Flood Risk Assessment and Drainage Strategy

Aldham Industrial Estate, Mitchells Road, Wombwell, Barnsley

Presented to: Cadam Construction Limited

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Reference of Terms

Canal Failure

Canal failure can include a breach or overtopping of a canal system due to the effects of a high intensity rainfall event or structural failure that is not associated with a rainfall event. Such failure can be very dangerous as it can involve the rapid release of large volumes of water at high velocity, however, it is typically limited to reaches of canal that are raised above the surrounding ground level on one or both side and where watercourses or other structures pass beneath the canal. The size and nature of canals themselves can also have a hydraulic control on the mechanisms of flooding associated with a failure, resulting in a rapid peak in flow followed by a gradual reduction as the flow becomes restricted by the capacity of the canal itself to rapidly pass flow to the breach or failure point.

Fluvial Flooding

Fluvial flooding typically occurs when a river's capacity is exceeded, and the excess water overtops the river banks. It can also occur when the watercourse has a high level downstream, perhaps due to structures or blockage, thus limiting conveyance. This creates a back-up of water which can overtop the banks. Typical flooding issues occur when the natural floodplain has been urbanised and the river has been confined.

Groundwater Flooding

Groundwater flooding is caused by the emergence of water from beneath the ground at either point or diffuse locations when the natural level of the water table rises above ground level. This can result in deep and long-lasting flooding of low-lying or below-ground infrastructure such as underpasses and basements. Groundwater flooding can cause significant damage to property, especially in urban areas, and can pose further risks to the environment and ground stability.

Reservoirs Failure

Reservoir failure can be a particularly dangerous form of flooding as it results in the sudden release of large volumes of water that can travel at high velocity. This can result in deep and widespread flooding, potentially resulting in significant damage. The likelihood of reservoir flooding occurring is generally extremely low given that all large reservoirs are managed in accordance with the Reservoirs Act 1975. Under the Reservoirs Act 1975, a large, raised reservoir is defined as one that holds over 25,000 cubic metres of water above the level of the surrounding land. The EA's online reservoir inundation map illustrates the maximum flood extents that could potentially occur in the event of a reservoir failure.

Sewer Flooding

Flooding from sewers primarily occurs when flow entering a system exceeds available capacity or if the network capacity has been reduced through blockage or collapse. In the case of surface water sewers that discharge to watercourses, the same effect can be caused as a result of high water levels in the receiving watercourse. As a result, water can begin to surcharge the sewer network, emerging at ground level through gullies and manholes and potentially causing flooding to highways and properties. If this occurs flooding can represent a significant hazard to human health due to the potential for contaminants in flood water.

Surface Water Runoff

Surface water runoff is defined as water flowing over the ground that has not yet entered a drainage channel or similar. It usually occurs as a result of an intense period of rainfall which exceeds the infiltration capacity of the ground. Typically, runoff occurs on sloping land or where the ground surface is relatively impermeable. The ground can be impermeable either naturally due to the soil type or geology, or due to development which places impervious material over the ground surface (e.g. paving and roads).

Tidal Flooding

Tidal flooding is caused by high tides coinciding with a low-pressure storm system which raises sea and tidal water levels, overwhelming coastal and river defences. This may be made worse by gale force winds blowing the raised body of water up tidal river basins some distance from the coast, due to floodwater being forced up the tidal reaches of rivers and estuaries. Such flooding may become more frequent in future years due to rising sea levels.

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1.0 Introduction

1.1 Appointment

1.1.1 Delta-Simons Limited ("Delta-Simons") was instructed by Cadam Construction Limited (the "Client") to prepare a Flood Risk Assessment (FRA) and Drainage Strategy (DS) to support the Planning Application for proposed industrial development at land within the Aldham Industrial Estate, off Mitchells Road, Wombwell, Barnsley.

1.1.2 The assessment considers potential flood risks from all sources and provides options for managing any Site-specific flood risks identified.

1.2 Project Understanding

1.2.1 The Site is within Flood Zone 1 (Low risk from fluvial and tidal sources). However, Barnsley Metropolitan Borough Council (BMBC) in their preapplication response has requested a Flood Risk Assessment (FRA) for submission as a validation requirement. The FRA will determine the level of risk from all sources, along with suitable mitigation measures to provide an informative report in line with the National Planning Policy Framework (NPPF) and associated planning guidance to support a planning application.

1.2.2 BMBC also stated that a Drainage Strategy (DS) with appropriate consideration for Sustainable Drainage Systems (SuDS) in line with CIRIA SuDS (C753) Guidance will also be a validation requirement for any planning application and is required to ensure that surface water flood risk is not exacerbated off-site as a result of the proposed development. The DS will be used to inform the final detailed design.

1.2.3 The aim of this report is to assess the potential flood risk to the Site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified risk. This report has been prepared in accordance with the guidance contained in the National Planning Policy Framework (NPPF) revised in 2021, and the National Planning Practice Guidance (NPPG) Flood Risk and Coastal Change.

1.2.4 Barnsley Metropolitan Borough Council as Lead Local Flood Authority (LLFA) is a statutory consultee for major planning applications in relation to surface water drainage, requiring that all planning applications are accompanied by a Sustainable Drainage Strategy. The aim of the Sustainable Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment.

1.3 Scope of Works

1.3.1 The scope of works has been as follows for this FRA:

- Assess flood risk from all sources using best available information including review of EA data and mapping, topography and historical records;
- Assess previous relevant studies, local authority plans or strategies;
- Advise on flood mitigation measures and residual risks;
- Assess evacuation routes;
- Advise on availability of flood warnings;
- Identify the requirement for a Sequential Test; and
- Prepare FRA report.

The proposed development will increase impermeable area and risk of surface water flooding to downstream receptors. Therefore, a DS with appropriate consideration for SuDS in line with CIRIA SuDS (C753) Guidance is required. The DS has included the following:

- Review existing conditions including sewer plans, British Geological Survey information and topographical information;
- Review Lead Local Flood Authority (LLFA) drainage policies;
- Submit developer enquiry to LLFA and Sewage Provider;
- Analyses existing and proposed impermeable areas;
- Calculate existing runoff rates (excluding existing drainage system modelling);
- Assess method of surface water runoff disposal (soakaway / watercourse / sewer);
- Establish surface water discharge rate in consultation with the LLFA / sewerage provider;
- Estimate required attenuation volume using MicroDrainage or similar;
- Assess and advise on suitable forms of SuDS;
- Advise on drainage system maintenance measures;
- Advise on surface water treatment methods;
- Establish method of foul water drainage;
- Prepare concept drainage sketch (where development plan is available as dwg. Format); and
- Prepare DS report

1.3.2 This report takes into account the following national and local policies:

- National Planning Policy Framework (NPPF) (2021)[1];
- National Planning Practice Guidance (NPPG) (2014)[2];
- CIRIA Guidance: The SuDS Manual (C753) (2017)[3]; and
- Barnsley Metropolitan Borough Council Local Development and Planning Policies.

1.4 Sources of Information

1.4.1 The following sources of information have been reviewed and assessed for the purpose of this FRA:

- EA online flood maps[4];
- British Geological Society (BGS) Interactive Map[5];
- MAGIC Interactive Map[6];
- Barnsley Metropolitan Borough Council Strategic Flood Risk Assessment (2010 SFRA);
- Barnsley Metropolitan Borough Council Catchment Flood Management Plan (2010 CFMP);
- Barnsley Metropolitan Borough Council Preliminary Flood Risk Assessment (2011 PFRA); and
- Barnsley Metropolitan Borough Council Local Flood Risk Management Strategy (2017 LFRMS).

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf
2 http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/
3 https://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx
4 https://flood-map-for-planning.service.gov.uk/
5 http://mapapps.bgs.ac.uk/geologyofbritain/home.html
6 http://www.magic.gov.uk/

1.5 Project Limitations

1.5.1 The wider Delta-Simons limitations are contained within Appendix A.

2.0 Site Description

2.1.1 The aim of this section of the report is to outline key environmental information associated with the baseline environment.

