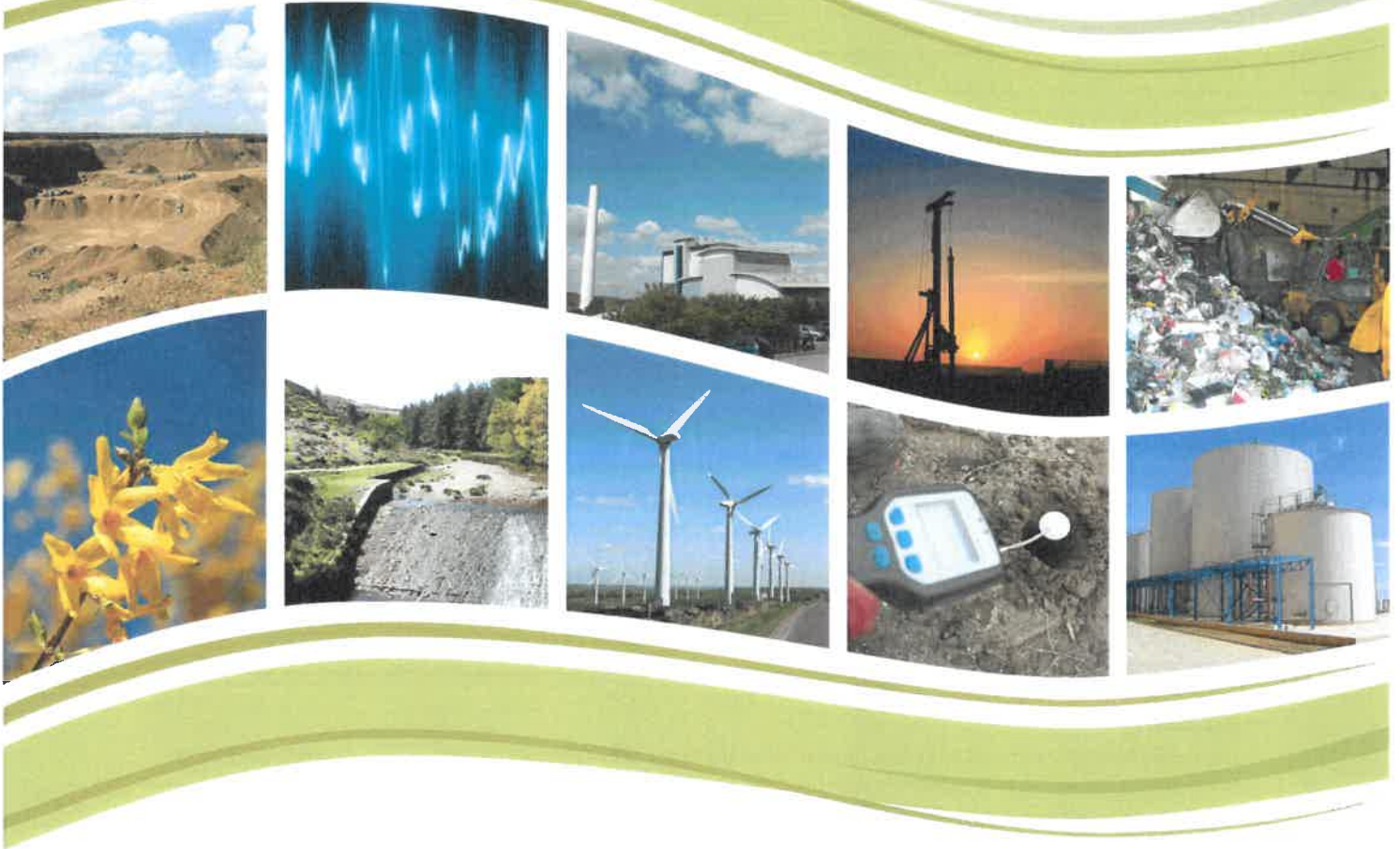




NPPF: Flood Risk Assessment

Land off Henthorn Road, Clitheroe

Gladman Developments Ltd

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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 off Henthorn Road, Clitheroe.

The FRA has demonstrated the following:

- The Site is 5.20ha, which comprises an agricultural field.
- The risk of flooding is assessed as followed:
 - The risk of fluvial flooding is assessed as negligible.
 - The risk of surface water flooding is assessed as mostly negligible with areas at high risk within the eastern part and along the south-eastern boundary of the Site.
 - The risk of groundwater flooding is assessed as mostly negligible with the southern part of the Site at low risk.
 - The risk of flooding from all other sources is negligible.
- Surface water, groundwater, and residual flood risk from Drain 1/culvert surcharging can be mitigated to a negligible level through the following approach:
 - Sequentially develop the Site, limiting the built development outside the mapped extent of surface water flow pathways.
 - Set finished floor levels above external levels.
 - Adoption of a surface water management strategy.
 - No below surface buildings (i.e. basements)
 - Provide an easement free from development either side of Drain 1.
 - Introduction of a bund feature on the right bank of Drain 1 at the Henthorn Road culvert to prevent floodwater that backs-up at the culvert from flooding the Site.
 - Undertake maintenance to keep Drain 1 and the Henthorn Road culvert free from debris and overgrown vegetation.

The proposed residential development is classified as 'more vulnerable', which is considered acceptable in Flood Zone 1. As such, the Sequential Test will 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. 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 (using complex controls) and an appropriately sized detention basin, with outfall to watercourse.

The FRA demonstrates 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 and surface water drainage.

1.0 Introduction

1.1 Background

- 1.1.1 Enzygo Ltd was commissioned by Gladman Developments Ltd to carry out a site-specific Flood Risk Assessment (FRA) including a surface water drainage strategy in support of an outline planning application for a proposed residential development, located on land north-west off Henthorn Road, Clitheroe (hereafter referred to as 'the Site').
- 1.1.2 The proposal is for up to 110 residential dwellings with associated landscaping, open spaces and vehicle access from Henthorn Road.
- 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 1 hectare (ha) 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.
- 1.1.4 Environment Agency indicative flood mapping shows that the Site is located within Flood Zone 1 but is more than 1 hectare (ha) in area (5.20ha). As such, an FRA is required.
- 1.1.5 The purpose of this FRA is to provide sufficient flood risk information to demonstrate that the future users of the development 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 99-104 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.
- 1.2.3 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

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

² Department for Communities and Local Government (2012) National Planning Policy Framework.

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

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

- 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 provide an assessment of the flood risk to and from a development site, over its lifetime, to satisfy the requirements of the local planning authority. They are categorised as Level 1 screening studies to give a general indication of the potential flood risk to a site and identify whether more detailed Level 2 scoping 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 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, NPPG ID: 7 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 ID: 7.

Regional/Local Policy

- 1.4.2 The FRA also considers the following Core Strategy 2008 - 2028⁵ policy of the Ribble Valley Borough Council:

- Policy DME6 – Water Management.

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.

⁵ https://www.ribblevalley.gov.uk/download/downloads/id/10010/adopted_core_strategy.pdf

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 OL41: Forest of Bowland & Ribblesdale).
- Detailed topographic survey (Appendix 1).
- Environment Agency online flood maps (Flood Map for Planning⁶, Long Term Flood Risk Assessment for Locations in England⁷, Operational Catchment data⁸ and Environment Agency – What’s in Your Backyard?⁹).
- River Basin District (RBD) Maps¹⁰ (North West RBD) together with guidance on climate change allowances¹¹.
- National River Flow Archive¹².
- Ribble Valley Borough Council Level 1 Strategic Flood Risk Assessment (SFRA) and associated mapping (Appendix 2).
- River Ribble Catchment Flood Management Plans (CFMP)¹³.
- North West River Basin Management Plan (RBMP)¹⁴.
- National Soils Resources Institute: Soilsdapes online mapping¹⁵.
- British Geological Survey [BGS] online mapping: Geology of Britain Viewer¹⁶.
- Landmark’s Promap: Flood Data package: Additional flood mapping.
- Geosmart 1 in 100-year groundwater flood risk map.
- United Utilities sewer asset plans (Appendix 3).
- DEFRA’s Magic Map¹⁷ for identifying Designated Sites.
- BHS Chronology of British Hydrological Events.

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 Company.

⁶ <https://flood-map-for-planning.service.gov.uk/>

⁷ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

⁸ <http://environment.data.gov.uk/catchment-planning/OperationalCatchment/3459>

⁹ http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

¹⁰ <https://www.gov.uk/government/publications/flood-risk-assessments-river-basin-district-maps>

¹¹ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

¹² <http://nrfa.ceh.ac.uk>

¹³ <https://www.gov.uk/government/publications/river-tees-catchment-flood-management-plan>

¹⁴ <https://www.gov.uk/government/publications/river-basin-management-plan-northumbria-district>

¹⁵ <http://www.landis.org.uk/soilsdapes/>

¹⁶ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

¹⁷ <http://www.natureonthemap.naturalengland.org.uk/>

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 Advice¹⁸ and the NPPF/NPPG ID: 7 was consulted and reviewed.
- 2.2.4 Correspondence with the Environment Agency is included in Appendix 4.

Ribble Valley Borough Council

- 2.2.5 Ribble Valley Borough Council as the LLFA responsible for surface water, groundwater and ordinary watercourses was consulted on flood risk issues at this Site. The consultation response is included in Appendix 5.

United Utilities Water Utility Company

- 2.2.6 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.
- 2.2.7 United Utilities is responsible for the disposal of wastewater within the area.

2.3 Site Walkover

- 2.3.1 Enzygo staff conducted a walkover of the Site in July 2018. Observations made were used to inform the Site description and technical assessment.

¹⁸ <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 off Henthorn Road, Clitheroe, Lancashire, BB7 2QF and is centred on National Grid Reference (NGR) 372929, 440832.
- 3.1.2 The Site location is shown in Drawing 001 and in more detail in Drawing 002 with the study area enclosing an area of 5.20ha.

3.2 Land Use

- 3.2.1 The Site comprises a single agricultural field bisected by a watercourse in the eastern extent (Figure 3.1).

Figure 3.1: Photograph of the Site



View to south-eastern boundary

- 3.2.2 The Site is bounded by hedgerows on all sides with agricultural land beyond to the north-west, new residential development to the north-east, Henthorn Road and new residential development beyond to the south-east and Siddows Hall to the south-west.
- 3.2.3 The Site is currently accessed from Henthorn Road via the south-east boundary.

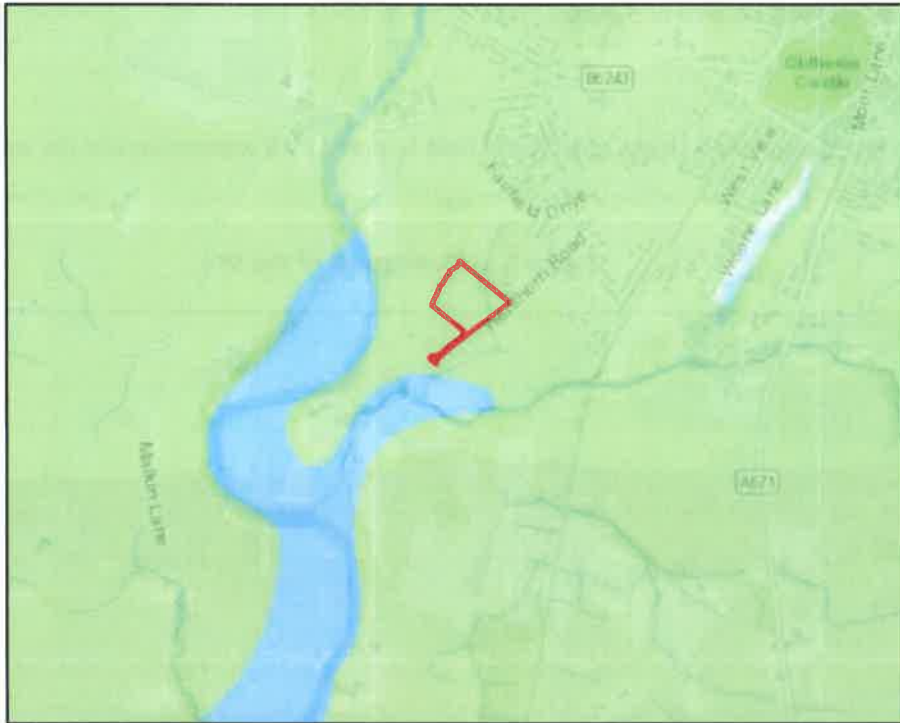
3.3 Topographic Information

- 3.3.1 The topographic survey shows the Site slopes from north to south with a depression running through north-south through the eastern corner associated with the watercourse.
- 3.3.2 The Site falls from 66mAOD (located on the north-west boundary) to 53.52mAOD (southern corner). The fall of 12.5m over 260m gives a gradient of approximately 1:21.

3.4 Soils and Geology

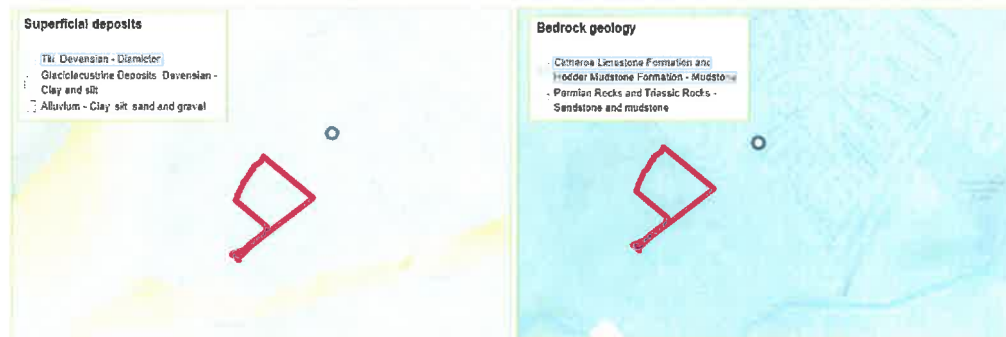
- 3.4.1 The Soilsmap online soils map viewer (Figure 3.2) shows that the Site is underlain by slowly permeable, seasonally wet, loamy and clayey soils. The loamy and clayey soils are indicative of low infiltration potential.

Figure 3.2: Soils Mapping



Soils Data © Cranfield University (NSRI) and for the Controller of HMSO [2018].

- 3.4.2 The Geology of Britain online map viewer (Figure 3.3) shows that there are Devensian Till (diamicton) superficial deposits beneath the entire Site. The bedrock is Clitheroe Limestone Formation and Hodder Mudstone Formation (undifferentiated) - mudstone. The superficial and bedrock geology is indicative of mixed infiltration potential with moderate potential for limestone and till, and low for mudstone.

Figure 3.3: Geology Mapping

Left: Superficial deposits. Right: Bedrock. Contains British Geological Survey materials © NERC [2018]

3.4.3 The Geology of Britain online map viewer shows no boreholes located within 500m of the Site. The nearest borehole is 1.3km north-east. The borehole log shows made ground (silty clay) to a depth of 3.15m above limestone (Appendix 6). Although the borehole is over 1km from the Site, it is from the same bedrock geology and gives a rough indication of the nature of the bedrock at the Site.

3.5 Hydrogeology

3.5.1 The borehole log shows groundwater was struck at 3m below ground level (bgl) rising to 1.8mbgl following removal of the temporary casing (Appendix 6).

3.5.2 The Environment Agency online groundwater mapping shows the Site is located above a Secondary undifferentiated superficial deposit aquifer and a Secondary A bedrock aquifer.

3.6 Catchment Hydrology

i. Environment Agency Catchment Data Explorer Mapping

3.6.1 The Environment Agency Catchment Data Explorer mapping (Figure 3.4) shows the Site is within the catchment of Mearley Brook, a tributary of the River Ribble which lies in the Ribble Middle (Settle to Calder) catchment. The River Ribble is within the Ribble Management Catchment and North West River Basin District.

Figure 3.4: Environment Agency Catchment Explorer Mapping



Top Left: Mearley Brook, zoomed to Site level. **Top Right:** Ribble Middle (Settle and Calder) full catchment.

Bottom Left: Ribble Management Catchment. **Bottom Right:** North West River Basin District. Contains Environment Agency information © Environment Agency and database right

ii. OS Mapping and Topographic Survey

- 3.6.2 OS mapping (Figure 3.5 and Drawings 001/002) identifies an unnamed watercourse (an 'ordinary watercourse' where flood risk work is carried out by the local drainage authority/riparian landowner hereafter referred to as Drain 1), conveying flows south, through the eastern corner of the Site. Drain 1 is conveyed beneath Blakewater Road via a 1270mm x 1020mm rectangular culvert 80m north-east of the Site and beneath Henthorn Road via a 1100mm wide by 1130mm high rectangular culvert immediately south-east of the Site (Figure 3.6). Drain 1 then turns south-west to join Pendleton Brook (a 'main river' where flood risk work is carried out by the Environment Agency) 200m south-west of the Site. The topographic survey identifies a ø225mm outfall discharging to Drain 1 approximately 10m north of the Site.
- 3.6.3 Pendleton Brook conveys flow west and south-west to join the River Ribble (also a main river) 700m south-west of the Site.
- 3.6.4 Two ponds are shown on the north-west boundary of the Site. The ponds are not impounded. The topographic survey identifies a dry ditch along the north-western boundary of the Site.

Figure 3.5: Watercourse Map

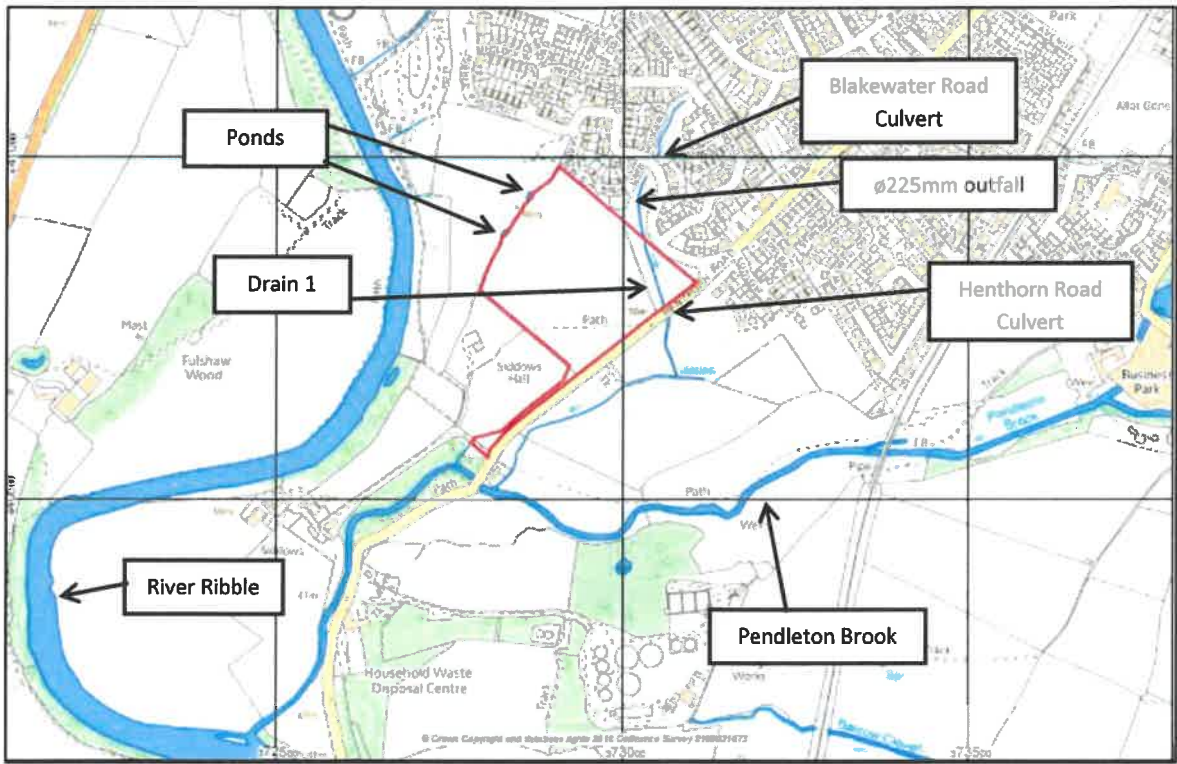


Figure 3.6: Watercourse Photographs



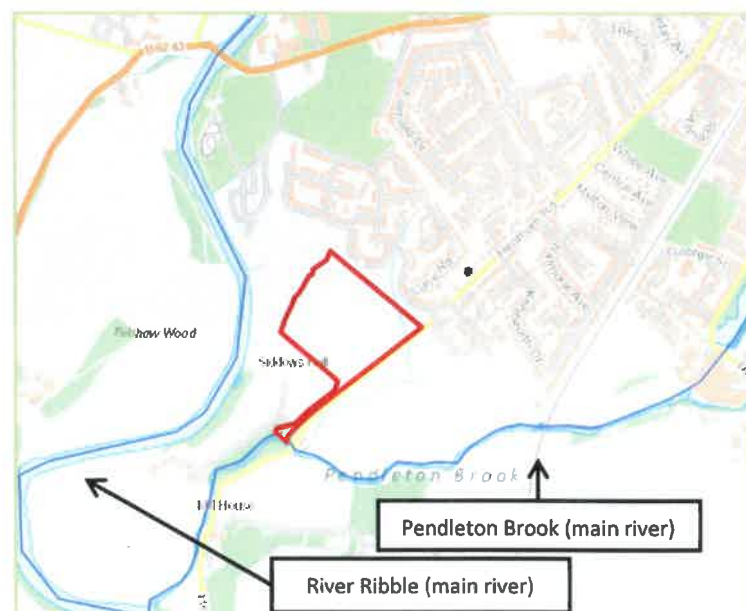


Top: Henthorn Road culvert. **Bottom Left:** Drain 1, looking south. **Bottom Right:** Pendleton Brook, south of the Site

iii. *Environment Agency online Main River Consultation Mapping*

- 3.6.5 The Main River Map (Figure 3.7) shows Pendleton Brook conveys flow west and south-west approximately 220m south of the Site to join the River Ribble which conveys flow south approximately 110m west of the Site. Main rivers are watercourses where flood risk work is undertaken by the Environment Agency.

