



NPPF: Flood Risk Assessment

Pitt Street, Wombwell

Hartwood Estates

CRM.1122.003.HY.R.001.A



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Project:	NPPF: Flood Risk Assessment
For:	Hartwood Estates
Status:	Final
Date:	July 2019
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Executive Summary

This report presents an FRA in accordance with the NPPF and NPPG ID: 7 guidance, for a proposed residential development located on land north of Pitt Street, Wombwell.

The report includes an assessment of the surface water drainage requirements of the Site and details the flood risk and how this could be managed and mitigated to allow the Site to be developed in support of the outline planning application.

The FRA has demonstrated the following:

- The 3.38-hectare (ha) Site is comprised of an agricultural (grassed) field.
- The Site slopes in a southerly direction and is underlain by loamy soils and variable bedrock.
- The risk of flooding is assessed as followed:
 - The risk of groundwater flooding is assessed negligible within the northern extent but low to medium risk within the middle and southern extents. The risk of groundwater flooding is likely to be limited to below ground and not at the surface.
 - The risk of surface water flooding is assessed as negligible for most of the Site, with flow pathways along onsite/bounding drains (including Site access/egress) at low to medium risk.
 - The risk of flooding from all other sources are assessed as negligible.
- Flood risk from identified sources can be mitigated to a negligible or low and acceptable level through the following approach:
 - No below surface habitable buildings (i.e. basements).
 - Adoption of a surface water management strategy.
 - Set finished floor levels above external levels.
 - Lined attenuation to prevent groundwater ingress.
 - Sequentially develop the Site, limiting the built development outside the mapped extent of surface water flooding.
 - Provide a development free easement along either side of the onsite land/bounding field boundary drains. This easement would provide access for inspection and maintenance purposes.
 - Undertake maintenance activities to keep the field boundary drains clear from debris and overgrown vegetation.
 - Position the surface water attenuation outside the mapped extent of surface water flooding for events less than the 1 in 1000-year event. The surface water attenuation would surcharge beyond a 1 in 100-year (plus 40% climate change) event, therefore inundation during the extreme 1 in 1000-year event would be inconsequential.
- The proposed residential use is classified as more vulnerable. More vulnerable uses are considered acceptable in terms of flood risk in Flood Zone 1 (low risk). The Site is however at risk of groundwater and surface water flooding. Subject to the implementation of the above mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required.

The FRA has considered the potential impact of the development on surface water runoff rates, given the increase in impermeable areas post-development. These rates have been calculated, and it has been demonstrated that surface water can be managed, such that flood risk to and from the Site following development will not increase. This will be achieved through restricted discharge rates (5l/s) and an appropriately sized detention basin with an outfall to surface water sewer.

The FRA demonstrates that the proposed development would be operated with minimal risk from flooding and would not increase flood risk elsewhere. The development should therefore not be precluded on the grounds of flood risk, as well as foul or surface water drainage.

1.0 Introduction

1.1 Background

- 1.1.1 Enzygo Ltd was commissioned by Hartwood Estates to carry out a site-specific Flood Risk Assessment (FRA) including a surface water drainage strategy in support of an outline application for a proposed residential development, located on land north of Pitt Street, Wombwell ('the Site').
- 1.1.2 The proposal is for up to 107 residential dwellings, with landscaping, sustainable drainage system (SUDS) within the 3.38-hectare (ha) Site, with vehicular access point from Pitt Street. A copy of the proposed layout is included in Appendix 1.
- 1.1.3 Planning applications for development in England require an FRA¹, when:
- In Flood Zone 2 or 3 including minor development and change of use.
 - More than 1ha in Flood Zone 1.
 - Less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water, drains, reservoirs).
 - In an area within Flood Zone 1 which has critical drainage problems as notified by the Environment Agency.
 - In land identified in a strategic flood risk assessment as being at increased flood risk in future.
- 1.1.4 Initial site screening using Environment Agency online indicative flood mapping shows that the Site is in Flood Zone 1 but is more than 1ha in area and at risk of surface water flooding. As such, an FRA is required.
- 1.1.5 The purpose of this FRA is to assess the risk of flooding to the proposed development and where possible provide sufficient mitigation to demonstrate that the future users of the development would remain safe throughout its lifetime, that the development would not increase flood risk on Site and elsewhere and, where practicable, that the development would reduce flood risk overall.

1.2 Scope of the Assessment

- 1.2.1 Government policy on development and flood risk is set out in the National Planning Policy Framework (NPPF)² and the supporting National Planning Practice Guidance: Flood Risk and Coastal Change [NPPG ID7]³.
- 1.2.2 NPPF paragraphs 148-169 set out the need for an appropriate assessment of flood risk at all levels of the planning process and requires the application of a sequential risk-based approach to assess the suitability of land for development in flood risk areas.

¹ <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

² Department for Communities and Local Government (2019) National Planning Policy Framework.

³ Department for Communities and Local Government (2014) Planning Practice Guidance ID7-030-20140306; Flood Risk & Coastal Change.

- 1.2.3 The FRA should also consider the effects of climate change⁴. The climate change allowances are predictions of anticipated change for:
- Peak river flow by river basin district;
 - Peak rainfall intensity;
 - Sea level rise; and
 - Offshore wind speed and extreme wave height.
- 1.2.4 They are based on climate change projections and different scenarios of carbon dioxide emissions to the atmosphere. There are different allowances for different periods of time over the next century.
- 1.2.5 Site-specific FRAs are categorised according to level. Simple Level 1 Screening studies give a general indication of the potential flood risk to a site and identify whether more detailed Level 2 assessment is required. A Level 2 assessment is a qualitative appraisal to develop understanding of flood risk to a site and the effects of the site on flooding elsewhere including recommended mitigation measures. Level 2 reporting is the minimum required to accord with the NPPF. Level 3 assessments are more detailed quantitative studies, for example modelling to establish flood levels at a site in the absence of Environment Agency or other data or providing detailed outline drainage designs.
- 1.2.6 This report is a Level 2 qualitative FRA but includes a Level 3 assessment of the surface water drainage requirements for the proposed development.

1.3 Aims

- 1.3.1 This FRA aims to provide sufficient flood risk information to satisfy the requirements of the NPPF, PPG ID7 and regional/local government plans and policies. It describes the potential for the Site to be impacted by flooding, the impacts of the proposed development on flooding elsewhere near the Site, and the proposed measures that could be incorporated into the development to mitigate the identified risks.

1.4 Planning Context

National Policy

- 1.4.1 The FRA was prepared in accordance with the NPPF and NPPG ID7.

Regional/Local Policy

- 1.4.2 The FRA also considers the following policies within the Barnsley Metropolitan Borough Council Local Plan (2019 to 2033):
- Policy CC1 - Climate Change: Reduce the causes of and adapt to the future impacts of climate change.
 - Policy CC3 - Flood Risk: Reducing the extent and impact of flooding.
 - Policy CC4 - Sustainable Drainage Systems (SuDS): The use of SuDS on major and minor developments.

⁴ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

1.5 Report Structure

1.5.1 This report is structured as follows:

- Section 2 identifies the sources of information that were consulted;
- Section 3 describes the Site and the existing and proposed development;
- Section 4 outlines the flood risk to the existing site and proposed development;
- Section 5 details the proposed mitigation measures against identified flooding sources;
- Section 6 assesses the potential impacts of the proposed development on surface water drainage and proposes mitigation for those effects; and
- Section 7 presents a summary and conclusions.

2.0 Sources of Information

2.1 Sources of Information

2.1.1 The following information was used in preparation of this FRA:

- Ordnance Survey 1:25,000 mapping (Explorer 278: Sheffield & Barnsley).
- Detailed topographic survey (Appendix 2).
- Environment Agency online mapping (Flood Map for Planning⁵, Long Term Flood Risk Assessment for Locations in England⁶, Catchment Data Explorer⁷ and Main River Map⁸).
- River Basin District (RBD) Maps⁹ (Humber RBD) together with guidance on climate change allowances¹⁰.
- National River Flow Archive¹¹.
- Barnsley Strategic Flood Risk Assessment (SFRA) and associated mapping¹² (Appendix 3).
- British Hydrological Society Chronology of British Hydrological Events¹³.
- National Soils Resources Institute (NSRI): Soilsdapes online mapping¹⁴.
- British Geological Survey [BGS] online mapping: Geology of Britain Viewer¹⁵.
- Landmark's Promap: Flood Data package: Additional flood mapping.
- Geosmart 1 in 100-year groundwater flood risk map.
- Yorkshire Water sewer asset plans (Appendix 4).
- DEFRA's Magic Map¹⁶ for identifying Designated Sites.

⁵ <https://flood-map-for-planning.service.gov.uk/>

⁶ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

⁷ <http://environment.data.gov.uk/catchment-planning/>

⁸ <https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386>

⁹ <https://www.gov.uk/government/publications/flood-risk-assessments-river-basin-district-maps>

¹⁰ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

¹¹ <http://nrfa.ceh.ac.uk>

¹² <https://www.barnsley.gov.uk/media/5162/barnsley-strategic-flood-risk-assessment-level-1-report-sept-2010.pdf>

¹³ <http://www.cbhe.hydrology.org.uk/search.php>

¹⁴ <http://www.landis.org.uk/soilsdapes/>

¹⁵ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

¹⁶ <http://www.natureonthemap.naturalengland.org.uk/>

2.2 Consultation and Discussion with Regulators

2.2.1 Consultation and discussions were undertaken with the Environment Agency, the Local Planning Authority (LPA)/Lead Local Flood Authority (LLFA), and Water Utility.

Environment Agency

2.2.2 The Environment Agency is a statutory consultee on flood risk and planning and is directly responsible for the prevention, mitigation and remediation of flood damage for main rivers and coastal areas; and it has a strategic overview for all forms of flooding.

2.2.3 Environment Agency Standing Advice¹⁷ and the NPPF/PPG ID: 7 was consulted and reviewed.

2.2.4 Correspondence with the Environment Agency is included in Appendix 5.

Barnsley Metropolitan Borough Council

2.2.5 Barnsley Metropolitan Borough Council as the Lead Local Flood Authority (LLFA) is responsible for surface water, groundwater and ordinary watercourses was consulted on flood risk issues at this Site.

2.2.6 Correspondence with the LLFA is included in Appendix 6.

Yorkshire Water

2.2.7 All Water Companies have a statutory obligation to maintain the DG5 Flood Register of properties which are at risk of flooding from the public sewerage system.

2.2.8 Yorkshire Water is responsible for the disposal of wastewater within the area.

Internal Drainage Board

2.2.9 The Danvm Drainage Commissioners Internal Drainage Board (IDB) area lies 95m to the south of the Site. The River Dove located 260m south of the Site is within the IDB.

2.2.10 Correspondence with the IDB is included in Appendix 7.

2.3 Site Walkover

2.3.1 Enzygo staff conducted a walkover of the Site during February 2019. Observations made were used to inform the Site description.

¹⁷ <https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>

3.0 Site Location and Description

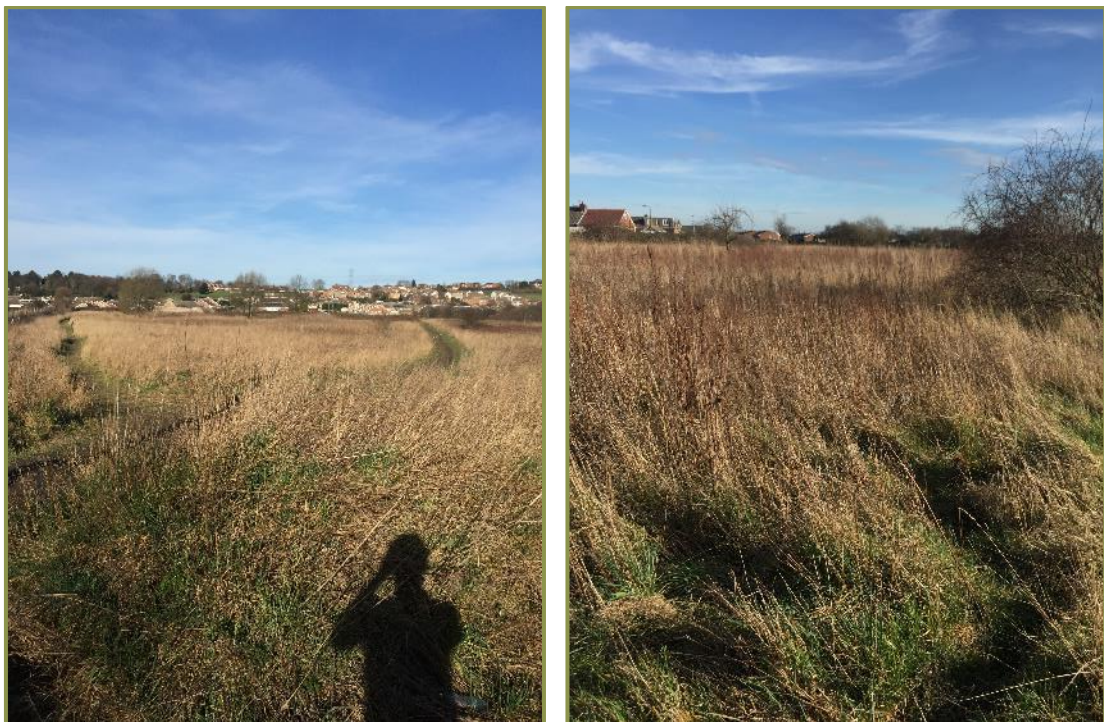
3.1 Location

- 3.1.1 The Site is located on land north of Pitt Street, Wombwell, S73 8AR.
- 3.1.2 The Site is centred on National Grid Reference (NGR) 440539, 404155.
- 3.1.3 The 3.38ha Site is shown in Drawing 001 and in more detail in Drawing 002.

3.2 Land Use

- 3.2.1 The land use comprises an agricultural (grassed) field (Figures 3.1 and 3.2).
- 3.2.2 The Site is bounded by residential dwellings to the north, allotments to the east, residential dwellings to the south-east, Pitt Street to the south and agricultural land to the west.
- 3.2.3 Access is currently off Pitt Street in the south west, and off Venetian Way in the north-east corner.

Figure 3.1: Photographs of the Site



Left: View north-east across the Site. **Right:** View south-west across the Site.

Figure 3.2: Aerial Photograph of the Site

Image © 2019 Digital Globe.

3.3 Topographic Information

- 3.3.1 A detailed topographic survey was carried out during March 2019 (Appendix 2). The Site falls in a southerly direction from 35.26 metres Above Ordnance Datum (m AOD) along the northern boundary, to 29.21m AOD along the southern boundary. The fall of 6.05m over 245m gives a gradient of 1:41.

3.4 Soils and Geology

Soils Mapping

- 3.4.1 The Soilsmap online soils map viewer shows that the Site is underlain by freely draining, loamy soils (Figure 3.3).
- 3.4.2 The soils beneath the Site are indicative of high infiltration potential. The soils mapping is indicative and there may be localised variation in soil type.

Figure 3.3: Soils Mapping



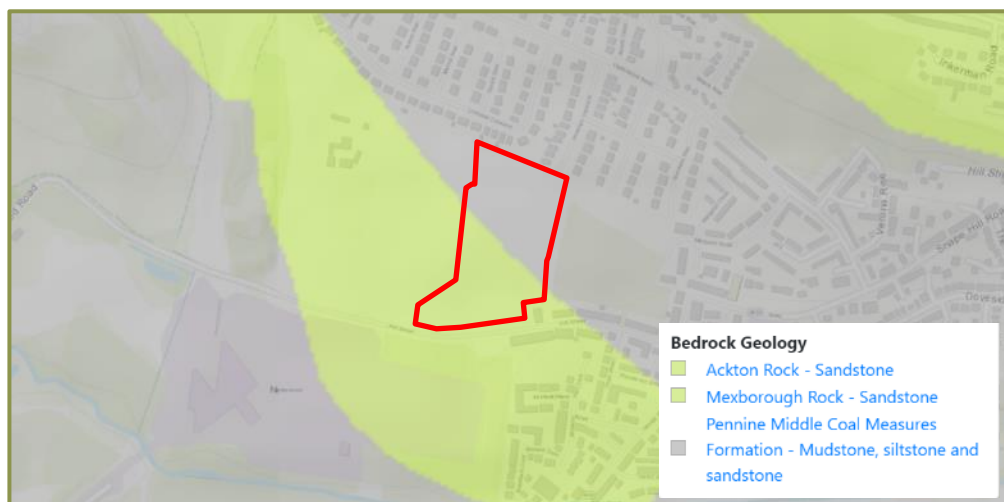
Soils Data © Cranfield University (NSRI) and for the Controller of HMSO [2019].

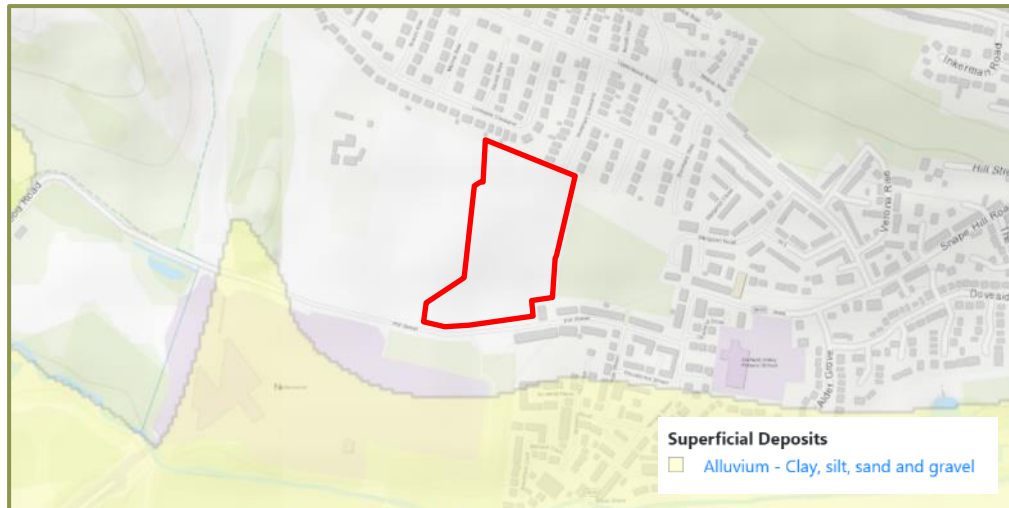
Geology Mapping

- 3.4.3 The Geology of Britain online map viewer (Figure 3.4) shows the bedrock beneath the north of the Site is Pennine Middle Coal Measures Formation - Mudstone, siltstone and sandstone. The south of the Site is underlain by Ackton Rock - Sandstone. There are no superficial deposits recorded beneath the Site.

The infiltration potential of the Pennine Middle Coal Measures Formation is likely to be low, whereas the Ackton Rock – Sandstone potentially has variable infiltration potential, depending on the depth of the weathered layer and depth of groundwater. This would need to be confirmed through soakway testing.

Figure 3.4: Geology Mapping





Top: Bedrock Geology Bottom: Superficial Deposits. Contains British Geological Survey materials © NERC [2019].

BGS Borehole Logs

- 3.4.4 The Geology of Britain online map viewer (Figure 3.5) shows there are no borehole logs located within the Site boundary. There are however six borehole logs located within the Pennine Middle Coal Measures to the south and south-west of the Site. Only two of the boreholes included geology logs (SE40SW221 and SE40SW84).
- 3.4.5 The borehole logs confirm the bedrock geology as depicted by the Geology of Britain mapping (Table 3.1). Copies of the borehole logs are included in Appendix 8.

Figure 3.5: Borehole Mapping



Contains British Geological Survey materials © NERC [2019].

Table 3.1: BGS Borehole Data

Reference	Summary of Strata	Depth (m bgl)	Groundwater Depth (m bgl)
SE40SW221	0.00 - 2.10m = made ground 2.10 - 3.30m = clay 3.30 - 7.05m = sandstone and mudstone interbedded	7.05	3.35
SE40SW84	0.00 - 0.83m = coal	0.83	Not encountered

Contains British Geological Survey materials © NERC [2019].

3.5 Hydrogeology

Borehole Logs

- 3.5.1 BGS online borehole mapping (Figure 3.5 and Table 3.1) shows groundwater ingress was encountered at 3.35 metres below ground level (mbgl) within borehole SE40SW221, 55m to the south of the Site.

Defra Magic Map

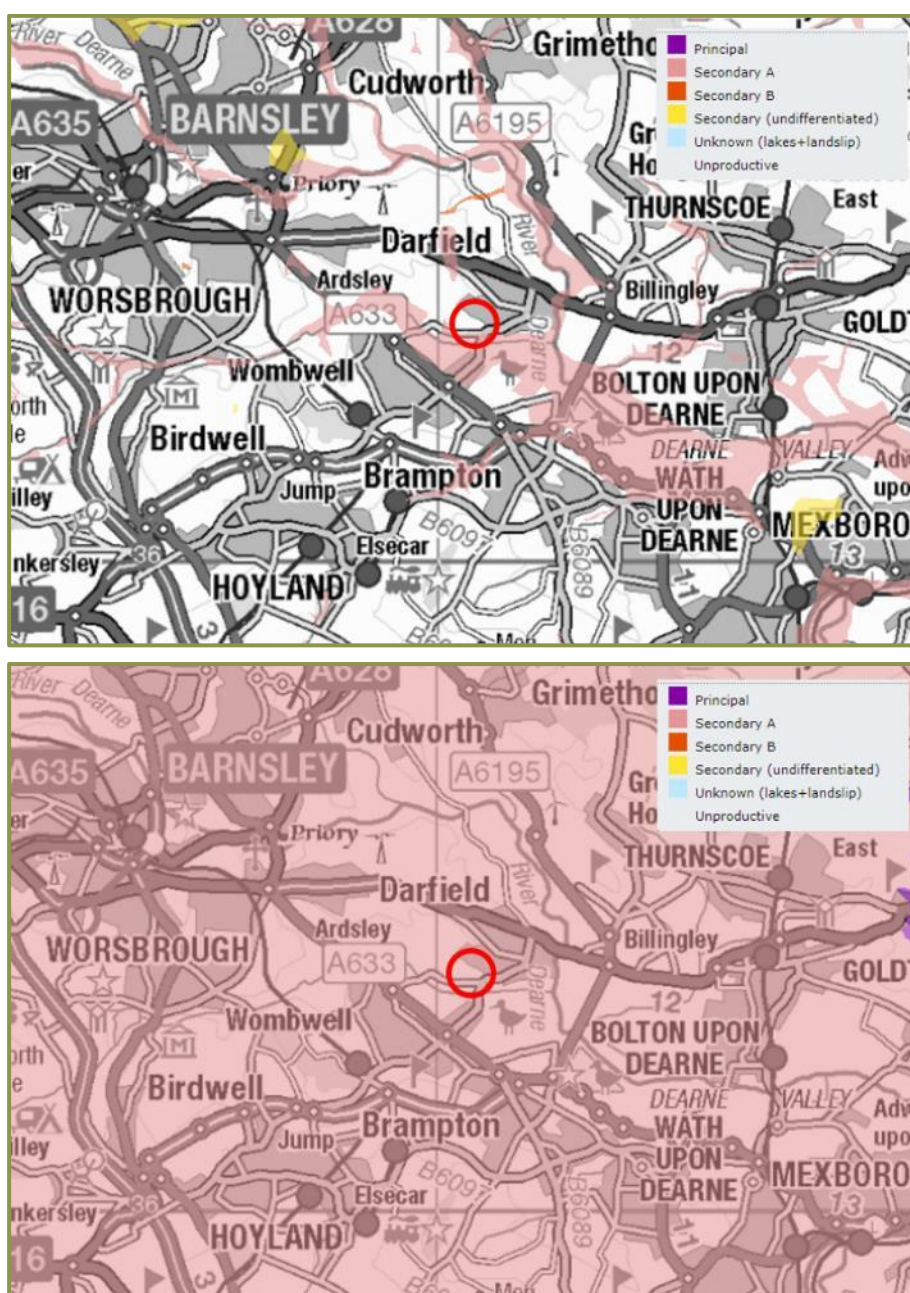
- 3.5.2 Defra Magic Map online mapping (Figure 3.6) shows the Site is not located in a groundwater Source Protection Zone (SPZ).

Figure 3.6: Source Protection Zone Map

From Magic Map. Contains Environment Agency information © Environment Agency and database right.

- 3.5.3 The Site is not located above a Principal Aquifer. The Site is located above a Secondary A Bedrock Aquifer (Figure 3.7).

Figure 3.7: Aquifer Designation Map (continues over page)

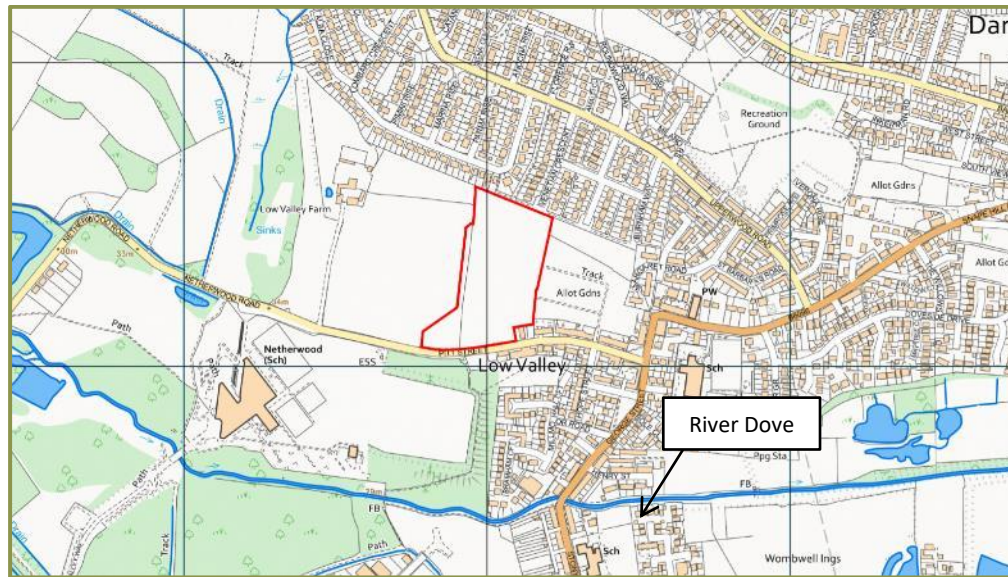


Top: Aquifer Designation (superficial deposits). Bottom: Aquifer Designation (bedrock). From Magic Map. Contains Environment Agency information © Environment Agency and database right [2019].

3.6 Catchment Hydrology

OS Mapping

- 3.6.1 OS mapping (Figure 3.8) shows there are no watercourses located within the immediate vicinity of the Site. The nearest watercourse is the River Dove, which conveys flows east, approximately 260m to the south of the Site.

Figure 3.8: Map of WatercoursesSite Walkover Observations

- 3.6.2 Field boundary drains were observed north to south through the western boundary (Drain 1) and east to west along part of the southern boundary (Drain 2) (Figure 3.9).
- 3.6.3 Both drains were heavily vegetated and were dry at the time of the walkover (Figure 3.10). The drains had an approximate 0.5m bed width, 0.25 to 0.75m depth, and 1:2 side slopes.
- 3.6.4 The drains were not observed to have connectivity to a wider watercourse network. It is assumed the field boundary drains intercept overland flows and infiltrate over time.

