	61	150	350	61	150	350	15	37	88	4400 ^{VAP} (224)	10000 ^{VAP} (540)	2500 ^{VAP} (1280)	17000	17000	17000	36000 ^{VAP} (224)	36000 ^{VAP} (540)	36000 ^{VAP} (1280)
Hexachlorobenzene	S4UL	4.1 ^{VAP} (0.2)	5.7 ^{VAP} (0.5)	6.7 ^{VAP} (1.2)	1.8 ^{VAP} (0.2)	3.3 ^{VAP} (0.5)	4.9	0.47	1.1	2.5	110 ^{VAP} (0.2)	120	120	16	16	16	30	30	30
Pentachlorobenzene	S4UL	19	30	38	5.8	12	22	1.2	3.1	7	640 ^{SOL} (43)	770 ^{SOL} (107)	830	100	100	100	190	190	190
1,2,3-trichlorobenzene	S4UL	1.5	3.7	8.8	1.5	3.6	8.6	4.7	12	28	102	250	590	1800	1800	1800	770 ^{VAP} (134)	1100 ^{VAP} (330)	1600 ^{VAP} (789)
1,2,4-trichlorobenzene	S4UL	2.6	6.4	15	2.6	6.4	15	55	140	320	220	530	1300	15000	17000	19000	1700 ^{VAP} (318)	2600 ^{VAP} (786)	4000 ^{VAP} (1880)

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSi (1%SOM)	POSi (2.5%SOM)	POSi (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
1,3,5-trichlorobenzene	S4UL	0.33	0.81	1.9	0.33	0.81	1.9	4.7	12	28	23	55	130	1700	1700	1800	380 ^{VAP} (36.7)	580 ^{VAP} (90.8)	860 ^{VAP} (217)
1,2,3,4-tetrachlorobenzene	S4UL	24	56	120	15	36	78	4.4	11	26	1700 ^{VAP} (122)	3080 ^{VAP} (304)	4400 ^{VAP} (728)	830	830	830	1500 ^{VAP} (122)	1600	1600
1,2,3,5-tetrachlorobenzene	S4UL	0.75	1.9	4.3	0.66	1.6	3.7	0.38	0.90	2.2	49 ^{VAP} (39.4)	120 ^{VAP} (98.1)	240 ^{VAP} (235)	78	79	79	110 ^{VAP} (39)	120	130
1,2,4,5-tetrachlorobenzene	S4UL	0.73	1.7	3.5	0.33	0.77	1.6	0.06	0.16	0.37	42 ^{SOL} (19.7)	72 ^{SOL} (49.1)	96	13	13	13	25	26	26
VOCs - chloroalkanes & alkanes																			
Chloroethene (aka vinyl chloride)	S4UL	0.00077	0.0010	0.0015	0.00064	0.00087	0.0014	0.00055	0.0010	0.0018	0.059	0.077	0.12	3.5	3.5	3.5	4.8	5	5.4
1,2-Dichloroethane	S4UL	0.0092	0.013	0.023	0.0071	0.011	0.019	0.0046	0.0083	0.016	0.67	0.97	1.7	29	29	29	21	24	28
Tetrachloroethene	S4UL	0.18	0.4	0.92	0.18	0.39	0.9	0.65	1.5	3.6	19	42	95	1400	1400	1400	810 ^{SOL} (424)	1100 ^{SOL} (951)	1500
1,1,1,2-Tetrachloroethane	S4UL	1.5	3.5	8.2	1.2	2.8	6.4	0.79	1.9	4.4	110	250	560	1400	1400	1400	1500	1800	2100
1,1,2,2-Tetrachloroethane	S4UL	3.9	8	17	1.6	3.4	7.5	0.41	0.89	2.0	270	550	1100	1400	1400	1400	1800	2100	2300
Tetrachloromethane	S4UL	0.026	0.056	0.13	0.026	0.056	0.13	0.45	1	2.4	2.9	6.3	14	890	920	950	190	270	400
Trichloroethene	S4UL	0.017	0.036	0.080	0.016	0.034	0.075	0.041	0.091	0.21	1.2	2.6	5.7	120	120	120	70	91	120
1,1,1-Trichloroethane	S4UL	9	18	40	8.8	18	39	48	110	240	660	1300	3000	140000	140000	140000	57000 ^{VAP} (1425)	76000 ^{VAP} (2915)	100000 ^{VAP} (6392)
Trichloromethane	S4UL	1.2	2.1	4.2	0.91	1.7	3.4	0.42	0.83	1.7	99	170	350	2500	2500	2500	2600	2800	3100
Other phenols & chlorophenols																			
Chlorophenols	S4UL	0.87	2	4.5	94	150	210	0.13	0.3	0.7	3500	4000	4300	620	620	620	1100	1100	1100
Pentachlorophenol	S4UL	27 ^{VAP} (16.4)	29	31	0.22	0.52	1.2	0.03	0.08	0.19	400	400	400	60	60	60	110	120	120
Pesticides																			
Aldrin	S4UL	7.3	7.4	7.5	5.7	6.6	7.1	3.2	6.1	9.6	170	170	170	18	18	18	30	31	31

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POStreal (1%SOM)	POStreal (2.5%SOM)	POStreal (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
Atrazine	S4UL	610	620	620	3.3	7.6	17.4	0.5	1.2	2.7	9300	9400	9400	1200	1200	1200	2300	2400	2400
Dichlofos	S4UL	6.4	6.5	6.6	0.032	0.066	0.14	0.0049	0.010	0.022	140	140	140	16	16	16	26	26	27
Dieldrin	S4UL	7	7.3	7.4	0.97	2	3.5	0.17	0.41	0.96	170	170	170	18	18	18	30	30	31
Endosulfan - alpha	S4UL	160 ^{VAP} (0.003)	280 ^{VAP} (0.007)	410 ^{VAP} (0.016)	7.4	18	41	1.2	2.9	6.8	5600 ^{VAP} (0.003)	7400 ^{VAP} (0.007)	8400 ^{VAP} (0.016)	1200	1200	1200	2400	2400	2500
Endosulfan - beta	S4UL	190 ^{VAP} (0.00007)	320 ^{VAP} (0.0002)	440 ^{VAP} (0.0004)	7	17	39	1.1	2.7	6.4	6300 ^{VAP} (0.00007)	7800 ^{VAP} (0.0002)	8700	1200	1200	1200	2400	2400	2500
Hexachlorocyclohexanes - alpha (inc. Lindane)	S4UL	6.9	9.2	11	0.23	0.55	1.2	0.035	0.087	0.21	170	180	180	24	24	24	47	48	48
Hexachlorocyclohexanes - beta (inc. Lindane)	S4UL	3.7	3.8	3.8	0.085	0.2	0.46	0.013	0.032	0.077	65	65	65	8.1	8.1	8.1	15	15	16
Hexachlorocyclohexanes - gamma (inc. Lindane)	S4UL	2.9	3.3	3.5	0.06	0.14	0.33	0.0092	0.023	0.054	67	69	70	8.2	8.2	8.2	14	15	15
Explosives																			
HMX	S4UL	6700	6700	6700	5.7	13	26	0.86	1.9	3.9	110000	110000	110000	13000	13000	13000	23000 ^{VAP} (0.35)	23000 ^{VAP} (0.39)	24000 ^{VAP} (0.48)
RDX	S4UL	13000	13000	13000	120	250	540	17	38	85	210000	210000	210000	26000	26000	27000	49000 ^{SOL} (18.7)	51000	53000
2,4,6-Trinitrotoluene	S4UL	65	66	66	1.6	3.7	8.1	0.24	0.58	1.4	1000	1000	1000	130	130	130	260	270	270
Other organics																			
Carbon disulphide	S4UL	0.14	0.29	0.62	0.14	0.29	0.62	4.8	10	23	11	22	47	11000	11000	12000	1300	1900	2700
Hexachloro-1,3-butadiene	S4UL	0.29	0.7	1.6	0.32	0.78	1.8	0.25	0.61	1.4	31	66	120	25	25	25	48	50	51

VAP
SOL
DIR

S4UL exceeds vapour saturation limit (presented in brackets)
S4UL exceeds solubility saturation limit (presented in brackets)
S4UL based on threshold protective of direct skin contact (value in brackets based on health effects of long term exposure)

APPENDIX E

COAL REPORT

Address: LOWFIELD FARM, LOWFIELD FARM CLOSE, BOLTON UPON DEARNE, BARNSELY,
Date: 20 Apr 2018
Reference: GS-4907011
Client: Castledine & Co



Aerial Photograph Capture date: 07-Jun-2013
Grid Reference: 446094,402622
Site Size: 0.52ha

Report Reference: GS-4907011
Client Reference: White_Rotherham

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Overview of Findings

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Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	2	68
1.2 Additional Information – Historical Tank Database	0	0	0	53
1.3 Additional Information – Historical Energy Features Database	0	0	0	7
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Potentially Infilled Land	0	0	0	20

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	2	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	3	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	1	0	6
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	4	2
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	1	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	3	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	2	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	4	5	7

Section 4: Current Land Use

	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	1	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology

5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	None identified
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	None identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?				Identified		
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?				Identified		
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	3	2	1
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	0	1	0	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

0-500m

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	Yes	Yes
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	0	24	48	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Identified					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site?	Identified					
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Low					
7.4 Are there any Flood Defences within 250m of the study site?	None identified					
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	None identified					
7.6 Are there any areas used for Flood Storage within 250m of the study site?	Identified					
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential					
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low					

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	1
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	1	0	0	0	0	1
8.14 Records of Green Belt land	1	0	0	1	1	2

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?

Very Low

9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?

Very Low

9.1.2 What is the maximum Landslides hazard rating identified on the study site?

Very Low

9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?

Negligible

9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?

Negligible

9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?

Very Low

9.1.6 What is the maximum Running Sand hazard rating identified on the study site?

Negligible

9.2 Radon

9.2.1 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 in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

9.2.2 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.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?

Identified

10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?

None identified

10.3 Are there any brine affected areas within 75m of the study site?

None identified

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

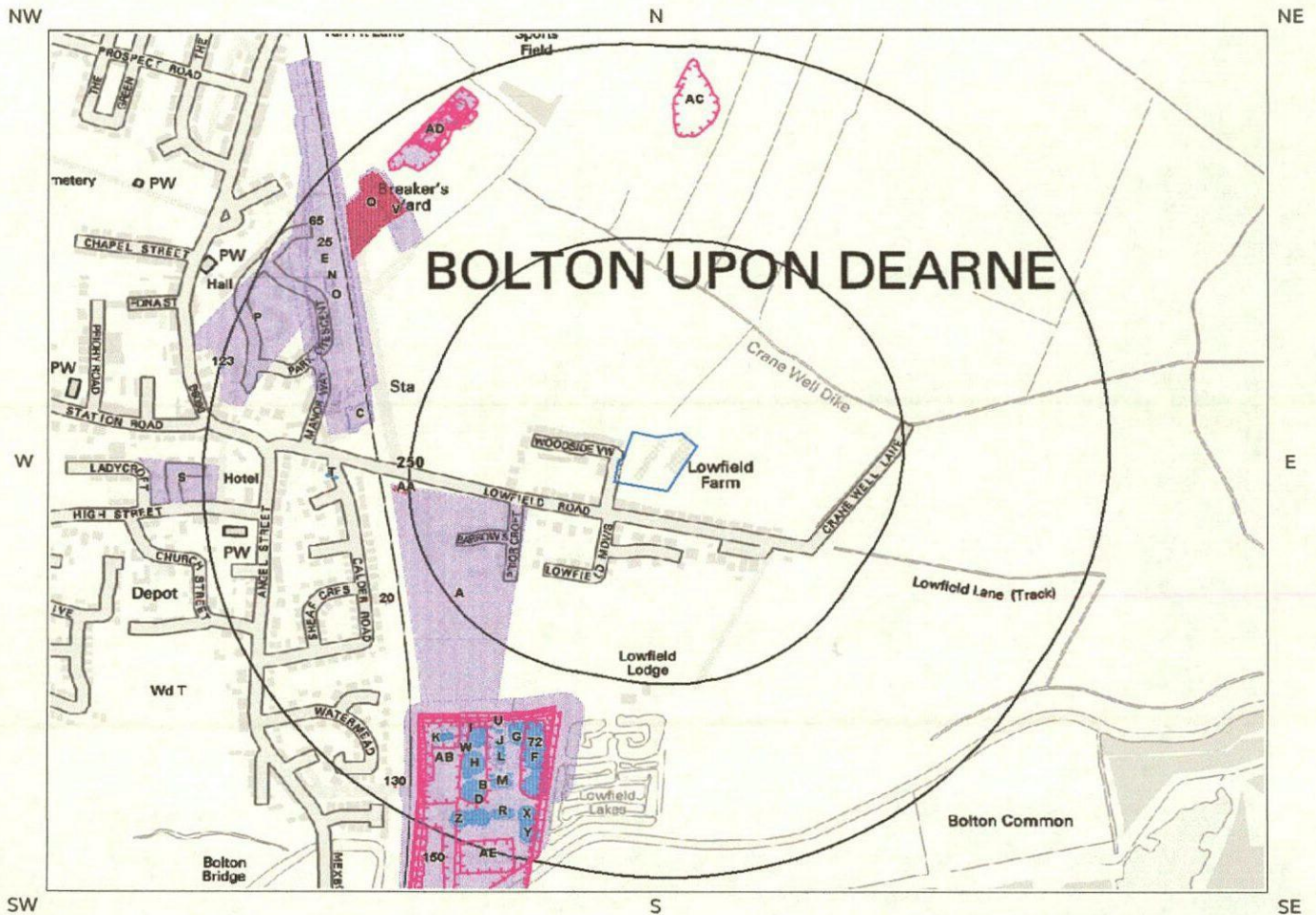
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

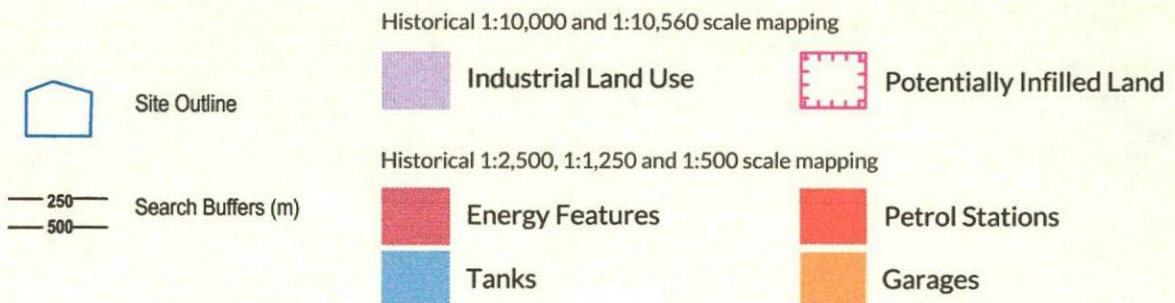
Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



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1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 70

ID	Distance [m]	Direction	Use	Date
1A	111	W	Unspecified Factory	1974
2A	111	W	Unspecified Factory	1986
3B	279	S	Unspecified Works	1966
4B	298	S	Sewage Works	1951
5C	301	W	Railway Station	1938
6C	302	W	Railway Station	1951
7C	302	W	Railway Station	1966
8C	302	W	Railway Station	1986
9C	302	W	Railway Station	1974
10C	302	W	Railway Station	1948
11D	303	S	Sewage Works	1938
12C	304	W	Railway Station	1901
13D	304	S	Sewage Works	1948
14D	304	S	Sewage Works	1948
15D	305	S	Sewage Works	1974
16D	305	S	Sewage Works	1986
17N	309	W	Railway Sidings	1938
18O	310	W	Railway Sidings	1966
19E	312	W	Railway Sidings	1901
20	313	SW	Railway Building	1948
21E	315	W	Railway Sidings	1951
22G	320	S	Unspecified Tanks	1951
23F	320	S	Unspecified Tanks	1986
24F	320	S	Filter Beds	1974
25	322	W	Railway Sidings	1948
26G	323	S	Unspecified Tanks	1966
27G	325	S	Unspecified Tank	1938
28G	326	S	Unspecified Tanks	1948
29G	335	S	Unspecified Tanks	1938
30H	352	SW	Filter Beds	1974
31H	352	SW	Unspecified Tanks	1986
32F	353	S	Unspecified Tank	1938
33I	354	SW	Unspecified Tank	1951
34K	356	SW	Sewage Works	1901

35I	357	SW	Unspecified Tank	1938
36V	358	NW	Unspecified Yard	1986
37J	361	S	Unspecified Tanks	1986
38J	361	S	Unspecified Tank	1974
39J	362	SW	Unspecified Tanks	1938
40K	375	SW	Unspecified Tanks	1951
41K	379	SW	Unspecified Tanks	1966
42L	379	S	Unspecified Tanks	1986
43L	379	S	Unspecified Tank	1974
44L	380	S	Unspecified Tanks	1938
45K	380	SW	Unspecified Tanks	1938
46K	385	SW	Unspecified Tanks	1986
47Q	401	NW	Gas Works	1901
48M	402	S	Unspecified Tanks	1974
49M	402	S	Unspecified Tanks	1986
50N	403	NW	Goods Shed	1938
51O	404	NW	Goods Shed	1948
52N	406	NW	Railway Building	1901
53N	407	NW	Railway Building	1966
54N	407	NW	Goods Shed	1951
55P	422	W	Unspecified Mill	1974
56P	422	W	Timber Yard	1986
57P	422	W	Unspecified Mill	1966
58Q	423	NW	Gasometer	1901
59AD	426	NW	Old Clay Pit	1901
60X	436	S	Unspecified Tank	1986
61R	439	S	Unspecified Tanks	1986
62R	439	S	Unspecified Tanks	1974
63D	458	S	Unspecified Tank	1986
64Y	461	S	Unspecified Tank	1986
65	464	NW	Railway Building	1948
66Z	469	SW	Unspecified Tank	1986
67AE	478	S	Sludge Beds	1974
68S	481	W	Unspecified Depot	1986
69S	481	W	Unspecified Depot	1974
70S	481	W	Unspecified Depot	1966

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

53

ID	Distance (m)	Direction	Use	Date
71G	324	S	Tanks	1961
72	324	S	Tanks	1962
73F	324	S	Tanks	1995
74G	334	S	Tanks	1962
75T	337	W	Tanks	1961
76T	337	W	Tanks	1962
77U	341	SW	Tanks	1982
78U	341	SW	Tanks	1979
79U	348	SW	Tanks	1982
80U	348	SW	Tanks	1979
81U	349	SW	Tanks	1930
82I	356	SW	Unspecified Tank	1962
83I	356	SW	Unspecified Tank	1961
84I	357	SW	Unspecified Tank	1995
85J	360	S	Unspecified Tank	1979
86J	360	S	Unspecified Tank	1982
87L	360	S	Tanks	1962
88L	379	S	Unspecified Tank	1979
89L	379	S	Unspecified Tank	1982
90K	381	SW	Tanks	1961
91K	381	SW	Tanks	1962
92K	381	SW	Tanks	1982
93K	381	SW	Tanks	1979
94K	384	SW	Tanks	1930
95H	386	SW	Unspecified Tank	1995
96W	387	SW	Tanks	1930
97L	396	S	Tanks	1982
98L	396	S	Tanks	1979
99M	396	S	Tanks	1979
100M	396	S	Tanks	1982
101V	397	NW	Gas Works	1891
102Q	397	NW	Gas Works	1903
103K	402	SW	Unspecified Tank	1982
104K	402	SW	Unspecified Tank	1979
105H	404	S	Tanks	1979
106H	404	S	Tanks	1982
107B	405	S	Tanks	1979
108B	405	S	Tanks	1982
109H	413	SW	Tanks	1930
110W	415	SW	Unspecified Tank	1979
111AB	415	SW	Unspecified Tank	1982

112B	420	SW	Unspecified Tank	1995
113Q	420	NW	Gasometer	1891
114Q	420	NW	Gasometer	1903
115X	431	S	Unspecified Tank	1982
116Y	432	S	Tanks	1995
117R	441	S	Tanks	1979
118R	441	S	Tanks	1982
119Z	452	S	Unspecified Tank	1982
120Z	453	S	Tanks	1995
121Y	456	S	Unspecified Tank	1982
122Z	463	SW	Unspecified Tank	1982
123	495	W	Tanks	1974

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary:

7

ID	Distance (m)	Direction	Use	Date
124AA	252	W	Electricity Substation	1994
125AA	261	W	Electricity Substation	1974
126Q	397	NW	Gas Works	1891
127Q	397	NW	Gas Works	1903
128Q	420	NW	Gasometer	1891
129Q	420	NW	Gasometer	1903
130	470	SW	Electricity Substation	1995

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary:

0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

Database searched and no data found.

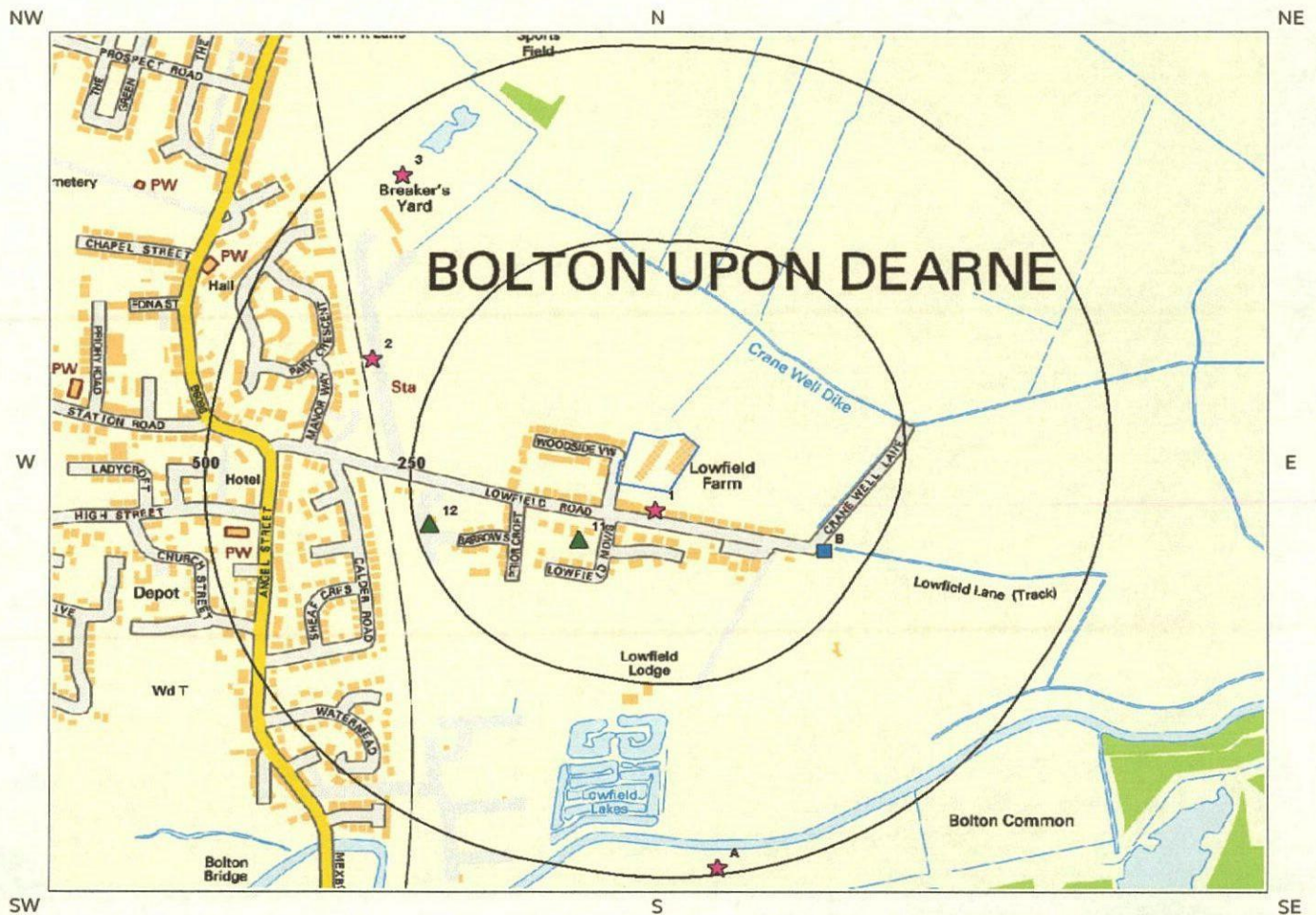
1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 20

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
131B	298	S	Sewage Works	1951
132Z	303	S	Sewage Works	1938
133B	304	S	Sewage Works	1948
134B	304	S	Sewage Works	1948
135B	305	S	Sewage Works	1986
136B	305	S	Sewage Works	1974
137F	320	S	Filter Beds	1974
138AB	352	SW	Filter Beds	1974
139K	356	SW	Sewage Works	1901
140AC	384	N	Pond	1986
141AC	384	N	Pond	1974
142AD	426	NW	Old Clay Pit	1901
143AD	432	NW	Pond	1986
144AD	432	NW	Pond	1974
145AD	437	NW	Pond	1948
146AD	439	NW	Pond	1938
147AD	443	NW	Pond	1951
148AD	443	NW	Pond	1966
149AE	478	S	Sludge Beds	1974
150	494	SW	Pond	1974

2. Environmental Permits, Incidents and Registers Map



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- | | | |
|--------------------|-------------------------------|--|
| Site Outline | Recorded Pollution Incident | RAS 3 & 4 Authorisations |
| Search Buffers (m) | Dangerous Substances (List 1) | Part A(1) Authorised Processes and Historic IPC Authorisations |
| | Dangerous Substances (List 2) | Part A(2) and Part B Authorised Processes |
| | Water Industry Referrals | COMAH / NIHHS Sites |
| | Licenced Discharge Consents | Sites Determined as Contaminated Land |
| | Red List Discharge Consents | Hazardous Substance Consents and Enforcements |

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

2

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
11	88	SW	446002 402513	Address: Addspace Furniture Limited, Lowfield Road, Bolton On Dearne, Rotherham, S63 8JE Process: Timber process Status: Historical Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
12	233	W	445820 402534	Address: Coltran Ltd, Lowfield Rd, Bolton Upon Dearne, Rotherham, S63 8JT Process: timber process Status: Historical Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

3

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
8B	201	SE	446300 402500	Address: SSO AT LOWFIELD ROAD PUMPING STATIO, N, BOLTON ON DEARNE (EMERGENCY O, VERFLOW) Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 3599 Permit Version: 3 Receiving Water: TRIB OF CRANE WELL DIKE Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 31/03/2003 Effective Date: 31-Mar-2003 Revocation Date: -
9B	201	SE	446300 402500	Address: SSO AT LOWFIELD ROAD PUMPING STATIO, N, BOLTON ON DEARNE (EMERGENCY O, VERFLOW) Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 3599 Permit Version: 2 Receiving Water: TRIB OF CRANE WELL DIKE Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 05/12/2002 Effective Date: 05-Dec-2002 Revocation Date: 30/03/2003

ID	Distance (m)	Direction	NGR	Details	
10B	201	SE	446300 402500	Address: SSO AT LOWFIELD ROAD PUMPING STATIO, N, BOLTON ON DEARNE (EMERGENCY O, VERFLOW) Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: 3599 Permit Version: 1	Receiving Water: TRIB OF CRANE WELL DIKE Status: TRANSFERRED FROM R(PP)A 1951- 1961 Issue date: 25/01/1982 Effective Date: 25-Jan-1982 Revocation Date: 04/12/2002

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

7

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	27	S	446094 402553	Incident Date: 30-Aug-2002 Incident Identification: 104291 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

ID	Distance (m)	Direction	NGR	Details	
2	331	NW	445750 402750	Incident Date: 23-May-2003 Incident Identification: 160367 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3	438	NW	445787 402988	Incident Date: 12-Dec-2003 Incident Identification: 206454 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 2 (Significant)
4A	490	S	446170 402090	Incident Date: 04-Oct-2004 Incident Identification: 270161 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 3 (Minor) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
5A	490	S	446170 402090	Incident Date: 04-Oct-2004 Incident Identification: 270161 Pollutant: Specific Waste Materials Pollutant Description: Asbestos	Water Impact: Category 3 (Minor) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
6A	490	S	446170 402090	Incident Date: 04-Oct-2004 Incident Identification: 270161 Pollutant: General Biodegradable Materials and Wastes: Specific Waste Materials Pollutant Description: Other General Biodegradable Material or Waste: Asbestos	Water Impact: Category 3 (Minor) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
7A	490	S	446170 402090	Incident Date: 10-Apr-2004 Incident Identification: 270161 Pollutant: General Biodegradable Materials and Wastes : Specific Waste Materials Pollutant Description: Other General Biodegradable Material or Waste : Asbestos	Water Impact: Category 3 (Minor) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

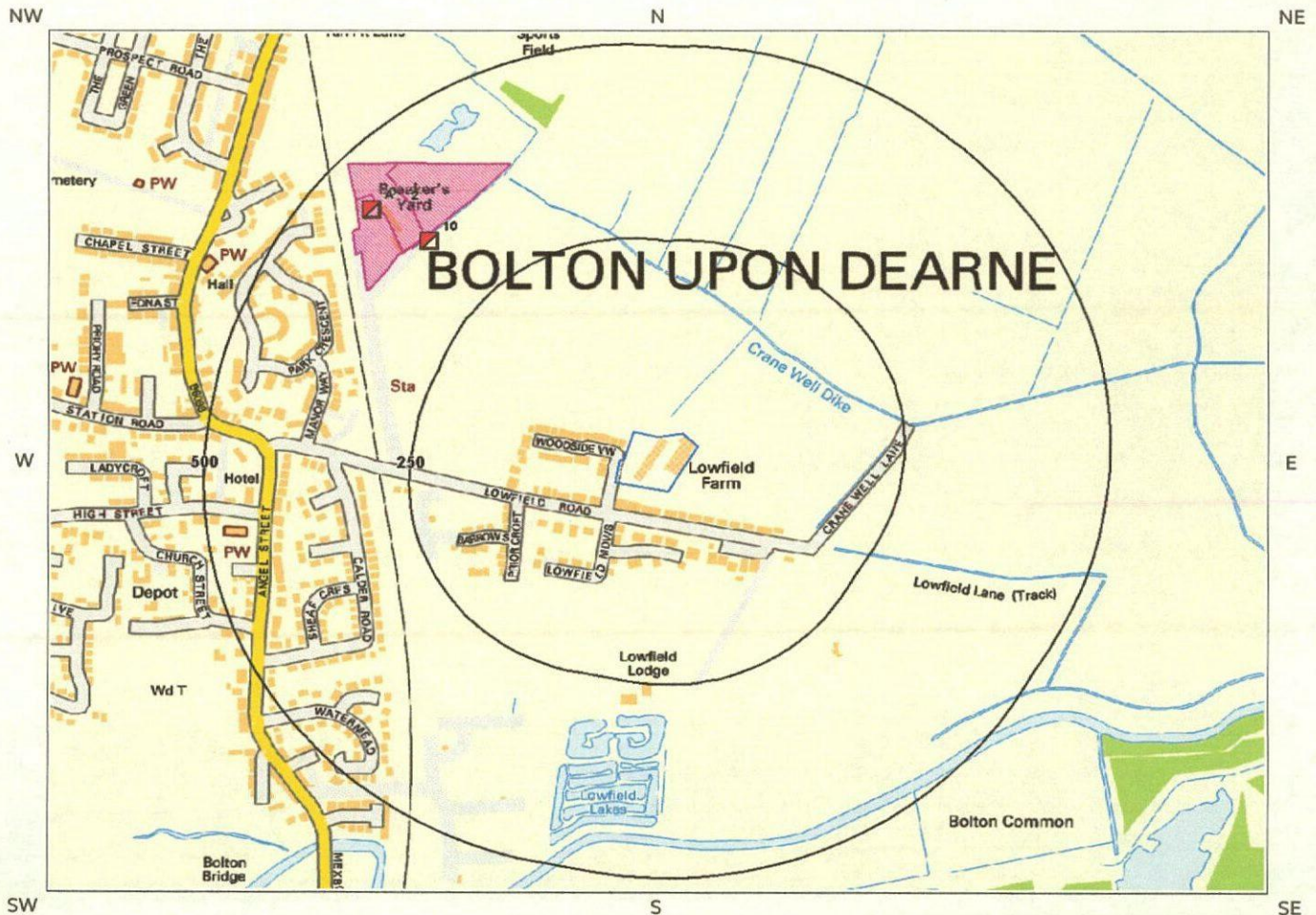
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