Figure 3.7: Environment Agency Main River Consultation Map



Contains Environment Agency information © Environment Agency and database right.

iv. FEH Web Service Mapping

- 3.6.6 A review of the FEH Web Service mapping (Figure 3.8) shows most of the Site is located within the catchment of Pendleton Brook. The western edge of the Site is shown to be located within the catchment of the River Ribble. Due to the course resolution of the Digital Terrain Model (DTM) used within the FEH Web Service Mapping, the western edge is expected to also fall within the Pendleton Brook catchment. This is confirmed by the ground levels shown on the topographic survey (Appendix 1) which shows the whole Site slopes from north to south towards Pendleton Brook.

Figure 3.8: Catchment Boundaries (continued overleaf)



Contains OS data © Crown copyright and database right.

Top: Pendleton Brook catchment. **Bottom:** River Ribble catchment

3.7 Sewerage Assets

- 3.7.1 United Utilities Water asset plans (Appendix 3) show no public sewers within the Site. Public foul and surface water sewer networks serve the newly built residential properties on Ludlow

Road and Beeston Grove immediately south-east of the Site beyond Henthorn Road. Public combined sewers are shown to serve the residential properties immediately east of the Site along Henthorn Road as well as west of the Site beyond Siddows Hall. Both combined networks route south to the sewage treatment works 350m south of the Site.

3.8 Designated Sites

- 3.8.1 The DEFRA Magic Map (England and Wales)¹⁹ shows the nearest designated site is the Hodder River Section Site of Special Scientific Interest (SSSI) located approximately 2.5km south-west of the Site. The Site is within the SSSI Impact Risk Zone of the Hodder River Section SSSI. However, the SSSI is in the River Hodder catchment which is a tributary of the River Ribble and although the confluence is downstream of the Site the SSSI is far enough upstream on the River Hodder that there is no pathway from the Site to the SSSI and no impact on the designated site.

¹⁹ <http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx>

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	Yes	River Ribble, Pendleton Brook, Drain 1	Surface Water Features (Drawing 002), JBA Flooding from Rivers (Drawing 004.2), Environment Agency flood mapping (Drawing 005), OS mapping, and SFRA mapping (Appendix 2).
Tidal	No	None identified	Site location (Drawing 001) and Environment Agency flood mapping (Drawing 005).
Groundwater	Yes	Secondary Aquifers	BGS mapping (Drawing 003 and 007) and Geosmart Groundwater (Drawing 006).
Surface Water	Yes	Poor permeability	Environment Agency online flood mapping, JBA Surface Water Flooding (Drawing 004.1) and Environment Agency Complex mapping (Drawing 008.1-008.4).
Sewer	Yes	Public sewers	United Utilities Water Asset plans (Appendix 3) and Topographic survey (Appendix 1).
Infrastructure Failure	Yes	Reservoir or pond failure	Environment Agency online flood mapping and Surface Water Features (Drawing 002).

4.2 Fluvial Flooding

Environment Agency Flood Map

- 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 (Drawing 005) 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.

Flood History

- 4.2.3 Environment Agency correspondence (Appendix 4) states they hold no record of flooding for the Site or surrounding area.
- 4.2.4 SFRA mapping (Appendix 2) shows no records of historical fluvial flooding within the Site boundary. The closest recorded flooding is shown approximately 500m north-west of the Site associated with the River Ribble. An historic flooding event is also shown on Pendleton Brook approximately 1.1km north-east of the Site.

Flood Defences

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

Flood Warning

- 4.2.6 Environment Agency online flood mapping shows the Site is not located within an area which receives flood warnings.

Summary Flood Risk

- 4.2.7 The risk of fluvial flooding is assessed as negligible.
- 4.2.8 Mitigation measures to account for the residual flood risk from Drain 1/culvert surcharging are discussed in Section 5.

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

- 4.4.2 The BGS Groundwater Flooding Susceptibility Map (Drawing 003) shows that most of the Site (north-western parts) is within the mapped extent of limited potential for groundwater flooding to occur. The central part of the Site is within the mapped extent of susceptibility to groundwater flooding, with potential for groundwater flooding of property situated below ground level. The southern and eastern parts of the Site are within the mapped extent of

susceptibility to groundwater flooding, with potential for groundwater flooding to occur at surface.

- 4.4.3 The Site is underlain by loamy and clayey soils, superficial till deposits, and mudstone geology with low infiltration potential. Based on the BGS Groundwater Flooding Susceptibility Mapping, the risk of groundwater flooding is considered to be negligible to high.

Geosmart 1 in 100-year Groundwater Flood Risk Map

- 4.4.4 The Geosmart 1 in 100-year groundwater flood risk map (Drawing 006) shows that the majority of the Site is at negligible risk of groundwater flooding. The southern corner is shown to be low risk of groundwater flooding (Table 4.2). This data source is of a higher resolution and accuracy level than the BGS mapping.
- 4.4.5 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.
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

4.4.6 The risk of groundwater flooding is assessed as mostly negligible with the southern part of the Site at low risk.

4.4.7 Mitigation measures against the risk of 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 or perched groundwater.

JBA Surface Water Flood Map

4.5.2 The JBA Surface Water Flood Map (Drawing 004.1) shows that most of the Site is located outside the mapped extent of surface water flooding. A small area of surface water flooding is shown on the south-eastern boundary. The area of surface water flooding is associated with the 1 in 75-year event. The risk of surface water flooding is likely to be associated with the Drain 1 culvert under Henthorn Road which is not represented by the JBA mapping.

Environment Agency Complex Surface Water Flood Mapping

4.5.3 The Environment Agency Complex Surface Water Flood Mapping (Drawings 008.1 to 008.4) shows a surface water flow pathway originating north of the Site around Fairfield Drive and Newlands Avenue before conveying flow south along the course of Drain 1 and into the Site. The flow pathway splits on the south-eastern boundary with the majority continuing south along the course of Drain 1 and a proportion flowing south-west along the boundary of the Site and Henthorn Road. The flood depth is between 0.15 and 1.2m during the extreme 1000-year event. The flood velocity is up to 2.0m/s or greater. The flood hazard is between 'low' (0.50-0.75) and 'extreme' (>2.0).

4.5.4 A small area of surface water ponding is shown on the north-western boundary associated with the southern onsite pond. The flood depth is up to 0.6m during the extreme 1000-year event.

Flow Pathway Analysis

3.8.2 Flow conveyance calculations, using Open Channel flow software, were undertaken for:

- the Blakewater Road Drain 1 culvert (Figure 4.1); and
- the ø225mm outfall into Drain 1 (Figure 4.2).

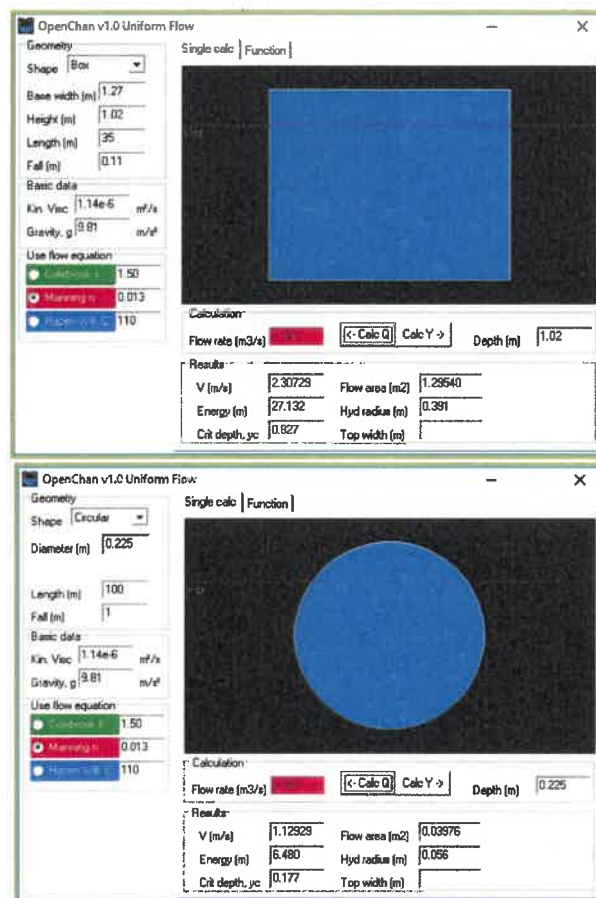
3.8.3 The calculations were based on the following parameters:

- Size (based on topo survey):

- Blakewater Road culvert: Rectangular 1.27m x 1.02m
- ø225mm outfall: Circular ø225mm diameter
- Manning's 'n': 0.013 (assumed concrete pipes)
- Gradients:
 - Blakewater Road: Fall of 0.11m over 35m (from topo survey)
 - ø225mm outfall: assumed 1:100 (conservative estimate)
- Depths:
 - Blakewater Road: 1.02m (full bore)
 - Depth: ø225mm outfall: 0.225m (full bore)

3.8.4 The full-bore flow for the Blakewater Road culvert is 2989 l/s (Figure 4.1) and for the ø225mm outfall is 45 l/s (Figure 4.2). Extracts showing the Open Channel calculations are included in Figure 4.1. The maximum flow entering the Site via Drain 1 based on the Open Channel calculations is 3034 l/s.

Figure 4.1: Upstream Culverts Open Channel Calculation Extracts

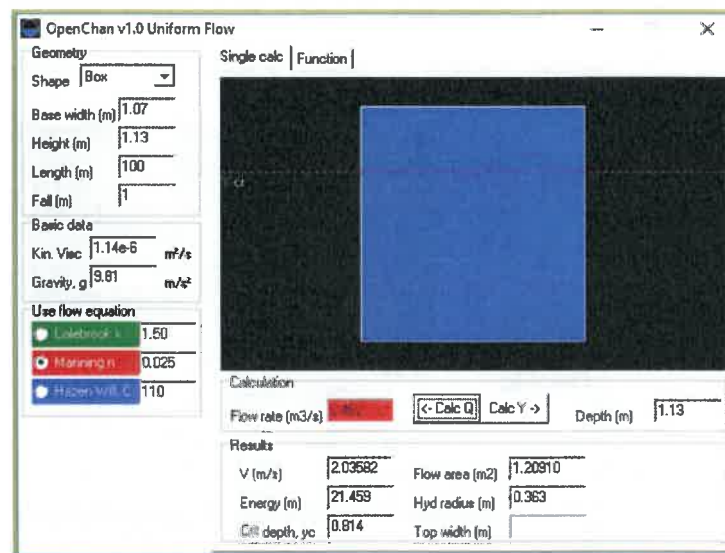


3.8.5 A flow conveyance calculation has been undertaken for the Henthorn Road culvert on the southern boundary of the Site based on:

- Size: Rectangular 1.07m x 1.13m (based on topo survey)
- Manning's 'n': 0.025 (cemented masonry based on walkover observations)
- Gradient: assumed 1:100 (conservative estimate)
- Depth: 1.13m (full bore)

3.8.6 The calculations show that the full-bore flow capacity of the Henthorn Road culvert is 2462 l/s (Figure 4.2). The full-bore flow entering the Site would exceed the capacity of the Henthorn Road culvert by 572 l/s. The exceedance flows would cause flood water to back-up at the culvert and shed overland following the topographic fall of the Site. The calculations show that flow pathway along the south-eastern boundary of the Site shown on the Environment Agency Complex Surface Water Flood Mapping (Drawings 008.1 to 008.4) is likely to be representative of fluvial flooding associated with Drain 1 and the Henthorn Road culvert.

Figure 4.2: Henthorn Road Culvert Open Channel Calculation Extract



Flood Risk

4.5.5 The risk of surface water flooding is assessed as mostly negligible with areas at high risk within the eastern part and along the south-eastern boundary of the Site.

4.5.6 Mitigation measures against surface water flooding are discussed in Section 5.

4.6 Sewer Flooding

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 Adoption²⁰ and have a design standard to the 1 in 30-year flood event. Older sewers were not designed to any particular

²⁰ WRC (2012) Sewers for Adoption 7th Edition.

standard. Modern sewer systems will only surcharge during rainstorm events with a return period greater than 30-years (e.g. 100-years).

- 4.6.3 There are no public sewers located within the Site boundary.
- 4.6.4 From a review of COMMERCIALDW Drainage and Water Enquiry (Appendix 3), there are no recorded sewer flooding incidents located within, or within close proximity to, the Site.
- 4.6.5 The SFRA states there are no known property flooding incidents from sewers in the vicinity of the Site.
- 4.6.6 The risk of flooding from sewers is assessed as negligible.

4.7 Flooding from Infrastructure Failure

Reservoir Failure

- 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.

Pond Failure

- 4.7.2 As identified in Section 3.7, two ponds are located on the north-western boundary of the Site. Both are not impounded. The ponds would therefore pose no flood risk to the Site.
- 4.7.3 Based on the above, the risk of flooding from pond failure is deemed to be negligible and will not be discussed further within this FRA report.

5.0 Flood Risk Mitigation Measures

5.1 Introduction

5.1.1 The following sources of flooding were identified:

- Surface water flooding;
- Groundwater flooding; and
- Residual flooding from Drain 1/culvert surcharging.

5.2 Mitigation Measures

Surface Water Flooding

- Set finished floor levels a minimum of +150mm above external levels.
- Sequentially develop the Site, limiting the built development (including surface water attenuation) outside the mapped extent of surface water flow pathways (Drawing 008.1).
- Adoption of a surface water management strategy.

Groundwater Flooding

- No below surface building (i.e. basements).
- Adoption of a surface water management strategy.
- Set finished floor levels as per above.

Residual Flooding from Drain 1/Culvert Surcharging

- Provide a 4m easement free from development along either side of Drain 1. This easement would provide access for inspection and maintenance purposes, including vehicle access.
- Limit all built development to outside the surface water flow pathway outlines.
- A bund feature is recommended to be located along the right bank of Drain 1 immediately upstream of the Henthorn Road culvert. This will prevent any floodwater that backs-up around the Henthorn Road culvert from causing flooding to the Site and will ensure that flows are contained within the Drain 1 channel.
- Undertake monthly maintenance activities to keep Drain 1 and the Henthorn Road culvert clear from debris and overgrown vegetation to maintain the conveyance of the channel and culvert.

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	River Ribble, Pendleton Brook, Drain 1	Negligible	Negligible	Negligible
Tidal	None identified	Negligible	Negligible	Negligible
Groundwater	Secondary Aquifers	Negligible to Low	Negligible to Low	Negligible
Surface Water	Poor permeability	Negligible to High	Negligible to High	Negligible
Sewer	Public sewers	Negligible	Negligible	Negligible
Infrastructure Failure	Reservoir or Pond failure	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 NPPG 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). As such, 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.

Flood Zone	Probability	Explanation	Appropriate Land use
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 Site is 5.20ha in area and current land use comprises an agricultural field.
- 6.2.2 The Site is underlain by loamy and clayey soils, superficial till deposits, and mudstone bedrock with indicative moderate to low infiltration potential. It is likely that drainage is predominantly via overland flow, following the topography of the Site to the topographic low points, with a small amount of infiltration to bedrock.
- 6.2.3 There is currently no foul water discharging from the undeveloped Site. Please note that foul drainage is not considered within this FRA but is dealt with in a separate standalone report.

6.3 Proposed Development

- 6.3.1 The proposal is for a residential development.
- 6.3.2 A developable area of 3.16ha is proposed for the 5.20ha Site boundary. A figure of 55% impermeable area (which includes 10% for urban creep) was applied to the residential 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)	0.0	1.74	+1.74
Percentage of Total Site Area (%)	0	33.5	+33.5

- 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 HR Wallingford UKSuDS design software using the current 'industry best practice' guidelines as outlined in the Interim Code of Practice for SuDS21, and the Environment Agency Report SC030219 – Rainfall runoff management for developments.
- 6.4.3 The following parameters were used in the runoff calculations:
- Developable Area: 3.16ha
 - Average Annual Rainfall (SAAR): 1183 mm/year;
 - Soil: 0.47;
 - Impermeable Areas: 0% (0.0ha);
 - Region No.: 10
- 6.4.4 The soil type assigned on the HR Wallingford website was 4 giving an SPR value of 0.47, indicating impermeable soils (Figure 6.1). These parameters are deemed appropriate given the indicative low to mixed permeability of the loamy and clayey soils, superficial till deposits, and mudstone bedrock.

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 the HR Wallingford UKSuDS calculations are included in Appendix 7.

²¹ 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	28.1
100% (1)	24.4
3.33% (30)	47.7
1% (100)	58.3
1% + Climate Change	81.6

Note: 40% added to the data to account for long-term climate change as stated in 'Flood Risk Assessment: Climate Change Allowance'. The 1-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.

6.5 Sustainable Drainage Options (SuDS)

Feasibility of SuDS

- 6.5.1 Soakaway testing was undertaken onsite during July 2018. A copy of the Infiltration Test Report is included in Appendix 8. Findings show that infiltration-based SuDS would not be feasible due to the low permeability of the loamy and clayey soils, superficial till deposits, and mudstone bedrock.

Choice of SuDS Options

- 6.5.2 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.
- 6.5.3 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.

6.5.4 A hierarchy of SuDS techniques is identified²²:

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).
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.

6.5.5 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

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

6.5.7 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.

6.5.8 The specifics of other SuDS features and maintenance would be considered further at detailed design, when a more comprehensive 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.

²² CIRIA (2004) Report C609, Sustainable Drainage Systems – Hydraulic, Structural and Water Quality advice.

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)
Occasional maintenance	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
Remedial actions	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)
	Repair erosion or other damage by reseedling 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

6.6 Surface Water Management Strategy

Hierarchy of Discharge

6.6.1 In accordance with requirement H3 of the Building Regulations 2000²³ 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 deemed to be unfeasible due to the low permeability of the soils, superficial deposits, and bedrock onsite.
- 2. A watercourse; or where that is not reasonably practicable:** Pendleton Brook conveys flow west and south-west approximately 220m south-west of the Site to join the River Ribble.
- 3. A sewer:** There are no public surface water sewers located within the Site.

6.6.2 The proposed drainage route will be via a new surface water sewer from the Site which will outfall to Pendleton Brook 220m south-east of the Site.

²³ Office of the Deputy Prime Minister, The Building Regulations 2000.

Drainage Design

- 6.6.3 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.
- 6.6.4 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.
- 6.6.5 Surface water will be directed to an onsite detention basin, positioned to achieve a gravity fed connection to the new surface water sewer connection to Pendleton Brook.
- 6.6.6 An indicative drainage layout is in Drawing 009.

Attenuation Requirements

- 6.6.7 Attenuation storage is required to reduce the post-application surface water runoff from the Site to the calculated greenfield runoff rates up to and including the 100-year (+40%CC) rainfall event, assuming no infiltration losses.
- 6.6.8 The following input parameters were assumed in the calculations:
 - Impermeable Area: 1.74ha (33.5%);
 - Cv (proportion of rainfall forming surface water runoff): 75% summer, 84% winter;
 - Infiltration losses: 0.00m/hour;
 - With outfall, using complex controls: Table 6.2.
- 6.6.9 The attenuation volume for the 1 in 100-year event (plus climate change) is 775m³.
- 6.6.10 Extracts from the PDS Flow calculations are included in Appendix 9.
- 6.6.11 The attenuation volumes will be reviewed at detailed design stage.

7.0 Summary and Conclusions

7.1 Introduction

- 7.1.1 A site-specific Flood Risk Assessment (FRA) has been undertaken for the proposed residential development, located on land off Henthorn Road, Clitheroe.

7.2 Flood Risk

- 7.2.1 The risk of fluvial flooding is assessed as negligible.
- 7.2.2 The risk of surface water flooding is assessed as mostly negligible with areas at high risk within the eastern part and along the south-eastern boundary of the Site.
- 7.2.3 The risk of groundwater flooding is assessed as mostly negligible with the southern part of the Site at low risk.
- 7.2.4 The risk of flooding from all other sources is negligible.

7.3 Mitigation Measures

- 7.3.1 Surface water, groundwater, and residual flood risk from Drain 1/culvert surcharging can be mitigated to a negligible level through the following approach:
- Sequentially develop the Site, limiting the built development outside the mapped extent of surface water flow pathways.
 - Set finished floor levels above external.
 - Adoption of a surface water management strategy.
 - No below surface buildings (i.e. basements)
 - Provide an easement free from development either side of Drain 1.
 - Introduction of a bund feature on the right bank of Drain 1 at the Henthorn Road culvert to prevent floodwater that backs-up at the culvert from flooding the Site.
 - Undertake maintenance to keep Drain 1 and the Henthorn Road culvert free from debris and overgrown vegetation.