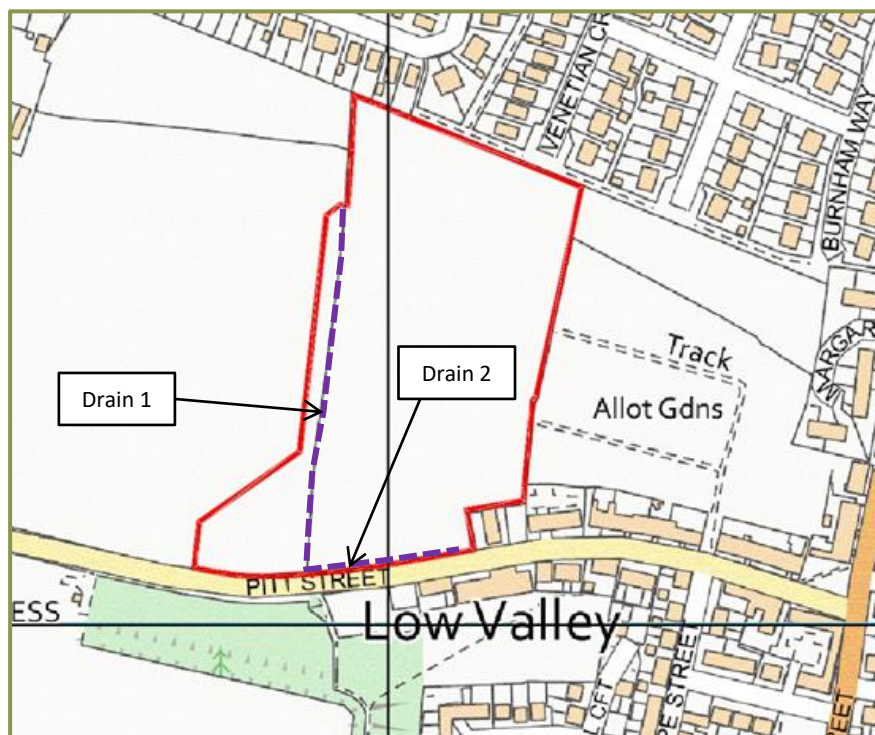
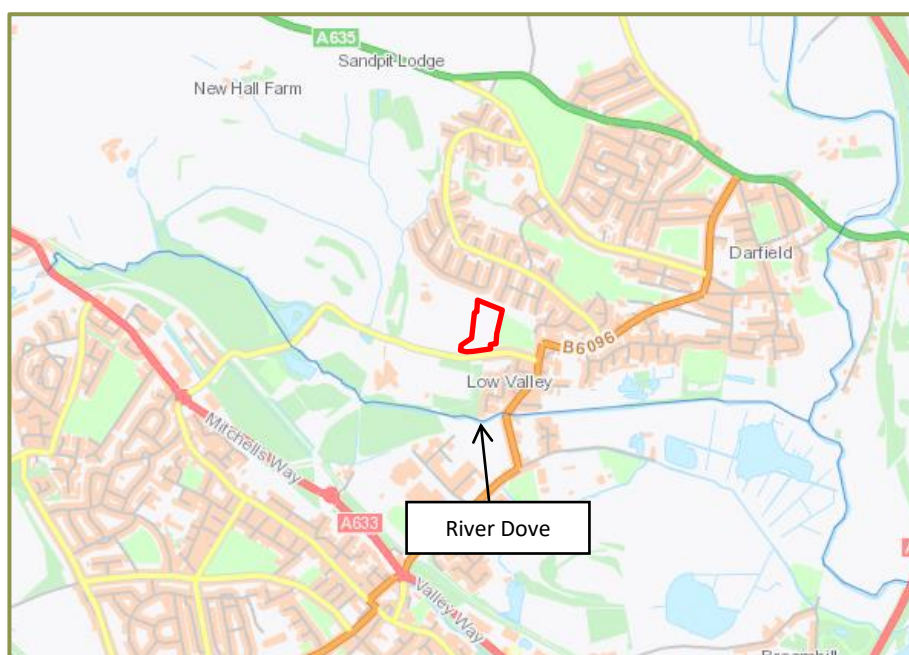
Figure 3.9: Map of Ditches 1 and 2

Figure 3.10: Drains 1 and 2*Right: Drain 1. Left: Drain 2.***Main River Map**

- 3.6.5 The Environment Agency online main river map (Figure 3.11) identifies the River Dove, conveying flows east, approximately 260m to the south of the Site. The River Dove is a 'main river', which is a watercourse where flood risk work is carried out by the Environment Agency.

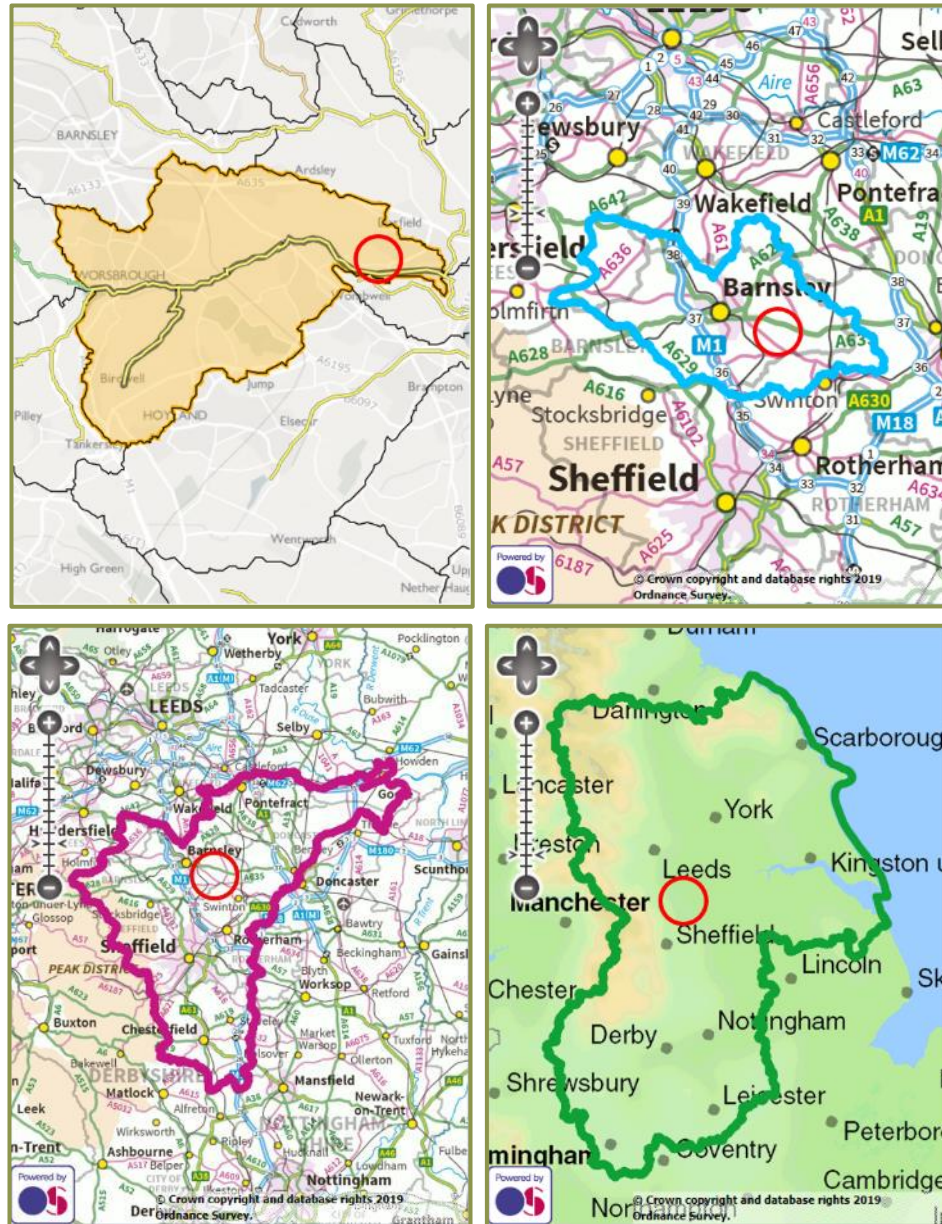
Figure 3.11: Main River Map

Contains Environment Agency information © Environment Agency and database right [2019].

Environment Agency Catchment Data Explorer Mapping

- 3.6.6 The Site resides within the Dove from Source to River Dearne Catchment (Figure 3.12), which is within the Dearne Operational Catchment, Don and Rother Management Catchment and Humber River Basin District.

Figure 3.12: Catchment Data Explorer



Top Left Dove from Source to River Dearne Catchment. Top Right: Dearne Operational Catchment. Bottom Left: Don and Rother Management Catchment. Bottom Right: Humber River Basin District. Contains Environment Agency information © Environment Agency and database right [2019].

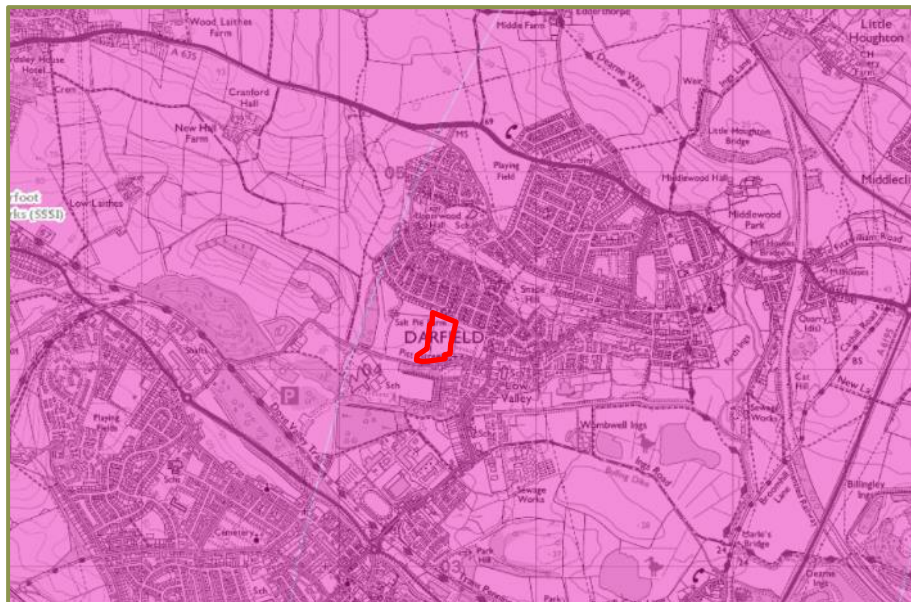
3.7 Sewerage Assets

- 3.7.1 Yorkshire Water asset plans show that there is a Ø900mm public surface water sewer and Ø375mm public foul sewer conveying flows south-east, within land outside the northern boundary. The separate system serves the residential dwellings to the north of the Site.
- 3.7.2 A Ø150mm public combined sewer conveys flow east beneath Pitt Street to the south of the Site.

3.8 Designated Sites

- 3.8.1 The DEFRA Magic Map (England and Wales) (Figure 3.13) shows that there are no designated sites in or close to the Site including downstream (from a flood risk and drainage perspective).
- 3.8.2 The Site and wider area is located within a Nitrate Vulnerable Zone (NVZ). Development of the Site would include SuDS to manage surface water runoff. The use of SuDS would improve the water quality of surface water runoff, thereby offer a betterment to existing conditions.

Figure 3.13: Catchment Data Explorer



4.0 Flood Risk Assessment

4.1 Potential Sources of Flooding

- 4.1.1 A summary of the potential sources of flooding and the potential risk posed by each source at the Site is presented in Table 4.1. Each source of flooding and level of risk is then assessed in further detail.

Table 4.1: Potential Risk Posed by Flooding Sources

Flooding Source	Potential Flood Risk at Application Site (Yes/No)	Potential Source	Data Sources
Fluvial	No	Drains 1 and 2	Environment Agency flood mapping (Drawing 005), JBA Flooding from Rivers (Drawing 004.2 and SFRA mapping.
Tidal	No	None identified	Environment Agency flood mapping (Drawing 005) and SFRA mapping.
Groundwater	Yes	Secondary A Bedrock Aquifer	BGS mapping (Drawing 003) and Geosmart Groundwater (Drawing 006) and SFRA mapping.
Surface Water	Yes	Poor permeability and Site topography	SFRA mapping, JBA Surface Water Flooding (Drawing 004.1) and Environment Agency Complex mapping (Drawings 009.1-9.4).
Sewer	No	Public sewers	Yorkshire Water Sewer Asset Plans
Infrastructure Failure	No	None identified	Environment Agency online flood mapping, OS Mapping, and Drawing 002.

4.2 Fluvial Flooding

Environment Agency Flood Zone Mapping

- 4.2.1 The Environment Agency Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, since these can be breached, overtopped and may not be in existence for the lifetime of a development.
- 4.2.2 The Environment Agency online flood map shows the Site is located within Flood Zone 1; outside the 1 in 1000-year probability of fluvial (river) flooding (0.1% Annual Exceedance Probability [AEP]), at 'low' risk.

JBA Flooding from Rivers

- 4.2.3 The JBA mapping (Drawing 004.2) shows the Site is located within Flood Zone 1 at low risk.

SFRA Mapping

- 4.2.4 SFRA mapping confirms the Site is located within Flood Zone 1 at low risk.

Flood History

- 4.2.5 The SFRA mapping and Drawing 008 show that there have been no historical fluvial flooding events within the Site boundary.
- 4.2.6 Environment Agency correspondence confirm that there have been no recorded flooding incidents within the Site boundary.

Flood Defences

- 4.2.7 Environment Agency online flood mapping and SFRA mapping show that the Site does not benefit from flood defences.

Flood Warning Service

- 4.2.8 River Levels UK online flood mapping shows the Site is not located within an area which receives flood warnings.

Summary Flood Risk

- 4.2.9 The risk of fluvial flooding is assessed as negligible.
- 4.2.10 There is a residual risk of flooding from Drains 1 and 2. The field boundary drains were not observed to have connectivity to a wider watercourse network. It is assumed the field boundary drains intercept overland flows and infiltrate over time. Mitigation measures against residential flooding are discussed in Section 5 under 'surface water flooding'.

4.3 Tidal Flooding

- 4.3.1 The Site is not located close to tidally affected flooding sources and so the flood risk from this source is assessed as negligible.

4.4 Groundwater Flooding

Introduction

- 4.4.1 Groundwater flooding occurs when subsurface water emerges either at surface or in made ground or in subsurface structures such as basements and services ducts. It occurs as diffuse seepage, emergence from new point source springs or an increase in flow from existing springs. It results from aquifer recharge from infiltrating rainfall, from sinking streams entering aquifers from adjacent non-aquifers, or from high river levels or tides driving water through near surface deposits. It tends to occur with a delay following rainfall and can last for several weeks or months. Groundwater flooding or shallow water tables also prevent or reduce infiltration and so can worsen surface water flooding.

BGS Groundwater Flooding Susceptibility Map

- 4.4.1 The BGS Groundwater Flooding Susceptibility Map (Drawing 003) shows that the northern extent of the Site is located outside the mapped extent of groundwater flooding where Pennine Middle Coal Measure are present.
- 4.4.2 The middle and southern extents of the Site have the potential to affect property situated below ground level and to occur at the surface. The risk of groundwater flooding is likely to be associated with the underlying geology (sandstone) sandstone. The nearest borehole logs (SE40SW221 - Figure 3.5 and Table 3.1) show groundwater ingress at 3.35mbgl, within the interbedded sandstone and mudstone (3.30 – 7.05mbgl), which is overlain by clay (2.10 - 3.30mbgl). The layer of clay is likely to have low infiltration potential; therefore, it is therefore unlikely that groundwater would rise to the surface.
- 4.4.3 The BGS mapping is coarse and should be superseded by the Geosmart groundwater flood risk map.

Geosmart Groundwater Flood Risk Map

- 4.4.4 The Geosmart 1 in 100-year groundwater flood risk map (Drawing 006) shows that the northern extent of the Site is located outside the mapped extent of groundwater flooding where Pennine Middle Coal Measures are present.
- 4.4.5 The middle and southern extents of the Site are at low to moderate risk of groundwater flooding (Risk Classes 2-4 - Table 4.2), where Sandstone is present.
- 4.4.6 Mapped classes combine understanding of likelihood, model and data uncertainty, and possible severity. Likelihood is ranked according to whether we expect groundwater flooding at a site due to extreme elevated groundwater levels with an annual probability of occurrence greater than 1%, considering model and data uncertainty. Severity relates to expectations of the amount of property damage or other harm that groundwater flooding at that location might cause (Table 4.2).

Table 4.2: Groundwater Flood Risk Classification

Risk Class	Probability of Groundwater Flooding	Effect
4: Negligible	Annual probability less than 1%.	Negligible unless unusually sensitive use.
3: Low	Annual probability greater than 1%.	Remote possibility of damage to property or harm to sensitive receptors Flooding likely to be limited to seepages and waterlogged ground, damage to basements and subsurface infrastructure, and should pose no significant risk to life. Surface water flooding may be worsened.
2: Moderate	Annual probability greater than 1%.	Significant possibility of damage to property or harm to other sensitive receptors at or near this location. flooding is likely to be in the form of shallow pools or streams. Surface water flooding and failure of drainage systems may be worsened when groundwater levels are high.

Risk Class	Probability of Groundwater Flooding	Effect
1: High	Annual probability greater than 1%.	Groundwater flooding will occur which could lead to damage to property or harm to other sensitive receptors at or near this location. Flooding may result in damage to property, road or rail closures and, in exceptional cases, may pose a risk to life. Surface water flooding and failure of drainage systems may be worsened when groundwater levels are high.

Flood Risk

4.4.7 The risk of groundwater flooding is assessed negligible within the northern extent but low to medium risk within the middle and southern extents. The risk of groundwater flooding is likely to be limited to below ground and not at the surface.

4.4.8 Mitigation measures against groundwater flooding are discussed in Section 5.

4.5 Surface Water Flooding

Introduction

- 4.5.1 Surface water flooding occurs following rainfall on ground where infiltration rates are less than the rainfall precipitation rate. This can occur when either:
- Soils or ground materials are naturally of low permeability or have been compacted (infiltration excess runoff);
 - Soils or ground materials are saturated from previous rainfall either directly or from upslope (saturation excess runoff and return flow) or from high groundwater levels.

SFRA Mapping

- 4.5.2 SFRA mapping shows the Site is located outside the mapped extent of surface water flooding. However, the access/egress from Pitt Street is at low risk of surface water flooding, with a 0.15-0.30m depth. However, the mapping also shows there are no historical surface water flooding incidents within the vicinity of the Site.
- 4.5.3 The SFRA mapping is coarse and should be superseded by the Environment Agency Complex Surface Water Flood mapping.

JBA Surface Water Flood Map

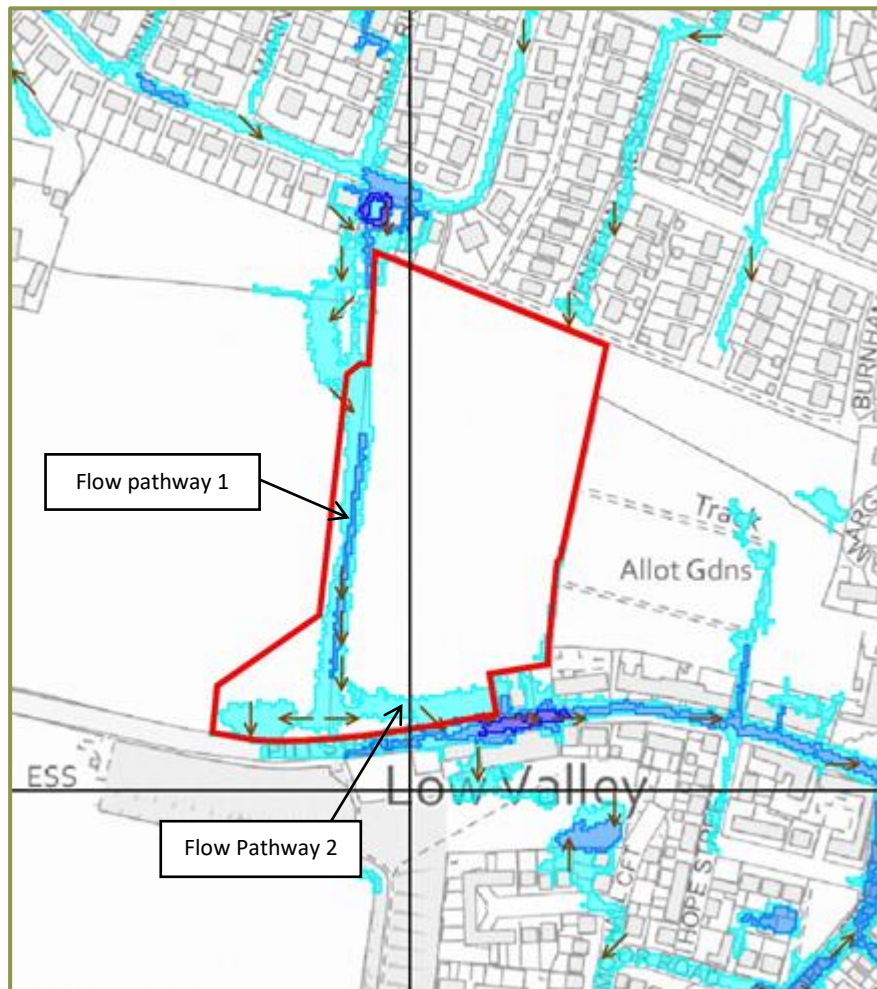
- 4.5.4 The JBA Surface Water Flood Map (Drawing 004.1) shows most of the Site is located outside the mapped extent of surface water flooding. There is however a surface water pathway orientated north to south through the western extent, along the reach of Drain 1. The flow pathway is associated with the 1 in 75-year, 200-year and 1000-year events.
- 4.5.5 The JBA Surface Water Flood mapping is superseded by the more detailed Environment Agency Complex Surface Water Flood mapping.

Environment Agency Complex Surface Water Flood Mapping

- 4.5.6 The Environment Agency Complex Surface Water Flood Mapping (Drawings 009.1 to 009.4) shows that most of the Site is located outside the mapped extent of surface water flooding (Figure 4.1).

There are two surface water flow pathways associated with the Site:

Figure 4.1: Surface Water Flow Pathways



Flow Pathway 1

- 4.5.7 Flow Pathway 1 is orientated north to south through the western extent, along the reach of Drain 1. The flow pathway is associated with the 1 in 30-year, 100-year and 1000-year events. The flood depth is mostly up to 0.30m during the extreme 1 in 1000-year event. The flood velocity is mostly up to 2.00m/s. The flood hazard is 'low' (0.50-0.75) to 'significant' (1.25-2.0).
- 4.5.8 The surface water flow pathway is likely to be generated by the Site topography, when the underlying soils become saturated and where the underlying geology has low permeability. Flows are channelled by Drain 1, into Drain 2/Flow Pathway 2 along the southern boundary. The flow pathway is partially fed by runoff from development to the north.
- 4.5.9 The ground model is unlikely to be detailed enough to capture the details of the channel profile and conveyance capacity. The flood outline is therefore likely to be conservative.

Flow Pathway 2

- 4.5.10 Flow Pathway 2 conveys flow west to east along the southern boundary of the Site and along Pitt Street. The flood depth is mostly up to 0.6m. The flood velocity is mostly up to 2.0m/s. The flood hazard is 'low' (0.50-0.75) to 'significant' (1.25-2.0).
- 4.5.11 The surface water flow pathway is likely to be generated by the Site topography, when the underlying soils become saturated and where the underlying geology has low permeability. Drain 2/Flow Pathway 2 is also fed by Drain 2/Flow Pathway 1.
- 4.5.12 Drain 2 does not have connectivity to a wider watercourse network. It is assumed the field boundary drains intercept overland flows and infiltrate over time. During high return period events, the drain will overtop and shed overland following the local topography. The flood mapping shows that flows are directed east along Pitt Street.
- 4.5.13 The ground model is unlikely to be detailed enough to capture the details of the channel profile and capacity for interception and attenuation. The flood outline is therefore likely to be conservative.
- 4.5.14 As per the Defra Hazard Ratings table (Figure 4.2), the flood hazard rating of 'significant' along the Site access/egress translates as 'Danger for Most – includes the general public. The Site itself is a safe place of refuge, and the highway access/egress is accessible by the emergency services.

Figure 4.2: Defra Hazard Ratings

HR	Depth of flooding - d (m)												
	DF = 0.5				DF = 1								
Velocity v (m/s)	0.05	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.0	0.03 + 0.5 = 0.53	0.05 + 0.5 = -0.55	0.10 + 0.5 = -0.60	0.13 + 0.5 = -0.63	0.15 + 0.5 = -1.15	0.20 + 0.5 = -1.20	0.25 + 0.5 = -1.25	0.30 + 0.5 = -1.30	0.40 + 0.5 = -1.40	0.50 + 0.5 = -1.50	0.75 + 0.5 = -1.75	1.00 + 0.5 = -2.00	1.25 + 0.5 = -2.25
0.1	0.03 + 0.5 = 0.53	0.06 + 0.5 = -0.56	0.12 + 0.5 = -0.62	0.15 + 0.5 = -0.65	0.18 + 0.5 = -1.18	0.24 + 0.5 = -1.24	0.30 + 0.5 = -1.30	0.36 + 0.5 = -1.36	0.48 + 0.5 = -1.48	0.60 + 0.5 = -1.60	0.90 + 0.5 = -1.90	1.20 + 0.5 = -2.20	1.50 + 0.5 = -2.55
0.3	0.04 + 0.5 = 0.54	0.08 + 0.5 = -0.58	0.15 + 0.5 = -0.65	0.19 + 0.5 = -0.69	0.23 + 0.5 = -1.23	0.30 + 0.5 = -1.30	0.38 + 0.5 = -1.38	0.45 + 0.5 = -1.45	0.60 + 0.5 = -1.60	0.75 + 0.5 = -1.75	1.13 + 0.5 = -2.13	1.50 + 0.5 = -2.50	1.88 + 0.5 = -2.88
0.5	0.05 + 0.5 = 0.55	0.10 + 0.5 = -0.60	0.20 + 0.5 = -0.70	0.25 + 0.5 = -0.75	0.30 + 0.5 = -1.30	0.40 + 0.5 = -1.40	0.50 + 0.5 = -1.50	0.60 + 0.5 = -1.60	0.80 + 0.5 = -1.80	1.00 + 0.5 = -2.00	1.50 + 0.5 = -2.50	2.00 + 0.5 = -3.00	2.50 + 0.5 = -3.50
1.0	0.08 + 0.5 = 0.58	0.15 + 0.5 = -0.65	0.30 + 0.5 = -0.80	0.38 + 0.5 = -0.88	0.45 + 0.5 = -1.45	0.60 + 0.5 = -1.60	0.75 + 0.5 = -1.75	0.90 + 0.5 = -1.90	1.20 + 0.5 = -2.20	1.50 + 0.5 = -2.50	2.25 + 0.5 = -3.25	3.00 + 0.5 = -4.00	3.75 + 0.5 = -4.75
1.5	0.10 + 0.5 = 0.60	0.20 + 0.5 = -0.70	0.40 + 0.5 = -0.90	0.50 + 0.5 = -1.00	0.60 + 0.5 = -1.60	0.80 + 0.5 = -1.80	1.00 + 0.5 = -2.00	1.20 + 0.5 = -2.20	1.60 + 0.5 = -2.60	2.00 + 0.5 = -3.00	3.00 + 0.5 = -4.00	4.00 + 0.5 = -5.00	5.00 + 0.5 = -6.00
2.0	0.13 + 0.5 = 0.63	0.25 + 0.5 = -0.75	0.50 + 0.5 = -1.00	0.63 + 0.5 = -1.13	0.75 + 0.5 = -1.75	1.00 + 0.5 = -2.00	1.25 + 0.5 = -2.25	1.50 + 0.5 = -2.50	2.00 + 0.5 = -3.00	3.50	4.75	6.00	7.25
2.5	0.15 + 0.5 = 0.65	0.30 + 0.5 = -0.80	0.60 + 0.5 = -1.10	0.75 + 0.5 = -1.25	0.90 + 0.5 = -1.90	1.20 + 0.5 = -2.20	1.50 + 0.5 = -2.50	1.80 + 0.5 = -2.80	3.40	4.00	5.50	7.00	8.50
3.0	0.18 + 0.5 = 0.68	0.35 + 0.5 = -0.85	0.70 + 0.5 = -1.20	0.88 + 0.5 = -1.38	1.05 + 0.5 = -2.05	1.40 + 0.5 = -2.40	1.75 + 0.5 = -2.75	2.10 + 0.5 = -3.10	3.80	4.50	6.25	8.00	9.75
3.5	0.20 + 0.5 = 0.70	0.40 + 0.5 = -0.90	0.80 + 0.5 = -1.30	1.00 + 0.5 = -1.50	1.20 + 0.5 = -2.20	1.60 + 0.5 = -2.60	2.00 + 0.5 = -3.00	2.40 + 0.5 = -3.40	4.20	5.00	7.00	9.00	11.00
4.0	0.23 + 0.5 = 0.73	0.45 + 0.5 = -0.95	0.90 + 0.5 = -1.40	1.13 + 0.5 = -1.63	1.35 + 0.5 = -2.35	1.80 + 0.5 = -2.80	2.25 + 0.5 = -3.25	2.70 + 0.5 = -3.70	4.60	5.50	7.75	10.00	12.25
4.5	0.25 + 0.5 = 0.75	0.50 + 0.5 = -1.00	1.00 + 0.5 = -1.50	1.25 + 0.5 = -1.75	1.50 + 0.5 = -2.50	2.00 + 0.5 = -3.00	2.50 + 0.5 = -3.50	3.00 + 0.5 = -4.00	5.00	6.00	8.50	11.00	13.50
5.0	0.28 + 0.5 = 0.78	0.60 + 0.5 = -1.10	1.10 + 0.5 = -1.60	1.38 + 0.5 = -1.88	1.65 + 0.5 = -2.65	2.20 + 0.5 = -3.20	2.75 + 0.5 = -3.75	3.30 + 0.5 = -4.30	5.40	6.50	9.25	12.00	14.75
Flood Hazard Rating (HR)		Colour Code		Hazard to People Classification									
Less than 0.75				Very low hazard - Caution									
0.75 to 1.25				Danger for some – includes children, the elderly and the infirm									
1.25 to 2.0				Danger for most – includes the general public									
More than 2.0				Danger for all – includes the emergency services									

Flood Risk

- 4.5.15 The risk of surface water flooding is assessed as negligible for most of the Site, with flow pathways along onsite/bounding drains (including Site access/egress) at low to medium risk.
- 4.5.16 Mitigation measures against surface water flooding are discussed in Section 5.

