

Land off A629, Birdsedge

Flood Risk Assessment & Drainage Strategy

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Yorkshire Land Limited

AMA Project Number: 300655

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.2	Regulatory Policy and Legislation	1
1.3	Scope of Flood Risk Assessment	2
1.4	Scope of Outline Drainage Strategy.....	3
2	METHODOLOGY	5
2.1	Introduction	5
3	PROJECT BACKGROUND	6
3.1	Development Description and Location	6
3.2	Topography.....	7
3.3	Geology and Ground Conditions.....	7
3.4	Hydrogeology	7
3.5	Hydrology	8
4	POTENTIAL FLOOD RISK	9
4.1	Sources of Flooding	9
4.2	Environment Agency Flood Zones.....	9
4.3	Fluvial and Coastal Flooding	9
4.4	Pluvial (Surface Water) Flooding	10
4.5	Groundwater Flooding	11
4.6	Flooding from Artificial Sources.....	11
4.7	Flooding from Sewers	12
4.8	Historic Flooding	12
5	FLOOD RISK ASSESSMENT.....	13
5.1	Flood Risk Planning Policy	13
5.2	Sequential and Exception Test.....	13
5.3	Conclusion.....	14
6	FLOOD RISK MITIGATION	15
6.1	Introduction	15
6.2	Effect of Development on Wider Catchment	15
6.3	Site Arrangements	15
7	FOUL WATER DRAINAGE	16
7.1	Introduction	16
7.2	Existing Sewers.....	16
7.3	Foul Water Discharge Rates	16
7.4	Foul Water Capacity and Point of Connection	16
8	SURFACE WATER DRAINAGE STRATEGY.....	17
8.1	Introduction	17
8.2	Overview and Concept.....	17
8.3	Pre-Development Surface Water Run-Off.....	17
8.4	Groundwater Protection.....	17
8.5	Methods of Surface Water Management	18
8.6	Infiltration.....	18
8.7	Watercourse.....	18
8.8	Public Sewers	18
8.9	Proposed Discharged Rates	19
8.10	Attenuation Requirements	19
8.11	Drainage Network	19

9	SUSTAINABLE DRAINAGE SYSTEMS	20
9.2	Sustainable Drainage (Overview)	20
9.3	SuDS Principals	20
9.4	SuDS Techniques	20
10	SuDS MAINTENANCE PLAN.....	22
10.1	Surface Water Maintenance and Management Schedule	22
11	SUMMARY	23
12	LIMITATIONS	24
	APPENDICES	25

TABLES

Table 3-1	Site Context.....	6
Table 5-1	Development Appropriateness Based on Vulnerability and Flood Zones.....	14
Table 5-2	Pre-Mitigation Flood Risk Summary.....	14
Table 8-1	Existing Run-Off Rates.....	17
Table 8-2	Attenuation Volume	19
Table 9-1	SuDS Feasibility Table	21
Table 10-1	Attenuation Tank Maintenance Schedule.....	22
Table 10-2	Hydrobrake Manhole Maintenance Schedule.....	22

FIGURES

Figure 3-1	Site Location Plan	7
Figure 3-2	Watercourse Location	8
Figure 4-1	Environment Agency Long Term Flood Map for Planning	9
Figure 4-2	Environment Agency Long Term Flood Map – Rivers and Sea – Yearly Chance of Flooding between 2036 and 2069	10
Figure 4-3	Environment Agency Long Term Flood Risk Map – Pluvial (Surface Water) Flooding – Yearly Chance of Flooding between 2040 and 2060.....	11

APPENDICES

Appendix A	Site Parameters Plan
Appendix B	Topographic Survey
Appendix C	Calder Catchment SFRA Volume II Groundwater Flood Map
Appendix D	Yorkshire Water Pre-Development Enquiry
Appendix E	UK SuDS Greenfield Run-Off Rates
Appendix F	Eastwood Consulting Engineers Infiltration Test Report
Appendix G	Correspondence with the LLFA
Appendix H	Causeway Flow Calculations
Appendix I	Drainage Layout Drawing

1 INTRODUCTION

- 1.1.1 This Flood Risk Assessment (FRA) and Outline Drainage Strategy (DS) has been provided at the request of Yorkshire Land Limited, hereafter referred to as “the client”, to assess the flood risks associated with the proposed development of Land off A629, Birdsedge, hereafter referred to as “the site”.
- 1.1.2 The purpose of this FRA and DS is to:
- ▶ Identify the possible hazards posed from all major sources of flooding (fluvial, surface water, groundwater, infrastructural and coastal sources);
 - ▶ Provide a qualitative assessment of the probability of each potential flood hazard representing a constraint on the proposed development, based on the proposed land use type for the development and likelihood of flood occurrence;
 - ▶ Investigate and define any potential drainage impacts associated with the site;
 - ▶ Conceptually determine and define necessary surface water management controls to ensure no exacerbation of flood risk on the site or to external receptors due to any increase in surface water runoff; and
 - ▶ Recommend appropriate and necessary mitigation measures and additional assessments that may be required to progress the sustainable development of the site.
- 1.1.3 The FRA and DS comprises the following:
- ▶ A desktop review of publicly available information, including information from the Environment Agency (EA) and Kirklees Council who are the Lead Local Flood Authority (LLFA) for the proposed development area; and
 - ▶ An assessment and outline design of hydraulic controls and drainage requirements and drainage elements required to support the development of the site.
- 1.1.4 This report further details the methodologies employed within this study and provides recommendations as to any further work or investigations required to support the development of the site through the planning application process.

1.2 REGULATORY POLICY AND LEGISLATION

- 1.2.1 This assessment has been carried out in line with the current Government legislation, the National Planning Policy Framework (NPPF) 2024.
- 1.2.2 It has been assessed with reference to the following documents and legislative guidelines:
- ▶ CIRIA 753 The SUDS Manual V8 (2018);
 - ▶ DEFRA “Flood Risk Assessment Guidance for New Developments” (2006);
 - ▶ DEFRA “Surface Water Management Plan Technical Guidance” (2010);
 - ▶ BS 8533 2017 Assessing & Managing Flood Risk in Development Code of Practice (2017);
 - ▶ BS 8582:2013 Code of practice for surface water management for development Sites (2013);
 - ▶ National Planning Practice Guidance (2012 – updated 2022);
 - ▶ C624 Development and Flood Risk – Guidance for the Construction Industry’ (2004);
 - ▶ Sewage Sector Guidance (2022);
 - ▶ Planning Policy Guidance – Flood Risk and Climate Change (2014 – updated 2022).
- 1.2.3 In addition to the above, this report has also been informed by the following documents:
- ▶ Kirklees Local Plan Strategy and Policies 2019
 - ▶ West Yorkshire Combined Authority SuDS Guidance
 - ▶ Calder Catchment Strategic Flood Risk Assessment – Volume I 2016
 - ▶ Calder Catchment Strategic Flood Risk Assessment – Volume II 2016

1.3 SCOPE OF FLOOD RISK ASSESSMENT

- 1.3.1 The objective of this analysis and report is to provide an FRA in accordance with local and national guidance.
- 1.3.2 The detail and complexity of the FRA will reflect the level of risk to the site and consider the appropriateness of the proposed development type. This will also include assessment of potential risk to property and livelihoods, consideration of climate change, and the definition of appropriate flood risk mitigations required to satisfy the planning process.
- 1.3.3 Based on the assessment of requirements for a site-specific FRA as defined within NPPF 2024 technical guidance, the site is indicated as being located within Flood Zone 1 however is over 1 ha in area, therefore it is necessary to provide a site-specific FRA. Flood Zone 1 refers to an area assessed as having less than a 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year.
- 1.3.4 Similarly, as the site is indicatively located in an area that may be subject to other assessable sources of flooding, such as pluvial (surface water) flooding, it is necessary to undertake a further site-specific assessment to verify the proposals for development.
- 1.3.5 Policy LP27 of the Kirklees Local Plan states that all future development must ensure that:
- ▶ Proposals for development which require a Sequential Test in accordance with national planning guidance will need to demonstrate that development has been directed to areas at the lowest probability of flooding, following a sequential risk based approach. The whole Kirklees district should be the starting point for the sequential test with applicants required to provide justification where a smaller area of search is proposed. If following application of the sequential test, there are no reasonably available sites which could accommodate the development in zones with a lower probability of flooding, it should also be demonstrated that a sequential approach has been applied within sites. This is to ensure that highly vulnerable and more vulnerable uses are directed towards the areas of lowest flood risk within the site. Proposals will also need to demonstrate that the exception test is passed, where applicable, as set out in national planning policy.
 - ▶ Proposals within flood zone 3ai will be assessed in accordance with national policies relating to flood zone 3a but with all of the following additional restrictions:
 - a. no new highly vulnerable or more vulnerable uses will be permitted;
 - b. less vulnerable uses may only be permitted provided that the sequential test has been passed and;
 - i. where extensions are linked operationally to an existing business or,
 - ii. where redevelopment of a site provides buildings with the same or a smaller footprint;
 - c. all proposals will be expected to include flood mitigation measures such as compensatory storage which should be identified and considered through a site specific Flood Risk Assessment;
 - d. development will not be permitted on any part of the site identified through a site specific Flood Risk Assessment as performing a functional floodplain role.
 - ▶ Proposals must be supported by an appropriate site specific Flood Risk Assessment in line with national planning policy. This must take account of all sources of flooding set out in the Strategic Flood Risk Assessment and demonstrate that the proposal will be safe throughout the lifetime of the development (taking account of climate change). The proposal must also not increase flood risk elsewhere and where possible should reduce flood risk. Mitigation measures, where necessary, should be proposed.
 - ▶ Proposals including building over existing culverts or the culverting or canalisation of water courses will not be permitted unless it can be demonstrated to be in the interests of public safety or to provide essential infrastructure and that there will be no detrimental effect on flood risk and biodiversity. Where feasible, development proposals should incorporate re-

opening of culverts, modification of canalised water courses and consideration of mitigation measures to achieve a more natural and maintainable state.

- ▶ Proposals for natural management such as targeted vegetation planting in upper catchments and along river banks will be supported in appropriate locations where consistent with national and local plan policies and relevant water catchment plans to reduce flood risk and improve water quality.

- 1.3.6 Potential flood risk at the site has been assessed against the site parameters plan, which has been provided as **Appendix A** to this report. Significant changes to the site's developable area may necessitate a further review of this document to ensure that risk of flooding is not exacerbated and has been satisfactorily addressed within the development proposal.

1.4 SCOPE OF OUTLINE DRAINAGE STRATEGY

- 1.4.1 Surface water runoff must be effectively managed to ensure that there is no exacerbation of potential surface water flooding issues on the site, or at any external receptors, due to any potential increases in surface water runoff rates and volumes.

- 1.4.2 The drainage hierarchy will be applied in determining the most suitable type and point of discharge of surface waters runoff from impermeable areas on the site. This will ensure that surface water is sustainably managed on the site, and that there is no exacerbation of flood risk elsewhere as a result of undertaking the development. This will be undertaken in accordance with industry best practice principles and guidance, such as the C753 SUDS Manual (2016), Design and Construction Guidance for Sewage Sector (DCGSS) (2020) and applicable sections of the Planning Policy Guidance (PPG).

- 1.4.3 Any increase in surface water runoff rate associated with the development of the site must also be managed in accordance with the guidelines set by LPA, the LLFA for the area.

- 1.4.4 As indicated in Policy LP28 of the Kirklees Local Plan, surface water runoff from the site must adhere to the following:

- ▶ The presumption is that Sustainable Drainage Systems (SuDS) will be used to assist in achieving the following on each site:
 - a. for proposals on greenfield sites, typical greenfield run-off rates should not be exceeded;
 - b. for proposals on brownfield sites there should be a minimum 30% reduction in surface water run-off where previous positive surface water connections from the site can be proven. New connections will be subject to at least greenfield restrictions;
 - c. No negative impact on local water quality and improvements in water quality where practicable;
 - d. Consider whether proposed open spaces and green infrastructure within sites can contribute to the sustainable drainage of the site.
- ▶ Local conditions including the existence of critical drainage areas may require a lower run-off rate to be agreed to reflect volume control, local surface water risks, water course capacity and flood risk further downstream.
- ▶ There will be a general presumption against pumping surface water. It must also be demonstrated that the surface water management solution is designed to meet requirements over the lifetime of the development including evidence that management and maintenance arrangements have been secured to cover that period. This includes ensuring proposals to store water meet national standards and latest best practice.
- ▶ Flow paths accommodating water from outside the site or due to an exceedance event should be designed to avoid buildings and curtilages.
- ▶ Development will only be permitted if it can be demonstrated that the water supply and waste water infrastructure required is available or can be co-ordinated to meet the demand generated by the new development.

- 1.4.5 The outline DS will identify potential opportunities and locations for attenuation infrastructure, as well as potential connection points and provide calculations of permissible discharge rates for runoff generated on site.
- 1.4.6 The outline DS therefore aims to provide surety that any drainage provided as part of the project development can safely and appropriately convey all flows from the site to appropriate discharge locations. This is to ensure sustainable and safe operation within the site, as well as ensuring sustainable operation of any receiving infrastructure. These assessments have been undertaken in accordance with prescribed best practice and building codes, including prioritising the incorporation of SuDS, where appropriate and practicable for the management of surface water.
- 1.4.7 Following the completion of a final site masterplan the drainage scheme proposed within this report should be reassessed to ensure surface water runoff and foul water drainage can be appropriately managed in accordance with best practise and local and national standard requirements.