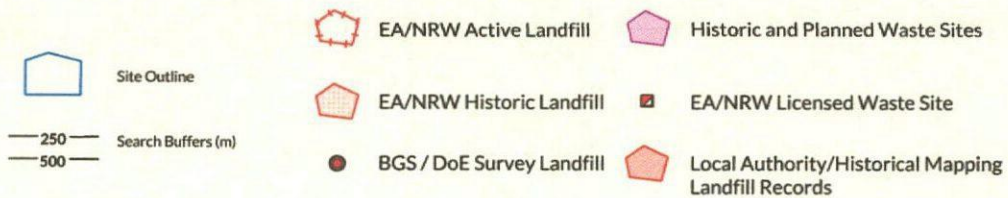
0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

6

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	619	N	446300 403400	Site Address: Marsh Tip, Goldthorpe, Rotherham, South Yorkshire Waste Licence: Yes Site Reference: 4400/B3, 2B3(5), WD2 B3 Waste Type: Inert, Industrial, Commercial, Household, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 03-Nov-1976 Licence Surrendered: 31-Dec-1979 Licence Holder Address: - Operator: Deane Urban District Council Licence Holder: South Yorkshire County Council First Recorded: 31-Dec-1970 Last Recorded: 31-Dec-1979
Not shown	693	S	446400 401900	Site Address: Barnburgh Tip, Common Lane, Mexborough, Adwick Upon Dearne, Doncaster Waste Licence: Yes Site Reference: WD20/D1189, 4400/D1189, NE4065 Waste Type: Special Environmental Permitting Regulations (Waste) Reference: YQ1/L/AOG001 Licence Issue: 15-Oct-1999 Licence Surrendered: 24-May-2004 Licence Holder Address: Boston Hall, Boston Spa, Yorkshire Operator: - Licence Holder: A Ogden and Sons Limited First Recorded: - Last Recorded: -
Not shown	726	W	445200 402600	Site Address: Station Road, Bolton on Dearne, Rotherham Waste Licence: Yes Site Reference: WD20 B191, 4400/B191, 20B191(17) Waste Type: Inert, Industrial, Commercial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 13-Mar-1979 Licence Surrendered: 12-Apr-1985 Licence Holder Address: Station Road, Bolton on Dearne, Rotherham, South Yorkshire Operator: Wath Skip Hire Limited Licence Holder: Wath Skip Hire Limited First Recorded: 31-Mar-1979 Last Recorded: 12-Apr-1985

ID	Distance (m)	Direction	NGR	Details	
Not shown	987	SW	445400 401700	Site Address: Wath Manvers Former Coal Preparation Site, Off Bolton Road, Wath Upon Dearne, Rotherham, South Yorkshire Waste Licence: Yes Site Reference: WD20/R1099, 4400/R1099, NE2175 Waste Type: Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: YQ1/L/ROT003	Licence Issue: 03-Aug-1994 Licence Surrendered: 12-Oct-2005 Licence Holder Address: Norfolk House, Walker Place, Rotherham, South Yorkshire Operator: Rotherham Metropolitan Borough Council Licence Holder: Rotherham Metropolitan Borough Council First Recorded: - Last Recorded: -
Not shown	1298	E	447400 402400	Site Address: Don Bait Company Limited, West Moot Lane, Harlington, Doncaster Waste Licence: Yes Site Reference: WD20 B157, 4400/B157 Waste Type: Industrial, Special, Liquid sludge Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 01-Jul-1977 Licence Surrendered: 01-Nov-1994 Licence Holder Address: Adwick Road, Mexborough Operator: Don Bait Company Limited Licence Holder: Don Bait Company Limited First Recorded: 31-Jul-1977 Last Recorded: 01-Nov-1994
Not shown	1456	S	445500 401000	Site Address: Land adjacent to Bolton Road, Managed workshops, Bolton Road, Wath upon Dearne Waste Licence: Yes Site Reference: WD2 R18, 4400/R18, WD2R18 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 04-Jul-1991 Licence Surrendered: - Licence Holder Address: - Operator: Director of Engineering, Rotherham Metropolitan Borough Council Licence Holder: Rotherham Metropolitan Borough Council First Recorded: - Last Recorded: -

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	866	N	446300.0 403500.0	Address: Marsh Tip, Goldthorpe, Rotherham, S Yorks BGS Number: 1547.0	Risk: No risk to aquifer Waste Type: N/A

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

3

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	781	SE	446330 401789	Refuse Tip	1997 mapping	Polygon
Not shown	853	N	446244 403510	Refuse Tip	1976 mapping	Polygon

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	885	N	446436 403532	Refuse Tip	1976 mapping	Polygon

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

2

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details		
2	356	NW	445820 402918	Type of Site: Breaker's Yard Site Address: N/A	Planning Application Reference: N/A Date: 1994	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
3	358	NW	445768 402942	Type of Site: Breaker's Yard Site Address: N/A	Planning Application Reference: N/A Date: 1974	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

16

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

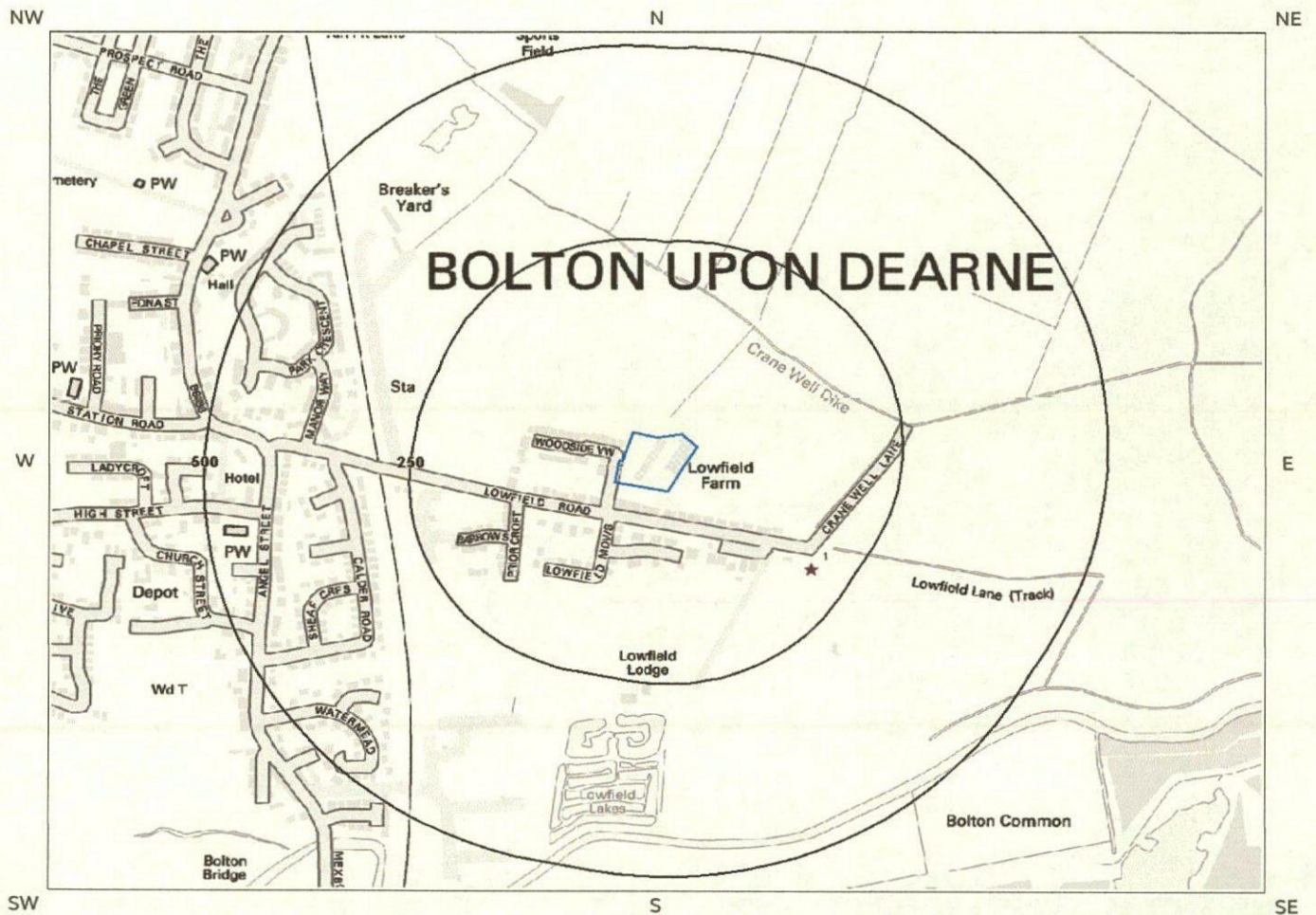
ID	Distance (m)	Direction	NGR	Details	
10	350	NW	445820 402900	Site Address: Lowfield Road, Side Of Railway Station, Bolton On Dearne, South Yorkshire Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WRI001 EPR reference: EA/EPR/JP3190ZS/S002 Operator: Wright Sid Waste Management licence No: 60612 Annual Tonnage: 5000.0	Issue Date: 09/09/1993 Effective Date: - Modified: - Surrendered Date: 01/11/2000 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Bolton Car Spares Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
11A	429	NW	445750 402940	Site Address: Lowfield Road, Bolton-on-dearner, Rotherham, South Yorkshire, S63 8JD Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PIL010 EPR reference: EA/EPR/GP3194SP/T001 Operator: Lowfield Road Dismantlers Ltd Waste Management licence No: 60544 Annual Tonnage: 5000.0 Issue Date: 09/06/1993 Effective Date: 07/06/2010 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Lowfield Road Dismantlers Correspondence Address: -
12A	429	NW	445750 402940	Site Address: Lowfield Road, Bolton On Dearner, Barnsley, S Yorks Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LEA001 EPR reference: - Operator: Leach Mr Waste Management licence No: 60544 Annual Tonnage: 0.0 Issue Date: 09/06/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Leach Bros Correspondence Address: 71, Calder Road, Bolton On Dearner, Barnsley, S Yorks, S63 8JH
13A	429	NW	445750 402940	Site Address: Leach Bros, Lowfield Road, Bolton-on-dearner, Rotherham, South Yorkshire, S63 8JD Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DES002 EPR reference: AP3291EP/T001 Operator: Desbro Paul Waste Management licence No: 60544 Annual Tonnage: 5000.0 Issue Date: 09/06/1993 Effective Date: 29/04/2009 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Leach Bros Correspondence Address: -
Not shown	755	W	445300 402700	Site Address: Land At Station Road, Station Road, Bolton Upon Dearner, Rotherham, South Yorkshire, S63 Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRY002 EPR reference: EA/EPR/JP3090ZP/A001 Operator: Bryan Hargreaves Ltd Waste Management licence No: 60600 Annual Tonnage: 25000.0 Issue Date: 30/10/1992 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Bryan Hargreaves Ltd Correspondence Address: -
Not shown	755	W	445300 402700	Site Address: Land At Station Road, Station Road, Bolton Upon Dearner, Rotherham, S Yorks Type: Household, Commercial & Industrial Waste T Stn Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: BRY002 EPR reference: - Operator: Bryan Hargreaves Ltd Waste Management licence No: 60600 Annual Tonnage: 0.0 Issue Date: 30/10/1992 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Bryan Hargreaves Ltd Correspondence Address: 1, Wath Wood Road, Wath Upon Dearner, Rotherham, S Yorks, S63 7PW

ID	Distance (m)	Direction	NGR	Details
Not shown	823	SE	446700 402000	Site Address: Common Lane, Adwick Upon Dearne, Doncaster, South Yorkshire, S63 8L Type: Other Landfill Site taking Special Waste Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: AOG001 EPR reference: EA/EPR/NP3394ZA/S002 Operator: A Ogden & Sons Limited Waste Management licence No: 65076 Annual Tonnage: 23100.0 Issue Date: 15/10/1999 Effective Date: - Modified: 29/08/2001 Surrendered Date: 24/05/2004 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Barnburgh Tip Correspondence Address: -
Not shown	877	N	446350 403500	Site Address: Barnburgh Lane, Goldthorpe, Barnsley, S Yorks Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SED001 EPR reference: - Operator: Sedgwick F Waste Management licence No: 60611 Annual Tonnage: 0.0 Issue Date: 15/07/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: F. Sedgewick Correspondence Address: 8, Stuart Street, Thurnscoe, Barnsley, S Yorks, S63 0EF
Not shown	877	N	446350 403500	Site Address: Land At Marsh Tip, Barnburgh Lane, Goldthorpe, Barnsley, South Yorkshire, S63 9EU Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SED001 EPR reference: EA/EPR/JP3690ZC/A001 Operator: Sedgwick Mr F Waste Management licence No: 60611 Annual Tonnage: 4999.0 Issue Date: 15/07/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: F. Sedgewick Correspondence Address: -
Not shown	1228	SW	445200 401700	Site Address: Off Bolton Road, Wath Upon Dearne, Rotherham, S Yorks, S60 1QT Type: Other Landfill Site taking Special Waste Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ROT003 EPR reference: - Operator: Rotherham Metropolitan Borough Council Waste Management licence No: 61558 Annual Tonnage: 0.0 Issue Date: 03/08/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Wath Manvers Former Coal Preparation Site Correspondence Address: Norfolk House, Walker Place, Rotherham, S Yorks, S60 1QT
Not shown	1228	SW	445200 401700	Site Address: Off Bolton Road, Wath Upon Dearne, Rotherham, South Yorkshire, S60 1QT Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ROT003 EPR reference: EA/EPR/RP3595ZM/S002 Operator: Rotherham Metropolitan Borough Council Waste Management licence No: 61558 Annual Tonnage: 4999.0 Issue Date: 03/08/1994 Effective Date: - Modified: - Surrendered Date: 12/10/2005 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Wath Manvers Former Coal Preparation Site Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
Not shown	1228	SW	445200 401700	Site Address: Off Bolton Road, Wath Upon Dearne, Rotherham, S Yorks, S60 1QT Type: Household, Commercial & Industrial Waste Landfill Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ROT003 EPR reference: - Operator: Rotherham Metropolitan Borough Council Waste Management licence No: 61558 Annual Tonnage: 0.0 Issue Date: 03/08/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Wath Manvers Former Coal Preparation Site Correspondence Address: Norfolk House, Walker Place, Rotherham, S Yorks, S60 1QT
Not shown	1301	N	446200 403950	Site Address: Hope Street, Low Valley, Barnsley, South Yorkshire, S73 0HX Type: Household, Commercial & Industrial Waste T Stn Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: RJM001 EPR reference: EA/EPR/RP3390ZN/S002 Operator: R & J M Shaw Waste Disposal Waste Management licence No: 60561 Annual Tonnage: 21656.0 Issue Date: 13/03/1985 Effective Date: - Modified: - Surrendered Date: 05/07/2004 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: R & J M Shaw Correspondence Address: -
Not shown	1442	SW	445400 401300	Site Address: Bolton Road W T & R E Facility, Bolton Road, Manvers, Wath Upon Dearne, South Yorks, S63 2LL Type: Biological Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA114 EPR reference: EA/EPR/FB3339RS/A001 Operator: Shanks Waste Management Ltd Waste Management licence No: 103665 Annual Tonnage: 265000.0 Issue Date: 03/10/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Bolton Road Waste Treatment & Renewable Energy Facility Correspondence Address: -
Not shown	1442	SW	445400 401300	Site Address: Bolton Road W T & R E Facility, Bolton Road, Manvers, Wath Upon Dearne, South Yorkshire, S63 2LL Type: Biological Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA114 EPR reference: EA/EPR/FB3339RS/V004 Operator: Shanks Waste Management Limited Waste Management licence No: 103665 Annual Tonnage: 265000.0 Issue Date: 03/10/2012 Effective Date: - Modified: 15/02/2017 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Bolton Road Waste Treatment & Renewable Energy Facility Correspondence Address: -
Not shown	1442	SW	445400 401300	Site Address: Bolton Road W T & R E Facility, Bolton Road, Manvers, Wath Upon Dearne, South Yorkshire, S63 2LL Type: Biological Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA114 EPR reference: EA/EPR/FB3339RS/V005 Operator: Renewi U K Services Limited Waste Management licence No: 103665 Annual Tonnage: 265000.0 Issue Date: 03/10/2012 Effective Date: - Modified: 20/10/2017 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: To PPC Site Name: Bolton Road Waste Treatment & Renewable Energy Facility Correspondence Address: -

4. Current Land Use Map



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Site Outline



Current Industrial Sites



Electricity Transmission Cables



Search Buffers (m)



Petrol & Fuel Sites



Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

1

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	200	SE	Water Pumping Station	446286 402477	S63	Water Pumping Stations	Industrial Features

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site:

0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.3 Bedrock and Solid Geology

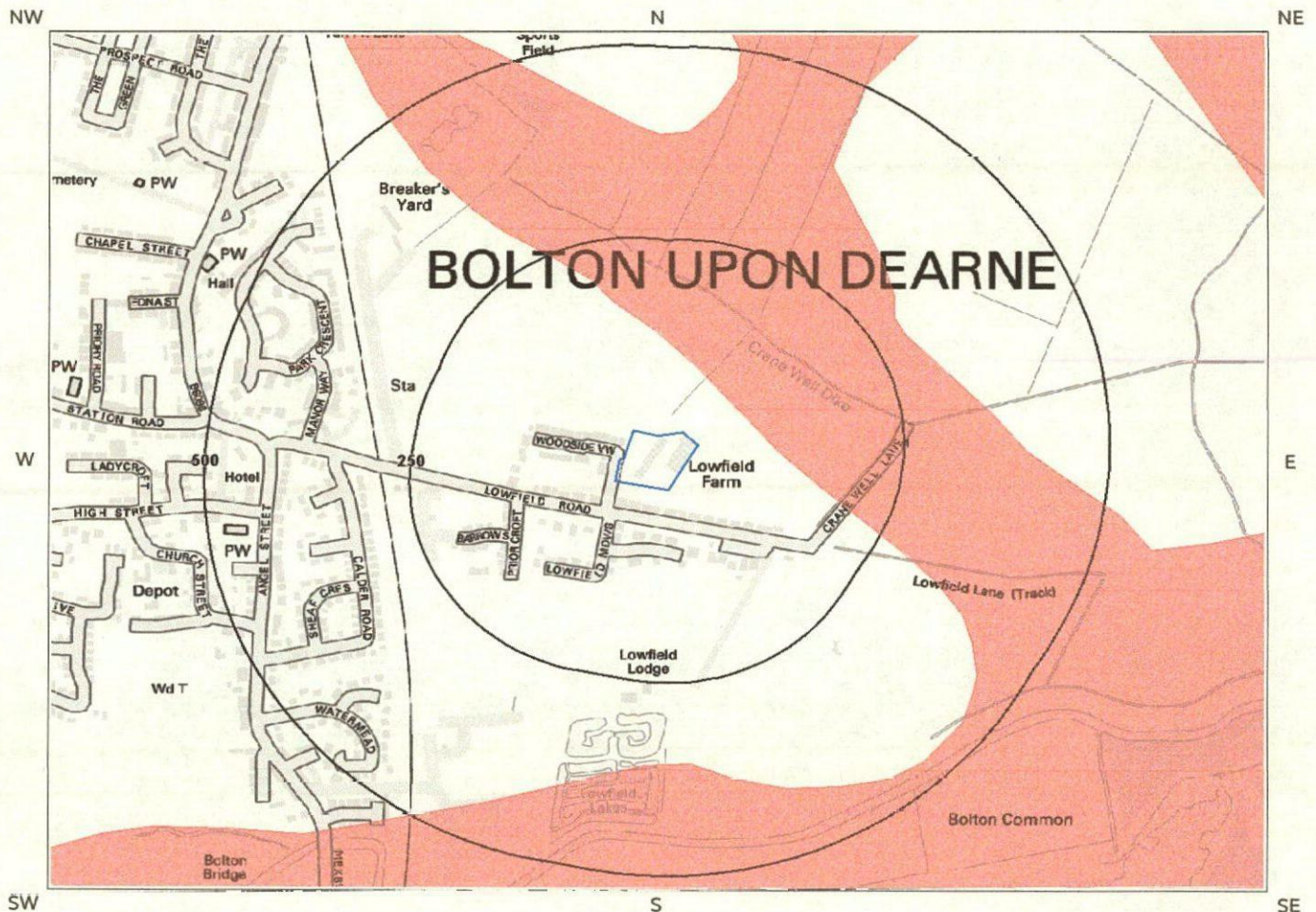
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
MXR-SDST	MEXBOROUGH ROCK	SANDSTONE
PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE

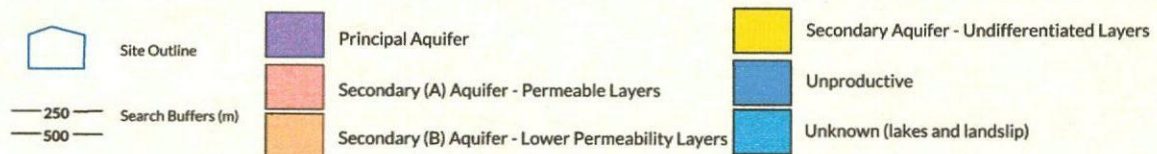
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

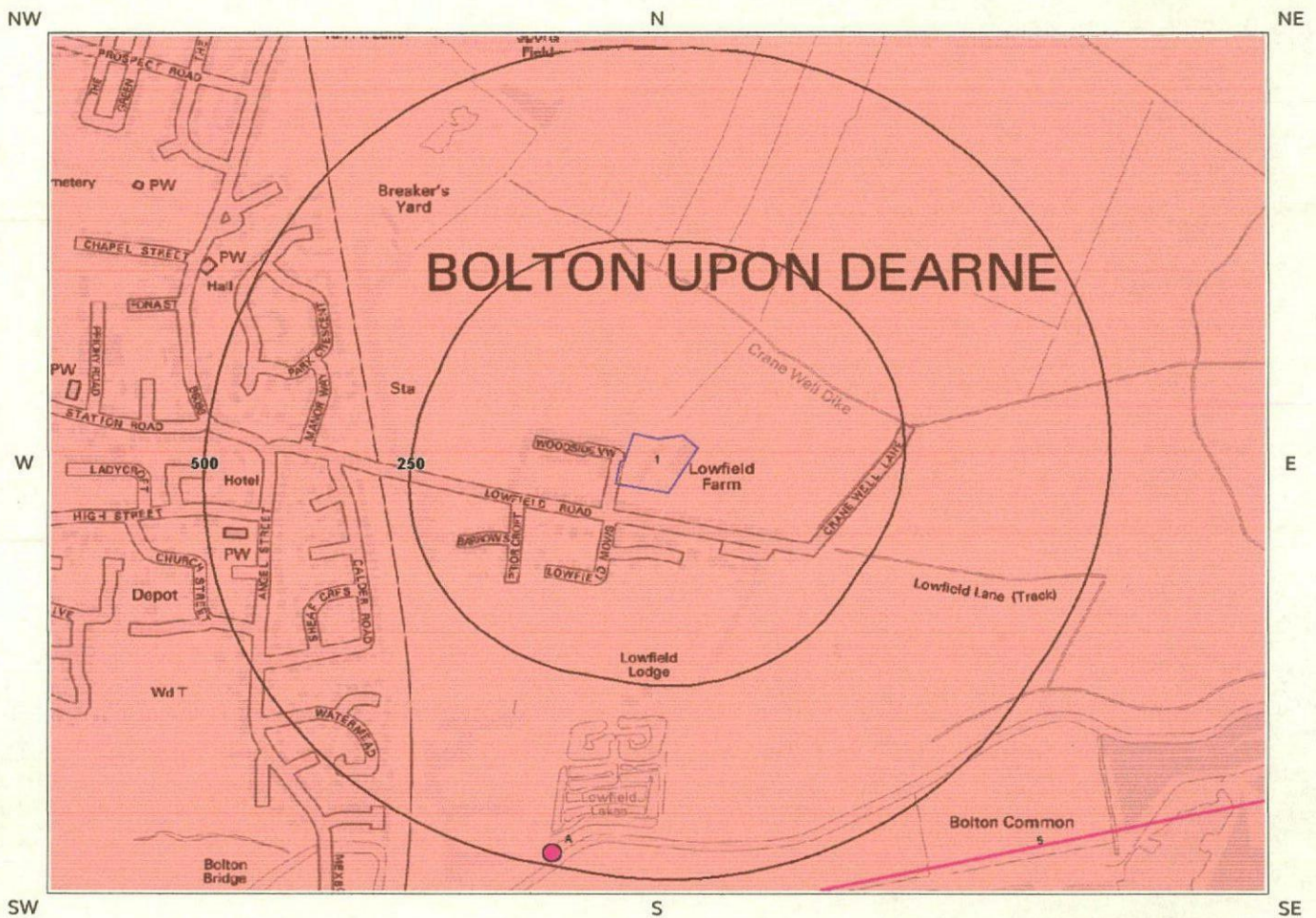
6a. Aquifer Within Superficial Geology



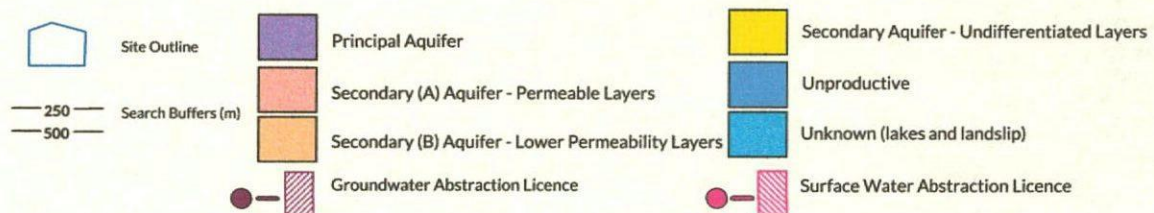
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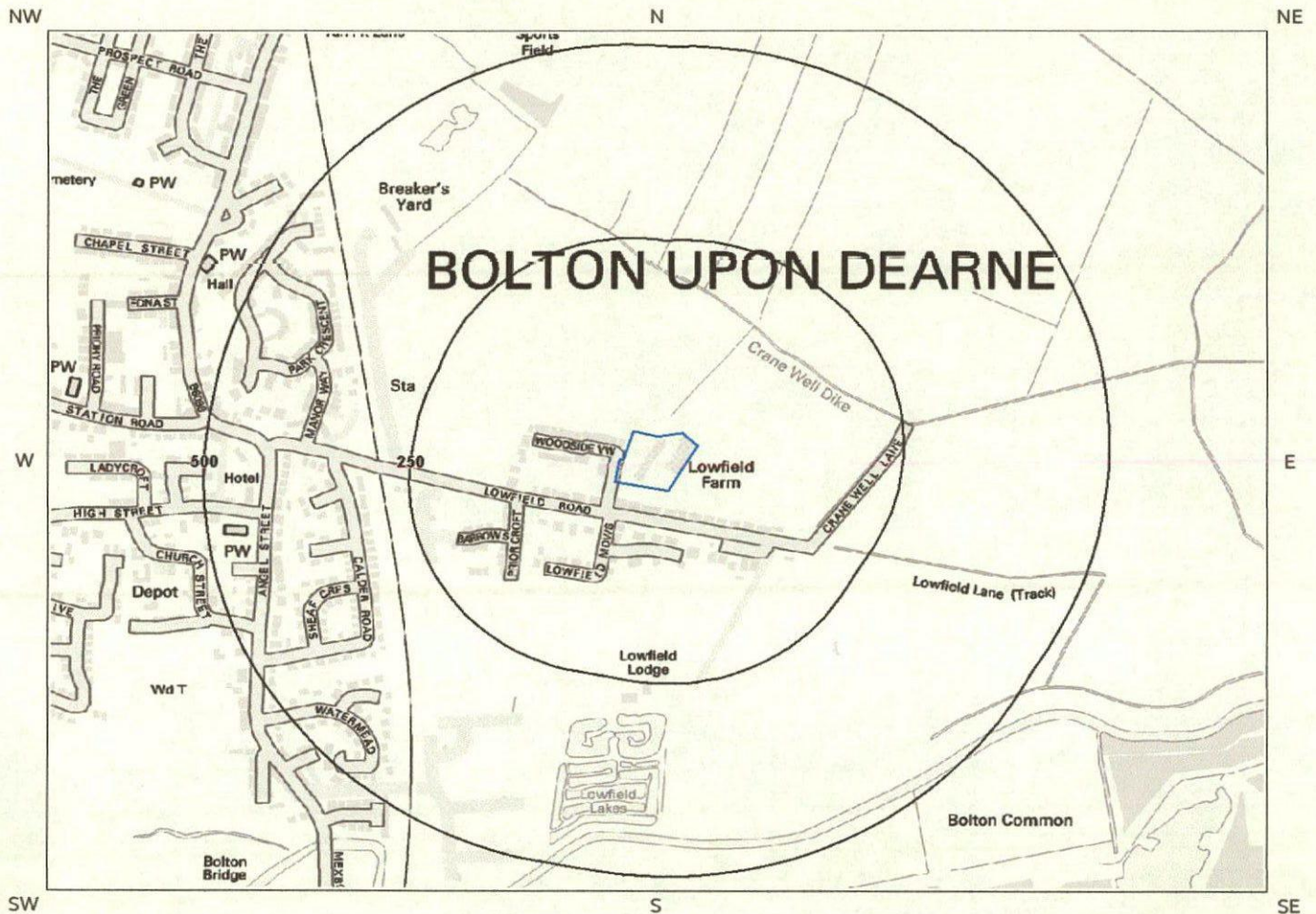
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