4.6 Sewer Flooding

Introduction

- 4.6.1 Sewer flooding occurs when urban drainage networks become overwhelmed after heavy or prolonged rainfall due to restrictions or blockage in the sewer network or if the volume of water draining into the system exceeds the sewer design capacity.
- 4.6.2 New sewers are built to the guidelines within Sewers for Adoption¹⁸ and have a design standard to the 1 in 30-year flood event. Older sewers were not designed to any standard. Modern sewer systems will only surcharge during rainstorm events with a return period greater than 1 in 30-years (e.g. 1 in 100-years).

Sewer Asset Plans

- 4.6.3 There are no public sewers located within the Site boundary separate public surface water and foul sewer network located within land outside the northern boundary and a public surface water sewer

Flood Risk

- 4.6.4 The risk of flooding from sewers is assessed as negligible.

4.7 Flooding from Infrastructure Failure

Reservoir

- 4.7.1 The Environment Agency online flood mapping shows the Site is located outside the extent of flooding sourced from reservoirs. The risk of flooding from reservoirs is assessed as negligible.

¹⁸ WRC (2012) Sewers for Adoption 7th Edition.

5.0 Flood Risk Mitigation Measures

5.1 Introduction

5.1.1 The following sources of flooding were identified:

- Groundwater flooding (below ground); and
- Residual Risk from field boundary drains / surface water flooding (flow pathways).

5.2 Mitigation Measures

Groundwater Flooding

- No below surface habitable buildings (i.e. basements).
- Adoption of a surface water management strategy.
- Set finished floor levels a minimum of +150mm above external levels.
- Lined attenuation to prevent groundwater ingress.

Residual Risk from Field Boundary Drains Surface Water Flooding

- Sequentially develop the Site, limiting the built development outside the mapped extent of surface water flooding.
- Provide a 4m easement free from development along either side of the onsite land/bounding field boundary drains. This easement would provide access for inspection and maintenance purposes, including vehicle access.
- Undertake maintenance activities to keep the field boundary drains clear from debris and overgrown vegetation to maintain the conveyance of the channels.
- Position the surface water attenuation outside the mapped extent of surface water flooding for events less than the 1 in 1000-year event. The surface water attenuation would surcharge beyond a 1 in 100-year (plus 40% climate change) event, therefore inundation during the extreme 1 in 1000-year event would be inconsequential.
- Adoption of a surface water management strategy.
- Set finished floor levels as per above.

5.3 Summary of Flood Risk

5.3.1 Table 5.1 summarises the probability and level of risk, both with and without mitigation measures.

Table 5.1: Probability and Consequences of All Sources of Flooding

Flooding Source	Potential Source	Probability	Consequence & Impact Without Mitigation	Consequence & Impact with Mitigation
Fluvial	Drains 1 and 2	Negligible	Negligible	Negligible
Tidal	None identified	Negligible	Negligible	Negligible
Groundwater	Secondary A Bedrock Aquifer	Negligible within the northern extent, low to medium below ground risk within the middle and southern extents.	Negligible within the northern extent, low to medium below ground risk within the middle and southern extents.	Low
Surface Water	Poor permeability and Site topography	Negligible for most of the Site but low to medium risk along flow pathways associated with onsite/bounding drains.	Negligible for most of the Site but low to medium risk along flow pathways associated with onsite/bounding drains.	Low
Sewer	Public sewers	Negligible	Negligible	Negligible
Infrastructure Failure	None identified	Negligible	Negligible	Negligible

Key: Green - Negligible, Yellow - Low, Orange - Medium and Red - High; based on consequence and impact with mitigation from each flooding source.

5.4 Flood Guidance and Sequential Test

- 5.4.1 The proposal is for a residential development. Table 2 of PPG ID: 7 (not included in this report) classifies the proposed use as 'more vulnerable'.
- 5.4.2 The Environment Agency Flood Zones and acceptable development types are listed in Table 5.2. All development types (including more vulnerable uses) are acceptable in Flood Zone 1 (low risk). The Site is however at risk of groundwater and surface water flooding. Subject to the above mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required as indicated in Table 5.3.

Table 5.2: Environment Agency Flood Zones and Appropriate Land Use

Flood Zone	Probability	Explanation	Appropriate Land use
Zone 1	Low	Less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).	All development types generally acceptable.
Zone 2	Medium	Between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.	Most development type are generally acceptable.
Zone 3a	High	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.	Some development types not acceptable.
Zone 3b	'Functional Floodplain'	Land where water must flow or be stored in times of flood. SFRAs should identify this zone (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, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes).	Some development types not acceptable.

Note: The Flood Zones are the current best information on the extent of the extreme flood from rivers or the sea that would occur without the presence of flood defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development. The identified risk of fluvial flooding is highlighted green.

Table 5.3: Vulnerability and Flood Zone 'Compatibility' as Identified in Table 3 of PPG ID: 7

Flood Risk Vulnerability classification (see Table 1 of PPG ID: 7)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	Yes	Yes	Yes	Yes	Yes
Zone 2	Yes	Yes	Exception test required	Yes	Yes
Zone 3a	Exception test required	Yes	No	Exception test required	Yes
Zone 3b 'Functional Floodplain'	Exception test required	Yes	No	No	No

*Key: Yes: Development is appropriate. No: Development should not be permitted.
The identified risk of fluvial flooding is highlighted green.*

6.0 Site Drainage

6.1 Surface Water Drainage

- 6.1.1 Consideration of flood issues is not confined to the floodplain. This is recognised in the NPPF and associated guidance where all proposed development of 1ha or more in Flood Zone 1 and so outside the floodplain nevertheless requires an FRA. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in a catchment, particularly flooding downstream; and replacing permeable vegetated areas with low permeability roofs, roads and other paved areas will increase the speed, volume and peak flow of surface water runoff.
- 6.1.2 A surface water management strategy for the development is proposed to manage and reduce the flood risk posed by surface water runoff from the Site. The developer will be required to ensure that any scheme for surface water should build in sufficient capacity for the entire Site.
- 6.1.3 The surface water drainage arrangements for any development Site should be such that the volume and peak flow rates of surface water leaving a developed Site are no greater than the rates prior to the proposed development, unless specific off-Site arrangements are made and result in the same net effect.
- 6.1.4 An assessment of the surface water runoff rates was undertaken to determine the surface water options and attenuation requirements for the Site.

6.2 Existing Drainage System

- 6.2.1 The 3.38ha Site comprises an agricultural (grassed) field.
- 6.2.2 The Site is underlain by impermeable soils and bedrock. It is likely that drainage is predominantly via overland flow, following the topography of the Site to the topographic low points (field boundary drains), with a small amount of infiltration to bedrock.

6.3 Developable and Impermeable Areas

- 6.3.1 The proposal is for a residential development.
- 6.3.2 A figure of 55% (inclusive of 10% urban creep) has been applied to the 2.67ha developable area. The existing and proposed impermeable areas are shown in Table 6.1.

Table 6.1: Impermeable Area

Area	Existing Buildings and Hardstanding	Proposed Buildings and Hardstanding	Difference
Area (ha)	0	1.47	+1.47
Percentage of Total Site Area (%)	0	43.5	+43.5

- 6.3.3 The proposed development will increase the impermeable surfaces and therefore increase the amount of runoff.

6.4 Greenfield Runoff Rates

- 6.4.1 An assessment of greenfield runoff rates was undertaken to determine the attenuation requirements for the proposed development.
- 6.4.2 The runoff rates were calculated using FEH Method within Causeway software using the current 'industry best practice' guidelines as outlined in the Interim Code of Practice for SuDS¹⁹, and the Environment Agency Report SC030219 – Rainfall runoff management for developments. This is a recommended methodology for Sites up to 50ha in area.
- 6.4.3 The following parameters were used in the runoff calculations:
- Developable Area: 2.67ha
 - Average Annual Rainfall (SAAR): 614 mm/year;
 - Soil Type / SPR: 4 / 0.47;
 - Region No.: 3
- 6.4.4 The soil type/SPR assigned on Causeway Software was 2/0.3, indicating very permeable soils with shallow groundwater. The nearest borehole log demonstrates the presence of clay soils and superficial deposits, with no groundwater encountered. As such, the soil type/SPR value has been changed to 4/0.47 to replicate on-site conditions (Figure 6.1).

Figure 6.1: Soil Index (Sourced from Microdrainage)

Soil Index	General Description	Soil Type
0.150	i) Well drained permeable sandy or loamy soils and shallower analogues over highly permeable limestone, chalk, sandstone or related drifts. ii) Earthy peat soil drained by dikes and pumps. iii) Less permeable soils in valleys.	1
0.300	i) Very permeable soils with shallow ground-water. ii) Permeable soils over rock or frangipani, commonly on slopes in western Britain associated with smaller areas of less permeable wet soils. iii) Moderately permeable soils, some with slowly permeable subsoils.	2
0.400	i) Relatively impermeable soils in boulder and sedimentary clays and in alluvium, especially in eastern England. ii) Permeable soils with shallow ground-water in low lying areas. iii) Mixed areas of permeable and impermeable soils in approximately equal proportions.	3
0.450	i) Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.	4
0.500	Soils of the wet upland i) With peaty or humose surface horizons and impermeable layers at shallow depth. ii) Deep raw peat associated with gentle upland slopes or basin sites. iii) Bare rock cliffs and screes. iv) Shallow, permeable rocky soil on steep slopes.	5

- 6.4.5 Table 6.2 shows the calculated greenfield runoff rates. Extracts from Causeway Software calculations are included in Appendix 9.

¹⁹ Office of the Deputy Prime Minister, National SuDS Working Group, July 2004, Interim Code of Practice for sustainable drainage systems.

Table 6.2: Greenfield Runoff Rates

Annual Probability (Return Period, years)	Greenfield Runoff (l/s)
QBAR	11.1
100% (1)	9.5
3.33% (30)	19.4
1% (100)	23.0
1% Plus Climate Change	32.2

Note: 40% added to the data to account for long-term climate change as stated in 'Flood Risk Assessment: Climate Change Allowance'. The 1 in 2-year, 30-year and 100-year annual probability events are of importance to the Water Companies and the Environment Agency when looking at sewage discharge and flood risk.

6.4.6 A predevelopment enquiry was sent to Yorkshire Water. Yorkshire water agreed to a restricted rate to the surface water sewer at 5l/s (subject to soakaway testing). As such a discharge rate of 5l/s is carried forward for the remainder of the report (Appendix 4).

6.4.7 Sustainable Drainage Options (SuDS)

Choice of SuDS Options

6.4.8 Sustainable water management measures should be used to control the surface water runoff from the proposed development Site, thereby managing the flood risk to the Site and surrounding areas from surface water runoff. These measures will also improve the quality of water discharged from the Site.

6.4.9 Current guidance promotes sustainable water management using SuDS. Options applicable to this Site are identified in Table 6.3.

Table 6.3: SuDS Options

Green roofs	Infiltration basins
Water butts	Detention basins
Permeable paving	Oversized pipes
Rainwater harvesting	Brown roofs
Filter strips	Swales
Wetland Areas	Cellular Storage

Note: SuDS appropriate to the development are highlighted green.

6.4.10 A hierarchy of SuDS techniques is identified²⁰:

- 1. Prevention** – the use of good Site design and housekeeping measures on individual Sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
- 2. Source Control** – control of runoff at or very near its source (such as the use of rainwater harvesting).

²⁰ CIRIA (2004) Report C609, Sustainable Drainage Systems – Hydraulic, Structural and Water Quality advice.

3. **Site Control** – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole Site).
4. **Regional Control** – management of runoff from several Sites, typically in a detention pond or wetland.

6.4.11 Using SuDS as opposed to conventional drainage systems provides several benefits by:

- reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
- reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed Sites;
- improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
- reducing potable water demand through rainwater harvesting;
- improving amenity through the provision of public open spaces and wildlife habitat; and
- replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

SuDS Maintenance

6.4.12 A detention basin will form the main attenuation feature within the development Site.

6.4.13 Maintenance of the SuDS features would be in line with the SuDS Manual (CIRIA C753, 2015), as detailed in Figure 6.2. The maintenance would be undertaken by a private maintenance company.

6.4.14 It is standard for SuDS features within a new development to be maintained by a private maintenance company, unless the council adopt it. If the maintenance company goes into administration, the Site will be contracted to a new maintenance company. Residents will pay a surcharge to the maintenance company and several of them would be appointed to its board. This will ensure maintenance throughout the lifetime of the development.

6.4.15 Details of other SuDS features, and maintenance would be considered further at detailed design, when a detailed layout has been produced. The level of detail provided within this FRA should be sufficient at outline stage to demonstrate that SuDS would be deliverable.

Figure 6.2: Detention Basin Operation and Maintenance Requirements (Table 22.1 of the SuDS Manual)

TABLE 22.1 Operation and maintenance requirements for detention basins		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

6.5 Surface Water Management Strategy

Hierarchy of Discharge

6.5.1 In accordance with requirement H3 of the Building Regulations 2000²¹ rainwater runoff must discharge to one of the following, listed in order of priority:

- 1. An adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable:** The use of infiltration-based SuDs is not feasible due to the indicative low permeability of the underlying geology. This would need to be confirmed through soakaway testing.

²¹ Office of the Deputy Prime Minister, The Building Regulations 2000.

- 2. A watercourse; or where that is not reasonably practicable:** Drains 1 and 2 were not observed to have connectivity to a wider watercourse network. An outfall to Drain 1 or 2 would not be a feasible option. There are no other watercourses located within the immediate vicinity of the Site.
 - 3. A sewer:** There is a public surface water sewer located within land outside the northern boundary and a public combined sewer beneath Pitt Street to the south of the Site.
- 6.5.2 The potential route to discharge from the existing Site will be by outfall to the surface water sewer within Pitt Street.

Drainage Design

- 6.5.3 Surface water runoff would be directed to the drainage system through drainage gullies located around the perimeter of the buildings and through contouring of the hardstanding areas.
- 6.5.4 Landscaped areas should be incorporated into the layout where possible, and the associated gardens of each unit will allow a proportion of the rainfall to infiltrate into the soil substrate.
- 6.5.5 Surface water will be directed to an onsite detention basin, positioned to achieve a gravity fed connection to the combined sewer beneath Pitt Street to the south.
- 6.5.6 An indicative drainage layout is in Drawing 010.

Attenuation Requirements

- 6.5.7 Attenuation storage is required to reduce the post-application surface water runoff from the Site to a 5l/s restricted discharge rate, up to and including the 1 in 100-year (+40%CC) rainfall event, assuming no infiltration losses.
- 6.5.8 The following input parameters were assumed in the calculations:
- Impermeable Area: 1.47ha (43.5%);
 - Cv (proportion of rainfall forming surface water runoff): 75% summer, 84% winter;
 - Infiltration losses: 0.00m/hour;
 - With outfall as per agreement with Yorkshire Water: 5l/s.
- 6.5.9 The attenuation volume for the 1 in 100-year event (plus climate change) is 1,274m³.
- 6.5.10 PDS Flow calculations are included in Appendix 9. The calculated runoff rates and attenuation volumes will be reviewed at detailed design stage.

6.6 Exceedance Routes

- 6.6.1 The detention basin will be designed with a capacity up to a 1 in 100-year (plus 40% climate change) event, with a +300mm freeboard allowance, based on the 5l/s restricted discharge rate. This provides a betterment (reduction) in runoff when compared to existing undeveloped conditions, where runoff is uncontrolled across all return periods.
- 6.6.2 A storm event in excess of this design standard would be extreme and would cause the detention basin to overtop (with no sudden deluge) and would then shed overland following the topography (south) towards the Pitt Street, as per existing conditions.
- 6.6.3 Finished floor levels of new dwellings will be set above external levels, which will mitigate the residual risk of overtopping.

6.7 Foul Drainage

- 6.7.1 The Site is not currently served by a foul drainage network.
- 6.7.2 It is proposed that foul flow is discharged to the Ø150mm public combined within Pitt Street to the south of the Site via a gravity fed connection. An indicative drainage layout is included in Drawing 010.
- 6.7.3 In accordance with Sewers for Adoption (7th Edition), peak foul water discharge from a residential development is 4,000 litres per property per day. Using this method, peak foul flows are estimated to be 5l/s from the 107-unit residential development. The calculated foul flow rate will be reviewed at detailed design stage.
- 6.7.4 All foul sewerage should be designed in accordance with Building Regulations Part H. In areas where sewers are to be adopted by Yorkshire Water, sewerage should be designed in accordance with Sewers for Adoption (7th Edition) and supplemented with additional standards provided by Yorkshire Water. An application to enter into a Section 104 agreement for sewer adoption must be made in writing to Yorkshire Water prior to any works commencing on Site. A connection point should be agreed with Yorkshire Water.

7.0 Summary and Conclusions

7.1 Introduction

- 7.1.1 A site-specific Flood Risk Assessment (FRA) has been undertaken for a proposed residential development, located on a 3.38ha Site on land north of Pitt Street, Wombwell.

7.2 Flood Risk

- 7.2.1 The risk of groundwater flooding is assessed negligible within the northern extent but low to medium risk within the middle and southern extents. The risk of groundwater flooding is likely to be limited to below ground and not at the surface.
- 7.2.2 The risk of surface water flooding is assessed as negligible for most of the Site, with flow pathways along onsite/bounding drains (including Site access/egress) at low to medium risk.
- 7.2.3 The risk of flooding from all other sources are assessed as negligible.

7.3 Mitigation Measures

- 7.3.1 Flood risk can be mitigated to a negligible or low and acceptable level through the following approach:
- No below surface habitable buildings (i.e. basements).
 - Adoption of a surface water management strategy.
 - Set finished floor levels above external levels.
 - Lined attenuation to prevent groundwater ingress.
 - Sequentially develop the Site, limiting the built outside the mapped extent of surface water flooding.
 - Provide a development free easement along either side of the onsite land/bounding field boundary drains. This easement would provide access for inspection and maintenance purposes.
 - Undertake maintenance activities to keep the field boundary drains clear from debris and overgrown vegetation.
 - Position the surface water attenuation outside the mapped extent of surface water flooding for events less than the 1 in 1000-year event. The surface water attenuation would surcharge beyond a 1 in 100-year (plus 40% climate change) event, therefore inundation during the extreme 1 in 1000-year event would be inconsequential.

7.4 Flood Guidance

- 7.4.1 The proposed residential use is classified as more vulnerable. More vulnerable uses are considered acceptable in terms of flood risk in Flood Zone 1 (low risk). The Site is however at risk of groundwater and surface water flooding. Subject to the implementation of the above mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required.

7.5 Site Drainage

Surface Water

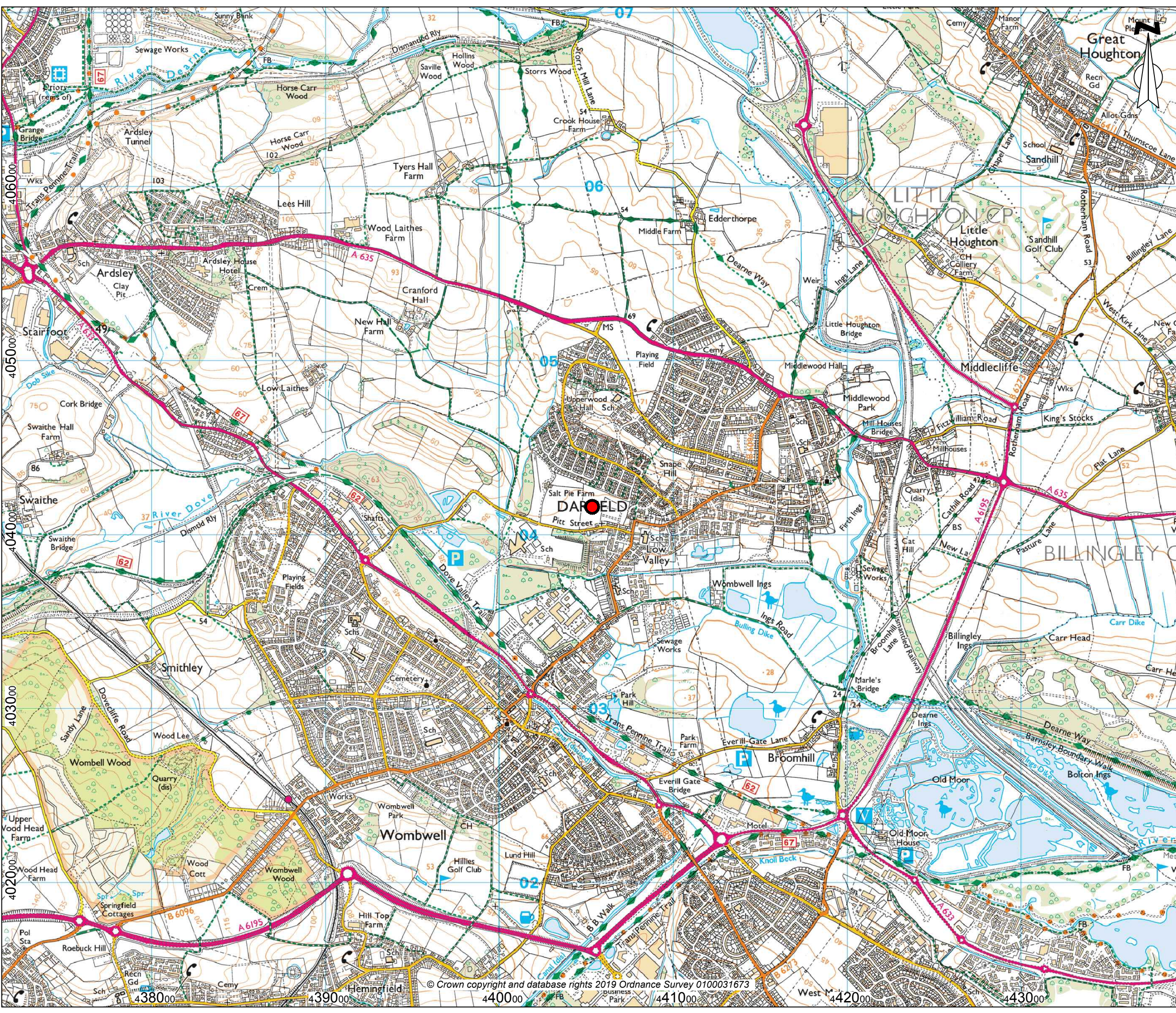
- 7.5.1 The proposed development will increase the area of impermeable surfaces and therefore increase the amount of runoff without mitigation.
- 7.5.2 Surface water runoff from the Site will be restricted to 5l/s, which offers a betterment to existing conditions which is currently uncontrolled runoff across all return periods.
- 7.5.3 Surface water runoff from the proposed development would be attenuated on-site up to and including the 1 in 100-year event, plus 40% climate change.
- 7.5.4 A SuDS drainage scheme is proposed to manage excess runoff from the development, comprising a detention basin designed to maintain runoff at pre-development rates, with an outfall to a public surface water sewer.

Foul Water

- 7.5.5 It is proposed that foul flows will discharge to public combined sewer. Foul flows have been calculated at 5 l/s.

7.6 Conclusion

- 7.6.1 This FRA demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of national policy and guidance.
- 7.6.2 The development should not therefore be precluded on the grounds of flood risk, as well as surface water or foul drainage.