2 METHODOLOGY

2.1 INTRODUCTION

- 2.1.1 This report aims to demonstrate that the proposed development is sustainable and will not be impacted by or exacerbate flood risk elsewhere through the development of the site. This assessment will account for the effects of climate change, as well as identifying further opportunities to reduce the probability and consequences of flooding within the site locality.
- 2.1.2 This report aims to identify constraints and opportunities for the site based on the site parameters plan provided by the client ([Appendix A](#)) and provide recommendations for the sustainable provision of drainage and mitigation of any potential flood risk for the site.
- 2.1.3 The assessment methodology is as follows:
- ▶ Desktop review of the geology, hydrology, and other pertinent environmental characteristics of the site, and how these affect flood risk of the proposed development and site drainage.
 - ▶ Obtain and review existing baseline flood risk and drainage guidance information from relevant environmental authorities (EA, LLFA, etc.) as to site specific flood risk from all applicable sources.
 - ▶ Review the findings from the above and advise on the suitability of developing the site for the proposed development in consideration of the applicable flood risk and comment on limitations and opportunities for the site, with recommendations of further mitigation where applicable and appropriate.
 - ▶ Produce indicative design calculations for the Outline DS to determine the requirements for developing the site's surface water drainage and providing adequate storage in line with local planning policy and guidance. This will include the presentation of drawings with an indicative layout for any additional drainage and attenuation infrastructure located on the site.
 - ▶ Review the findings from the above and advise on the suitability of developing the site for the proposed development in consideration of the applicable flood risk and drainage and comment on limitations and opportunities for the site, with recommendations of further mitigation where applicable and appropriate.

3 PROJECT BACKGROUND

3.1 DEVELOPMENT DESCRIPTION AND LOCATION

- 3.1.1 Andrew Moseley Associates (AMA) was appointed by Yorkshire Land Limited to provide a Flood Risk Assessment and Drainage Strategy in support of an outline planning application for residential development, located off Land off A629, Birdsedge, Huddersfield, HD8 8XP and NGR: SE 20324 07841.
- 3.1.2 The proposed development is located in the area of Birdsedge, approximately 10.7 km from Huddersfield. Proposals for the site are for residential use including associated infrastructure works. A site parameters plan can be found in [Appendix A](#).
- 3.1.3 The Local Planning Authority for this development is Kirklees Council who are also the Lead Local Flood Authority for the area.
- 3.1.4 This report has been prepared in accordance with the National Planning Policy Framework (NPPF) and the accompanying technical guidance to assess all forms of flooding including the management of surface water on-site.
- 3.1.5 The site is referenced in [Table 3-1](#) and [Figure 3-1](#) below.

Table 3-1 Site Context

Site Name	Land off A629
Location	Birdsedge, Huddersfield
NGR (approx..)	SE 20324 07841
Application Site Area (ha)	3.17
General Locality	The site is located on undeveloped greenfield land and borders undeveloped land to the north and east of the site, residential development to the south of the site, agricultural development to the west of the site. Pedestrian and vehicular access to the site is provided via Penistone Road which is located along the northern southwestern boundary of the site.
Development Type	Residential
EA Flood Zone	Flood Zone 1

Figure 3-1 Site Location Plan



3.2 TOPOGRAPHY

- 3.2.1 A topographic survey provided by the client and undertaken by MT Surveys (Ref: 1216-205) shows ground levels at the site to be in the region of 255.66 to 270.33 m Above Ordnance Datum (m AOD). The topographic survey can be seen in [Appendix B](#).
- 3.2.2 Further review of topographical data shows site levels to be lowest at the northeast of the site, while greatest levels are located at the southwest of the site. A general fall in gradient from south to north is observed across the site.
- 3.2.3 As indicated by aerial imagery, the site consists of grass land consisting of light vegetation.

3.3 GEOLOGY AND GROUND CONDITIONS

- 3.3.1 British Geological Survey (BGS) Open Geoscience website indicates that the entire site is underlain by Grenoside Sandstone-Sandstone with no overlying superficial deposits.
- 3.3.2 The BGS website information indicates that there is no borehole record within close proximity to the site.
- 3.3.3 Information obtained from the Cranfield University's Soilscape website indicates that the majority of the site is located in an area classified as being Soilscape 6, which is defined as having freely draining slightly acid loamy soils. There is a small area in the south of the site that is located in an area classified as being Soilscape 17, which is defined as having slowly permeable seasonally wet acid loamy and clayey soils.

3.4 HYDROGEOLOGY

- 3.4.1 According to the Department for Environment, Food and Rural Affairs (DEFRA) MAGIC map, the site is indicated as not being located in a Groundwater Source Protection Zone (SPZ), as defined by the Environment Agency (EA) for the protection of a potable groundwater supply.
- 3.4.2 The site is located as being in an area of high groundwater vulnerability and located above a Secondary A bedrock aquifer and a superficial drift aquifer.

3.5 HYDROLOGY

- 3.5.1 The River Dearne is located approximately 15m to the north of the site at its closest point. Additionally, the Jordan Beck is located approximately 95m southeast of the site at its closest point, and an unnamed watercourse is located 135m northwest of the site at its closest point.
- 3.5.2 The EA's Catchment Data Explorer website indicates that the site resides within the Dearne operational catchment and the Dearne from Source to Bentley Brook sub catchment.

Figure 3-2 Watercourse Location



4 POTENTIAL FLOOD RISK

4.1 SOURCES OF FLOODING

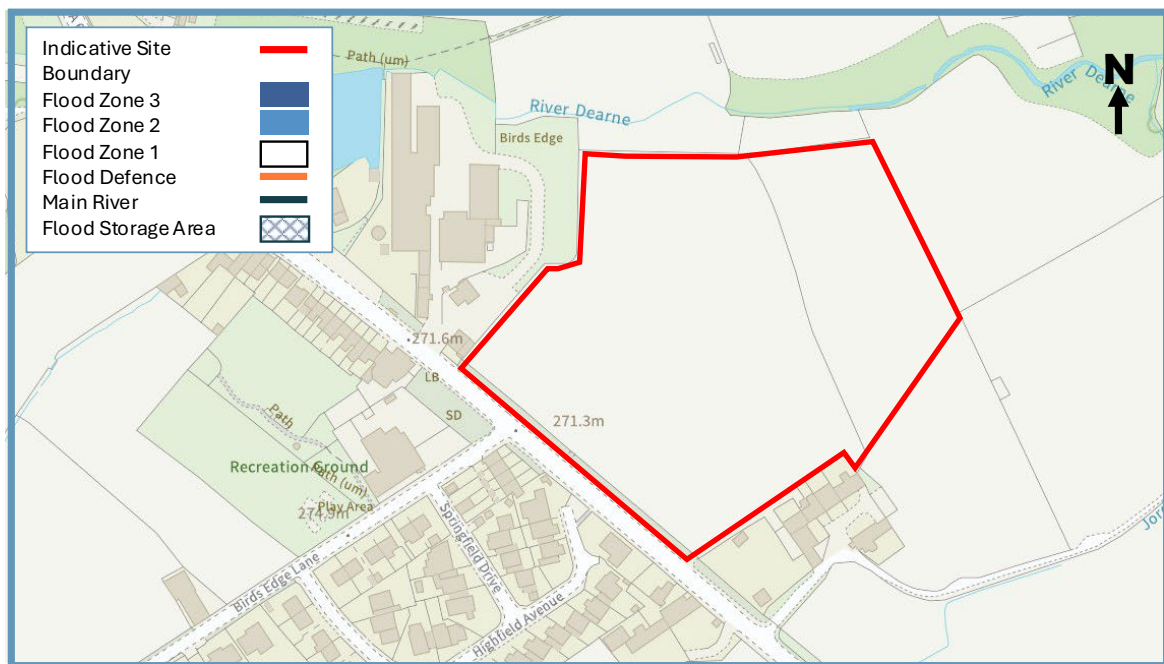
4.1.1 This report is to consider flood risk from all potential sources. [Section 5](#) then discusses in further detail the probability of flooding, any potential impacts and necessary mitigation, where required.

4.2 ENVIRONMENT AGENCY FLOOD ZONES

4.2.1 The EA Flood Map for Planning shows the site is located within Flood Zone 1, which is designated as land having less than a 1 in 1000 probability of river or sea flooding.

4.2.2 This potential fluvial/coastal flood risk to the site has been illustrated in [Figure 4-1](#).

Figure 4-1 Environment Agency Long Term Flood Map for Planning



4.3 FLUVIAL AND COASTAL FLOODING

4.3.1 It is necessary to consider the risk of fluvial and coastal flooding at the site during both present times and with the impacts of climate change. Therefore, the EA Long Term Flood Risk Map for fluvial and coastal flooding between the years 2036 and 2069 has been presented below in [Figure 4-2](#). This figure indicates that the site is at very low risk of fluvial and/or coastal flooding.

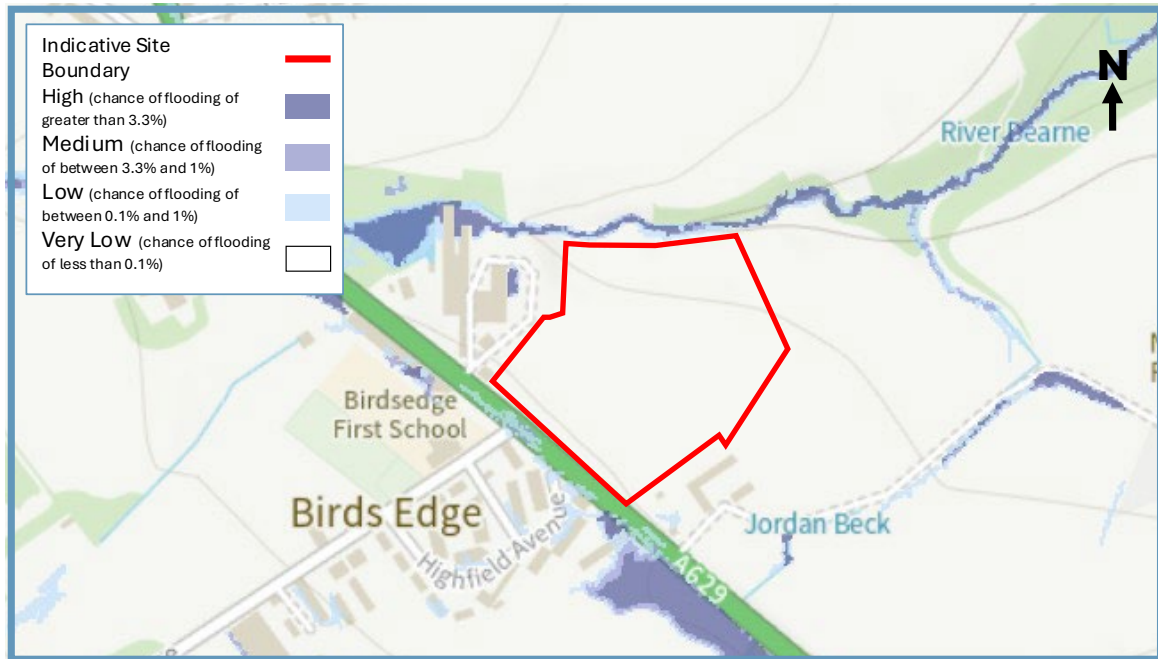
Figure 4-2 Environment Agency Long Term Flood Map – Rivers and Sea – Yearly Chance of Flooding between 2036 and 2069



4.4 PLUVIAL (SURFACE WATER) FLOODING

- 4.4.1 Similarly to that discussed in [Section 4.3](#), the impacts of climate change on the potential for surface water flooding should be considered within the assessment of the flood risk at the site. The EA Long Term Flood Risk Map for surface water flooding between the years 2040 and 2060 is shown below in [Figure 4-3](#). This figure shows that the site is located within an area at very low risk of surface water flooding.
- 4.4.2 As the proposed development of the site may potentially reduce the overall site permeability and potentially increase surface water run-off rates and volumes, the surface water discharge controls must ensure that any proposal for drainage, or discharge, does not adversely impact upon downstream drainage infrastructure or offsite receptors.
- 4.4.3 The site is therefore considered to have very low risk potential risk of flooding from pluvial sources.