7.4 Flood Guidance

- 7.4.1 The proposed residential use is classified as 'more vulnerable'.
- 7.4.2 All development is acceptable within Flood Zone 1. As such, the Sequential Test will be passed, and the Exception Test would not be required.

7.5 Site Drainage

- 7.5.1 The proposed development will increase the impermeable surfaces and therefore increase the amount of runoff.
- 7.5.2 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.
- 7.5.3 Surface water runoff from the proposed development would be attenuated onsite up to and including the 1 in 100-year event, plus 40% climate change.

7.5.4 Surface water runoff from the Site will be restricted to the greenfield rates using complex controls which would ensure no increase in flood risk downstream from the Site.

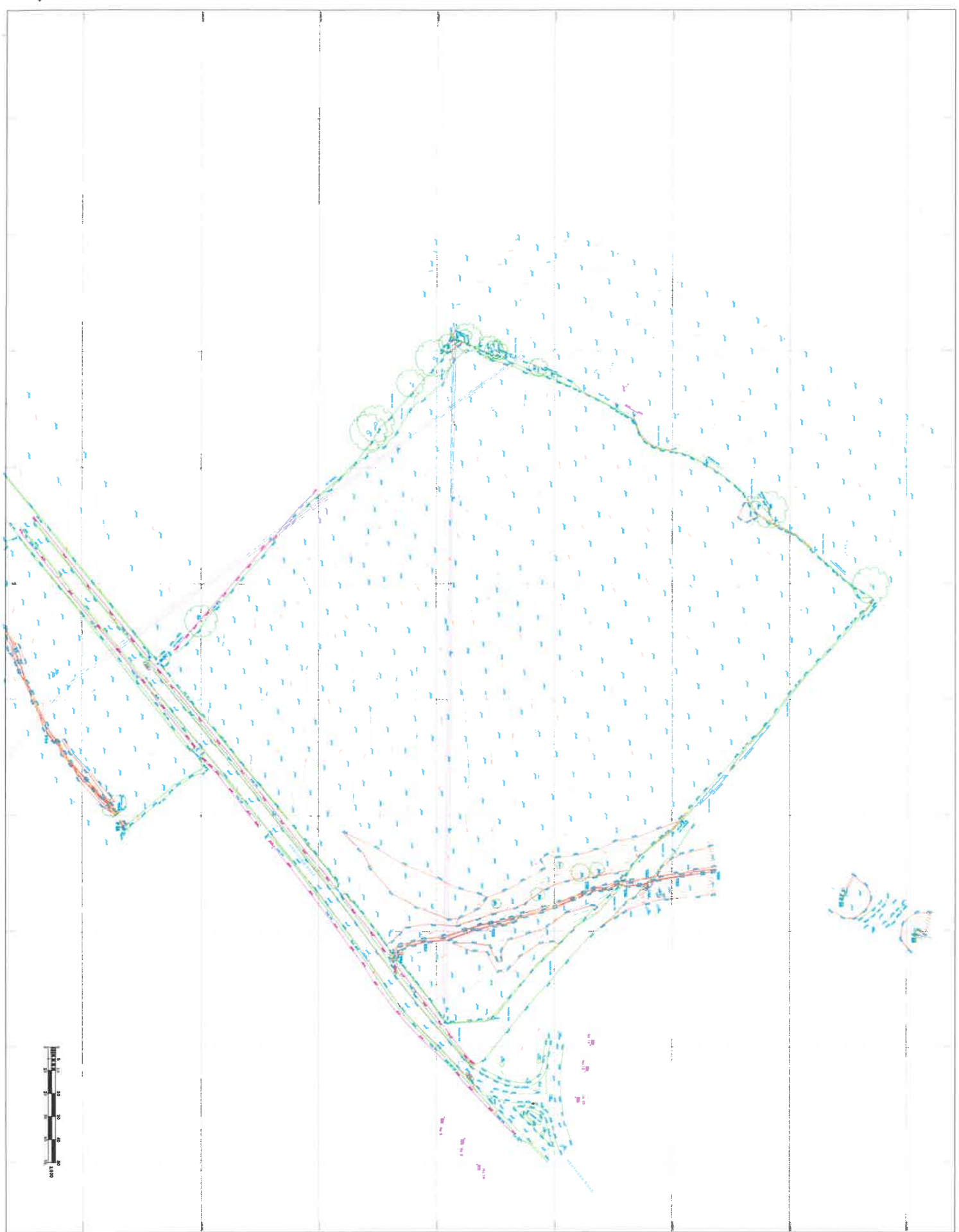
7.6 Conclusion

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 and surface water drainage.

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Appendix 1 – Topographic Survey



NOTES

1. This map is a preliminary plan and should not be used for construction purposes without the approval of the Engineer.

2. The proposed road layout is shown in red and green. The existing road layout is shown in blue.

3. The proposed road layout is shown with stationing and elevations. The existing road layout is shown with stationing and elevations.

4. The proposed road layout is shown with a width of 20 feet. The existing road layout is shown with a width of 20 feet.

5. The proposed road layout is shown with a centerline. The existing road layout is shown with a centerline.

6. The proposed road layout is shown with a right-of-way. The existing road layout is shown with a right-of-way.

7. The proposed road layout is shown with a shoulder. The existing road layout is shown with a shoulder.

8. The proposed road layout is shown with a drainage ditch. The existing road layout is shown with a drainage ditch.

9. The proposed road layout is shown with a culvert. The existing road layout is shown with a culvert.

10. The proposed road layout is shown with a bridge. The existing road layout is shown with a bridge.

LEGEND

- Proposed Road Layout
- Existing Road Layout
- Proposed Right-of-Way
- Existing Right-of-Way
- Proposed Shoulder
- Existing Shoulder
- Proposed Drainage Ditch
- Existing Drainage Ditch
- Proposed Culvert
- Existing Culvert
- Proposed Bridge
- Existing Bridge

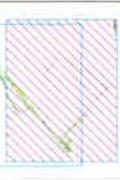
ABBREVIATIONS

- Proposed Road Layout
- Existing Road Layout
- Proposed Right-of-Way
- Existing Right-of-Way
- Proposed Shoulder
- Existing Shoulder
- Proposed Drainage Ditch
- Existing Drainage Ditch
- Proposed Culvert
- Existing Culvert
- Proposed Bridge
- Existing Bridge

STATION COORDINATES

Station	Latitude	Longitude
0+00	34° 15' 00" N	118° 15' 00" W
1+00	34° 15' 00" N	118° 15' 00" W

PLOT LOCATIONS



INFORMATION

Project: Chippewa
Harrison Road

Topographical Survey
AS OF 20.05.18
SHEET 1 OF 2

PROJECT

Project: Chippewa
Harrison Road

Topographical Survey
AS OF 20.05.18
SHEET 1 OF 2

PROJECT

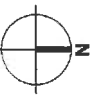
Project: Chippewa
Harrison Road

Topographical Survey
AS OF 20.05.18
SHEET 1 OF 2

PROJECT

Project: Chippewa
Harrison Road

Topographical Survey
AS OF 20.05.18
SHEET 1 OF 2



NOTES

1. This map was prepared by the Department of Transportation, Office of the State Engineer, from data furnished by the Bureau of Land Management, U.S. Department of the Interior, and the U.S. Geological Survey, U.S. Department of the Interior.

2. The map is based on the 1984 datum and is not to be used for navigation purposes.

3. The map is not to be used for navigation purposes.

4. The map is not to be used for navigation purposes.

LEGEND

- Point
- Line
- Area
- Water
- Vegetation
- Topography
- Infrastructure
- Boundaries
- Other

ABBREVIATIONS

- AL - Alabama
- AR - Arkansas
- CA - California
- CO - Colorado
- CT - Connecticut
- DE - Delaware
- FL - Florida
- GA - Georgia
- HI - Hawaii
- IL - Illinois
- IN - Indiana
- IO - Iowa
- KS - Kansas
- LA - Louisiana
- MA - Massachusetts
- MD - Maryland
- ME - Maine
- MI - Michigan
- MO - Missouri
- MT - Montana
- NE - Nebraska
- NC - North Carolina
- ND - North Dakota
- OH - Ohio
- OK - Oklahoma
- OR - Oregon
- PA - Pennsylvania
- RI - Rhode Island
- SC - South Carolina
- SD - South Dakota
- TN - Tennessee
- TX - Texas
- UT - Utah
- VA - Virginia
- VT - Vermont
- WA - Washington
- WI - Wisconsin
- WY - Wyoming

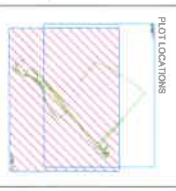
STATION COORDINATES

Station	East	North	Upland	Water
1	1000000	1000000	1000000	1000000
2	1000000	1000000	1000000	1000000
3	1000000	1000000	1000000	1000000
4	1000000	1000000	1000000	1000000
5	1000000	1000000	1000000	1000000
6	1000000	1000000	1000000	1000000
7	1000000	1000000	1000000	1000000
8	1000000	1000000	1000000	1000000
9	1000000	1000000	1000000	1000000
10	1000000	1000000	1000000	1000000

TIME SCHEDULE

Time	Start	End	Activity
1	0800	0900	Fieldwork
2	0900	1000	Fieldwork
3	1000	1100	Fieldwork
4	1100	1200	Fieldwork
5	1200	1300	Lunch
6	1300	1400	Fieldwork
7	1400	1500	Fieldwork
8	1500	1600	Fieldwork
9	1600	1700	Fieldwork
10	1700	1800	Fieldwork

PLOT LOCATIONS



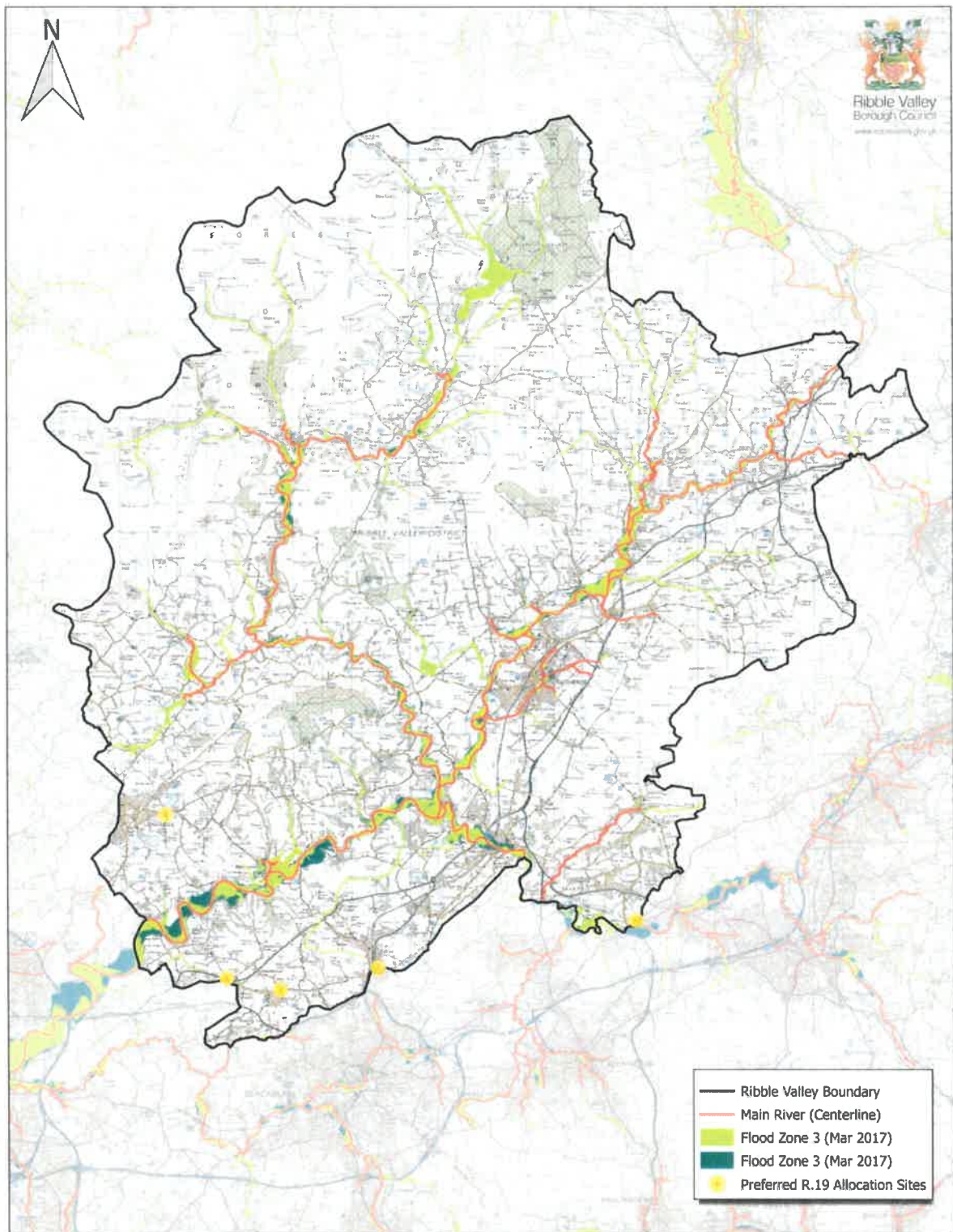
INFORMATION

Project: California
Henderson Road
Topographical Survey
AS OF 2006.18
SHEET 2 OF 2



Project No.	2006.18
Sheet No.	2 OF 2
Scale	1:5000
Author	A

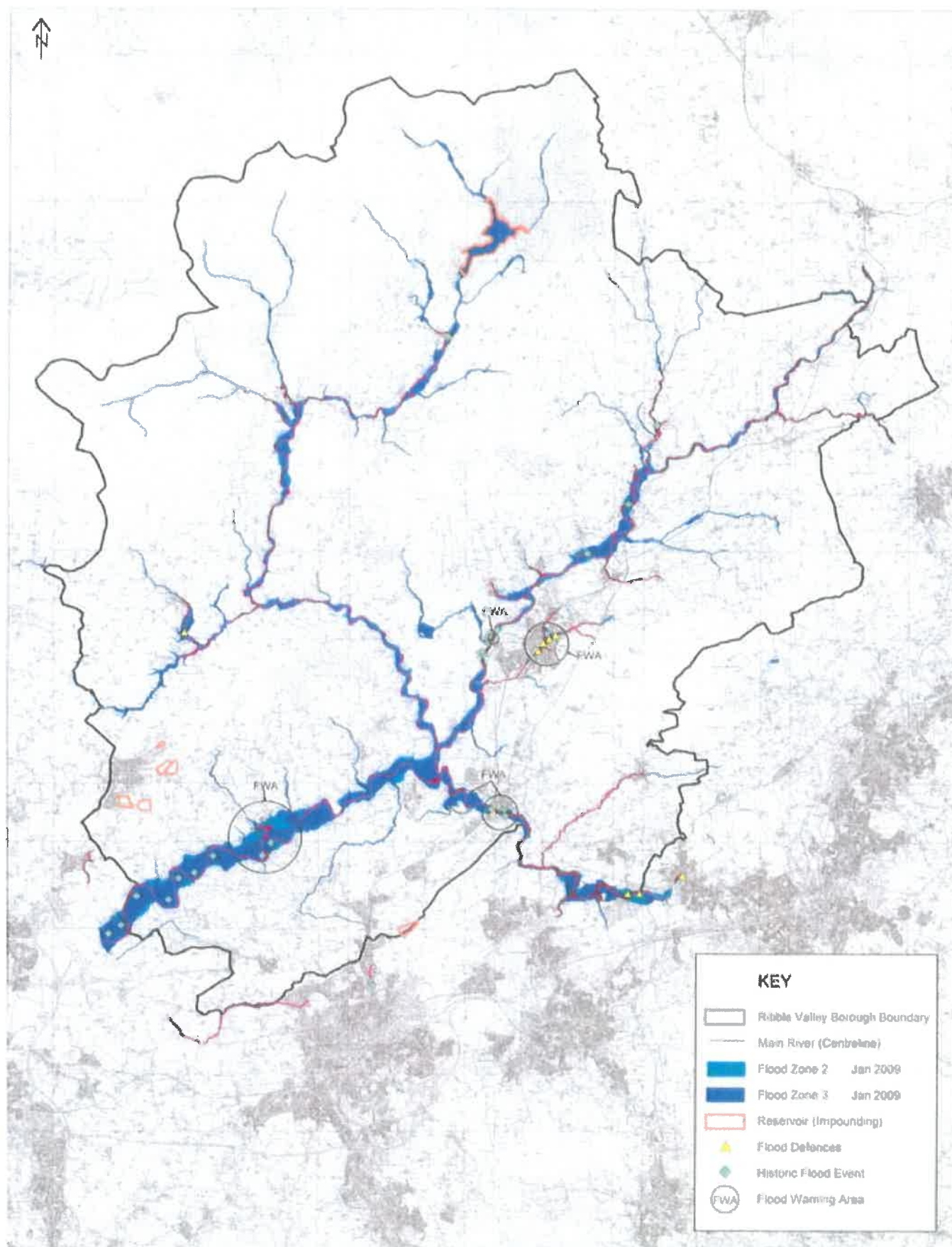
Appendix 2 – SFRA Mapping



Ribble Valley Strategic Flood Risk Assessment (Level 1)

Scale: 1:115,000
Date: 25 Apr 2017

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MAP 1 RIBBLE VALLEY STRATEGIC FLOOD RISK ASSESSMENT

Scale 1:115000

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Ribble Valley Borough Council Licence 100018041 23 April 2009

Appendix 3 – United Utilities Water Asset Plans

Commercial Drainage and Water Enquiry

Responses to a drainage and water enquiry for commercial premises or development sites.

This document was ordered by: -

Searchflow Ltd

42 Kings Hill Avenue
Kings Hill
West Malling, Kent
ME19 4AJ

Client Ref: SF26176514000

FAO:

This document was produced by: -

United Utilities Water Limited
Property Searches
Lower Ground Floor Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone 0370 7510101

e-mail - property.searches@uuplc.co.uk

The information in this document refers to: -

**Property: LAND NORTH WEST OF HENTHORN ROAD CLITHEROE LANCASHIRE
BB7 2QF**

For any queries relating to this report please e-mail, write or phone our Customer Liaison Team at the above address quoting United Utilities' Reference Number: 1365177

1. Section one: Introduction

The following records were searched in compiling this report:-

- * The map of the public sewers
- * The map of the waterworks
- * Water and Sewerage connection records
- * Adoption of public sewer records
- * Building over public sewers records
- * The properties subject to internal foul flooding
- * Adoption of public water mains records
- * The properties subject to poor water pressure and
- * Water supply clarification.

All these are held by United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP.

Please Note - We must make you aware that due to the introduction of the open market with effect from 1st April 2017 for commercial customers, Property Searches will no longer be able to resolve issues regarding some discrepancies within the report. Due to the change in the structure of the market the retailer is now responsible for taking ownership of certain issues, particularly relating to billing/tariff charges as well as, but not limited to change of usage of a property.

If you are planning works anywhere in the North West, please read our access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

United Utilities Water Limited

Registered In England & Wales No. 2366678

Registered Office Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP.

Interpretation of Drainage and Water Enquiry

Appendix 1 of this report contains definitions of terms and expressions used in the report.

Enquiries and Responses

The records were searched by Daniel Burthem for United Utilities who does not have, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

This search report was prepared by Daniel Burthem for United Utilities who does not have, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

Appendix 2 of this report contains the terms and conditions of sale

Appendix 3 of this report contains our formal complaints procedures

Commercial drainage and water search complaint procedure

In the event of any queries relating to this report please e-mail, write or phone our Customer Liaison Team at the address above quoting United Utilities reference. We will endeavour to resolve any telephone contact or complaint at the time of the call

Whilst we always try to resolve all complaints straightaway, if this is not possible and you are not happy with the course of action taken by us, you can ask us to escalate the issues internally or take your complaint to an independent third party.

We will listen to your complaint and do our best to deal with it immediately.

If we fail to give you a written substantive response within 5 working days Property Searches will compensate our client the original fee paid for a Property Searches Commercial Drainage and Water enquiry, regardless of the outcome of your complaint.

If it is a complex issue requiring more time, we will still get back to you within 5 days and notify you of progress and update you with the new timescales.