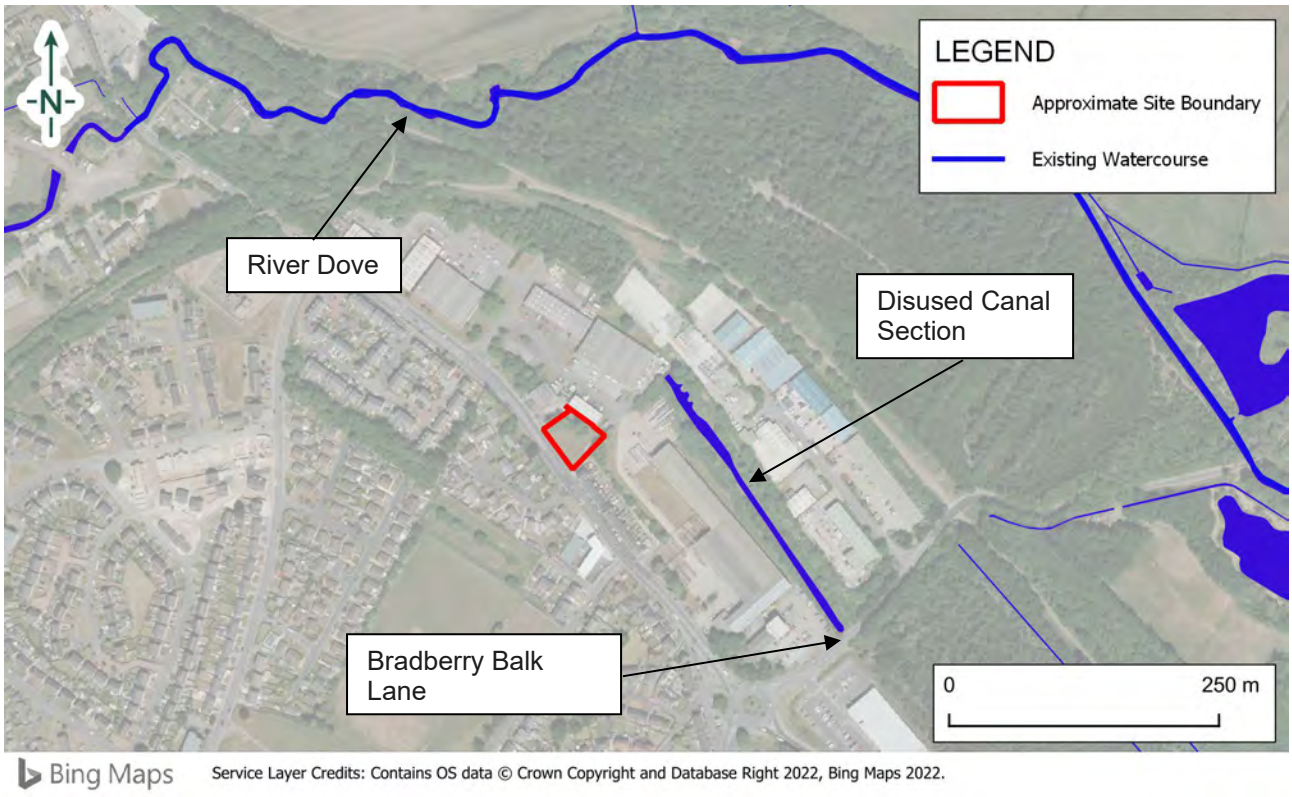


Figure 1: Site Location Plan

Co-ordinates	Centred approximately at National Grid Reference (NGR) 439060, 404105	**Area (approx.)**	0.15 ha
Site Location	The Site is located approximately 5 km southeast of Barnsley train station and 1.2 km northwest of Wombwell town centre.		
Existing Site Conditions	Online mapping (including Google Maps / Google Streetview imagery, accessed 31/10/2022) shows that the Site is entirely greenfield with trees around the periphery of the Site. The Site is bordered by the A633 and residential dwellings to the southwest, a car wash and its associated parking to the northwest, a vehicle repair shop and tyre shop to the northeast and residential plots to the southeast. Access to the Site is currently provided from the A633 road to the southwest. The Site in its current form is entirely greenfield.		
Topography	A topographical survey of the Site was undertaken by Kudos in May 2022 [and is included in Appendix B]. The topographical survey shows that the Site slopes from 42.1 metres Above Ordnance Datum (m AOD) in the south to 38.9 m AOD in the northeast. The road adjacent to the northeast of the Site is recorded to slope down and away from the Site in a northeast direction. Additionally, the building bordering the Site to the northeast is located within a sudden lowered footprint compared to the Site at 38.9 m AOD, whereas the vast majority of the Site apart from the area in		

	the northeast of the Site is raised at a minimum of 39.3 m AOD, approximately 400 mm above. Topographic levels to metres Above Ordnance Datum (m AOD) have also been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the local area around the Site slopes generally in a northeast direction away from Site for approximately 100 m before sloping to the southeast. The LiDAR extract is included in Appendix C.
Hydrology	The nearest watercourses are as follows. • The River Dove which is located approximately 300 m north of the Site. The River Dove flows in a west to east direction and drains into the River Dearne approximately 3 km to the east of the Site. This river is a Main River and the responsibility of the EA to maintain. • Other watercourses in the area include a section of disused canal which is situated approximately 75 m to the northeast. The canal is shown to slope gently from a northwest to southeast direction and utilizing online imagery (accessed 31/10/2022), is shown to drain underneath Bradberry Balk Ln which confines it's south-eastern extent and drain down a dike named the Bulling Dike away from Site. The Bulling Dike is an Ordinary Watercourse and under the jurisdiction of the LLFA.
Geology	Reference to the British Geological Survey (BGS) online mapping (1:50,000 scale) indicates there are no superficial deposits recorded beneath the Site. The Site is shown to be directly underlain by bedrock deposits of Oaks Rock which is described comprising sandstone. The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a Site-specific basis. There is a BGS borehole recorded 200 m to the north of the Site, however due to the distance away from the Site and the closer proximity to the River Dove, the borehole record is not considered to be representative of the Site conditions and therefore was not utilised.
Hydrogeology	According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mapping [accessed 31/10/2022], the underlying bedrock deposits are classified as a Secondary A Aquifer. Secondary A Aquifers are 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'. The EA's 'Source Protection Zones' data, obtained from MAGIC Map's online mapping [accessed 31/10/2022], indicates that the Site is not located within a Groundwater Source Protection Zone. The Soilscapes mapping obtained from MAGIC Map's online mapping [accessed 28-10-2022] shows the Site is located in a 'slowly permeable seasonally wet acid loamy and clayey soils'.
Local Drainage	Public sewer records have been obtained from Yorkshire Water and are included in Appendix D The public sewer records show that there is an underground 300 mm surface water sewer draining in a southeast direction down Barnsley Road, which is bordering the Site to the southwest. The surface water sewer then changes direction and drains in a northeast direction following the south-eastern border of the Site and down the natural topography. Additionally, a 300 mm combined sewer is located approximately 4 m to the southeast of the Site and flows in a northeast direction adjacent to the Site boundary. The combined sewer enters into a 375 mm diameter

	pipe approximately 25 m northeast of the Site which then continues to flow to the northeast down Mitchell's Road. No invert levels are detailed upon the sewer plans. Based on the presence of the sewer along the eastern boundary of the Site, consultation has been undertaken with Yorkshire Water to confirm potential standoff requirements. Yorkshire Water have since confirmed a 3 m standoff requirement from either side of the sewer.
Proposed Site Conditions	The proposed development is for three small commercial units with associated external yard, access, infrastructure, and peripheral soft landscaping. Access and egress to the Site will be provided via Mitchell Road. A proposed development plan is included in Appendix E. The proposed development will introduce hardstanding in the form of buildings and access. Hardstanding will comprise 0.132 ha or 88% of the total Site area. The remaining permeable, soft landscaped areas will occupy 0.018 ha or 12% of the total Site area. These values were calculated using the proposed development plan (Appendix E, drawing no. J2030 00103) in CAD.

3.0 Relevant Planning Policy and Guidance

3.1 Introduction

3.1.1 The aim of this section of the report is to discuss the main aspects of the local and national planning policies that are relevant to any proposed development on the Site and relevant guidance and legislation.