Figure 4-3 Environment Agency Long Term Flood Risk Map – Pluvial (Surface Water) Flooding – Yearly Chance of Flooding between 2040 and 2060



4.5 GROUNDWATER FLOODING

- 4.5.1 Ground conditions at the site consist mostly of freely draining slight acid loamy soils with a small area in the south of the site consisting mostly of slowly permeable seasonally wet acid loamy and clayey soils, therefore the propensity for groundwater emergence at the site is considered to be medium, and the potential risk of groundwater emergence affecting the site development is considered to be medium.
- 4.5.2 However, given the impermeable nature of the proposed site's hardstanding areas subsequent to development, potential elevation of groundwater or groundwater emergence within the superficial geology causing flooding within the site post-development will be largely eliminated. Likewise, noting the fall in gradient from south to north, any emerging ground water would be directed away from the proposed development area and discharge into the River Dearne.
- 4.5.3 According to the Calder Catchment SFRA Volume 2 groundwater flooding map presented in [Appendix C](#), the site is not susceptible to groundwater flooding.
- 4.5.4 During long periods of heavy rainfall, the water table within an area can rise above the natural ground level, resulting in groundwater flooding.
- 4.5.5 Site specific investigations should be able to prove the presence of ground water and propose remedial mitigation where required. Flood risk to the proposed development due to groundwater emergence is therefore considered to be low.
- 4.5.6 Flood risk to the proposed development due to groundwater emergence is considered to be low provided that all reasonable and practicable mitigation measures for any subsurface construction associated with the development are adhered to.

4.6 FLOODING FROM ARTIFICIAL SOURCES

In accordance with information taken from the EA Long Term Flood Risk information, the site and its surroundings are unlikely to experience flooding from artificial sources such as dam or canal failure. In addition, reservoirs and canals are regularly maintained by relevant local authorities and failure is extremely unlikely. Therefore, the potential risk of flooding from reservoir and/or canal failure is considered to be negligible.

4.7 FLOODING FROM SEWERS

- 4.7.1 The site currently consists of greenfield land and is not identified as having any drainage infrastructure within its boundary. The site is therefore considered to have very low potential risk of flooding from sewer flooding.
- 4.7.2 The SFRA does not mention any historical occasions of sewer flooding within the site.

4.8 HISTORIC FLOODING

- 4.8.1 The EA historic flood map shows the site to not have experienced historic flooding.

5 FLOOD RISK ASSESSMENT

5.1 FLOOD RISK PLANNING POLICY

National Planning Policy Framework

- 5.1.1 The National Planning Policy Framework (NPPF) sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online.
- 5.1.2 The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 5.1.3 The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.
- 5.1.4 This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance.
- 5.1.5 The EA Flood Map for Planning locates the site within Flood Zone 1, i.e. land assessed as having less than 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year.
- 5.1.6 The flood map extents indicated on this map show the potential for flooding from fluvial and coastal sources, and although they are indicative, they are a key tool in defining the appropriateness of a development type or the requirement for further assessment.
- 5.1.7 Under the NPPF (2024), Flood Zone 1 is defined as having a low probability flood risk. The proposed development includes up to 70 dwellings which are defined within Table 2 of the NPPF technical guidance as being 'More Vulnerable'. Therefore, according to the criteria in Table 3 of the NPPF Technical Guidance (Flood Risk Vulnerability and Flood Zone 'Compatibility'), the proposed development may be deemed as 'Appropriate'.

5.2 SEQUENTIAL AND EXCEPTION TEST

- 5.2.1 Both the NPPG and the SFRA require the 'Sequential Test' to be applied to ensure that proposed developments are carried out in area that are at the least risk of flooding, before considering development in areas that are at risk of flooding. The proposed site falls within Flood Zone 1 and is considered to come under the 'More Vulnerable' category as a residential development.
- 5.2.2 Based on Table 3 in the National Planning Practice Guidance for Flood Risk and Coastal Change, the proposed use of the site is acceptable due to it being located in Flood Zone 1 and an Exception Test is not required.

Table 5-1 Development Appropriateness Based on Vulnerability and Flood Zones

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception test required	✓	✓
Flood Zone 3a	Exception test required	✓	x	Exception test required	✓
Flood Zone 3b	Exception test required	✓	x	x	x

5.3 CONCLUSION

- 5.3.1 In light of this assessment against the sites applicable flood zone (Flood Zone 1), further assessment against the sequential or exception test is not required. This should be confirmed with the LPA prior to development of the site.
- 5.3.2 **Table 5-2** summarises the pre mitigation flood risk associated with the site as well as the impacts of the flood risk on the wider catchment prior to mitigation. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within **Section 3**.

Table 5-2 Pre-Mitigation Flood Risk Summary

Sources	Probability of Flood Risk	Impacts	Description
Tidal	N/A	N/A	The site is located inland and therefore, is not tidally influenced.
Fluvial	Very Low	Very Low	The site is not shown to be located in an area susceptible to fluvial flooding.
Surface Water (Pluvial)	Very Low	Very Low	The site is not shown to be located in an area susceptible to surface water flooding.
Groundwater	Medium	Low	The site is shown to be at risk of ground water flooding; however, given the hard standing nature of the site following development, ground water emergence at the site will be limited.
Artificial Sources	Very Low	Very Low	Review of information from multiple sources (EA, LLFA) reveals no evidence of flooding from reservoirs or canals.
Sewers	Very Low	Very Low	The risk of flooding from the surcharging of sewers is considered to be low.
Effect of development on wider catchment	Low	Low	The impermeable area of the site is being altered.

- 5.3.3 Based on the assessable information presented, the site is considered to meet the requirements of the NPPF, given the assessed potential flood risk posed from all applicable sources, the means of adopting suitable mitigation measures to prevent increase in the potential for flood risk and based on the vulnerability of the development type. Further consideration of necessary surface water run-off mitigation measures will be provided, so as to address the potential for increase of surface water arising from the proposed development of the site.

6 FLOOD RISK MITIGATION

6.1 INTRODUCTION

- 6.1.1 **Section 4** has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be considered within the proposed development detail design to address and reduce the risk of flooding to within acceptable levels.

6.2 EFFECT OF DEVELOPMENT ON WIDER CATCHMENT

Development Drainage

- 6.2.1 The current site is considered to be greenfield. The amount of impermeable area will be altered. Therefore, the existing drainage systems will not be suitable to discharge the surface water from the site alongside the additional run-off from the proposed development. A sufficient drainage strategy will be therefore provided by AMA.

6.3 SITE ARRANGEMENTS

Sequential Arrangement

- 6.3.1 The Flood Zone mapping shows the site to be located within Flood Zone 1. Therefore, a Sequential Test has not been completed for this site.

Finished Floor Levels

- 6.3.2 Given the site's location within Flood Zone 1, there are no specific requirements for finished floor levels with regard to flood risk. However, it is recommended that an FFL of 0.15m above the adjacent ground level is set for the proposed development.

7 FOUL WATER DRAINAGE

7.1 INTRODUCTION

- 7.1.1 It is proposed to install a new foul drainage system to serve the proposed residential development.
- 7.1.2 The foul water system will be designed and constructed in accordance with the current Building Regulations, BS EN:752 'Drainage and Sewer Systems Outside Buildings', the Local Authority Building Control specifications and requirements, Sewers for Adoption 8th Edition and the Civil Engineering Specification for the Water Industry.

7.2 EXISTING SEWERS

- 7.2.1 AMA attained a Yorkshire Water pre-development enquiry which can be seen in [Appendix D](#). They state that the local wastewater treatment works is Clayton West, which is noted to have limited capacity, with an update to be provided from the respective treatment team.

7.3 FOUL WATER DISCHARGE RATES

- 7.3.1 The estimate design peak flow generated by the proposed development, based on a gravity system, has been calculated as 3.24 litres per second.
- 7.3.2 This figure is based on 70 dwellings at 4,000 litres per dwelling as prescribed in Sewers for Adoption.

7.4 FOUL WATER CAPACITY AND POINT OF CONNECTION

- 7.4.1 Yorkshire Water have advised that foul water can discharge to the existing 225mm combined water sewer located to the south of the site, located within Penistone Road. They have advised that at present the sewer network does not have capacity to accept flows from the development, and Yorkshire Water would likely not support the proposed development.
- 7.4.2 Under the Water Industry Act 1991, there is a legal obligation placed on Yorkshire Water to carry out any necessary upgrades to the local network for consented schemes. As such, should the proposals be granted planning permission, Yorkshire Water will be required to provide the necessary upgrades to the Boroughbridge STW to allow for the additional flows from the proposed scheme.
- 7.4.3 Due to the fall of the site away from Penistone Road and the depth of the sewer at 3.55m at manhole 2801, pumping will be required.
- 7.4.4 Any proposed connection onto the public recorded sewers will require a S106 connection application.

8 SURFACE WATER DRAINAGE STRATEGY

8.1 INTRODUCTION

- 8.1.1 The National Planning Policy Framework (NPPF) and accompanying Technical Guidance indicate that surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.
- 8.1.2 Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

8.2 OVERVIEW AND CONCEPT

- 8.2.1 As detailed in [Section 3.1](#), development proposals for the site consist of residential use including associated infrastructure works. The Parameters Plan shows the developable area of the site to be restricted to the red line boundary, as shown in [Appendix A](#), with an approximate total developable area of 3.17 ha.
- 8.2.2 The developable area of the site has been identified within the Parameters Plan as totalling to 1.401 ha, and as such the impermeable area for dwellings and private drives has been taken as 0.84 ha, based on 60% of the developable area. The access road throughout the site has an impermeable area of 0.39 ha and as such, the proposed impermeable area of the site is taken as 1.23 ha.
- 8.2.3 It is considered that green open space and landscaped areas will not produce or contribute run-off to the surface water management infrastructure proposed as part of this strategy. This has been taken into account when deriving the impermeable area for the site.

8.3 PRE-DEVELOPMENT SURFACE WATER RUN-OFF

Greenfield

- 8.3.1 The site is approximately 3.17 ha in area and currently comprises of undeveloped greenfield land.
- 8.3.2 For the purposes of determining the existing rate of surface water run-off the site is considered to greenfield therefore the run-off will be estimated using the IH124 method.
- 8.3.3 The table below summarises the existing greenfield run-off rates generated by the development for a range of storm return periods. A calculation summary sheet from the UK SuDS website can be found in [Appendix E](#).

Table 8-1 Existing Run-Off Rates

Area	Q ₁	Q ₁₀	Q ₃₀	Q ₁₀₀	Q ₂₀₀
3.17	7.4	12.4	15.0	17.8	20.3

8.4 GROUNDWATER PROTECTION

- 8.4.1 The proposed development site is not identified as being within a groundwater source protection zone (SPZ), as such no special measures are required to prevent risk to drinking water supplies.

8.5 METHODS OF SURFACE WATER MANAGEMENT

8.5.1 There are three methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed:

- ▶ Discharge via Infiltration
- ▶ Discharge to a Watercourse
- ▶ Discharge to Surface Water Sewer or Highway Drain
- ▶ Discharge to Public Sewer

8.6 INFILTRATION

- 8.6.1 Any impermeable areas that can drain to a soakaway or an alternative method of infiltration would significantly improve the sustainability of any surface water systems.
- 8.6.2 The British Geological Society (BGS) Geology of Britain Viewer indicates that the entire site is underlain by Grenoside Sandstone-Sandstone with no overlying superficial deposits.
- 8.6.3 Information obtained from the Cranfield University's Soilscape website indicates that the majority of the site is in an area classified as being Soilscape 6, which is defined as freely draining slightly acid loamy soils. There is a small area in the south of the site that is located in an area classified as being Soilscape 17, which is defined as slowly permeable seasonally wet acid loamy and clayey soils.
- 8.6.4 From a desktop review of the geology and soil at the site, and with consideration for the topography of the site, it is believed that infiltration would not be an acceptable way of discharging surface water from the site.
- 8.6.5 Infiltration testing was undertaken at the site by Eastwood Consulting Engineers, and the associated report can be found in [Appendix F](#). The testing concluded that soakaways were not viable across a large portion of the site, with low rates found towards the north of the site.
- 8.6.6 As noted within the correspondence with the LLFA, as provided in [Appendix F](#), infiltration is not acceptable in locations where surface gradients are more than 1 in 10 due to the risk of re-emergence.
- 8.6.7 As such, infiltration methods are not deemed to be viable.

8.7 WATERCOURSE

- 8.7.1 As discussed in [Section 3.4.1](#), the River Dearne is located approximately 15m to the north of the site at its closest point. Additionally, the Jordan Beck is located approximately 95m southeast of the site at its closest point, and an unnamed watercourse is located 135m northwest of the site at its closest point.
- 8.7.2 As the site is in close proximity to the Dearne, it would be possible to discharge surface water from the site into the watercourse, subject to third party land agreements.
- 8.7.3 AMA contacted the LLFA regarding the possibility of discharging surface water from the site to the watercourse. The LLFA confirmed that the River Dearne adjacent to the development site is an ordinary watercourse and as such land drainage consent will be required. They also state due to the steep topography of the site, a direct surface water outfall to the Dearne would be acceptable, with run-off restricted to greenfield rates. This correspondence has been provided within [Appendix G](#).

8.8 PUBLIC SEWERS

- 8.8.1 As a last resort and following the hierarchy of surface water, disposal discharge to the public sewer system may need to be considered.

8.8.2 In the Yorkshire Water pre development enquiry ([Appendix D](#)) they state that as the site is currently undeveloped, no surface water is known to have previously discharged to the public sewer network. As such, the lower public sewer network does not have capacity to accept surface water from the site.