If we consider your complaint to be justified we will or we have made any errors that substantially change to outcome of the search we will-

- Refund your search fee
- Provide you with a revised search
- Take the necessary action within our power to put things right
- Keep you informed of any action required

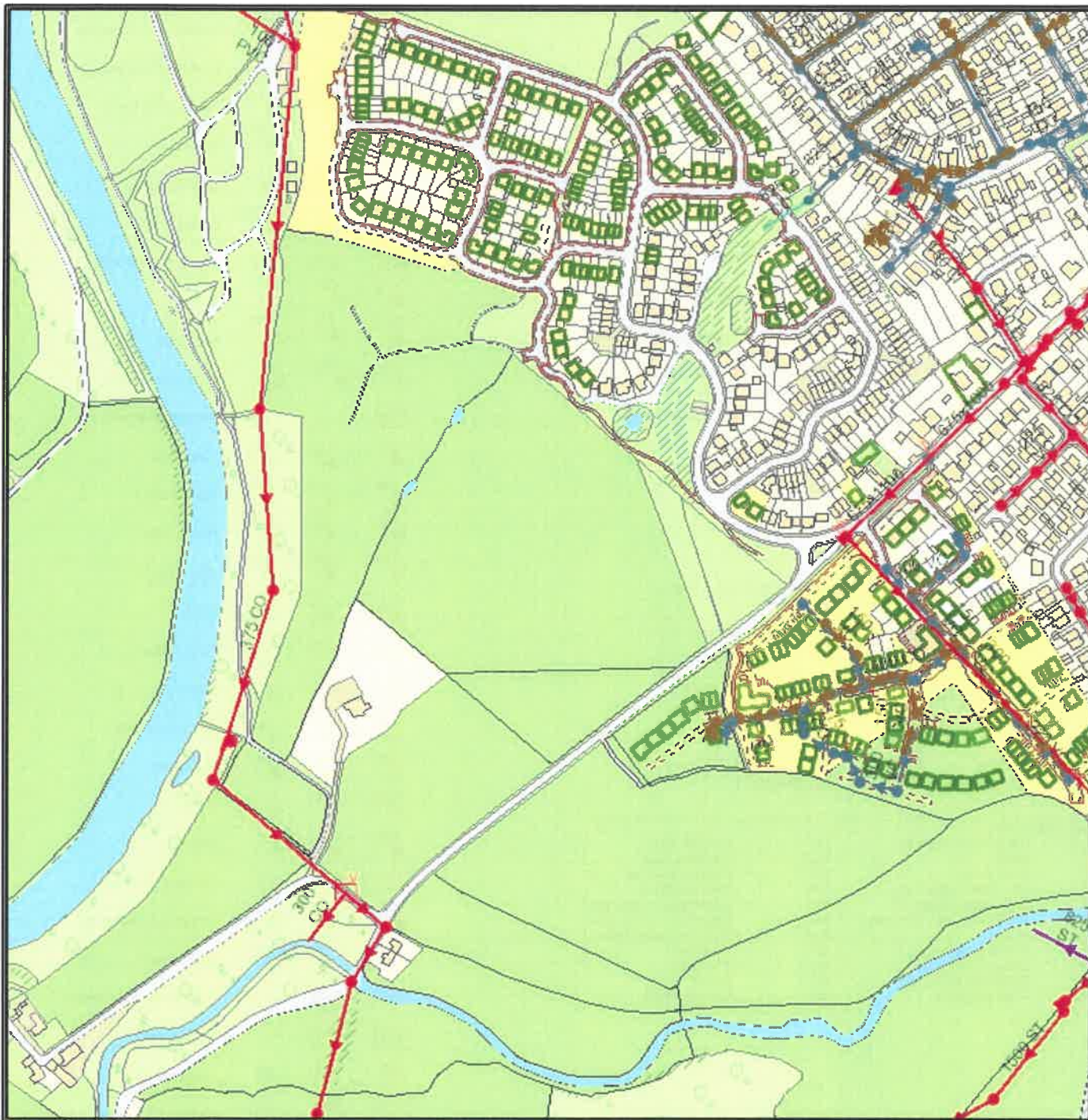
If we cannot resolve your complaint or have failed to comply with the complaints procedure you can:

- Let us know and we can escalate your complaint
- Refer the issue to an independent body of your choice.

To help understand the implications of the Drainage and Water Enquiries Report a summary guide to the content of the full report is provided below.

-  The attention of the purchaser is drawn to this response. The purchaser may wish to make further investigations into this situation.
-  This response represents the typical situation for a property.
-  This response represents an uncommon situation for a property and the purchaser should carefully consider its implications.

Question	Report Schedule	Answer
1	Where relevant, please include a copy of an extract from the public sewer map.	Yes & in vicinity 
2	Where relevant, please include a copy of an extract from the map of waterworks.	Yes & in vicinity 
3	Does foul water from the property drain to a public sewer?	Plot of Land 
4	Does surface water from the property drain to a public sewer?	Plot of Land 
5	Is a surface water drainage charge payable?	No 
6	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	None 
6.1	Does the public sewer map indicate any pumping station or any other ancillary apparatus within the boundaries of the property?	None 
7	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	None 
7.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?	None 
8.1	Are any sewers or lateral drains serving or which are proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?	No 
8.2	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No 
9	Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	None 
10	Is the property, or part of the property, at risk of internal foul flooding due to overloaded public sewers?	No 
11	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	Yes 
12	Is the property connected to mains water supply?	Plot of Land 
13	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	No 
14	Is any water main or service pipe serving or which is proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?	No 
15	Is the building at risk of receiving low water pressure or flow?	No 
16	What is the clarification of the water supply for the property?	Very Soft 
18	Please include details of the location of any water meter serving the property.	No Meter 
19	Who is responsible for providing the sewerage services for the property?	United Utilities 
19	Who is responsible for providing the water services for the property?	United Utilities 
20	Who bills the property for sewerage services?	Not Billed 
21	Who bills the property for water services?	Not Billed 
AQ1	Has a customer been granted a trade effluent consent at this property?	No 
AQ2	Is there an easement affecting the property?	No 

SEWER RECORD LAND NORTH WEST OF HENTHORN ROAD CLITHEROE LANCASHIRE BB7 2QF


The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water Limited will not accept any liability for any damage caused by the actual positions being different from those shown.

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Waste Water Symbolology

Combined Foul Surface Overflow

				Manhole
				Manhole, side entry
				Public sewer
				Private sewer
				S104 sewer
				Rising main, public
				Rising main, private
				Rising main, S104
				Highway drain, private
				Screen chamber
				Discharge point
				Outfall
				Control kiosk
				Sludge main

Abandoned pipe	
	Public sewer
	Rising main
	Private sewer
	Sludge main

Manhole function	
FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

Sewer shape		U	Unspecified
CI	Circular	SQ	Square
EG	Egg	TR	Trapezoidal
OV	Oval	AR	Arch
FT	Flat top	BA	Barrel
RE	Rectangular	HO	Horse shoe

Sewer material			
AC	Asbestos cement	DI	Ductile iron
BR	Brick	VC	Vitrified clay
CO	Concrete	PP	Polypropylene
CSB	Concrete segment	PF	Pitched fibre
CSU	Concrete segment	MA	Masonry, coursed
CC	Concrete box culverted	MA	Masonry, random
PSC	Plastic	RP	Reinforced plastic
GR	Glass reinforced	CI	Cast iron
GRP	Glass reinforced	SI	Spun iron
PVC	Polyvinyl chloride	ST	Steel
PE	Polyethylene	U	Unspecified

			WW pumping station
			Inspection chamber
			Extent of survey
			Head of system
			Soakaway
			Rodding eye
			Lamp hole
			T junction/saddle
			Gully
			Air valve
			Non return valve
			Sewer overflow
			Cascade
			Flow meter
			Hatch box
			Hydrobrake
			Inlet
			Bifurcation
			Catchpit
			Oil interceptor
			Penstock
			Summit
			Valve
			Valve chamber
			Washout chamber
			Drop shaft
			WW treatment works
			Septic tank
			Vent column
			Network storage tank
			Orifice plate
			Vortex chamber
			Penstock chamber

Clean Water Symbolology

Proposed	Abandoned	Live	
			Distribution Main
			Trunk Main
			Comms Pipe
			Private Pipe
			Concessionary Service
			Raw Water
			LDTM Raw Water
			LDTM Treated Water

Air Valve

AC Valve, open

AC Valve, closed

CC Valve, open

CC Valve, closed

Non Return Valve

Pressure Management Valve

OMS Valve

Stop Tap

Flow Meter

Domestic Meter

Commercial Meter

Pump

Hydrant

Fire Hydrant

Anode

Chlorination Point

De-chlorination Point

Strainer Point

Access Point

Hatch Box

IP Point

Sampling Station

Logger Box

Bore Hole

Bulk Supply Point

Inlet Point

End Cap

Site Termination

Change of Characteristic

Property Types

Water Tower

Valve House

Booster Pumping Station

Intake Pumping Station

Water Treatment Works

Supply Reservoir

Service Reservoir

Impounding Reservoir

Pipe Bridge

Condition Report

Material Types

AC	Asbestos Cement
CI	Cast Iron
CU	Copper
CO	Concrete
DI	Ductile Iron
GI	Galvanised Iron
GR	Grey Iron
OT	Others
PB	Lead
PV	uPVC
SI	Spun Iron
ST	Steel
UN	Unknown
PE	Ployethelene

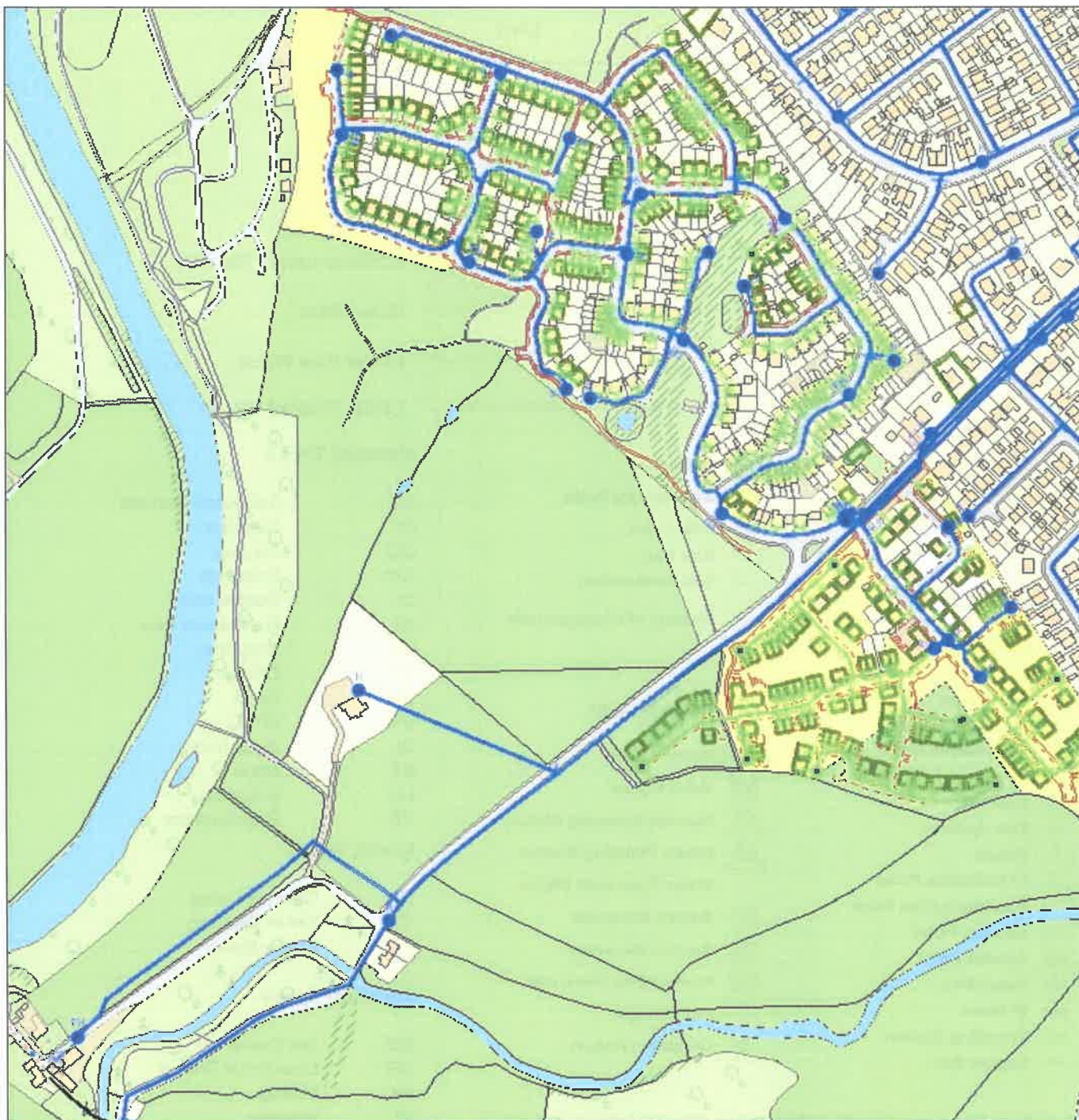
Lining Types

CL	Cement Lining
TB	Tar or Bitumen
ERL	Epoxy Resin

Insertion Types

DD	Die Drawn
DR	Directional Drilling
MO	Moling
PI	Pipeline
SL	Slip Lined

Symbology for proposed assets is the same as above, but shown in **green**.

WATER RECORD LAND NORTH WEST OF HENTHORN ROAD CLITHEROE LANCASHIRE BB7 2QF


The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water Limited will not accept any liability for any damage caused by the actual positions being different from those shown.

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Question 1 **Where relevant, please include a copy of an extract from the public sewer map.**

Answer **A copy of an extract of the public sewer map within the vicinity of the property is included.**

Informative 1. The Water Industry Act 1991 defines Public Sewers as those which (United Utilities) have responsibility for. Other assets and rivers, water courses, ponds, culverts or highway drains may be shown for information purposes only.

2. Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

3. The Sewerage Undertaker has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of the Sewerage Undertaker or its contractors needing to enter the property to carry out work.

Question 2 **Where relevant, please include a copy of an extract from the map of waterworks.**

Answer **A copy of an extract of the map of waterworks is included, showing water mains, resource mains or discharge pipes in the vicinity of the property.**

Informative The "water mains" in this context are those which are vested in and maintainable by the Water Undertaker under statute.

Assets other than public water mains may be shown on the plan, for information only.

Water Undertakers are not responsible for private supply pipes connecting the property to the public water main and do not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

If an extract of the public water main record is enclosed, it will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

The presence of a public water main running within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the Water Undertaker or its contractors needing to enter the property to carry out work.

Question 3 Does foul water from the property drain to a public sewer?

Answer This enquiry appears to relate to a plot of land or a recently built property. It is recommended that drainage proposals are checked with the developer.

Informative Sewerage Undertakers are not responsible for any private drains or sewers that connect the property to the public sewerage system, and do not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

If foul water does not drain to the public sewerage system the property may have private facilities in the form of a cesspit, septic tank or other type of treatment plant.

If an extract from the public sewer map is enclosed, this will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

Question 4 Does surface water from the property drain to a public sewer?

Answer This enquiry appears to relate to a plot of land or a recently built property. It is recommended that drainage proposals are checked with the developer. If the property was constructed after the 6th April 2015 the surface water drainage may be served by a sustainable drainage system.

Informative Sewerage Undertakers are not responsible for any private drains or sewers that connect the property to the public sewerage system and do not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

In some cases, Sewerage Undertakers' records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Sewerage Undertaker.

If surface water does not drain to the public sewerage system the property may have private facilities in the form of a soakaway or private connection to a watercourse.

If an extract from the public sewer map is enclosed, this will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

Question 5 **Is a surface water drainage charge payable?****Answer** **Records confirm that a surface water drainage charge is not payable for the property.**

Informative Since 1st April 2017 commercial customers can choose their retailer for clean, waste or both services. For more information on any applicable surface water charges you will need to contact the current owner of the property to find out who the current retailer is. Details of the retailer for a property can be found on the current occupiers bill. For a list of all potential retailers of water and waste water services for the property please visit www.open-water.org.uk.

Please note if the property was constructed after 6th April 2015 the Surface Water drainage may be served by a Sustainable Drainage System. Further information may be available from the Developer.

Question 6 **Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?**

Answer **The public sewer map included indicates that there are no public sewers, disposal mains or lateral drains within the boundary of the property. However from the 1st October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map which may further prevent or restrict development of the property. If you are considering any future development at this property which may require build over consent, please complete the enquiry form by accessing the following link**
<http://www.unitedutilities.com/planning-wastewater-guidance.aspx>.

Informative The approximate boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.
The presence of a public sewer running within the boundary of the property may restrict further development.

United Utilities has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of United Utilities or its contractors needing to enter the property to carry out work.

Sewers indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended that these details be checked with the developer, if any.

Assets other than public sewers may be shown on the copy extract, for information only. Please note if the property was constructed after 1st July 2011 any sewers and/or lateral drains within the boundary of the property are the responsibility of the householder.

Question 6.1 Does the public sewer map indicate any pumping station or any other ancillary apparatus within the boundaries of the property?

Answer The public sewer map included indicates that there is no public pumping station or other ancillary apparatus within the boundaries of the property. However, from the 1st October 2016 private pumping stations which serve more than one property will be transferred into public ownership but may not be recorded on the public sewer map until that time

Informative From 1 October 2016 United Utilities will be responsible for private pumping stations (though we may take ownership of some stations before this date) that either:

- serve a single property, and are outside the property boundary or
- serves two or more properties

Only private pumping stations installed before 1st July 2011 will be transferred into our ownership. United Utilities will be responsible for all associated costs, maintenance, repairs and any necessary upgrade work.

United Utilities has rights of access to maintain this asset on a regular basis.

Question 7 Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

Answer The public sewer map included indicates that there are no public sewers within 30.48 (100 feet) of a building within the boundary of the property. However from the 1st October 2011 private sewers will be transferred into public ownership and may not be recorded on the public sewer map and it is our professional opinion that there will be a public sewer within 30.48 (100 feet) of a building within the boundary of the property.

Informative From 1st October 2011 there may be additional lateral drains and/or public sewers which are not recorded on the public sewer map but are also within 30.48 metres (100 feet) of a building within the property.

The presence of a public sewer within 30.48 metres (100 feet) of the building(s) within the property can result in the Local Authority requiring a property to be connected to the public sewer.

The measure is estimated from the Ordnance Survey record, between the building(s) within the boundary of the property and the nearest public sewer.

Sewers indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended that these details are checked with the developer, if any.

Assets other than public sewers may be shown on the copy extract for information only.

Where the property is part of a very recent or ongoing development and the sewers/pumping station are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains, sewers and pumping stations for which they will hold maintenance and renewal liabilities.

Question 7.1 Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?

Answer The public sewer map included indicates that there is no public pumping station or other ancillary apparatus within 50 metres of any buildings within the property. However, from 1st October 2016 private pumping stations which serve more than one property will be transferred into public ownership but may not be recorded on the public sewer map until that time.

Informative From 1 October 2016 United Utilities will be responsible for private pumping stations (though we may take ownership of some stations before this date) that either:
" serve a single property, and are outside the property boundary or
" serves two or more properties
Only private pumping stations installed before 1st July 2011 will be transferred into our ownership. United Utilities will be responsible for all associated costs, maintenance, repairs and any necessary upgrade work.

Where the property is part of a very recent or ongoing development and the sewers/pumping station are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains, sewers and pumping stations for which they will hold maintenance and renewal liabilities.

Question 8.1 Are any sewers or lateral drains serving or which are proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?

Answer Records confirm that foul sewers and/or lateral drains serving the development, of which the property forms part are not the subject of an existing adoption agreement or an application for such an agreement.

Informative This enquiry is of interest to purchasers of new property who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Question 8.2 Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?

Answer the surface water sewer(s) and/or surface water lateral drain(s) are not the subject of an adoption agreement and it is recommended that responsibility for maintenance of these is checked with the Developer as this may be due to a Sustainable Drainage

Informative This enquiry is of interest to purchasers of new property who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Question 9 Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?

Answer There are no records in relation to any approval or consultation about plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.

Informative From the 1st October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership and the sewerage undertaker may not have granted approval or been consulted about any plans to erect a building or extension on the property over or in the vicinity of these assets.

Prior to 2003 United Utilities Water Limited had sewerage agency agreements with the local authorities therefore details of any agreements/consents or rejections may not have been forwarded on to our offices before this date.

Buildings or extensions erected over a sewer in contravention of building controls may have to be removed or altered.

Question 10 Is the property, or part of the property, at risk of internal foul flooding due to overloaded public sewers?

Answer The building is not recorded as being at risk of internal flooding due to overloaded public sewers. From the 1st October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership it is therefore possible that a property may be at risk of internal flooding due to an overloaded public sewer which the sewerage undertaker is not aware of. For further information it is recommended that enquiries are made of the vendor.

Informative

1. A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
2. "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
3. These are defined as properties that have suffered or are likely to suffer internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Sewerage Undertaker's reporting procedure.
4. Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included.
5. Properties may be at risk of flooding but not included where flooding incidents have not been reported to the Sewerage Undertaker.
6. Public sewers are defined as those for which the Sewerage Undertaker holds statutory responsibility under the Water Industry Act 1991.
7. It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Sewerage Undertaker.
8. This report excludes flooding from private sewers and drains and the Sewerage Undertaker makes no comment upon this matter. For reporting purposes buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.

Question 11 Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.

Answer The nearest Sewage Treatment Works is 0.29 miles (0.46 km), South East of the property. The name of the Sewage treatment works is CLITHEROE WWTW.

The owner is United Utilities

Informative The nearest sewage treatment works will not always be the sewage treatment works serving the catchment within which the property is situated i.e. the property may not necessarily drain to this works.

The Sewerage Undertaker's records were inspected to determine the nearest sewage treatment works.