Key

Site Location

SE 4053 0416

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CLIENT

Hartwood Estates

SCALE

1:20,000

A3

PROJECT REF

CRM.1122.003

DRAWN

MG

CHECKED

EOC

DATE

June 2019

PROJECT

Land North of Pitt Street

Low Valley

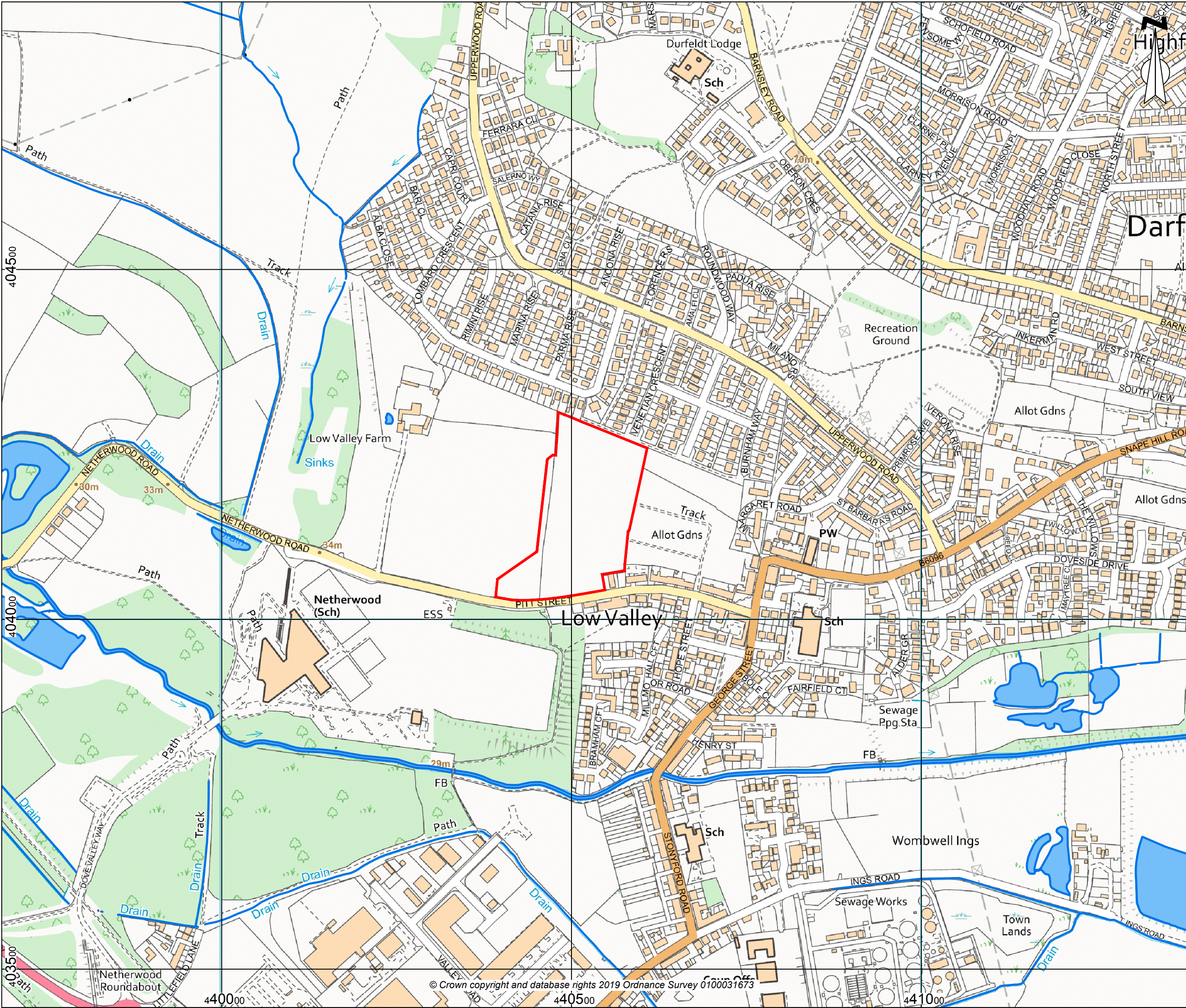
TITLE

Site Location Plan

DRAWING NO

CRM.1122.003.HY.D.001

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Key

Site Boundary

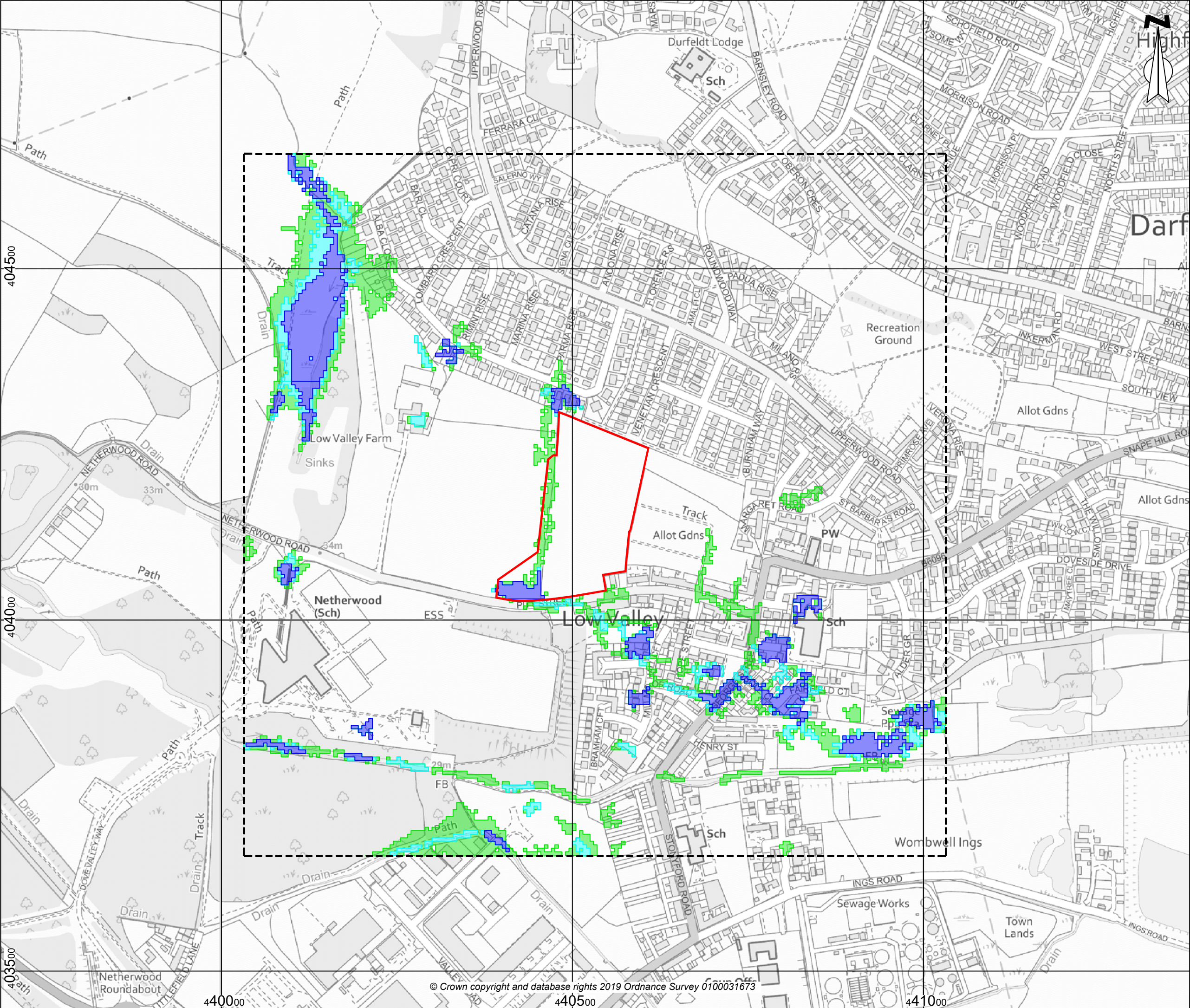
Surface Water Features



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CLIENT		
Hartwood Estates		
SCALE	PROJECT REF	
1:5,000 A3	CRM.1122.003	
DRAWN	CHECKED	DATE
MG	EOC	June 2019
PROJECT		
Land North of Pitt Street Low Valley		
TITLE		
Surface Water Features		
DRAWING NO		
CRM.1122.003.HY.D.002		



Key

- Site Boundary
- Search Extent
- 1 in 75 Year Surface Water Flooding
- 1 in 200 Year Surface Water Flooding
- 1 in 1000 Year Surface Water Flooding



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CLIENT:
Hartwood Estates

SCALE:
1:5,000@A3

PROJECT REF:
CRM.1122.003

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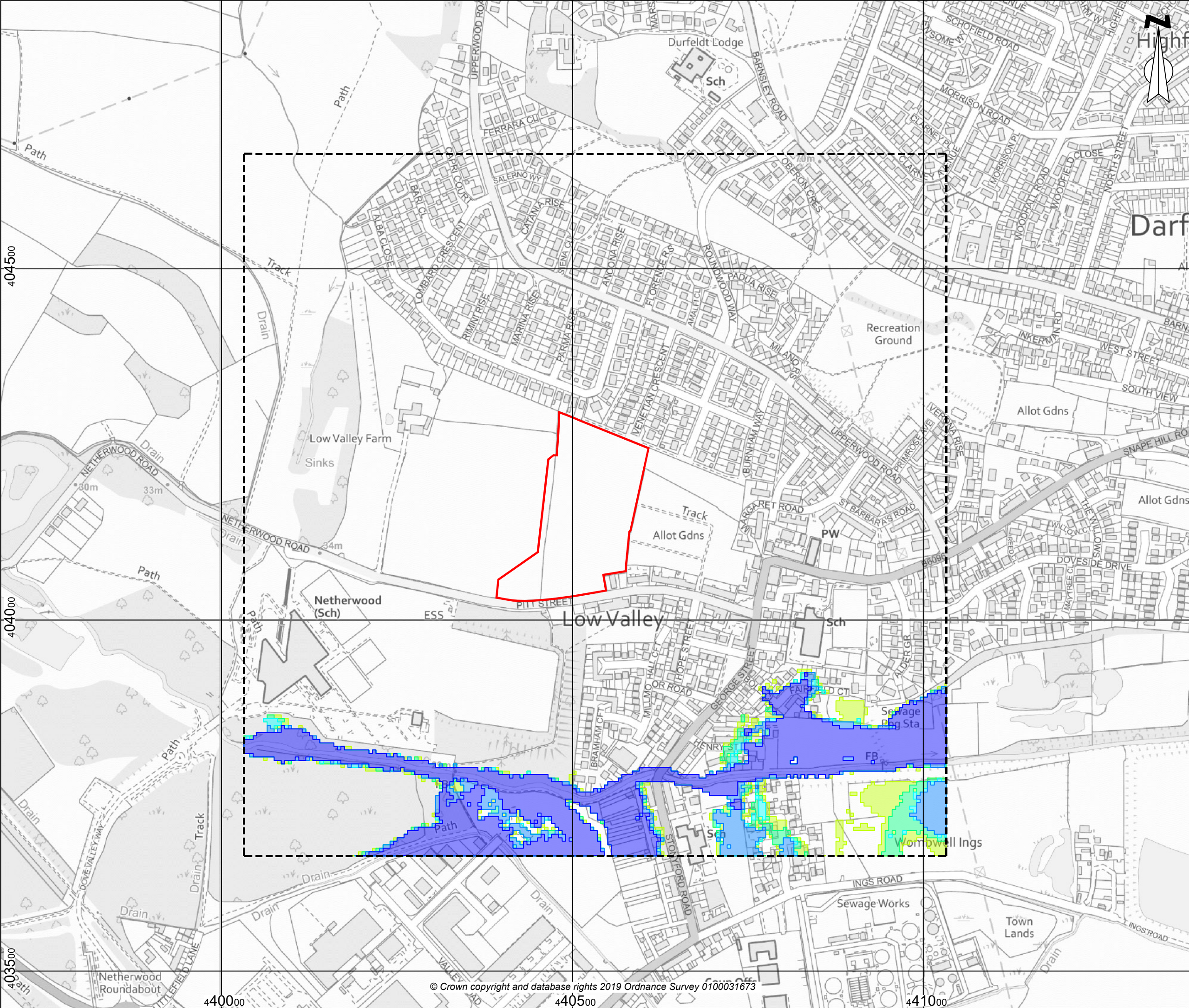
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EO'C

DATE:
June 2019

PROJECT:
**Land North of Pitt Street,
Low Valley**

TITLE:
JBA Surface Water Flooding

DRAWING NO:
CRM.1122.003.HY.D.004.1



Key

Site Boundary

Search Extent

1 in 20 Year Flooding from Rivers

1 in 75 Year Flooding from Rivers

1 in 100 Year Flooding from Rivers

1 in 200 Year Flooding from Rivers

1 in 1000 Year Flooding from Rivers

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SCALE:

1:5,000@A3

PROJECT REF:

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EO'C

DATE:

June 2019

PROJECT:

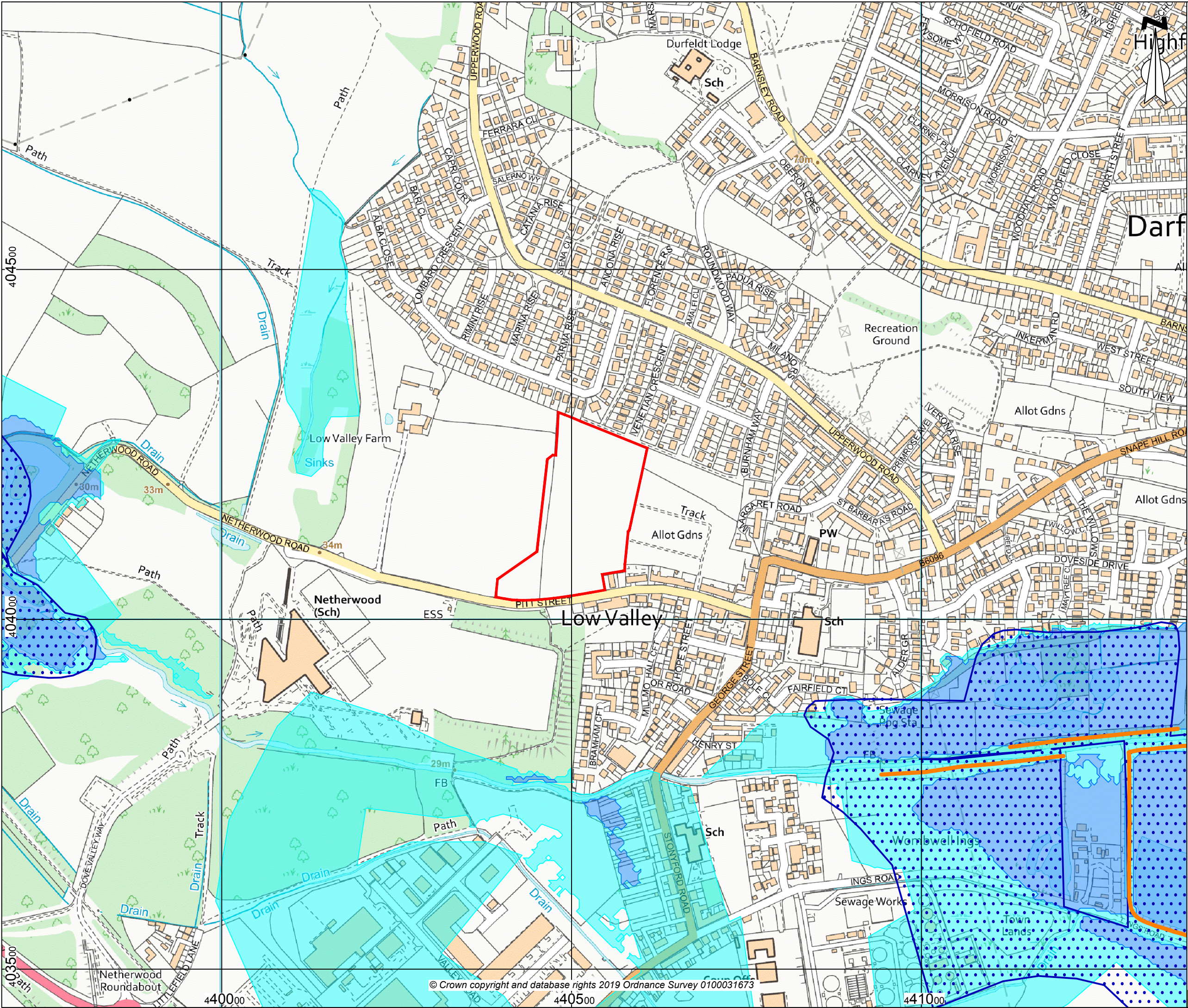
Land North of Pitt Street,
Low Valley

TITLE:

JBA Flooding from Rivers

DRAWING NO:

CRM.1122.003.HY.D.004.2



Key

Site Boundary

Flood Defences

Flood Storage Area

Flood Zone 3

Flood Zone 2

Flood Zone 1

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SCALE

1:5,000 A3

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June 2019

PROJECT

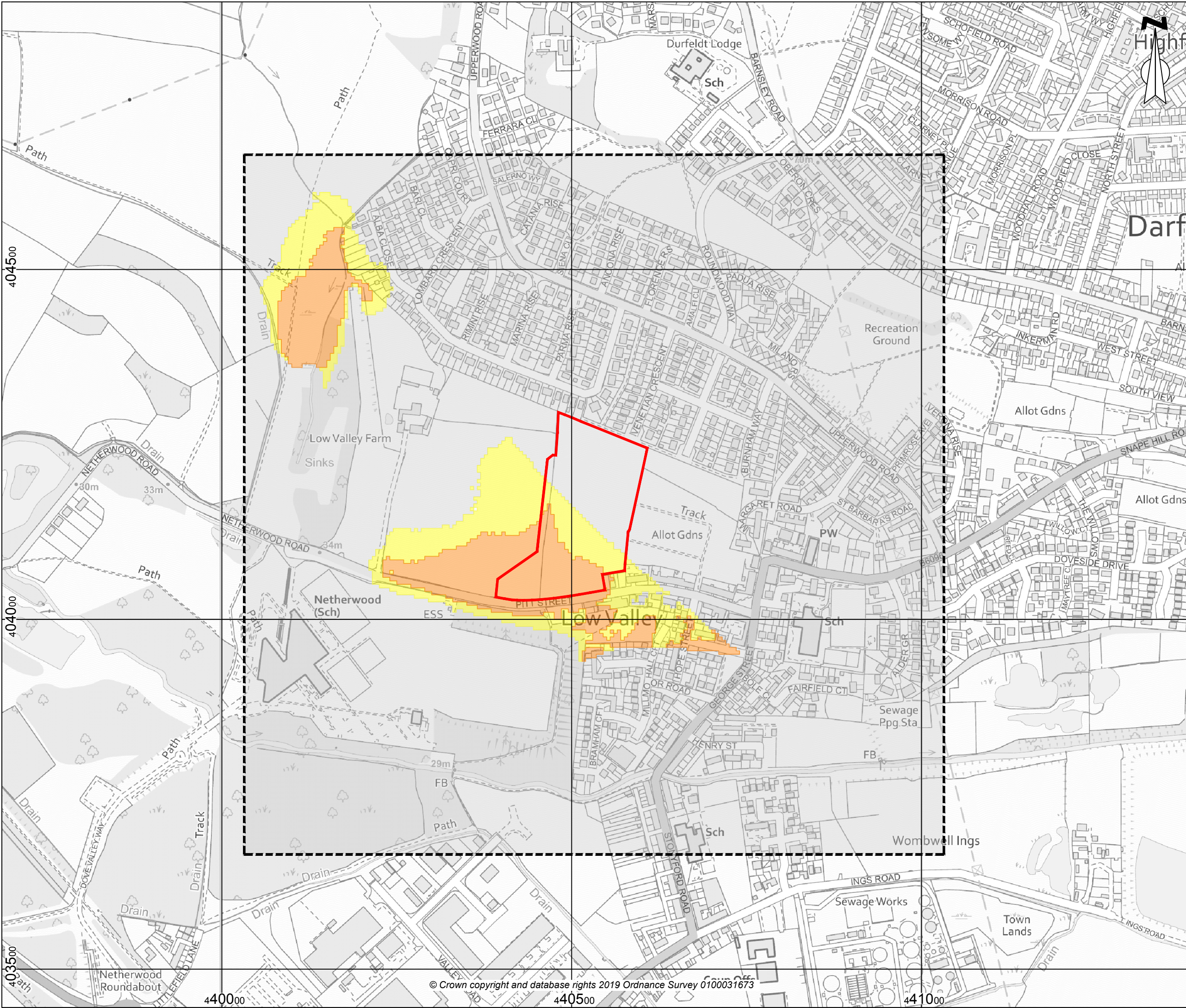
Land North of Pitt Street
Low Valley

TITLE

Environment Agency Flood Zones

DRAWING NO

CRM.1122.003.HY.D.005



Key

- Site Boundary
- Search Extent
- Class 1 High Risk
- Class 2 Moderate Risk
- Class 3 Low Risk
- Class 4 Negligible Risk

Notes:
GEOSMART GROUNDWATER FLOOD RISK MAP GW5
Version 2.2© - www.geosmartinfo.co.uk



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1:5,000 A3

PROJECT REF
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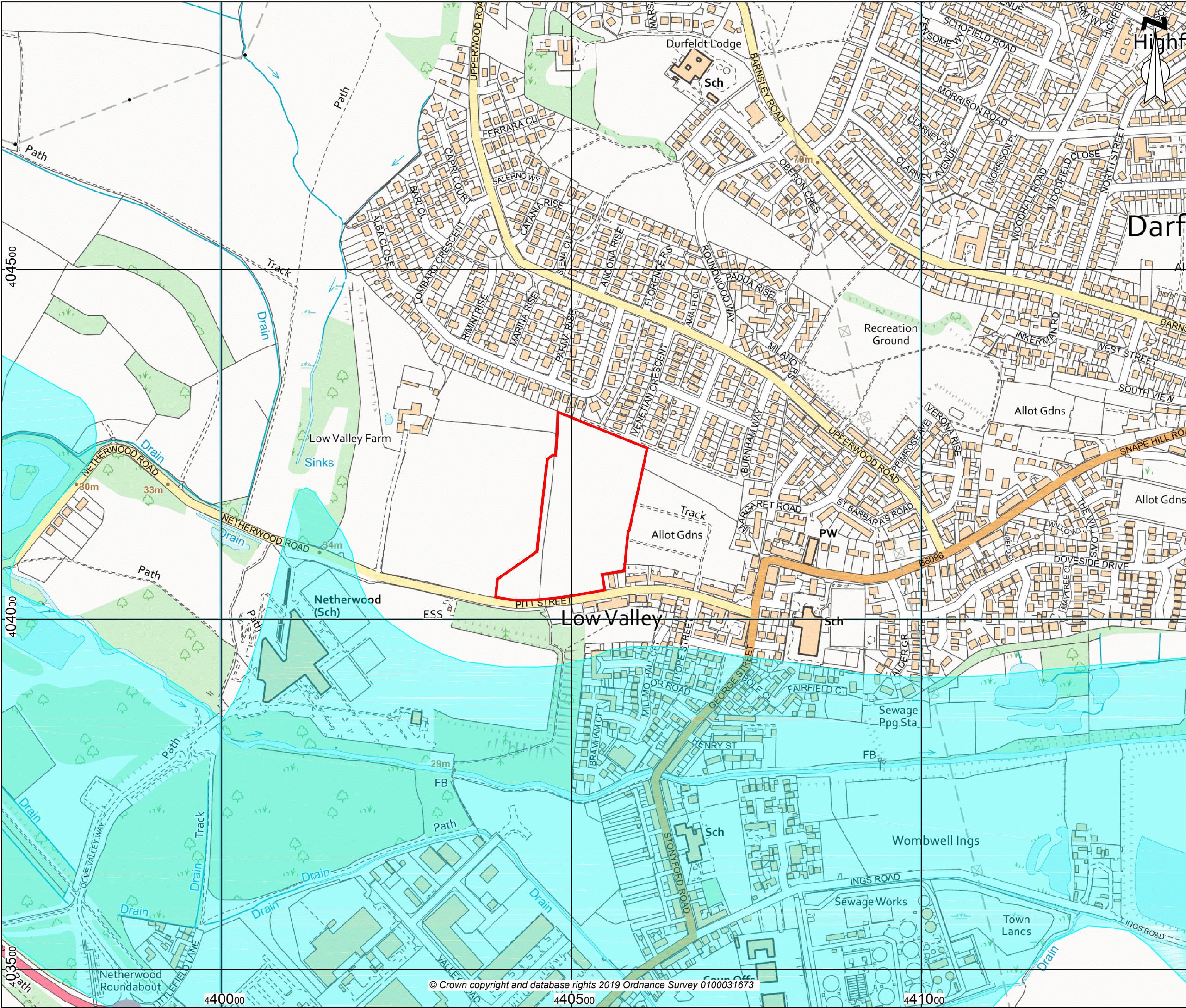
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EOC