8.8.3 Therefore, it would not be possible to discharge surface water from the site into a public sewer.

8.9 PROPOSED DISCHARGED RATES

8.9.1 Surface water from the site will be discharged via an outfall to the River Dearne.

8.9.2 As the site will be drained by discharging surface water into the watercourse, surface water will be restricted to 7.4 l/s based on greenfield run-off rates for the site.

8.10 ATTENUATION REQUIREMENTS

8.10.1 As discussed earlier the site will be drained into a watercourse at a restricted discharge rate of 7.4 l/s. Therefore, attenuation will have to be provided.

8.10.2 Causeway Flow drainage design software has been used to estimate the maximum storage volume required on-site for the 100-year storm event plus 40% allowance for climate change and 10% for urban creep. The results of these calculations can be found in [Appendix H](#).

8.10.3 The results below are based on an attenuation tank located in the northeast corner of the site, discharging surface water to the River Dearne at a restricted discharge rate of 7.4 l/s. Due to the steep topography of the site in this area, an attenuation basin is not considered to be a suitable option.

8.10.4 A Drainage Layout Drawing can be found in [Appendix I](#).

Total Impermeable Area

8.10.5 This volume is based on using an attenuation tank with a discharge rate of 7.4 l/s. The details on the attenuation of the tank can be found in [Table 8-2](#) below.

Table 8-2 Attenuation Volume

Gross Area (ha)	Max Discharge (l/s)	Imp. Area (ha)	Q100+50% Volume (m ³)
3.17	7.4	1.23	1338

8.11 DRAINAGE NETWORK

8.11.1 An indicative drainage network has been illustrated showing how flows would be intercepted and conveyed to the attenuation tank. This includes a series of surface water pipes and manholes.

8.11.2 The final surface water drainage network servicing the site should ideally consist of permeable paving to limit the run-off from any paved areas, whilst extending time of concentration for discharge to the accompanying drainage network.

8.11.3 For any portion of the network crossing a highway or an area to be trafficked by heavy grade vehicles (HGV's), a minimum cover requirement of 1.20 m below cover level should be provided where practically possible for the internal drainage network to satisfy Sewers for Adoption standards.

8.11.4 Proposals for the drainage network are to discharge to the River Dearne to the north of the site, which is classified as an ordinary watercourse in this location, and would fall under the purview of Kirklees Council, the LLFA for the area.

9 SUSTAINABLE DRAINAGE SYSTEMS

- 9.1.1 Where possible, Sustainable drainage (SuDS) systems/techniques should be used to drain the site of surface water runoff. These could be in the form of permeable paving, rainwater harvesting, ponds, and other above ground green systems. Swales could also be incorporated into the layout to convey surface runoff rather than below ground pipes (which tend to have a higher velocity).

9.2 SUSTAINABLE DRAINAGE (OVERVIEW)

- 9.2.1 Drainage systems can contribute to sustainable development and improve urban design, by balancing the different issues that influence the development of communities. Approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) and amenity issues are collectively referred to as Sustainable Drainage Systems (SuDS).
- 9.2.2 SuDS mimic nature and typically manage rainfall close to where it falls. SuDS can be designed to slow water down (attenuate) before it enters streams, rivers, and other watercourses, they provide areas to store water in natural contours and can be used to allow water to soak (infiltrate) into the ground or evaporated from surface water and lost or transpired from vegetation (known as evapotranspiration).
- 9.2.3 SUDS are technically regarded as a sequence of management practices, control structures and strategies designed to drain surface water efficiently and sustainably, while minimising pollution and managing the impact on water quality of local water bodies.
- 9.2.4 SuDS are more sustainable than traditional drainage methods because they:
- ▶ Manage runoff volumes and flow rates from hard surfaces, reducing the impact of urbanisation on flooding,
 - ▶ Protect or enhance water quality (reducing pollution from runoff),
 - ▶ Protect natural flow regimes in watercourses,
 - ▶ Are sympathetic to the environment and the needs of the local community,
 - ▶ Provide an attractive habitat for wildlife in urban watercourses,
 - ▶ Provide opportunities for evapotranspiration from vegetation and surface water,
 - ▶ Encourage natural groundwater/aquifer recharge (where appropriate),
 - ▶ Create better places to live, work and play.

9.3 SUDS PRINCIPALS

- 9.3.1 Sustainable drainage is a departure from the traditional approach to draining sites. There are some key principles that influence the planning and design process enabling SuDS to mimic natural drainage by:
- ▶ Storing runoff and releasing it slowly (attenuation)
 - ▶ Allowing water to soak into the ground (infiltration)
 - ▶ Slowly transporting (conveying) water on the surface
 - ▶ Filtering out pollutants
 - ▶ Allowing sediments to settle out by controlling the flow of the water

- 9.3.2 The above was replicated from www.susdrain.org.

9.4 SUDS TECHNIQUES

- 9.4.1 The following table is a list of SuDS features that may/may not be feasible for the proposed site.

Table 9-1 SuDS Feasibility Table

SuDS Technique	Can they be feasibly incorporated into the site?	Comments
Green Roofs	✗	The sloping roofs of the proposed development would not permit a green roof design.
Basins and Ponds	✗	The steep topography of the site means that the use of a basin in this location would not be suitable.
Filter Strips, Swales and Bio-Retention	✗	The proposed development could not be designed to incorporate these elements due to site constraints.
Infiltration Techniques	✗	The steep topography of the site means that infiltration would not be suitable here, due to the risk of seepage.
Permeable Surfaces and Tree Pits	✓	Surfacing of the external areas could be in a permeable material, such as permeable paved access roads and driveways.
Rainwater Harvesting	✓	New roofs could be directed to rainwater harvesting tanks for reuse.

10 SUDS MAINTENANCE PLAN

10.1 SURFACE WATER MAINTENANCE AND MANAGEMENT SCHEDULE

Attenuation Tank Maintenance Schedule

Table 10-1 Attenuation Tank Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually.
	Remove debris from catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required.
Remedial Actions	Repair/rehabilitate inlets, outlets, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment and build-up and remove if necessary.	Every 5 years or as required

Hydrobrake Manhole Maintenance Schedule

Table 10-2 Hydrobrake Manhole Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove sediment and debris from flow control chambers and upstream manholes.	Monthly for first 12 months, then 6 monthly.
Remedial Actions	Replace or clean hydrobrake if performance deteriorates or failure occurs.	As necessary
Monitoring	Check flow control to ensure emptying is occurring.	Quarterly and post high intensity storm event

11 SUMMARY

- 11.1.1 The proposals for the site are for residential use including associated infrastructure works.
- 11.1.2 The site is in an area identified as having a low probability of flooding on the EA Flood Map and is located in Flood Zone 1.
- 11.1.3 The site is not considered to be at risk of tidal flooding, fluvial flooding, surface water flooding, sewer flooding, or flooding from artificial sources.
- 11.1.4 The site is shown to be at risk of groundwater flooding; however, given the hardstanding and sloping nature of the site following development, groundwater emergence at the site will be limited.
- 11.1.5 Given the site's location within Flood Zone 1, there are no specific requirements for finished floor levels with regard to flood risk. However, it is recommended that an FFL of 0.15m above the adjacent ground level is set for the proposed development.
- 11.1.6 As with any drainage system, blockages within the surface water sewer systems constructed to serve the development has the potential to cause flooding or disruption. Any drainage systems which are not to be offered for adoption to either the Water Company or the Local Authority will have a suitable maintenance regime scheduled, and an appropriate management company appointed to carry out the works.
- 11.1.7 The primary option for surface water disposal is to form an outfall to a watercourse.
- 11.1.8 Due to the steep topography of the site, infiltration is not deemed to be suitable for the disposal of surface water from the site.
- 11.1.9 There is a suitable watercourse in the vicinity of the site which could be utilised to dispose of surface water from the site. It is proposed that surface water will discharge through an outfall to the River Dearne.
- 11.1.10 There is not a suitable public sewer in the vicinity of the site which could be utilised to dispose of the surface water as Yorkshire Water has stated that the sewers do not have capacity.
- 11.1.11 Attenuation is required as the means of surface water disposal is through an outfall to a watercourse. Furthermore, there will be a restricted discharge limit of 7.4 l/s based on the greenfield run-off rate for the site.
- 11.1.12 There is a formal point of connection into a Yorkshire Water public combined water sewer in close proximity to the site. Foul water domestic waste can discharge to the 225 mm diameter public combined sewer recorded in Penistone Road, at a point to the south of the site.

12 LIMITATIONS

- 12.1.1 This report has been prepared for exclusive use by Yorkshire Land Limited for the purpose of assisting them in evaluating the potential constraints imposed by flood risk and drainage in making a Planning Application.
- 12.1.2 AMA accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of AMA. Any advice, opinions or recommendations within this document should be read and relied upon only in the context of the document as a whole.
- 12.1.3 AMA has endeavoured to assess all information provided to them during this appraisal. The report summarises from several external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon.
- 12.1.4 This report has been undertaken with the assumption that the site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.
- 12.1.5 A topographic survey has been completed for the site and was supplied to AMA by the client. AMA accepts no liability for the accuracy of this survey, and it is recommended that it is verified on-site prior to the commencement of any construction work.
- 12.1.6 Existing drainage information is based on third party survey data and record information which is considered to be incomplete. It is therefore recommended that a FULL drainage investigation survey is commissioned to establish the precise alignment, level, and condition of ALL existing drainage within the development site to inform the masterplan and future detailed design proposals.

APPENDICES

Appendix A Site Parameters Plan

Appendix B Topographic Survey

Appendix C Calder Catchment SFRA Volume II Groundwater Flood Map

Appendix D Yorkshire Water Pre-Development Enquiry

Appendix E UK SuDS Greenfield Run-Off Rates

Appendix F Eastwood Consulting Engineers Infiltration Test Report

Appendix G Correspondence with the LLFA

Appendix H Causeway Flow Calculations

Appendix I Drainage Layout Drawing



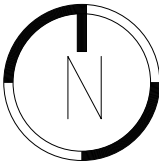
Appendix A
Site Parameters Plan



Birds Edge

KEY

- Red Line Boundary (3.17ha)
- BNG Area
- Vehicular route through the site
- Pedestrian Routes
- Developable Area (with landscaping details to be agreed)
- Public Open Space / Amenity Green Space - 1.48ha
- Landscaping
- LEAP - 938m2 (with 20m buffer zone)
- Landscape Buffer



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Architects are to be notified of any discrepancies.
Contractors must check all dimensions on site.
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For other information refer to the latest revision of any cross referenced drawings.
To be read in conjunction with relevant design standards/protocols.

REV	DATE	DESCRIPTION	DRN	CKD
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STATUS: **Planning**

CLIENT: **Yorkshire Land Limited**

PROJECT NAME: **Birdsedge**

PROJECT ADDRESS: **Land off A629 (Penistone Road), Birdsedge**

DRAWING TITLE: **Parameters Plan**

DRG NO:	7072-SSA-00-XX-DR-A- 03	REV:	P07
PROJECT	ORIG	BLDG LEVEL	TYPE ROLE NO

DATE:	FEB 26	SCALE:	1:500	SHEET SIZE:	A1
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HARROGATE | LEEDS

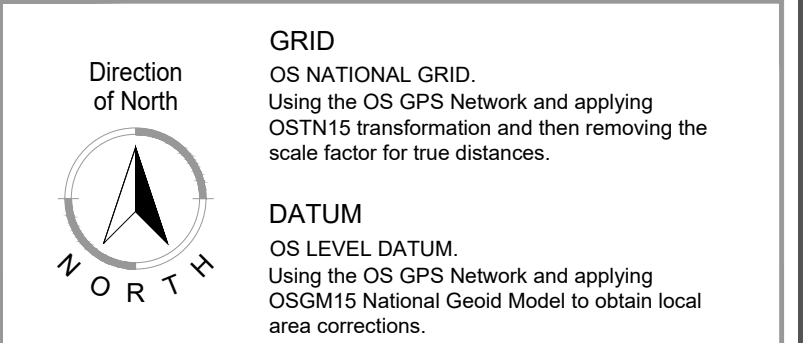
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Appendix B
Topographic Survey

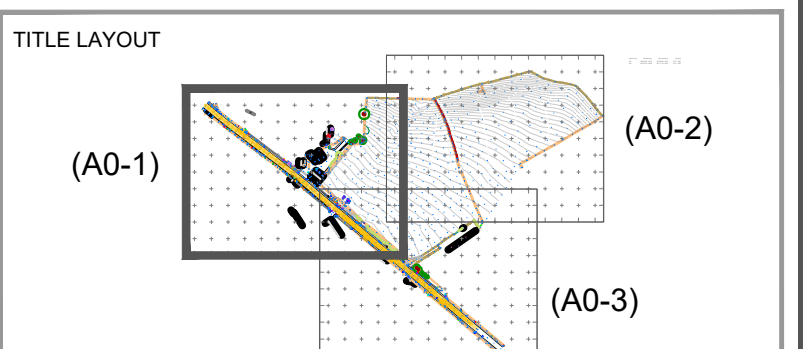
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STATION LISTING			
Station	Easting	Northing	Level
S3	420240.219	407830.443	271.792
S4	420310.588	407770.495	271.190