3.2 Assessment of Flood Risk

3.2.1 The flood risk from fluvial (Main Rivers) and coastal flooding is assessed through the use of the EA Flood Maps (flood risk from rivers or the sea). This map defines three zones of different flood risk, the third of which is subdivided into two categories:

- Zone 1 "Low probability of flooding" – This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Zone 2 "Medium probability of flooding" – This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year;
- Zone 3a "High probability of flooding" – This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year; and
- Zone 3b "Functional floodplain" – A sub-part of Zone 3, this zone comprises land where water has to flow or be stored in times of flood. This zone is not normally included within the national Flood Map for Planning and is calculated where necessary using detailed hydraulic modelling.

3.3 National Planning Policy Framework

3.3.1 Flood risk in England is normally considered through the planning process in the NPPF (2021), produced by Ministry of Housing, Communities and Local Government.

3.3.2 The principal aim of the NPPF assessment of flood risk is that:

"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere".

3.3.3 The NPPF requires a FRA to be produced where development Sites are:

- Greater than one hectare in size;
- All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3;
- Or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the EA); and
- Where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

3.3.4 The NPPF requires that developers consider not just the flood risk to the development but also the impact that the development might have on flood risk elsewhere. As well as Main Rivers and the sea, it is also necessary to consider flood risk from other sources, including surface water, groundwater, Ordinary Watercourses, artificial drainage systems, canals and reservoirs.

Sequential Test

3.3.5 A key part of the NPPF is that a proposed development must first pass a "Sequential Test" to demonstrate that the overall development proposal is appropriate in terms of flood risk. It ensures that a sequential approach is followed to guide new development to areas with the lowest probability of flooding.

Exception Test

3.3.6 The Exception Test determines whether the benefits of the proposed development will outweigh the potential flood risk.

Vulnerability Classification

3.3.7 In accordance with Table 2 of the NPPG: Flood Risk and Coastal Change, commercial developments are considered to be '**less vulnerable'**.

Table 1: Flood Risk Vulnerability Classification (from Table 3 of online Planning Practice Guidance)

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water-Compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

✓ development is permitted
✗ development is not permitted

3.3.8 Table 3 of the NPPG (reproduced above as Table 1), states that a 'less vulnerable' development is considered appropriate within Flood Zone 1. The development therefore passes the flood risk Sequential Test and the Exception Test does not need to be applied.

3.4 Local Policy

3.4.1 The Barnsley Metropolitan Borough Council Local contains the following policies relating to flood risk:

Policy CC3 Flood Risk

3.4.2 The extent and impact of flooding will be reduced by:

3.4.3 Not permitting new development where it would be at an unacceptable risk of flooding from any sources of flooding, or would give rise to flooding elsewhere;

3.4.4 Ensuring that in the Functional Floodplain (Flood Zone 3b), only water compatible development or essential infrastructure (subject to the flood risk exception test) will be allowed. In either case it must be demonstrated that there would not be a harmful effect on the ability of this land to store floodwater;

3.4.5 Requiring developers with proposals in Flood Zones 2 and 3 to provide evidence of the sequential test and exception test where appropriate;

3.4.6 Requiring site-specific Flood Risk Assessments (FRAs) for proposals over 1 hectare in Flood Zone 1 and all proposals in Flood Zones 2 and 3;

3.4.7 Expecting proposals over 1000 m2 floor space or 0.4 hectares in Flood Zone 1 to demonstrate how the proposal will make a positive contribution to reducing or managing flood risk;

3.4.8 Expecting all development proposals on brownfield sites to reduce surface water run-off by at least 30% and development on greenfield sites to maintain or reduce existing run-off rates requiring development proposals to use Sustainable Drainage Systems (SuDS) in accordance with policy CC4; and

3.4.9 Using flood resilient design in areas of high flood risk.

The Barnsley Metropolitan Borough Council Local contains the following policies relating to SUDS:

3.4.10 Policy CC4 Sustainable Drainage Systems (SuDS)

3.4.11 All major development (12) will be expected to use Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it can be demonstrated that all types of SuDS are inappropriate.

3.4.12 The Council will also promote the use of SuDS on minor development.

3.4.13 To enable the Council to determine the suitability of a proposed SuDS scheme:

3.4.14 Outline Planning applications must be supported by a conceptual drainage plan and SuDS design statement; and

3.4.15 Detailed Planning applications must be supported by a detailed drainage plan and SuDS design statement, which should contain information on how the SuDS will operate, be managed and maintained for the lifetime of the development.

3.5 Consultation

3.5.1 A consultation request was submitted to the LLFA in September 2022 and a response is still awaited.

3.5.2 A pre-development enquiry request was submitted to Yorkshire Water to enquire about the standoff requirements for the surface water sewer in the southeast of the Site in August 2022. A response is included in Appendix F. Yorkshire Water have informed that a 3 m easement is required on either side of the surface water sewer.

3.5.3 The Site is not located within an Internal Drainage Board (IDB) District.

4.0 Assessment of Flood Risk

4.1 Tidal Flood Risk

4.1.1 The Site is situated at a minimum of 38.9 m AOD and is significantly above sea level. Therefore, the risk from tidal flooding is considered to be **Negligible**.

4.2 Fluvial Flood Risk

4.2.1 The nearest watercourse is the River Dove which is located approximately 300m north of the Site.

4.2.2 The Site is situated wholly within Flood Zone 1 but is located within approximately 55 m of Flood Zone 2 and 100 m of Flood Zone 3, both of which are associated with out of channel flooding of the River Dove.

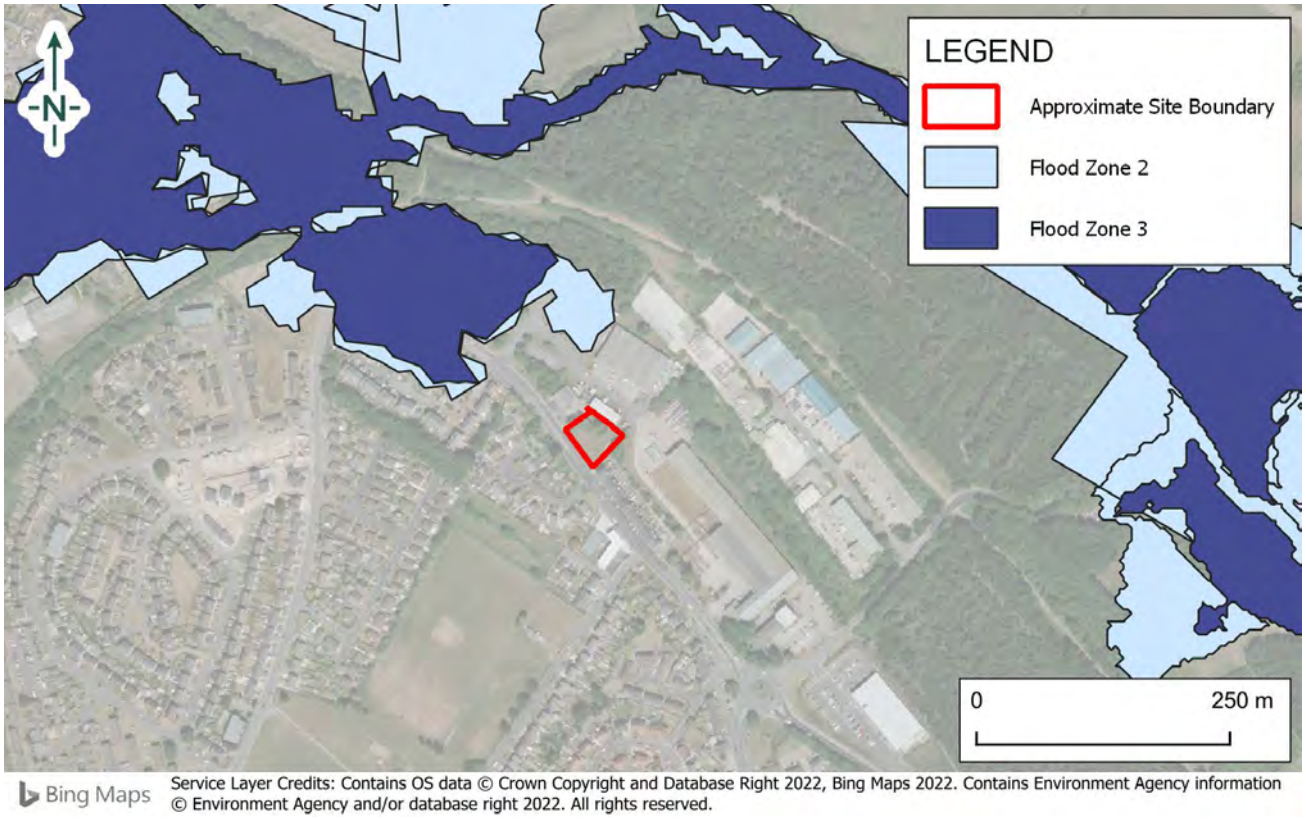


Figure 2: EA's Flood Map for Planning

4.2.3 The EA 'Historical Flood Map' (Appendix G) indicates that there have been no recorded historical flooding events at or near the Site.