It should be noted therefore that there may be a private sewage treatment works closer than the one detailed above that has not been identified. As a responsible utility operator, United Utilities Water Limited seeks to manage the impact of odour from operational sewage works on the surrounding area.

This is done in accordance with the "Code of Practice on Odour Nuisance from Sewage Treatment Works" issued via the Department of Environment, Food and Rural Affairs (DEFRA).

This Code recognises that odour from sewage treatment works can have a detrimental impact on the quality of the local environment for those living close to works.

However DEFRA also recognises that sewage treatment works provide important services to communities and are essential for maintaining standards in water quality and protecting aquatic based environments. For more information visit www.unitedutilities.com.

Question 12 Is the property connected to mains water supply?

Answer This enquiry relates to a plot of land or a recently built property. It is recommended that the water supply proposals are checked with the developer.

Informative If the property is supplied by private water mains please note that details of private supplies are not kept by the Water Undertaker. The situation should be checked with the current owner of the property.

Question 13 Are there any water mains, resource mains or discharge pipes within the boundaries of the property?

Answer The map of waterworks does not indicate any water mains, resource mains or discharge pipes within the boundaries of the property.

Informative The boundary of the property has been determined by reference to the Ordnance Survey record.

The presence of a public water main within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice.

This may result in employees of the Water Undertaker or its contractors needing to enter the property to carry out work.

Question 14 Is any water main or service pipe serving or which is proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?

Answer Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.

Informative This enquiry is of interest to purchasers of new premises who will want to know whether or not the property will be linked to the mains water supply.

Question 15 Is the building at risk of receiving low water pressure or flow?

Answer **Records confirm that the building is not recorded by the water undertaker as being at risk of receiving low water pressure or flow.**

Informative The boundary of the property has been determined by reference to the Ordnance Survey record. "Low water pressure" means water pressure below the regulatory reference level which is the minimum pressure when demand on the system is not abnormal.

Water Undertakers report properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level).

The reference level of service is a flow of 9 litres/minute at a pressure of 10 metres head on the customer's side of the main stop tap. The reference level of service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap. The reference level applies to a single property.

Allowable exclusions:

The Water Undertaker to include in the properties receiving pressure below the reference level, provided that allowable exclusions listed below do not apply.

Abnormal demand:

This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand, which are normally expected. Water Undertakers exclude from figures properties which are affected by low pressure only on those days with the highest peak demands. During the report year Water Undertakers may exclude, for each property, up to five days of low pressure caused by peak demand.

Planned maintenance:

Water Undertakers will not report low pressures caused by planned maintenance.

It is not intended that Water Undertakers identify the number of properties affected in each instance. However, Water Undertakers must maintain sufficiently accurate records to verify that low-pressure incidents that are excluded because of planned maintenance, are actually caused by maintenance.

One-off incidents:

This exclusion covers a number of causes of low pressure; mains bursts; failures of company equipment (such as pressure reducing valves or booster pumps); fire fighting and action by a third party.

However, if problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded.

Low pressure incidents of short duration:

Properties affected by low pressures that only occur for a short period, and for which there is evidence that incidents of a longer duration would not occur during the course of the year, may be excluded.

It should be noted that low water pressure can occur from private water mains, private supply pipes (the pipework from the external stop cock to the property) or internal plumbing which are not the responsibility of the Water Undertaker. This report excludes low water pressure from private water mains, supply pipes and internal plumbing and the Water Undertaker makes no comment upon this matter.

Question 16 What is the clarification of the water supply for the property?

Answer The water supplied to the property has an average water hardness of 54 mg/l calcium carbonate which is defined as very soft by United Utilities.

Informative

The hardness of water is due to the presence of calcium and magnesium minerals that are naturally present in the water. The usual signs of a hard water supply are scaling inside kettles, poor lathering of soaps and scum.

What is water hardness?

Hard water is formed when water passes through or over limestone or chalk areas and calcium and magnesium ions dissolve into the water. The hardness is made up of two parts: temporary (carbonate) and permanent (non-carbonate) hardness. When water is boiled, calcium carbonate scale can form, which can deposit on things like kettle elements. The scale will not stick to kettles that have a plastic polypropylene lining but will float on the surface. The permanent hardness that comprises calcium and magnesium sulphate does not go on to form scale when heated or boiled.

How is water hardness measured?

Hardness is usually expressed in terms of the equivalent quantity of calcium carbonate (CaCO₃) in milligrams per litre or parts per million. You may also see hardness expressed as degrees of hardness in Clark (English) degrees, French or German degrees. Interconversion between the different measurements can be made by using the appropriate conversion factors below.

There are no standard levels as to what constitutes a hard or a soft water. Table 1 gives an indication of the equivalents of calcium and calcium carbonate and the relative degree of hardness.

Water quality standards

There are no regulatory standards for water hardness in drinking water.

Water hardness in the North West

The majority of raw water in the United Utilities region comes from upland surface water reservoirs. The water in the reservoirs has little chance of passing through rocks and to dissolve the minerals that make water hard. Therefore, the majority of water in this region is soft or very soft. We supply water from a number of boreholes in the south of the region that are reasonably hard, but these tend to be blended with softer sources to meet demand. No water supply in the North West is artificially softened.

Can hard water be softened?

Yes, water can be softened artificially by the installation of a water softener or the use of 'jug type' filters. Medical experts recommend that a non-softened supply is maintained for drinking purposes because softened water may contain high levels of sodium. Softeners should be fitted after the drinking water tap and comply with the requirements of the Water Supply (Water Fittings) Regulations 1999. They should be maintained in accordance with manufacturers' instructions.

If you're interested in finding out more about the quality of your drinking water, please visit www.unitedutilities.com/waterquality and enter your postcode..

The Drinking Water Inspectorate is responsible for ensuring the quality of public water supplies. Visit their website at: www.dwi.defra.gov.uk

Table 1 Drinking water hardness

mg Ca/l	mg CaCO ₃ /l	Clark Degrees	French Degrees	German Degrees	Hardness
<30	<75	<5.3	<7.5	<4.2	Very soft
30-50	75 - 125	5.3 - 8.8	7.5 - 12.5	4.0 - 7.0	Soft
50-100	125 - 250	8.8 - 17.5	12.5 - 25.0	7.0 - 14.0	Mod. hard
100-150	250 - 375	17.5 - 26.3	25.0 - 37.5	14.0 - 21.0	Hard
>150	>375	>26.3	>37.5	>21.0	Very hard

Question 18 Please include details of the location of any water meter serving the property.

Answer Records indicate that the property is not served by a water meter.

Informative Where the property is not served by a meter the current occupier can contact the retailer directly to advise on the current charging method, details of the retailer can also be found on the current occupiers bill.

Question 19 Who is responsible for providing the sewerage services for the property?

Answer United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP is the sewerage undertaker for the area and United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP is the water undertaker for the area.

Informative Not Applicable

Question 20 Who bills the property for sewerage services?

Answer Since 1st April 2017 commercial customers can choose their retailer. If you wish to know who currently bills the property for sewerage services you will need to contact the current owner of the property to find out who the current retailer is.

Informative Details of the retailer for a property can be found on the current occupiers bill. For a list of all potential retailers of waste water services for the property please visit www.open-water.org.uk

Question 21 Who bills the property for water services?

Answer Since 1st April 2017 commercial customers can choose their retailer. If you wish to know who currently bills the property for water services you will need to contact the current owner of the property to find out who the current retailer is.

Informative Details of the retailer for a property can be found on the current occupiers bill. For a list of all potential retailers of water services for the property please visit www.open-water.org.uk

Additional Questions

**Additional
Question 1
Answer**

Has a customer been granted a trade effluent consent at this property?

There is no record of a Trade Effluent consent at this property. Applications for Trade Effluent consents should be submitted via your retailer for info please visit <https://www.unitedutilities.com/services/wholesale-services/trade-effluent/>

Informative

The owner/occupiers of Trade Premises do not have the right to discharge Trade Effluent to the public wastewater network. Any Trade Effluent Discharge Consent will be issued under Section 118 of the Water Industry Act 1991 and will be subject to conditions set by the Sewerage Undertaker.

Generally these conditions are to ensure:

a) The Health and Safety of staff working within the wastewater network and at wastewater treatment plants.

b) The apparatus of the wastewater network is not damaged.

c) The flow of the contents of the wastewater network is not restricted.

d) Equipment, plant, and processes at treatment works are not disrupted or damaged.

e) Treatment of sewage sludge is not impeded and sludges are disposed of in an environmentally friendly manner.

f) Final effluent discharge from wastewater treatment plants has no impact on the environment or prevents the receiving waters from complying with EU Directives.

g) Potential damage to the environment via storm water overflows is minimised.

Disputes between an occupier of a Trade Premise and the Sewerage Undertaker can be referred to the Director General of Water Services (OFWAT).

Protecting Public Sewers - Discharges Section 111 of the Water Industry Act 1991, places prohibition on the discharge of the following into a public sewer, drain or a sewer that communicates with a public sewer.

i) Any matter likely to injure the sewer or drain, to interfere with the free flow of its contents or to affect prejudicially the treatment or disposal of its contents.

ii) Any chemical refuse or waste steam or any liquid of temperature higher than 43.3 degrees Celsius (110 degrees Fahrenheit).

iii) Any petroleum spirit or carbide of calcium.

On summary conviction offences under this Section carry a fine not exceeding the statutory maximum or a term of imprisonment not exceeding two years, or both.

Please note any existing consent is dependant on the business being carried out at the property and will not transfer automatically upon change of ownership.

**Additional
Question 2
Answer**

Is there an easement affecting the property?

There is no record of a formal easement agreement affecting this property.

Informative

Not Applicable.

Appendix 1 - General Interpretation

1. (1) In this Schedule-

"the 1991 Act" means the Water Industry Act 1991(a);

"the 2000 Regulations" means the Water Supply (Water Quality) Regulations 2000(b);

"the 2001 Regulations" means the Water Supply (Water Quality) Regulations 2001(c);

"adoption agreement" means an agreement made or to be made under Section 51A(1) or 104(1) of the 1991 Act (d);

"bond" means a surety granted by a developer who is a party to an adoption agreement;

"bond waiver" means an agreement with a developer for the provision of a form of financial security as a substitute for a bond;

"calendar year" means the twelve months ending with 31st December;

"discharge pipe" means a pipe from which discharges are made or are to be made under Section 165(1) of the 1991 Act;

"disposal main" means (subject to Section 219(2) of the 1991 Act) any outfall pipe or other pipe which-
(a) is a pipe for the conveyance of effluent to or from any sewage disposal works, whether of a sewerage undertaker or of any other person; and
(b) is not a public sewer;

"drain" means (subject to Section 219(2) of the 1991 Act) a drain used for the drainage of one building or any buildings or yards appurtenant to buildings within the same curtilage;

"effluent" means any liquid, including particles of matter and other substances in suspension in the liquid;

"financial year" means the twelve months ending with 31st March;

"lateral drain" means-

- (a) that part of a drain which runs from the curtilage of a building (or buildings or yards within the same curtilage) to the sewer with which the drain communicates or is to communicate; or
- (b) (if different and the context so requires) the part of a drain identified in a declaration of vesting made under Section 102 of the 1991 Act or in an agreement made under Section 104 of that Act (e);

"licensed water supplier" means a company which is the holder for the time being of a water supply licence under Section 17A(1) of the 1991 Act(f);

"maintenance period" means the period so specified in an adoption agreement as a period of time-

- (a) from the date of issue of a certificate by a Sewerage Undertaker to the effect that a developer has built (or substantially built) a private sewer or lateral drain to that undertaker's satisfaction; and
- (b) until the date that private sewer or lateral drain is vested in the Sewerage Undertaker;

"map of waterworks" means the map made available under Section 198(3) of the 1991 Act (g) in relation to the information specified in subsection (1A);

"private sewer" means a pipe or pipes which drain foul or surface water, or both, from premises, and are not vested in a Sewerage Undertaker;

"public sewer" means, subject to Section 106(1A) of the 1991 Act(h), a sewer for the time being vested in a Sewerage Undertaker in its capacity as such, whether vested in that undertaker-

- (a) by virtue of a scheme under Schedule 2 to the Water Act 1989(i);
- (b) by virtue of a scheme under Schedule 2 to the 1991 Act (j);

- (c) under Section 179 of the 1991 Act (k); or
- (d) otherwise;

"public sewer map" means the map made available under Section 199(5) of the 1991 Act (l);

"resource main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a trunk main, which is or is to be used for the purpose of-

- (a) conveying water from one source of supply to another, from a source of supply to a regulating reservoir or from a regulating reservoir to a source of supply; or
- (b) giving or taking a supply of water in bulk;

"sewerage services" includes the collection and disposal of foul and surface water and any other services which are required to be provided by a Sewerage Undertaker for the purpose of carrying out its functions;

"Sewerage Undertaker" means the company appointed to be the Sewerage Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated;

"surface water" includes water from roofs and other impermeable surfaces within the curtilage of the property;

"water main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a pipe for the time being vested in a person other than the water Undertaker, which is used or to be used by a Water Undertaker or licensed water supplier for the purpose of making a general supply of water available to customers or potential customers of the undertaker or supplier, as distinct from for the purpose of providing a supply to particular customers;

"water meter" means any apparatus for measuring or showing the volume of water supplied to, or of effluent discharged from any premises;

"Water Undertaker" means the company appointed to be the Water Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated.

(2) In this Schedule, references to a pipe, including references to a main, a drain or a sewer, shall include references to a tunnel or conduit which serves or is to serve as the pipe in question and to any accessories for the pipe.

(a) 1991 c. 56.

(b) S.I. 2000/3184. These Regulations apply in relation to England.

(c) S.I. 2001/3911. These Regulations apply in relation to Wales.

(d) Section 51A was inserted by Section 92(2) of the Water Act 2003 (c. 37). Section 104(1) was amended by Section 96(4) of that Act.

(e) Various amendments have been made to Sections 102 and 104 by Section 96 of the Water Act 2003.

(f) Inserted by Section 56 of and Schedule 4 to the Water Act 2003.

(g) Subsection (1A) was inserted by Section 92(5) of the Water Act 2003.

(h) Section 106(1A) was inserted by Section 99 of the Water Act 2003.

(i) 1989 c. 15.

(j) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.

(k) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.

(l) Section 199 was amended by Section 97(1) and (8) of the Water Act 2003.

Appendix 2 - DRAINAGE AND WATER ENQUIRY (COMMERCIAL) AGREEMENT

The Customer, the Client and the Purchaser are asked to note this Agreement which governs the basis on which this drainage and water report is supplied

Definitions

'Company' means United Utilities Water Limited who produce the Report; its registered office being at Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3LP, company number 2366678.

'Order' means any request completed by the Customer requesting the Report.

'Report' means the drainage and water report prepared by the Company in respect of the Property.

'Property' means the address or location supplied by the Customer in the Order.

'Customer' means the person, company, firm or other legal body placing the Order, either on their own behalf as Client, or, as an agent for a Client.

'Client' means the person, company or body who is the intended recipient of the Report with an actual or potential interest in the Property.

'Purchaser' means the actual or potential purchaser of the Property including their mortgage lender.

Agreement

1.1 The Company agrees to supply the Report to the Customer and the Client subject to this Agreement. The scope and limitations of the Report are described in clause 2 of this Agreement.

Where the Customer is acting as an agent for the Client then the Customer shall be responsible for bringing this Agreement to the attention of the Client and the Purchaser.

1.2 The Customer, the Client and the Purchaser agree that the placing of an Order for a Report and the subsequent provision of a copy of the Report to the Client and/ or the Purchaser indicates their acceptance of this Agreement.

The Report

Whilst the Company will use reasonable care and skill in producing the Report, it is provided to the Customer, the Client and the Purchaser on the basis that they acknowledge and agree to the following:

2.1 The information contained in the Report can change on a regular basis so the Company cannot be responsible to the Customer, the Client and the Purchaser for any change in the information contained in the Report after the date on which the Report was produced and sent to the Client.

2.2 The Report does not give details about the actual state or condition of the Property nor should it be used or taken to indicate or exclude actual suitability or unsuitability of the Property for any particular purpose, or relied upon for determining saleability or value, or used as a substitute for any physical investigation or inspection. Further advice and information from appropriate experts and professionals should always be obtained.

2.3 The information contained in the Report is based upon the accuracy, completeness and legibility of the address and/or plans supplied by the Customer or Client or Purchaser.

2.4 The Report provides information as to the location and connection status of existing services and other information in relation to drainage and water enquiries and should not be relied on for any other purpose. The Report may contain opinions or general advice to the Customer, the Client and the Purchaser. The Company cannot ensure that any such opinion or general advice is accurate, complete or valid and therefore accepts no liability in relation thereto.

2.5 The position and depth of apparatus shown on any maps attached to the Report are approximate and are furnished as a general guide only, and no warranty as to its correctness is given or implied. The exact positions and depths should be obtained by excavation trial holes and the maps must not be relied on in the event of excavation or other works made in the vicinity of the Company's apparatus.

Liability

3.1 The Company shall not be liable to the Client or the Purchaser for any failure defect or non-performance of its obligations arising from any failure to provide or delay in providing the Report to the extent that such failure or delay is due to an event or circumstance beyond the reasonable control of the Company including but not limited to any delay, failure of or defect in any machine, processing system or transmission link or any failure or default of a supplier or sub-contractor of the Company or any provider of any third party Information except to the extent that such failure or delay is caused by the negligence of the Company.

3.2 Where a Report is requested for an address falling within a geographical area where two different companies separately provide Water and Sewerage Services, then it shall be deemed that liability for the information given by either company will remain with that company in respect of the accuracy of the information supplied.

A company supplying information which has been provided to it by another company for the purposes outlined in this agreement will therefore not be liable in any way for the accuracy of that information and will supply that information as an agent for the company from which the information was obtained.

3.2 The Report is produced for use in relation to individual commercial property transactions where the property is used solely for carrying on a trade or business, the property is intended to be developed for commercial gain or the property is not a single residential, domestic property. The Company's entire liability (except to the extent provided by clause 3.5) in respect of all causes of action arising by reason of or in connection with the Report (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) shall be limited to £2,000,000.

3.3 In any event, the Company shall not have any liability in contract, negligence or any other tort or for breach of statutory duty or otherwise in respect of any loss of profit, loss of revenue, loss of opportunity or anticipated savings, or any indirect or consequential loss or damage that may be suffered by the Customer, the Client or the Purchaser howsoever arising. The plans attached to the report are provided pursuant to the Company's statutory duty to make such plans available for inspection (notwithstanding the provisions of this clause) and attention is drawn to the notice on the plan(s) attached to the report which applies to the plan and its contents.

3.4 Where the Customer sells this Report to a Client or Purchaser under its own name or as a reseller of the Company (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) the Company shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty, restitution or otherwise at all) be liable to the Customer for any loss (whether direct, indirect or consequential loss (all three of which terms include without limitation, pure economic loss, loss of profit, loss of business, depletion of goodwill and like loss)) or damage whatsoever caused in respect of the Report or any use of the Report or reliance placed upon it and the Customer shall indemnify and keep indemnified the Company in respect of any claim by the Client or the Purchaser that the Company may incur or suffer.

3.5 Nothing in this Agreement shall exclude the Company's liability for death or personal injury arising from its negligence or for fraud.

Copyright and Confidentiality

4.1 The Customer, the Client and the Purchaser acknowledge that the Report is confidential and is intended for the personal use of the Client and the Purchaser. The copyright and any other intellectual property rights in the Report shall remain the property of the Company. No intellectual or other property rights are transferred or licensed to the Customer, the Client or the Purchaser except to the extent expressly provided herein.

4.2 The Customer or the Client or the Purchaser is entitled to make copies of the Report but may only copy Ordnance Survey mapping or data contained in or attached to the Report if they have an appropriate licence from the originating source of that mapping or data.

4.3 The Customer, the Client and the Purchaser agree (in respect of both the original and any copies made) to respect and not to alter any part of the Report including but not limited to the trademark, copyright notice or other property marking which appears on the Report.

4.4 The maps contained in the Report are protected by Crown Copyright and must not be used for any purpose outside the context of the Report.

4.5 The enquiries in the Report are protected by copyright by the Law Society of 113 Chancery Lane, London WC2A 1PL and must not be used for any purpose outside the context of the Report.

4.6 The Customer, the Client and the Purchaser agree to indemnify the Company against any losses, costs, claims and damage suffered by the Company as a result of any breach by either of them of the provisions of clauses 4.1 to 4.4 inclusive.

Payment

5.1 Unless otherwise stated all prices are inclusive of VAT. The Customer shall pay the price of the Report specified by the Company, without any set off, deduction or counterclaim.

5.2 Payment must be received in advance unless an account has been set up with the Company. In these cases, payment terms will be as agreed with the Company, but in any event any invoice must be paid within 30 days.

5.3 The Company reserves the right to increase fees on reasonable prior written notice at any time.

Appendix 2 continued - DRAINAGE AND WATER ENQUIRY (COMMERCIAL) AGREEMENT

Data Protection

6.1 We will process any personal data you provide to us in accordance with the Data Protection Act 1998. Any personal information you provide to us may be used for the purposes for which the information is provided and to assist with our debt recovery processes. We may also disclose it to other companies in the United Utilities group (being United Utilities Group PLC and its subsidiary companies) and their sub-contractors in connection with those purposes, but it will not be processed for other purposes or disclosed to other third parties without your express permission. We may also utilise any information we collect so that we are able to correctly administer, develop and improve the business and services we provide to our customers.