DATE
June 2019

PROJECT
Land North of Pitt Street
Low Valley

TITLE
Groundwater Flood Risk Map

DRAWING NO
CRM.1122.003.HY.D.006



Key

Site Boundary

Geological Indicators of Flooding from Inland Flooding

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1:5,000 A3

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DATE

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PROJECT

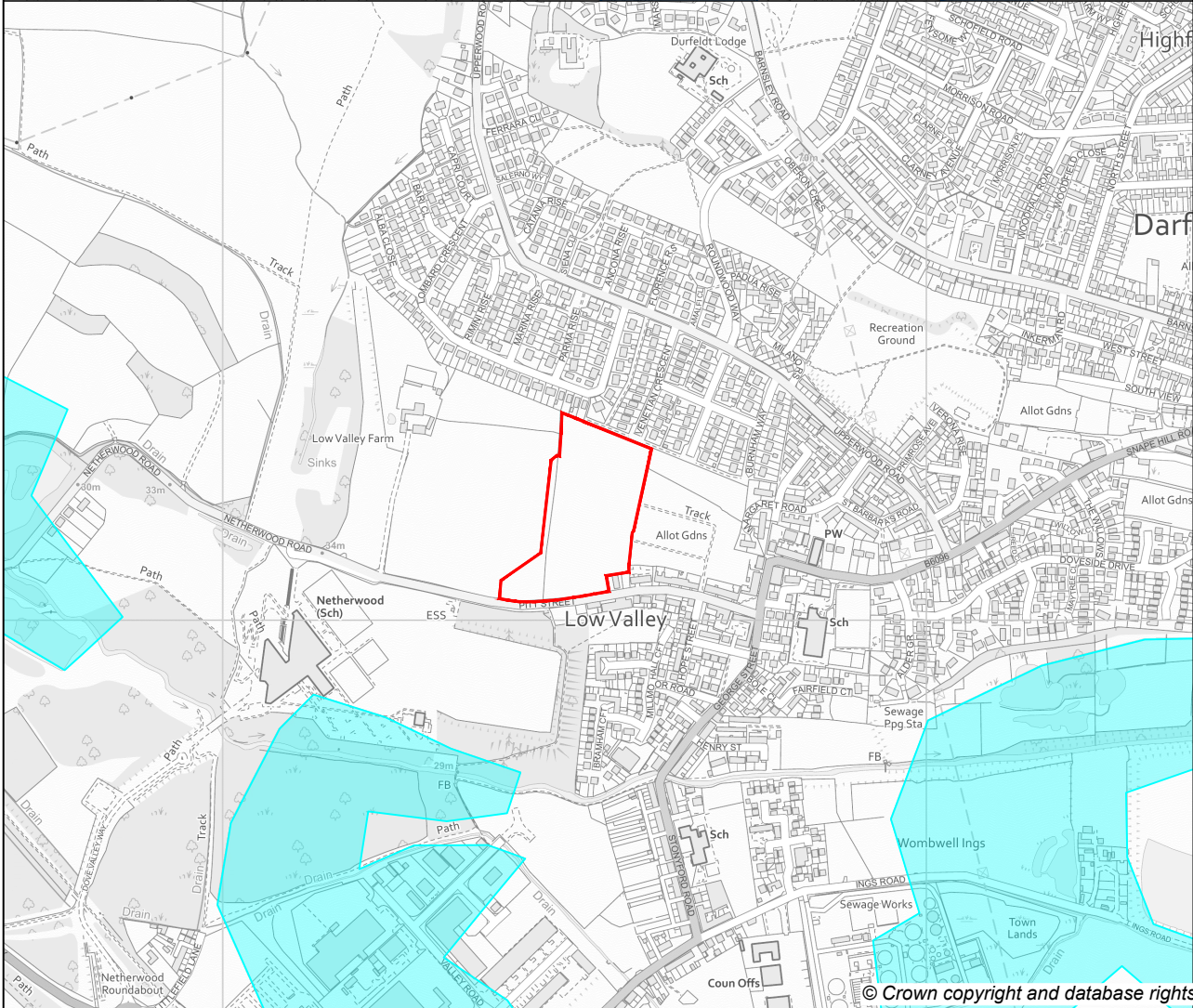
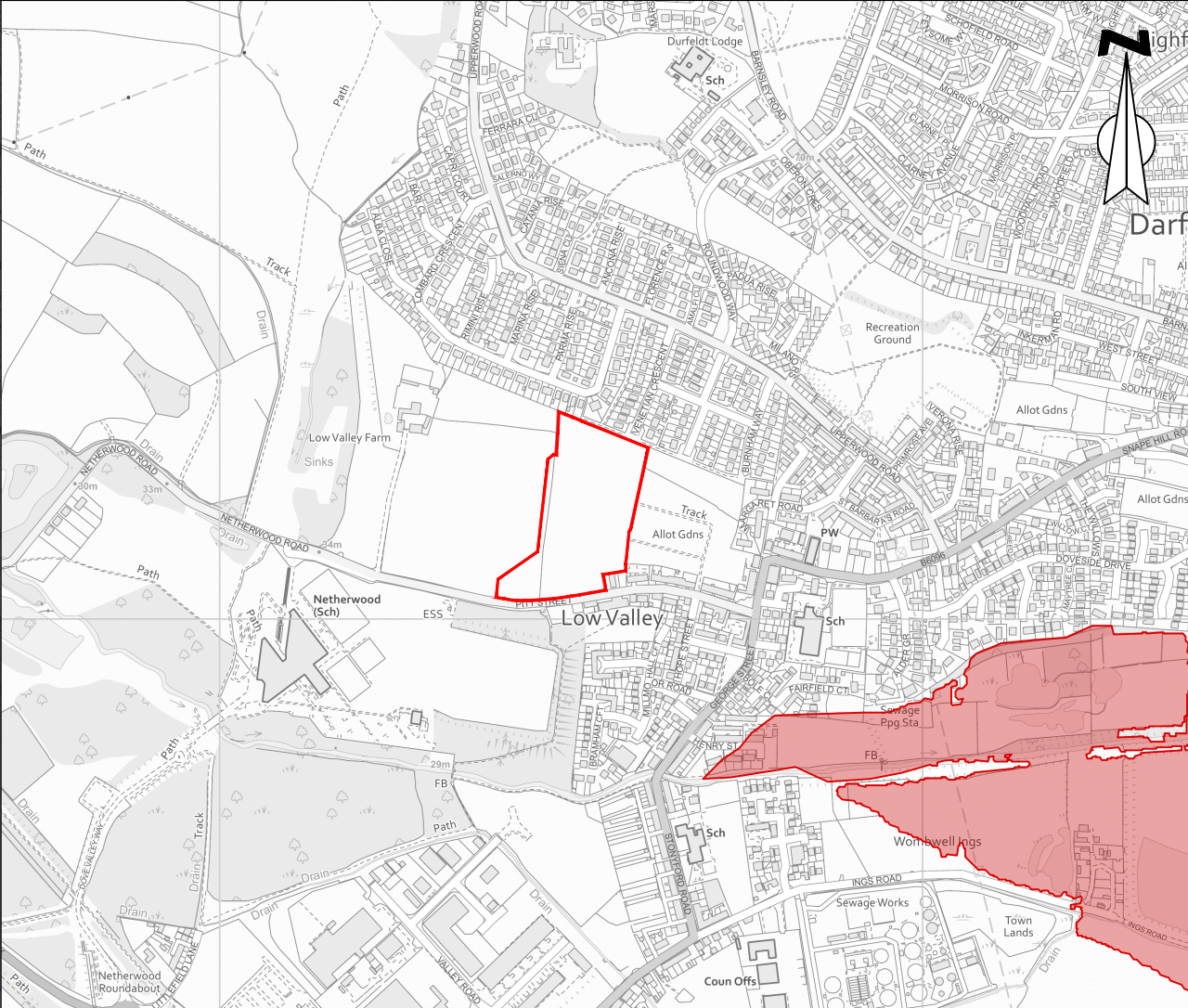
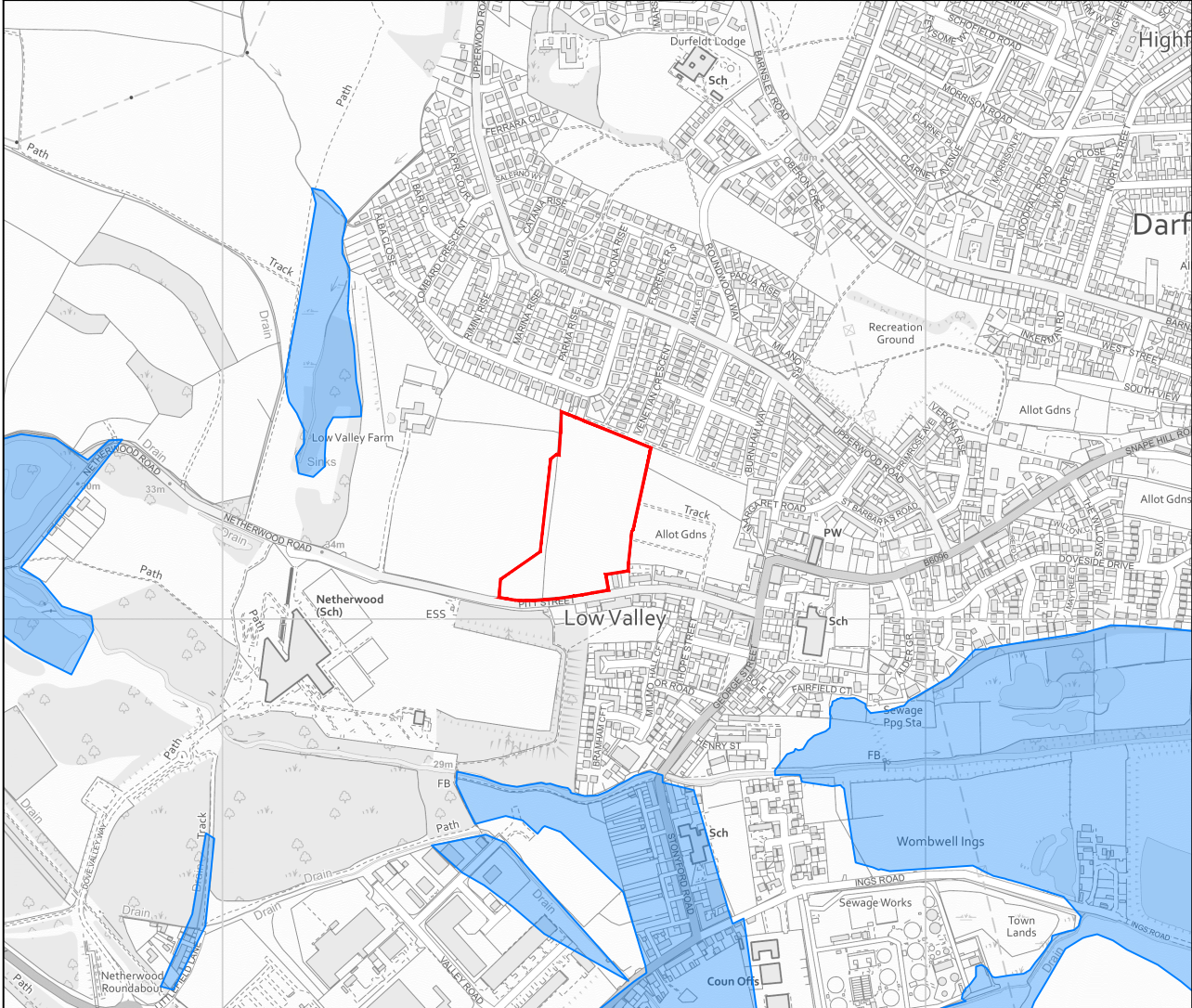
Land North of Pitt Street
Low Valley

TITLE

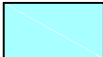
Geological Indicators of Flooding
based on geological deposits

DRAWING NO

CRM.1122.003.HY.D.007



Key

-  Site Boundary
-  Historic Flood Zone
Date of Flood 25.06.2007 - 26.06.2007
-  Historic Flood Zone
Date of Flood 06.11.2000 - 04.12.2000
-  Historic Flood Zone
Date of Flood 19.03.1947 - 22.03.1947



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SCALE
1:10,000 A3

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DATE
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PROJECT
Land North of Pitt Street
Low Valley

TITLE
Historic Flood Events

DRAWING NO
CRM.1122.003.HY.D.008



CLIENT:

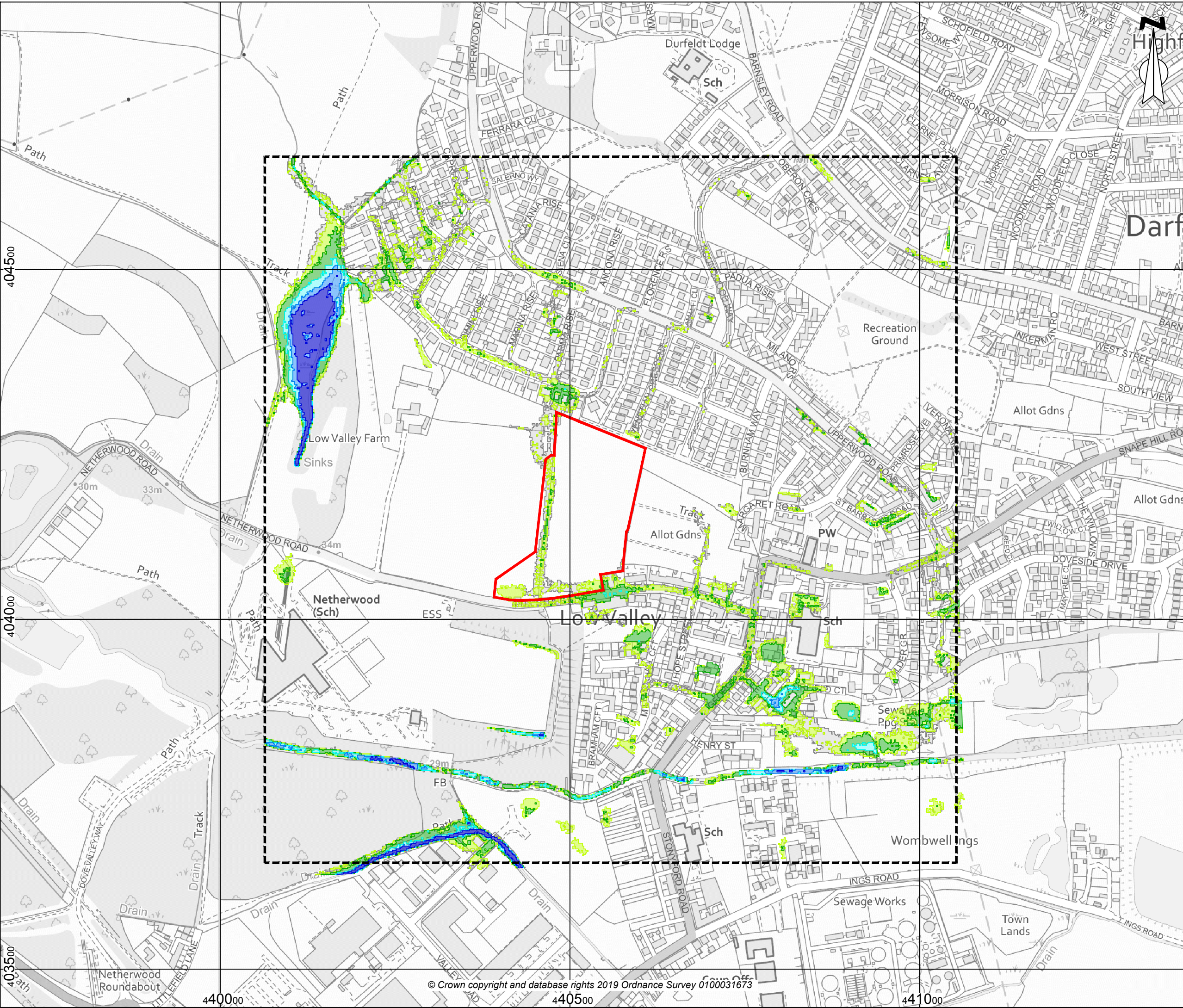
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DATE:

SUBJECT:

TITLE:

DRAWING NO:



Key

- Site Boundary
- Search Extent
- Depth greater than 1.20 m
- Depth 0.90 - 1.20 m
- Depth 0.60 - 0.90 m
- Depth 0.30 - 0.60 m
- Depth 0.15 - 0.30 m
- Depth 0.0 - 0.15 m

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SCALE
1:5000 A3

PROJECT REF
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DRAWN
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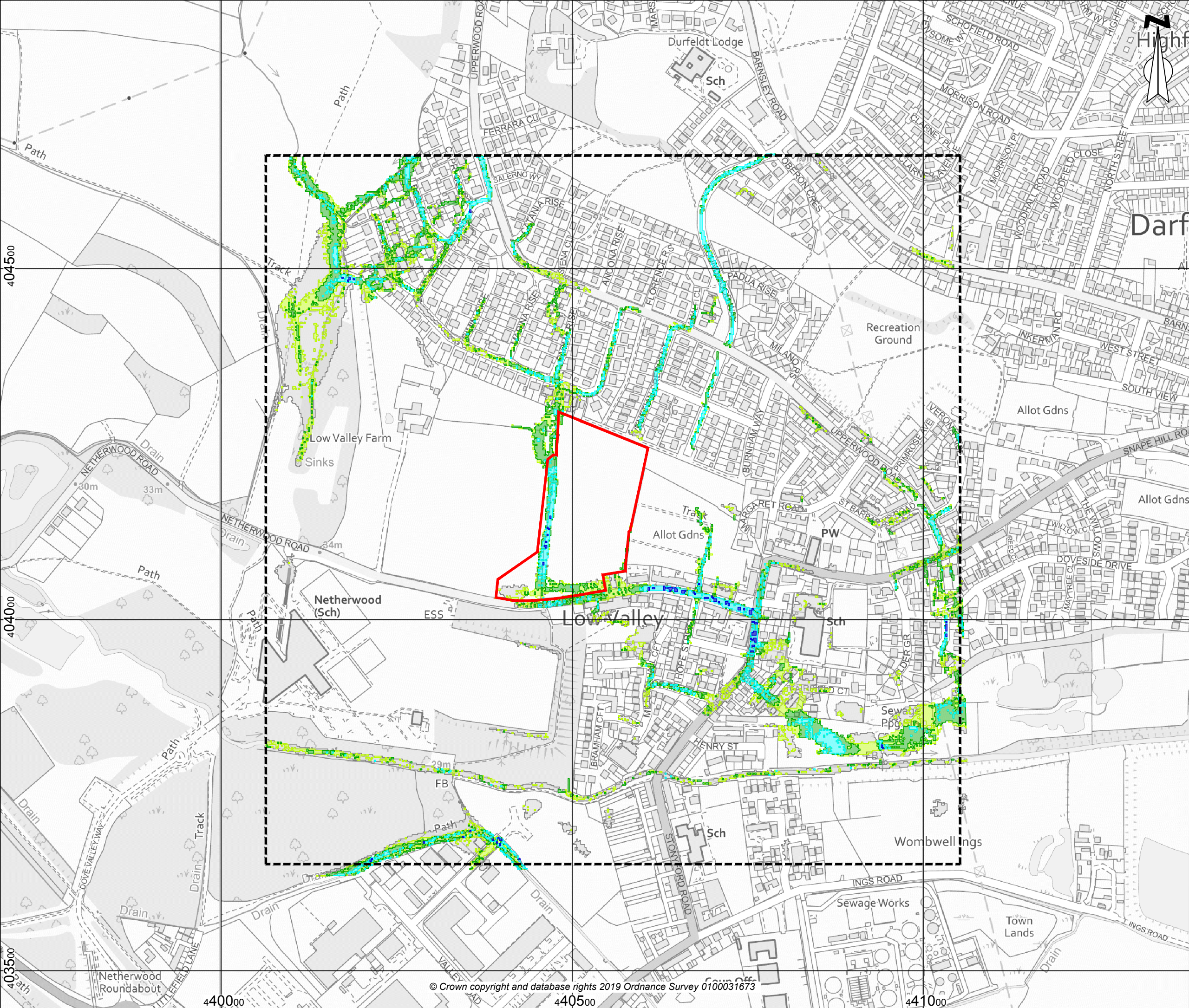
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DATE
June 2019

PROJECT
**Land North of Pitt Street
Low Valley**

TITLE
**Environment Agency 1 in 1000
Year Surface Water Depth**

DRAWING NO
CRM.1122.003.HY.D.009.2



Key

- Site Boundary
- Search Extent
- Velocity 2.00 or greater m/s
- Velocity 1.00 - 2.00 m/s
- Velocity 0.50 - 1.00 m/s
- Velocity 0.25 - 0.50 m/s
- Velocity 0.00 - 0.25 m/s

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SCALE
1:5000 A3

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PROJECT REF
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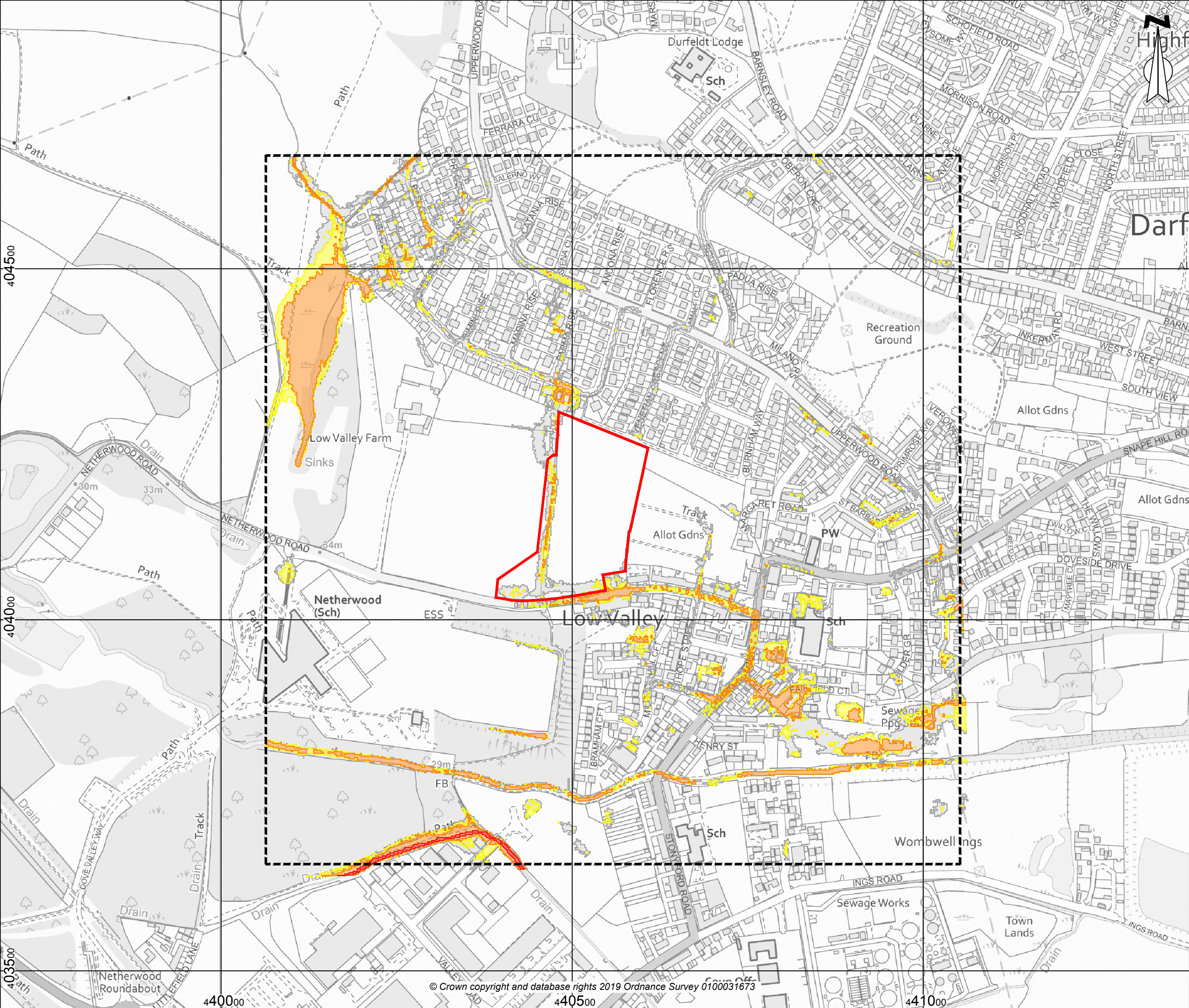
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DATE
June 2019

PROJECT
**Land North of Pitt Street
Low Valley**

TITLE
**Environment Agency 1 in 1000
Year Surface Water Velocity**

DRAWING NO
CRM.1122.003.HY.D.009.3



Key

Site Boundary

Search Extent

Extreme Hazard
≥ 2.0%

Significant Hazard
1.25 - 2.00%

Moderate Hazard
0.75 - 1.25%

Low Hazard
0.50 - 0.75%

High

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SCALE

1:5000 A3

PROJECT REF

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DATE

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PROJECT

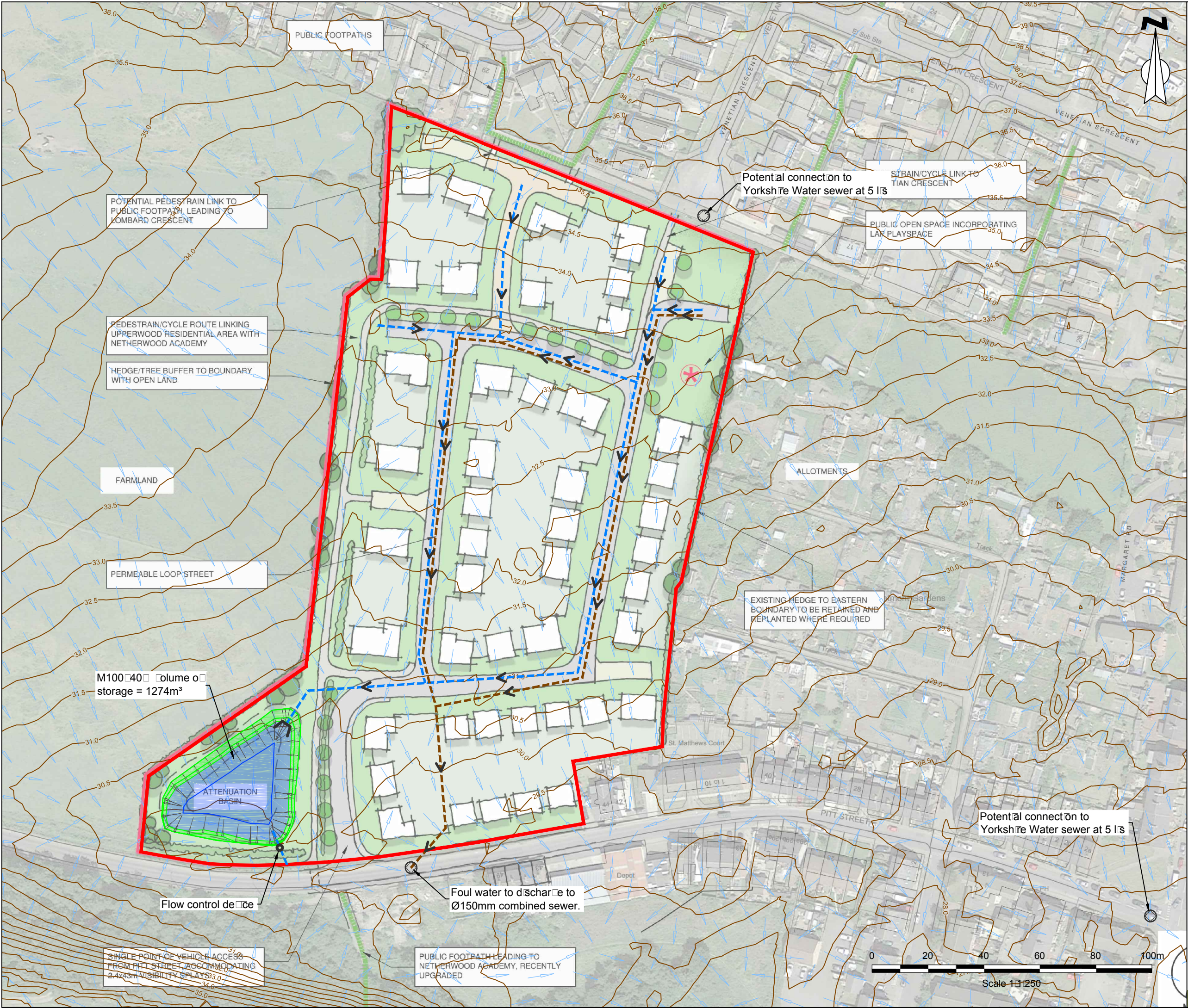
Land North of Pitt Street
Low Valley

TITLE

Environment Agency Surface
Water 1000 Year Hazard Rating

DRAWING NO

CRM.1122.003.HY.D.009.4



Key

- Site Boundary
- Proposed Attenuation Pond
- Proposed Surface Water
- Proposed Foul Water
- Contours 0.5m Interval in AOD
- Surface Water Flow Path

- Notes:**
- Both connections likely to be require pumping
 - Soakaway test needs to be undertaken for approval to discharge to Yorkshire Water Sewer.