4.2.4 The Site is not located within a Flood Warning Area or a Flood Alert Area.

4.2.5 According to the EA's 'Spatial Flood Defences with Standardised Attributes' dataset, there is a Natural High Ground defence alongside the River Dove with a Standard of Protection (SoP) of up to 1 in 30 years, but there is no recorded condition of the defence nor it's crest levels. The asset is recorded to have been constructed on the 25/08/2012 and is privately owned. There has been no recorded fluvial flooding event since it's construction.

4.2.6 The Site is situated at a minimum of 38.9 m AOD, and the River Dove normal river water levels, based off contours of the river channel, are situated typically between 31 m AOD and 33.5 m AOD in channel which the Site is raised over 5 m above.

4.2.7 A contour analysis of LiDAR data of Flood Zone 2 (between 1 in 100 and 1 in 1000 Annual exceedance probability) and Flood Zone 3 (1 in 100 annual exceedance probability) identify outer fluvial extents and their associated maximum elevations for each scenario. Flood Zone 3 maximum depth is illustrated to be approximately 36.8 m AOD and Flood Zone 2 is shown to be at approximately 37.2 m AOD, this is 2.1 and 1.7 m respectively below the Site's lowest topographical point.

4.2.8 Considering that the change in elevation from Flood Zone 3 to Flood Zone 2 is 0.4 m which represents the elevation change between the two scenario probabilities, it is fair to assume that the Site, which sits at a minimum of 1.7 m above Flood Zone 2, is likely to be protected from a reasonable increase to flow rates from the River Dove as a result of climate change.

4.2.9 Additionally, any out of channel flooding from the River Dove, beyond Flood Zone 2 and 3 is unlikely to flow onto Site and is likely to flow southeast down the natural topography of the local area, towards the disused canal and surrounding area to the east and away from Site.

4.2.10 The 2011 PFRA, identifies that area close to the River Dove is identified as a Future Flood Risk Area – which comprises of numerous criteria including, proximity to the watercourse and local population count. No Site-specific information is detailed, however.

4.2.11 Additionally, the same area is identified as a Local Significant Flood Risk Area, which are areas which have at least 30 people or 2 businesses or a critical service is at risk of significant harmful consequences as a result of flooding. Once again, no Site-specific information can be retrieved for the Site.

4.2.12 Climate change (CC) mapping contained within the 2010 SFRA, identifies that the Site is unaffected by a 1 in 100 year fluvial flood incident with 20% increased flow as a result of CC.

4.2.13 Based on the above, the overall risk of fluvial flooding is considered to be at **Low**.

4.3 Surface Water Flood Risk

4.3.1 The EA 'Flood Risk from Surface Water' map (Figure 4) indicates that the Site is almost entirely at Very Low risk of surface water flooding (less than 0.1% annual probability). The north-eastern border of the Site is shown to be at Low (between a 1% and 0.1% annual probability) risk of surface water flooding.

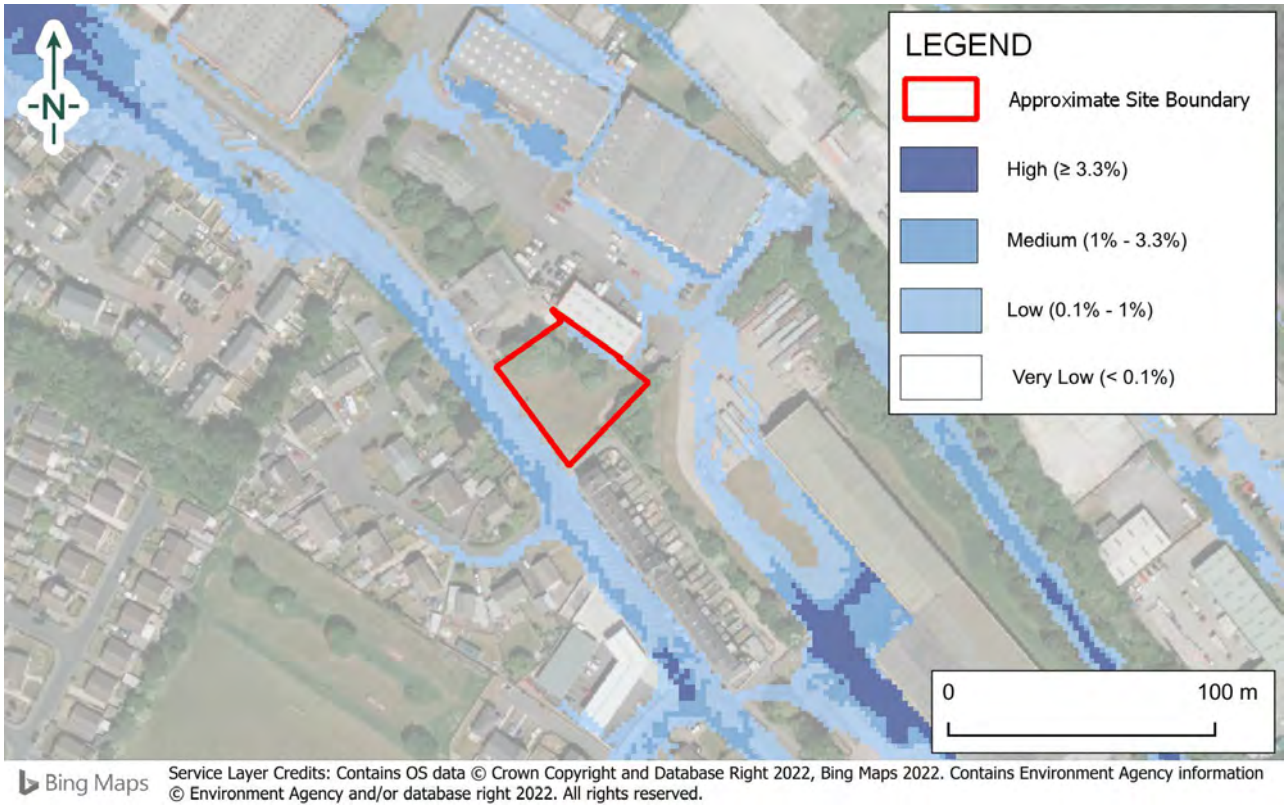


Figure 3: EA's Long-Term Flood Risk Map (Flood Risk from Surface Water)

4.3.2 Surface water depth mapping indicates that the area in the northeast of the Site, within the footprint of the building to the northeast, is free of flooding during the High and Medium risk scenario but is shown to contain depths of between 300 – 900 mm during the Low risk scenario. An analysis of the topographic survey identifies that the Site is raised approximately 400 m above the footprint of the adjacent building and depth mapping indicates no surface water flooding surpasses the raised ground of the Site indicating that flood depths would likely not exceed 400 mm and migrate onto the Site.