General

7.1 If any provision of this Agreement is or becomes invalid or unenforceable, it will be taken to be removed from the rest of this Agreement to the extent that it is invalid or unenforceable. No other provision of this Agreement shall be affected.

7.2 This Agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts.

7.3 Nothing in this Agreement and conditions shall in any way restrict the Customer's the Client's or the Purchaser's statutory or any other rights of access to the information contained in the Report.

7.4 This Agreement and conditions may be enforced by the Customer, the Client and the Purchaser.

7.5 Before you agree to this Agreement, please note it is your responsibility to ensure your client/customer is aware of them and that any objections are raised accordingly.

Appendix 4 – Environment Agency Correspondence

Ian Hopkinson

From: Eric O'Connor
Sent: 21 June 2018 08:42
To: Ian Hopkinson
Subject: Henthorn Road, Clitheroe - EA Response

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Anna-Lisa

Thank you for contacting the Environment Agency regarding a Flood Risk Assessment (FRA) for a proposed residential development on land north-west of Henthorn Road, Clitheroe, BB7 2QW (Grid ref: SD7289340829). You also asked about biodiversity data. I apologise for the delay in responding to you.

We respond under the Freedom of Information Act 2000 and Environment Regulations 2004. Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Can you confirm the flood zone within the site?

Our assessment of Pendleton Brook and River Ribble indicates that the site is located in Flood Zone 1, therefore the site classified as very low risk of flooding from rivers and sea based upon our current understanding. Please note that the Environment Agency are currently undertaking updated modelling for this area.

Are you able to provide comment on the likely source of flooding to the site?

As indicated by the maps which you provided there is a risk of Surface Water Flooding to the site. Surface Water Maps can be viewed online at <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map> or can be downloaded using the [Data.gov.uk](#) Web Map Service. For further information relating to the risk of flooding from surface water, please contact the Lead Local Flood Authority, Lancashire County Council

Please provide any relevant modelled flood information including hydraulic models if available

At present as the site is located in Flood zone 1, we have no relevant hydraulic modelling. This may change on receipt of the updated hydraulic modelling, for this a separate request would be required.

Do you have any records of historic flooding events on this site, either from fluvial sources or other sources (i.e. surface water, sewers, groundwater, reservoir etc.)?

If you are aware of historical flooding at the site, can you please provide us with details of these historical flood events where it is available, including flood levels, estimated return periods, photographs, and other such data as may be relevant to our study?

We hold no record of flooding in this area. Please be aware, however, that this does not necessarily mean that flooding has not occurred in the past.

Do you have any information on drainage within the site and in the local area, including any known drainage problems on site and in the local area?

Lead Local Flood Authorities are responsible for managing local flood risk, including surface water flooding and groundwater flooding. Therefore, you may want to contact Lancashire County Council in this instance.

Fisheries and Biodiversity

In terms of sensitive ecological receptors: the River Ribble is designated as a biological heritage site in this location, so you should contact Lancashire County Council, if you have not already done so, for details regarding the sites designation. Otters are known to use the rivers in the Ribble Catchment, these rivers also support salmonid and coarse fish species. We hold records of the invasive non-native Japanese Knotweed on the banks of the Ribble in this location.

You are welcome to get in touch if you have any further queries or you can contact us within 2 months if you would like us to review the information we have sent to you.

Kind regards,

Mark

Mark Goucher | Customers and Engagement Officer
Customers and Engagement Team | Cumbria and Lancashire
External: 020 302 50821
Internal: 50821

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Eric O'Connor BSc (Hons), MSc, MCIWEM.
Consultant Hydrologist



Enzygo Ltd,
Samuel House, 5 Fox Valley Way,
Stocksbridge, Sheffield, S36 2AA

Offices in Bristol, Sheffield and Manchester

Planning and EIA, Waste & Environmental Permitting, Noise and Vibration, Flood Risk and Hydrology, Hydrogeology, Landscape and Visual Impact, SI and Geo environmental, Ecology, Traffic & Transport

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Registered in England & Wales registered number: 06525159 VAT number: 283259677



Appendix 5 – Lancashire County Council Correspondence

C/O Ian Hopkinson
Enzygo Ltd
Samuel House
5 Fox Valley Way
Stocksbridge
Sheffield
S36 2AA

Phone: 0300-123-6780
Email: Suds@lancashire.gov.uk

Date: 1 August 2018

Dear Mr Hopkinson

PRE-APPLICATION CONSULTATION RESPONSE

Pre-Application Number:	LLFA-03-2018-00059
Location:	Henthorn Road, Clitheroe
Coordinates:	E: 372929, N: 440826

Thank you for requesting pre-application advice on flood risk and land drainage for the above development proposal. The following comments have been provided in accordance with the Terms and Conditions of this paid for service and include written advice following our meeting on 24 July 2018. The comments have been composed based on the current extent of the knowledge of the Lead Local Flood Authority (LLFA), and with regard to the background information that was submitted to and received by the LLFA on 19 July 2018. This includes:

- a pre-application consultation form and payment via invoice
- a site location plan (drawing no. 2018-015/101)
- a site framework plan (drawing no. 8439-L-02 Rev A)
- a topographical survey (drawing no. Topo_01_2D Rev 0)
- indicative surface water runoff rates; and
- indicative on-site storage requirements

Whilst the LLFA expects to be consulted by the Local Planning Authority (LPA) on any subsequent planning submission for this development proposal, it would ultimately be the responsibility of the LPA to approve, or otherwise, any drainage strategy for the site. As such, it should not be assumed that any agreement made with the LLFA would automatically mean that planning permission will be granted.

Details of the meeting on 24 July 2018:

The following representatives attended the meeting on 24 July 2018 to discuss the above development proposal:

- Chris Dunderdale on behalf of the LLFA; and
- Ian Hopkinson and Mark Jarvis on behalf of Enzygo.

The following topics were discussed at the meeting:

1) Site Specific Flood Risk Assessment:

The LLFA noted that an important part of the planning application process is consideration of flood risk as detailed under Footnote 50 of Paragraph 163 of the National Planning Policy Framework (NPPF). This is facilitated through a site-specific flood risk assessment (FRA) which will be required for this development proposal because the application site is larger than 1 hectare in size. The LLFA would expect for the site specific FRA to consider the risk of flooding from all sources, including surface water, ground water and ordinary watercourses. Failure to provide an appropriate site specific flood risk assessment at the planning stage would likely result in an objection from the LLFA.

2) Site Layout:

The LLFA was unable to comment specifically on the layout of the site as insufficient information had been provided in that regard. The LLFA did however note that the site layout should be designed in accordance with the findings and recommendations of the site-specific FRA. Doing so will ensure that the level of flood risk to and from the development site is properly understood, and it will also help to identify any flood mitigation or flood resilience measures that may be required to deal with those risks. The expectation would be for the most vulnerable parts of the development to be located in the areas at lowest risk of flooding from any source, and for exceedance routes to be directed away from property and infrastructure. Failure to demonstrate this at the planning stage would likely result in an objection from the LLFA.

3) Surface water drainage strategy:

The LLFA was unable to comment specifically on the surface water drainage strategy as insufficient information had been provided in that regard. The LLFA did however note that the proposed scale of development could present risks of flooding on or off-site if surface water is not effectively managed for the lifetime of the development. An appropriate surface water drainage strategy will therefore need to accompany any subsequent planning application submitted to the local planning authority. This must

comply with Paragraph 80 of the Planning Practice Guidance, Paragraph 165 of the National Planning Policy Framework and Standards 2, 4, 7, 8 and 9 of the non-statutory technical standards for sustainable drainage systems; March 2015.

As a minimum, the surface water drainage strategy will need to include:

For an Outline Planning Application:

- An indicative site drainage plan, showing:
 - the indicative layout of the site;
 - details of any drains, sewers and watercourses (existing/proposed);
 - details of any preliminary sustainable drainage proposals;
 - details of any preliminary surface water outfalls locations;
- Preliminary surface water discharge rates and volumes (existing/proposed);
- Preliminary on-site storage requirements; and
- Preliminary sustainable drainage system flow calculations (PDF files showing the input and output data for flow calculations) and a preliminary storm simulation plan for the 1 in 1 year event, 1 in 30 year event and 1 in 100 year event + climate change.

For a Full or Reserved Matters Planning Application:

- A final site drainage plan, showing:
 - the final layout of the site;
 - details of any drains, sewers and watercourses (existing/proposed);
 - details of any sustainable drainage proposals;
 - details of any surface water outfalls locations;
 - details of any catchment areas
- Evidence of an assessment of the site conditions to include site investigation and test results to confirm infiltrations rates. Should investigations conclude that infiltration is possible, then the expectation would be for infiltration to be used as the primary method for disposing of surface water from the site. Disposal of surface water via a surface water body would only be considered acceptable where infiltration is proved to be unviable.
- Details of inlets, outlets and flow controls,
- Long and cross section drawings of the proposed drainage system;
- Details of appropriate water quality treatments;
- Sustainable drainage system flow calculations (PDF files showing the input and output data for flow calculations) and a storm simulation plan for the 1 in 1 year event, 1 in 30 year event and 1 in 100 year event + climate change.
- Flood water exceedance routes, both on and off site. These should be directed away from property and infrastructure.
- A Management and maintenance plan for the sustainable drainage system for the lifetime of the development; and

- A construction management plan that establishes how surface water will be managed throughout the construction phase of the development.

If any sustainable drainage systems or surface water outfalls are to be located outside the red line boundary of the site, then the applicant would be expected to provide evidence of legal rights to the land, either via direct ownership or via legal agreement. Failure to provide this information at the planning stage would likely result in an objection from the LLFA.

4) Surface Water runoff rates and volumes:

The LLFA was unable to assess or comment on the suitability of the proposed surface water runoff rates and volumes. This was because the final rates and volumes are directly influenced by the amount of impermeable area within the proposed development site. Any agreement can only be made once the final site layout has been agreed.

The LLFA did explain that the expectation would be for the site surface water drainage to be designed in accordance with standards S2, S4, S7, S8 and S9 of the [Non-Statutory Technical Standards for Sustainable Drainage Systems](#). Suitable allowances should be made for climate change and urban creep, and surface water should be managed as close to the surface as possible; prioritising infiltration as a means of surface water disposal where possible.

5) Sustainable Drainage Systems:

The LLFA encouraged the applicant to maximise the use of sustainable drainage systems (SuDS) when designing the surface water drainage scheme for the development site. This is because sustainable drainage systems offer significant advantages over conventional piped drainage systems in reducing flood risk. Sustainable drainage systems can attenuate the rate and quantity of surface water run-off from a site, and they can also absorb diffuse pollutants and promote groundwater recharge. Ponds, reed beds and seasonally flooded grasslands are also particularly attractive features within public open space. The wide variety of available sustainable drainage techniques means that virtually any development should be able to include a scheme based around these principles and provide multiple benefits, reducing costs and maintenance needs.

It was noted that some SuDS features, for example rainwater harvesting and permeable paving used on roads and driveways, must not be included as part of the hydrological calculations for the site. This is because occupants may change or remove these features in the future and this could have the potential to increase surface water runoff from the site. Where SuDS features such as rainwater harvesting and permeable paving are included in the hydrological calculations, the local planning

authority would normally be advised to consider the removal of permitted development rights.

6) Land Drainage Consent:

The LLFA are the consenting body for works on Ordinary Watercourses. Under Section 23 of the Land Drainage Act 1991 (the "LDA") (as amended by paragraph 32 of Schedule 2 of the FWMA 2010) anyone who intends to carry out works which may obstruct or affect the flow of an ordinary watercourse needs written consent from Lancashire County Council.

It is important to note that Land Drainage Consent is a separate application process that lies outside the planning legislation. It should not be assumed therefore the grant of planning permission means that Land Drainage Consent will automatically be given. Parallel processing of Land Drainage Consent applications is advised, as any land drainage consenting issues could directly impact the suitability of the proposed site layout.

Land Drainage Consent applications can take up to eight weeks to process following receipt of all required information and payment (£50 per structure). Retrospective consent cannot be issued.

7) Highway Drainage Network:

For avoidance of doubt, this response does not cover highway drainage or matters pertaining to highway adoption (s38 Highways Act 1980) or off-site highway works (s278 Highways Act 1980). Planning approval does not grant permission to connect to the highway drainage network.

Pre-application advice (chargeable) regarding highways is available from developers@lancashire.gov.uk

I hope you find this response helpful.

Yours faithfully,

Chris Dunderdale
Lead Local Flood Authority

Appendix 6 – Borehole Logs



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 19220918 : BGS Reference: SD74SW34

British National Grid (27700) : 374275,441451

[Report an issue with this borehole](#)

<<

< Prev

Page 1 of 2 ▼

Next >

>>

CLIENT SANDERSON WATTS ASSOC.		JOB NO C8840	LOCATION SUN STREET, CLITHEROE.		BOREHOLE NO BH1	
DATE JANUARY 1997		SCALE 1 to 50	BORING METHOD CABLE PERCUSSIVE		Sheet: 1	
Drilling & Casing Progress	SAMPLE/TEST		SPT N - value or COHESION	DESCRIPTION	O D LEVEL	LEGEND
	Type & No.	Depth(M)				
27TH						
	D 1	0.30		MADE GROUND - Concrete.		0.0
				MADE GROUND - Stone slab.		0.15
	B 2	0.80 - 1.30		MADE GROUND - Loose stone subbase.		0.30
				MADE GROUND - Soft and visually moist medium to dark brown silty clay.		0.60
	S 3	1.50 - 1.85	4			
	B 4	2.00 - 2.50				
	S 5	2.50 - 2.95	3			
27TH						
27TH	S 6	3.30 - 3.35	50	Light grey very slightly weathered strong micritic carboniferous LIMESTONE, with some indeterminate mollusc shells and occasional small flecks of mica.		3.15
	D 7	3.30				3.40
DUNELM DRILLING COMPANY TEL 0191-528-2534 FAX 0191-517-0086				BOREHOLE LOGSHEET		
Water Observations, Remarks, Etc Borehole visually moist from 0.60m. Water struck at 3.00m, standing at 1.80m on removal of temporary casing at end of borehole.				Chiselling initial slab and stone base - 1 hr. Chiselling and knocking down stone obstruction from 0.30m to 1.30m - 0.5 hr. Chiselling to prove rock from 3.15m to 3.40m - 2 hrs.		

Appendix 7 – HR Wallingford Calculations

Calculated by: Eric O'Connor
Site name: Henthorn Road
Site location: Clitheroe

Site coordinates
Latitude: 53.86297° N
Longitude: 2.41273° W

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Reference: 6413508
Date: 2018-08-01T14:50:15

Methodology

IH124

Site characteristics

Total site area (ha) 3.16

Methodology

Qbar estimation method Calculate from SPR and SAAR

SPR estimation method Calculate from SOIL type

	Default	Edited
SOIL type	4	4
HOST class	—	—
SPR/SPRHOST	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm)	1178	1178
Hydrological region	10	10
Growth curve factor: 1 year	0.87	0.87
Growth curve factor: 30 year	1.7	1.7
Growth curve factor: 100 year	2.08	2.08

Notes:

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

(2) Are flow rates < 5.0 l/s?

(3) Is $SPR/SPRHOST \leq 0.3$?

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	28.05	28.05
1 in 1 year (l/s)	24.4	24.4
1 in 30 years (l/s)	47.68	47.68
1 in 100 years (l/s)	58.34	58.34

Appendix 8 – Infiltration Test Report

Dean Fisher
Gladman Developments
Gladman House
Alexandria Way
Congleton
Cheshire
CW12 1LB

Our Ref: SHF.1132.159.HY.LR.01

Date: 20th July 2018

Sent via email (D.Fisher@gladman.co.uk)

Dear Dean,

HENTHORN ROAD, CLITHEROE – SOAKAWAY TESTING

Following your request, we are pleased to report on the results of soakaway tests, which were undertaken on 11th and 12th July 2018.

Anticipated Geology

British Geological Survey (BGS) mapping (Figure 1) indicates the site is underlain by Clitheroe Limestone Formation and Hodder Mudstone Formation (undifferentiated), with clay-dominant Devensian Till (diamicton) superficial deposits.

Figure 1: Geology Mapping



Left: Superficial deposits. Right: Bedrock. Contains British Geological Survey materials © NERC [2018]

Fieldwork and Ground Conditions

Fieldwork was undertaken on 11th and 12th July 2018 and comprised the construction of 3 No. soakaway pits and carrying out soakaway tests using them. The soakaway pits were excavated using a '2 foot' (600mm wide) excavator bucket at the locations shown in Figure 2. Locations were constrained to specific areas of the site due to underground and overhead utility services including 2 sets of overhead power lines running from West to East through the middle of the Site and North-West to South-East through the Western corner of the Site as well as an underground power line running along the South-Western boundary.

The excavated pits and arisings are shown on the accompanying photographs. The ground conditions found were as follows:

- SA1 topsoil between 0.00 – 0.30mbgl (metres below ground level); Grey/brownish slightly sandy clay with rounded cobbles between 0.30 – 2.00mbgl.
- SA2 topsoil between 0.00 – 0.28mbgl; Grey/mottled brown clay with fine to medium sand and sub angular medium to coarse limestone gravel and rounded sandstone gravel between 0.28 – 0.80mbgl; Grey clay with fine to medium gravel and sub rounded to rounded sandstone gravel between 0.28 – 2.00mbgl.
- SA3 topsoil between 0.00 – 0.30mbgl; Grey/brown mottled clay with fine to coarse sand and rounded coarse sandstone gravel and cobbles and boulders between 0.30 – 2.2mbgl.

Soakaway test methodology

The test method was in accordance with BRE365.

- The base of each trial hole was approximately at the depth anticipated in full-size soakaways (typically 1.5-2.5m depth for areas <100m²). The depth of the trial hole was recorded on each test sheet.
- The length and width of each trial hole was within the range 0.3m -1m wide and 1m-3m long. The length and width were recorded on each test sheet.
- Each trial hole was rapidly filled with water from a bowser to mimic a runoff event. The water level and time in minutes from filling the trial hole was recorded on each test sheet.
- Each test should be repeated twice more (3 times in total), allowing the trial hole to drain between tests.
- Where drain times are excessively slow, it is unnecessary to repeat the first test.
- On completion the soakaway pits were backfilled with the arisings and compacted to ground level.

A tractor-towed water bowser was used for the water supply with a large outlet valve. The trial pits were filled to approximately 1mbgl and sides remained stable and vertical during filling. Tests were undertaken for 1440 minutes due to the low infiltration rates.

Results and Conclusions

The soakaway test results are summarised in Table 1 and included as Appendix 1. Drain times were excessively long for Test 1 in all three soakaway pits such that uptake was insufficient to calculate an infiltration rate.

The water level in all three pits did not recede from full to half-volume within 24 hours and therefore all are considered to have failed the soakaway testing in accordance with BRE Digest 365 guidance.

No groundwater was encountered in any of the test pits. However, infiltration rates were not found to be favourable for an infiltration-based surface water drainage system.

If you have any queries, or require further information, please contact us.