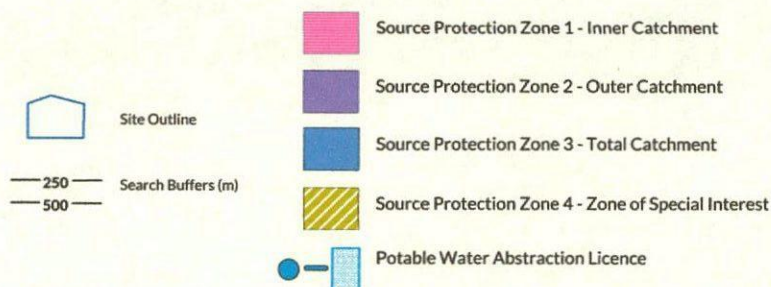
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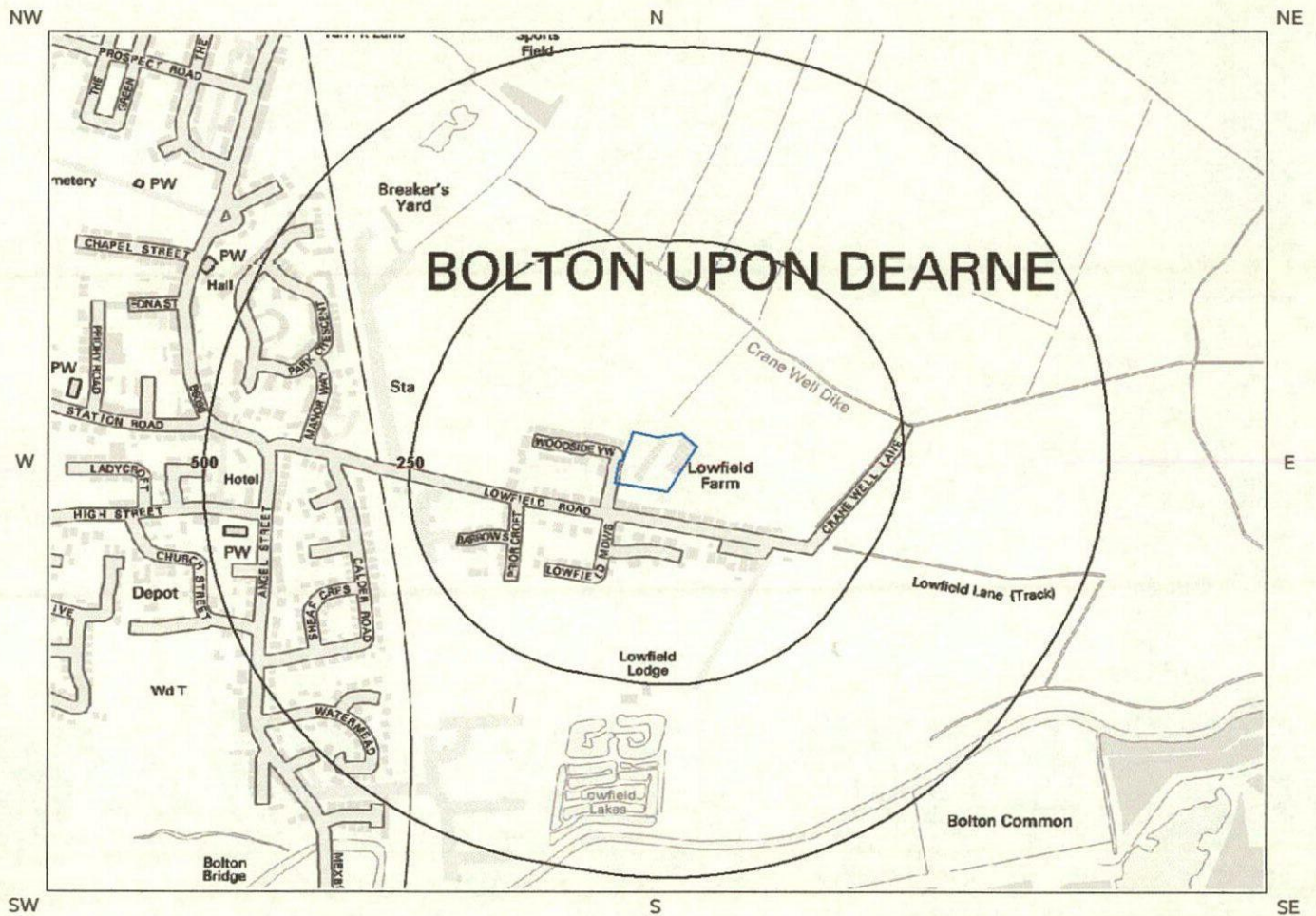
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



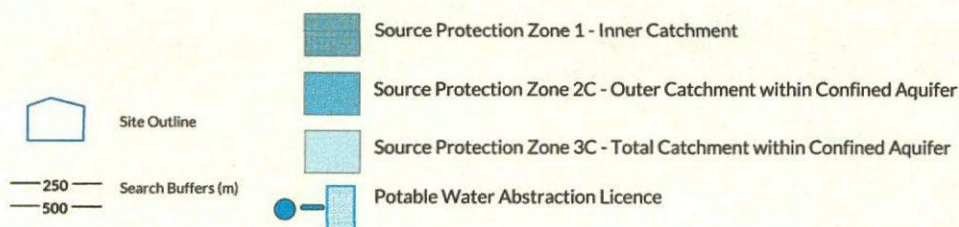
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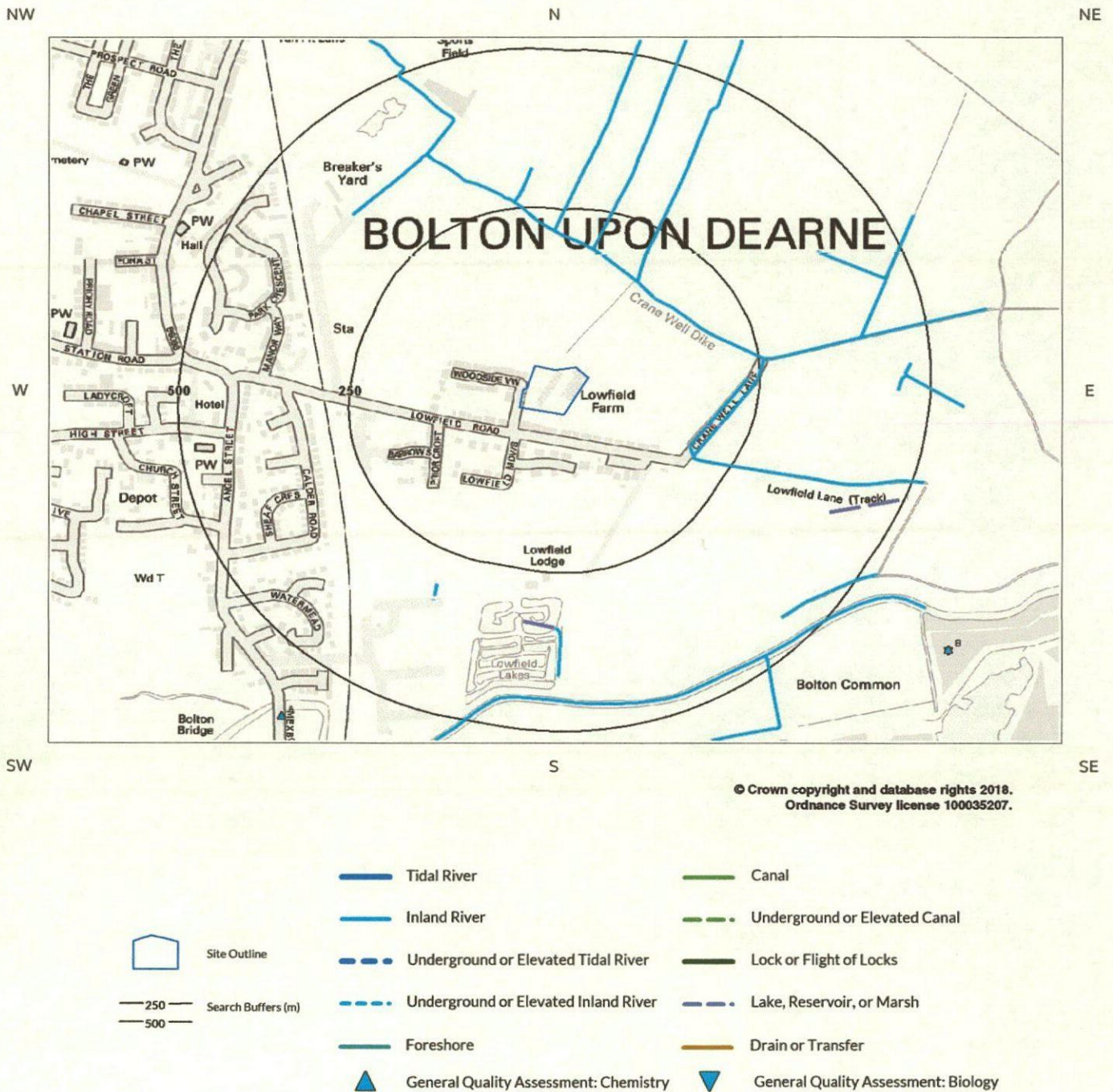
6d. Hydrogeology – Source Protection Zones within confined aquifer



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6e. Hydrology – Watercourse Network and River Quality



6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there 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	Distance (m)	Direction	Designation	Description
1	66	NE	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

6.2 Aquifer within Bedrock Deposits

Are there 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	Distance (m)	Direction	Designation	Description
1	0	On Site	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

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? None identified

Database searched and no data found.

6.4 Surface Water Abstraction Licences

Are there any 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	Details
2A	485	S	445970 402110	Status: Historical Licence No: 2/27/08/125 Details: Make-Up or Top Up Water Direct Source: Surface Water Point: River Dearne-lowfield Lane-wath On Dearne Data Type: Point Name: NASH Annual Volume (m³): - Max Daily Volume (m³): - Application No: 6938 Original Start Date: 20/9/1999 Expiry Date: 31/12/2009 Issue No: 2 Version Start Date: 30/8/2002 Version End Date:
3A	485	S	445970 402110	Status: Historical Licence No: 2/27/08/125 Details: Make-Up or Top Up Water Direct Source: Surface Water Point: River Dearne Data Type: Point Name: NASH Annual Volume (m³): - Max Daily Volume (m³): - Application No: 6938 Original Start Date: 20/9/1999 Expiry Date: 31/12/2009 Issue No: 1 Version Start Date: 20/9/1999 Version End Date:
4A	485	S	445970 402110	Status: Historical Licence No: 2/27/08/125 Details: Make-Up or Top Up Water Direct Source: Surface Water Point: Inland Water - River Dearne Data Type: Point Name: NASH Annual Volume (m³): - Max Daily Volume (m³): - Application No: 6938 Original Start Date: 20/9/1999 Expiry Date: 31/12/2009 Issue No: 2 Version Start Date: 30/8/2002 Version End Date:
5	540	S	446000 402000	Status: Historical Licence No: 2/27/08/120 Details: General use relating to Secondary Category (High Loss) Direct Source: Surface Water Point: River Dearne Data Type: Line Name: A OGDEN & SONS LTD Annual Volume (m³): - Max Daily Volume (m³): - Application No: 6819 Original Start Date: 25/6/1997 Expiry Date: 31/12/2006 Issue No: 101 Version Start Date: 15/3/2000 Version End Date:
Not shown	607	S	445900 402000	Status: Historical Licence No: 2/27/08/127 Details: Dust suppression Direct Source: Surface Water Point: Inland Water - Tributary Of River Dearne Data Type: Point Name: GATEWAYS FUELS LTD Annual Volume (m³): - Max Daily Volume (m³): - Application No: 8022 Original Start Date: 2/8/2002 Expiry Date: 31/3/2017 Issue No: 1 Version Start Date: 2/8/2002 Version End Date:
Not shown	1630	E	447662 402033	Status: Active Licence No: NE/027/0008/010 Details: Fish Pass/Canoe Pass Direct Source: Surface Water Point: River Dearn At Adwick Weir Data Type: Point Name: ENVIRONMENT AGENCY Annual Volume (m³): 0 Max Daily Volume (m³): 0 Application No: NPS/WR/010885 Original Start Date: 14/5/2013 Expiry Date: 31/3/2029 Issue No: 1 Version Start Date: 15/5/2016 Version End Date:

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

None identified

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any 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

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

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
0	On Site	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
246	W	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? Identified

6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
37B	674	SE	446674 402205	River Name: Dearne Reach: Brook Dike Hound Hill Dyke End/Start of Stretch: End of Stretch NGR	D	D	D	D	D
Not shown	848	SE	446896 402237	River Name: West Moor Dike Reach: Goldthorpe Pit River Dearne End/Start of Stretch: End of Stretch NGR	C	C	C	C	C
Not shown	1294	SW	444911 401970	River Name: Dearne Reach: Brook Dike Hound Hill Dyke End/Start of Stretch: Start of Stretch NGR	D	D	D	D	D
Not shown	1294	SW	444911 401970	River Name: Brook Dike Reach: Wath Sewage Works River Dearne End/Start of Stretch: End of Stretch NGR	D	C	C	C	B
Not shown	1294	SW	444911 401970	River Name: Dearne Reach: Ings Dike Brook Dike End/Start of Stretch: End of Stretch NGR	D	D	D	D	D

6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAH). 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):

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
42A	599	SW	445700 402100	River Name: River Dearne Reach: Knoll Beck Ings Dike End/Start of Stretch: Sample Point NGR	C	C	C	C	C
43A	599	SW	445700 402100	River Name: River Dearne Reach: River Dove Bulling Dike End/Start of Stretch: Sample Point NGR	C	C	C	C	C
44A	599	SW	445700 402100	River Name: River Dearne Reach: Ings Dike Brook Dike End/Start of Stretch: Sample Point NGR	C	C	C	C	C
45A	599	SW	445700 402100	River Name: River Dearne Reach: Brook Dike Hound Hill Dyke End/Start of Stretch: Sample Point NGR	C	C	C	C	C
46A	599	SW	445700 402100	River Name: River Dearne Reach: Bulling Dike Knoll Beck End/Start of Stretch: Sample Point NGR	C	C	C	C	C
47B	674	SE	446674 402205	River Name: River Dearne Reach: Hound Hill Dike West Moor Dyke End/Start of Stretch: Start of Stretch NGR	C	D	D	D	D
48B	674	SE	446674 402205	River Name: River Dearne Reach: Brook Dike Hound Hill Dyke End/Start of Stretch: End of Stretch NGR	C	C	C	C	C
Not shown	848	SE	446896 402237	River Name: River Dearne Reach: Hound Hill Dike West Moor Dyke End/Start of Stretch: End of Stretch NGR	C	D	D	D	D
Not shown	848	SE	446896 402237	River Name: River Dearne Reach: West Moor Dyke River Don End/Start of Stretch: Start of Stretch NGR	C	D	D	D	D
Not shown	1294	SW	444911 401970	River Name: River Dearne Reach: Ings Dike Brook Dike End/Start of Stretch: End of Stretch NGR	C	C	C	C	C
Not shown	1294	SW	444911 401970	River Name: River Dearne Reach: Brook Dike Hound Hill Dyke End/Start of Stretch: Start of Stretch NGR	C	C	C	C	C

6.10 Ordnance Survey MasterMap Water Network

Are there any Ordnance Survey MasterMap Water Network entries within 500m of the study site?

#DRN_Count#

#NDF_DRN_tag#

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	158 NE	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.4
25	158 NE	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.4
2	163 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
3	163 NE	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.4
26	163 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
27	163 NE	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.4
4	183 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.0
5	183 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
28	183 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.0

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
29	183 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
6	188 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.8
7	188 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
30	188 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.8
31	188 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
8	193 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
32	193 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
9	196 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 3.5
33	196 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 3.5
10	197 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 3.5
34	197 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 3.5
11	215 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.5

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
12	215 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
35	215 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.5
36	215 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
13	253 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
37	253 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
14	254 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
38	254 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
15	257 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.5
39	257 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.5
16	261 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
17	261 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.5
Not shown	261 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
Not shown	261 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.5
18	304 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	304 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
19	328 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	328 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
20	332 S	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	332 S	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
21	337 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	337 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
22	342 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	342 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
23	355 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
47	355 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
24	369 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	369 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
25	388 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.2
49	388 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.2
26	403 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.5
27	403 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	403 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.5
Not shown	403 E	Crane Well Dike	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
28	412 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	412 SE	-	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
29	450 S	River Dearne	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 11.2

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
Not shown	450 S	River Dearne	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 11.2
30	451 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.4
Not shown	451 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 2.4
31	453 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.7
Not shown	453 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.7
32	463 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.7
Not shown	463 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.7
33	464 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.2
34	464 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.7
Not shown	464 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.2
Not shown	464 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 4.7
35	480 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
36	480 SE	River Dearne	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 13.1
Not shown	480 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	480 SE	River Dearne	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 13.1

6.11 Surface Water Features

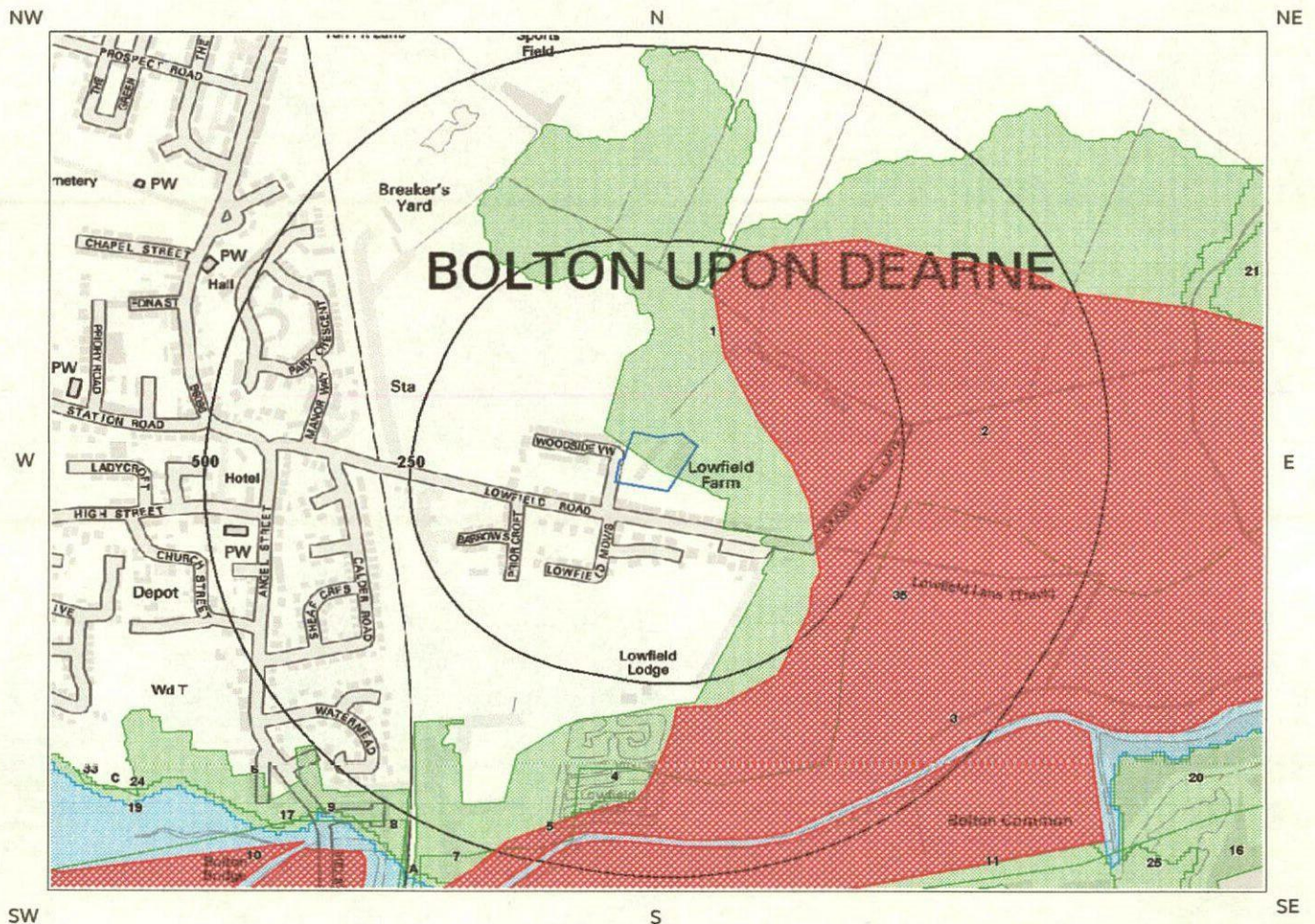
Are there any surface water features within 250m of the study site?

Identified

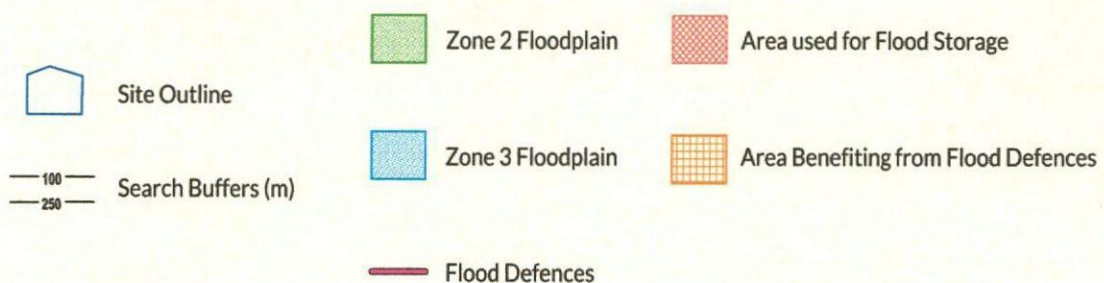
The following surface water records are not represented on mapping:

Distance (m)	Direction
25	N
156	NE
163	NE
174	NE
188	N
193	E
209	SE
211	N
216	N

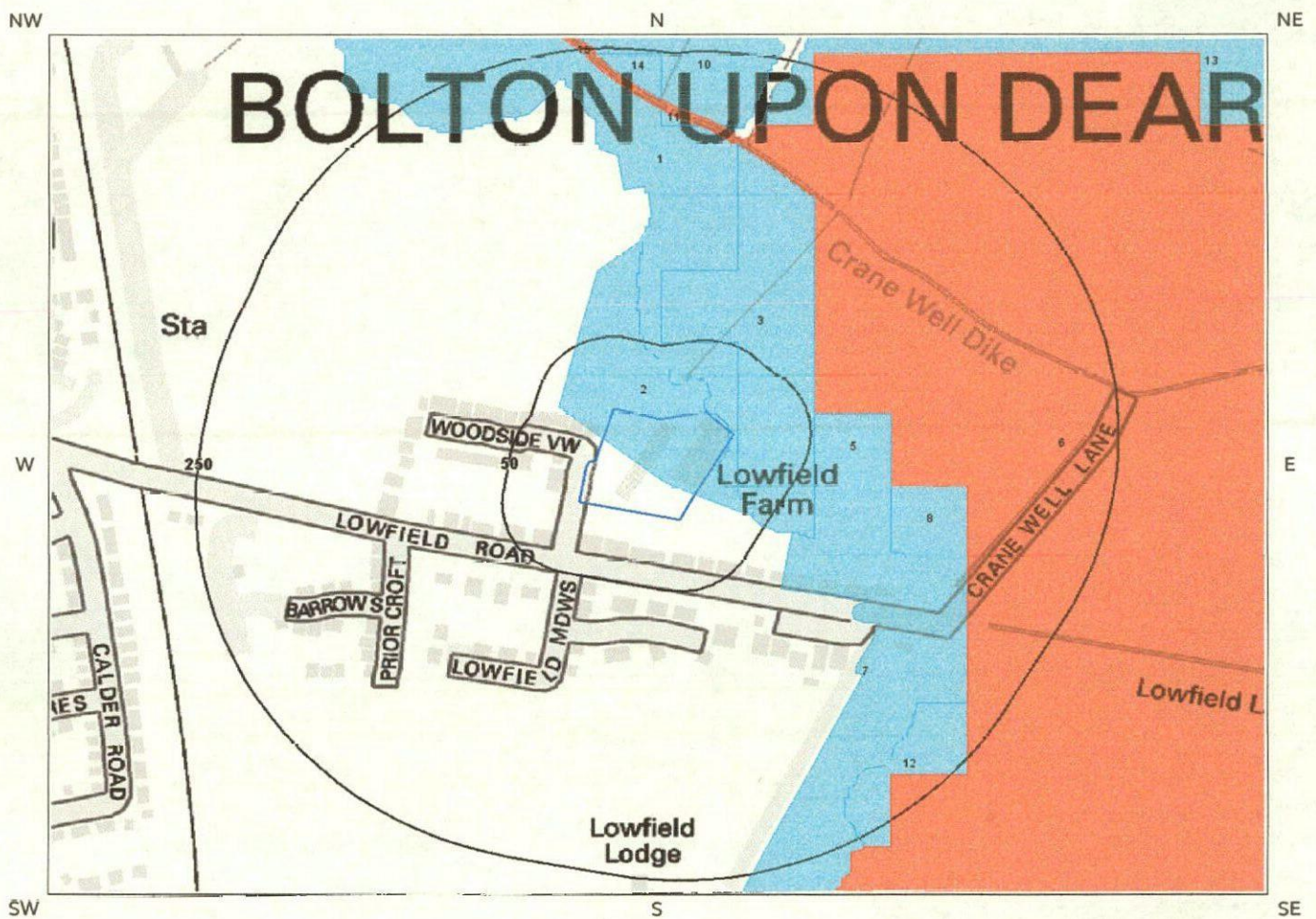
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



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



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 Site Outline
 Search Buffers (m)

RoFRaS Rating
 Very Low
 Low
 Medium
 High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? 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	Type
1	0	On Site	19-Mar-2018	Zone 2 - (Fluvial /Tidal Models)
2	82	NE	19-Mar-2018	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? 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	Type
1	82	NE	19-Mar-2018	Zone 3 - (Fluvial Models)

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

What is the highest risk of flooding onsite?

Low

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 Low (greater than 1 in 1000 but less than 1 in 100) 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	Low
2	0.0	On Site	Low
3	2.0	E	Low
4	21.0	SE	Low

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? None identified
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? None identified

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? Identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Identified

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

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 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

7.8 Groundwater Flooding Confidence Areas

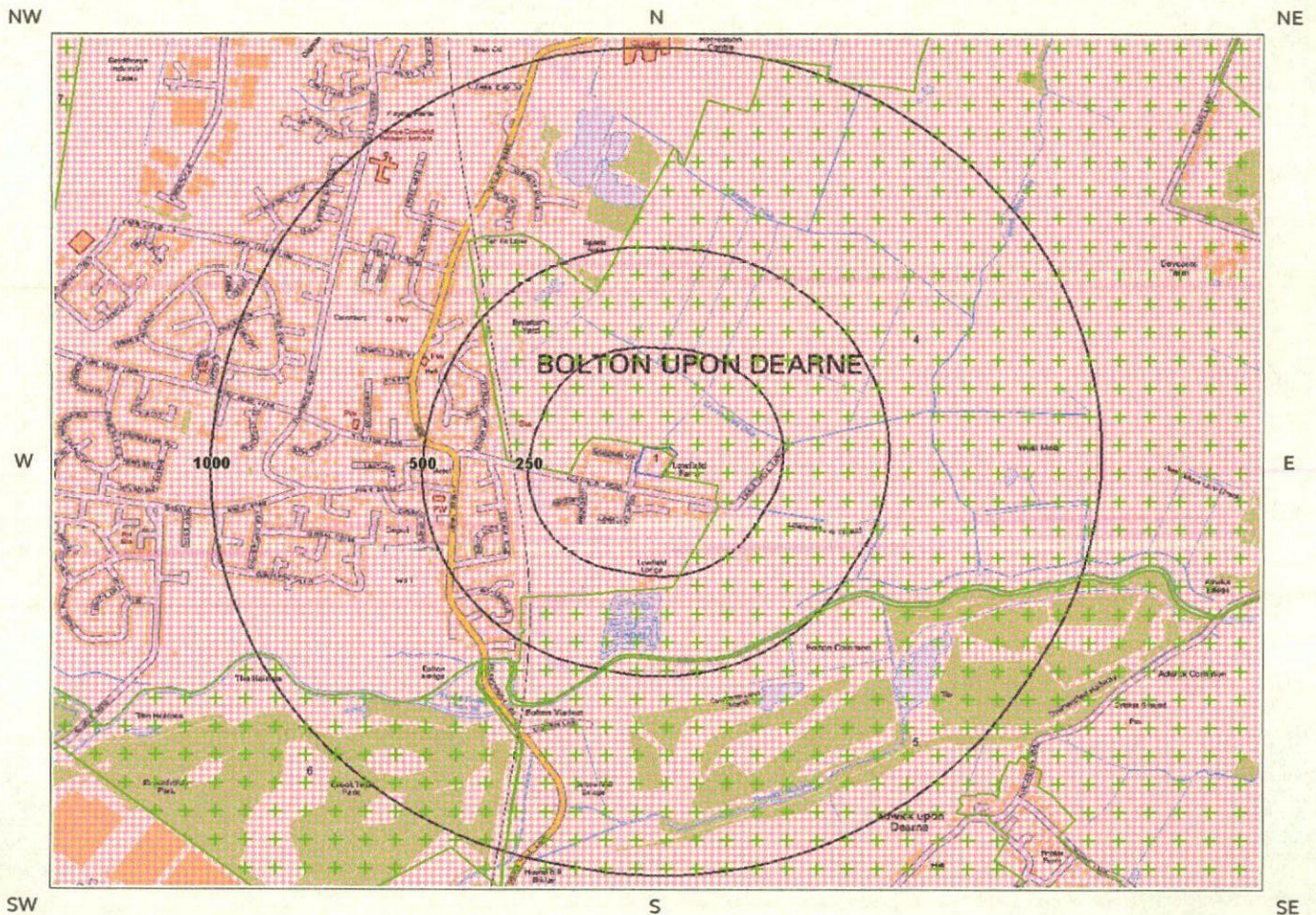
What is the British Geological Survey confidence rating in this result?

Low

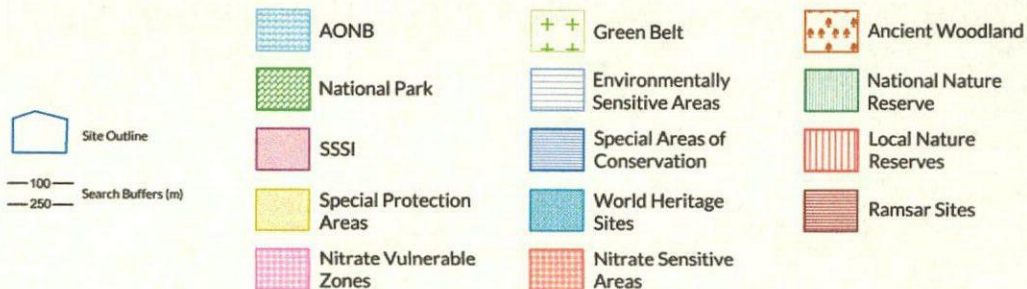
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

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



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8. Designated Environmentally Sensitive Sites

Presence of 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:

0

Database searched and no data found.

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:

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1967	NE	UNKNOWN	Ancient Replanted Woodland

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:

2

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
1	0	On Site	Existing	DEFRA
Not shown	1713	S	Existing	DEFRA

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

5

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
4	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
5	456	S	Liverpool, Manchester and West Yorks Greenbelt	Doncaster District (B)
6	599	SW	Liverpool, Manchester and West Yorks Greenbelt	Rotherham
7	1440	W	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
Not shown	1753	S	Liverpool, Manchester and West Yorks Greenbelt	Rotherham

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

What is the maximum Shrink-Swell** 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

Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

What is the 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

What is the 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.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* 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 compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* 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

Deposits with potential to collapse when loaded and saturated are unlikely to be present. 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

What is the maximum Running Sand** 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 running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* 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 in a Radon Affected Area, as between 1 and 3% 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

Are there any coal mining areas within 75m of the study site?