TOPOGRAPHICAL SURVEY KEY			
DRAINAGE & WATER SERVICES		STREET FURNITURE & GEOTEC	
DS	Down Gully	MAAL	Post Box
KS	Kerb Outlet	ROB	Bus Stop
CS	Circular Manhole	ROB	Bus Stop
MS	Manhole	SGH	Sign
MS	Square Manhole	SGH	Sign
MS	Triangle Manhole	TCFL	Traffic Light
MS	Roofing Line	OVCT	Overhead Light
FLH	Fire Hydrant	LP	Lamp Post
ST	Stop Tap	LGHT	Light
SV	Stop Valve	COL	Column
WT	Wash Out	MM	Marker
WT	Water Meter	BM	Bench Mark
WP	Water Pipe	MP	Manhole Post
WP	Water Valve	TP	Traffic Post
AW	Air Valve	BN	Banquette



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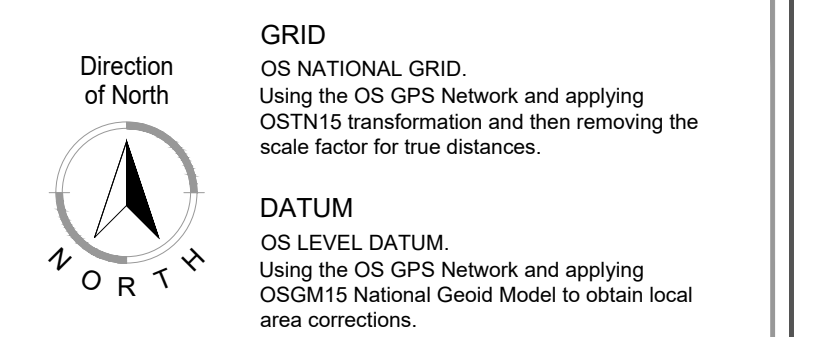
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CLIENT Johnson Mowat					
SITE Land off A629, Birdsedge, HD8 8XS					
DRAWING TITLE 2D Topographical Survey					
DRAWING REF-(LAYOUT TAB) 1216-205_2D (A0-1)					SCALE@ 1/250
PROJECT REF 1216-205					REV Ø
SURVEYED CHECKED	JW & MA MT	DRAWN DATE	JW 30 / 01 / 2026		
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REV	DATE	DRAWN	DESCRIPTION		CHECKED

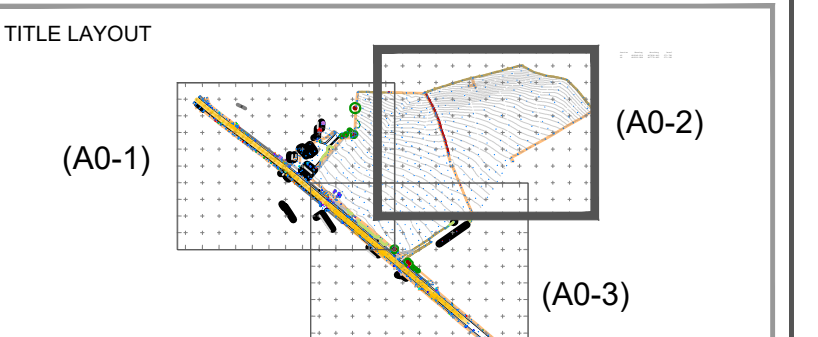
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STATION LISTING			
Station	Easting	Northing	Level
S3	420240.219	407830.443	271.792
S4	420310.588	407770.495	271.190

TOPOGRAPHICAL SURVEY KEY	
DRAINAGE & WATER SERVICES	
DO	Drain Gully
KG	Kenb Gully
CS	Circular Sewerhole
SM	Square Manhole
TR	Triangular Sewerhole
RI	Rodding Eye
FR	Fire Hydrant
ST	Stop Tap
SV	Stop Valve
WM	Wash Out
WA	Water Meter
WO	Water Valve
AV	Air Valve
STREET FURNITURE & GEOTECH	
MAL	Mail Box
BS	Bus Stop
LD	Lamp Post
SG	Sign
TL	Traffic Light
CCV	Can
LP	Lamp Post
UR	Urinal
CL	Cum Pot
WV	Went
BA	Bench Mark
M	Man Post
TP	Tie Pin
B	Borehole
SERVICES	
GS	Gas Valve
IC	Inspection Cover
CC	Cable TV Cover
CT	Cable TV Supply
E	Electric Cover
EL	Electricity Pipes
ET	Earth Rod
TE	Telephone Cover
TP	Telegraph Pole
GR	Gas Riser Pipe
RA	Rainwater Pipe
SP	Soil Vent Pipe
ABBREVIATIONS	
CS	Cover Level
IL	Invert Level
TL	Top of Level
TR	Threshold Level
TOP	Top of Fence
TOP	Top of Road
TOP	Top of Mail
TOP	Top of Sewer
TOP	Top of Gully Level
TOP	Top of Window Head Level
TOP	Top of Door Head Level



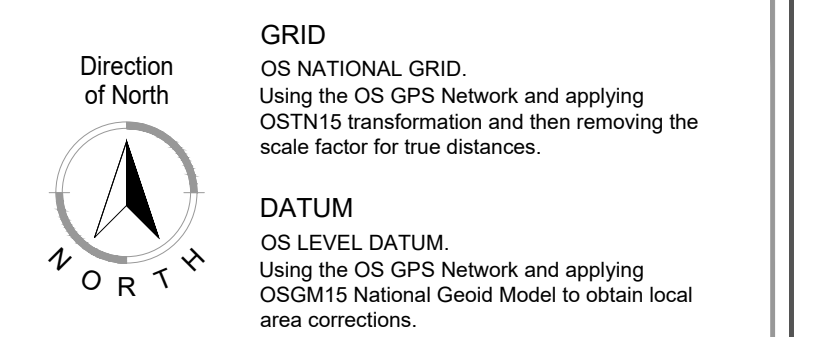
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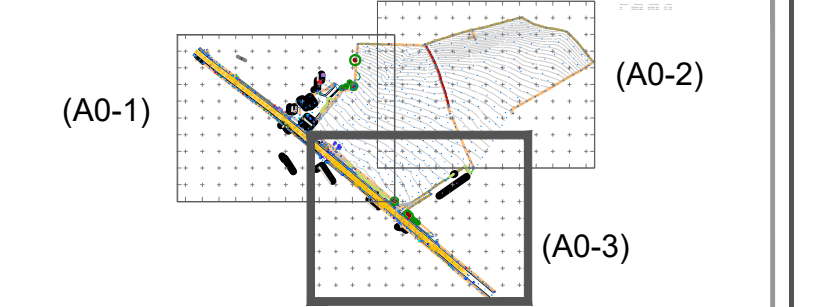
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TOPOGRAPHICAL SURVEY KEY

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MC	Circular Manhole	SG	Sign
MS	Square Manhole	SGN	Sign
MT	Triangular Manhole	TL	Traffic Light
RE	Rodding Eye	OCVTV	Camera
FE	Fire Hydrant	LP	Post Light
ST	Stop Tap	UP	Up Street
SV	Stop Valve	CL	Column
TA	Tap	CLV	Valve
WV	Water Meter	SW	Switch Mark
WM	Water Valve	M	Marker Post
AV	Air Valve	PH	Pit
		BS	Borehole

SERVICES		ABBREVIATIONS	
G	Gas Valve	CL	Cover Level
I	Inspection Cover	IL	Insert Level
C	Cable TV Cover	UTR	Unable To Raise
V	Cable TV Supply	THR	Threshold Level
E	Electric Cover	TH	Threshold
EP	Electricity Pole	TOH	Top Of Hedge
ER	Earth Rod	TOH	Top Of Wall
TEL	Telecoms Cover	TOH	Top Of Road
TP	Telegraph Pole	WC	Window Cill Level
GR	Gas Riser Pipe	WH	Window Head Level
BN	Boundary	DR	Door Head Level
SW	Soil Vent Pipe		

TITLE LAYOUT



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CLIENT	Johnson Mowat
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SITE

Land off A629,
Birdsedge, HD8 8XS

DRAWING TITLE

2D Topographical Survey

DRAWING REF-(LAYOUT TAB)	SCALE@A0
1216-205_2D (A0-3)	1/250

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CHECKED	MT	DATE	30 / 01 / 2026

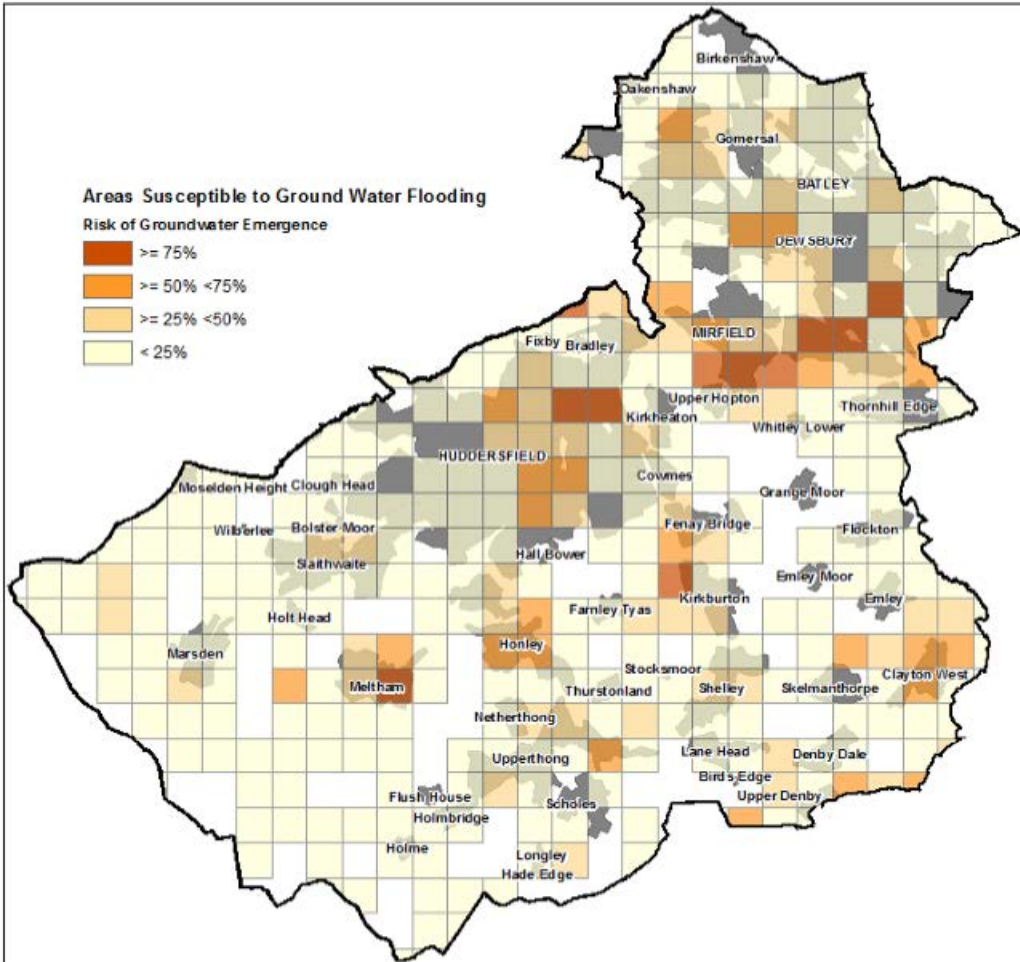
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Appendix C
Calder Catchment SFRA Volume II
Groundwater Flood Map

Areas Susceptible to Ground Water Flooding

Risk of Groundwater Emergence





Appendix D
Yorkshire Water Pre-Development
Enquiry



YorkshireWater

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Our Ref: B/00005**

**Email:
technical.sewerage@yorkshirewater.co.uk**

**For telephone enquiries ring:
George Mullaney on 0345 120 8482**

3rd February 2026

Dear Ms Ellenor,

**Land off A629, Penistone Road, Denby Dale, Birds Edge HD8 8XP – Pre-Planning
Sewerage Enquiry X206567**

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Existing Infrastructure

The local Waste Water Treatment Works (WWTW) is Clayton West. It is understood that this WWTW may only have limited spare capacity, if any, available. We have contacted the respective treatment team for more information regarding the impact of proposed development and will contact you when an assessment has been made.

Foul Water



Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

At present the sewer network does not have sufficient available capacity to support the size of development proposed. It is understood that the site is not allocated within the adopted Kirklees Local Plan and as such the site has not been considered within the current Yorkshire Water Asset Management Plan (AMP) period. Should the site come forward as part of a planning application Yorkshire Water (YWS) would likely not support the proposal.

Should the site benefit from the grant of permission, the closest practicable point of discharge for foul effluent would be the 225mm diameter combined public sewer in Penistone Road to the south of the site.

It is likely that a sewage pumping station will be required to facilitate connection to the public sewer network

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

As the proposed site is currently undeveloped no surface water is known to have previously discharged to the public sewer network.

As such, the local public sewer network does not have capacity to accept any surface water from the proposed site. If SuDS are not viable, the developer is advised to contact the Environment Agency/local Land Drainage Authority/Internal Drainage Board with a view to establishing a suitable watercourse for discharge.