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SCALE
1:1250 A3

PROJECT REF
CRM.1122.003

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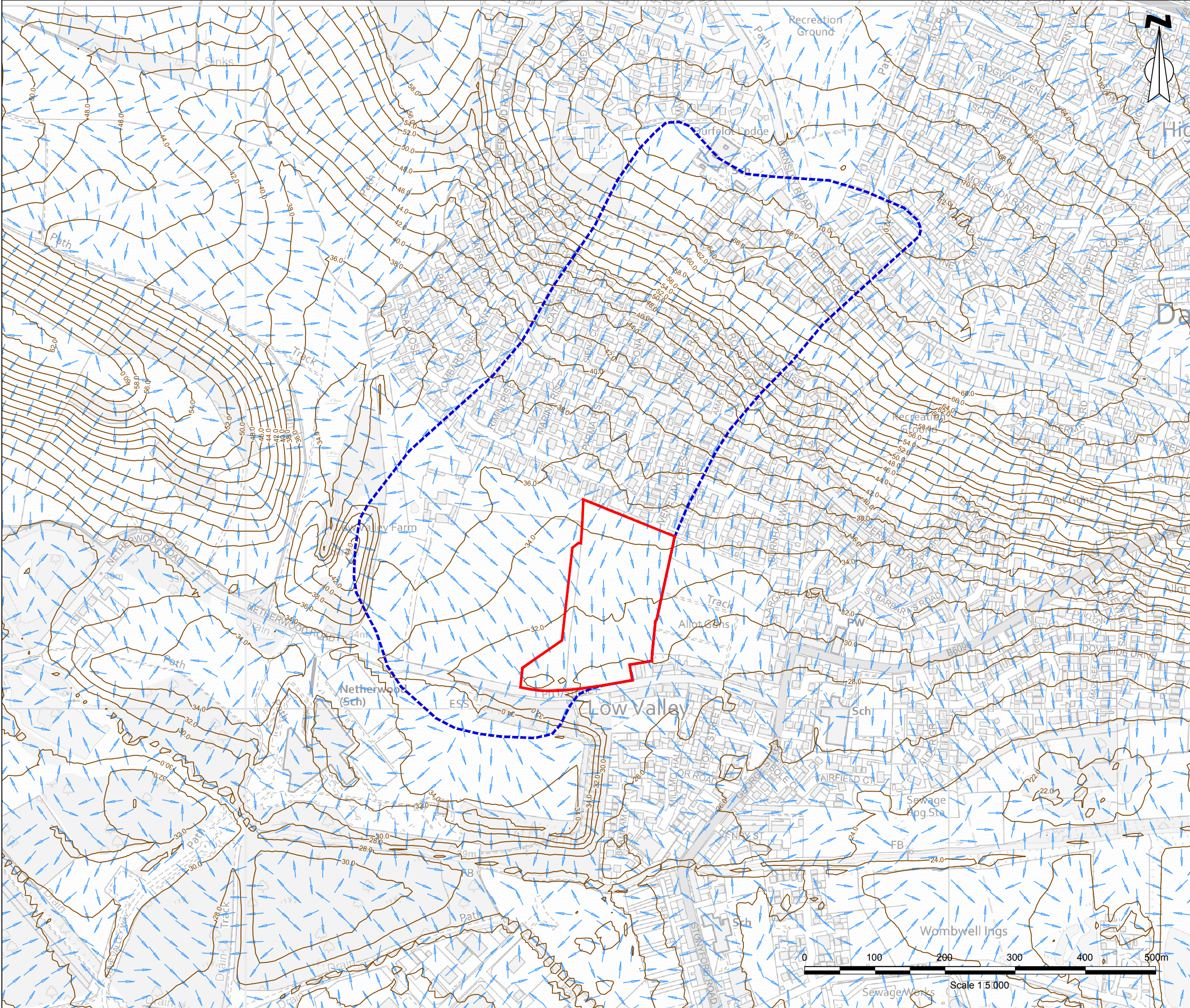
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DATE
June 2019

PROJECT
**Land North of Pitt Street
Low Valley**

TITLE
Indicative Drainage Layout

DRAWING NO
CRM.1122.003.HY.D.010



Key

- Site Boundary
- Catchment Area
Area 32.9 ha
- Contours
2.0m Interval mAOD
- Surface Water Flow Path



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SCALE
1:5,000 A3

PROJECT REF
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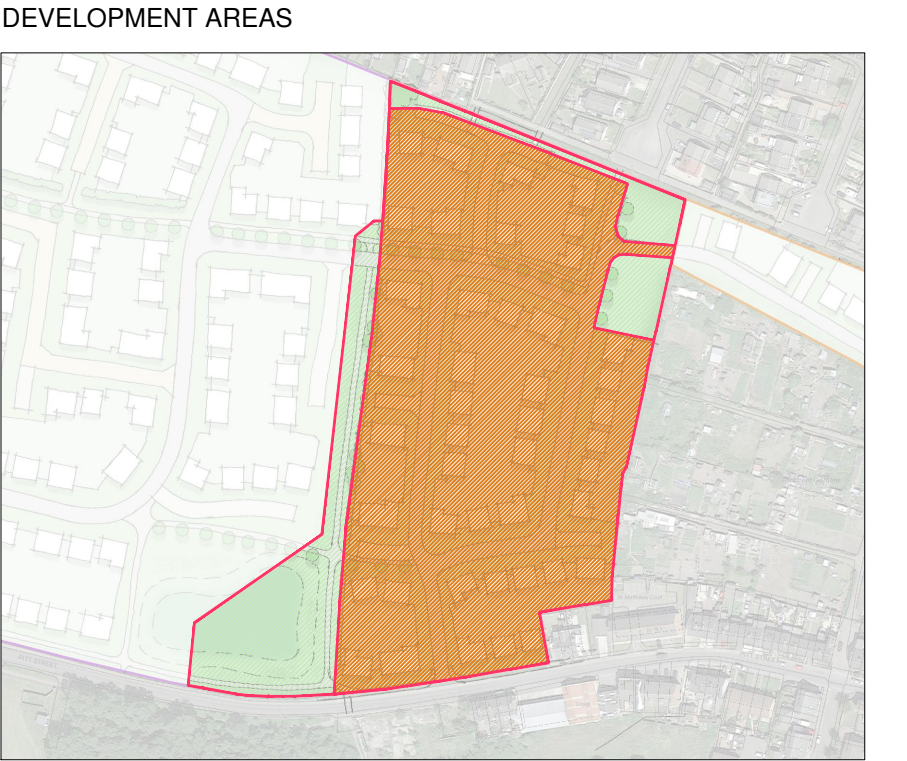
DATE
July 2019

PROJECT
**Land North of Pitt Street
Low Valley**

TITLE
Flow Path Analysis

DRAWING NO
CRM.1122.003.HY.D.011

Appendix 1 – Indicative Layout



DEVELOPMENT AREA = 2.67 HECTARES (107 UNITS @40 DPH)

PUBLIC OPEN SPACE & DRAINAGE = 0.71 HECTARES (26%)

GROSS AREA = 3.38 HECTARES

KEY TO MASTERPLAN:

APPLICATION BOUNDARY

PUBLIC RIGHT OF WAY

C	14.08.19	ACCESS POSITION MOVED FURTHER WEST, AWAY FROM EXISTING PROPERTIES. DWELLINGS RE-ORIENTATED TO OVERLOOK ACCESS & FOOTPATH.	LB	LM
B	27.06.19	EAST-WEST GREEN ROUTE ADDED HEDGE SHOWN RETAINED ON EASTERN BOUNDARY ACCESS POSITION MOVED FURTHER WEST PUBLIC OPEN SPACE ENLARGED & LAP RELOCATED	LB	
A	17.05.19	DRAWING LOCATED ACCORDING TO NEW TOPO SURVEY CONTOURS SHOWN	LB	

REV	DATE	DESCRIPTION	BY	CHECK
-----	------	-------------	----	-------



CLIENT:
HARTWOOD

PROJECT:
LAND AT PITT STREET
WOMBWELL

DRAWING:
ILLUSTRATIVE MASTERPLAN

DRAWING NUMBER:
P09 4270 101

SCALE @ A2:
1:1000

DRAWN:
LB

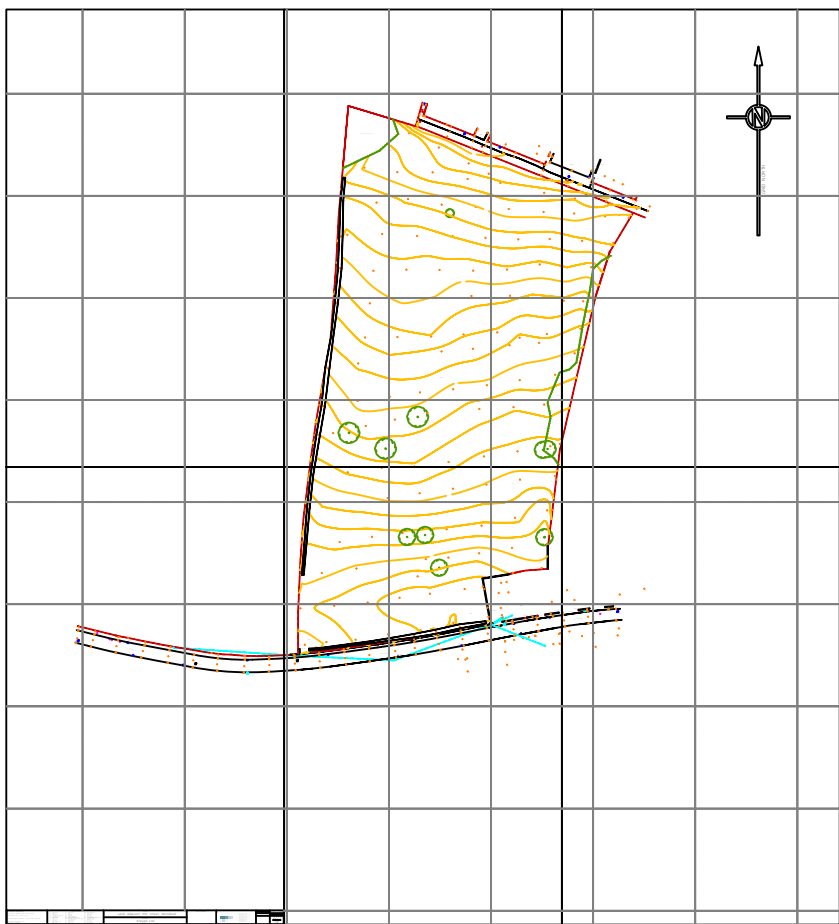
DATE:
13.05.19

CHECKED:

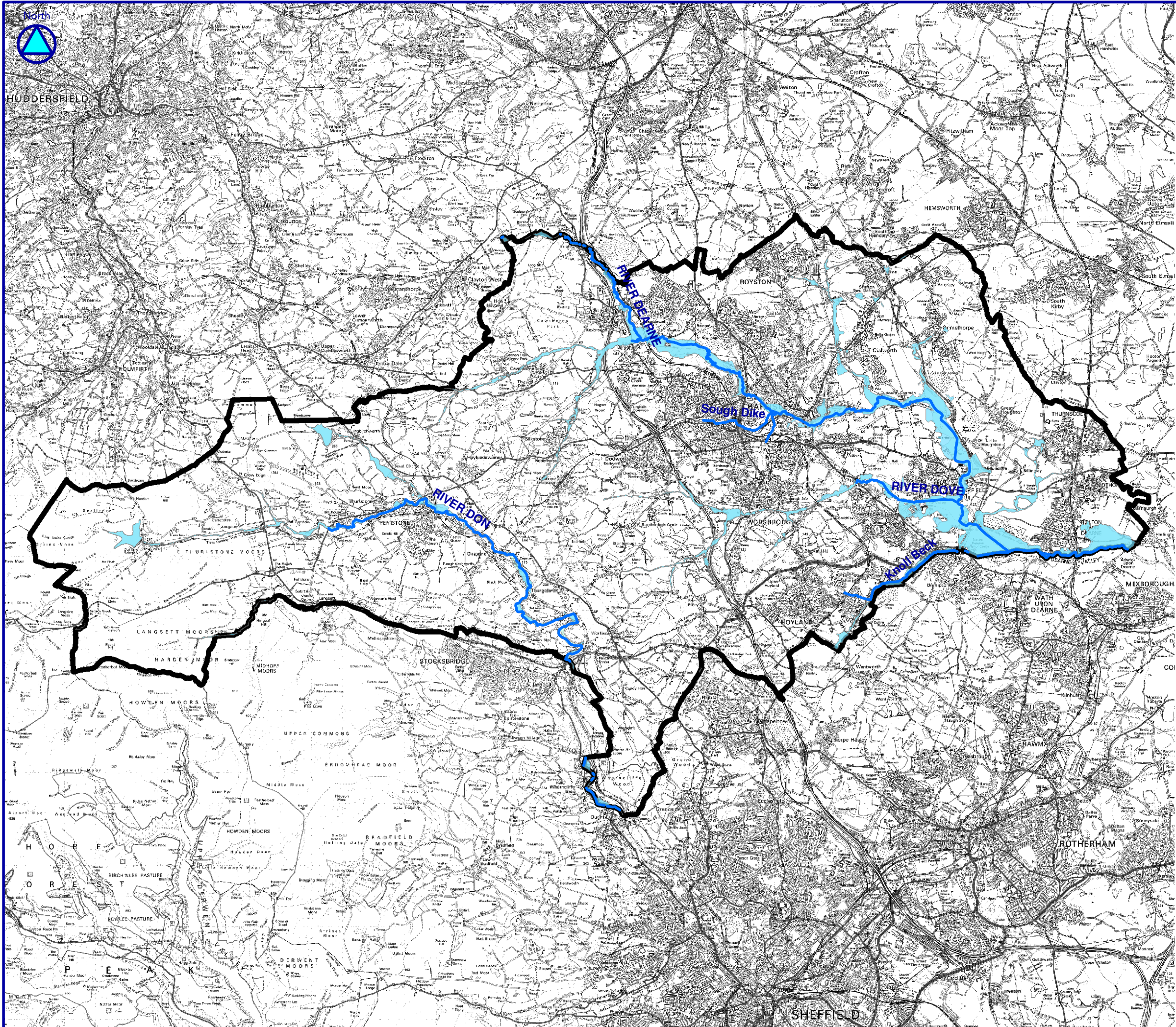
DATE:

14 MARINER COURT / CALDER PARK / WAKEFIELD / WF4 3FL
01924 383322 / www.jrpassoc.co.uk / info@jrpassoc.co.uk
jrpassociates is a trading style of John R Pailey Associates Limited

Appendix 2 – Topographic Survey



Appendix 3 – SFRA Mapping Extracts



LEGEND

1:120,000

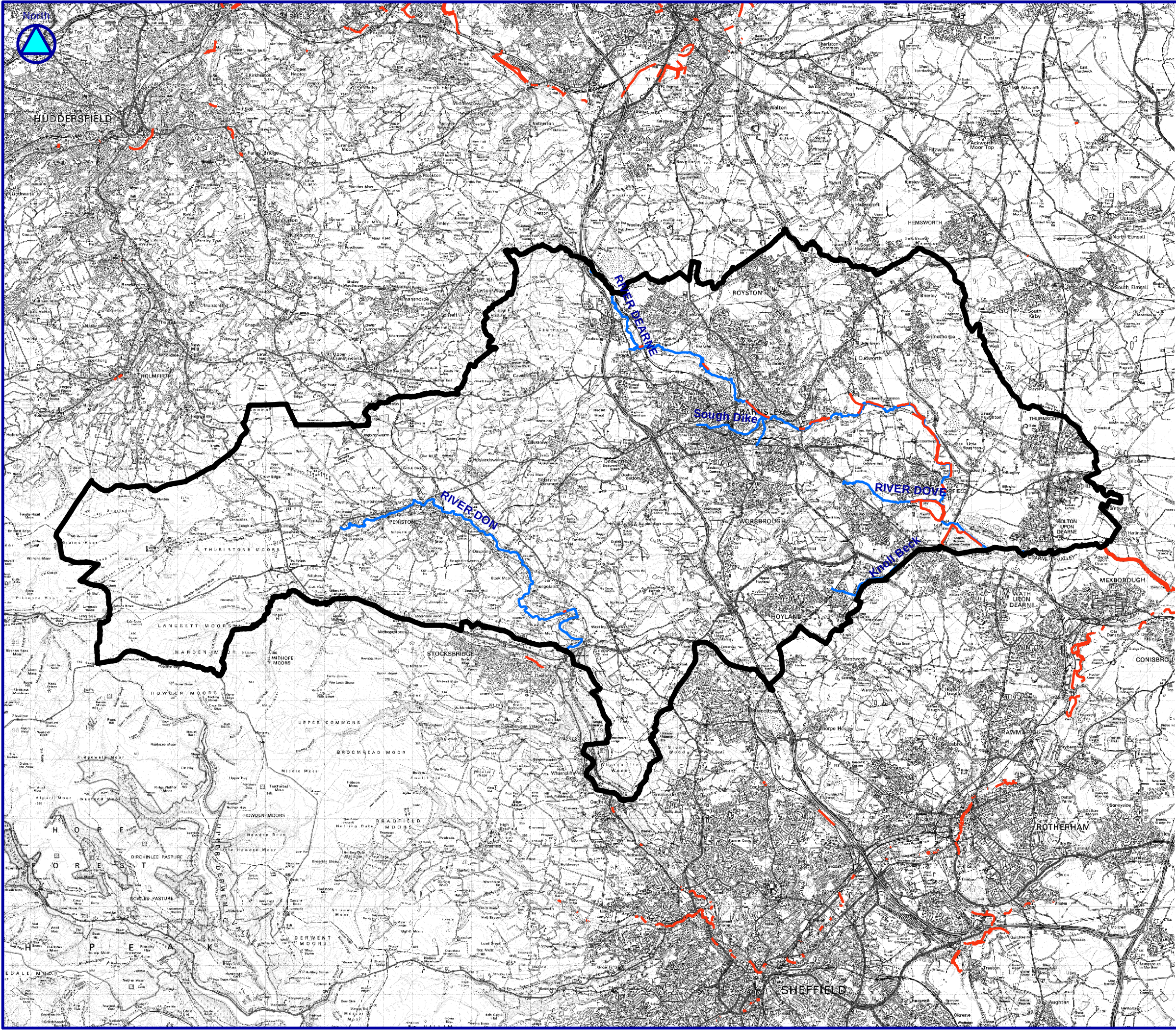
- Main River
- Flood Zone 2
- Barnsley MBC Boundary

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MAP 4

FLOOD ZONE 2



LEGEND

1:126,172



Barnsley MBC Boundary



Main River

Existing Flood Defences



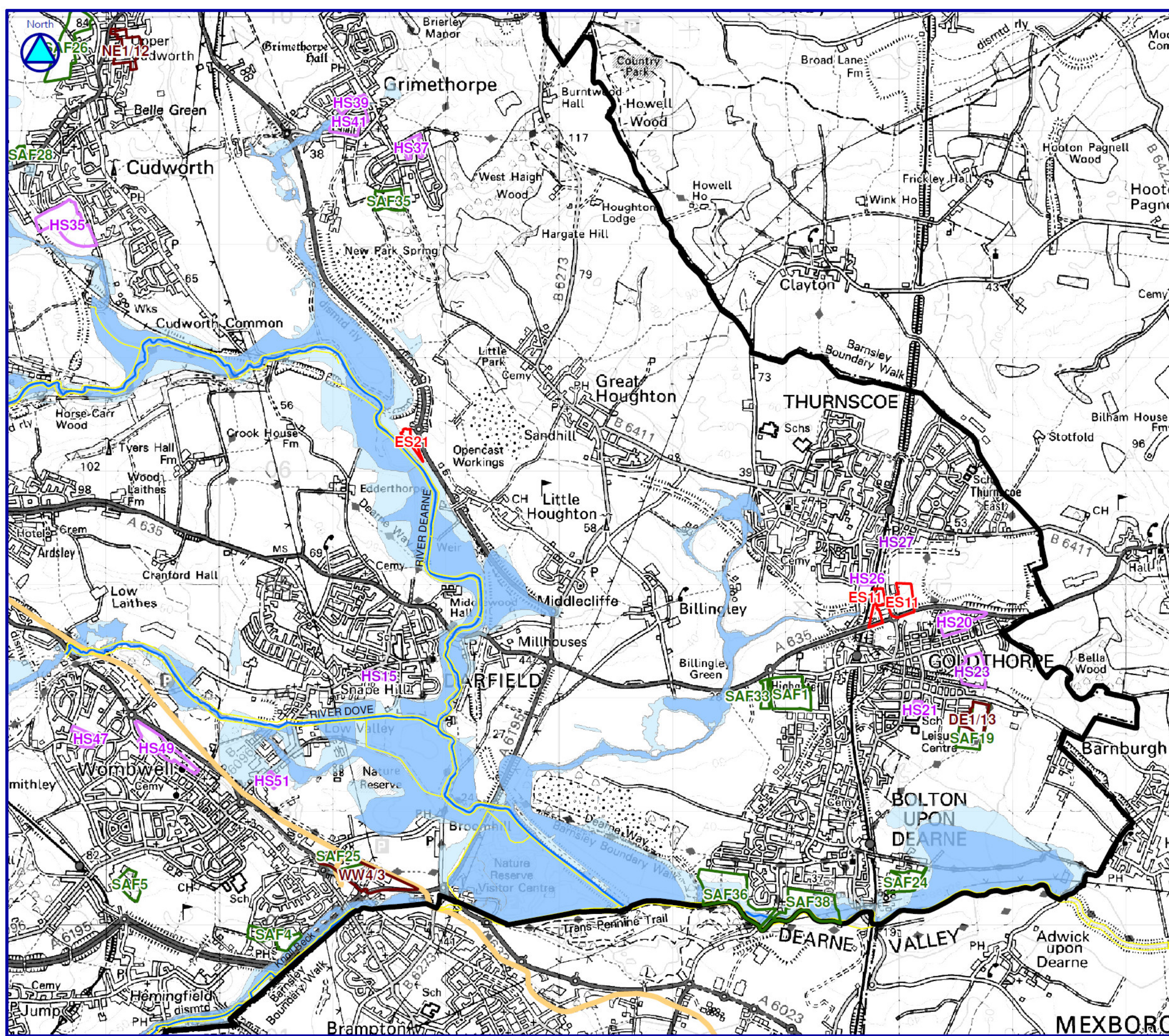
Flood Defence

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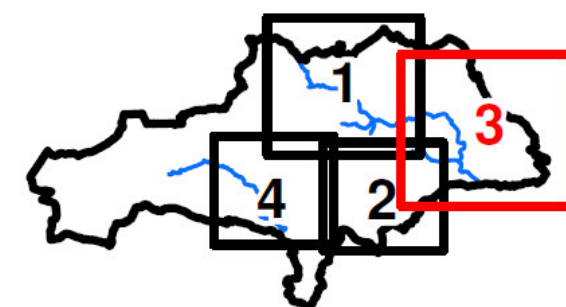


MAP 5

EXISTING DEFENCES



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

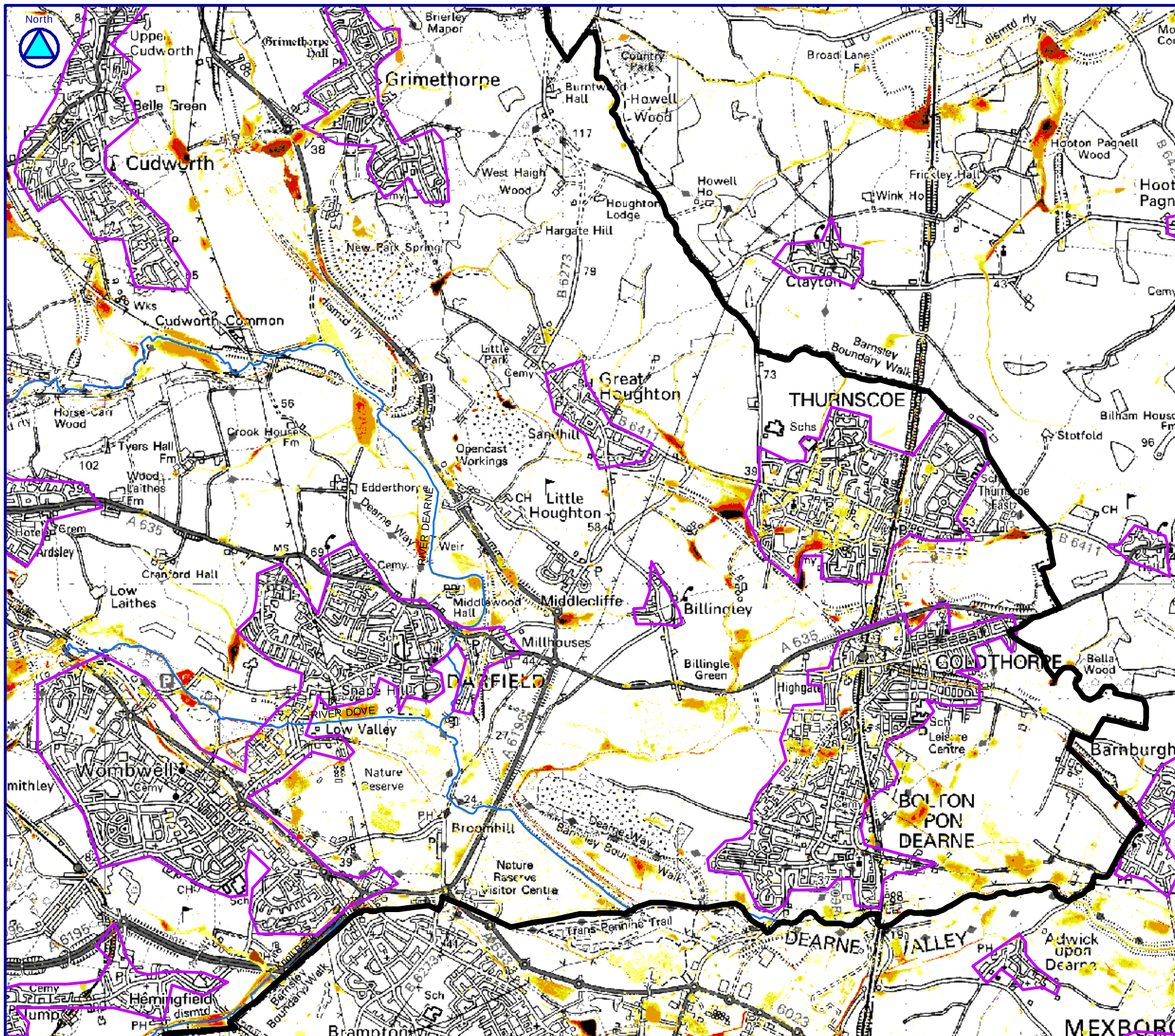
- Employment Sites
- Housing Sites
- UDP Sites
- Safeguarded Land

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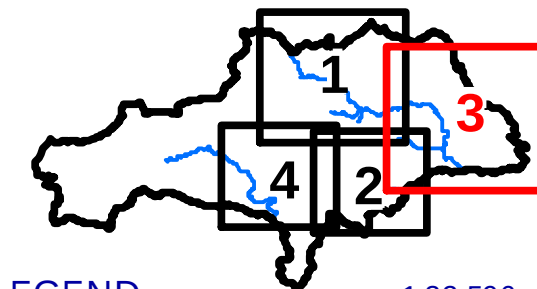


MAP A - 3

PROPOSED DEVELOPMENT SITES
AND FLOOD ZONES



KEYPLAN



LEGEND

1:32,596

- Barnsley MBC Boundary
- 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

Appendix 4 – Yorkshire Water Sewer Asset Plans

YORKSHIRE WATER PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the **general** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.
2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.
3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will **generally** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will **generally** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.
4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.
5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45° and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter (*see illustration below*). Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.
6. All excavation works near to YW apparatus should be by hand digging only.
7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.
8. Adequate support must be provided where any works pass under YW apparatus.
9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.
10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.
11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.
12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.
13. **Under no circumstances** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.
14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversions Works).

15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.
16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.
17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available* " should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.
18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011. Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).
19. Please note that the information supplied on the enclosed plans is reproduced from Ordnance Survey material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number 1000019559.
20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trial holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0345 124 24 24.

Property Identifier

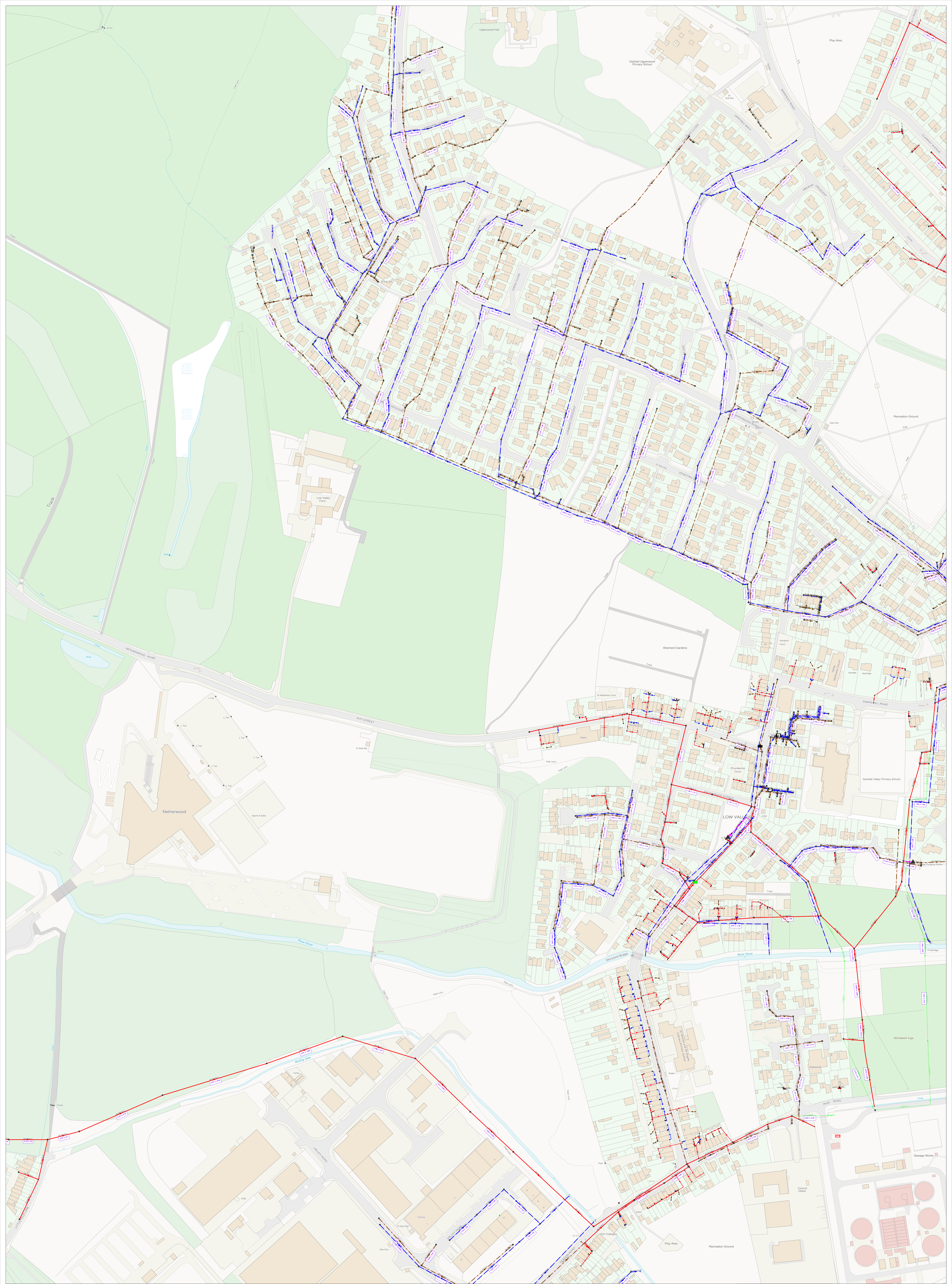


Sewer Legend

	Combined Sewer		S24 Combined Sewer
	Surface Water Sewer		S24 Surface Water Sewer
	Foul Sewer		S24 Foul Sewer
	Section 104 Sewer		Rising Main
	Overflow		Abandoned Sewer
	Syphon Sewer & Vacuum Sewer		
	Pumping Station		Public Sewer Treatment Works

Water Legend

	Water Main 4" and below
	Water Main 4" and above
	Raw Water Main
	Private Water Main
	Fire Hydrant
	Pumping Station



48020 - 42016

**Yorkshire Water**

Map Name : SE09056

Yorkshire Water,
PO Box 900,
Hathers Road,
Bradford BD6 3JZ
Contact Name :
Ms H Wootter
Contact Tel :

Title

Notes

Partial Key

Full Name of
Contracted Sewer - C
Contracted Sewer - S
Public Sewer - PS
Private Sewer - PS

Drawn By : 19022019, 100610
Source : Sewer Network Enquiry

The data is provided as a general guide only and should not be used for any purpose other than that for which it was intended. The data is provided as a general guide only and should not be used for any purpose other than that for which it was intended. The data is provided as a general guide only and should not be used for any purpose other than that for which it was intended.