Identified

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary?

None identified

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

None identified

Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

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: Barnsley Metropolitan Borough Council
Phone: 01226 770770
Web: <http://www.barnsley.gov.uk/>
Address: PO Box 634, Barnsley, South Yorkshir, S70 9GG

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Hampshire RG27 8NW
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Public Health England



The Coal Authority



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.

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**Lowfield Farm
Bolton upon Dearne**

**Preliminary
Ecological Appraisal**

June 2018

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1 Introduction

- 1.1.1.1 This report presents the results of a preliminary ecological appraisal undertaken on land at Lowfield Farm, Bolton upon Dearne, S63 8GY. An aerial view of the site and its geographical context is shown in Figure 1. The site is centred on grid reference SE 46105 02622.
- 1.1.1.2 The aims of this assessment were to identify the habitat types present on the site, to assess the potential for protected / notable species to occur and to make any recommendations for further surveys or assessments which may be required to inform the proposed development which involves improvements to the existing car park and a car park extension.
- 1.1.1.3 A preliminary ecological appraisal survey including a bat scoping survey was conducted on 31st May 2018 by Gemma Longman ACIEEM. A desk-based study was also undertaken to obtain existing ecological records for the site and the surrounding area.

Figure 1: Aerial view of the site subject to survey (red area indicates the approximate area for the proposed development). Aerial Imagery dated 2016.



2 Methodology

2.1 Desk Study

2.1.1.1 An ecological data search was commissioned from Sheffield Biological Records Centre (SBRC) in order to identify any existing records of protected / notable species and non-statutory sites within 2km of the site. In addition, the following web sources were searched for statutorily protected sites and additional ecological data of most relevance:

- Multi-Agency Geographic Information for the Countryside (MAGIC).
- Ordnance Survey 1:25,000 mapping.
- Aerial imagery (dated 2016).

2.2 Preliminary Ecological Field Survey

2.2.1.1 A Preliminary Ecological Appraisal of the site was conducted on 31st May 2018 by Gemma Longman¹ ² ACIEEM in accordance with the standard survey methodology³ ⁴.

2.2.1.2 The habitats on the site were assessed and categorised in order to provide baseline information and subsequent interpretation of the ecological value of the site. In addition, the site was searched for evidence of protected / notable species and assessed in terms of its potential to support protected / notable species such as badger, great crested newt, water vole, reptiles and bat species.

2.3 Limitations

2.3.1.1 The survey was undertaken within the optimum season for Phase 1 habitat surveys (May to September/October). Overall, it is considered that there were no significant constraints to achieving the purpose of the assessment.

2.3.1.2 The weather conditions at the time of the survey were dry, wind Beaufort Scale 1 and 17°C with good visibility. There were no access restrictions during the survey.

¹ Natural England Class Licence Registration No. WLM-A34 - Level 1: 2017-27778-CLS-CLS (Bats).

² Natural England Class Licence Registration No. WML-CL08 2015-16801-CLS-CLS (Great Crested Newts).

³ JNCC, (2010), Handbook for Phase 1 habitat survey - a technique for environmental audit, ISBN 0 86139 636 7.

⁴ Chartered Institute of Ecology and Environmental Management (CIEEM). (2017). Guidelines for Preliminary Ecological Appraisal, Second Edition. December 2017. CIEEM, Winchester.

3 Results

3.1 Desk Study

3.1.1.1 Key information provided by SBRC is summarised below and included in Appendix 3. Species information can be provided upon request.

3.1.2 Statutory Sites.

3.1.2.1 There are no statutorily protected sites within 2km: The closest site, **Denaby Ings**; a Site of Special Scientific Interest (SSSI) is located 3.9 km southeast from the study site.

3.1.3 Non-Statutory Sites

3.1.3.1 There is one Non-Statutory site within the 2km search area; a Local Wildlife Site (LWS) **Bolton upon Dearne Wetlands** lies ~500m south east of the Non-Statutory site. This 2.52 ha LWS comprises marshy grassland, swamp and semi-improved neutral grassland.

3.1.4 Protected./ Notable Species Records

3.1.4.1 The key information provided by SBRC is summarised below. Please note that the paucity of records for any given species may be attributed to a lack of survey and recording input rather than a limited distribution or abundance of species within the area.

3.1.4.2 Amphibians

SBRC provided several records of toad, frog and smooth newt within the 2km search area and four records of great crested newts (GCN) within the radius. The closest GCN record is 1.2km north of the site.

3.1.4.3 Reptiles

SBRC provided one record of a grass snake within 2km of the site (recorded 500m from the site within Adwick Nature Reserve).

3.1.4.4 Birds

Bird records within the search radius include red-list species of conservation concern⁵ and/or bird species of principal importance in England⁶. Records include: skylark, teal, mallard, meadow pipit, swift, Canada goose, linnet, stock dove, cuckoo, house martin, greater spotted woodpecker, green woodpecker, yellowhammer, reed bunting, kestrel, snipe, swallow, common gull, lesser black-backed gull, black-headed gull, hearing gull, grasshopper warbler, corn bunting, reed bunting, yellow wagtail, curlew, willow tit, house sparrow, tree sparrow, grey partridge, red-legged partridge, willow warbler, reed warbler, garden warbler, sedge warbler, dunnoek, bullfinch, little grebe, gradwall, pintail, garganey, avocet, starling, whitethroat, redwing, song thrush, fieldfare, mistle thrush, barn owl (>1km north), lapwing (majority associated with Adwick Washlands, situated >700m east of the site), sparrowhawk (>1km north), osprey (1.4km north west of the site), peregrine falcon (>500m from site) and buzzard.

Bats

SBRC provided no records of bats within the site itself, but numerous records within the wider area the majority of which were recorded >1km from the study site. The closest bat roost is a common pipistrelle *Pipistrellus pipistrellus* roost recorded 1.4km south east of the site (dated 2016). Other species recorded include, Daubenton's bat *Myotis daubentoni*, noctule *Nyctalus noctule* and unidentified myotis species *Myotis sp.*

⁵ Eaton MA, et al. (2005). *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*

⁶ Species of Principal Importance in England. The Natural Environment and Rural Communities (NERC) Act 2006 (S41)

3.1.4.5 **Other Mammals**

SBRC provided extensive records of water voles the closest of which was recorded 500m south east from the site on the River Dearne with several otter, harvest mice, mink, bank and water vole, hedgehog and roe deer records within a 2km radius of the site. No records of otters were recorded within the site itself or within 500m of the site. The majority of the records relate to the River Dearne (situated ~470m south at its nearest point) with the closest record being 700m from the site.

3.2 **Preliminary Ecological Field Survey**

3.2.1 **Overview**

3.2.1.1 Please also refer to Figure 1 and photos included in Appendix 2. At the time of survey, the buildings shown on Figure 1 had been demolished with the exception of one agricultural building situated towards the north of the site.

3.2.1.2 The site is situated towards the eastern edge of the village, Bolton Upon Dearne. The area surveyed is bordered to the south and west by residential housing, with arable land to the north and pastoral land (currently grazed by horses) to the east.

3.2.1.3 The wider area comprises a mixture of land uses, including residential housing, pastoral and arable land, woodlands and wetlands (including Bolton upon Dearne Wetlands (LWS) and Adwick Washlands). The River Dearne is situated approximately 470m south (at its nearest point) and a railway running north to south is located approximately 320m west at its nearest point.

3.2.2 **Habitats**

3.2.2.1 The majority of the site comprises bare earth and hard-standing with piles of rubble from buildings that have been demolished. These areas support very little vegetation with ruderal vegetation generally limited to the margins of the site. Species present include dandelion *Taraxacum officinale*, pineapple weed *Matricaria discoidea*, creeping thistle *Cirsium arvense*, nettle *Urtica dioica*, ribwort plantain *Plantago lanceolata*, common bent *Agrostis capillaris*, Yorkshire fog *Holcus lanatus*, white clover *Trifolium repens* and broad-leaved dock *Rumex obtusifolius*. Three semi-mature trees are located on the eastern boundary, including horse chestnut *Aesculus hippocastanum* and ash *Fraxinus excelsior*.

3.2.2.2 The site is bordered by arable land to the north and north-west. An agricultural shed (proposed for demolition) currently used to house machinery is situated towards the north of the site with chickens and farming paraphernalia situated adjacent to the building.

3.2.3 **Birds**

3.2.3.1 A limited range of birds was observed during the survey. Species observed within the site included ten house martins circling the site. Other species observed adjacent to the site include wood pigeon, magpie and blackbird.

3.2.3.2 No Species of Principal Importance for the conservation of biodiversity in England⁷ were recorded at the site.

3.2.3.3 There are limited opportunities for birds to nest within the site. A range of common birds may nest in trees and the adjacent vegetation and the agricultural shed.

⁷ Species listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance for the conservation of biodiversity in England.

3.2.3.4 Open ground nesting birds such as meadow pipit and skylark may nest within the arable field to the north of the site – highly dependent on field management regime. The site is highly unlikely to be a location used by significant assemblages of breeding or wintering birds, particularly due to its proximity to the adjacent residential housing estate.

3.2.3.5 No evidence of specially protected species such as barn owl was noted at the site and it is considered highly unlikely that such species would occur at the site.

3.2.4 *Bats*

3.2.4.1 The trees on the eastern boundary were assessed as having negligible or zero bat roost potential.

3.2.4.2 The agricultural building in the northern part of the site (see photos at Appendix 2) is assessed as having negligible potential to support bat roosts due to the absence of suitable roost features. No evidence of bats was observed in the building

3.2.4.3 In terms of foraging and commuting habitats, the areas of hard standing, bare earth, limited vegetation and arable land on and adjacent to the site are assessed as being of low value for bats. The site is not particularly well connected by hedgerows or trees to suitable foraging or commuting areas.

3.2.5 *Great Crested Newt*

3.2.5.1 SBRC provided two records of great crested newts within 2km of the site.

3.2.5.2 No waterbodies potentially suitable for breeding great crested newts have been identified within 500 metres of the site, apart from potentially suitable waterbodies separated by significant barriers such as main roads and fast-flowing rivers. The site itself provides sub-optimal conditions for great crested newts. It is considered very unlikely that great crested newts will occur at the site. The closest record of great crested newts is 1.2km north of the site.

3.2.6 *Other Protected/Notable Species*

3.2.6.1 Although bare earth and rubble on the site provide potential suitable habitat for reptiles; overall the site is suboptimal for reptiles, being adjacent to sub-optimal habitats (i.e. residential housing and arable land). It is considered highly unlikely that reptiles will occur on site

3.2.6.2 No evidence of badger was observed at the site and the site provides negligible opportunities for badgers.

3.2.6.3 Hedgehog, a Species of Principal Importance in England⁷, could potentially occur within the site.

3.2.6.4 No habitats suitable for otter or water vole were identified within the site.

4 Conclusions and Recommendations

4.1 Protected Sites

- 4.1.1.1 Based on the nature of the development and the distance between the development site and protected sites, the proposed development is not predicted to result in any significant effects on protected sites.

4.2 Habitats

- 4.2.1.1 All of the habitats are assessed as being of low ecological value with the trees and vegetation being of ecological value at site level only.

4.2.1.2 Recommendations

- 4.2.1.3 It is recommended the development should include planted native species at the site. Suitable species would include pedunculate oak *Quercus robur*, rowan *Sorbus aucuparia*, holly *Ilex aquifolium*, silver birch *Betula pendula* and alder *Alnus glutinosa*.

4.3 Birds

- 4.3.1.1 A range of common species may nest in the trees and building on the site.

- 4.3.1.2 Open ground nesting birds such as meadow pipit and skylark may nest within the arable field.

4.3.1.3 Recommendations

- 4.3.1.4 It is recommended that, where possible, any works affecting potential bird nesting areas (trees, arable field and buildings) should be undertaken outside the main bird nesting period of March to August (inclusive). If this is not possible, any such works undertaken within the bird nesting period (March to August inclusive) should be supervised by a suitably qualified ecologist. The supervising ecologist will advise all site personnel of the potential presence of nesting birds, their legal protection and the need to minimise disturbance of nesting birds. If active nests are present, they must be retained in situ undisturbed until the nests are no longer in active use. A nest is classed as active when it contains eggs or chicks and when it is being built.

- 4.3.1.5 There is an opportunity to provide nesting sites for birds such as house martins within the new development. Options such as the 9A Schwegler House Martin Nest can be installed in suitable locations within the site. Nest cups would need to be installed within an outbuilding >3m from ground level.

- 4.3.1.6 Once the nest cups are fixed, it is important to not disturb the birds. House martins are fully protected under the Wildlife and Countryside Act 1981, which makes it an offence to kill, injure or take an adult bird, or to take, damage or destroy the eggs, young or nest of a house martin whilst it is being built or in use⁸.

4.3.1.7 Bats

- 4.3.1.8 No evidence of bat roosts at the site was observed during the surveys and all trees and buildings were assessed as having zero or negligible bat roost potential. In terms of foraging and commuting habitats, the habitats within the site are assessed as being of negligible value for bats.

⁸ Read more at <https://www.rspb.org.uk/birds-and-wildlife/advice/how-you-can-help-birds/nestboxes/how-to-attract-house-martins/#tz9et8b8EgsVWskm.99>

4.3.1.9 Recommendations

4.3.1.10 No further bat surveys are considered necessary.

4.3.1.11 Any additional lighting at the site should aim to avoid artificial light-spill affecting retained trees and woodland.

4.3.1.12 There is an opportunity to enhance the site for bats through provision of roosting opportunities by installing bat boxes. Boxes (such as the 1ff Schwegler bat box) could be installed on the south elevations of trees with low or negligible bat roost potential within the site or on the new development. Bat boxes provide permanence, unobtrusiveness and durability. The bat boxes should be placed >4m above ground level with no artificial light directed on these features

4.4 *Great Crested Newt*

4.4.1.1 It is considered very unlikely that great crested newts will occur at the site. No further surveys or mitigation for this species are considered necessary.

4.5 *Other Fauna*

4.5.1.1 No further surveys or mitigation for other fauna are considered necessary.

4.5.1.2 Recommendations

In the interest of animal welfare, during construction any deep excavations should be either fenced-off, covered overnight or fitted with an exit ramp to avoid the trapping of mammals.

Appendix 1. Legislation and Conservation Context

Bats

All British bat species are fully protected through The Conservation of Habitats and Species Regulations 2010 as a European Protected Species (EPS). They also receive some protection through inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

Under the legislation, it is an offence to deliberately capture, injure or kill a bat. It is an offence to damage or destroy a breeding site or resting place of a bat. It is also an offence to intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection; or obstruct access to any structure or place which it uses for that purpose.

It is also an offence to deliberately disturb a bat; in particular any disturbance which is likely (a) to impair their ability - (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or (b) to affect significantly the local distribution or abundance of the species to which they belong.

The 'appropriate authority' (Natural England in England) has powers to issue licences for various purposes including - (a) scientific or educational purposes... and (e) preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment. The appropriate authority shall not grant a licence under this regulation unless they are satisfied - (a) that there is no satisfactory alternative, and (b) that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range. It is an offence for any person authorised by virtue of a licence to which this paragraph applies to contravene or fail to comply with any condition which the licence requires him to comply with.

Several species of bat including brown long-eared and soprano pipistrelle *Pipistrellus pygmaeus* are listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance for the conservation of biodiversity in England and are capable of being a material consideration in the planning process.

Nesting Birds

All wild birds in the UK are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy the nest (whilst being built or in use) or its eggs. Bird species listed in Schedule 1 of the 1981 Act, e.g. barn owl, receive further protection which makes it an offence to intentionally or recklessly disturb these species while building a nest or in, on or near a nest containing eggs or young; or to disturb dependent young of such a bird.

Appendix 2. Photographs

Photo 1. Looking north across the site towards the agricultural shed with negligible potential for bats



Photo 2. Looking south-east across the site towards the trees situated on the eastern border

CO



Photo 3. Agricultural shed assessed as having negligible potential for bats

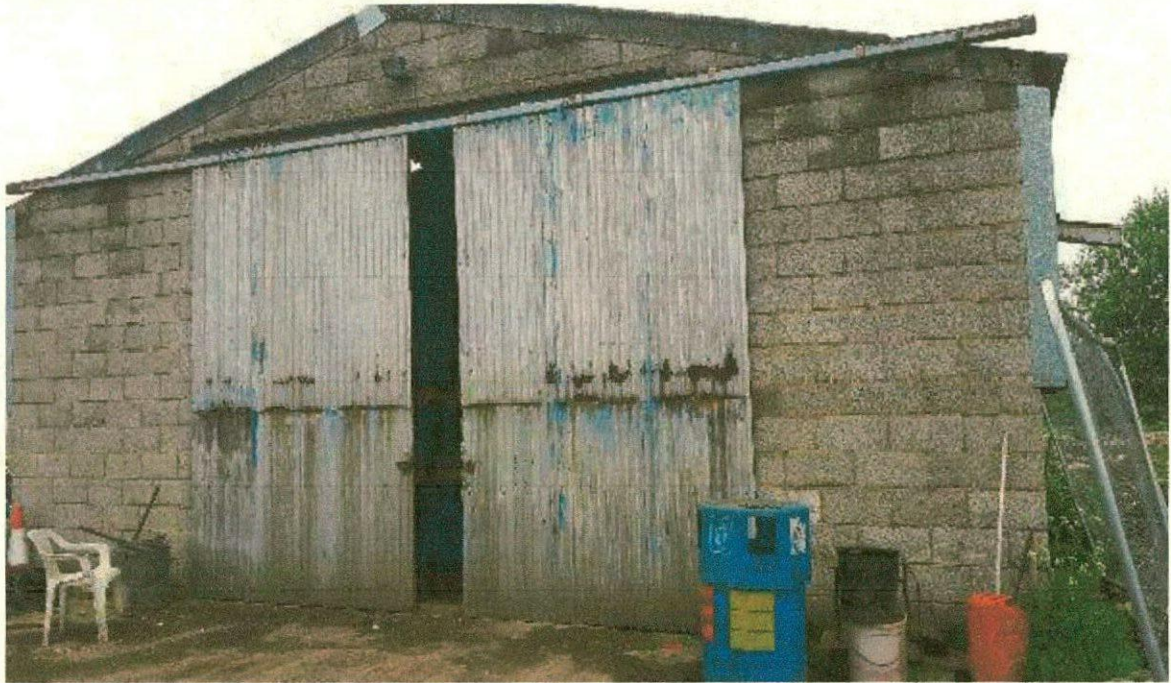


Photo 4. Looking west across north-eastern part of the site



Photo 5. Looking south along the western margin of the site



Appendix 3. Information provided by SBRC

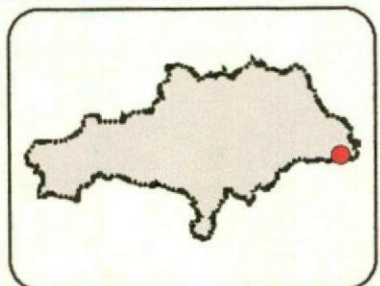
Statutory and Non Statutory Local Wildlife Sites Within the Search Area

**Low Field Farm,
Wath Upon Dearne**



Key

- Centre of Search Area
- 2km Radius
- Local Wildlife Sites
- Watercourse
- Barnsley District Boundary



Map Created - 04 Jun 2018



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Contaminated Land Appraisals
Brownfield Remediation Solutions
Site Investigation Services
Earthworks Design and Control
Flood Risk Assessments

Mr Gordon Stephenson
10 Parkwood Rise
Barnby Dun
Doncaster
DN3 1LY

12th October 2018

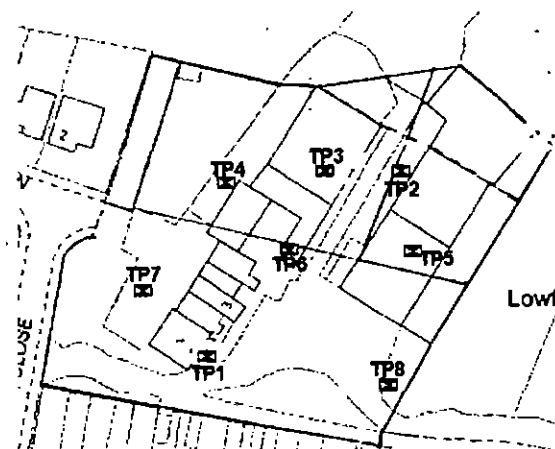
Ref C297/02/GS

Dear Gordon,

Ref: Percolation Tests on Land at Lowfield Farm, Lowfield Road, Bolton Upon Dearne.

In accordance with your instructions, a representative of G&M Consulting Ltd (G&M), attended the above site to witness the undertaking of three soakaway tests within the superficial soils encountered on the site. It is understood that a planning application will be submitted in due course for the development of the site for residential purposes. This work was carried out in order to assess the feasibility as to the use of infiltration methods for the drainage of surface water run-off.

The fieldwork was carried out on the 15th August 2018. The pits were excavated using a 1.5 tonne 360° tracked machine, at the locations shown below, and referenced TP1 to TP8. The locations of the test pits were determined primarily on site access constraints at the time of investigation.



The Chestnuts, Brackenhill Road
East Lound, Haxey
Doncaster. DN9 2LR
Registered in England No. 5806528
VAT No. 772 3112 51

Tel: 01427 752788
Mob: 07743 319788
Mob: 07718 122766
Email: enquiries@soilexperts.co.uk
Website: www.soilexperts.co.uk

- The dimensions of each test pit are summarised below;

Test Pit No	Length (m)	Width (m)	Depth (m)
1	1.2	0.3	1.4
2	1.5	0.3	1.9
3	1.5	0.3	1.0
4	1.4	0.3	1.1
5	1.4	0.3	1.2
6	1.5	0.3	1.6
7	1.2	0.3	0.9
8	1.4	0.3	1.7

In summary, made ground soils were encountered in all of the pits excavated, with the exception of TP4 and TP7, which encountered a thin 100 mm thick topsoil. The made ground was encountered to depths of between 0.20 m and 0.80 m bgl.

In TP2, TP3 and TP5, the made ground or topsoil was underlain by a pale yellow sandy clay, which extended to the base of each of the trial pits.

In the remaining trial pits, located in the western and southern part of the site the made ground or topsoil was underlain by granular soils. In TP1 and TP8 these granular soils comprised a slightly gravelly clayey fine to coarse sand over lying a very gravelly fine to coarse sand with low cobble content; the latter of which is considered likely to be highly weathered sandstone bedrock. In TP4, TP6 and TP7, the upper granular strata, encountered in TP1 and TP8 was recorded as absent.

A copy of the trial pit logs are provided in Attachment A of this correspondence.

No groundwater seepages were recorded during the excavation of the trial pits.

In total three soakaway tests were undertaken, in TP1, TP4 and TP6. The test procedure was carried out in general accordance with the requirements of DG365 (2016) under the supervision of a geologist from G&M.

Clean potable water for the tests was supplied from a 1000 litre intermediate bulk container (IBC) provided by the client, which were rapidly emptied to fill each of the test pits.

The field data sheets presenting the results are provided in Attachment A of this correspondence.

In one instance (TP6), the test was abandoned after three hours, as the infiltration rate was not sufficiently rapid enough to allow monitoring of the water level recorded during the test to the 25% depth required for analysis by BRE Digest 365. In order to analyse the test results G&M has extrapolated the falling trend at the end of the test period to determine the soil infiltration rate. This allows a reasonable and conservative assessment of the characteristics of the sand layers encountered within the trial pit to be determined.

Graphs of water level fall have been plotted, presented in Attachment B of this report, and calculations taken from these graphs have provided soil infiltration rates as follows for the tests carried out;

Test Pit No	Soil Infiltration Rate (m/s)	Notes
1	1.6×10^{-5}	Test pit refilled
4	9.2×10^{-6}	Test pit refilled
6	1.8×10^{-6}	Test pit refilled

The findings and recommendations contained in this correspondence are based on the ground conditions encountered within the trial pit together with the results of the field testing at that location. There may be other ground conditions elsewhere on site which may not have been revealed by the investigation, and which may not be taken into account in the report.

Based on the findings of this report, it would appear that some infiltration drainage is likely to be possible in the southern and western portion of the site. At the time of writing of this report, no details of the proposed location of the dwellings or external development layout was available for inspection. Therefore it is currently unclear as to the total amount of impermeable surfaces that will require to be drained.

The test results obtained during the fieldwork are only representative of local ground conditions. Given the range of the soakaway results, and the variability observed in the geology, including the fines content noted within the granular soils at some locations, there may be differences in capacity to receive storm water discharge across the site. Given the size of the site and likely scale of the development and the area requiring soakaway discharge, it is advised that further, confirmatory, testing is carried out once the external development layout is established, at the locations of any proposed soakaways to determine whether the anticipated design capacity is available.

Following detailed design of the infiltration drainage system, should there prove to be insufficient area of granular soils to drain all of the surface water generated by the proposed development, then consideration may need to be given to an attenuated drainage system to any local combined sewer system, if present, subject to asset owner approval. Alternatively it is noted that the site is underlain by sandstone bedrock, again should further infiltration drainage be required, then consideration may be given to the design of a borehole soakaway system; although this would be subject to confirmatory testing and regulatory approval.

We trust the above and the attachments are acceptable and meet with your current needs.

Yours sincerely

A handwritten signature in black ink, appearing to read 'GSw', followed by a horizontal line.

Graeme Swinbourne
For and on behalf of **G&M Consulting Ltd**

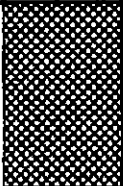
Attachments



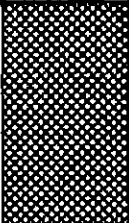
ATTACHMENT A – TRIAL PIT LOGS/FIELD DATA SHEETS

Trial Pit Record					TP No	1	
Method: Machine excavated trial pit using a 1.5tn excavator Site: Lowfield Farm, Bolton Upon Dearne Client:					Contract No		
					Date	29/09/18	
					Scale	1:25	
					Logged By	AS	
Sample Details			Description	Depth (m)	Level (mAOD)	Legend	
Type	Depth To-from (m)	Vane kN/m ²					
			MADE GROUND	0.20			
			Light orangish brown slightly gravelly clayey fine to coarse SAND. Gravel is subangular fine to medium of sandstone	0.80			
			Pale yellow, very gravelly sand with low cobble content, gravel is subangular to subrounded fine to coarse of sandstone, Cobble sized fragments are subangular of sandstone. (Probably highly weathered Sandstone)	1.40			
			Trial Pit Complete at 1.4m (Target depth)				

Remarks Faces stable during excavation No groundwater encountered Pit dimension = 0.30m x 1.2m	Sample Types D - Disturbed B - Bulk	W - Water ES - Environmental	
--	--	---------------------------------	---

Trial Pit Record					TP No	2	
					Contract No		
Method:	Machine excavated trial pit using a 1.5tn excavator	Site	Lowfield Farm, Bolton Upon Dearne	Date			29/09/18
				Scale			1:25
				Logged By			AS
Sample Details							
Type	Depth To-from (m)	Vane kN/m ²	Description	Depth (m)	Level (mAOD)	Legend	
			MADE GROUND	0.20			
				0.70			
			Firm, pale yellow locally orange yellow slightly gravelly very sandy CLAY. Gravel is subangular fine of sandstone, sand is fine to coarse.	1.90			
			Trial Pit Complete at 1.9m (Target depth)				

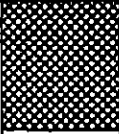
Remarks Faces stable during excavation No groundwater encountered Pit dimension = 0.30m x 1.5m	Sample Types D - Disturbed W - Water B - Bulk ES - Environmental	
--	---	---

Trial Pit Record					TP No	3	
Method: Machine excavated trial pit using a 1.5tn excavator Site: Lowfield Farm, Bolton Upon Deame Client:					Contract No		
					Date	29/09/18	
					Scale	1:25	
Sample Details Type Depth To-from (m) Vane kN/m² Description					Logged By		AS
					Depth (m)	Level (mAOD)	Legend
			MADE GROUND	0.80			
			Firm, pale yellow locally orange yellow slightly gravelly very sandy CLAY. Gravel is subangular fine of sandstone, sand is fine to coarse.				
			Trial Pit Complete at 1.0m (Target depth)				

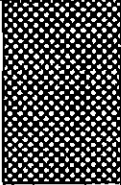
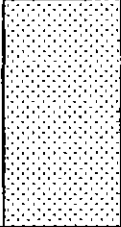
Remarks Faces stable during excavation No groundwater encountered Pit dimension = 0.30m x 1.5m	Sample Types D - Disturbed W - Water B - Bulk ES - Environmental		

Trial Pit Record				TP No	4
				Contract No	
Method:	Machine excavated trial pit using a 1.5tn excavator	Site	Lowfield Farm, Bolton Upon Dearne	Date	29/09/18
				Scale	1:25
Sample Details			Client	Logged By	
Type	Depth To-from (m)	Vane kN/m ²	Description	Depth (m)	Level (mAOD)
			TOPSOIL	0.10	
			Orangish yellow, very sandy subangular fine to coarse gravel of sandstone with low cobble content. Sand is fine to coarse, cobbles are subangular of sandstone	1.10	
			Trial Pit Complete at 1.1m (Unable to progress)		
Remarks			Sample Types		
Faces stable during excavation			D - Disturbed W - Water		
No groundwater encountered			B - Bulk ES - Environmental		
Pit dimension = 0.30m x 1.4m					



Trial Pit Record					TP No	5	
					Contract No		
Method:	Machine excavated trial pit using a 1.5tn excavator		Site	Lowfield Farm, Bolton Upon Dearne		Date	29/09/18
				Client		Scale	1:25
Sample Details				Logged By			AS
Type	Depth To-from (m)	Vane kN/m ²	Description	Depth (m)	Level (mAOD)	Legend	
			MADE GROUND	0.50			
			Firm, pale yellow locally orange yellow slightly gravelly very sandy CLAY. Gravel is subangular fine of sandstone. Sand is fine to coarse.	1.20			
			Trial Pit Complete at 1.2m (Target depth)				

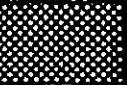
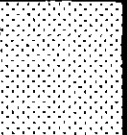
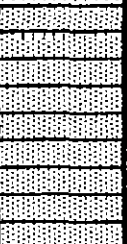
Remarks Faces stable during excavation No groundwater encountered Pit dimension = 0.30m x 1.4m	Sample Types D - Disturbed B - Bulk	W - Water ES - Environmental	
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Trial Pit Record				TP No	6	
Method:		Machine excavated trial pit using a 1.5tn excavator	Site	Lowfield Farm, Bolton Upon Dearne		
			Client			
				Contract No		
				Date	29/09/18	
				Scale	1:25	
				Logged By	AS	
Sample Details						
Type	Depth To-from (m)	Vane kN/m ²	Description	Depth (m)	Level (mAOD)	Legend
			MADE GROUND	0.70		
			Orangish yellow, slightly clayey very sandy subangular fine to coarse gravel of sandstone. Sand is fine to coarse	1.60		
			Trial Pit Complete at 1.6m (Target depth)			

Remarks Faces stable during excavation No groundwater encountered Pit dimension = 0.30m x 1.5m	Sample Types D - Disturbed B - Bulk W - Water ES - Environmental	
--	---	---