It is understood that a watercourse (River Dearne) is located to the north of the site. This appears to be the obvious place for surface water disposal (if SuDS are not viable). Please note Yorkshire Water cannot provide plans of culverted watercourses or highway drains. To obtain plans please contact the Lead Local Flood Authority for more details.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the



YorkshireWater

Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply online or obtain an application form from our website (www.yorkshirewater.com/developers/sewerage/sewerage-connections/) or by telephoning 0345 120 84 82.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for Code for Adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.

An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - <https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/> for further information.

All the above comments are based upon the information and records available at the present time and are valid for a period of 12 months. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

George Mullaney
Town Planning Technician



420156 : 407738	YorkshireWater	Map Name : SE2007NW	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : G Mullaney Contact Tel :	Title	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
			Notes			
			(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2024. All rights reserved Ordnance Survey Licence number AC0000813445			
			Date Req : 03/02/2026, 16:35:10		Date Gen : 03/02/2026, 16:35:23	
				Source : Sewer Network Enquiry		

Appendix E
UK SuDS Greenfield Run-Off Rates

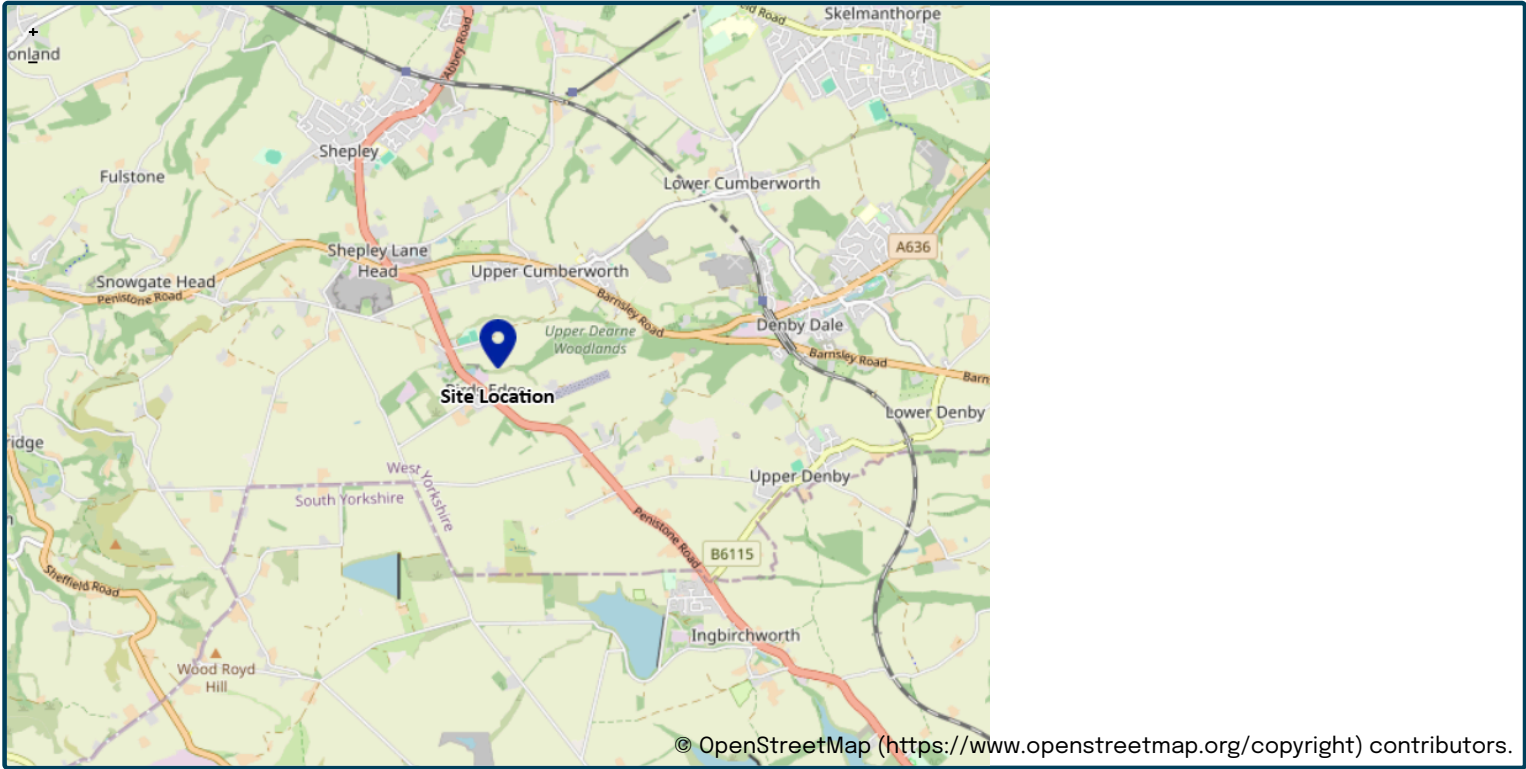
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	12/03/2026
Calculated by	Jasmine Ellenor
Reference	300655
Model version	2.2.3

Location

Site name	Land off A629
Site location	Birdsedge



Site easting (British National Grid)	420361
Site northing (British National Grid)	407825

Site details

Total site area (ha)	3.17	ha
----------------------	------	----

Greenfield runoff

Method

Method	IH124
--------	-------

IH124

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	979	mm	979
How should SPR be derived?	WRAP soil type		
WRAP soil type	2		2
SPR	0.3		
QBar (IH124) (l/s)	8.6	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	3		3
1 year growth factor	0.86		
2 year growth factor	0.94		
10 year growth factor	1.45		
30 year growth factor	1.75		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	IH124	
Flow rate 1 year (l/s)	7.4	l/s
Flow rate 2 year (l/s)	8.0	l/s
Flow rate 10 years (l/s)	12.4	l/s
Flow rate 30 years (l/s)	15.0	l/s
Flow rate 100 years (l/s)	17.8	l/s
Flow rate 200 years (l/s)	20.3	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com/) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.



Appendix F
Eastwood Consulting Engineers
Infiltration Test Report

Report on Infiltration Testing

PENISTONE ROAD, BIRDSEDGE

YORKSHIRE LAND LIMITED

29 MARCH 2026

Sam Green
Yorkshire Land Ltd
Tattersall House,
East Parade,
Harrogate,
HG1 5LT

50175-ECE-XX-XX-RP-C-0001

AJK/JK

29 March 2026

Dear Sam,

Penistone Road, Birdsedge Report on Infiltration Testing

We write to provide a summary of the infiltration testing for the above site on the instruction of Johnson Mowat Planning and Development Consultants, on behalf of Yorkshire Planning Limited. Any other parties using the information in this report do so at their own risk and any duty of care is excluded.

This summary is based on a review and interpretation of geological maps and memoirs, as well as the site works completed on the 16 March 2026.

The Site

The approximately 3.17-hectare site is located adjacent to Penistone Road, Birdsedge and is centred on 420330, 407860. The site currently comprises agricultural fields. The site boundaries comprise hedgerows, walls and adjacent fields. On the northwestern boundary a farm is present and on the southeastern boundary a row of houses is present. The site borders Penistone Road on the southwest boundary. Three large diameter water mains cross the site from the southern boundary towards the north.

A topographical survey provided to us indicates the site slopes down towards the north east, from approximately 270 m AOD on the south western boundary, to approximately 256 m AOD in the north of the site at a gradient of around 1 in 11.

Historical Ordnance Survey maps and aerial photography have been reviewed to assess the previous use of the site. The Envirocheck notes the site to comprise of agricultural land with no development from as early as 1892.

Eastwood Consulting Engineers is a trading name of Eastwood and Partners (Consulting Engineers) Limited
Registered Office: St Andrew's House, 23 Kingfield Road, Sheffield, S11 9AS, Company No: 1835021, VAT Registration No: 738 2114 44

Directors:

C A Topliss BSc CEnv CSci CGeol SiLC FICE FGS I S J English BEng CEng MStructE I A R Priest BEng
M P Chappell BEng CEng FStructE FICE I K Edwards MSci CGeol FGS I C Hodge EngTech MICE

Technical Directors:

A J Kerslake BEng FGS I A M Cross MEng CEng MICE I A Lavelle MEng CEng MICE I A J Cartlidge MEng CEng MStructE

Associates/Principals:

R A Noble BSc FGS I C L Capes BSc FGS I R Wall BSc CGeol FGS I W T Chidawanyika BSc CEng MIEI MICE
C J Burgoyne BSc IEng MICE I G C Burgin BSc MSc FGS

Consultants:

P Richardson BSc CEng MICE FStructE I S D Preston BEng CEng FICE FStructE I A G Marshall BEng CEng MStructE

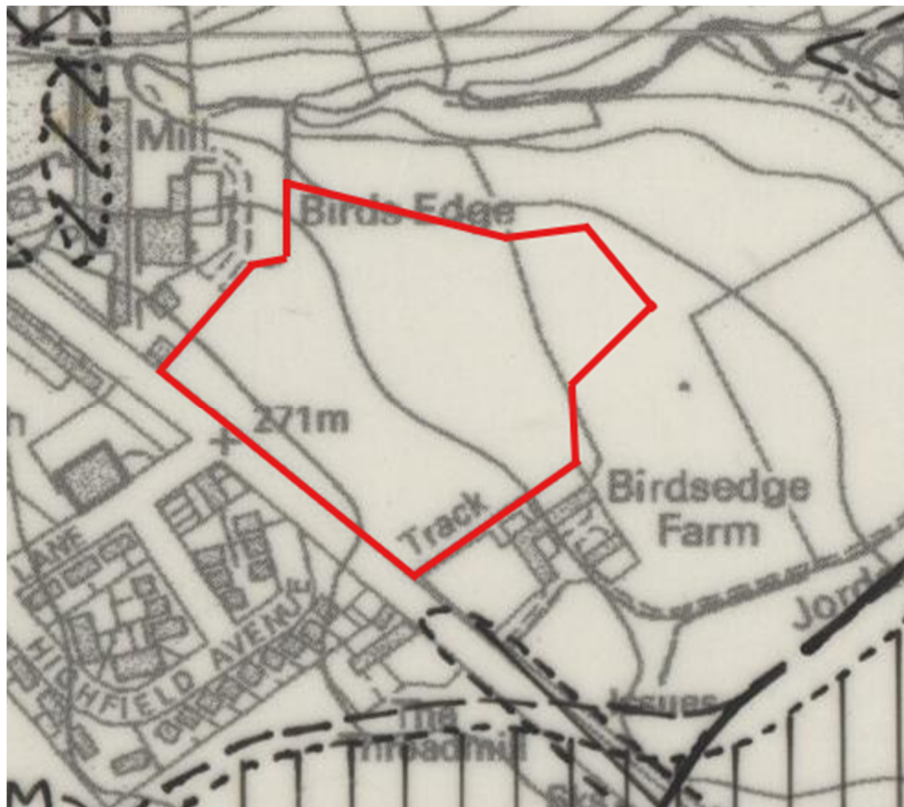
Geological Review

The geological maps for the area, Sheet SE20NW (1:10,000 scale), Yorkshire 273NW (1:10,560 scale) and the British Geological Survey (BGS) online viewer have been reviewed.

These maps indicate the solid geology below the site to comprise the Grenoside Sandstone, a named unit of the Pennine Lower Coal Measures Formation. The Grenoside Sandstone is a fine-grained, thinly bedded micaceous and carbonaceous sandstone.

There are no superficial deposits indicated to underlie the site and no faults are seen to cross the site.

The site investigation shown the strata to comprise topsoil of a dark brown clayey fine to coarse sand. Underlying this an extremely weak weathered sandstone bedrock recovered as a very gravelly fine to coarse sand was encountered. All three soakaway pits refused on sandstone bedrock from depths between 1.15 and 1.55 m below ground level (bgl).



Infiltration Testing

ECE visited the site on the 16 March 2026 and undertook 3 soakaway tests (SA01, SA02 and SA03) across the western field of site.

The ground conditions recorded on the site comprised topsoil at surface, consisting of a dark brown clayey fine to coarse grained sand. This was between 300 mm and 350 mm thick.

Below the topsoil, gravelly sand was present, where the gravel comprised sandstone. This transitioned in to weathered sandstone bedrock at depths of between 1.05 and 1.45 m below ground level.

The infiltration tests were undertaken in accordance with BR365, with water being placed in to the test pit from a bulk container. Where the water drained successfully, the test was repeated up to twice more. All three test pits encountered the weathered bedrock in the base of the pit.

The results of the infiltration testing are summarised below.

Location	Depth (m)	Test Number	Infiltration Rate ($\times 10^{-6}$ m/s)	
			BR365 Infiltration Rate	Average Infiltration Rate
SA01	1.50	1	110	89
		2	40	45
		3	39	47
SA02	1.10	1	Infiltration test not be completed.	2.8
SA03	1.30	1	Infiltration test not be completed.	2.2

Three repeat tests to BRE365 requirements were completed in SA01. Due to low infiltration rates, SA02 and SA03 did not drain to below 25% effective depth within three hours and therefore a BRE365 soil infiltration rate could not be calculated.