Yours sincerely,

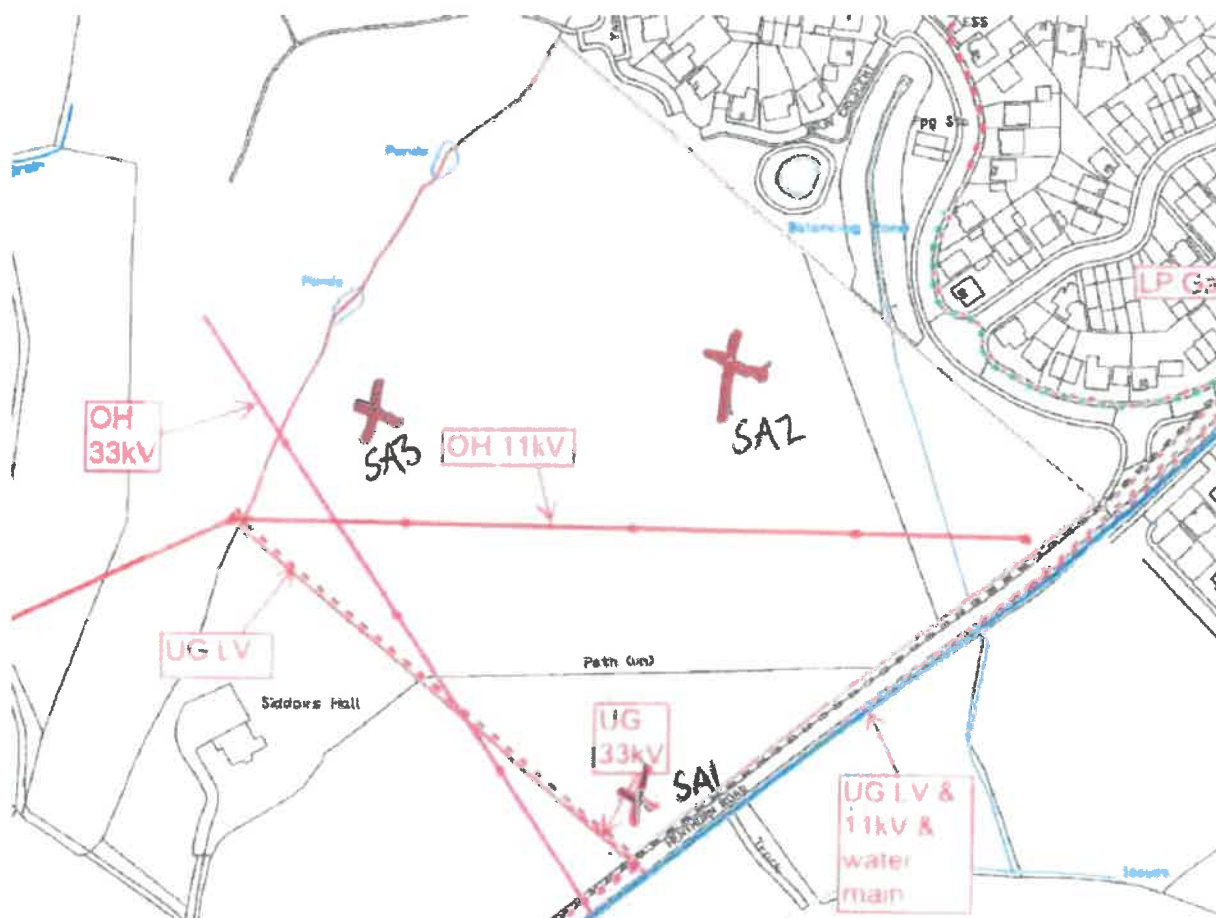


Ian Hopkinson BSc (Hons), MSc, MCIWEM
Consultant Hydrologist

Table 1 – Test Results

Exploratory Hole	Depth (m bgl)	Test No	Water level start of test (m bgl)	Water level end of test (m bgl) (fall/duration)	Change in level (m)	Test Duration (minutes)	Extrapolated/ Soil Infiltration Rate (m/s)	Design Soil Infiltration Rate (m/hr)
SA1	2.00	1	1.00	1.12	0.12	1440	N/A	Insufficient uptake to calculate infiltration rate
		2	N/A	N/A	N/A	N/A	N/A	
		3	N/A	N/A	N/A	N/A	N/A	
SA2	2.00	1	1.10	0.85	0.00	1440	N/A	Insufficient uptake to calculate infiltration rate
		2	N/A	N/A	N/A	N/A	N/A	
		3	N/A	N/A	N/A	N/A	N/A	
SA3	2.20	1	0.87	0.88	0.01	1440	N/A	Insufficient uptake to calculate infiltration rate
		2	N/A	N/A	N/A	N/A	N/A	
		3	N/A	N/A	N/A	N/A	N/A	

**Figure 2 – Site Location with
locations of constraints: SA1 – SA3
locations**



SA1 Test Pit



SA1 Test Pit Arisings



SA2 Test Pit



SA2 Test Pit Arisings



SA3 Test Pit



SA3 Test Pit Arisings



Appendix 9 – PDS Flow Calculations



Drainage Design Report

Flow+

v7.0

Copyright © 1988-2018 Causeway Software Solutions Limited

Network

Filename

Username

Last analysed

Report produced on

Storm Network

J:\Projects\1132 - Gladman Developments Ltd\159 - Henthorn Road, Clitheroe\Pods\Flow\Storage Volume complex controls .pfd

Mark Jarvis (mark.jarvis@enzygo.com)

01/08/2018 16:23:43

01/08/2018 16:25:19

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Technical support web portal:

<http://support.causeway.com>

Rainfall Methodology	FSR
Return Period (years)	1
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	20.000
Ratio-R	0.400
CV	0.750
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.200
Preferred Cover Depth (m)	1.200
Enforce best practice design rules	

J:\Projects\1132 - Gladman Developments Ltd\159 - Henthorn Road, Clitheroe\Pds\Flow\Storage Volume\copying\text\Contaminant\2018 Causeway Software Solutions Limited

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Office											
Node	Flap Valve	Online / Offline	Downstream Link	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Diameter (m)	Discharge Coefficient	
	x	Online				0.300	1.000	33.9	0.129	0.600	
Hydro-Brake®											
Node	Flap Valve	Online / Offline	Downstream Link	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Objective	Sump Available	Product Number
	x	Online				0.000	1.300	24.4 (HE)	Minimise upstream storage		CTL-SHE-0213-2440-1300-2440
									Min Outlet Diameter (m)	0.225	1500

Depth/Area/Inf Area									
Node	Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Depth (m)	Area (m ²)	Inf. Area (m ²)
1	0.00000	0.00000	2.0	1.00	0.000	138	0.000	573.6	0.0
							1.300	573.6	0.0
							1.301	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Event	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Outflow (l/s)	Discharge Vol (m³)
120 minute winter	90	0.267	0.267	82.2	158.8621	0.0000	OK	23.6	233.0
								0.0	0.0

Results for 100 year +40% Critical Storm Duration. Lowest mass balance: 100.00%

[illegible]



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Tel: 0161 413 6444

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Key



Site Location
(SD 7255 4054)



Samuel House, 6 Fox Valley Way, Stockbridge, Sheffield, S24 2AA

CLIENT:
Gladman Developments Ltd

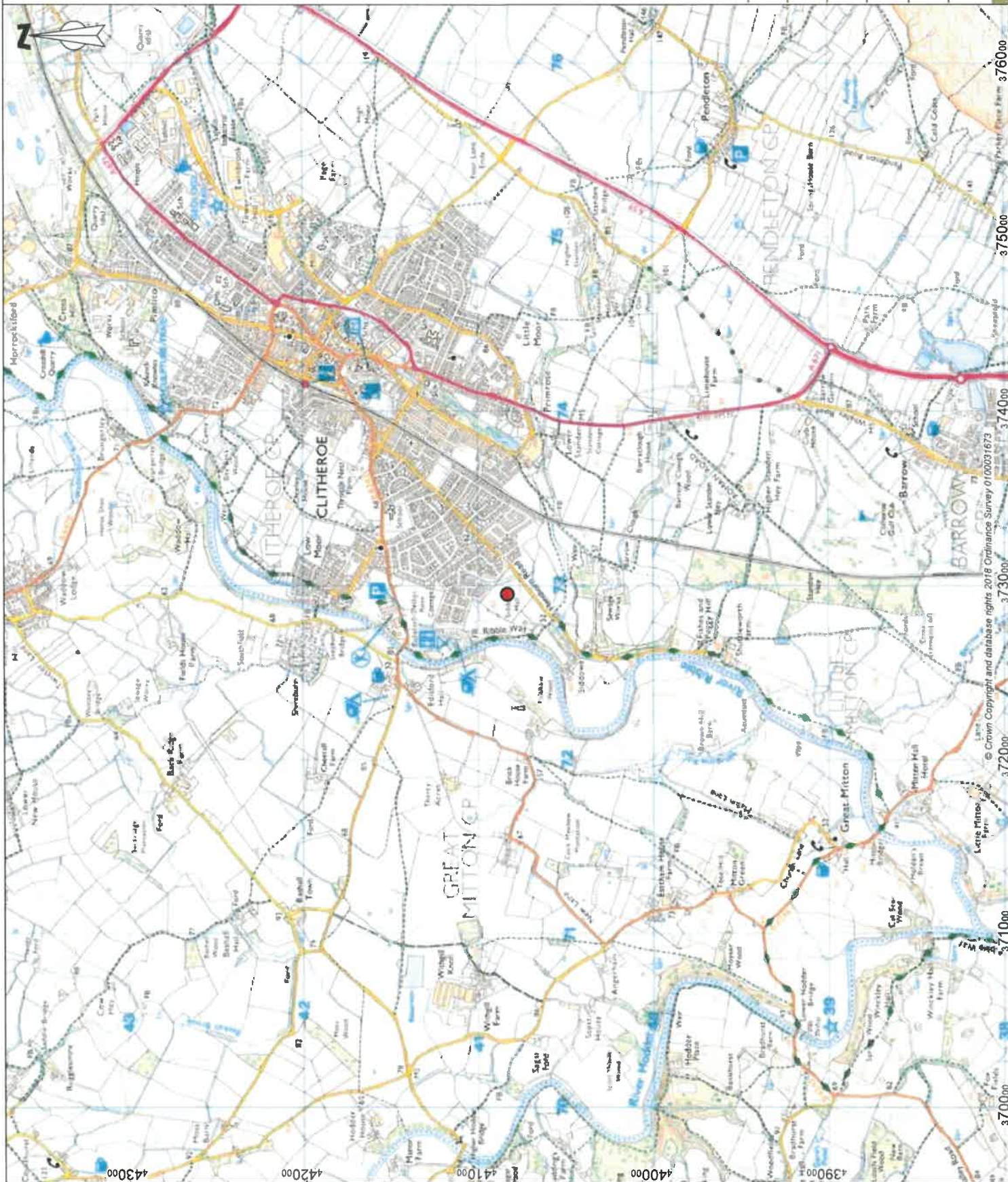
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DRAWN: MG
CHECKED: ALM
DATE: Aug 2018

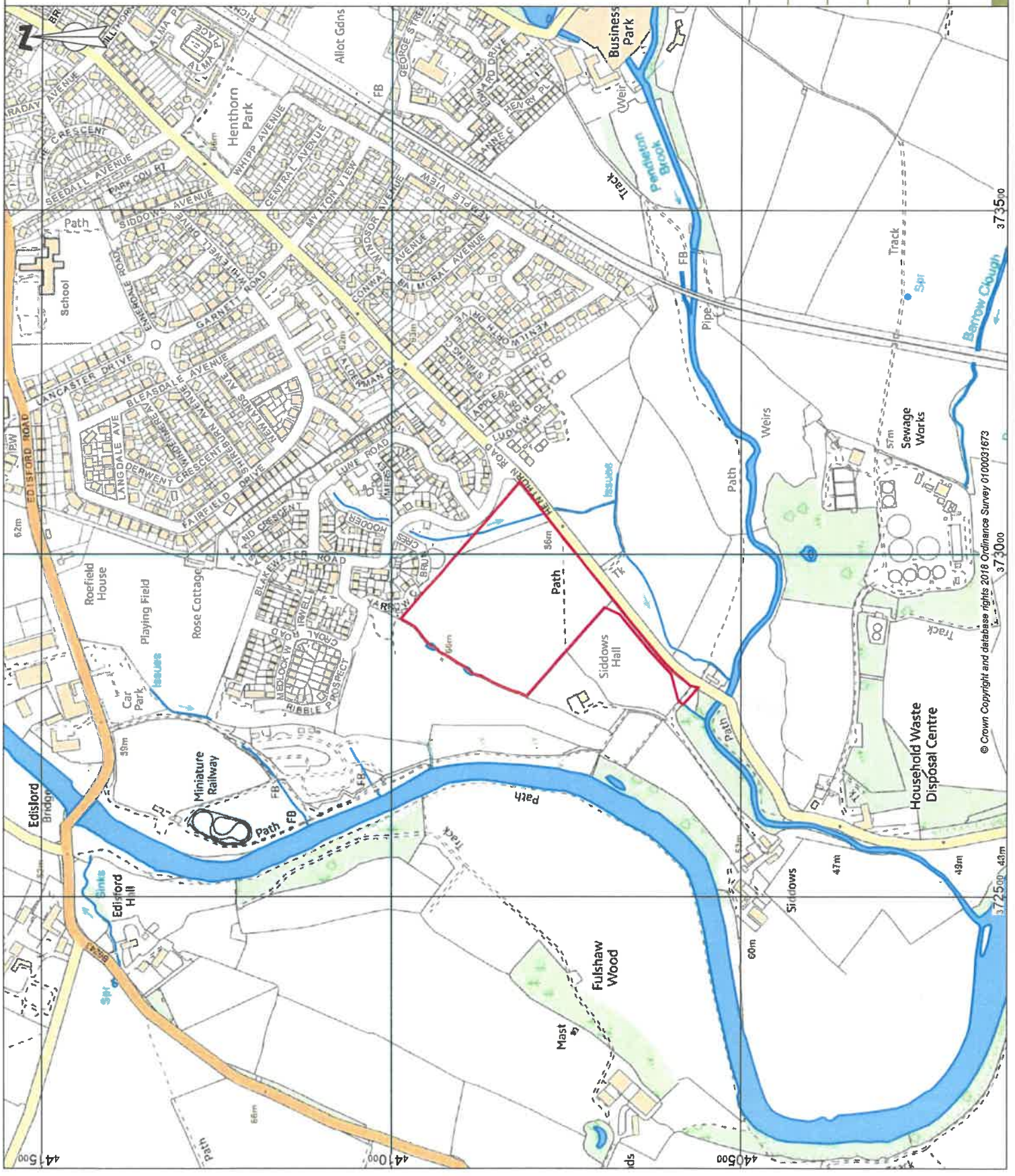
PROJECT:
Henthorn Road, Clitheroe

TITLE
Site Location Plan

DRAWING NO
SHF.1132.159.HY.D.001



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Key



Site Boundary

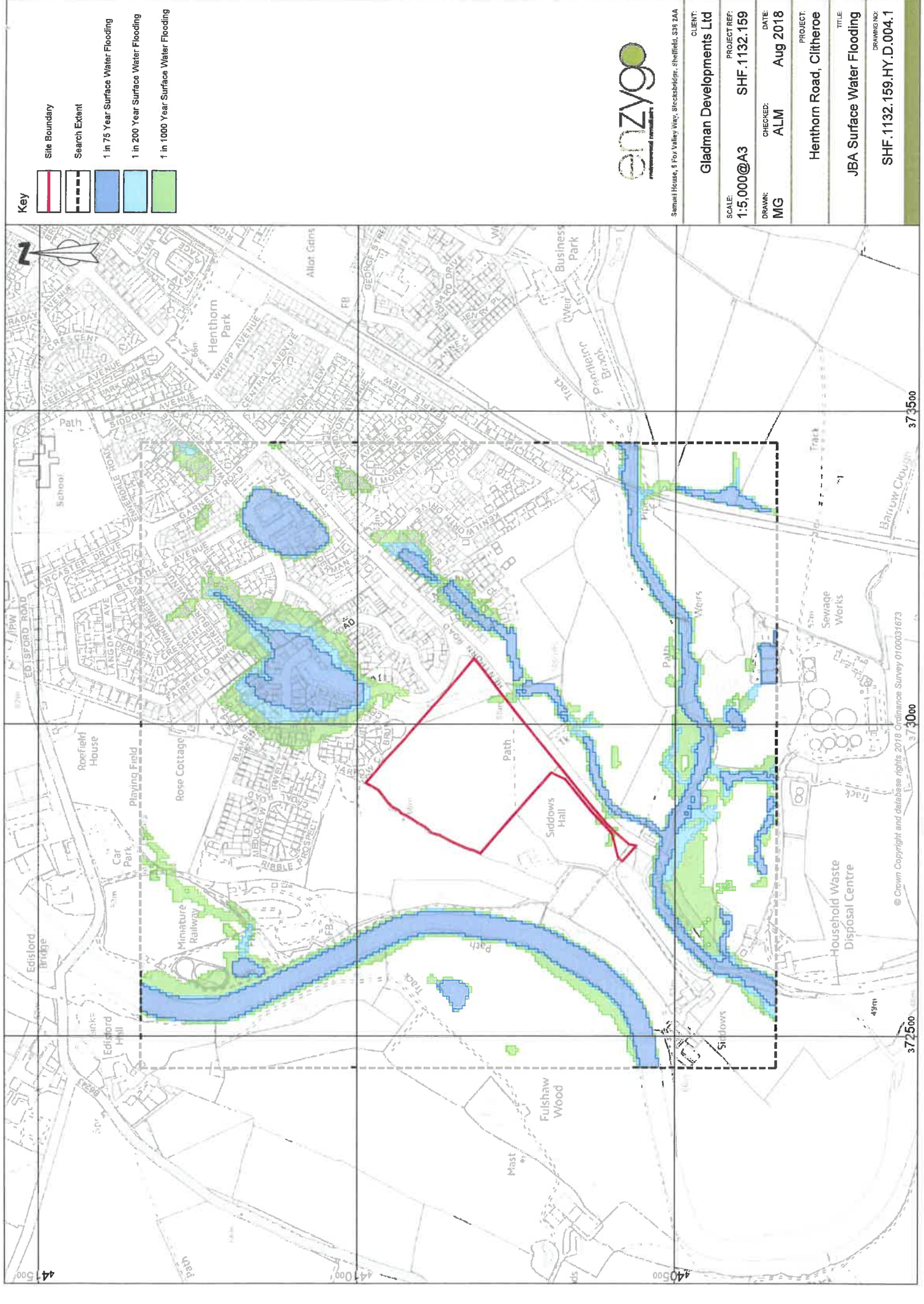
Surface Water Features



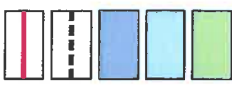
Samuel House, 6 Fox Valley Way, Stocksbridge, Sheffield, S35 2AA

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TITLE:	Surface Water Features			
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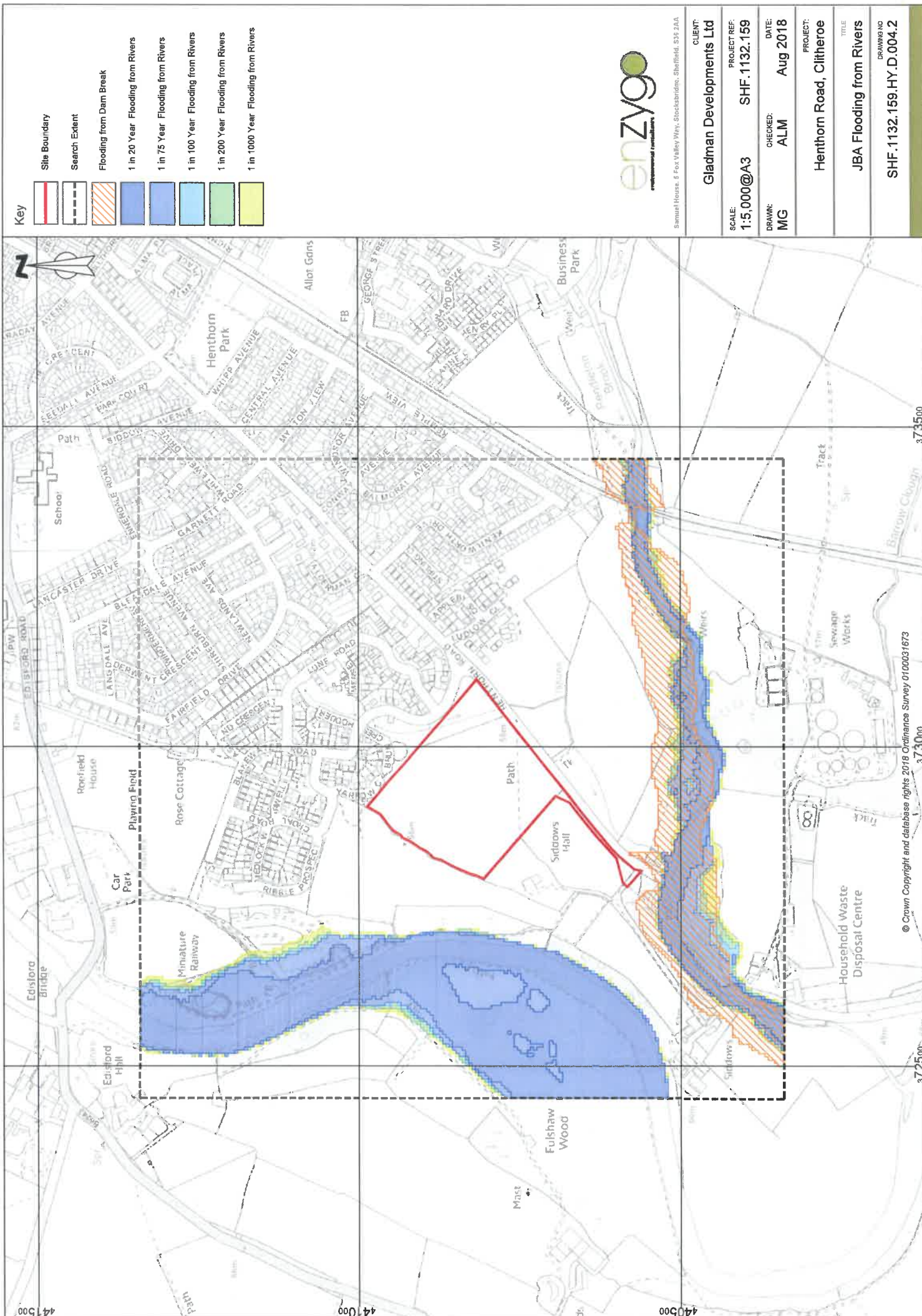
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Key



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PROJECT REF:	SHF.1132.159
DRAWN:	MG
CHECKED:	ALM
DATE:	Aug 2018
PROJECT:	Henthorn Road, Clitheroe
TITLE:	JBA Surface Water Flooding
DRAWING NO:	SHF.1132.159.HY.D.004.1

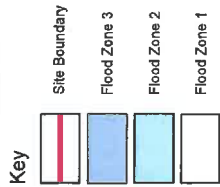


Key

- Site Boundary
- Search Extent
- Flooding from Dam Break
- 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