Trial Pit Record				TP No	7	
				Contract No		
Method:	Machine excavated trial pit using a 1.5tn excavator	Site	Lowfield Farm, Bolton Upon Dearne	Date	28/09/18	
				Scale	1:25	
				Logged By	AS	
Sample Details			Client			
Type	Depth To-from (m)	Vane kN/m ²	Description	Depth (m)	Level (mAOD)	Legend
			TOPSOIL	0.10		---
			Orangish yellow, very sandy subangular fine to coarse gravel of sandstone with low cobble content. Sand is fine to coarse, cobbles are subangular of sandstone			
				0.90		
			Trial Pit Complete at 0.9m (Target depth)			
Remarks Faces stable during excavation No groundwater encountered Pit dimension = 0.30m x 1.2m				Sample Types D - Disturbed W - Water B - Bulk ES - Environmental		



Trial Pit Record					TP No	8
Method: Machine excavated trial pit using a 1.5tn excavator Site: Lowfield Farm, Bolton Upon Dearne					Contract No	
					Date	29/09/18
					Scale	1:25
Sample Details					Logged By	AS
					Client	
Type	Depth To-from (m)	Vane kN/m ²	Description	Depth (m)	Level (mAOD)	Legend
			MADE GROUND	0.3		
			Light orangish brown slightly gravelly clayey fine to coarse SAND. Gravel is subangular fine to medium of sandstone	0.80		
			Pale yellow, very gravelly sand with low cobble content, gravel is subangular to subrounded fine to coarse of sandstone, Cobble sized fragments are subangular of sandstone	1.70		
			Trial Pit Complete at 1.7m (Target depth)			

Remarks Faces stable during excavation No groundwater encountered Pit dimension = 0.30m x 1.4m	Sample Types D - Disturbed B - Bulk	W - Water ES - Environmental	
--	--	---------------------------------	---

Soakaway Test Results Sheet

G & M Consulting Ltd

Job No	C297
Site	Lowfield Farm
Date	29/09/2018

Cumulative Time (mins)	Standing Water (mm bgl)	Cumulative Change (mm)	Head (m)
0	0.220		
1	0.282		
2	0.330		
3	0.355		
4	0.375		
5	0.392		
10	0.455		
15	0.512		
20	0.568		
25	0.605		
30	0.639		
45	0.754		
60	0.843		
75	0.895		
90	0.938		
105	0.977		
120	1.034		
150	1.093		
180	1.140		
210	1.205		
240			
270			
300			
360			
420			
480			

TP No	1
-------	---

Trial Pit Dimensions

Width (m)	0.3
Length (m)	1.2
Depth (m)	1.4

Infill depth (m)	0.22
Head of water (m)	1.18
25% Depth Value (m bgl)	0.515
75% Depth Value (m bgl)	1.105

25% Depth Value (Head m)	
75% Depth Value (Head m)	

Carried Out By	ATS
----------------	-----

Soakaway Test Results Sheet

G & M Consulting Ltd

Job No	C297
Site	Lowfield Farm
Date	29/09/2018

Cumulative Time (mins)	Standing Water (mm bgl)	Cumulative Change (mm)	Head (m)
0	0.334		
1			
2			
3			
4			
5	0.469		
10	0.491		
15			
20	0.512		
25			
30	0.529		
45			
60	0.662		
75			
90			
105			
120	0.839		
150			
180	0.878		
210	0.915		
240			
270			
300			
360			
420			
480			

TP No	4
-------	---

Trial Pit Dimensions

Width (m)	0.3
Length (m)	1.4
Depth (m)	1.1

Infill depth (m)	0.334
Head of water (m)	0.766
25% Depth Value (m bgl)	0.526
75% Depth Value (m bgl)	0.909

25% Depth Value (Head m)	
75% Depth Value (Head m)	

Carried Out By	ATS
----------------	-----

Soakaway Test Results Sheet

G & M Consulting Ltd

Job No	C297
Site	Lowfield Farm
Date	29/09/2018

Cumulative Time (mins)	Standing Water (mm bgl)	Cumulative Change (mm)	Head (m)
0	0.500		
1	0.523		
2	0.538		
3	0.541		
4	0.550		
5	0.558		
10	0.572		
15	0.582		
20	0.611		
25	0.625		
30	0.636		
45	0.684		
60	0.731		
75	0.764		
90	0.804		
105	0.836		
120	0.866		
150	0.902		
180	0.933		
210			
240			
270			
300			
360			
420			
480			

TP No	6
-------	---

Trial Pit Dimensions

Width (m)	0.3
Length (m)	1.5
Depth (m)	1.6

Infill depth (m)	0.500
Head of water (m)	1.100
25% Depth Value (m bgl)	0.775
75% Depth Value (m bgl)	1.325

25% Depth Value (Head m)	
75% Depth Value (Head m)	

Carried Out By	ATS
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ATTACHMENT B – CALCULATION SHEETS

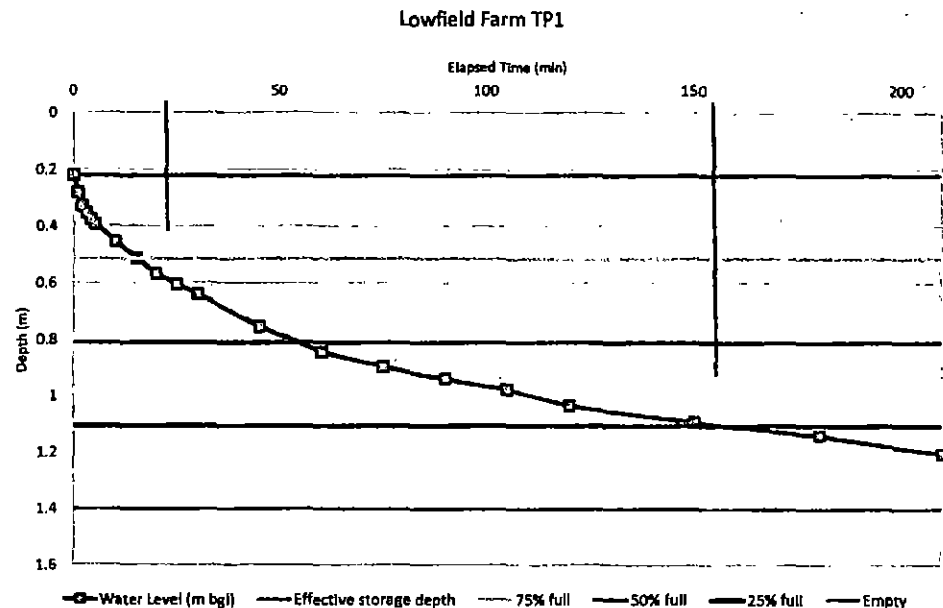
Soakaway Test Interpretation

Site	Lowfield Farm
Test location	TP1
Trial pit length (m)	1.2
Trial pit width (m)	0.3
Trial pit depth (m)	1.4

Cumulative Time (mins)	Water Level (m bgl)	Effective storage depth	75% full	50% full	25% full	Empty
0	0.22	0.22	0.515	0.810	1.105	1.4
1	0.282	0.22	0.515	0.810	1.105	1.4
2	0.33	0.22	0.515	0.810	1.105	1.4
3	0.355	0.22	0.515	0.810	1.105	1.4
4	0.375	0.22	0.515	0.810	1.105	1.4
5	0.392	0.22	0.515	0.810	1.105	1.4
10	0.455	0.22	0.515	0.810	1.105	1.4
15	0.512	0.22	0.515	0.810	1.105	1.4
20	0.568	0.22	0.515	0.810	1.105	1.4
25	0.605	0.22	0.515	0.810	1.105	1.4
30	0.639	0.22	0.515	0.810	1.105	1.4
45	0.754	0.22	0.515	0.810	1.105	1.4
60	0.843	0.22	0.515	0.810	1.105	1.4
75	0.895	0.22	0.515	0.810	1.105	1.4
90	0.938	0.22	0.515	0.810	1.105	1.4
105	0.977	0.22	0.515	0.810	1.105	1.4
120	1.034	0.22	0.515	0.810	1.105	1.4
150	1.093	0.22	0.515	0.810	1.105	1.4
180	1.14	0.22	0.515	0.810	1.105	1.4
210	1.205	0.22	0.515	0.810	1.105	1.4

Effective storage volume between 75% and 25%	0.21 m3
Internal surface area up to 50% effective depth	2.13 m2
Time water level at 75% effective depth	900 s
Time water level at 25% effective depth	7200 s
Time for water level to fall from 75% to 25% depth	6300 s
Soil Infiltration rate	1.6E-05 m/s

TP1 Graph



Soakaway Test Interpretation

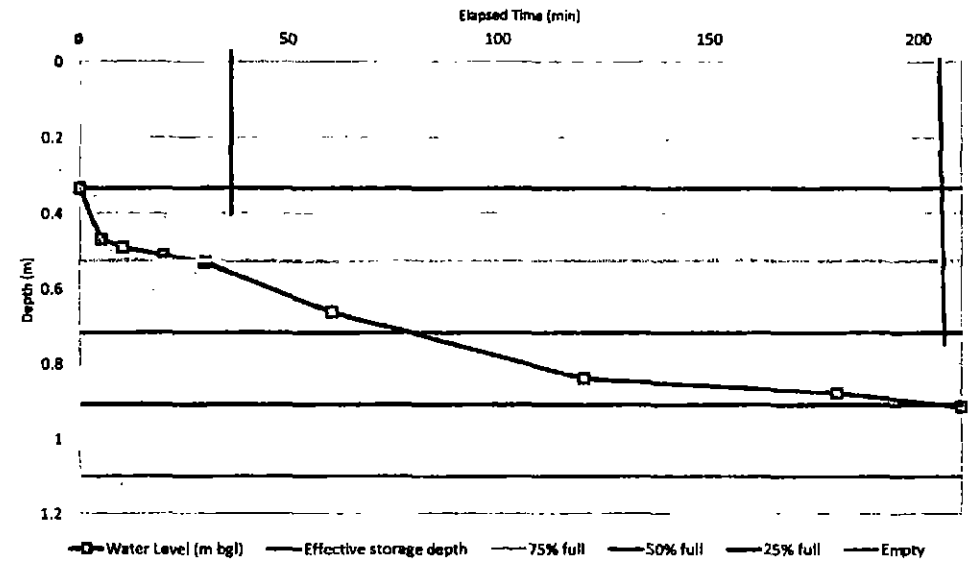
Site **Lowfield Farm**
 Test location **TP4**
 Trial pit length (m) **1.4**
 Trial pit width (m) **0.3**
 Trial pit depth (m) **1.1**

Cumulative Time (mins)	Water Level (m bgl)	Effective storage depth	75% full	50% full	25% full	Empty
0	0.334	0.334	0.526	0.717	0.909	1.1
1		0.334	0.526	0.717	0.909	1.1
2		0.334	0.526	0.717	0.909	1.1
3		0.334	0.526	0.717	0.909	1.1
4		0.334	0.526	0.717	0.909	1.1
5	0.469	0.334	0.526	0.717	0.909	1.1
10	0.491	0.334	0.526	0.717	0.909	1.1
15		0.334	0.526	0.717	0.909	1.1
20	0.512	0.334	0.526	0.717	0.909	1.1
25		0.334	0.526	0.717	0.909	1.1
30	0.529	0.334	0.526	0.717	0.909	1.1
45		0.334	0.526	0.717	0.909	1.1
60	0.662	0.334	0.526	0.717	0.909	1.1
75		0.334	0.526	0.717	0.909	1.1
90		0.334	0.526	0.717	0.909	1.1
105		0.334	0.526	0.717	0.909	1.1
120	0.839	0.334	0.526	0.717	0.909	1.1
150		0.334	0.526	0.717	0.909	1.1
180	0.878	0.334	0.526	0.717	0.909	1.1
210	0.915	0.334	0.526	0.717	0.909	1.1

Effective storage volume between 75% and 25% **0.16 m³**
 Internal surface area up to 50% effective depth **1.72 m²**
 Time water level at 75% effective depth **1800 s**
 Time water level at 25% effective depth **12000 s**
 Time for water level to fall from 75% to 25% depth **10200 s**

Soil Infiltration rate 9.2E-06 m/s

Lowfield Farm TP4



Soakaway Test Interpretation

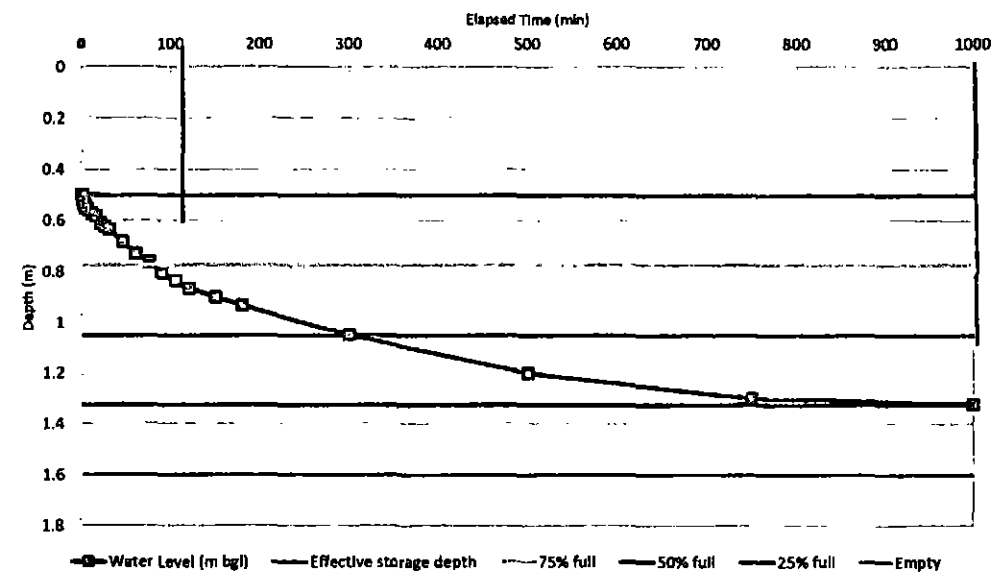
Site	Lowfield Farm	
Test location	TP6	
Trial pit length (m)	1.5	
Trial pit width (m)	0.3	
Trial pit depth (m)	1.6	

Cumulative Time (mins)	Water Level (m bgl)	Effective storage depth	75% full	50% full	25% full	Empty
0	0.5	0.5	0.775	1.050	1.325	1.6
1	0.523	0.5	0.775	1.050	1.325	1.6
2	0.538	0.5	0.775	1.050	1.325	1.6
3	0.541	0.5	0.775	1.050	1.325	1.6
4	0.55	0.5	0.775	1.050	1.325	1.6
5	0.558	0.5	0.775	1.050	1.325	1.6
10	0.572	0.5	0.775	1.050	1.325	1.6
15	0.582	0.5	0.775	1.050	1.325	1.6
20	0.611	0.5	0.775	1.050	1.325	1.6
25	0.625	0.5	0.775	1.050	1.325	1.6
30	0.636	0.5	0.775	1.050	1.325	1.6
45	0.684	0.5	0.775	1.050	1.325	1.6
60	0.731	0.5	0.775	1.050	1.325	1.6
75	0.764	0.5	0.775	1.050	1.325	1.6
90	0.804	0.5	0.775	1.050	1.325	1.6
105	0.836	0.5	0.775	1.050	1.325	1.6
120	0.866	0.5	0.775	1.050	1.325	1.6
150	0.902	0.5	0.775	1.050	1.325	1.6
180	0.933	0.5	0.775	1.050	1.325	1.6
300	1.05	0.5	0.775	1.050	1.325	1.6
500	1.2	0.5	0.775	1.050	1.325	1.6
750	1.3	0.5	0.775	1.050	1.325	1.6
1000	1.325	0.5	0.775	1.050	1.325	1.6

Effective storage volume between 75% and 25%	0.25 m3
Internal surface area up to 50% effective depth	2.43 m2
Time water level at 75% effective depth	4500 s
Time water level at 25% effective depth	60000 s
Time for water level to fall from 75% to 25% depth	55500 s

Soil Infiltration rate 1.8E-06 m/s

Lowfield Farm TP6



J ROBERTS DESIGN LTD

**Lowfield Farm
Lowfield Road
Rotherham**

FLOOD RISK ASSESSMENT

Client

Mr D White

1714 / August 2018

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1 EXECUTIVE SUMMARY

1.1 Location and Type of Development

- 1.1.1 This Flood Risk Assessment has been prepared in support of a new residential development, on land which was formally Lowfield Farm, Lowfield Road, Bolton Upon Dearne, Rotherham. This assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF).
- 1.1.2 The site is located to the East end of Lowfield Road, on the outskirts of Bolton upon Dearne, some 10km north east from the centre of Rotherham. The development site is within Barnsley Metropolitan Borough Council (BMBC). The proposed development is bounded by residential properties to the South and South West. The North and Eastern Boundary's comprise agricultural fields. The Ordnance Survey grid reference for the site is 446094E, 402622N.
- 1.1.3 No defined residential development has been provided.
- 1.1.4 The watercourses near the site are the River Dearne and Lowfield lakes to the South, and Crane Well Dike to the North.

1.2 Flood Zone

- 1.2.1 The Environment Agency data shows the lower half of the site to be located within Flood Zone 2.
- 1.2.2 Barnsley and Rotherham MBC's Strategic Flood Risk Assessments (SFRA) locates the development just outside Flood Zone 2.

1.3 Probability of Flooding

- 1.3.1 The Environment Agency information flood history records show that the River Dearne flooded in 2007. The flood waters are shown to encroach on to the Northern lower half of the development site.
- 1.3.2 The 'Main River' closest to the site is the River Dearne which is indicated upon the Environment Agency's Flood Map. The river has raised earth embankments which are maintained and monitored by the Environment Agency.
- 1.3.3 The next closest watercourse to the proposed development is the Crane Well Dike some 190m away at the point closest to the site. The Dike is shown to have flooded at the same time as the River Dearne, which is likely to be due to the river flooding. The dike is considered as tertiary by the Danvm Drainage Commission.
- 1.3.4 Bolton upon Dearne and the surrounding area is protected by raised flood defence embankments and high ground on the River Dearne. The embankments local to the site provide protection from a predicted 1 in 50 year flood event which is below the national standard. The high ground local to the site provide protection from a predicted 1 in 30 year flood event which is below the national standard.

- 1.3.5 Overtopping of the River Dearne flood defences would take place primarily over the lower South bank in the first instance, into the functional flood plain to the south of the proposed development. Further rising of water levels would cause overtopping of the earth embankment flood defences on the Northern bank of the River Dearne and the Northern functional flood plain to flood.
- 1.3.6 The drainage ditches in the vicinity of the site are largely managed by the Danvm Drainage Commission and only have records of overtopping when the River Dearne overtopped and flooded in 2007. Should high intensity rainfall occur it is likely the drains will be temporarily inundated and largely the surface water will be accommodated within the channel, however in the event of overtopping occurring it will be shallow and localised to the ditches and drains. The site is considered to be at risk of flooding from local watercourses and from local drains and sewers.

1.4 Flood Risk Management Measures

- 1.4.1 Levels will be fixed to ensure flood water flows away rather than towards the buildings.
- 1.4.2 The proposed development is classified in the 'More Vulnerable' category of NPPF Table 2. Flood resilient construction in the lower parts of the structures should be considered where appropriate, in accordance with the document "Improving the Flood Performance of New Buildings – Flood Resilient Construction" (ISBN 9781 85946 2874).
- 1.4.3 It is proposed that the Finished Floor Level (FFL) of the new dwellings is 17.6m Above Ordnance Datum (AOD). This level will provide a minimum flood resilience of at least 600mm above the existing ground levels and above the maximum 1 in 200 year flood level from the River Dearne.

1.5 Off Site Impacts

- 1.5.1 The development proposal will increase the impermeable area of the site which will be managed by SuDs.
- 1.5.2 It is recommended that the surface water discharge from the site be via soakaways and other infiltration systems where possible. However, the prevailing ground conditions are thought to be sandy Clays of low permeability. Should infiltration systems not be viable for the site following testing, the surface water should be attenuated within the site and discharged at a controlled rate of 5L/s (or as agreed with Yorkshire Water, the IDB and local water authority) into a public sewer manhole to the north of the site. The public sewer discharges directly into the Crane Well Dike and currently serves the neighbouring housing estate to the west of the proposed development.
- 1.5.3 The controlled discharge will minimise the effect on any increase in flood water levels within the Crane Well Dike and active flood plain downstream. A 5L/s discharge is the minimum recommended to minimise blockages within the flow control manhole.

1.6 Residual Risks

- 1.6.1 It is inevitable that rare and extreme rainfall events will involve volumes of water that exceed the design standard of the surface water drainage which will lead to temporary surface ponding around the site. The final site levels proposed dwellings will be fixed so that in extreme conditions surface water flows away from them towards low lying landscaping. This will ensure to reduce the flood risk to the development during extreme rainfall events.
- 1.6.2 In extreme events it is possible the River Dearne and Crane Well Dike may overtop their banks. The topography of the wider surrounding is low lying this will act to dissipate the flood waters over large lower lying areas. The flood water will both spread and rise slowly allowing for warnings to be received and action taken. It is to be noted the Southern bank of the river Dearne is lower and land to both banks of the River act as the functional flood plain. With the Southern bank being lower than the embankments the southern bank would overtop first.
- 1.6.3 Access to the proposed development will be via Lowfield Farm Close. Should flooding of the area surrounding the site occur, access and egress of the site should remain available to allow evacuation from the site to higher land in Bolton upon Dearne should it be necessary.
- 1.6.4 In the event of flooding preventing the access or egress from the site then refuge should be taken on the first floor of the dwelling.
- 1.6.5 The proposed development should be registered with the Environment Agency Flood Warning Scheme.
- 1.6.6 The residual risks should be managed by the designers and the construction team for the development, who should ensure that its design and construction incorporates the more detailed points and recommendations contained within this assessment.

1.7 Conclusion

- 1.7.1 This report has identified that the main flood risk to the development is from overtopping of the River Dearne's North bank flood defences or overtopping arising from the Crane Well Dike watercourse. The defences of the area local to the site are rated as in 'Fair' and 'Good' condition according to the EA. The defences are monitored and maintained by the Environment Agency.
- 1.7.2 The finished floor levels of 17.6mAOD have been set 600mm above the lowest ground level and above the highest modelled 1 in 200 flood level within the River Dearne.
- 1.7.3 The Flood Risk Assessment concludes that the proposed development is appropriate for this location.

2 INTRODUCTION

This report aims to assess the risk of flooding for the development of a residential site located at Lowfield Farm, Lowfield Road, Bolton upon Dearne, Rotherham.

The assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF). It has used information of the existing topography, existing surface water drainage systems, and historical flood records

Relevant information was also sought from the local authority, Environment Agency (EA) and the Shiregroup of IDB's. Possible sources of flooding will be identified and a careful evaluation will be carried out to determine the level of risk they each pose to the development. The effect of climate change will also be taken into consideration, as well as the off-site impact caused, if any, by the proposed development.

Should a risk of flooding be of significance, the report will aim to provide measures to minimise the impact upon the development throughout its design life, as well as the local area, and to protect against the threat to life.

3 DEVELOPMENT AND SITE LOCATION

3.1 Site Description

- 3.1.1 The development proposal is for a residential development. A detailed layout for the site is not yet available, however the total site area is 0.52Ha.
- 3.1.2 The proposed development site is a former farm yard comprising various agricultural buildings which have been demolished.
- 3.1.3 The site is accessed via a public road to the west of the development.
- 3.1.4 The general levels of the site range from 20.7 to 16.6 metres Above Ordnance Datum (mAOD). The topography varies across the site, but there is a general fall in the north east direction. The lowest level of the site is located to the north east corner of the proposed development plot (see Existing Levels Plan in **Appendix B**).

3.2 Site Location

- 3.2.1 The site is located on Lowfield Road , Bolton upon Dearne, some 10 km north east from the centre of Rotherham (see site location plan in **Appendix C**). The development site is within Barsley Metropolitan Borough Council (BMBC). The proposed development is bounded by residential properties and agricultural farm land. The Ordnance Survey grid reference for the site is 446094E, 402622N (see Site Location Plan in **Appendix C**).

3.3 Classification of Vulnerability

- 3.3.1 Table 2 of the Technical guidance to the NPPF, the classification of the proposed development is in the 'More Vulnerable' category.

3.4 Flood Zone Classification

- 3.4.1 The Environment Agency's flood map (see Environment Agency information in **Appendix D**), the development site is located within Flood Zone 2: Medium Risk (Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.)
- 3.4.2 Barnsley and Rotherham Council's Strategic Flood Risk Assessment locates the development within Flood Zone 1 for the majority of the site: Low Risk (Land having a less than 1 in 1,000 annual probability of river or sea flooding.) with the northern end of the site in Flood Zone 2. (Refer to **Appendix E**)

3.5 Local Development Plan

- 3.5.1 The site is located within a residential area of Bolton upon Dearne, and is located to the side of a small housing estate to the Eastern side of Bolton upon Dearne.
- 3.5.2 The site is currently considered to be developed as the site is considered as brown field having previously being the site of a former farm yard with associated agricultural buildings which have been demolished.
- 3.5.3 RMBC's Local Development Framework (LDF): Core Strategy document, makes clear that there is a growing demand for housing development, but that RMBC is aiming to minimise loss of countryside and take advantage of sustainable locations.
- 3.5.4 The development site is not located within a 'Housing Allocation' area, although as in fill development is considered to be consistent with the aims of Barnsley Council LDF.

3.6 Sequential and Exceptions Test

- 3.6.1 The development proposed is for the construction of residential dwellings. The development is categorised as 'More Vulnerable'.
- 3.6.2 The Environment Agency categorise the site within Flood Zone 2 as such Table 3 of the Technical Guidance to the NPPF a Sequential Test and Exceptions Test are not required.
- 3.6.3 The Eastern edges of Bolton upon Dearne are largely located in Flood Zone 2, with limited areas located in lower flood zone categories.
- 3.6.4 The development site is located to the East of Bolton upon Dearne and would be a benefit to the local area by adding additional housing, whilst also providing additional customers for the local economy. It is considered that the proposed development meets the requirements of the Exceptions Test.

4 DEFINITION OF THE FLOOD HAZARD

The sources of flooding that could potentially affect the site are; -

- Flooding from water courses
 - The River Dearne
 - The Crane Will Dike
- Flooding from land
- Flooding from sewers
- Flooding from ground water

4.1 The River Dearne

- 4.1.1 It is considered that fluvial flooding represents the worst case scenario rather than tidal flooding, and therefore fluvial flooding is considered over tidal flooding.
- 4.1.2 The development site is located some 500m to the North of the River Dearne at its nearest point. Bolton upon Dearne falls within the River Dearne catchment. The River Dearne has raised flood defences that protect large areas of low lying land in Bolton upon Dearne. The defences located closest to the site are recorded in the asset tables as being in condition grade 2 - 3 (Good - fair condition). The defences are mainly of earth embankments that provide protection for a 1 in 50 year storm event which does not meet the national standard.
- 4.1.3 The EA information (**Appendix D**) also included modelled water level results for various defended storm events of the River Dearne. Table 1 below details a summary of the information most relevant to the site.

Table 1; Defended modelled results of the River Dearne at the points closest to the site, and associated asset information.

Node Point	Asset ID	South Bank level (mAOD)	North Bank level (mAOD)	100YR Level (mAOD)	150YR Level (mAOD)	200YR Level (mAOD)
DRN01_5795	214728	16.260	15.850	16.03	16.49	16.95
DRN01_5544	214008	14.650	15.275	15.95	16.39	16.87
DRN01_5292		14.080	14.024	15.92	16.37	16.85

- 4.1.4 The sample data of the Environment Agency's modelled results of the River Dearne, for a 1 in 200 year storm event the risk of overtopping is high.
- 4.1.5 In the event the River Dearne overtops, the flood water would initially overtop the lower South bank, and the natural gradient of the land would result in water spreading in an Easterly direction across agricultural fields within the Flood Storage Areas. If river levels continue to rise the embankments on the north bank would overtop causing the functional flood plane to flood. Due to the topography of the agricultural land the water would spread in an easterly direction.

4.2 The Crane Well Dike

- 4.2.1 The Crane Well Dike is situated some 190m to the proposed development site at its closest point.
- 4.2.2 The dike forms part of the drainage ditch network in the interests of the Shires IDB, predominantly the Danvm Drainage Commission.
- 4.2.3 The Crane Well Dike is recorded to have flooded in 2007. This is likely to have been caused by the River Dearne over topping its defences at the same time and the ensuing flood enveloping the flood plain.
- 4.2.4 Crane Well Dike is considered as tertiary by the Danvm Drainage Commission. Therefore it is not considered as imperative to the drainage of the surrounding agricultural land, as such maintenance may only take place every 5 years.
- 4.2.5 The Crane Well Dike is unlikely to pose a direct risk to the development.

4.3 Flooding from Land

- 4.3.1 The topography of the surrounding land uphill of the development to the south west has a shallow fall in an easterly direction. The gradient on site is around 1 in 22 towards the north east corner of the site. Surface water flooding is likely to be contained within the highways and channelled into the local sewer network.
- 4.3.2 It is considered flooding from land is unlikely.

4.4 Flooding from Sewers

- 4.4.1 Existing Foul water sewers are located within Lowfield Farm Close at a depth of approximately 1.25m. (Refer to **Appendix F** for sewer plans and **Appendix B** for levels). The relative invert level would be around 18.94mAOD with cover level of 20.19mAOD. The foul water sewer connects to an existing combined sewer on the north side of the site with a depth of circa 2.1m within the Lowfield Farm Close. The combined sewer has an invert level of 18.68m within the road. Should the foul water sewer flood, overland flows would travel in a northerly direction towards the farm land. The proposed development should ensure the ground levels generally fall away from the dwellings to prevent localised sewers from flooding.

- 4.4.2 An existing surface water public sewer is present within Lowfield Farm Close, which then follows the western boundary of the site and discharges into the Crane Well Dike to the north via a headwall. The drainage within Lowfield Road consist of 900mm diameter pipes, whereby the sewers reduce to 225mm diameter at the corner of the existing turning head. Typically this would indicate attenuation has been provided for the adjacent development and the manhole where the pipe sizes reduce would contain a flow control device. Should the surface water sewer flood, overland flows would travel in a northerly direction towards the farm land and Crane Well Dike. The proposed development should ensure the ground levels generally fall away from the dwellings to prevent localised sewers from flooding.
- 4.4.3 The risk of sewer flooding is considered to be low.

4.5 Flooding from Ground Water

- 4.5.1 There are no known records of ground water flooding in the vicinity of the site.
- 4.5.2 The BGS confidence rating for the area is generally low.