BRE365 infiltration rates of between 3.9×10^{-5} m/s and 11×10^{-5} m/s were recorded in SA01.

The infiltration rates recorded in SA01 suggest that soakaway drainage may locally be a viable form of surface water drainage. However, due to the much lower rates recorded in SA02 and SA03, it appears that infiltration drainage may not be possible in all areas of the site.

It is recommended that further testing is undertaken to determine which areas of the site can provide suitable infiltration rates, if the use of infiltration drainage is to be pursued. It may be prudent also to test the shallower, more weathered soils to see if shallow infiltration features such as swales or permeable paving could be considered.

Alternatively, a connection to the local sewer network or a watercourse would need to be agreed, if soakaway are not found to be viable.

Yours sincerely,

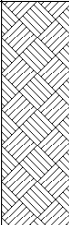
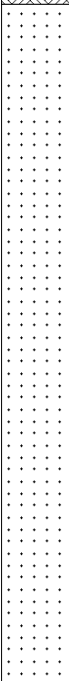
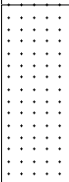


Andrew Kerslake

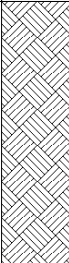
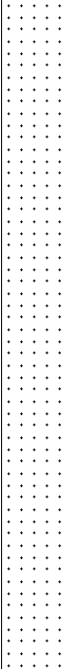
Technical Director

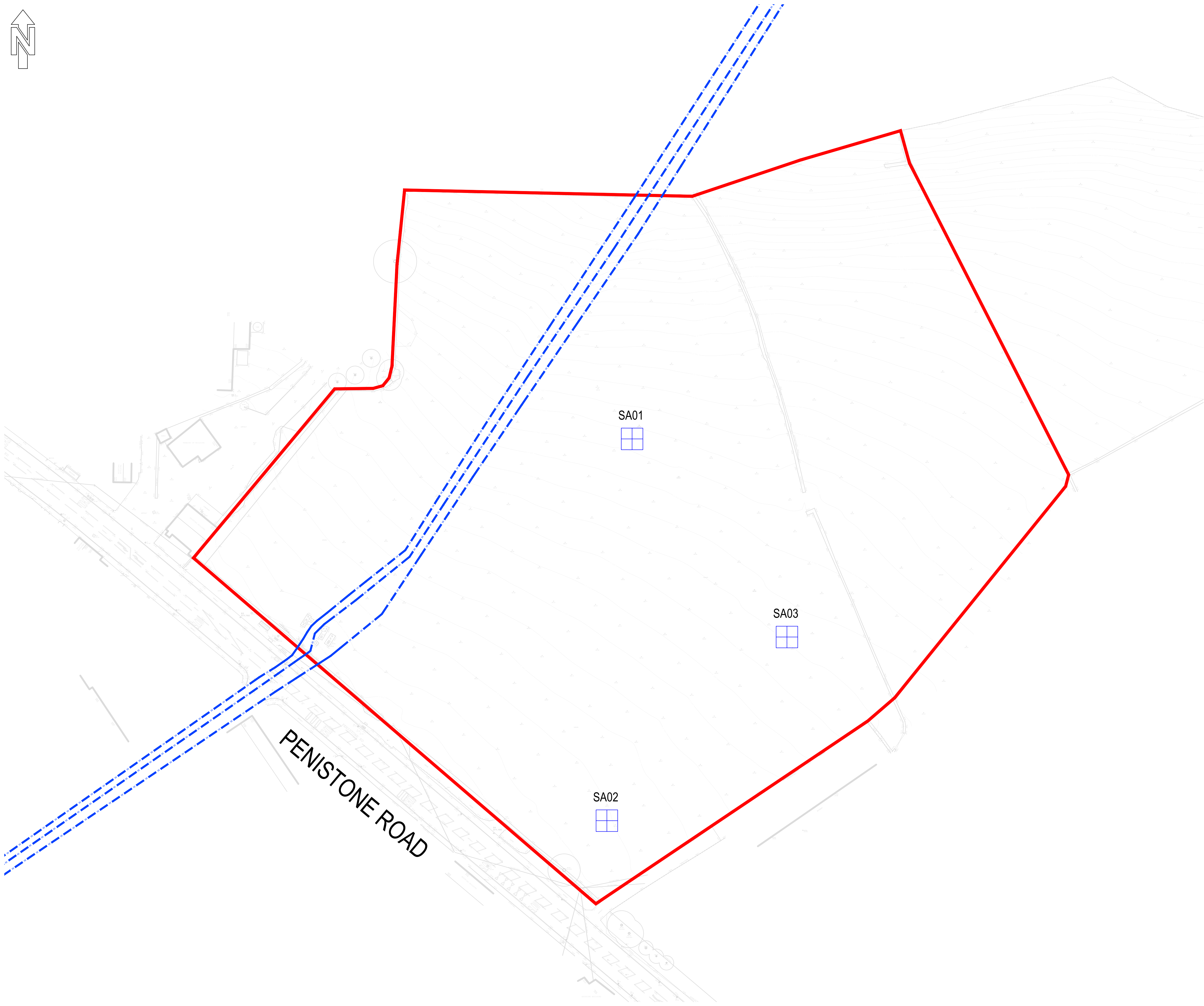
Enc: Trial Pit Logs and Location Plan (50175-ECE-XX-XX-DR-C-0001)
Infiltration Rate calculations

Copy: Mr J. Fisher – Johnson Mowat

Eastwood CONSULTING ENGINEERS						TrialPit No SA01 Sheet 1 of 1	
Project Name Penistone Road, Birdsedge			Project No. 50175		Co-ords: 420349.00 - 407880.00 Level:		Date 16/03/2026
Location: Penistone Road, Birdsedge					Dimensions: 2.10m		Scale 1:10
Client: Yorkshire Land Limited					Depth: 1.50m		Logged JK
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.30			TOPSOIL. Grass over dark brown clayey fine to coarse SAND with frequent rootlets.	
						Extremely weak yellowish brown weathered SANDSTONE bedrock. Recovered as a very gravelly fine to coarse SAND with frequent cobbles and boulders. Gravel is fine to coarse angular to subangular of sandstone. Cobbles are subangular. Boulders are tabular.	
						Extremely weak yellowish brown weathered SANDSTONE bedrock. Recovered as a yellow slightly gravelly SAND. Gravel is fine to coarse angular to subangular.	
						Extremely weak SANDSTONE bedrock.	
			1.20				
			1.45				
			1.50			Trialpit Complete at 1.500m	
Remarks: Infiltration test terminated at 1.5 m due to refusal on sandstone bedrock. Groundwater not encountered.							
Stability: Stable							

Eastwood CONSULTING ENGINEERS						TrialPit No SA02 Sheet 1 of 1	
Project Name Penistone Road, Birdsedge			Project No. 50175		Co-ords: 420342.00 - 407774.00 Level:		Date 16/03/2026
Location: Penistone Road, Birdsedge			Dimensions: 2.10m			Scale 1:10	
Client: Yorkshire Land Limited			Depth: 1.10m			0.80m Logged JK	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.35			TOPSOIL. Grass over dark brown clayey fine to coarse SAND with frequent rootlets.	
						Extremely weak yellowish brown weathered SANDSTONE bedrock. Recovered as a very gravelly fine to coarse SAND with frequent cobbles and boulders. Gravel is fine to coarse angular to subangular of sandstone. Cobbles are subangular. Boulders are tabular.	
						Extremely weak SANDSTONE bedrock.	
			1.05				
			1.10			Trialpit Complete at 1.100m	
Remarks: Infiltration test terminated at 1.1 m due to refusal on sandstone bedrock. Groundwater not encountered.							
Stability: Stable							

Eastwood CONSULTING ENGINEERS						TrialPit No SA03 Sheet 1 of 1	
Project Name Penistone Road, Birdsedge			Project No. 50175		Co-ords: 420392.00 - 407825.00 Level:		Date 16/03/2026
Location: Penistone Road, Birdsedge					Dimensions: 2.10m		Scale 1:10
Client: Yorkshire Land Limited					Depth: 1.30m		Logged JK
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.35			TOPSOIL. Grass over dark brown clayey fine to coarse SAND with frequent rootlets.	
						Extremely weak yellowish brown weathered SANDSTONE bedrock. Recovered as a very gravelly fine to coarse SAND with frequent cobbles and boulders. Gravel is fine to coarse angular to subangular of sandstone. Cobbles are subangular. Boulders are tabular.	
			1.25			Extremely weak SANDSTONE bedrock.	
			1.30			Trialpit Complete at 1.300m	
Remarks: Infiltration test terminated at 1.5 m due to refusal on sandstone bedrock. Groundwater not encountered.							
Stability: Stable							



1. This drawing is to be read in conjunction with all relevant Eastwood Consulting Engineers drawings prefixed 50175 and Architect's drawings.
2. The topographical survey is taken from 'MTSurveys', Topographical Survey, 'Land off A629, Birdsedge, HD8 8XS', dated January 2026.

KEY:

-  Approximate position of soakaway test undertaken by ECE on 16.03.2026.
-  Site boundary.
-  Approximate location of water main according to yorkshire water services limited.

Exploratory Hole Coordinates		
SA:	Easting:	Northing:
SA01	420349	407880
SA02	420342	407774
SA03	420392	407825

P01	First issue.	TGM	AK	07.04.2026
REV	DESCRIPTION	SIG	CHK	DATE

YORKSHIRE LAND LIMITED

PENISTONE ROAD, BIRDSLEDGE,
HUDDERSFIELD

EXPLORATORY HOLE LOCATION
PLAN



Eastwood
CONSULTING ENGINEERS

St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS

T: 0114 255 4554
E: mail@eastwoodce.com
eastwoodce.com

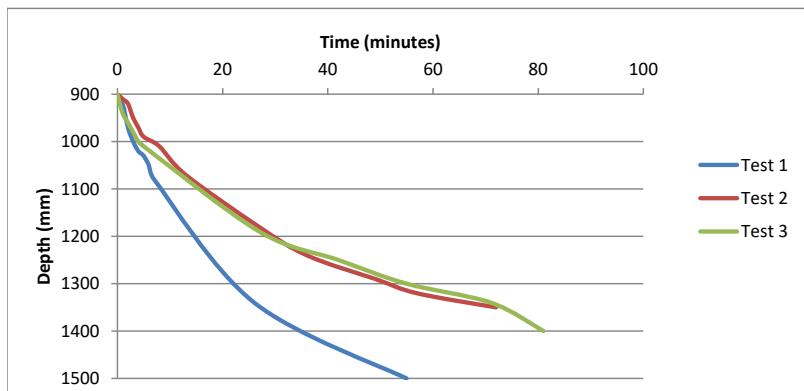
ECE PROJECT No	SCALE AT A1	STATUS	SUITABLE FOR
50175	1:500m	S2	Information
DRAWING NUMBER			REV
50175 - ECE - XX - XX - DR - C - 0001			P01
Project	Originator	Zone	Level
	Type	Role	Number

Infiltration Test Results and Calculation of Infiltration Rates

Site: Penistone Road, Birdsedge

Client: Yorkshire Land Limited

Test Reference: SA01

[illegible]

Testing completed by	JK
Date	16.03.26

Calculation completed by	JK
Date	17.03.26

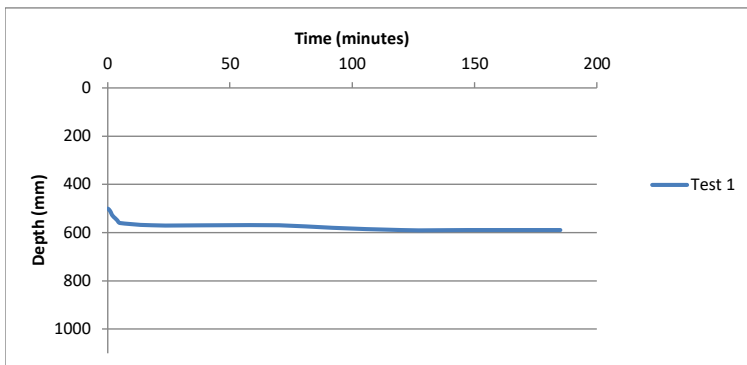
Calculation checked by	AJK
Date	27.03.26

Infiltration Test Results and Calculation of Infiltration Rates

Site: Penistone Road, Birdsedge

Client: Yorkshire Land Limited

Test Reference: SA02

[illegible]

Testing completed by	JK
Date	16.03.26

Calculation completed by	JK
Date	17.03.26

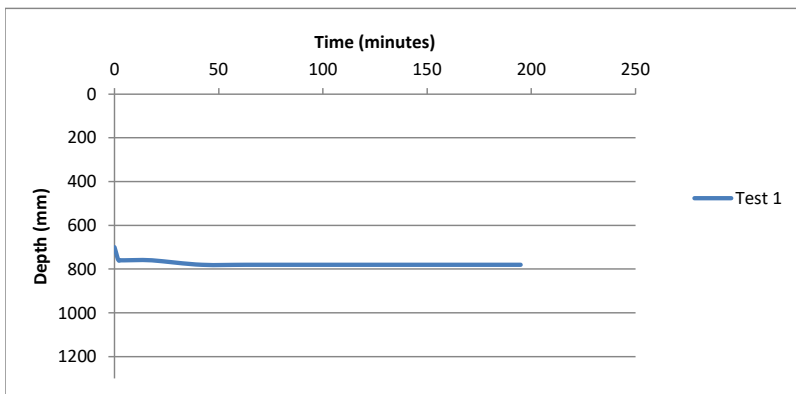
Calculation checked by	AJK
Date	27.03.26

Infiltration Test Results and Calculation of Infiltration Rates

Site: Penistone Road, Birdsedge

Client: Yorkshire Land Limited

Test Reference: SA03

[illegible]

Testing completed by	JK
Date	16.03.26

Calculation completed by	JK
Date	17.03.26

Calculation checked by	AJK
Date	27.03.26



Eastwood

CONSULTING ENGINEERS

St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS
mail@eastwoodce.com
0114 255 4554
eastwoodce.com



Appendix G
Correspondence with the LLFA

From: [Floodmanagement](#)
To: [Jasmine Ellenor](#)
Cc: [Caitlin Shearer](#)
Subject: RE: Land off A629, Birdsedge - Drainage Strategy
Date: 27 February 2026 15:30:14
Attachments: [image001.png](#)

Hi Jasmine

I can confirm that the river Dearne adjacent to the proposed development is an Ordinary Watercourse and therefore any outfall into the river will require a Land Drainage Consent. However, this can generally be granted as part of the Planning Application provided details of the outfall are submitted with the Application.