4.3.3 Access and egress to the Site post development via Mitchell Road is shown to be at risk only during the Low risk scenario but flood depths are shown to remain below 300 mm. Flood depths below 300 mm are considered to be passable to vehicles and pedestrians

4.3.4 A review of relevant third party reports indicates no evidence of Site specific surface water flooding.

4.3.5 Based on the above, the overall risk of surface water flooding is considered to be **Low**.

4.4 Groundwater Flood Risk

4.4.1 A review of BGS online mapping indicates there are no superficial deposits recorded beneath the Site. The Site is shown to be directly underlain by bedrock deposits of Oaks Rock which is described comprising sandstone

4.4.2 The relevant third-party reports record no groundwater flooding at or near to the Site.

4.4.3 The proposed development will be predominantly hardstanding, limiting the vertical migration of groundwater. Furthermore, no basement levels are identified on plans.

4.4.4 Based on the above, the overall risk of groundwater flooding is considered to be **Low**.

4.5 Artificial Sources Flood Risk

Sewer Flooding

4.5.1 Public records provided by Yorkshire Water (Appendix D) indicates the presence of a 300 mm surface water sewer located along the south-eastern boundary of the Site and a 300 mm combined sewer located 4m to the southeast which expands into a 375 mm combined sewer 25 m to the northeast of the Site.

4.5.2 DG5 Mapping, contained within the 2011 PFRA records no sewer flooding incidents on Site or the immediate surroundings.

4.5.3 In the event of surcharging of the public sewers, flooding will flow in a generally north easterly direction following natural topography reducing the risk of any pooling of sewer water on Site.

4.5.4 It can therefore be concluded that the risk of sewer flooding is **Low**.

Reservoirs

4.5.5 The Long-Term Flood Risk Map (Reservoirs) indicates that the Site is not within the flood extents of a reservoir overtopping or breach event. Flood risk from reservoirs is therefore considered **Negligible**.

Reservoir and Canal Flooding

4.5.6 There are no in use canals within the vicinity of the Site.

4.5.7 A section of the old Dearne and Dove Canal which was used for transporting goods for the coal mining industry is located approximately 75 m to the northeast of the Site. This section is disused, and the old canal was closed completely in 1961, therefore causing negligible risk to the Site.

4.5.8 It can therefore be concluded that there is a **Negligible** risk of flooding from canals.

4.6 Summary of Flood Risk

4.6.1 It can be concluded that the Site is at **Negligible to Low** risk of flooding from all sources. Therefore, no Site-specific mitigation measures are considered necessary. However, in accordance with Building Regulations, finished floor levels of the properties should be set 150mm above surrounding ground levels. Where level access is required, external ground levels should be graded to slope away from building entrances.

4.7 Residual Risks

4.7.1 Given that the Site is contained within Flood Zone 1, which is less than a1 in 1,000 annual probability of river or sea flooding (<0.1%), the Site is not considered to be at a residual risk of fluvial flooding. No further mitigation beyond what is proposed is required.

5.0 Drainage Strategy

5.1 Introduction

5.1.1 The proposed development comprises the construction of a light industrial building with associated yard access, infrastructure, and peripheral soft landscaping. The proposed development will create an overall hardstanding area of 0.132 ha with the remaining area of the Site occupied by soft landscaping.

5.1.2 The existing Site currently comprises greenfield land which is not formally drained and is therefore considered to be 100% permeable.

5.1.3 The increase in hardstanding area will result in an increase in surface water runoff rates and volumes. In order to ensure the proposed development will not increase flood risk elsewhere, surface water discharge from the Site will be controlled.

5.2 Existing Runoff Rates

5.2.1 The existing greenfield runoff rates have been estimated using the Interim Code of Practice for Sustainable Drainage Systems (ICP SuDS) method, the results are provided as Table 2 below. The existing 1 in 1 year event greenfield rate for the 0.132 ha greenfield Site s 0.2 l/s.

Table 2: Greenfield Runoff Rates

Return Period (Years)	Runoff Rate (l/s)
1 in 1	0.2
1 in 30	0.4
1 in 100	0.5

5.2.2 Discharge rates would normally be proposed to match the current existing QBAR rates of the Site, including all the events up to the 1 in 100 year + 40% climate change (CC) scenario. However, as the estimated discharge rates for the Site are low, a 1 l/s discharge rate is proposed to ensure the drainage system is self-cleansing and can achieve a half-drain down time which is less than 24 hours.

5.3 Attenuation Storage

5.3.1 In order to achieve a discharge rate of 1 l/s, attenuation storage will be required. MicroDrainage Quick Storage Estimates have been undertaken to determine the potential attenuation requirement up to the 1 in 100 plus 40% climate change events based on a hardstanding area of 0.132 ha. The output of the MicroDrainage Quick Storage Estimates is included in Table 3 below.

Table 3: Summary of Attenuation Requirements

Return Period	Attenuation Storage Requirement (m^3)
1 in 100 + 40% CC	85 - 124

5.3.2 The attenuation volume is provided for indicative purposes only and should be verified at the detailed design stage.

5.4 Drainage Hierarchy

5.4.1 The recommended surface water drainage hierarchy (Paragraph 080 of the NPPG: Flood Risk and Coastal Change) is to utilise soakaway systems or infiltration as the preferred option, followed by discharging to an appropriate watercourse. If this is not feasible, the final option is to discharge to an existing public sewer.

To ground (infiltration)

5.4.2 The first consideration for the disposal of surface water is infiltration (soakaways and permeable surfaces).

5.4.3 As described in Section 2.0, no superficial deposits are recorded to be present at the Site, bedrock deposits of Oaks Rock that consists of sandstone are indicated to underlie the Site.

5.4.4 According to Soilscapes mapping obtained from MAGIC Map's online mapping [accessed 31-10-2022] the Site is located in a 'slowly permeable seasonally wet acid loamy and clayey soils'. The soils on Site are classified as typically having a high-water table with 'impeded drainage'.

5.4.5 It can be concluded that due to the impeded drainage of the underlying soils, infiltration is unlikely to be a suitable method of surface water disposal at the Site.

5.4.6 Infiltration tests could be undertaken in accordance with the BRE365 specification to determine the suitability of soakaways. Soakaways should be located a minimum of 5 m from habitable dwellings.

Surface Water Discharge to Watercourse

5.4.7 Where soakaways are not suitable a connection to watercourse is the next consideration.

5.4.8 The Site is separated from the disused canal to the northeast and the River Dove to the north by third party, urbanised land. Therefore, discharge to these watercourses are not feasible.

Surface Water Discharge to Sewer

5.4.9 Where disposal of surface water to a watercourse is not possible, a connection to the public sewer system is the final consideration.

5.4.10 The Sewer Records included as Appendix D show that there is a 300 mm public surface water sewer located within the Site's eastern boundary. No invert levels are stated on the records however, the sewer follows the natural topography down the course of the Site to the northeast, therefore a gravity connection should be feasible.

5.4.11 It is recommended that an appropriate survey of the surrounding sewer network is undertaken to determine the invert level of the receiving system.

5.5 Sustainable Drainage Systems

5.5.1 Attenuation storage should be provided in the form of Sustainable Drainage Systems (SuDS) where practical. The following SuDS options have been considered:

Soakaways

5.5.2 As described above, the use of soakaways is not considered to be feasible for the Site due to the limiting characteristics of the drainage for the soils. However, infiltration tests could be undertaken in accordance with the BRE Digest 365 specification to assess the Site-specific conditions.

Swales, Detention Basins and Ponds

5.5.3 The Site will be occupied by an industrial building and its associated yard access and access road. There is limited space to accommodate above ground storage features such as ponds and basins and therefore is not considered feasible.

Rainwater Harvesting

5.5.4 The attenuation benefits provided through the use of rainwater harvesting are considered to be limited and would only be realised when the tanks were not full. However, rainwater harvesting techniques could be incorporated within the final design.

Green Roofs

5.5.5 Green roofs are not identified on development plans. Given the nature of the proposed development, the significant additional cost involved in installing and maintaining green roofs and the additional works required to allow for the additional loading on the building, green roofs are not considered a practical option. The benefits achieved through installing a green roof would be disproportionate to the significant ongoing maintenance and construction costs involved.

Porous/Permeable Paving

5.5.6 Permeable paving could be incorporated within the carparking spaces, whilst avoiding any areas of the Site trafficked by HGV's. Storage would be provided within the sub-grade material prior to controlled release to the receiving sewer. The amount of storage offered by permeable paving is subject to sub-grade depth and Site gradient. The use of permeable paving should be considered at the detailed design stage.