Appendix 5 – Environment Agency Correspondence

Please find the required modelled data and outputs for **2009 River Dove Model** available in the following link:

<https://ea.sharefile.com/d-se2d0a61307c4ab29>

Please also find below the conditional license relevant to the use of this model.

**RE: Model Data and Outputs for 2009 River Dove Model
Request for information under the Freedom of Information Act 2000 (FOIA) / Environmental Information Regulations 2004 (EIR)**

This information is not available with the Open Government Licence but we may be able to license it to you under the [Environment Agency Conditional Licence](#):

Title: 2009 River Dove Model

- Third Party Rights: Centre for Ecology and Hydrology

The condition below applies to this model:

- 1.1 We are supplying the Information to you without charge in the public interest and request that you likewise agree to the following paragraphs in the public interest
- 1.2 You agree, in the public interest, unless you advise us otherwise in writing within fourteen days of receipt of the data, to supply to the Environment Agency, copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as "the Data".
- 1.3 You agree, in the public interest, unless you advise us otherwise in writing within fourteen days of receipt of the data, to the Environment Agency using the Data or any part thereof for its internal purposes or using it in any way as part of Environment Agency derivative products which it supplies free of charge to others such as incorporation into the Environment Agency's Open Data mapping products.
- 1.4 Please be aware that model data is not raw, factual or measured but comprises of estimations or modelled results based on the data available to us.
- 1.5 For technical reasons the Licensed Content you have been supplied may be greater than strictly necessary for the site or project you are working on and so contain more data than specified above. You must not use such additional Licensed Content.

However, you must first check the supporting information above to determine if the conditions on use are suitable for your purposes. If the conditions are not suitable, this information is not provided with a licence for use, and the data is provided for read right only.

I hope that we have correctly interpreted your request.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.



Planning advice for developers – FAQs

INTRODUCTION

Local planning authorities (LPAs) across Yorkshire are required to consult us on [certain planning applications](#) which affect flood risk, groundwater, waste, or water quality.

If your development falls into one of these categories, we'll be invited to comment on your planning application. Your LPA, when considering your application, will take our comments into account.

We've produced this guidance to summarise the environmental issues we're responsible for. The guidance forms part of our free advice service; if you require site-specific or face-to-face advice, we'll need to recover our costs through our [charged advice service](#). Engaging with us early can help you identify the big issues, reduce the chances of subsequent delays and help you design a more sustainable and attractive development.

DEVELOPMENT AND FLOOD RISK

Is my development proposal at risk of flooding?

The [flood map for planning](#) shows where flooding from rivers and the sea may occur. Whilst this map isn't suitable for a detailed flood risk assessment, it'll show which [flood zone](#) your development is located within and therefore will indicate whether further assessment is needed. You should also refer to your LPA's [strategic flood risk assessment](#) which will provide additional local information on flood risk, including the location of functional floodplain and areas which are susceptible to other sources of flooding such as from surface water or reservoirs.

Will my application need to pass the sequential and exception tests?

Local planning authorities apply the [sequential test](#) to steer development towards areas at the lowest risk of flooding. If your proposal is located within flood zones 2 or 3, you should contact your LPA to discuss the sequential test **before** submitting your application. The LPA may require you to submit information with your application in support of the sequential test.

If the LPA confirm that the sequential test has ruled out steering the development to lower risk sites, the development may also need to pass the [exception test](#) by demonstrating that its sustainability benefits outweigh flood risk and that it can be made safe for its lifetime, through the production of a site-specific flood risk assessment. [Planning practice guidance](#) advises when an exception test will be required, which will depend on the [vulnerability of the development](#) and the flood zone it lies within.

Do I need to submit a flood risk assessment with my planning application?

You'll need to submit a flood risk assessment if your application lies within flood zones 2 or 3 or is over 1 hectare within flood zone 1. You'll also need to submit an assessment if your proposal could be affected by sources of flooding other than from rivers or the sea. For certain lower risk applications, we've provided '[flood risk standing advice](#)' which enables local planning authorities to assess flood risk assessments without the need to consult us.

What information should I include in my flood risk assessment?

We recommend that you refer to the checklist for a [site-specific flood risk assessment](#) for detailed advice on what to include in your flood risk assessment. Alongside referring to your LPA's strategic flood risk assessment, you should contact your LPA to find out whether there are any development guidelines which are specific to your locality.

Can I undertake my own flood risk assessment?

Your FRA must be appropriate to the scale, nature and location of the development whilst being credible and fit-for-purpose. Whilst it's possible to undertake your own assessment, most applicants employ suitably experienced professionals. We're not able to recommend specific consultants, but a simple web search should help you source a competent individual or company.

Do I need to consider how climate change will affect my proposal's flood risk?

Yes, you should demonstrate how flood risk will be managed now and over the development's lifetime, taking climate change into account. Please refer to the following [guidance](#) when undertaking your flood risk assessment. In some cases we'll hold the climate change flood data you need. In others you'll need to undertake your own analysis to understand the impacts.

Where can I get modelled or historic flood levels from?

Email our Customers and Engagement team (neyorkshire@environment-agency.gov.uk) to find out whether we have any modelled or historic flood levels available for your development site. A list of the packages of information we're able to provide can be found under the 'get information to complete an assessment' section of the [planning practice guidance](#). They'll aim to provide this information within 20 days. We no longer charge for providing this information.

The risk portrayed by your flood map doesn't seem to reflect the site's actual risk. How do I 'challenge' your flood map?

If you have evidence suggesting that our flood map is inaccurate, please contact our Customers and Engagement team (neyorkshire@environment-agency.gov.uk) who will provide you with any existing data we hold. To formally contest our flood zones, you'll need to submit supporting evidence, such as digital copies of a topographic survey or modelling for quality assurance purposes. Digital files of the proposed new flood zones in ArcMap or MapInfo format should also be supplied. Any new outline data you submit must conform to our flood zones policy, copies of which are available on request.

Whilst we'll usually be happy to review any topographical survey or model prior to the application being submitted, we would have to recover our costs for this work. In some cases where work to review and update our existing models is already underway, we may decline to consider a challenge.

As we have to be certain that the data which informs our flood map is fit-for-purpose, any revisions will need to meet stringent quality checks.

SURFACE WATER AND DRAINAGE

Who's responsible for managing surface water?

[Lead local flood authorities](#) are responsible for providing advice on the management of surface water resulting from new [major](#) development. [Internal drainage boards](#), where established, have permissive powers to manage water levels within their drainage districts, so also play a key role in managing surface water.

Will I need to provide surface water storage and limit the discharge rate?

You should contact your lead local flood authority to discuss surface water discharge rates and storage requirements. Typically, they'll ask that your development does not increase run-off and limits the discharge to the existing greenfield run-off rate (usually 1.4l/s/ha if not calculated).

Do I need to install sustainable drainage systems?

[Sustainable Drainage Systems \(SuDS\)](#) should always be carefully considered in discussion with your lead local flood authority. A SuDS scheme can reduce flood risk, improve water quality, create better habitats for wildlife, and produce pleasant, more amenable places for people.

Infiltration drainage must not, however, pose a risk to groundwater quality. All infiltration SuDS must:

- Meet the groundwater protection criteria set out on [GOV.UK](https://www.gov.uk)
- Not be constructed in ground affected by contamination

Who should I contact about connecting my development to the mains sewer?

Talk to your water company about connecting to their sewerage system. Here are some contact details for water companies operating in the Yorkshire Environment Agency area:

Yorkshire Water	planningconsultation@yorkshirewater.co.uk
Northumbrian Water	developmentenquiries@nwl.co.uk
Severn Trent Water	new.connections@severntrent.co.uk

My development is a long way from the mains sewer. Can I install a 'non-mains' drainage system, such as a package treatment plant?

New development should connect to the public mains sewer wherever possible. Individual treatment plants can deteriorate local water quality and are more challenging to monitor and regulate. If you can't connect to the mains sewer, your planning submission should outline how you will deal with foul drainage discharge. You should include evidence as to why it is not possible to connect to the mains system, including details of any prohibitive costs. Please

note that some 'non-mains' foul water drainage systems will require an environmental permit, irrespective of any planning approval.

OTHER ENVIRONMENTAL CONSIDERATIONS

What other environmental issues will you consider with my planning application?

Your planning application will need to demonstrate that any environmental risks can be managed, through design and construction, for the development's lifetime. Alongside flood risk, the key environmental risks we'll consider are:

- **[Land Contamination](#)**
We're mainly interested in those sites where there is a risk of pollution to controlled waters. You should investigate any contamination to see whether the environmental risk or cost of clean-up (remediation) would hinder your proposal. If contamination is known or suspected, a desktop study, investigation, remediation and other works may be required to enable safe development. Our [model procedures for the management of land contamination](#) provide further information.
- **[Pollution prevention](#)**
Your application should demonstrate how you'll minimise the risk of pollution from all aspects of your development, including construction and

operation phases. Groundwater can be vulnerable to pollution, as well as rivers and streams. Some areas (source protection zones and aquifers) are especially sensitive to pollutants as they typically supply public drinking water. To find out whether your development is located in an area sensitive to groundwater pollution, visit our interactive [maps](#). Advice on groundwater protection can be found on [GOV.UK](#)

- **Fisheries, biodiversity, geomorphology and protected species**

If your proposal is likely to affect the ecology of a main river, you'll need to carry out a risk assessment. This assessment should show that your development can proceed without demonstrable harm, and should propose mitigation, compensation or enhancements where required. A survey should be carried out if any protected species are thought to be nearby. If this survey confirms the presence of protected species or their habitat, measures should be taken to manage the development's risks. Natural England are the statutory consultee for other biodiversity-related matters. Further information on their remit can be found on [GOV.UK](#)

- **Water framework directive**

If your proposal affects ground or surface waterbodies, you'll need to consider the [Water Framework Directive](#) (WFD) and the actions set out in the [Humber River Basin Management Plan](#). You'll also need to submit a [WFD Assessment](#) demonstrating how the development will prevent deterioration and improve the waterbody's ecological status.

- **River buffer zone**

Your development should ensure that an 8m strip of land (planted with locally appropriate, native species) is left undisturbed next to the bank of any main river. This 'river corridor' will improve habitat connectivity and will ensure we're able to access the bank for any future flood defence construction and maintenance.

- **Culverting**

We're opposed to culverting. Culverts degrade watercourses' ecology and prevent the movement of wildlife and fish. As culverts can easily become blocked, they increase flood risk. They're also difficult to inspect and maintain. We may object to any planning applications involving culverting on a main river and may refuse to grant an environmental permit. Existing culverts should be removed and the river channel and bankside habitat reinstated to restore the ecological continuity of the river channel and its corridor.

Will I need any other Environment Agency permits for my development?

You might need an environmental permit if your development manages or produces waste or emissions that pollute the air, water or land or is work that affects a [main river](#) or a sea defence. The lead local flood authority is responsible for any consents relating to ordinary watercourses.

The [Environmental Permitting Regulations \(England and Wales\) 2015](#) cover water discharges, groundwater activities, flood risk activities, radioactive substances, waste, mining waste and installations. They also include provision for a number of directives including batteries. Further information, including contact details for further permitting related enquiries, can be found [here](#).

As planning and permitting decisions are often closely linked, we have issued detailed [guidance for developments requiring planning permission and environmental permits](#). This guidance explains how, when responding to planning consultations that require environmental permits, we will advise of three possible positions:

- No major permitting concerns
- More detailed consideration is required and parallel tracking is recommended
- Don't proceed – unlikely to grant a permit.

PRE-APPLICATION ADVICE

Can you provide site-specific advice, review a submission document, or attend a site meeting before I submit my planning application?

We encourage you to seek pre-application advice as it can help you solve key environmental issues early, reduce the chance of an objection and help you design a more sustainable development. If you'd like to take advantage of this service, please email our Sustainable Places team so that we can provide further details and estimated costs.

Please note that any pre-application guidance we provide doesn't represent our final view in relation to any future planning application. We recommend that you seek your own expert advice prior to submitting your application.

Who should I contact for further information?

Yorkshire planning enquiries: sp-yorkshire@environment-agency.gov.uk

General enquiries: 03708 506 506

Environment Agency, Lateral, 8 City Walk, Leeds LS11 9AT
<https://www.gov.uk/government/organisations/environment-agency>

The Flood Map for Planning

The Environment Agency provides the Flood Map (see enclosed extract).

What is the Flood Map for Planning?

The Flood Map for Planning provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map for Planning shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences
 - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
 - For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.
2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:
 - indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.
 - and/or indicates the greatest recorded historic flood, whichever is greater.
3. Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.
4. Areas benefiting from flood defences - areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would flood.

Flood History

To the best of our knowledge there is no known flood history for this site. However, in close proximity to this location we do have some flood history available (see enclosed map). The extent of flooding, and/or flood level information is only shown for those watercourses surveyed after the flood. Other flooding may have occurred which is not shown. This is the best information currently available.

Assets

Asset Location Map

Please find attached asset map(s) showing location of all (Agency and non Agency maintained) flood defences and channels.

Description of Works

See attached table with description of the defences and structures shown on the above drawing, including condition ratings, upstream and downstream crest levels, where available.

Risk of Flooding – Environment Agency Defences

The risk of flooding in this area is now reduced by the presence of flood defences that we maintain, but there still is a residual risk of flooding if these were to breach or be overtopped by a flood greater than that for which they were designed.

Risk of Flooding – Privately Maintained Defences

You will see that the Environment Agency does not maintain any of those defences. However we undertake regular risk based visual inspections. We do not hold design levels and have no height information on these defences or structures.

Asset Condition Ratings

The performance of a flood defence asset is recorded as the condition of the asset. Our asset inspectors subjectively assess the conditions of assets (during visual inspection site visits) with reference to a national standard template. Each asset is given a rating between one and five with one being very good condition and five being very poor. A condition rating of 3, or 'fair' is the minimal acceptable standard for a critical asset, such as a defence wall that protects properties. We are striving to improve all assets below 'fair' to an acceptable standard.

Asset inspections are done on average every six months, although some critical assets are assessed on a more regular basis. It is possible that adjacent assets are inspected on different dates, which may result in two assets of a similar state of repair having different condition ratings.

Condition ratings of assets may also be affected by the time of year the surveys are conducted, as vegetation may obscure the asset in the summer months, or accessibility may be an issue during winter months. These factors would not usually affect the recorded condition rating of an asset unless the asset is on a borderline between two ratings.

Asset Standard of Protection

Please note that the provided Design Standard of Protection is an estimate and should not be relied on. Please note that where available the defended flood extents provide more reliable information relating to the protection offered by the defence (i.e. at which return period the water levels are likely to overtop the defence). If available and required the defended flood extents can be provided on request.

Modelling

2009 River Dove Study

We have provided you with a copy of the Model Data Files and Outputs for the **2009 River Dove Model**. Also provided is a copy of the Modelling Reports (Product 5). They can be downloaded from the ShareFile link below:

<https://ea.sharefile.com/d-se2d0a61307c4ab29>

There is a Conditional Data Licence associated with the provision of the Model. This sets out the Terms and Conditions for the uses of the Data.

Climate Change

Please note that new guidance on climate change allowances for Flood Risk Assessments has been published in February 2016.

The new guidelines are available from:

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Bespoke Flood Risk Assessment (FRA) advice:

If the pre-application advice is required with regards the preparation of a site-specific Flood Risk Assessment, this can be requested via the Yorkshire Sustainable Places team (email: sp-yorkshire@environment-agency.gov.uk). Charges may apply for any advice that is provided, this currently stands at £100 per hour per person. The [.gov.uk](https://www.gov.uk) pages provide a good starting point on what to include within a site-specific Flood Risk Assessment and can be accessed via <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>. A site-specific Flood Risk Assessment will need to consider flood risks from all sources, including those associated with defence failure (e.g. breach) and accounting for the predicted impacts as a result of climate change. Please contact the Sustainable Places team if you require advice on how to include these within a Flood Risk Assessment.

Other

Surface Water Map

In partnership with Local Authorities, we publish Risk of flooding from surface water maps. These were updated in December 2013. If you would like a copy of the map for your area, please contact us again. Otherwise the map can be viewed online at :

<https://flood-warning-information.service.gov.uk/long-term-flood-risk/#x=438988&y=406600&scale=2>

Surface Water Drainage

The Lead Local Flood Authority is the statutory consultee for planning matters relating to surface water drainage, therefore it is recommended they should be consulted separately regarding this.

Surface water discharge from new development should ideally 'mimic' the pre-development situation using a sustainable drainage system so that the flow and volume of water in watercourses is not increased.

A permit may be required, under the Environmental Permitting Regulations 2010 from the Environment Agency for any proposed works or structures in, under, over or within eight metres of a 'main river' (e.g. a new outfall). A permit is separate to and in addition to any planning permission granted. Further details and guidance are available on the GOV.UK website: <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

Risk of Flooding from Reservoirs Map

Outlines and simplified depth and velocity maps can be viewed on our website:

<https://flood-warning-information.service.gov.uk/long-term-flood-risk/#x=438988&y=406600&scale=2>

Please, zoom into the location of interest, and then click on the inundated location for details. As a result a list of reservoirs will be provided with supporting information and a links to other data, such as estimated depths and speed of flooding, at the bottom of the result page.

A map of showing the outlines can also be provided on request.

Flood Warning

The site is not covered by a Flood Warning.

LIDAR Data

Please note that our LiDAR data is now available free of charge (Open Data) from <http://environment.data.gov.uk/ds/survey/index.jsp#/survey> (once zoomed to the relevant location the available LiDAR products will be listed below the map).

Two LIDAR products are available:

1. Tiled LIDAR data - The full tiled dataset consists of historic LIDAR data which has been gathered since 1998. For some areas we have carried out repeat surveys and data is available in a range of resolutions.

2. Composite LIDAR data - The composite dataset is derived from a combination of our full tiled dataset which has been merged and re-sampled to give the best possible spatial coverage.

Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.

The Environment Agency owns two LIDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.

The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

For more information on Rights and Responsibilities of a riverside owner, you can visit our website at:

<https://www.gov.uk/guidance/owning-a-watercourse>

Ordnance Survey Data

Under the terms of our licence agreement with the Ordnance Survey, we are unable to supply the OS data. Under this agreement we can only supply OS data to consultants/contractors carrying out work on our behalf.

Flood Portal

It's a new 'one-stop shop' web portal providing guidance and information on flood risk management in the UK. Arup have written and designed the site, in conjunction with CIRIA, the Local Government Association, the EA and Defra, primarily as a resource for local authority officers, flood risk management professionals, and others with an interest in flood risk. It's a part of the Capacity Building Strategy. <http://www.local.gov.uk/floodportal>

Groundwater Flooding

Unfortunately, we do not hold any information relating to groundwater flooding in this area. Mapping the risk of flooding from groundwater is complex and is currently not possible. There are no flood risk maps for groundwater. If you want to find out if this area could be at risk of flooding from groundwater or may have flooded in the past you should contact your Lead Local Flood Authority. If they do not have any information on the risk in your area you may find it helpful to contact your parish or town council or any Flood Wardens or Flood Action Groups in your area.

Sustainable drainage systems (SuDS)

The Environment Agency's position on the use of SuDS is outlined under position statement G13 of the document '[The Environment Agency's Approach to Groundwater Protection](#)'

Source Protection Zones (SPZs)

There are no Source Protection Zones at the site.

Contaminated Land

We are not aware of any land contamination at the site however the local council are the proprietors of information about land contamination. We recommend you contact the Environmental Health team at Barnsley Metropolitan Borough Council. Website: <https://www.barnsley.gov.uk/services/contact-us/> Telephone: 01226 772468

Further data layers relevant to the implementation of SuDs are publicly available at <https://magic.defra.gov.uk/MagicMap.aspx>.

The British Geological Survey also holds further information regarding the suitability of using SuDs at a given location and can produce reports as a paid service <https://www.bgs.ac.uk/research/engineeringGeology/urbanGeoscience/suds/information.html>. Detailed assessment pertaining to the suitability of a given location to the use of SuDs should be sought from a consulting engineer.

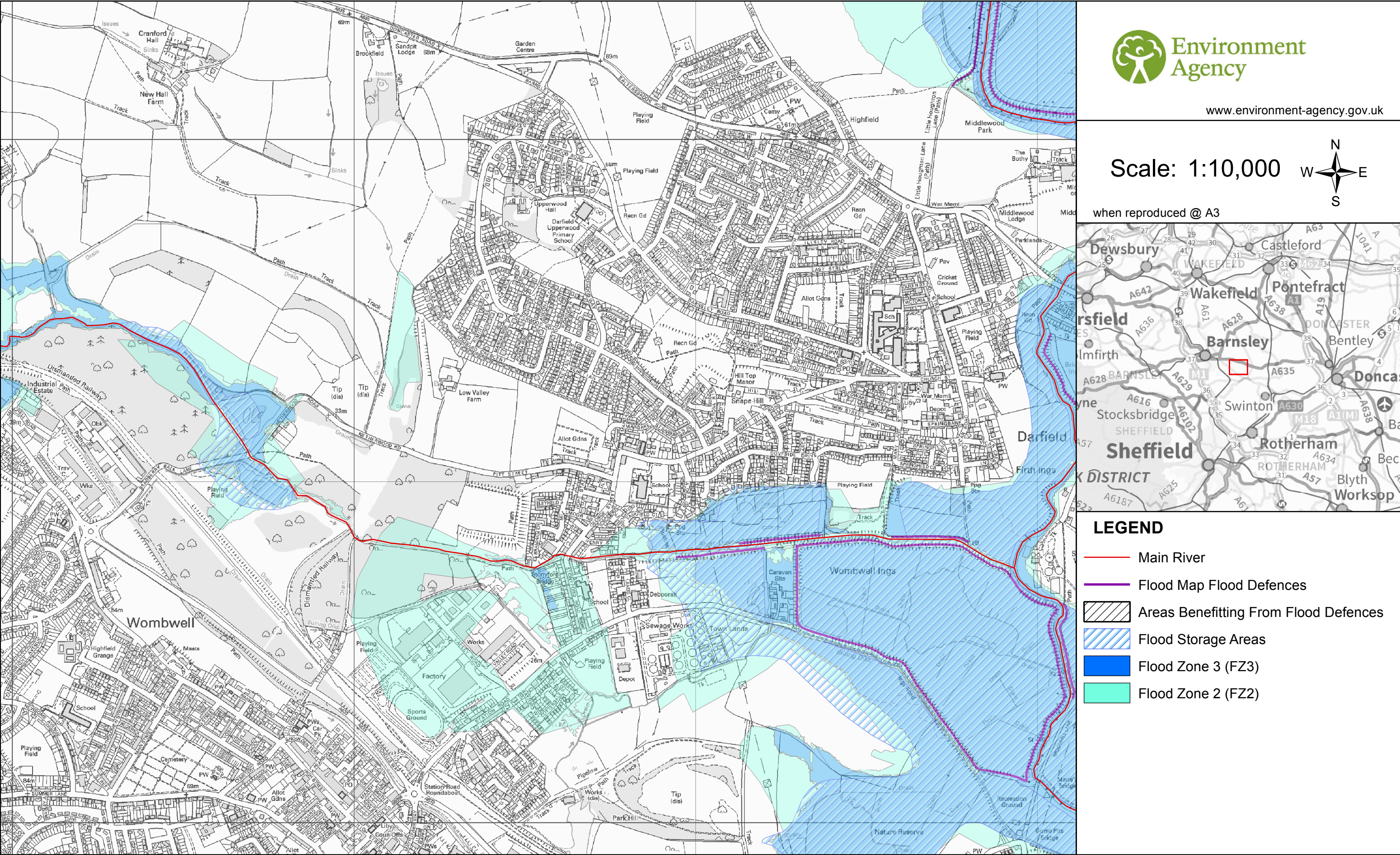
If you are still unsure whether this area could be affected by flooding from groundwater, then you may wish to carry out a flood risk assessment. To do this, you will need to contact a professional such as a consulting engineer or chartered surveyor

Environmental Sensitive Receptors

We do not hold any data of sensitive species on the site in question. The River Dove is listed as an eel migratory route. The section of woodland to the south of the site, and the north of the River Dove is also listed as deciduous woodland. There are water vole and willow tit records within 1km of the site. The consultant should contact the Local Records Centre to obtain a full list of species records in the area.