5 THE PROBABILITY OF FLOODING

5.1 Probability of Flooding

- 5.1.1 According to the Environment Agency and Barnsley / Rotherham Strategic Flood Risk Assessment flood maps the site is located mostly within Flood Zone 2: Medium Risk (Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.)
- 5.1.2 The Environment Agency's response details there is one known historical flood event of the site, which occurred in 2007. The extent of flooding is shown to cover at least half of the development site. Based on the topographic survey levels this is thought to represent a flood level of 19.0m AOD.
- 5.1.3 Additional OS terrain levels were obtained for the larger area. The general ground levels fall to the north towards Crane Well Dike at around 1 in 20 to 1 in 30 gradient. From a comparison between the EA flood history map and OS terrain levels the flood levels appear to vary between 19m AOD and 16m AOD across the development site and the upstream end of Crane Well Dike (Refer to **Appendix B dwg 1714-SK1**). Due to the steep nature of the topography it is unlikely the flooding on site is the result of an extreme water level, but due to local shallow flood water as a result of water logged ground. It is known flood maps can vary in accuracy and based on the more detailed information the extent of the flood zone 2 boundary is expected to be closer to the north end of the proposed development than indicated.
- 5.1.4 The highest modelled flood level at chainage 5795 in the River Dearne closest to the site is 16.95m AOD for a 1 in 200 year event. At this level only the very end of the site would be affected by flooding, which would support the flood zone 2 extents in the SFRA's. Therefore, it is proposed to raise the finished floor levels 600mm above the lowest ground level and modelled flood level to give a minimum FFL of 17.6m AOD to allow for future increase in flood levels due to climate change above the 1 in 200 year model data.
- 5.1.5 From the river monitoring station at Adwick the maximum flood level in 2007 was 15.1m AOD. The EA modelled River level at change 3836U for a 1 in 150 year event is 14.9m AOD.
- 5.1.6 From the river monitoring station upstream of Bolton Bridge the maximum flood level in 2007 was 17.88m AOD. The EA modelled River level at change 6014U for a 1 in 150 year event is 18.1m AOD. The flood level upstream of Bolton Bridge would be expected to be at a higher level due to the weir at this location, plus the raised topography upstream and the viaduct presents a barrier to throttle to the flood water. At chainage 5795 adjacent to the sewage treatment works the 1 in 150 water level is 16.49m AOD, which confirms the reduction in water level downstream of the Bridge. Therefore a minimum floor level of 17.6m AOD would appear reasonable in comparison with this information.
- 5.1.7 The River Dearne's flood defences local to Burton upon Dearne do not meet the required national standard for the predicted 1 in 100 year storm event. The defences nearest to the site are recorded in the asset tables as being in condition grade 2 and 3 (good to fair condition).

- 5.1.8 Should overtopping occur it is likely to be over the South bank which is at a lower crest level than the Northern bank, which will enable flood water to enter into a functional flood plain away from the site. However, should river levels continue to rise the river would overtop the flood defence embankment on the Northern bank, which will enable flood water to enter a functional flood plane to the East of the proposed development.
- 5.1.9 It is considered likely that overtopping of the Crane Well Dike will occur during extreme events.
- 5.1.10 Should particularly high rainfall intensities take place, surface water ponding may occur in the vicinity of the site. Flood waters would be slow and gradual, surface water ponding would be for a short period and is not seen to be a significant risk to the development.

5.2 Surface and Foul Water Discharge

- 5.2.1 There are no buildings remaining on the site. The location and condition of any remaining drainage systems on site from the demolished buildings is unknown at this time.
- 5.2.2 The development is for new residential properties. There is no detailed scheme for the site at this time.
- 5.2.3 It is recommended that the surface water discharge from the site be via soakaways and other infiltration systems where possible. However, the prevailing ground conditions are thought to be sandy Clays of low permeability. Should infiltration systems not be viable for the site following testing, the surface water should be attenuated within the site and discharged at a controlled rate of 5L/s (or as agreed with Yorkshire Water, the IDB and local water authority) into a public sewer manhole to the north of the site. The public sewer discharges directly into the Crane Well Dike and currently serves the neighbouring housing estate to the west of the proposed development.
- 5.2.4 The connection manhole has a cover level of 17.34mAOD and an invert of 16.40mAOD. The outlet from the manhole is a 225mm diameter clay sewer. Based on the topography a gravity system is possible to connect to the sewer. The minimum recommended FFL is 17.6mAOD, however to contain the attenuation within the site and to have a gravity connection it is probable the site levels would have to be a minimum of 18.5mAOD, which would result in filling on the northern part of the development by up to 1m. At detailed design stage this will be assessed in more detail once a scheme has been developed.
- 5.2.5 Assuming 45% of the gross site is impermeable this would generate an area of 2340m² to be drained. With a discharge of 5L/s up to a 1 in 100 year event plus 30% climate change the approximate storage required would be in the order of 90m³. A full detailed assessment will be required to determine where and how this storage is to be provided.

- 5.2.6 In respect of the foul water connection a sewer is located within Lowfield Farm Close at a depth of approximately 1.25m. The relative invert level would be around 18.94mAOD with cover level of 20.19mAOD. The foul water sewer connects to an existing combined sewer on the north side of the site with a depth of circa 2.1m within the Lowfield Farm Close. The combined sewer has an invert level of 18.68m within the road. Based on typical gradients and the distance across the site the highest invert level of the drains at the north end of the development would be around a level of 19.8 – 20.2mAOD for a gravity system to be viable. As this would require the site to be raised by around 3m at the north end it is assumed an adoptable pumping station will be required. The minimum cover level for the pumping station (private or public) would also need to be 17.6mAOD to protect the compound from flooding.

6 CLIMATE CHANGE AFFECT

- 6.1.1 National Planning Policy Framework (Technical Guidance) (NPPF-TG) Table 5 suggests that a 20% increase in peak river flows will result from climate change in the period to 2115. The design model data provided is up to a 1 in 200 year event which estimates flooding to 2190, thus takes into account climate change beyond the required 2115 period.
- 6.1.2 A further 600mm allowance above the maximum predicted flood level provides increased allowance for future climate change and increase in peak river levels. This provides a minimum floor level of 17.6mAOD.
- 6.1.3 NPPF-TG suggests that a 30% increase in rainfall intensity will result from climate change in the period to 2115. Levels should be fixed so surfaces fall away from buildings or dwellings and any temporary surface water ponding does not pose a risk of flooding adjacent to the other nearby buildings. It is likely that Doncaster Council Drainage Team with Yorkshire Water will continue to monitor the Surface Water drainage network to mitigate any surface water flooding that may occur as a result. Whilst continual improvements to the land drainage systems and Crane Well Dike will be undertaken by the Danvm Drainage Commission (IDB).

7 FLOOD RISK MEASURES

- 7.1.1 The proposed development is deemed to be in the 'More Vulnerable' category of NPPF Table 2. Therefore flood resilient construction in the lower parts of the dwellings should be considered where appropriate, in accordance with the document "Improving the Flood Performance of New Buildings – Flood Resilient Construction" (ISBN 9781 85946 2874).
- 7.1.2 Such measures may include:-
- (a) All services to be routed in the ceiling void and brought down walls to terminate at least 0.6m above floor level.
 - (b) Water sensitive apparatus such as boilers, water heaters and their controllers, to be mounted at least 1.2m above ground floor level.
 - (c) Ground floor construction to be solid concrete slab with floor insulation to be water resistant.

(d) Wall insulation to be of a closed cell water resistant material up to at least 900mm above ground floor level.

(e) If brickwork is proposed, then up to at least 0.6m above ground floor level should be of a low porosity (e.g. engineering brick) in order to minimise water absorption.

(f) Where possible chipboard and Medium Density Fibreboard should be avoided within 900mm of ground floor level.

(g) Openings in walls are to be minimised below 900mm above floor level.

(h) The dwelling should be registered on the Environment Agency's Flood Warning scheme.

(i) The finished floor level (FFL) of the proposed dwellings is to be a minimum of 17.60 mAOD. This level will provide a minimum flood resilience of at least 600mm above the existing ground levels and the maximum 1 in 200 year flood level.

The above minimum floor level and construction details will ensure that flood risk at the site arising from the identified sources of flooding is minimized during the lifetime of the dwellings.

8 OFF SITE IMPACTS

8.1 Increase of Flood Risk Elsewhere

- 8.1.1 The development proposal will increase the impermeable area of the total site, managed this will have negligible impact upon areas elsewhere.

8.2 Management of Remaining Risks Over Lifetime of Development

- 8.2.1 At present the condition or location of any remaining drainage systems from the demolished buildings is unknown.
- 8.2.2 The proposed development should include a drainage design that incorporates Sustainable Drainage Systems (SuDs) where practical. Should infiltration structures not be viable, discharge into the Crane Well Dike is possible via a public sewer. The peak rate of 5L/s with on-site attenuation will need to be confirmed with Yorkshire Water, the IDB and LLFA as required. Such consideration will serve to reduce impact of the development upon the local area.
- 8.2.3 The new surface water sewers and attenuation storage is expected to be offered for adoption by Yorkshire Water. Thereby the drainage system will be maintained over the life of the development by a statutory authority. Should the system remain in private ownership a management company will be set up to maintain the system for the life of the development.

9 RESIDUAL RISKS

9.1 Remaining Flood Risks After Implementation of Protection measures

- 9.1.1 It is inevitable that rare and extreme rainfall events will involve volumes of water that exceed the design standard of the surface water drainage which will lead to temporary surface ponding around the site. The final site levels of the proposed dwelling will be fixed so that in extreme conditions surface water flows away from them towards low lying landscaping. This will ensure to reduce the flood risk to the development during extreme rainfall events.
- 9.1.2 In extreme events it is possible The River Dearne and Crane Well Dike may overtop its banks. The topography of the wider surrounding land rises from the River Dearne and Crane Well Dike towards the site. This will cause flood water to dissipate over large lower lying areas. The flood water will both spread and rise slowly allowing for warnings to be received and the necessary action taken.
- 9.1.3 Access to the proposed development will be via Lowfield Farm Close. Should flooding of the area surrounding the site occur, access and egress of the site should remain available to allow evacuation from the site to higher land in Bolton upon Dearne should it be necessary
- 9.1.4 Should the access or egress from the site not be possible then refuge should be made available on the first floor of any proposed dwellings.

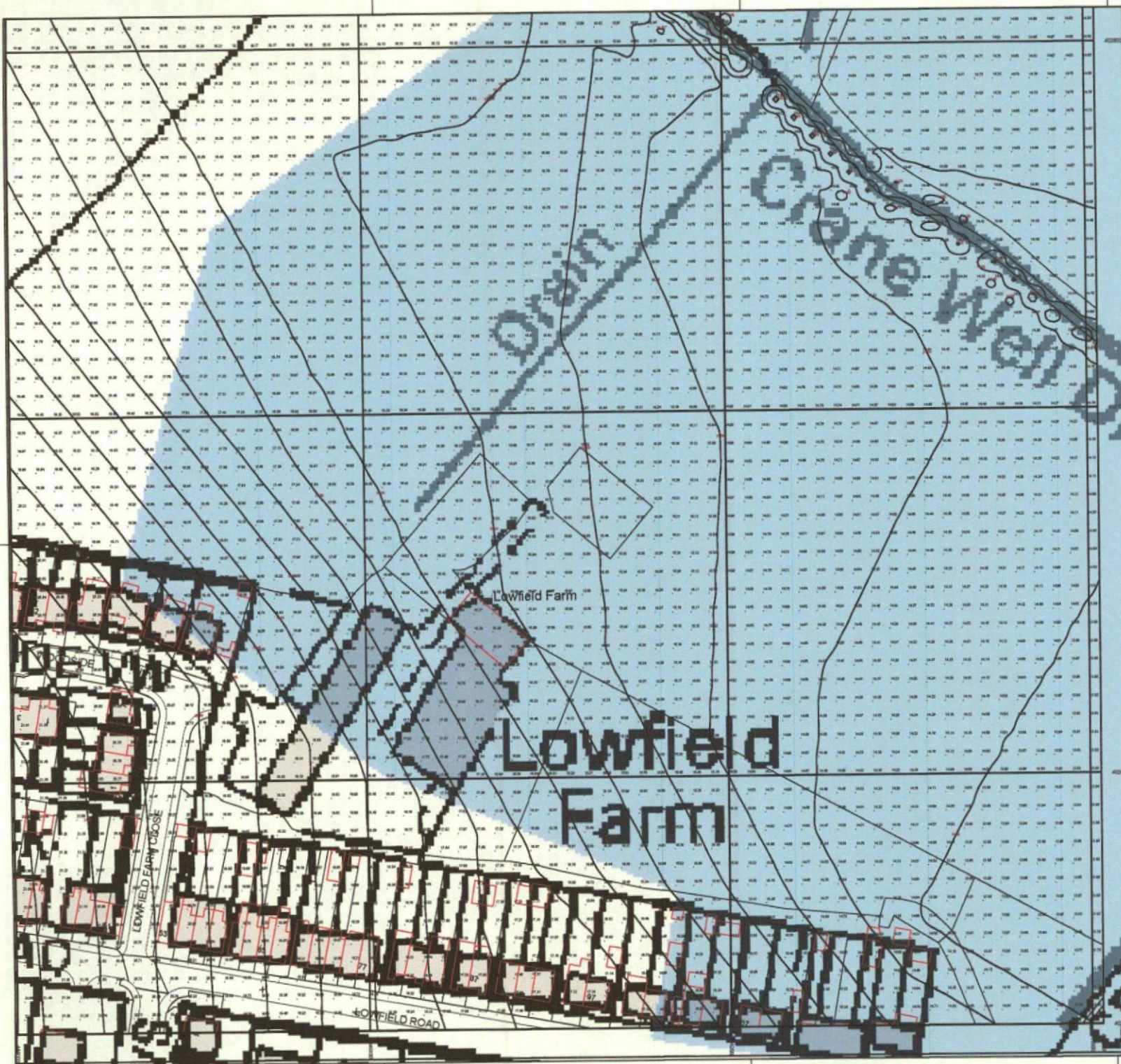
9.2 Management of Remaining Risks Over the Lifetime of Development

- 9.2.1 The residual risk should be managed by the designers and the construction team for the development, who should ensure that its design and construction incorporates the points and recommendations contained within this assessment.
- 9.2.2 The development should be registered for automated flood warnings from the Environment Agency as soon as the development is in use.

APPENDIX A – Proposed Site Layout

NOT CURRENTLY AVAILABLE

APPENDIX B – Existing Site Levels



NOTES

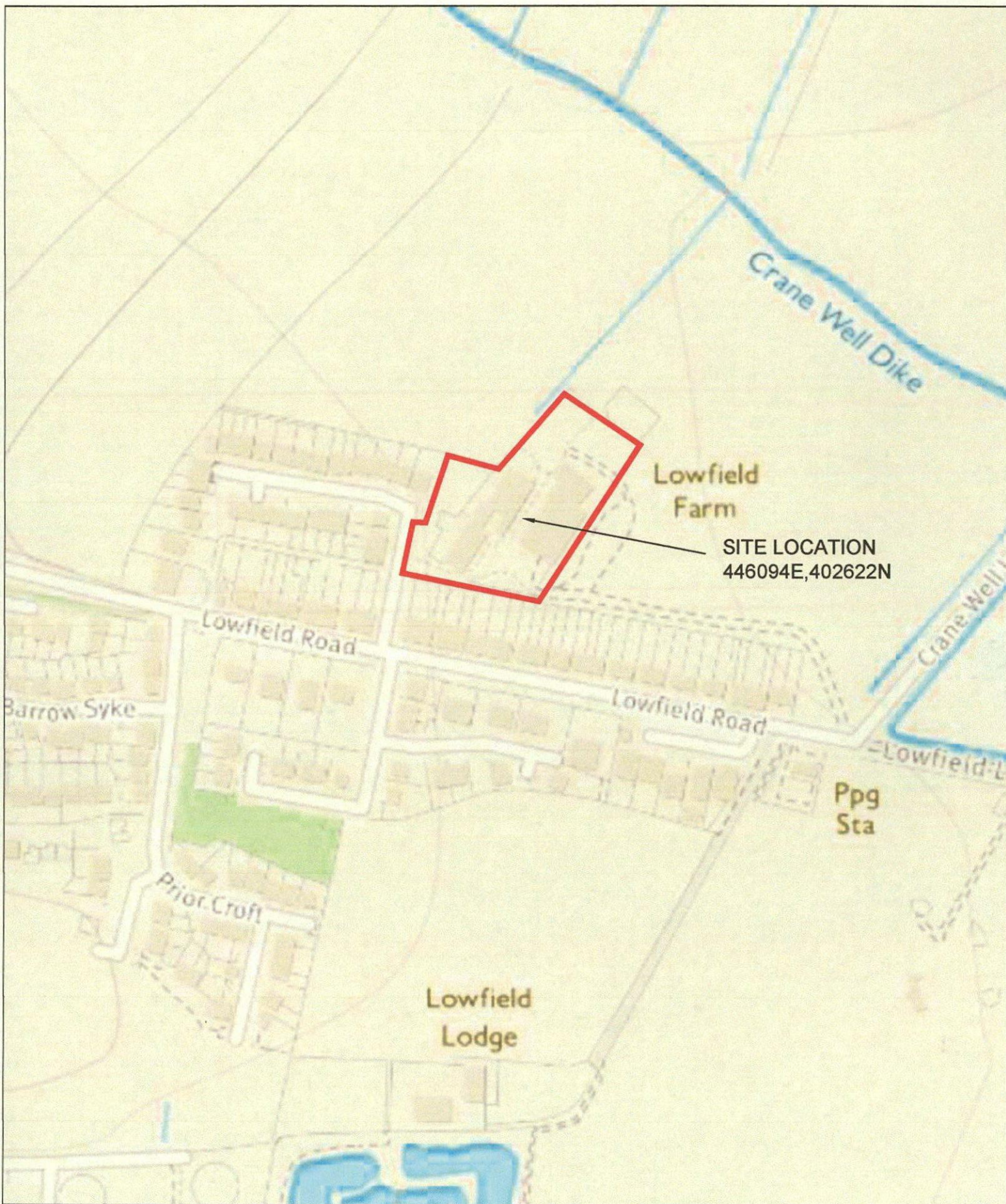
1. DO NOT SCALE - Use figured dimensions only.
2. All dimensions shown are in millimetres unless otherwise stated.
3. The Contractor is to verify all dimensions on site before commencing work or preparing shop drawings.
4. This drawing is to be read in conjunction with all Engineers and Architects drawings and specifications.

Series number: 148734

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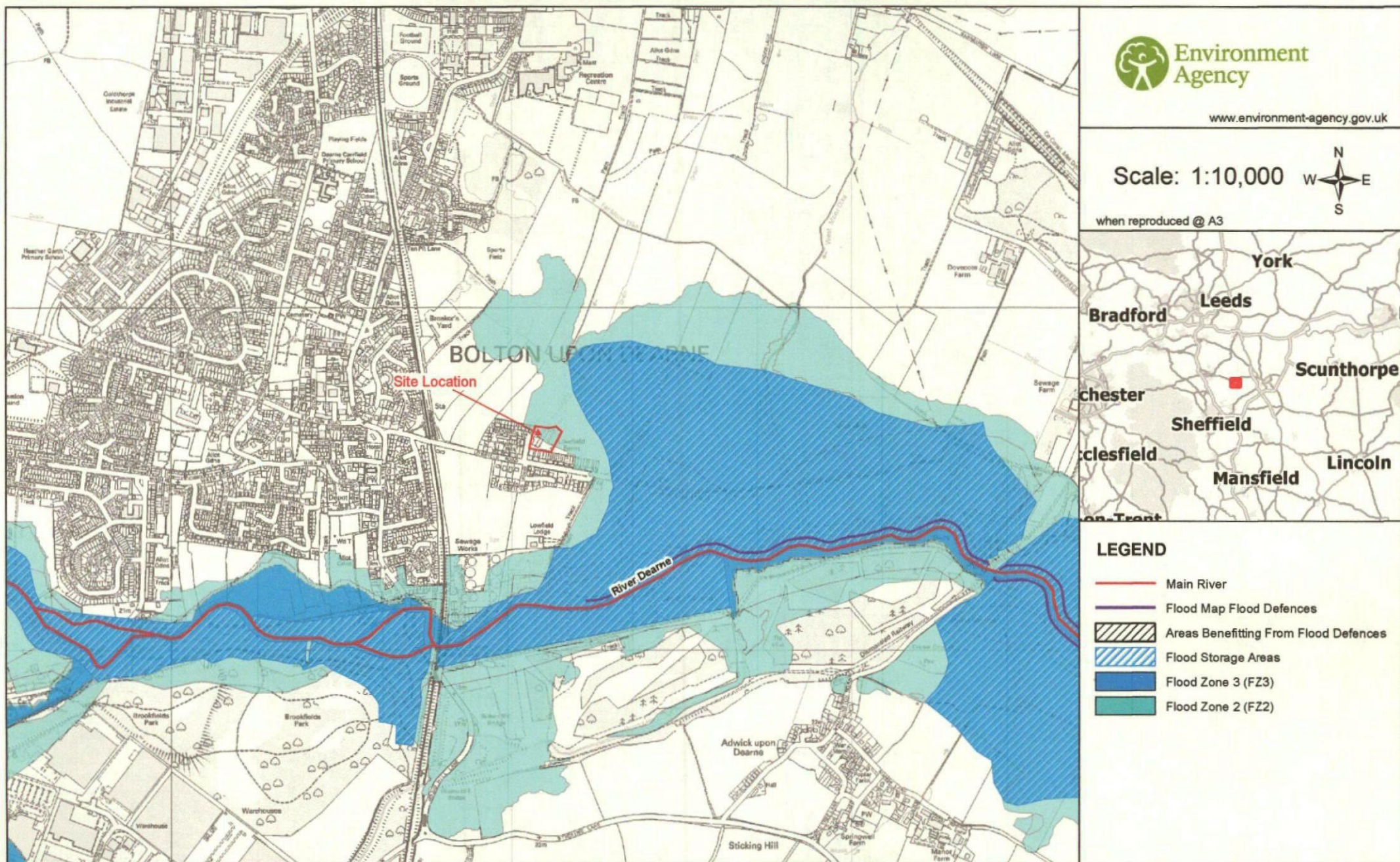
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Client	Mr D White				
Project	Lowfield Farm, Lowfield Road Rotherham				
Title	Flood History Plan Overlay onto OS Level Data				
J ROBERTS DESIGN LTD		Sheet Size	A1	Scale	1:500
Tel: 01709 917154		Drawn	None	Drawing Number	1714-SK1
www.jrobertsdesign.co.uk		Checked		Rev	P1
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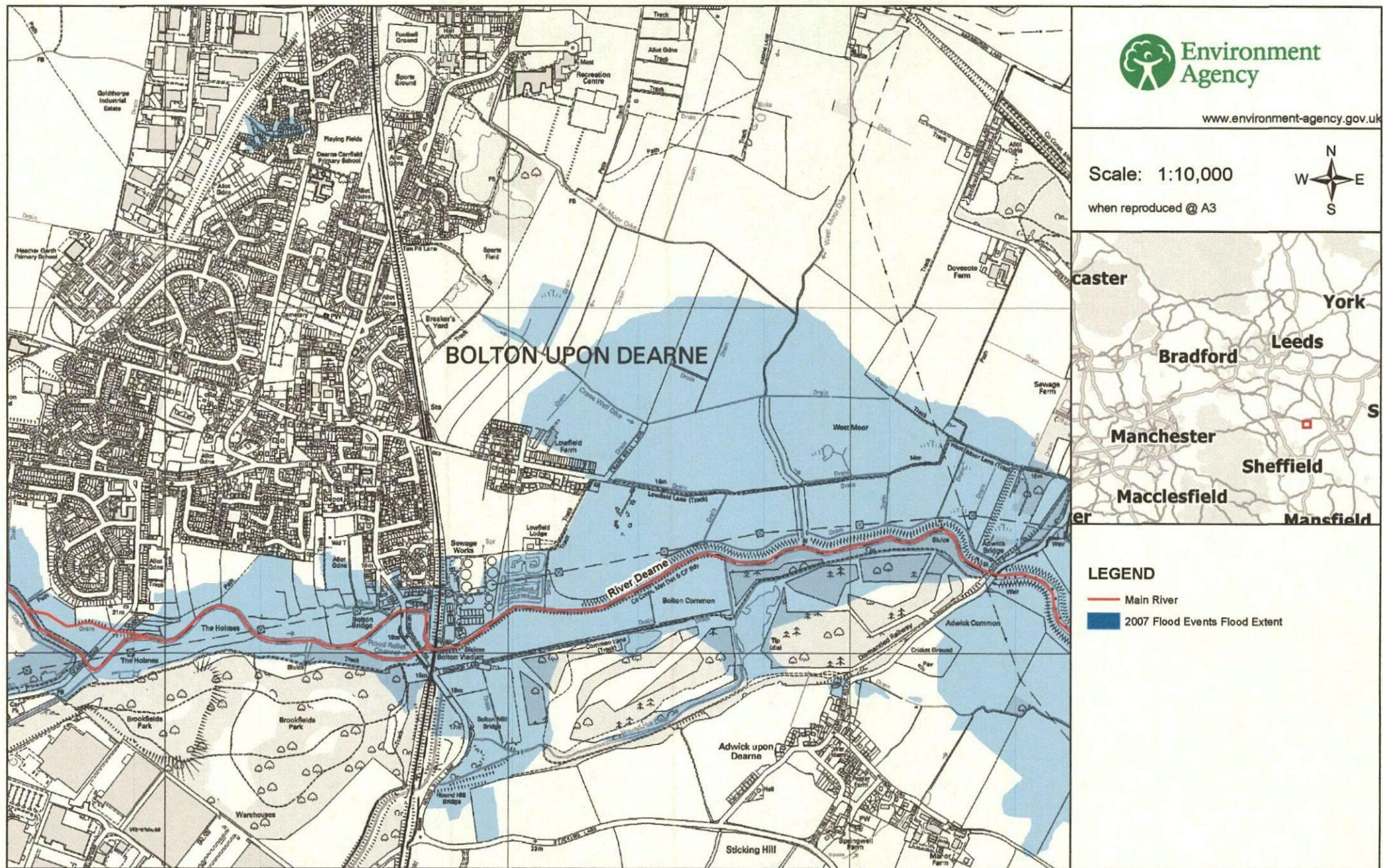
APPENDIX C – Site Location Plan

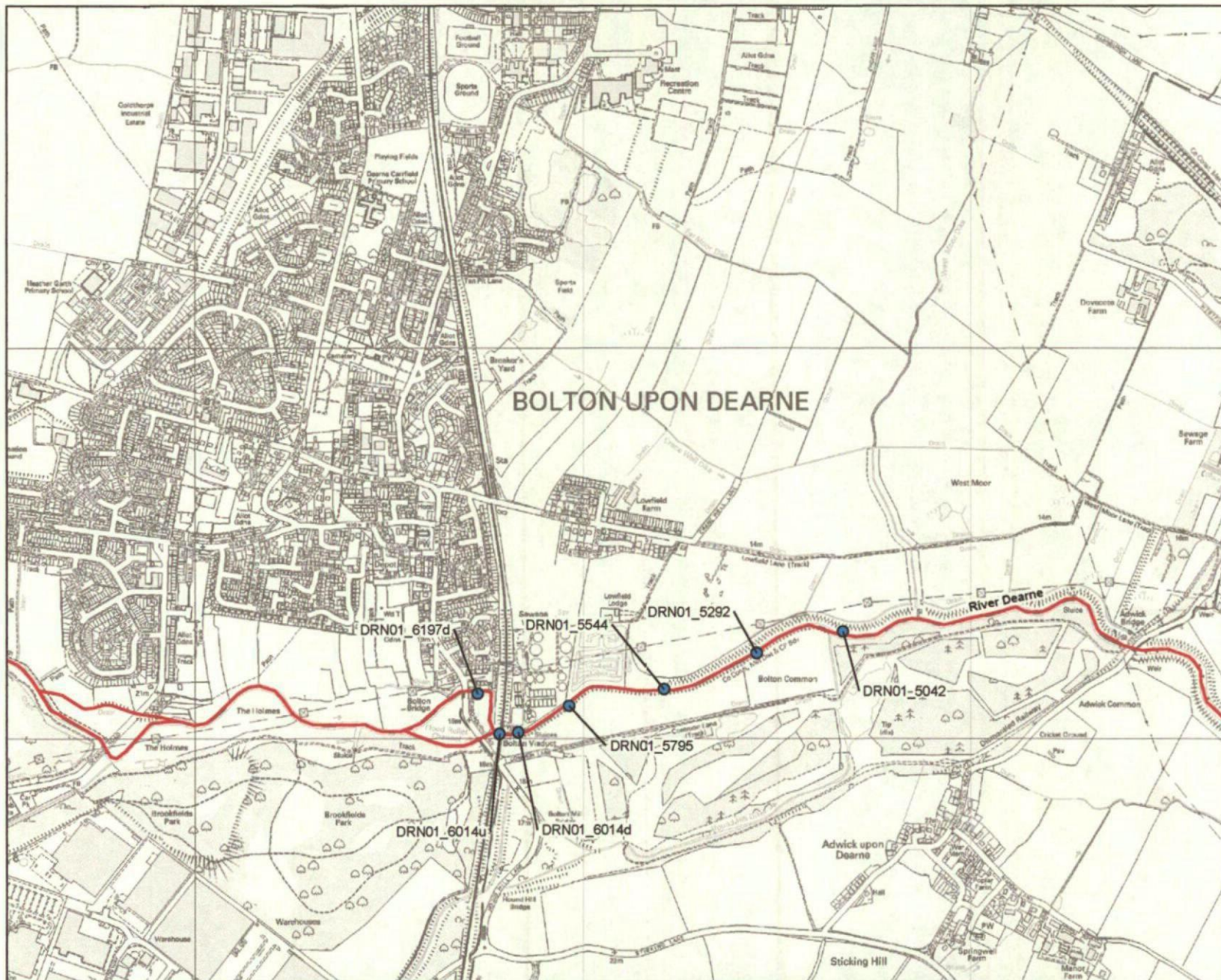


SITE LOCATION PLAN
SCALE 1:2500

APPENDIX D – Environment Agency Information







www.environment-agency.gov.uk

Scale: 1:10,000



when reproduced @ A3



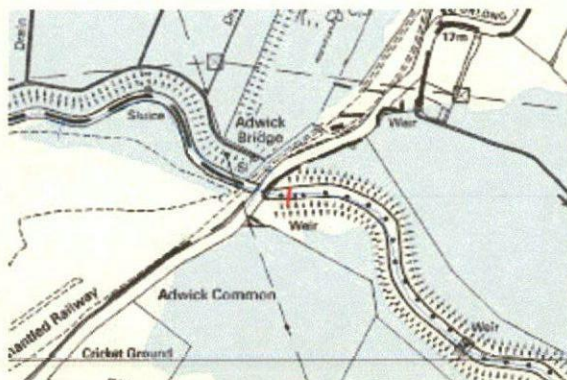
LEGEND

- Node Points selection
- Main River

River Don Results:

	25		50		75		100		150		200	
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DRN01_6014u	47.22	17.29	51.94	17.39	58.38	17.53	68.72	17.74	84.11	18.12	93.14	18.37
DRN01_6014d	71.08	15.75	77.27	15.82	87.15	15.92	103.07	16.07	134.34	16.37	157.60	17.20
DRN01_5795	71.08	15.52	77.27	15.58	87.15	15.65	103.06	16.03	136.54	16.49	160.06	16.95
DRN01_5544	64.47	15.48	66.91	15.55	70.78	15.65	82.92	15.95	114.93	16.39	135.90	16.87
DRN01_5292	64.28	15.45	66.61	15.52	70.56	15.61	82.78	15.92	108.87	16.37	134.44	16.85
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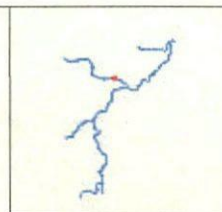
Location Plan