Samuel House, 8 Fox Valley Way, Stockbridge, Sheffield, S19 2AA		CLIENT: Gladman Developments Ltd	
SCALE: 1:5,000@A3	PROJECT REF: SHF.1132.159	CHECKED: ALM	DATE: Aug 2018
DRAWN: MG		PROJECT: Henthorn Road, Clitheroe	
		TITLE: JBA Flooding from Rivers	
		DRAWING NO: SHF.1132.159.HY.D.004.2	



Samuel House, 6 For Valley Way, Stockbridge, Sheffield, S19 2AA

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Gladman Developments Ltd

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PROJECT REF:
SHF: 1132.159

DRAWN:
MG

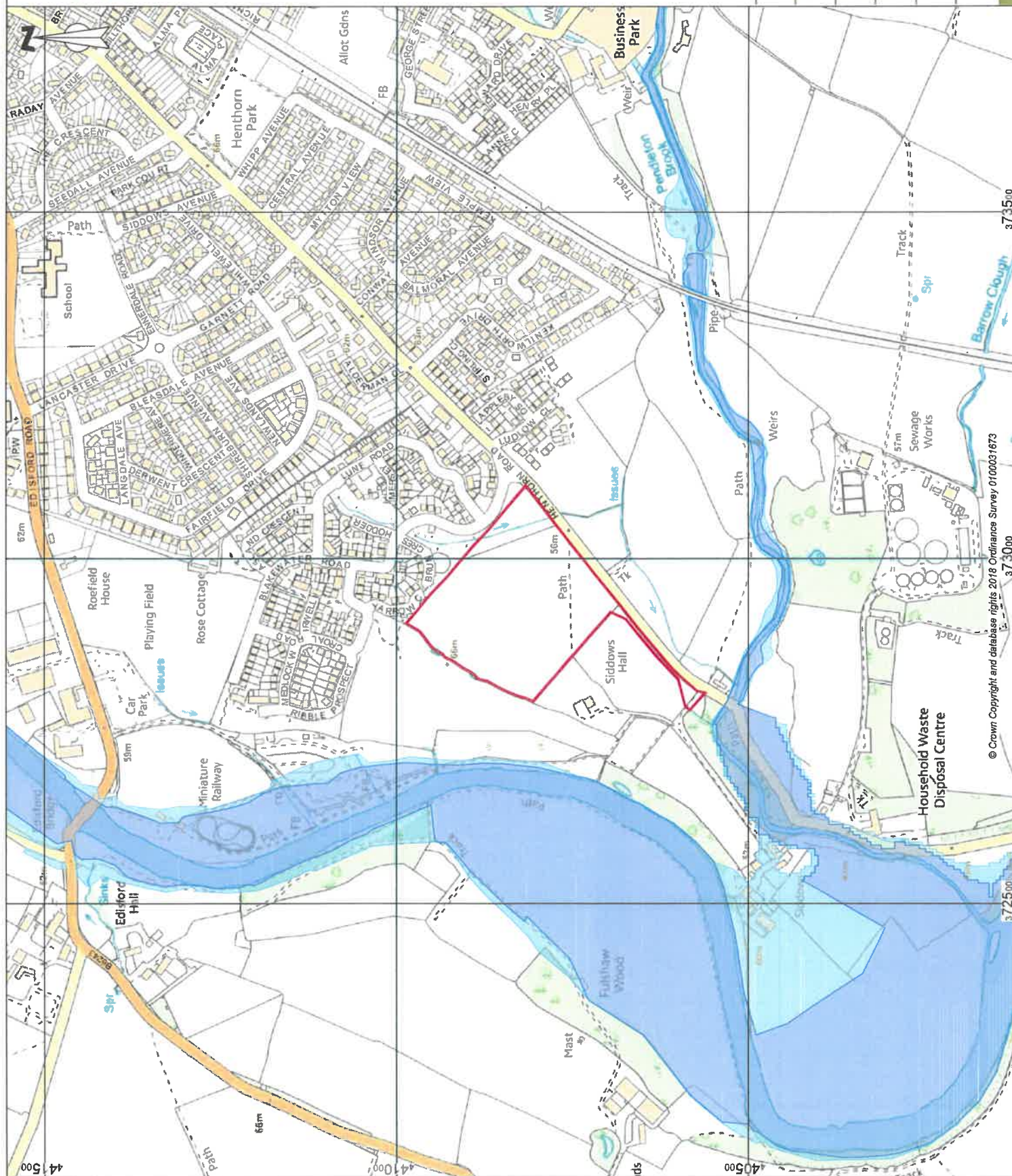
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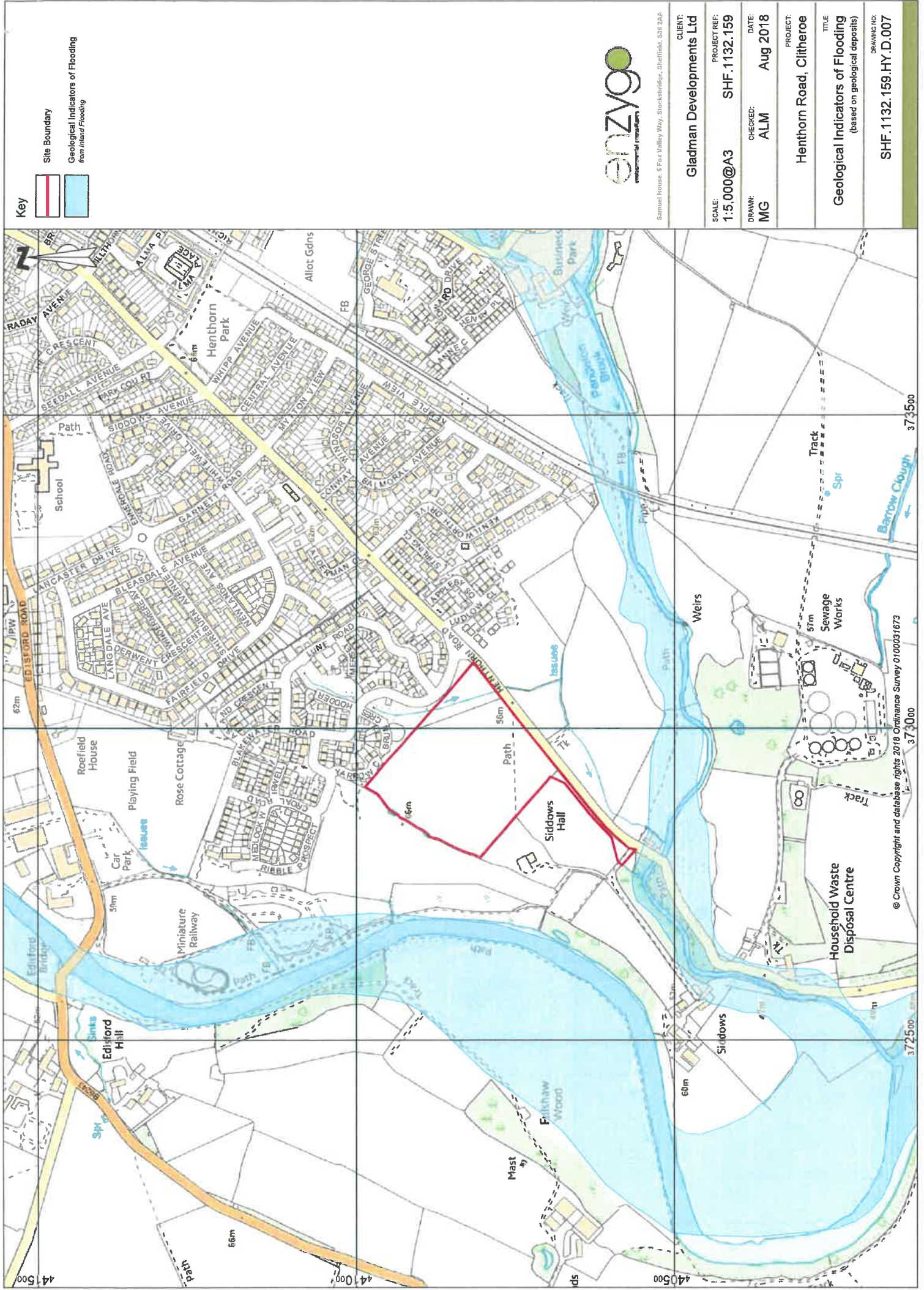
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Aug 2018

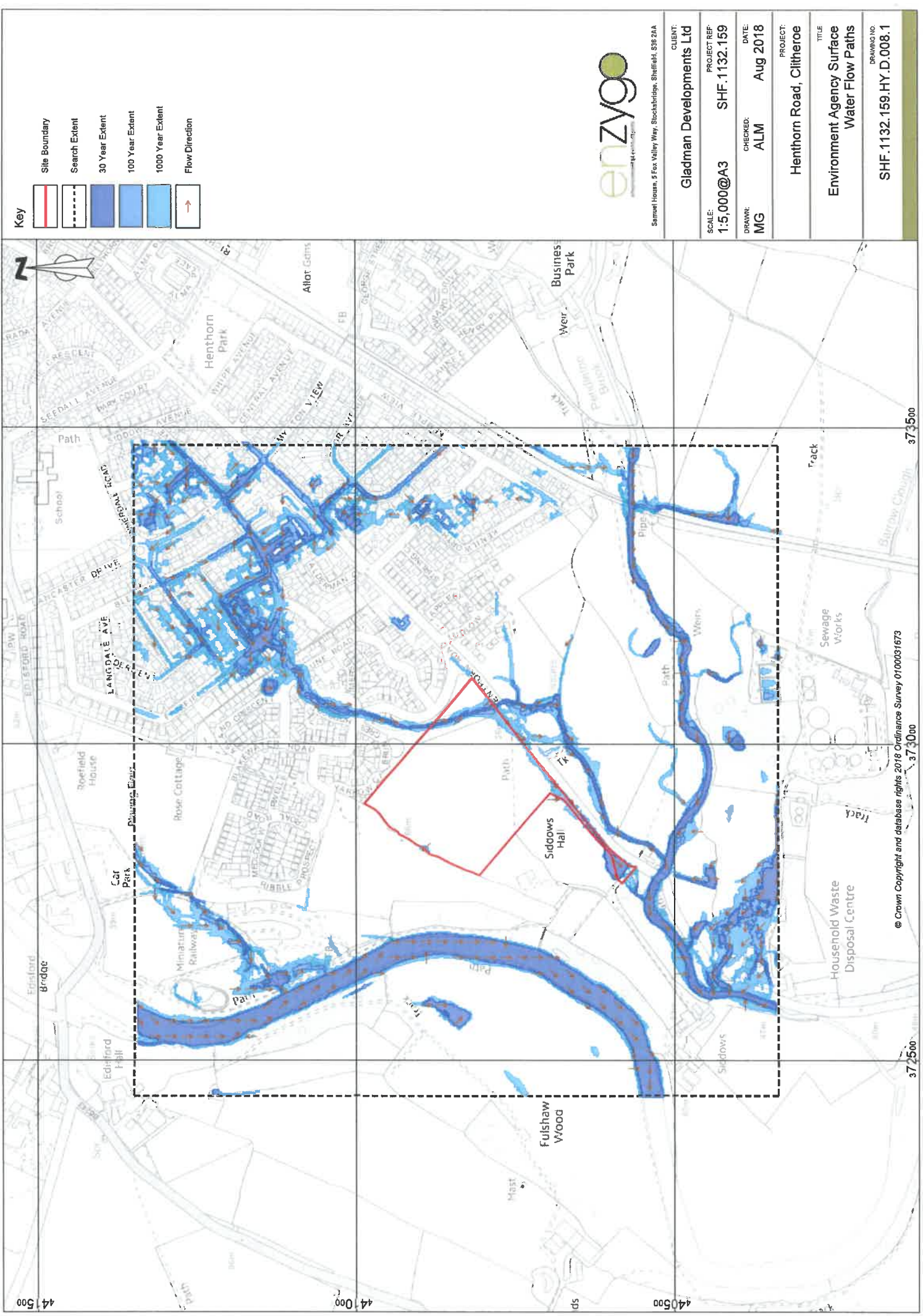
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Henthorn Road, Clitheroe

TITLE:
Environment Agency Flood Zones

DRAWING NO:
SHF: 1132.159.HY.D.005





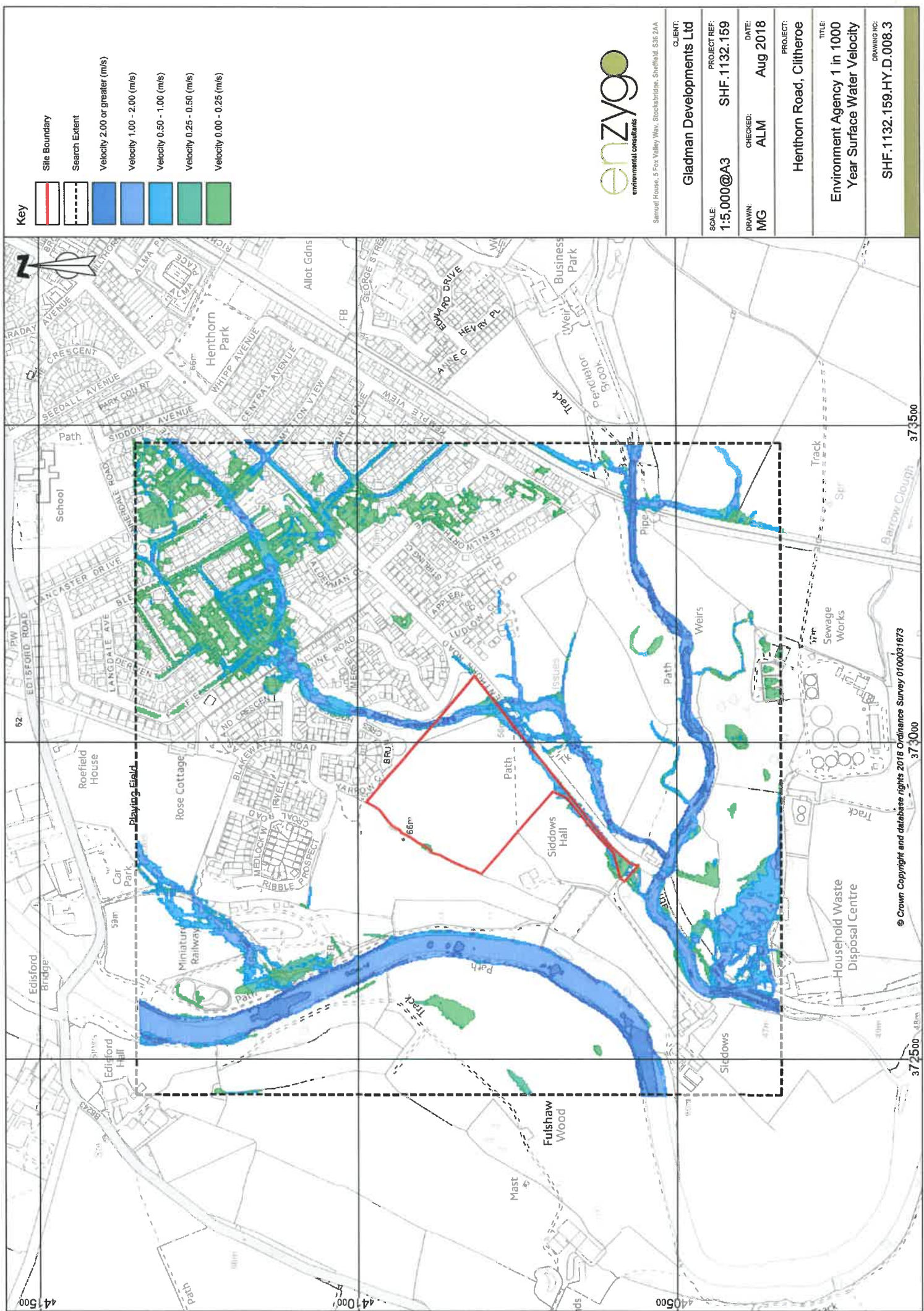


Key

- Site Boundary
- Search Extent
- 30 Year Extent
- 100 Year Extent
- 1000 Year Extent
- Flow Direction



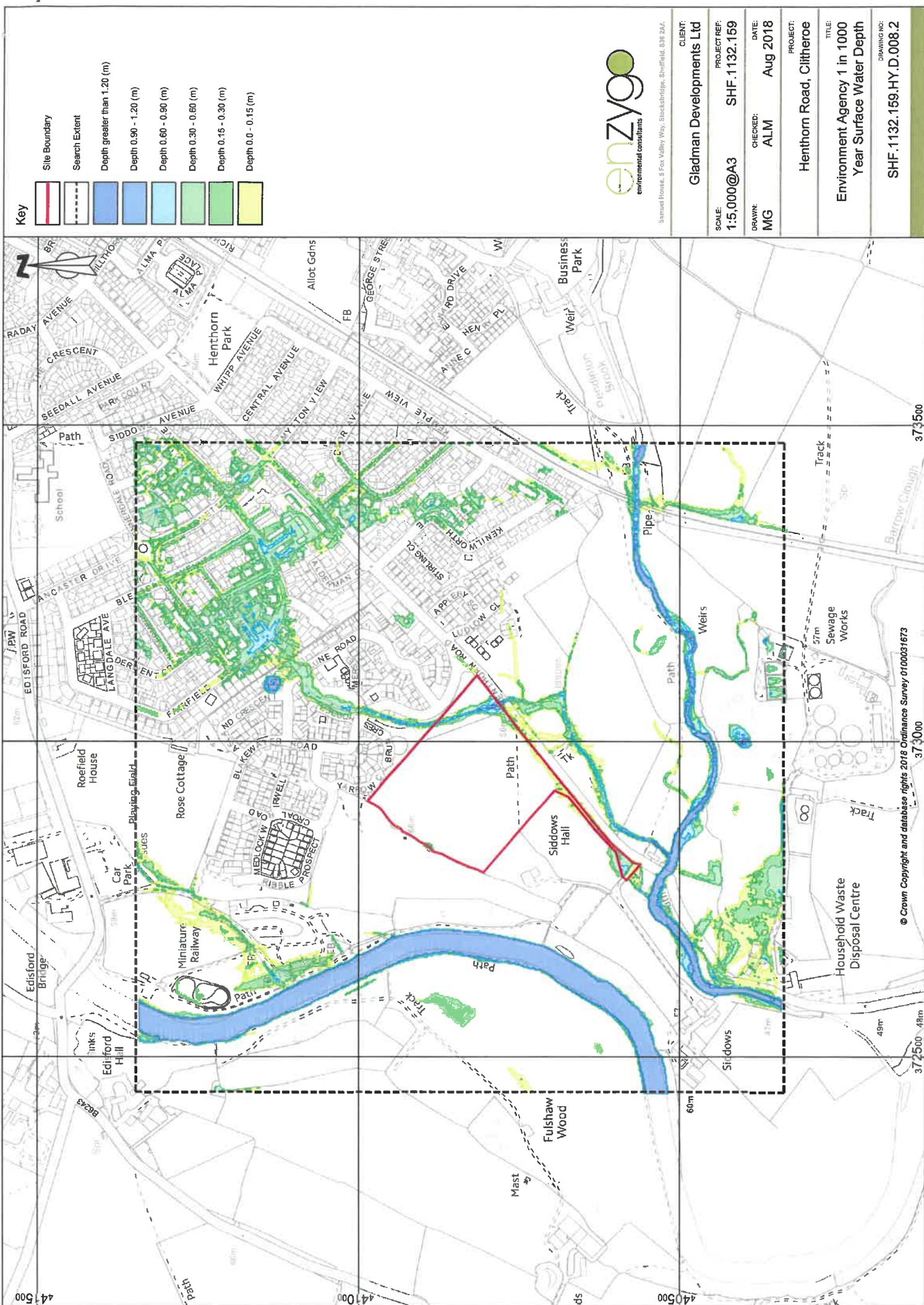
Samuel House, 5 Fox Valley Way, Stockbridge, Sheffield, S36 2AA		CLIENT: Gladman Developments Ltd	
SCALE: 1:5,000@A3	PROJECT REF: SHF.1132.159	DRAWN: MG	DATE: Aug 2018
PROJECT: Henthorn Road, Clitheroe		TITLE: Environment Agency Surface Water Flow Paths	
DRAWING NO: SHF.1132.159.HY.D.008.1			



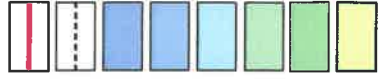
Key



CLIENT:		Gladman Developments Ltd	
PROJECT REF:		SHF.1132.159	
SCALE:		1:5,000@A3	
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CHECKED:		ALM	
DATE:		Aug 2018	
PROJECT:		Henthorn Road, Clitheroe	
TITLE:		Environment Agency 1 in 1000 Year Surface Water Velocity	
DRAWING NO:		SHF.1132.159.HY.D.008.3	



Key



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CLIENT:	Gladman Developments Ltd			
PROJECT REF:	SHF.1132.159			
SCALE:	1:5,000@A3	SHF.1132.159		
DRAWN:	MG	CHECKED:	ALM	DATE: Aug 2018
PROJECT:	Henthorn Road, Clitheroe			
TITLE:	Environment Agency 1 in 1000 Year Surface Water Depth			
DRAWING NO:	SHF.1132.159.HY.D.008.2			