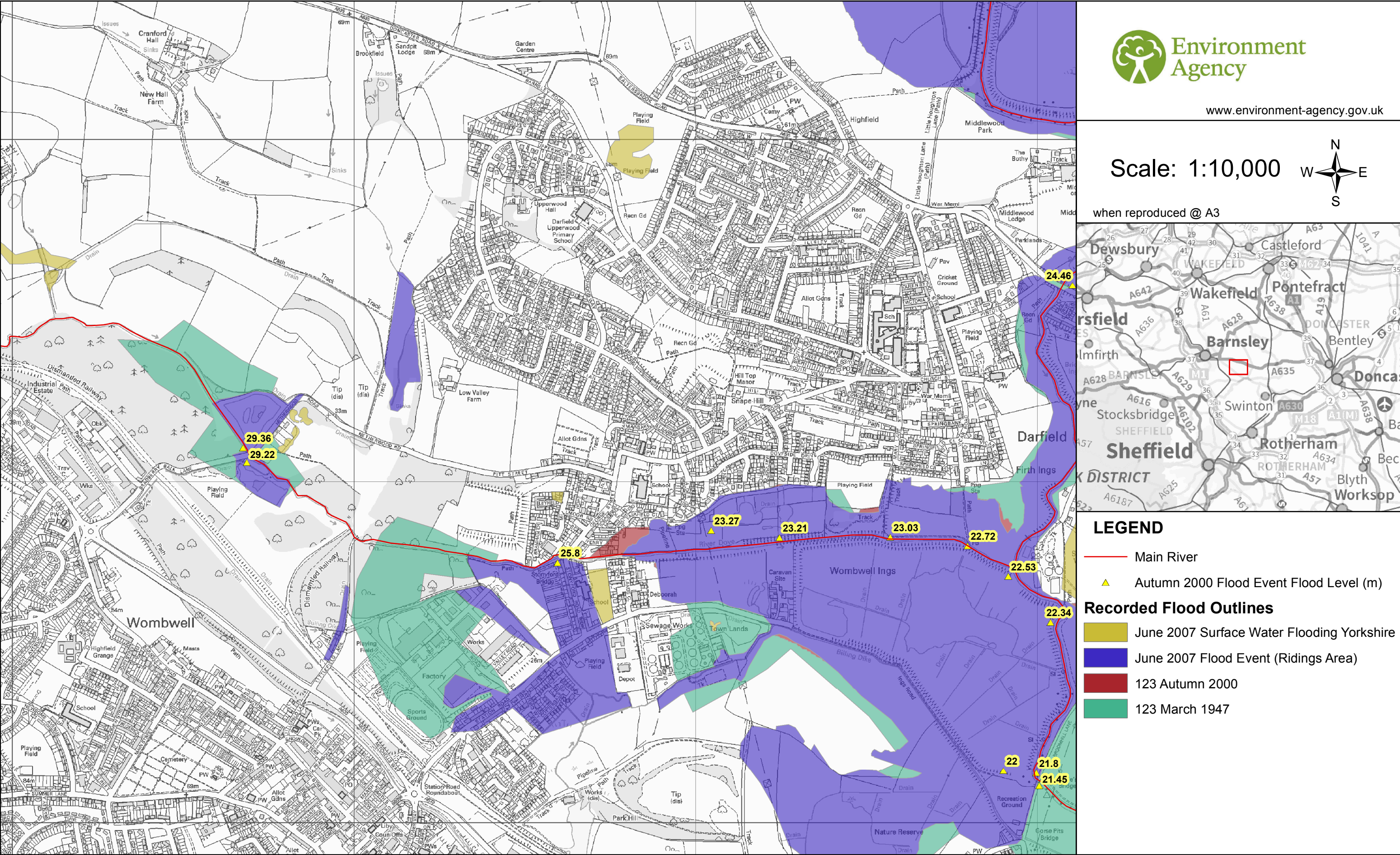
RFI/2019/117705 Flood Map for Planning, centred on land north of Pitt Street, S73 8AS

Date Created: 06/03/19



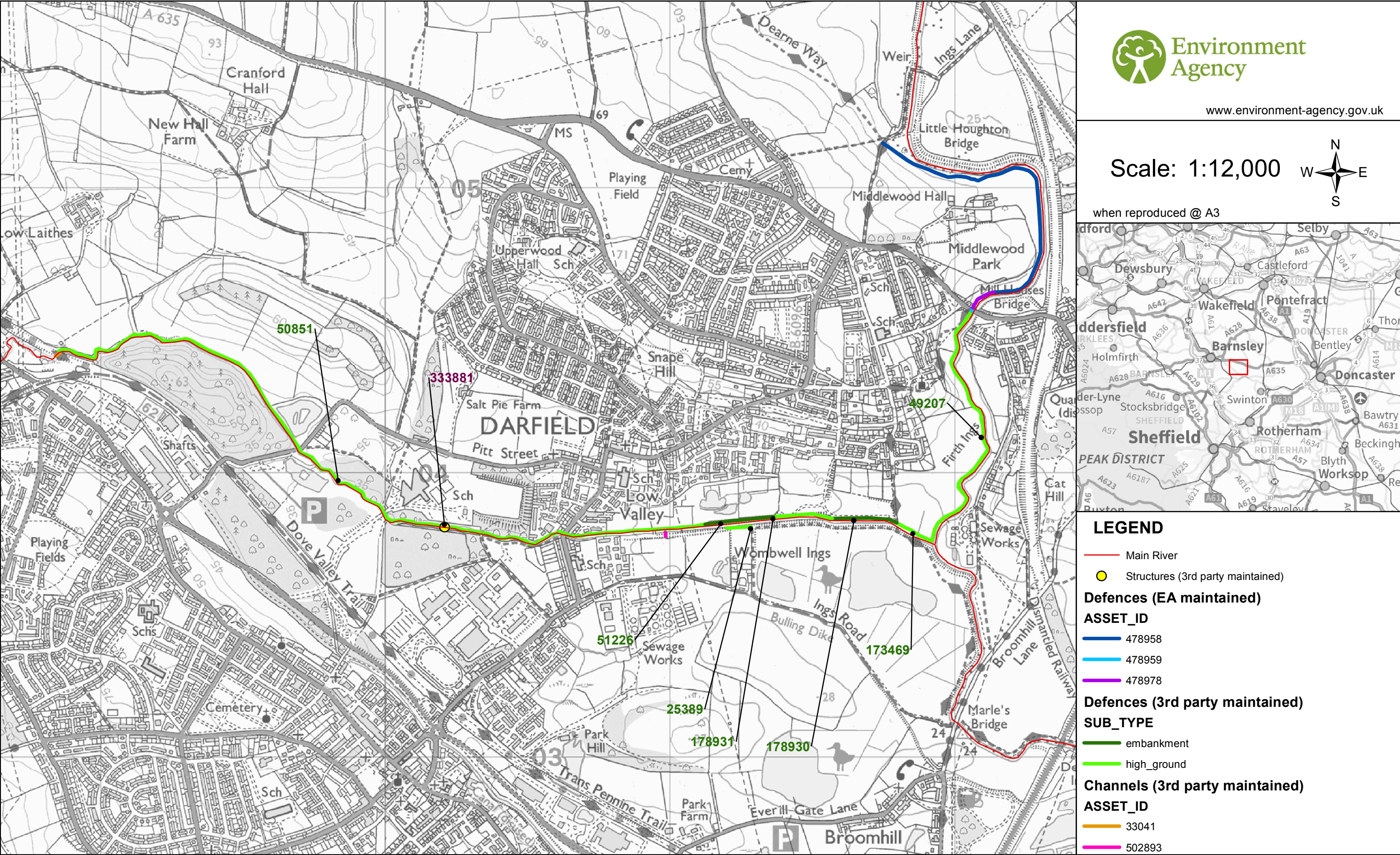
RFI/2019/117705 Flood History Map, centred on land north of Pitt Street, S73 8AS

Date Created: 06/03/19



RFI/2019/117705 Assets Map, centred on land north of Pitt Street, S73 8AS

Date Created: 06/03/19



Channels (3rd Party Maintained) - 117705

ASSET_ID	DESCRIPTION	ASSET_MAIN	AIMS_SUB_T	LENGTH	LAST INSPECTION	LOCAL AUTHORITY	PROTECTION	TARGET_CON	OVERALL_CO	DESIGN_SOP
33041		private	simple_culvert	18.65	43384.00	Barnsley District (B)	fluvial	2	2	50
502893	Culvert	unknown	simple_culvert	13.51	43384.00	Barnsley District (B)	fluvial	3	3	

Defences (EA Maintained) - 117705										
ASSET_ID	DESCRIPTION	ASSET_MAIN	AIMS_SUB_T	LENGTH	ACTUAL_DCL	ACTUAL_UCL	PROTECTION	TARGET_CON	OVERALL_CO	DESIGN_SOP
478958		environment_agency	high_ground	1098.20			fluvial	3	3	
478959		environment_agency	bridge_abutment	12.18			fluvial	3	2	
478978		environment_agency	high_ground	96.64			fluvial	3	3	

Defences (3 rd Party Maintained) - 117705										
ASSET_ID	DESCRIPTION	ASSET_MAIN	AIMS_SUB_T	LENGTH	ACTUAL_DCL	ACTUAL_UCL	PROTECTION	TARGET_CON	OVERALL_CO	DESIGN_SOP
49207		private	high_ground	976.71			fluvial	3	4	30
173469		private	high_ground	140.22			fluvial	3	3	30
178930		private	embankment	229.26	22.50	23.03	fluvial	4	3	
178931		private	high_ground	208.79			fluvial	3	3	
50851		private	high_ground	2660.03			fluvial	3	3	30
51226		private	embankment	241.22	23.00	22.89	fluvial	3	3	30
25389		private	high_ground	85.43	23.33	23.44	fluvial	3	3	30

Structures (3 rd Party Maintained) - 117705							
ASSET_ID	AIMS_SUB_T	DESCRIPTION	DESIGN_SOP	ASSET_MAIN	PROTECTION	TARGET_CON	OVERALL_CO
333881	weir			private	fluvial	9	3

Appendix 6 – Barnsley Metropolitan Borough Council Correspondence



BARNSLEY
Metropolitan Borough Council

**Planning & Building Control Service
Development Management
Westgate Plaza
PO Box 634, Barnsley, S70 9GG
Head of Service: Joe Jenkinson**

Bethany Kington
Enzygo
The Byre, Woodend Lane
Cromhall
GL12 8AA

My Ref: 2019ENQ00157
Your Ref:
Date: 15th April 2019
Enquiries to: Hannah Andrew
Direct Dial: 01226 775752
E-Mail: hannahandrew@barnsley.gov.uk

Dear Bethany,

Proposed residential development at land off Pitt Street, Darfield

Thank you for the above enquiry, this letter provides advice and an assessment of the material planning considerations that would influence the outcome of any subsequent application.

Planning Policy Considerations

Planning decision should be made in accordance with the development plan unless material considerations indicate otherwise and the NPPF does not change the statutory status of the development plan as the starting point for decision making. The new Local Plan was adopted at the full Council meeting held 3th January 2019 after it was found to be sound by the appointed Planning Inspector following the examination process. This means that it now takes on full weight for decision making process in planning law terms as the development plan for the Borough alongside the Joint Waste Plan, superseding the remaining saved policies from the Unitary Development Plan (adopted in the year 2000) and the Core Strategy (adopted in 2011).

Principle of Development

The site is part of a wider residential allocation (HS77) in the Local Plan; therefore the principle of residential development is accepted.

You have indicated that you would be seeking to submit an outline application with all matters reserved except access, albeit an indicative layout will be



PO Box 634, Barnsley, South Yorkshire S70 9GG

provided and you would like to agree the maximum number of dwellings for the site.

With regards to the 4 options provided, these show two possible vehicular access arrangements i.e. Pitt Street only or a dual access option utilising Pitt Street and Venetian Crescent. I have not been able to obtain formal comments from highways but initial discussions suggest the preferred option would be Pitt Street only. Notwithstanding this, options 3 and 4 provide the best frontage onto Pitt Street and overlooking of the footpath along the western boundary. They also provide possible future access points into the safeguarded land to the west.

Beyond this, the 4 various layout options all fail to include a future access into the remaining allocation, or 'pan-handle' as described in your letter. This will need to be included as there is no clear alternative access into this part of the site.

Based on the level of detail provided this is the best response I can give at this stage and as more information is provided the overall design approach may need to change.

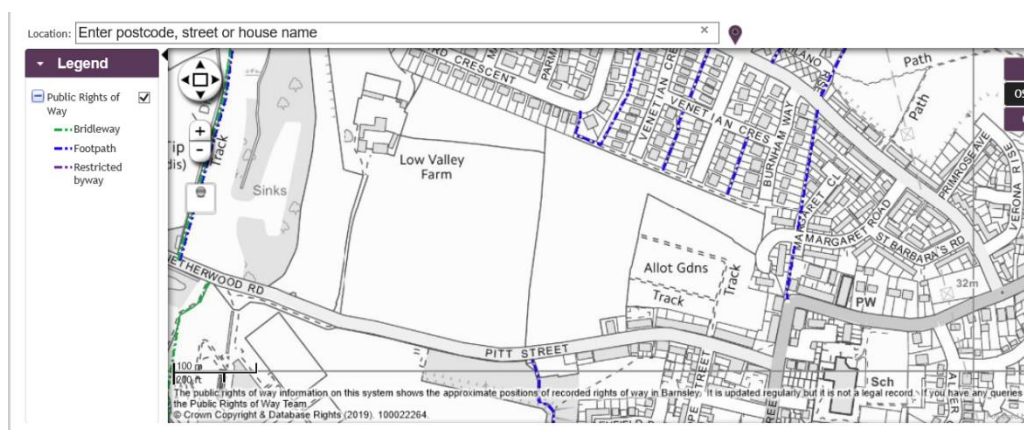
With regards to the number of dwellings, you have correctly identified that the indicative number of dwellings assumed in the Local Plan is 109. This is based on the whole allocation and it will be for you to demonstrate that this part of the site can be brought forward without prejudicing the delivery of the remaining allocation or expected number of units. It will also be important to address policy H6 in the Local Plan as part of this.

Other Material Considerations

The Public Rights of Way officer has confirmed the following - There are no recorded public rights of way crossing the site, but there are 2 informal paths which appear to be well-established and well-used (shown on the plan included). Public access rights can be acquired if the public have used a route unchallenged for 20+ years, or for a lesser period under Common Law if access is deemed to have been encouraged by the landowner. Members of the public may apply to have such rights formally recorded and if an application is made, the Council has a legal duty to research the claimed rights and reach a decision.

As these paths appear to be well used they are likely to have acquired public rights. Therefore the most practical option may be to apply to formally stop up or divert those paths, via application to either Barnsley Council or the Department for Transport. I have included the Council's application form for information (NB: fees are subject to change in the new financial year). DfT forms and fees are available via the www.gov.uk website.

There are a number of public footpaths immediately north of the site, which connect to the informal walked paths (see plan below).



Any layout for this site should consider connections into those paths at both the north western and north eastern boundaries of the site. As any pedestrian through route has potential to be heavily used, particularly by students of Horizon ALC, any paths should be accommodated in a way which minimises conflict between pedestrians and homeowners.

The proposals show a cycleway connecting Pitt Street to the housing to the north of the site. If a cycleway is provided it should be built to adoptable standard and contained within the highways adoption agreement for the site, so both Public Rights of Way and Highways Development Control should be consulted.

Although a cycleway would provide a good connection to the ALC, such a route could cause conflict with existing and new homeowners. There are currently 'cycling prohibited' signs on the footpath links to the north of the site. A large increase in use of the route by schoolchildren may not be well received by residents of the bungalow estate to the north, and any proposed links through the site should bear this in mind.

The tree officer has provided the following comments: - There are sporadic self-set trees across the site along with more established sections of hedgerow located on the boundary. As such a tree survey will be required with any application and the information in it will need to be used to inform the proposed layout so as to avoid impacts on trees as far as possible and in particular the boundary hedges. If any trees or hedges are implicated in the proposed scheme then an arboricultural impact assessment will also be required to deal with these and protection measures for the trees and hedges on the site will be required as part of an arboricultural method statement. It should be noted that subject to agreement from all parties it may be acceptable to provide this as part of a pre-commencement condition.

Without a tree survey it is not possible to offer more meaningful comments on the indicative masterplans proposed, however as noted above it is recommended that the tree survey information is used to inform the final layout put forward

With regards to drainage: - The Council has historic records of an open/culverted watercourse crossing the site indicated on the attached plan. Further, it is confirmed that part of the site is shown on the Environment Agency 30 & 200 year surface water flooding maps

There should be no increase in surface water runoff from the new development. NPPF recognizes that the management of flood risk is not simply restricted to flood plains and that a catchment-wide approach should be employed.

There are both Foul and Surface water sewers on the Northern boundary of this site. The developer should contact Yorkshire Water if they wish to discharge to this sewer to discuss allowable discharge rates.

Any balancing facility should be designed to accommodate a 1 in 30 year flow from the site below ground and a 1 in 100 year flow retained within the site (including an allowance of 30% for climate change), without causing any flooding to buildings.

There are alternatives to conventional storage for the control of surface water run-off that are favoured by the authority where ground conditions are suitable. Sustainable Urban Drainage techniques (SUD's) tackle surface water run-off problems at source using features such as soakaways, permeable pavements, grassed swales, infiltration trenches, ponds and wetlands to attenuate flood peak flows, produce water quality improvements and environmental enhancements.

The authority seeks to promote the use of SUD's techniques to this site and the authority expects the developer of the site to submit detailed investigations such that the use of SUD's has been fully explored.

As the Site area is greater than 1 Ha then a flood risk assessment in accordance with NPPF is required to be submitted with any planning application

The Biodiversity officer has advised that - The site is covered with semi-natural vegetation, and as such any planning application must be supported by an accompanying ecology report complying with the relevant parts of our attached standard ecology guidance and Local Plan policy BIO1.

The site has the benefit of a Preliminary Ecological Assessment carried out for the LPA in support of Local Plan decision-making (report 516-GAT21 attached) which suggested that at that time (2013) the site appeared to be of relatively low ecological value mainly comprising species-poor semi-improved grassland. The grassland may have more value than that. Also attached is the ecology report for the safeguarded land to the west (report 624-Dar3a) which indicated that most of that site was poor semi-improved grassland as well. The applicant's own ecology report should be the much more detailed extended phase 1 habitat survey required at the next stage, and the authors should refer to our reports and have regards to their findings.

In this case, external data should also be gained from South Yorkshire Badger Group. The site is in the Nature Improvement Area so the LPA requires biodiversity enhancements as well as mitigation.

Wildlife corridors should be retained or created through the site from east to west, connecting into adjoining site vegetation.

The site is not in a coal mining referral area and as such no coal mining risk assessment is required. In addition, the contaminated land officer has raised no concerns regarding possible contamination.

The site is located close to the A633 Mitchell Way and it is likely traffic from the site will impact on this route. Whilst not an air quality management area (AQMA), this road is detailed within the Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance, where mitigation of air quality impact is recommended. An assessment shall also therefore be undertaken in accordance with the guidance and subsequent mitigation proposed.

No noise report is required, however, if an application was received it is expected that information relating to the management of noise and dust during construction would be included, or we would look to require this with a pre-commencement condition(s).

All internal roads will need to accommodate a 26tonne waste vehicle and bin stores must be provided for dwellings off a private drives (adjacent the nearest adopted highway) as the waste wagons will not access these.

Validation Requirements

This list included in your letter covers most of the requirements, however I have amended it below:

Planning Statement (inc Heads of Terms);
Design and Access Statement;
Forms and Certificates;
Statement of Community Involvement;
Transport Assessment;
Flood Risk Assessment;
Preliminary Ecological Assessment;
Phase 1 Geo-Environmental Desk Study;
Archaeological Assessment (it would be advisable to seek advice from South Yorkshire Archaeology Service asap);
Health Impact Assessment; and
Air Quality Assessment.

S106 Requirements

Education have confirmed that at this stage there is sufficient capacity in the local schools to accommodate pupils likely to be generated by the proposed scheme. Therefore no contribution is currently required for new school places.

Affordable Housing is set at 10% in this area and we would seek an 80/20 split in terms of Social Rent / Affordable Ownership as defined in the NPPF.

Local Plan Policy GS1 and the accompanying SPD require 15% onsite greenspace and whilst it may be possible to agree some of this could be subject to a contribution towards offsite improvements, I would anticipate that a LEP should be required on site (taking account of available play space in this area). A contribution to formal greenspace would be calculated utilising the Open Space SPD and is based on the number and type of dwellings therefore I cannot confirm this at this time. I can confirm that the site is not on the greenspace register however and as such no compensatory payment is required.

Finally, Policy T3 Development and Sustainable Travel and the accompanying SPD require a contribution towards improvements to sustainable travel. This is calculated on the number of bedrooms however so I am unable to provide a figure at this time.

Consultation

The approach to community consultation as set out in your email dated 29th March is acceptable albeit I would contact Ward Councillors first and discuss it with them as they may have valuable input.

This covers everything that will be required based on the information we have to date. However I reserve the right to request additional information should that be considered necessary or be identified through the consultation process.

These comments will be treated as a material consideration in relation to any planning application submitted in the next 2 years for a scheme that reflects the advice provided in this letter. However, please note that the views and opinions in

this letter do not constitute a formal response or decision of the Council in relation to any future planning application.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Hannah Andrew', with a large, sweeping loop at the end.

Hannah Andrew

For and on behalf of:
Joe Jenkinson BA (Hons) MSc
Head of Planning and Building Control
www.barnsley.gov.uk/developmentmanagement

Appendix 7 – Danvm Drainage Commissioners Internal Drainage Board

PRE-APPLICATION PLANNING CONSULTATION



Shire
Group of IDBs

Enquiry Date:	21 January 2019	 <i>Epsom House Chase Park Redhouse Interchange Doncaster South Yorkshire DN6 7FE</i>
Contact:	Charlotte Whitham (Enzygo Ltd)	
Proposal	Residential Development	
Address	Land North of Station Road, Wombwell, Barnsley	
Date of Reply	21 January 2019	
Engineer to the Board/Officer	Paul Jones (Shire Group of IDB's)	
On behalf of	Danvm Drainage Commissioners	

The IDB as a Consultee give the following standard comments/recommendations:

If the surface water were to be disposed of via a soakaway system, the IDB would have no objection in principle but would advise that the ground conditions in this area may not be suitable for soakaway drainage. It is therefore essential that percolation tests are undertaken to establish if the ground conditions are suitable for soakaway drainage throughout the year.

If surface water is to be directed to a mains sewer system the IDB would again have no objection in principle, providing that the Water Authority are satisfied that the existing system will accept this additional flow.

If the surface water is to be discharged to any watercourse within the Drainage District, Consent from the IDB would be required in addition to Planning Permission, and would be restricted to 1.4 litres per second per hectare or greenfield runoff.

If there is an existing connection which is being altered, then the discharge is likely to be consented at the existing discharge rate.

If this is a new connection, then the likely discharge rate acceptable would be 1.4 l/s/ha. or 5 l/s for small sites.

No obstructions within 9 metres of the edge of a watercourse are permitted without Consent from the IDB.

If surface water or works are planned adjacent to a Main River within the Drainage District, then the Environment Agency should be contacted for any relevant Permits

Advice/recommendations:

SHOULD Consent be required from the IDB as described above then we would advise that this should be made a CONDITION of any Planning DECISION.

ANY surface water discharge into ANY watercourses in, on, under or near the site requires CONSENT from the Drainage Board.

For further guidance, pre-application advice & consent form visit:
www.shiregroup-idbs.gov.uk, and select "Danvm DC"

For direct enquiries e-mail: planning@shiregroup-idbs.gov.uk

IDB Location Plan of Proposed site



NB: IDB drain in blue is called “Bulling Dyke”

Appendix 8 – BGS Borehole Logs

Kshire Regional Laboratory

Report No: 17313

Seam Studies Report No:- 6073

Nat.Grid Ref: E 440211 N 404094

Barnsley

Date Received: 14-JUN-85

HOUGHTON MAIN, SILKSTONE LINK ROAD-1995M INBYE

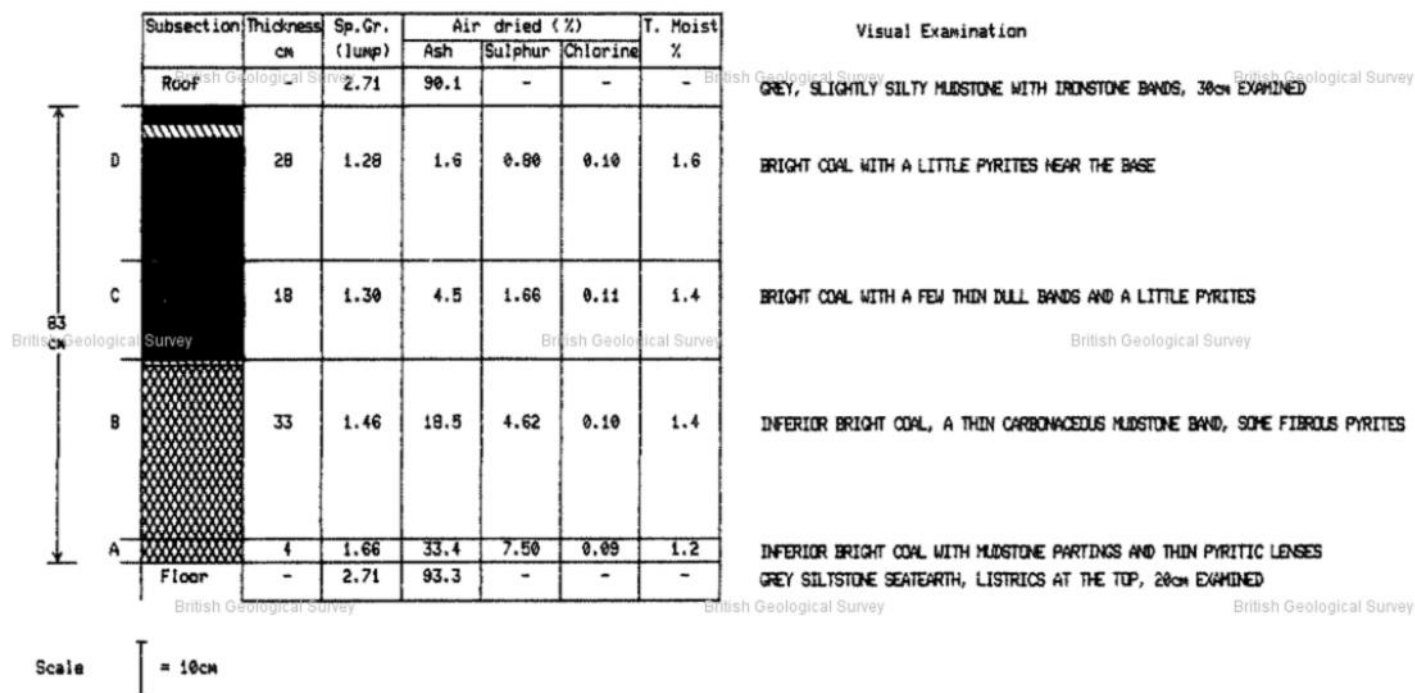
SE40SW/8k

Depth below O.D. 607.200m

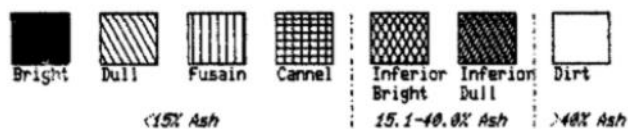
SILKSTONE

08.170.760

Cover 637.400m



A-D	83	1.37	11.2	2.98	0.10	1.5	Whole seam
C,D	46	1.29	2.7	1.14	0.10	1.5	Clean coal



Washability of a Sample of the Whole Seam, A-D, 83cm thick						
	Floats at		Middlings	Sinks at		Whole
Sp. Gr.	1.4	1.6	1.4-1.6	1.4	1.6	-
Wt. %	77.6	89.7	12.1	22.4	10.3	100.0
Ash %	3.0	5.3	20.4	34.8	51.8	10.1
Sulphur	1.6	2.2	6.2	7.1	8.1	2.8

SE40SW/221

BOREHOLE No. AND LOCATION	DEPTH		SOIL DESCRIPTION 4047, 0398	SAMPLES	
	From	To		Depth	Test and Result
Borehole 2A 11.7.73.	0	1.0	Grass on colliery waste.	0.3- 0.9	m 11
	1.0	2.1	Brick rubble pieces of concrete, broken sandstone, ash and clay fill.	2.1- 2.45	m 17 LL 39 FL 27 DD 1740 CU 55 DU 7
	2.1	2.6	Firm to stiff light brown and grey sandy clay with occasional fragments of mudstone and sandstone	2.45- 2.5	m 13
	2.6	3.3	Firm dark brown with veins of light grey very sandy clay with small fragments of ironstained sandstone.	2.9- 3.35	m 13 LL 23 FL 13 DD 1950 CU 60 DU 30
	3.3	4.25	Light grey ironstained medium grained weathered flaggy sandstone becoming less weathered with depth.	3.8- 3.85	m 14 50 blows for 50mm initial penetration N > 300
				3.8- 4.675	Core 1 Recovery 100% RCD 30%
	4.25	5.28	Dark grey ironstained silty mudstone.	4.675- 5.55	Core 2 Recovery 100% RCD 20%
	5.28	5.75	Brown fine to medium grained sand with fragments of weathered sandstone.	5.55- 6.425	Core 3 Recovery 100% RCD 15%
	5.75	6.0	Dark grey ironstained sandy mudstone.		
	6.0	7.05	Grey ironstained fine to medium grained very fractured sandstone, less fractured below 6.35m.	6.475- 7.05	Core 4 Recovery 100% RCD 65%
		7.05	End of Borehole. Water encountered at 3.35m.		

Appendix 9 – Drainage Calculations

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Diameter (mm)	Depth (m)
1	1.470	100.000	1200	1.800

Simulation Settings

Rainfall Methodology	FEH-13	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
100	40	0	0

Node 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	98.200	Product Number	CTL-SHE-0098-5000-1500-5000
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	835.0	0.0	1.500	835.0	0.0	1.501	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	1	720	98.490	0.290	17.4	246.8295	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute winter	1	Hydro-Brake®	4.8	242.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	1	1410	99.694	1.494	46.9	1273.7250	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	1	Hydro-Brake®	5.0	412.6



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