Underground Attenuation Tanks

5.5.7 Storage could be provided within underground attenuation tanks or within oversized pipes. Sufficient space for an underground tank is provided underneath the parking/yard area.

5.6 Preferred Drainage Scheme

5.6.1 A Conceptual Drainage Sketch (Appendix I) has been prepared to illustrate the proposed drainage strategy for the Site. The strategy depicted is deemed to be an appropriate approach to the nature of the proposed development.

5.6.2 It is proposed to restrict surface water runoff generated by the proposed development to 1 l/s for all events up to and including the 1 in 100 year plus 40% climate change event.

5.6.3 In order to achieve this restriction, attenuation will be provided in the form of an underground geocellular storage crated located beneath the parking/access area. The proposed crate will have a surface area of 100 m^2 x 1 m deep with a 95% porosity, thereby providing 95 m^3 of attenuation.

5.6.4 MicroDrainage Source Control calculations (see Appendix H) indicate that the storage provided by the proposed crate system is sufficient to attenuation runoff generated by all events up to and including the 1 in 100 year plus 40% climate change event.

5.6.5 Surface water runoff stored within the geocellular storage crate will discharge via a Hydrobrake or similar flow control device to the 300 mm public surface water sewer in the east of the Site.

5.7 Event Exceedance

5.7.1 Storage will be provided for the 1 in 100 year plus 40% CC event. Storm events in excess of the 1 in 100 year plus 40% CC event should be permitted to produce temporary shallow depth flooding within the car park, access road and soft landscaped areas. Finished floor levels are recommended to be set at a minimum of 150 mm above surrounding ground levels ensuring exceedance flooding will not affect the buildings.

5.8 Surface Water Treatment

5.8.1 In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), Other Roofs have a 'Low' pollution hazard level, with moderately traffic roads classified as having a 'Medium' pollution hazard level. Table 4 below shows the pollution hazard indices for each land use.

Table 4: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other Roofs (typically commercial/industrial roofs)	Low	0.5	0.2**	0.4
Moderately Trafficked Roads	Medium	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

** up to 0.8 where there is potential for metals to leach from the roof

5.8.3 To ensure adequate treatment of surface water runoff is provided, proposed SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution.

5.8.4 It is proposed to provide attenuation in the form of underground geocellular storage crates. The CIRIA SuDS Manual identifies storage tanks/crates do not provide any form of treatment of surface water runoff therefore treatment will need to be provided by a suitably sized separator.

5.9 Maintenance

5.9.1 Maintenance of communal drainage features such as permeable paving or an attenuation tank will be the responsibility of the Site owner.

5.9.2 Maintenance schedules for an attenuation tank and permeable paving are included in Appendix J and Appendix K respectively. Maintenance of the separator will be as per the manufacturer's guidance.

5.10 Foul Water Discharge

A dedicated foul sewer is not located within the vicinity of the Site; however, discharge should be made to the 300 mm combined sewer that is located to the northeast of the Site in Mitchell Road as per the existing situation. Given that Mitchell Road is located down the natural gradient of the Site, a gravity fed connection appears to be achievable.

5.10.1 A survey of the combined sewer system to the northeast of the Site should be undertaken to determine invert levels.

5.11 Other Considerations

5.11.1 Yorkshire Water have stated that a 3 m easement should be maintained either side of the public surface water sewer which runs under the eastern Site boundary (see Appendix F).

6.0 Conclusions and Recommendations

6.1 Conclusions

6.1.1 The Site is located within Flood Zone 1 on the Environment Agency (EA) 'Flood Map for Planning (Rivers and Sea)' – an area considered to have the lowest probability of fluvial and tidal flooding.

6.1.2 The risk of flooding from all sources has been assessed and the flood risk to the proposed development is considered to be **Negligible** to **Low.**

6.1.3 The proposed development will result in an overall hardstanding area of 0.132 ha. Surface water runoff generated by the proposed development will be restricted to 1 l/s for all events up to and including the 1 in 100 plus 40% climate change event. In order to achieve this restriction, attenuation will be provided in the form of underground geocellular crates.

6.1.4 The geo-cellular storage crates measure a total surface area of 100 m^2 x 1 m deep with a 95% porosity, providing 95 m^3 of attenuation storage on Site.

6.1.5 Surface water stored on Site will be discharged via gravity into the existing surface water sewer located in the northeast area of the Site located at the lowest topographic point of the Site.

6.1.6 A dedicated foul sewer is not located within the vicinity of the Site; however, discharge should be made to the 300 mm combined sewer which is located to the northeast of the Site in Mitchell Road as per the existing situation. Given that Mitchell Road is located down the natural gradient of the Site, a gravity connection is possible.

6.1.7 A survey of the combined sewer system to the northeast of the Site should be undertaken to determine invert levels.

6.2 Recommendations

Flood Risk

6.2.1 Raise FFLs of proposed units to a minimum of 150 mm above surrounding ground levels to reduce the potential for the ingress of water in the event of a surface water flood; and

6.2.2 Where level access is required, external ground levels should be graded to slope away from building entrances, or alternatively, cut-off drains could be installed.

Drainage Strategy

6.2.3 Verify the attenuation volumes included in this report when undertaking detailed drainage design; and

6.2.4 Survey the public surface water sewers and foul sewers to determine invert levels.

Other

6.2.5 Maintain a 3 m easement either side of the surface water sewer located along the eastern border of the Site when undertaking the detailed design stage.

Appendix A – Limitations

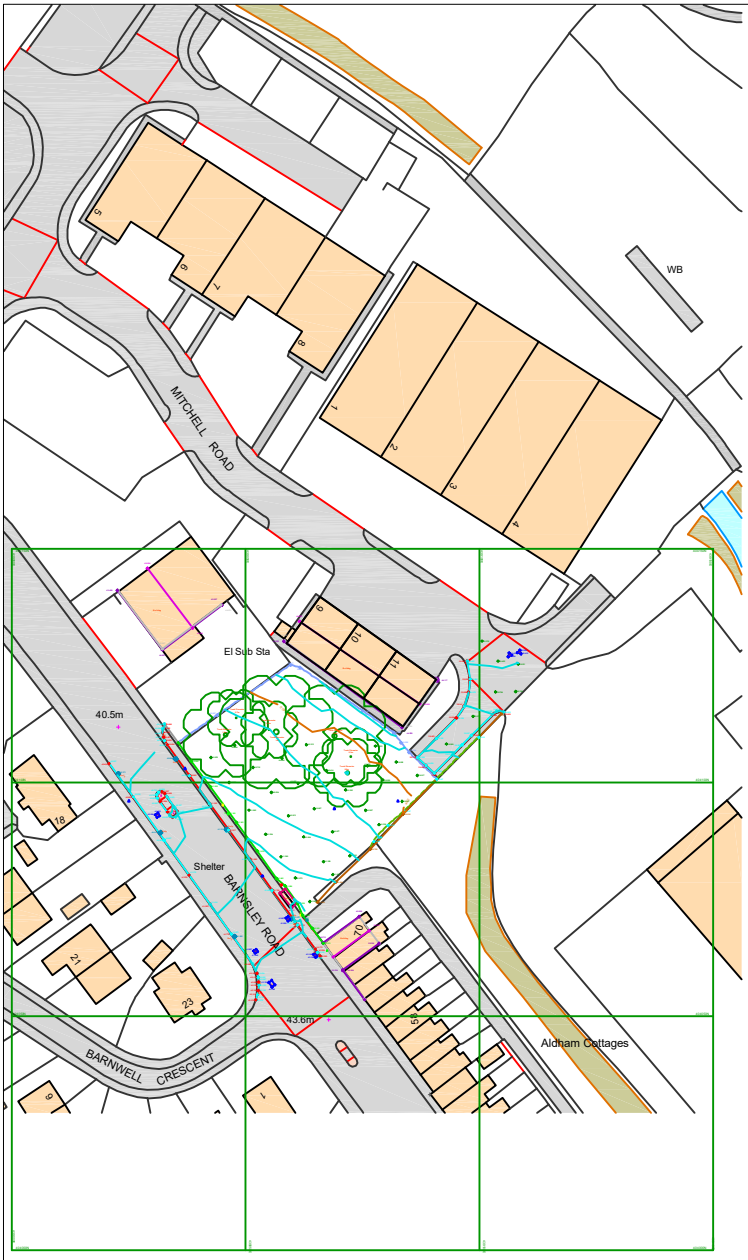
Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