Regarding infiltration, The LLFA generally will not accept soakage into the ground where surface gradients are greater than 1 in 10 (which appears to be the case here) due to the risk of re-emergence. Therefore, a direct outfall of surface water run-off from the new development, restricted to the calculated Greenfield Run-off Rate, into the watercourse is preferred. Note that the flow control device outlet should not be less than 75mm.

Regards

Martin Stephenson

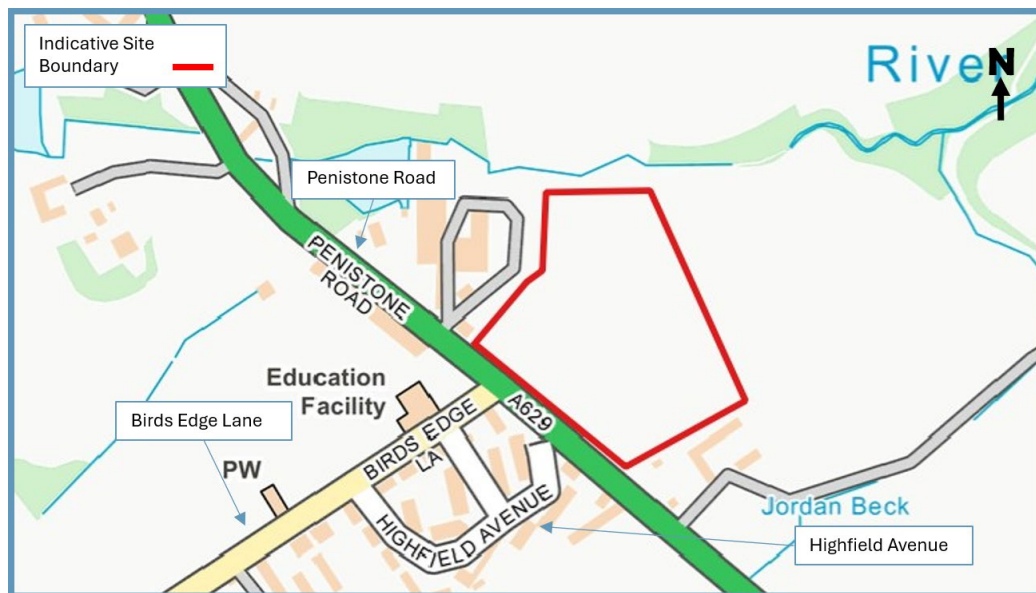
Flood Risk Management

From: Jasmine Ellenor <jasmine@amatp.co.uk>
Sent: 26 February 2026 16:35
To: Floodmanagement <Floodmanagement@kirklees.gov.uk>
Cc: Caitlin Shearer <Caitlin@amatp.co.uk>
Subject: Land off A629, Birdsedge - Drainage Strategy

CAUTION: External email. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon,

Hope you are well. I am emailing with regard to a drainage strategy that AMA are preparing for a residential development at Land off A629, Birdsedge, Huddersfield, HD8 8XP at NGR: SE 20324 07841 – see below location plan.



The site has a steep gradient towards the River Dearne to the north and as such it is assumed infiltration will not be viable here. Testing is to be completed at a later date to confirm.

As such, we are looking at the possibility of forming an outfall to the River Dearne to the north of the site. At the point of the river which is adjacent to the development site, the river is not classified as an EA main river. As such, please can you confirm if this length of the watercourse falls under the LLFA's purview and if so, please can you confirm if this would be an acceptable outfall for surface water from the site? As the site is greenfield we would look to discharge to the greenfield run-off rate of 5.6 l/s. Please can you confirm if this would be an acceptable discharge rate?

Thank you in advance

Kind regards,

Jasmine Ellenor
Flood Risk and Drainage Engineer
BSc Grad.CIWEM

Mobile: 0774 266 8250
***Leeds Office:** 0113 418 2615
Newcastle Office: 0191 486 2745
Web: www.amatp.co.uk
**my main office base*

Andrew Moseley Associates Ltd
Yorkshire: 15 St Pauls Street, Leeds, LS1 2JG

North East: Haylofts, 5 St Thomas' Street, Newcastle upon Tyne NE1 4LE

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Appendix H
Causeway Flow Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.800	Minimum Backdrop Height (m)	0.200
Ratio-R	0.320	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Storage	1.230	5.00	100.000	1500	100.000	100.000	2.000

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	19.800	Additional Storage (m³/ha)	0.0
Ratio-R	0.320	Starting Level (m)	
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	10	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	98.000	Product Number	CTL-SHE-0118-7400-1600-7400
Design Depth (m)	1.600	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.4	Min Node Diameter (mm)	1500

Node Storage Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	98.000	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	1.600
Safety Factor	2.0	Width (m)	22.000	Inf Depth (m)	
Porosity	0.95	Length (m)	40.000		

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	Storage	495	98.291	0.291	32.5	210.0109	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
720 minute summer	Storage	Hydro-Brake®	7.1	297.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.99%

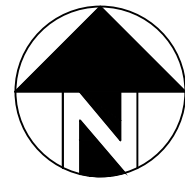
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	Storage	570	98.682	0.682	51.4	538.0551	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)				
600 minute winter	Storage	Hydro-Brake®	7.4	309.2				

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	Storage	930	99.575	1.575	71.5	1285.9820	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)				
960 minute winter	Storage	Hydro-Brake®	7.4	457.0				

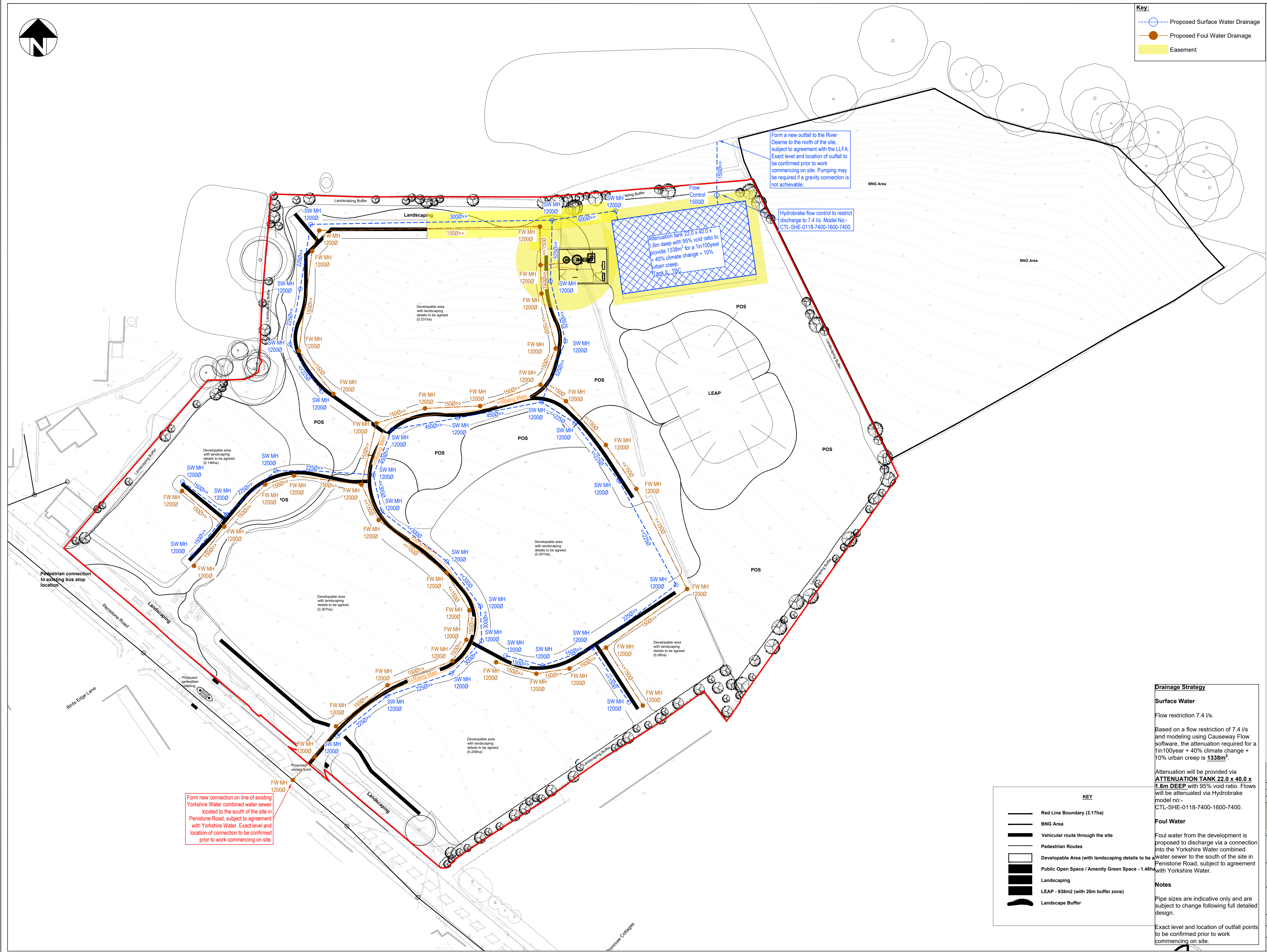


Appendix I
Drainage Layout Drawing



Key:

- Proposed Surface Water Drainage
- Proposed Foul Water Drainage
- Easement



Form a new outfall to the River Deame to the north of the site, subject to agreement with the LLFA. Exact level and location of outfall to be confirmed prior to work commencing on site. Pumping may be required if a gravity connection is not achievable.

Hydrobrake flow control to restrict discharge to 7.4 l/s. Model No:- CTL-SHE-0118-7400-1600-7400.

Attenuation tank 22.0 x 40.0 x 1.6m deep with 95% void ratio to provide 1338m³ for a 1in100year + 40% climate change + 10% urban creep. Tank L: TBC

Form new connection on line of existing Yorkshire Water combined water sewer located to the south of the site in Penistone Road, subject to agreement with Yorkshire Water. Exact level and location of connection to be confirmed prior to work commencing on site.

Drainage Strategy

Surface Water

Flow restriction 7.4 l/s.

Based on a flow restriction of 7.4 l/s and modeling using Causeway Flow software, the attenuation required for a 1in100year + 40% climate change + 10% urban creep is **1338m³**.

Attenuation will be provided via **ATTENUATION TANK 22.0 x 40.0 x 1.6m DEEP** with 95% void ratio. Flows will be attenuated via Hydrobrake model no:- CTL-SHE-0118-7400-1600-7400.

Foul Water

Foul water from the development is proposed to discharge via a connection into the Yorkshire Water combined water sewer to the south of the site in Penistone Road, subject to agreement with Yorkshire Water.

Notes

Pipe sizes are indicative only and are subject to change following full detailed design.

Exact level and location of outfall points to be confirmed prior to work commencing on site.

KEY

- Red Line Boundary (3.17ha)
- BNG Area
- Vehicular route through the site
- Pedestrian Routes
- Developable Area (with landscaping details to be agreed)
- Public Open Space / Amenity Green Space - 1.48ha
- Landscaping
- LEAP - 938m² (with 20m buffer zone)
- Landscape Buffer

P2	Updated Site Masterplan	30.04.26	JE
P1	Preliminary Issue	02.04.26	JE
DRAFT	Draft Issue	12.03.26	JE
AMA ANDREW MOSELEY ASSOCIATES 15 St Pauls Street Second Floor Leeds LS1 2AP www.ama.co.uk			
Project: Land off A629, Birdsedge			
Client: Yorkshire Land Limited			
Drawing: Drainage Layout Drawing			
Drawn By:	JE	Date:	12.03.2026
Checked:	TD	Scale:	1:500
Drawing No:	AMA-300655-DS-001	Rev:	P2



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