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Cross Section References

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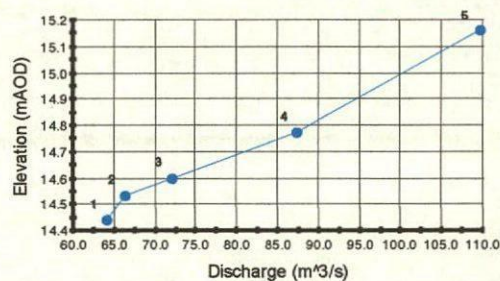


Next

Section D/s: 4035
Section U/s: 4210U



Rating Curve



Number represents model profile number

Summary of Results

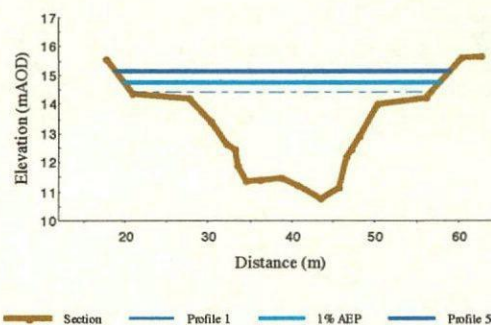
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2	2.00	66.4	14.537	1.22
3	1.33	72.1	14.601	1.26
4	1.00	87.2	14.775	1.29
5	0.67	109.5	15.160	1.32

Level of Left Bank 15.570 mAOD

Level of Right Bank 15.630 mAOD

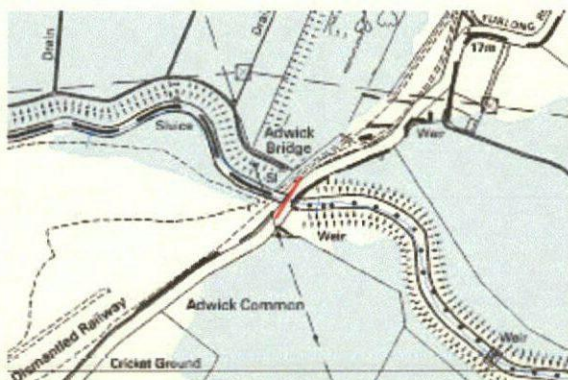
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



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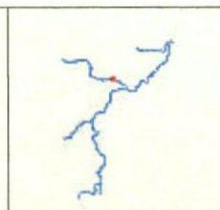
Location Plan



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Cross Section References

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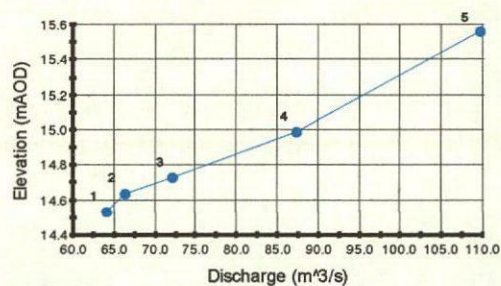


Next

Section D/s: 4168
Section U/s: 4539



Rating Curve



Number represents model profile number

Summary of Results

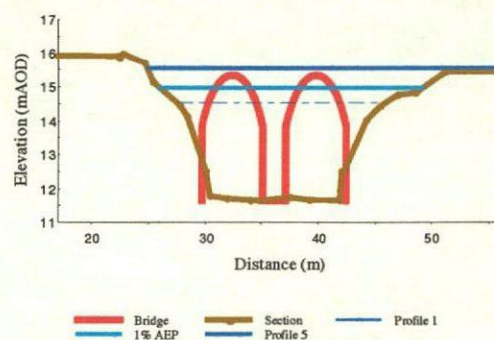
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2	2.00	66.4	14.640	1.69
3	1.33	72.1	14.733	1.72
4	1.00	87.2	14.991	1.76
5	0.67	109.5	15.559	1.78

Level of Left Bank 15.980 mAOD

Level of Right Bank 15.450 mAOD

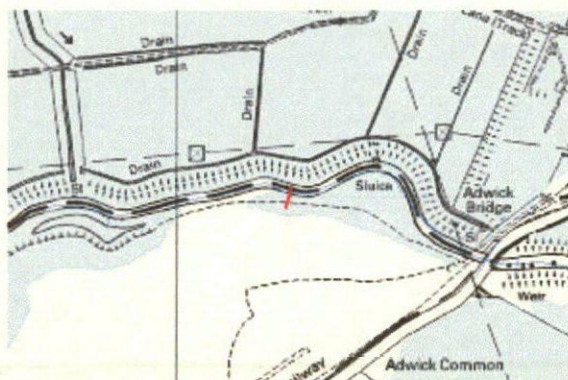
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



DRN: 01: CROSS SECTION NUMBER 4210U

Location Plan



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Cross Section References

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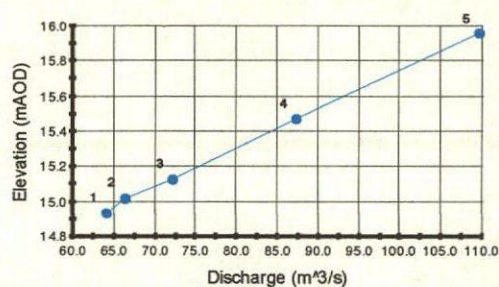


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Section U/s: 4789U



Rating Curve



Number represents model profile number

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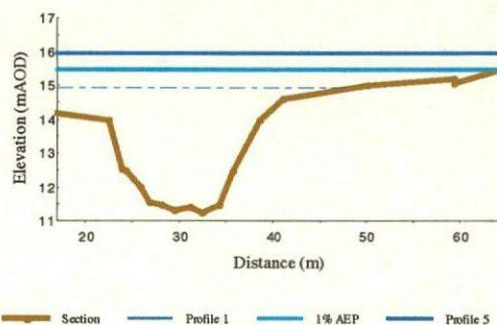
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3	1.33	72.2	15.131	1.20
4	1.00	87.2	15.473	1.20
5	0.67	109.5	15.958	1.21

Level of Left Bank 13.980 mAOD

Level of Right Bank 15.066 mAOD

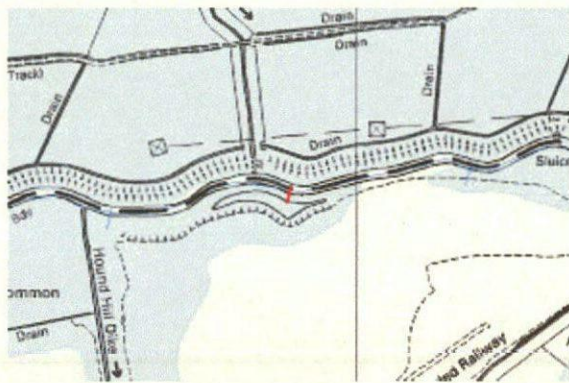
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



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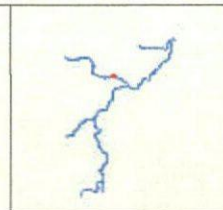
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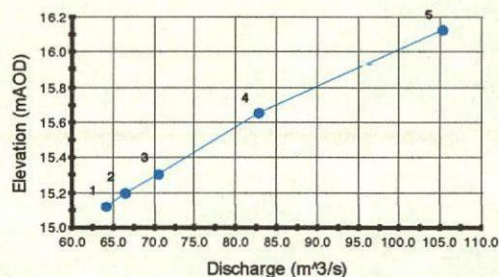


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Section U/s: 5042



Rating Curve



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Summary of Results

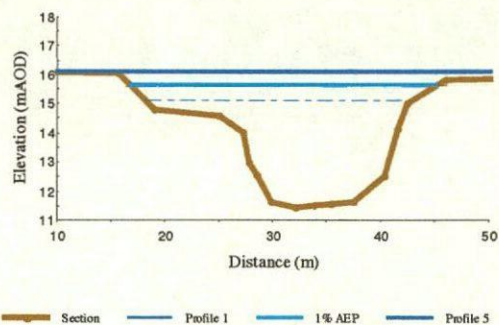
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3	1.33	70.5	15.310	1.28
4	1.00	82.7	15.658	1.28
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Level of Left Bank 15.840 mAOD

Level of Right Bank 14.734 mAOD

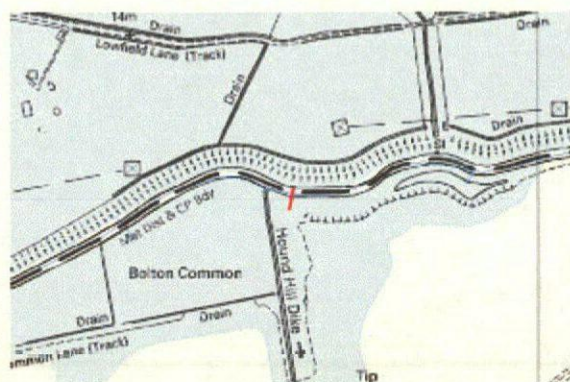
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



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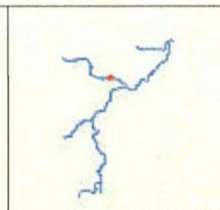
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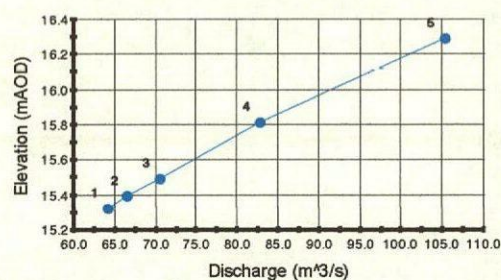


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Section U/s: 5292



Rating Curve



Number represents model profile number

Summary of Results

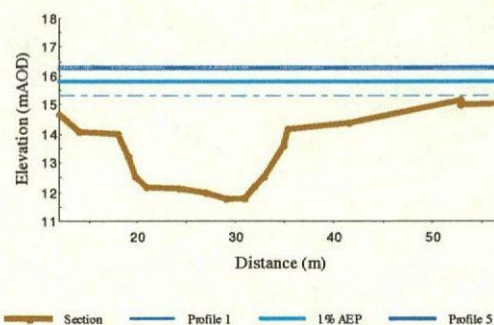
Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	4.00	64.1	15.326	0.95
2	2.00	66.5	15.400	0.96
3	1.33	70.5	15.499	0.96
4	1.00	82.7	15.818	0.96
5	0.67	105.2	16.292	0.96

Level of Left Bank 14.020 mAOD

Level of Right Bank 15.014 mAOD

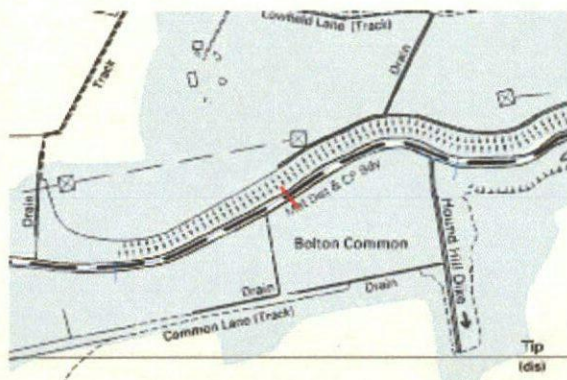
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



DRN: 01: CROSS SECTION NUMBER 5042

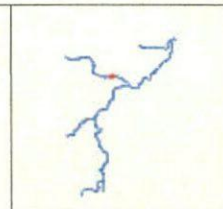
Location Plan



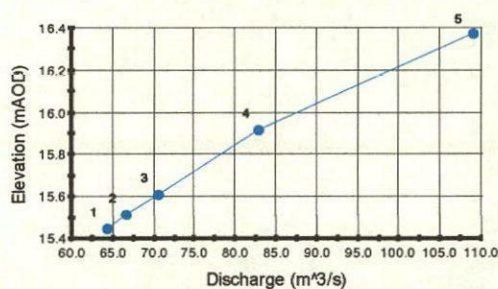
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Cross Section References

River: DRN
Reach: 01
Chainage: 5292
Section Type: SECTION
OS NGR: SE 46446 02214
Survey Dwg Ref: N/A
Photograph Ref: DEAR_05292.JPG
Next
Section D/s: 5042
Section U/s: 5544



Rating Curve



Number represents model profile number

Summary of Results

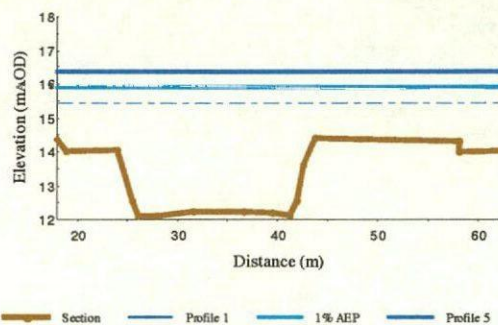
Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	4.00	64.3	15.450	0.74
2	2.00	66.6	15.519	0.74
3	1.33	70.6	15.614	0.74
4	1.00	82.8	15.919	0.74
5	0.67	108.9	16.372	0.74

Level of Left Bank 14.080 mAOD

Level of Right Bank 14.024 mAOD

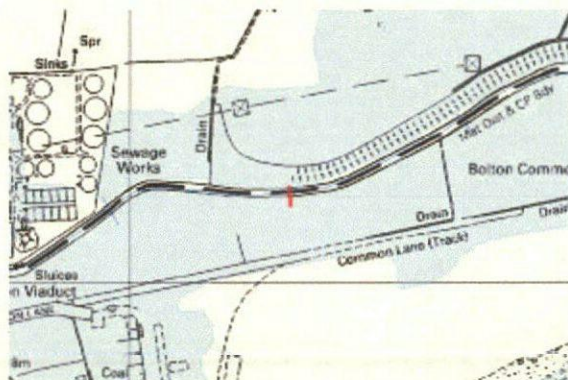
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



DRN: 01: CROSS SECTION NUMBER 5292

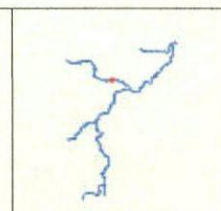
Location Plan



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Cross Section References

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Reach: 01
Chainage: 5544
Section Type: SECTION
OS NGR: SE 46213 02115
Survey Dwg Ref: N/A
Photograph Ref: DEAR_05544.JPG

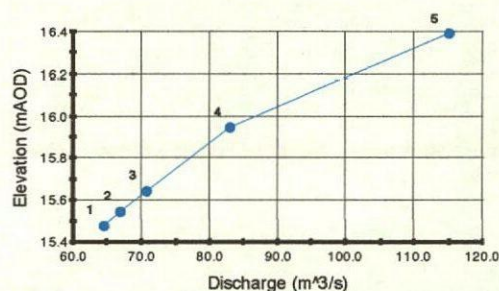


Next

Section D/s: 5292
Section U/s: 5795



Rating Curve



Number represents model profile number

Summary of Results

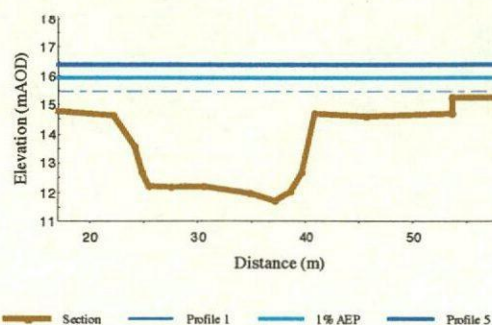
Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	4.00	64.5	15.481	0.97
2	2.00	66.9	15.550	0.98
3	1.33	70.8	15.647	0.99
4	1.00	82.9	15.948	1.00
5	0.67	114.9	16.391	1.01

Level of Left Bank 14.650 mAOD

Level of Right Bank 15.275 mAOD

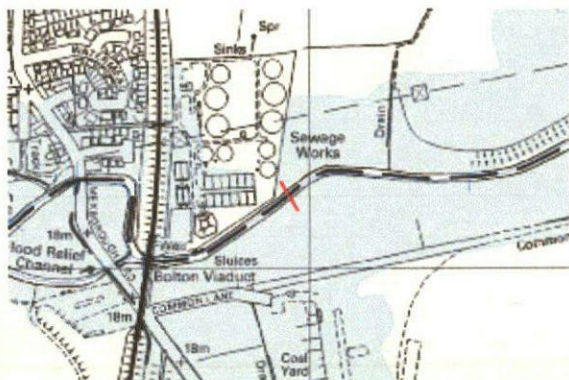
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



DRN: 01: CROSS SECTION NUMBER 5544

Location Plan



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Cross Section References

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Reach: 01
Chainage: 5795
Section Type: SECTION
OS NGR: SE 45973 02096
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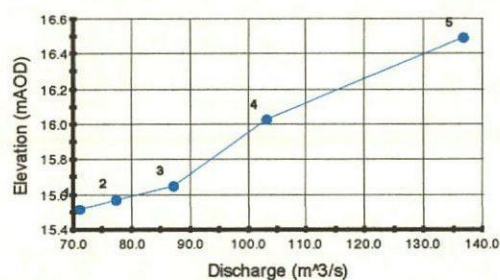


Next

Section D/s: 5544
Section U/s: 6014U



Rating Curve



Number represents model profile number

Summary of Results

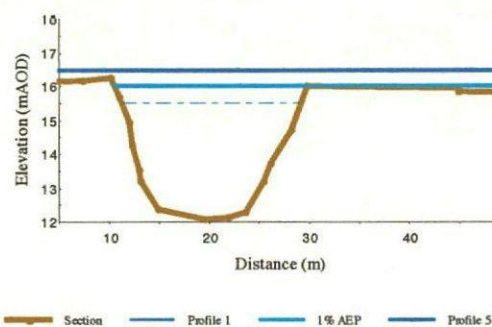
Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	4.00	71.1	15.521	1.57
2	2.00	77.3	15.576	1.65
3	1.33	87.2	15.654	1.78
4	1.00	103.1	16.031	1.89
5	0.67	136.5	16.493	1.90

Level of Left Bank 16.260 mAOD

Level of Right Bank 15.850 mAOD

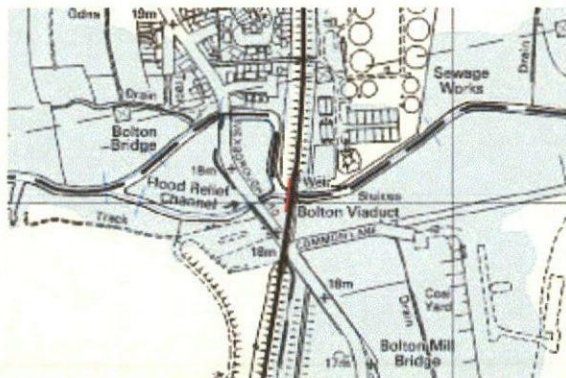
AEP: Annual Exceedance Probability = $1/T$, where T = Return Period (Years)

Cross Section Profile



DRN: 01: CROSS SECTION NUMBER 5795

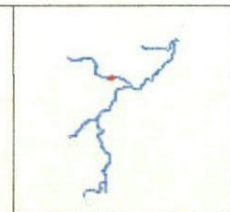
Location Plan



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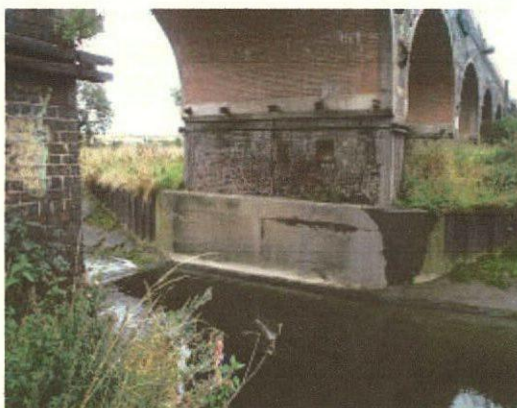
Cross Section References

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Chainage: 6014U
Section Type: SECTION
OS NGR: SE 45780 02011
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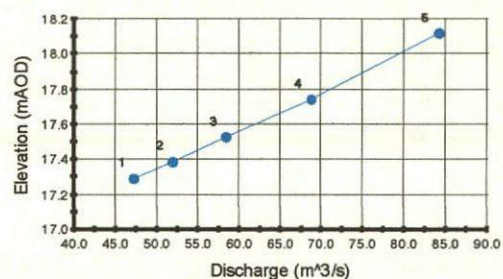


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Section U/s: 6197U



Rating Curve



Number represents model profile number

Summary of Results

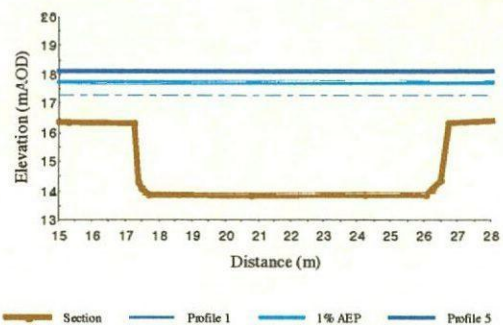
Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	4.00	47.2	17.295	0.96
2	2.00	51.9	17.390	0.96
3	1.33	58.4	17.532	0.96
4	1.00	68.7	17.744	0.96
5	0.67	84.1	18.117	0.96

Level of Left Bank 16.332 mAOD

Level of Right Bank 16.342 mAOD

AEP: Annual Exceedance Probability = $1/T$, where T = Return Period (Years)

Cross Section Profile



DRN: 01: CROSS SECTION NUMBER 6014U



www.environment-agency.gov.uk

Scale: 1:10,000 



when reproduced @ A3



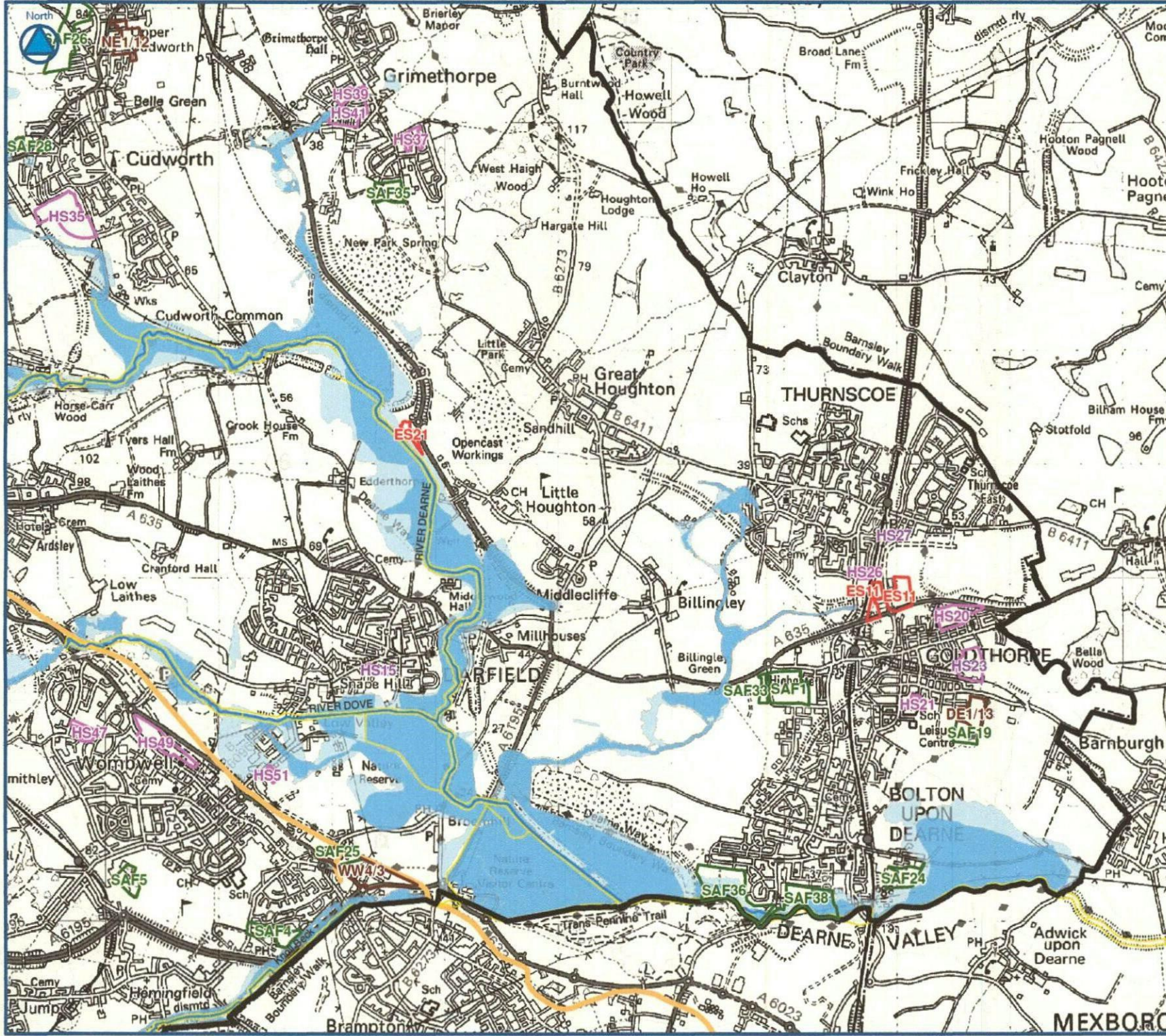
LEGEND

-  Main River
-  Structures
-  High Ground
-  Embankment

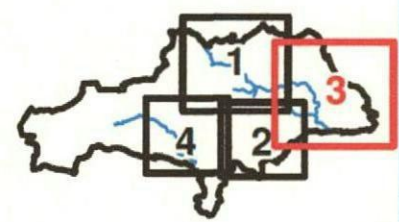
ASSET_ID	AIMS_SUB_T	DESCRIPTION	DESIGN_SOP	ASSET_MAIN	PROTECTION	TARGET_CON	OVERALL_CO
333898	weir			private	fluvial	9	2
214728	outfall			private	fluvial	9	3
276421	outfall			private	fluvial	9	3
214008	outfall			private	fluvial	9	2

ASSET ID	DESCRIPTIO	ASSET MAIN	AIMS SUB T	LENGTH	ACTUAL DCL	ACTUAL UCL	PROTECTION	TARGET CON	OVERALL CO	DESIGN SOP
445403	Adwick Spillway	environment agency	embankment	163.35			fluvial	3	3	
25730		environment agency	embankment	1325.11	15.95	15.36	fluvial	2	3	50
48853		private	high ground	1847.20			fluvial	3	2	30
25731		private	high ground	450.42			fluvial	3	4	50

APPENDIX E – Rotherham SFRA Information



KEYPLAN



LEGEND

1:32,596

- Barnsley MBC Boundary
- Defence
- Main River
- Possible route of restored canal
- Flood Zone 3
- Flood Zone 2

Proposed Development Sites

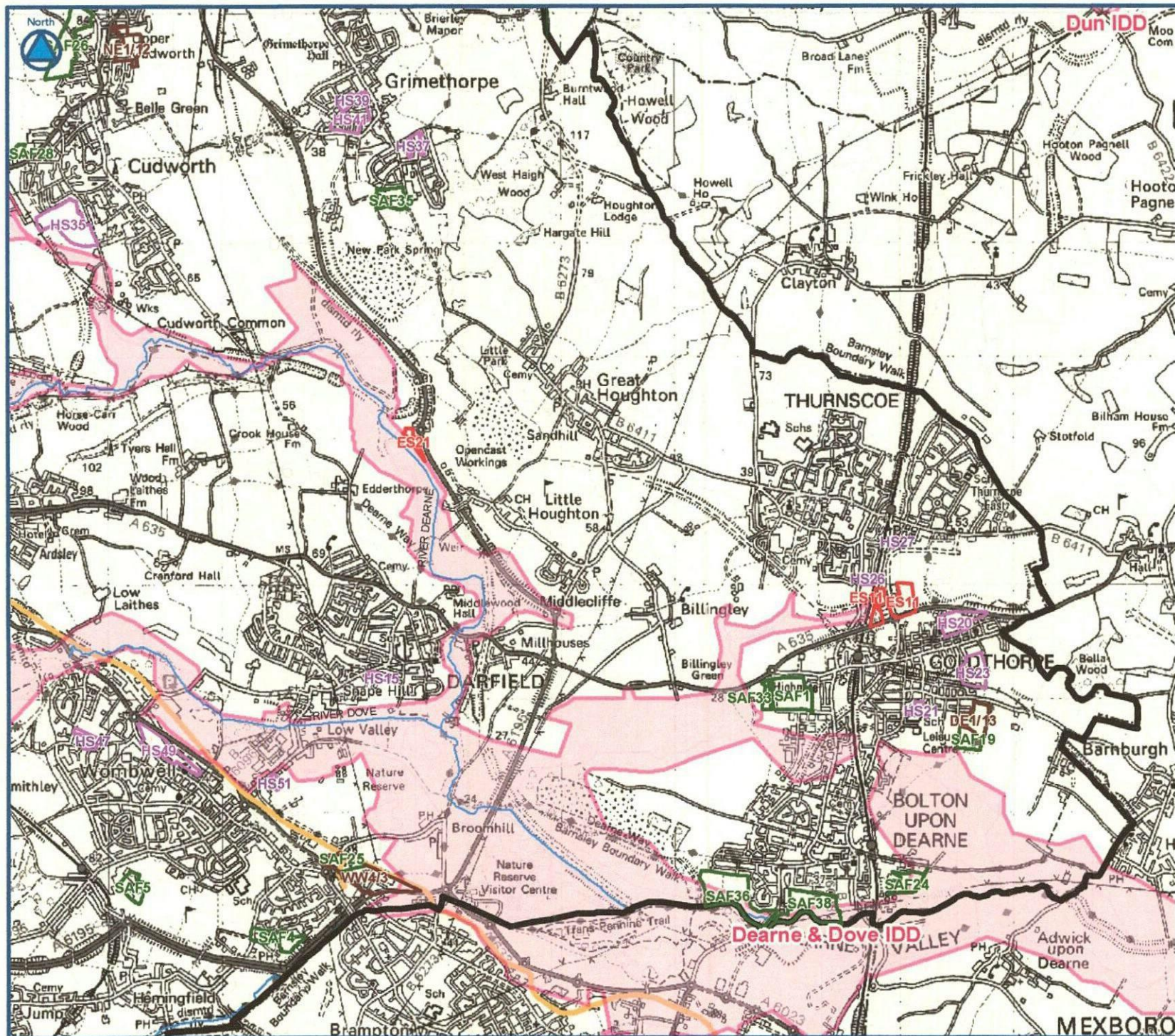
- Employment Sites
- Housing Sites
- UDP Sites
- Safeguarded Land

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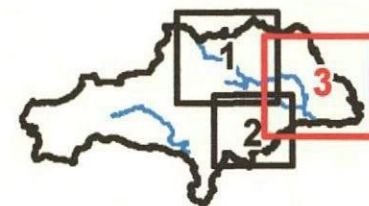


MAP A - 3

PROPOSED DEVELOPMENT SITES
AND FLOOD ZONES



KEYPLAN



LEGEND

1:32,596

- Barnsley MBC Boundary
- IDB Boundaries
- Main River
- Possible route of restored canal