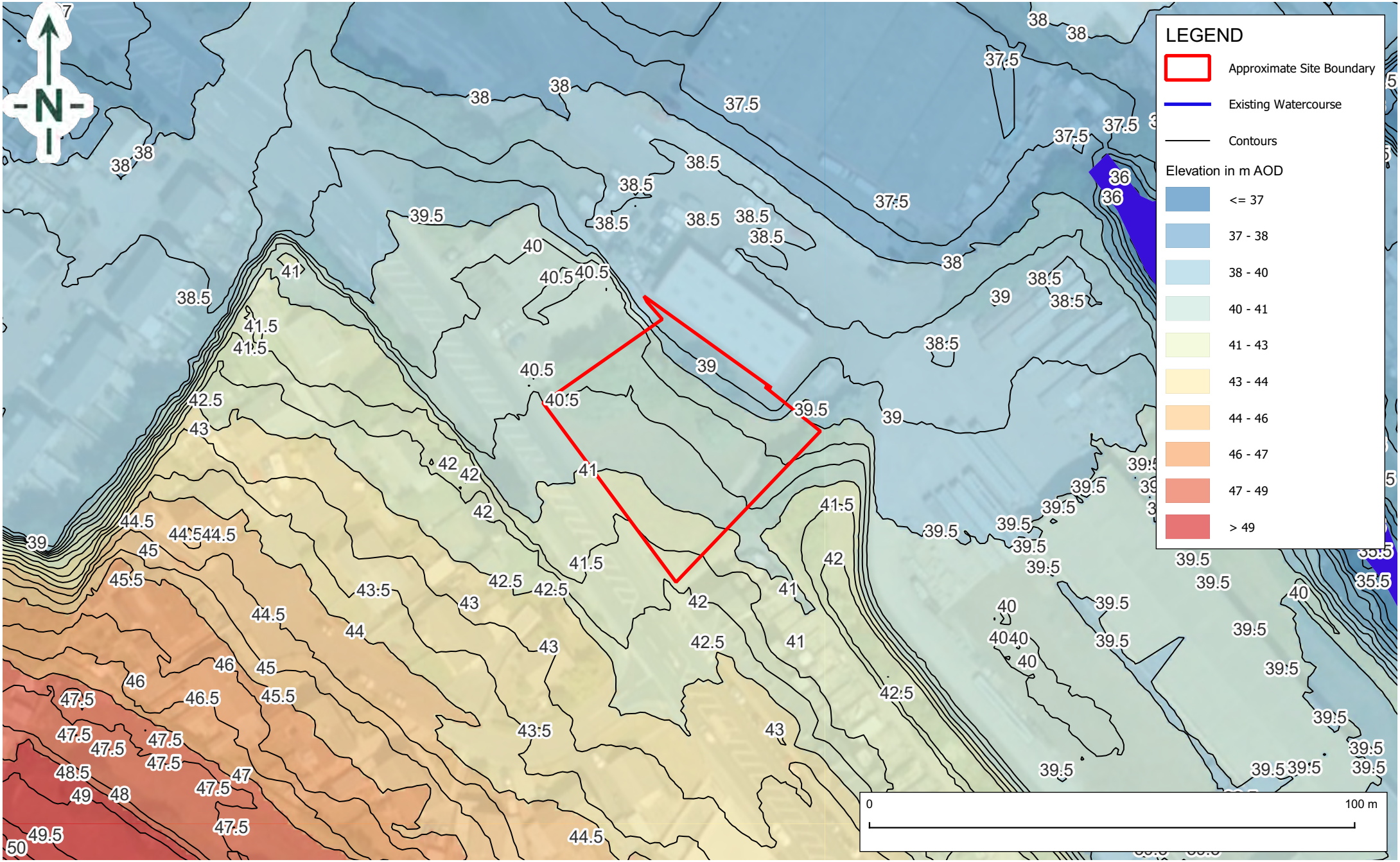
Appendix B – Topographical Survey





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Appendix C – LiDAR Extract



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DeltaSimons

TITLE:

LiDAR Plan

Aldham Industrial Estate, off Mitchells Road, Wombwell, Barnsley, S73 8HA

DRAWN BY: AR	SCALE (@A4): 1:1,000	PROJECT NO: 22-0573	
CHECKED BY: JR	REVISION: -	APPENDIX: C	
DATE: 28 October 2022			

Appendix D – Public Sewer Records

YORKSHIRE WATER
PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the ***general*** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.

2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.

3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will ***generally*** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will ***generally*** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.

4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.

5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45o and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter *(see illustration below)*. Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.

6. All excavation works near to YW apparatus should be by hand digging only.

7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.

8. Adequate support must be provided where any works pass under YW apparatus.

9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.

10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.

11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.

12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.

13. ***Under no circumstances*** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.

14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).

15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.

16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.

17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.

18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

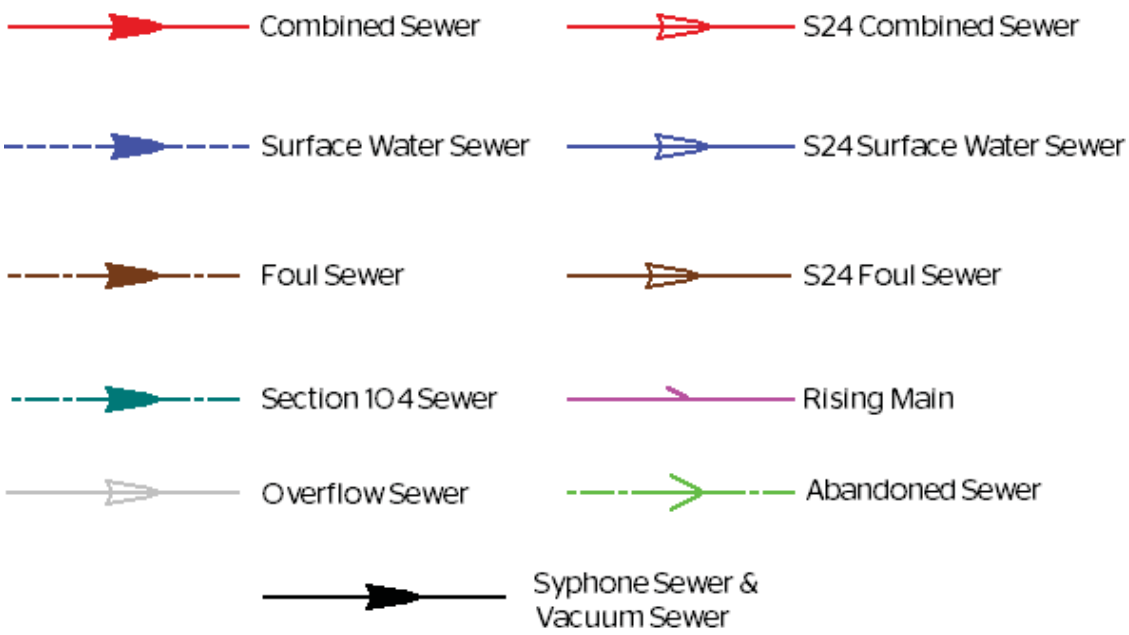
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20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trail holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0845 124 24 24.