Proposed Development Sites

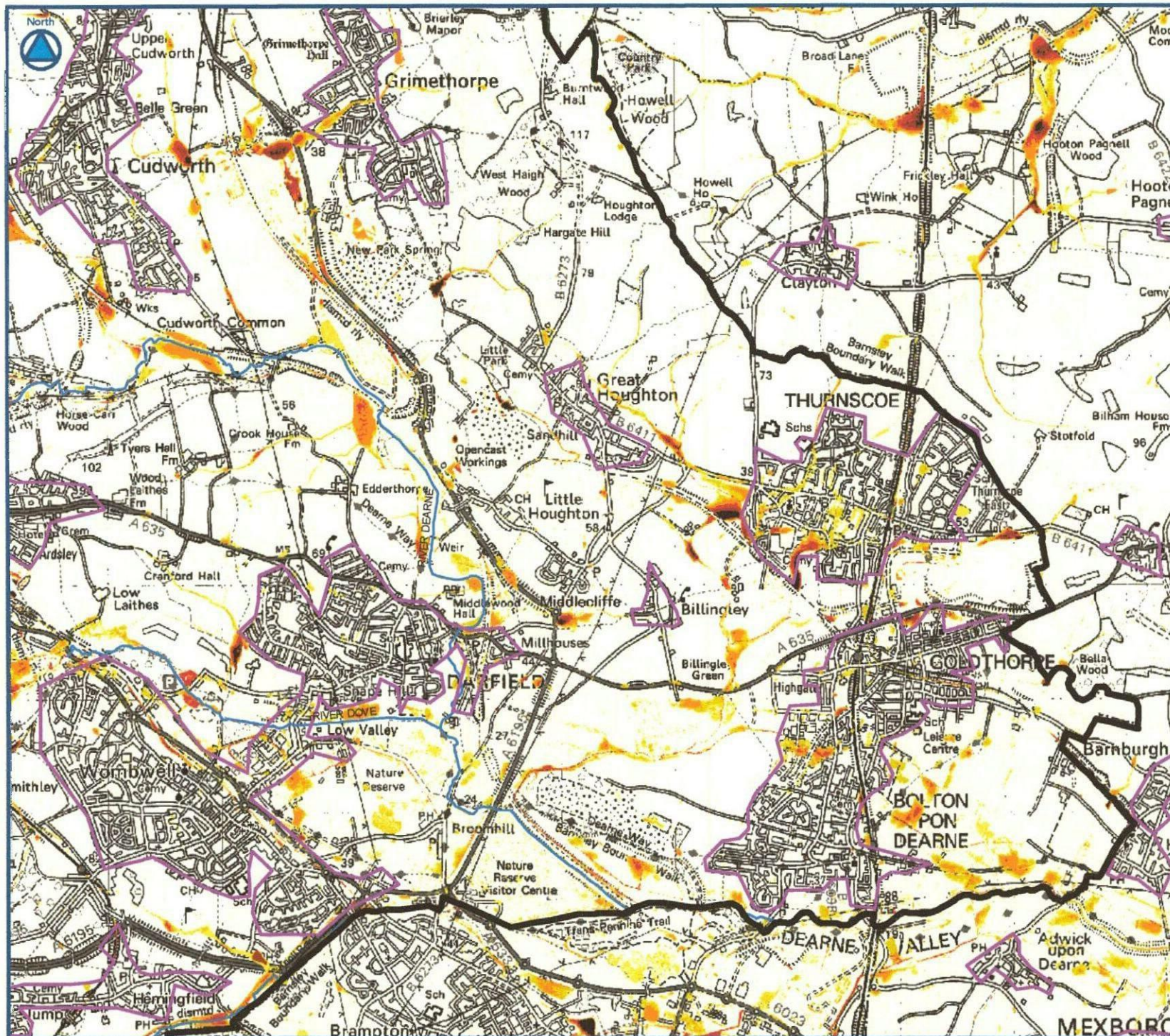
- Employment Sites
- Housing Sites
- UDP Sites
- Safeguarded Land

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MAP B - 3

PROPOSED DEVELOPMENT SITES
AND IDB BOUNDARIES



KEYPLAN



LEGEND

1:32,596

- Barnsley MBC Boundary
- Urban Areas
- Main River
- Surface Water Flooding
- Flood Depth (m)
- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1 - 2
- > 2

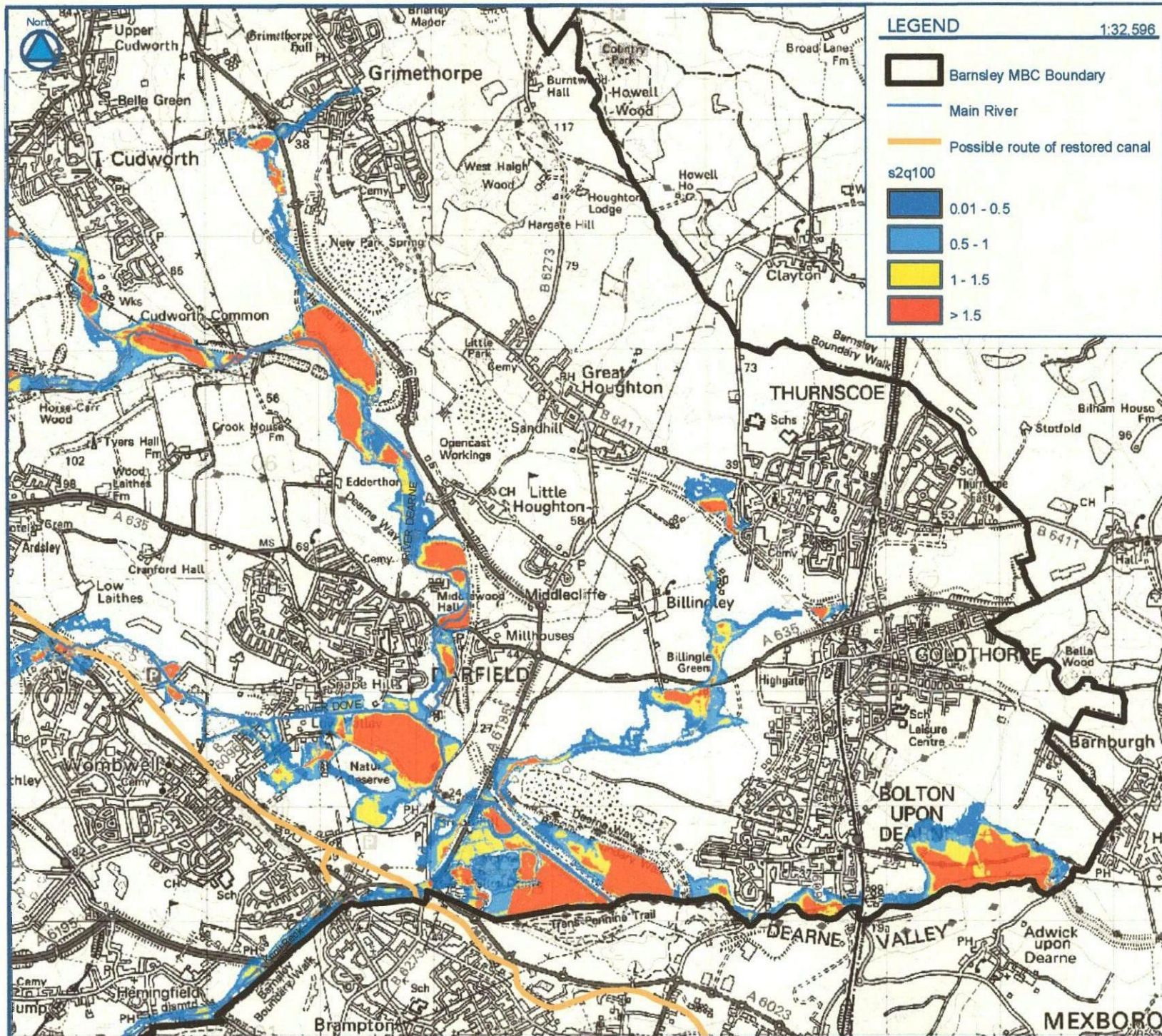
Note:
Please see Section 5.8 of the SFRA
for further details.

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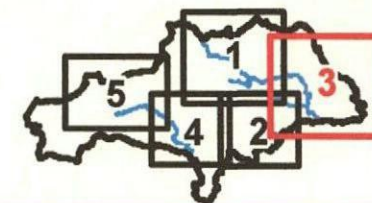


MAP C - 3

PLUVIAL FLOODING CAUSED BY
100YEAR RAINSTORM



KEYPLAN



Note:
This map shows the potential scale of flood inundation for a range of severe overtopping flood events and different standards of flood defence. They do not include the impact of a breach or failure of these defences.

Typical range of defence standards for the River Don and Dearne is to protect up to a 1 in 30year (3%) return period.

s2 = 1 in 2year Standard of Defence
q100 = 1 in 100year or 1% probability flood event.

This map should be considered in support of the Environment Agency Flood Zone Maps to aid the Sequential and Exception Tests. It should not be considered in isolation without reference to the other SFRA Flood Risk Maps.

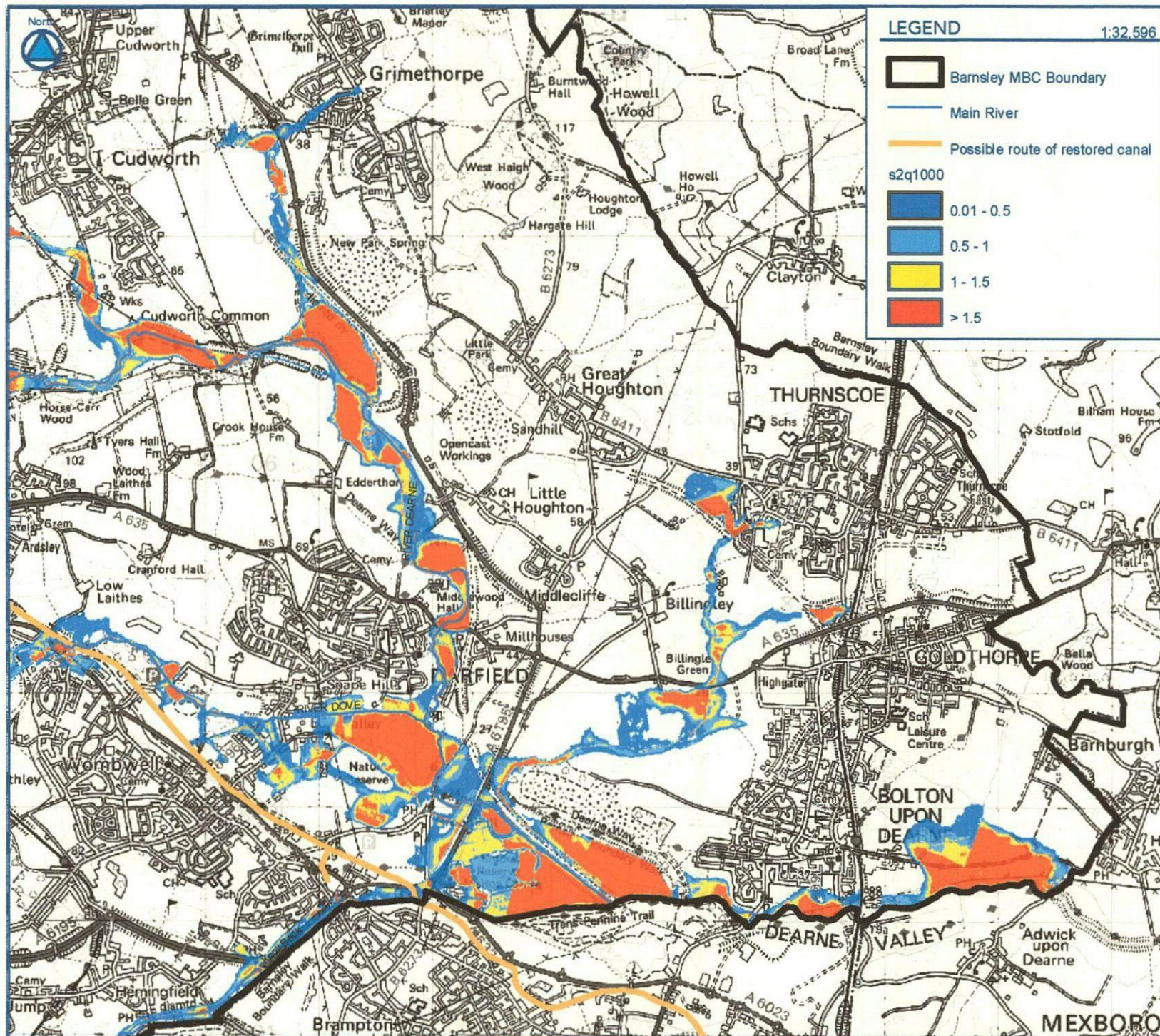
Please see the Section 6 of the SFRA for further details.

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MAP D - 3

s2q100

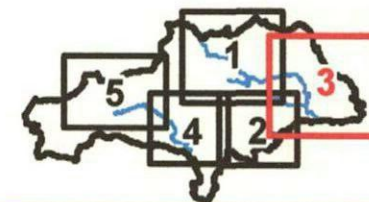


LEGEND

1:32,596

- Barnsley MBC Boundary
 - Main River
 - Possible route of restored canal
- s2q1000
- 0.01 - 0.5
 - 0.5 - 1
 - 1 - 1.5
 - > 1.5

KEYPLAN



Note:
This map shows the potential scale of flood inundation for a range of severe overtopping flood events and different standards of flood defence. They do not include the impact of a breach or failure of these defences.

Typical range of defence standards for the River Don and Dearne is to protect up to a 1 in 30year (3%) return period.

s2 = 1 in 2year Standard of Defence
q1000 = 1 in 1000year or 0.1% probability flood event.

This map should be considered in support of the Environment Agency Flood Zone Maps to aid the Sequential and Exception Tests.

It should not be considered in isolation without reference to the other SFRA Flood Risk Maps.

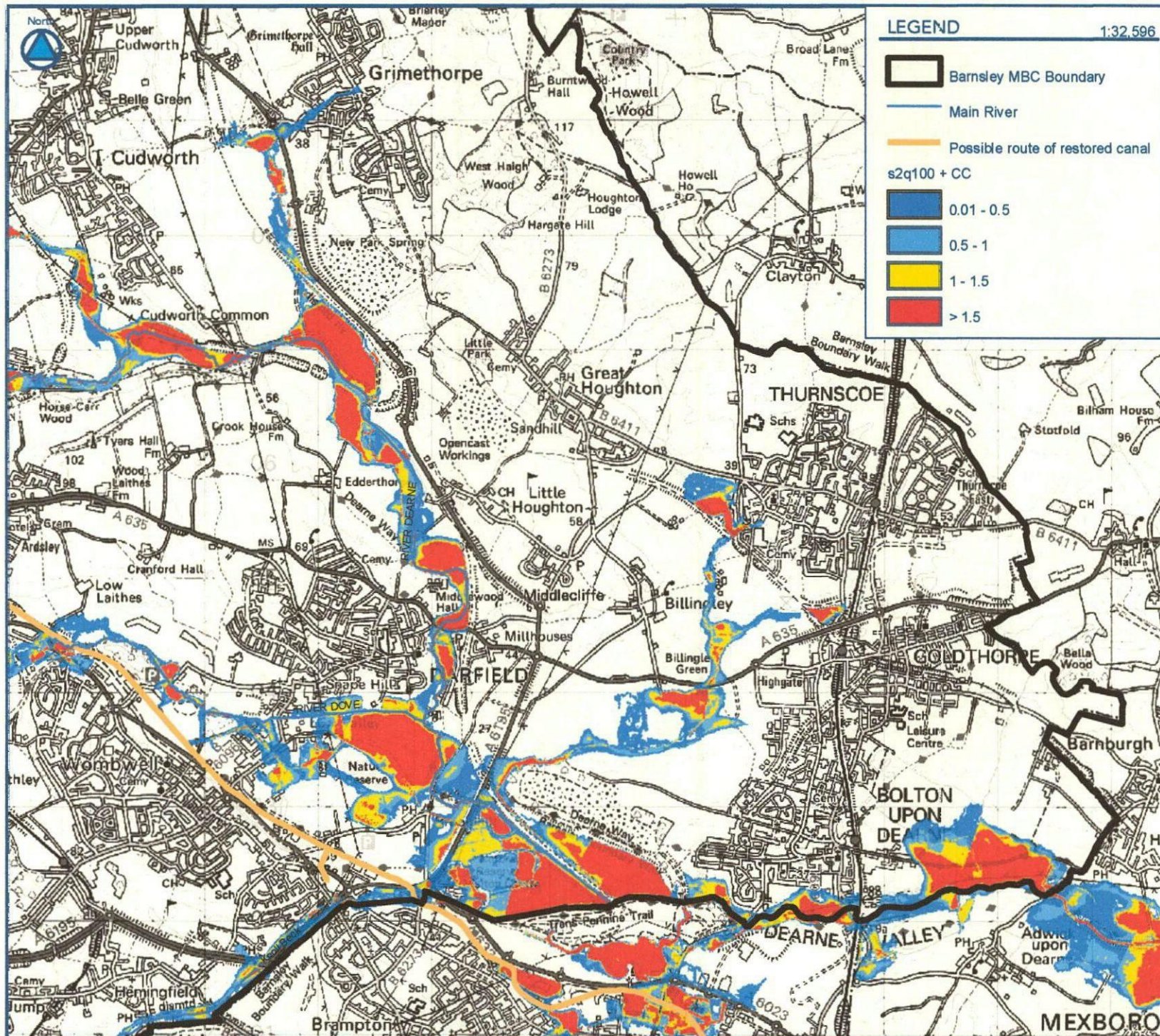
Please see the Section 6 of the SFRA for further details.

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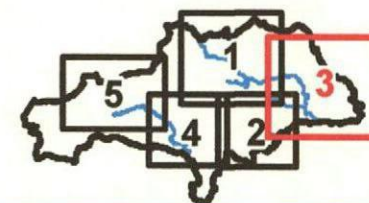


MAP E - 3

s2q1000



KEYPLAN



Note:
This map shows the potential scale of flood inundation for a range of severe overtopping flood events and different standards of flood defence. They do not include the impact of a breach or failure of these defences.

Typical range of defence standards for the River Don and Deane is to protect up to a 1 in 30year (3%) return period.

$s2 = 1$ in 2year Standard of Defence
 $q100 = 1$ in 100year or 1% probability flood event.

Climate Change scenario represents 20% increase of flood flow.

This map should be considered in support of the Environment Agency Flood Zone Maps to aid the Sequential and Exception Tests.

It should not be considered in isolation without reference to the other SFRA Flood Risk Maps.

Please see the Section 6 of the SFRA for further details.

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MAP H - 3

s2q100 + Climate Change

APPENDIX F – Yorkshire Water Sewer Plan

BOLTON UPON DEARNE



APPENDIX G – Glossary of Terms

GLOSSARY OF TERMS AND ABBREVIATIONS

Attenuation	Slowing down the rate of flow to prevent flooding and erosion, with a consequent increase in the duration of flow.
Balancing Pond	A pond designed to attenuate flows by storing runoff during peak periods and releasing the water after the flood peak has passed. The pond always contained water. Storage periods may not be long enough to improve water quality.
Catchment	A river catchment is the whole area which drains either naturally or with artificial assistance to a river. It includes the drainage channels, tributaries, floodplains and washlands associated with a river and an estuary where one is present.
Climate Change	Flood risk may increase due to environmental changes, and one of the key uncertainties in assessing flood risk at present is the extent to which climate is changing and may change in the future. NPPF Table 5 advocates a precautionary approach to deal with uncertainties of how climate change may affect sea levels, river flows and flood risk. Current best practice recommends allowing for a 10% increase in peak rainfall intensity and a 20% increase in peak river flow to 2055. Recommended allowances for net sea level rise in the East of England are 4mm/year to 2025 and then 8.5mm/year onwards to 2055.
Critical Ordinary Watercourse	Ordinary watercourses which the Environment Agency and other operating authorities agree are critical because they have the potential to put large numbers of people and property at risk from flooding.
Design flood level	the flood level to which defences or mitigation measures are designed. This is typically the 1% (1 in 100 year) flood level. More extensive flooding and higher levels due to more extreme conditions than the design event or as a result of obstructions of the watercourse may occur at any time.
Development	In accordance with the definitions given in Section 55 of Town and Country Planning Act 1990, with certain exceptions development means the carrying out of building, engineering, mining or other operations, in on over or under land or the making of any material change in use of any buildings or other land.
Drainage (land drainage)	The Water Resources Act 1991 (as amended by the Environment Act 1995) defines drainage as including: a) defence against water, including sea water; b) irrigation other than spray irrigation; c) warping d) the carrying on, for any purpose, of any other practice which involves management of the level of water in a watercourse.
Exception Test	If, following application of the Sequential Test (see below), it is not possible for proposed development to be located in zones of lower probability of flooding, the Exception Test can be applied as detailed in the NPPF. For the Exception Test to be passed the Flood Risk Assessment must demonstrate the proposed development provides wider sustainability benefits to the community that outweigh the estimated flood risk.
Flood Defence	Flood defence means the drainage of land (as defined above), and the provision of flood warning systems.
Flood Estimation Handbook (FEH)	The primary national guide to flood probability estimation in the UK, developed by CEH Wallingford. The use of the FEH ensures national consistency in estimating the probability of flooding, although users must be aware of the need to exercise good judgment and recognise the uncertainty inherent in flood estimation. Prediction of flood flows is not an exact science

and therefore the results of estimation cannot be guaranteed and the users make use of them at their own risk.

Flood return period/risk	The risk of flooding to floodplain areas and property is often described in terms of a return period. Statistical return periods relate to the long term average time interval between events of a particular magnitude. The 1 in 100 year return period flood has a one percent chance of occurring in any one year. i.e. the odds of it happening are one hundred to one. It does <u>not</u> mean that flooding of this magnitude will only occur once every 100 years.
Flood Zone Maps	These were produced by the Environment Agency after the 1998 and 2000 floods to improve public awareness of flood risk and updated in 2004 alongside the release of the new FRA guidance. The floodplain envelopes indicate where flooding from rivers, streams, watercourses or the sea is possible or has occurred, but ignore the presence of all flood defences such as embankments, pumping stations and walls, although the locations of flood defence structures are indicated. The maps therefore only give a general indication of potential areas at risk of flooding, generally based on either 1% probability assessments or historic flood levels. (www.environment-agency.gov.uk/subjects/flood/?lang=e)
Flooding	Inundation by river or sea water whether caused by inadequate or slow drainage, or by breaches or overtopping of banks or defences.
Floodplain	All land adjacent to a watercourse over which water flows in times of flood.
Fluvial Flooding	Is the process of flooding arising from a watercourse
Greenfield	Land which has not been developed.
Greenfield rate of run off	Rate of water flow which would occur over the ground surface of undeveloped land to the drainage system.
Hydrology	The study of water resources.
Main River	Watercourses shown as such on the statutory main river maps held by the Department for Environment, Flood and Rural Affairs. Main rivers are maintained by the Environment Agency and are generally larger arterial watercourses.
NPPF	National Planning Policy Framework and Technical Guidance published by Communities and Local Government in March 2012. Technical Guidance explains how flood risk should be considered at all stages of the planning and development process in order to reduce future damage to property and loss of life.
Ordinary Watercourses	Any watercourse that does not form part of Main River. Internal Drainage Boards maintain certain designated common watercourses within Internal Drainage Districts. Local Authorities maintain certain 'awarded' common watercourses and highway ditches outside Internal Drainage Districts. Generally, other common watercourses are the responsibility of riparian owners.
PAGN/FCDPAG	The DEFRA Flood Coastal Defence Project Appraisal Guidance (FCDPAG) documents provide advice on best practice for the appraisal of flood and coastal defence projects. A brief summary of these documents and the applicable standards (tables 6.1 & 6.2) are appended to this glossary.
Pluvial Flooding	Is the process of flooding arising from rainfall and associated surface water runoff.
Riparian	Relating to, or situated on the banks of a river or watercourse.

Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable or if permeable ground is saturated.
Sequential test	NPPF advocates that planners use a sequential test when considering land allocations for development to avoid flood risk where possible. Details of this test are summarised in the NPPF.
Soakaway	A subsurface structure into which surface water is conveyed, designed to promote infiltration.
Source Control	The control of runoff at or near to its source.
Storage Compensation	Due to the cumulative impacts of developments on the extent and function of the floodplain, the EA may require compensation storage to be provided at a site where a loss of storage in the floodplain occurs, irrespective of the negligible impacts of individual developments. In other words, an area of ground above the floodplain level must be found that can be excavated to compensate for the floodplain storage volume lost by the developing building area. In addition, the EA may insist that compensation is provided on a 'level-for-level' basis, i.e. providing compensation areas at the same level as where storage has been lost, so that there is a minimal impact on the flood patterns in the area.
SuDS	Sustainable Drainage Systems: A strategy, supported by a range of techniques, for dealing with surface water drainage that seeks to promote sustainable and environmentally beneficial or least damaging solutions. Developing a 'greenfield' site can significantly alter the way rainfall runs off the site. Impermeable areas such as tarmac mean that rainwater cannot infiltrate into the ground, and is instead channelled directly into rivers via drains and sewers. Flood risk may therefore be increased by the rapid flow of surface water run-off from developed areas into the watercourse. SuDS were developed initially with urban drainage in mind but the approach has broad application over all development drainage. SuDS techniques include Source Control.
Swale	A grass-lined channel designed to drain water from a site as well as controlling the flow and quality of the surface water.
Watercourse	Any natural or artificial channel which conveys surface water.
Wetland	A pond that has a high proportion of emergent vegetation in relation to open water that provides a variety of habitats.

NPPF Technical Guidance - The Sequential and

Exception Tests

3. As set out in the National Planning Policy Framework, the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The flood zones (see table 1) are the starting point for this sequential approach. Zones 2 and 3 are shown on the flood map¹ with Flood Zone 1 being all the land falling outside Zones 2 and 3. These flood zones refer to the probability of sea and river flooding only, ignoring the presence of existing defences.
4. Strategic Flood Risk Assessments (see paragraphs 7-8) refine information on the probability of flooding, taking other sources of flooding and the impacts of climate change (see paragraphs 11-15) into account. They provide the basis for applying the Sequential Test, on the basis of the flood zones in table 1. Where table 1 indicates the need to apply the Exception Test (as set out in the National Planning Policy Framework), the scope of a Strategic Flood Risk Assessment will be widened to consider the impact of the flood risk management infrastructure on the frequency, impact, speed of onset, depth and velocity of flooding within the flood zones considering a range of flood risk management maintenance scenarios. Where a Strategic Flood Risk Assessment is not available, the Sequential Test will be based on the Environment Agency flood zones.
5. The overall aim should be to steer new development to Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, local planning authorities allocating land in local plans or determining planning applications for development at any particular location should take into account the flood risk vulnerability of land uses (see table 2) and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required (see table 3). Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

¹ To access the flood map, see the Environment Agency's website at:
<http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx>

Table 1: Flood zones

(Note: These flood zones refer to the probability of river and sea flooding, ignoring the presence of defences)

Zone 1 - low probability Definition This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%). Appropriate uses All uses of land are appropriate in this zone. Flood risk assessment requirements For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a flood risk assessment. This need only be brief unless the factors above or other local considerations require particular attention. Policy aims In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems². ² Sustainable drainage systems cover the whole range of sustainable approaches to surface drainage management. They are designed to control surface water run off close to where it falls and mimic natural drainage as closely as possible.
Zone 2 - medium probability Definition This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year. Appropriate uses Essential infrastructure and the water-compatible, less vulnerable and more vulnerable uses, as set out in table 2, are appropriate in this zone. The highly vulnerable uses are <i>only</i> appropriate in this zone if the Exception Test is passed. Flood risk assessment requirements All development proposals in this zone should be accompanied by a flood risk assessment. Policy aims In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage systems.
Zone 3a - high probability Definition This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. Appropriate uses The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone.

The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

Flood risk assessment requirements

All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;
- relocate existing development to land in zones with a lower probability of flooding; and
- create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b - the functional floodplain

Definition

This zone comprises land where water *has* to flow or be stored in times of flood.

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

Appropriate uses

Only the water-compatible uses and the essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

Flood risk assessment requirements

All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;
- relocate existing development to land with a lower probability of flooding.

Table 2: Flood risk vulnerability classification

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use³. • Installations requiring hazardous substances consent⁴. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure")⁵.
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste⁶. • Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷
Less vulnerable • Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do <i>not</i> need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation).

- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to a specific warning and evacuation plan.*

³ For any proposal involving a change of use of land to a caravan, camping or chalet site, or to a mobile home site or park home site, the Sequential and Exception Tests should be applied.

⁴ See Circular 04/00: *Planning controls for hazardous substances* (paragraph 18) at: www.communities.gov.uk/publications/planningandbuilding/circularplanningcontrols

⁵ In considering any development proposal for such an installation, local planning authorities should have regard to planning policy on pollution in the National Planning Policy Framework.

⁶ For definition, see *Planning for Sustainable Waste Management: Companion Guide to Planning Policy Statement 10* at www.communities.gov.uk/publications/planningandbuilding/planningsustainable

⁷ See footnote 3.

⁸ See website for further details.

www.defra.gov.uk/science/ProjectData/DocumentLibrary/FD23203364TRP.pdf

Notes to table 2:

a. This classification is based partly on Department for Environment, Food and Rural Affairs and Environment Agency research on *Flood Risks to People (FD2321/TR2)*⁸ and also on the need of some uses to keep functioning during flooding.

b. Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

c. The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.

FCDPAG INDICATIVE STANDARDS OF PROTECTION

The DEFRA Flood and Coastal Defence Project Appraisal Guidance (FCDPAG) documents provide advice on best practice for the appraisal of flood and coastal defence projects. Volume 3: Economic Appraisal gives indicative standards for flood and coastal defence in England and Wales. The tables below are provided "as an aid to authorities to help in establishing the range of options to be considered, though they should not constrain the need to consider a full range of alternatives. They do not represent any entitlement to protection or minimum level to be achieved". Please refer to the FCDPAG documents at <http://www.defra.gov.uk/enviro/fcd/pubs/pagn/default.htm> for further information.

Table 6.1 Indicative standards of protection

Land use band	Indicative standards of protection				
	Fluvial		Coastal		
	Return period (years)	Annual probability of failure	Return period (years)	period	Annual probability of failure
A	50-200	0.005-0.02	100-300		0.003-0.01
B	25-100	0.01-0.04	50-200		0.005-0.02
C	5-50	0.02-0.20	10-100		0.01-0.10
D	1.25-10	0.10-0.80	2.5-20		0.05-0.40
E	<2.5	>0.40	<5		>0.20

The standards shown in Table 6.1 are determined by land use bands, as defined in Table 6.2 below.

Table 6.2 Description of Land Use Bands

Land use band	Indicative range of housing units (or equivalent) per km of coastline or single river bank	Description
A	>=50	Typically intensively developed urban areas at risk from flooding and/or erosion
B	>=25 to <50	Typically less intensive urban areas with some high-grade agricultural land and/or environmental assets of international importance requiring protection.
C	>=5 to <25	Typically large areas of high-grade agricultural land and/or environmental assets of national significance requiring protection with some properties also at risk, including caravans and temporary structures.
D	>=1.25 to <5	Typically mixed agricultural land with occasional, often agriculturally related, properties at risk. Agricultural land may be prone to flooding, water logging or coastal erosion. May also apply to environmental assets of local significance.
E	>0 to <1.25	Typically low-grade agricultural land, often grass, at risk from flooding, impeded land drainage or coastal erosion, with isolated agricultural or seasonally occupied properties at risk, or environmental assets at little risk from frequent inundation.