Property Identfier

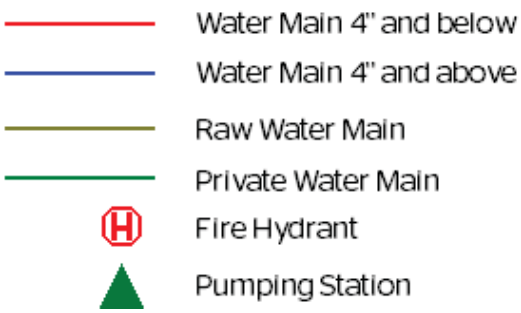


Sewer Legend

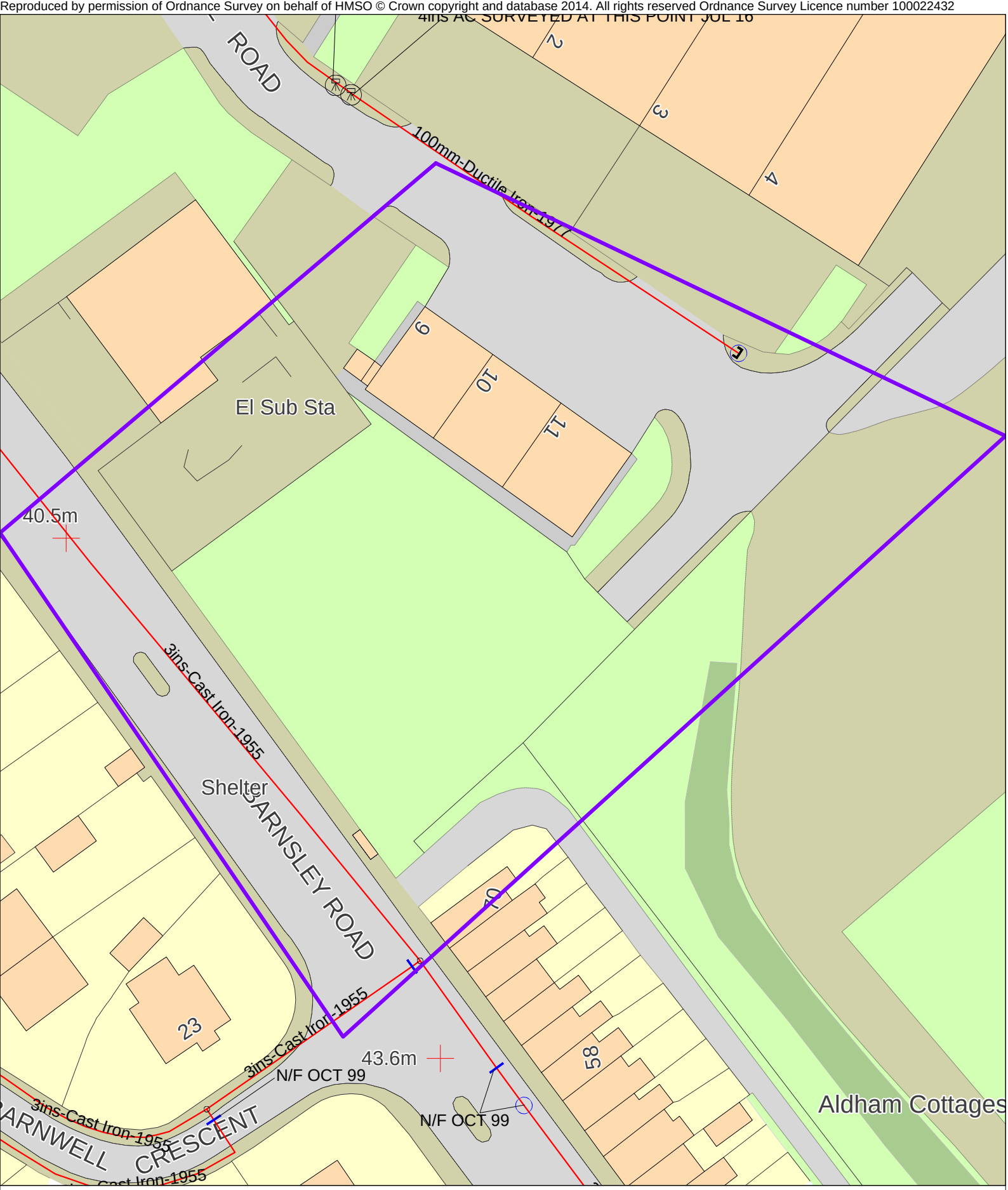


Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend



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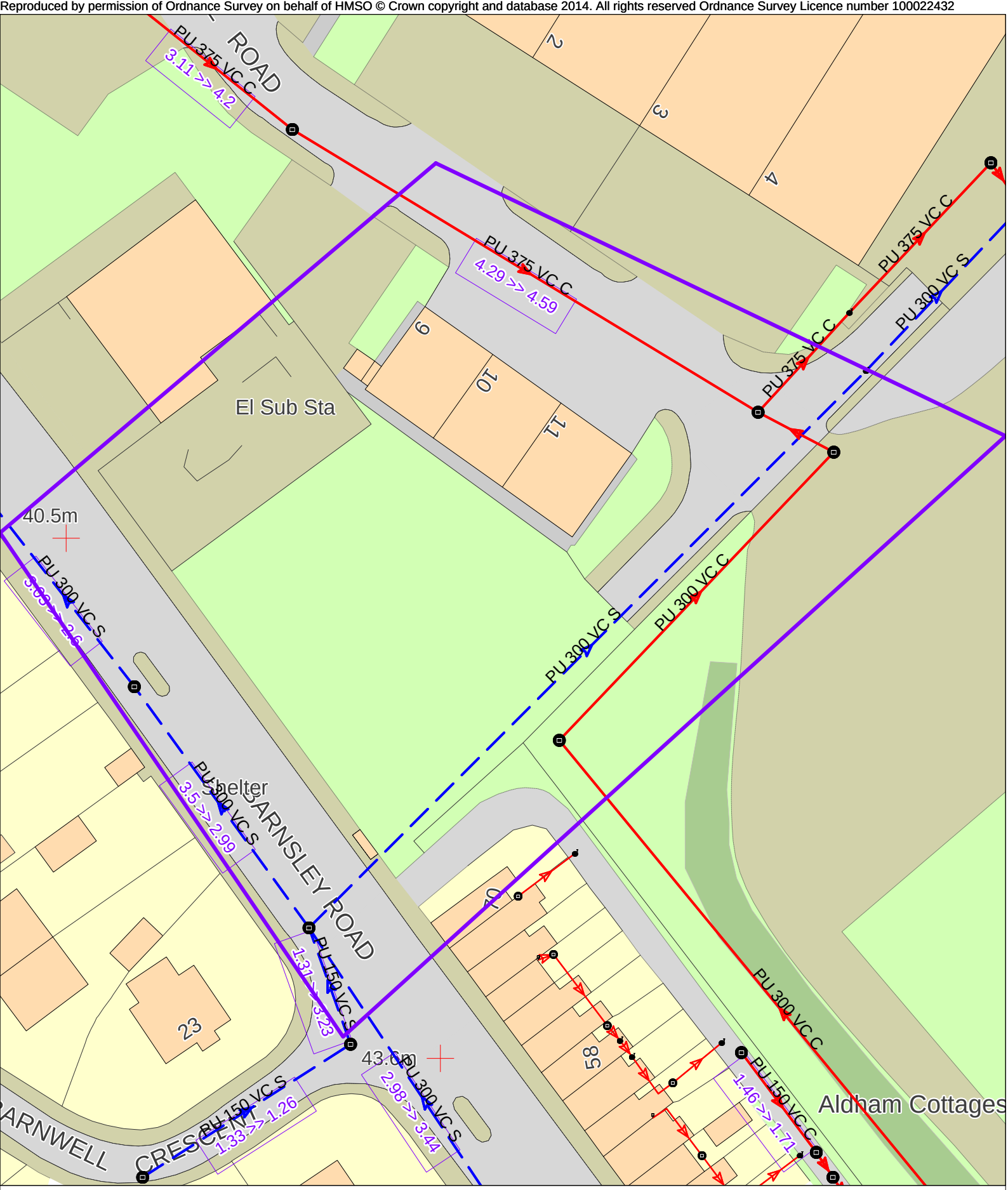


Public Clean Water Network 08/09/2022 10:51:13 OS Grid Coordinates: 439014 : 404034 Map Name : SE3904SW svcGISSafeMovePD

Registered office, Yorkshire water Services Limited. 1
Western House, Halifax Road, Bradford BD62SZ.
Registered in England and wales No. 2366682

SafeMove
A part of YorkshireWater

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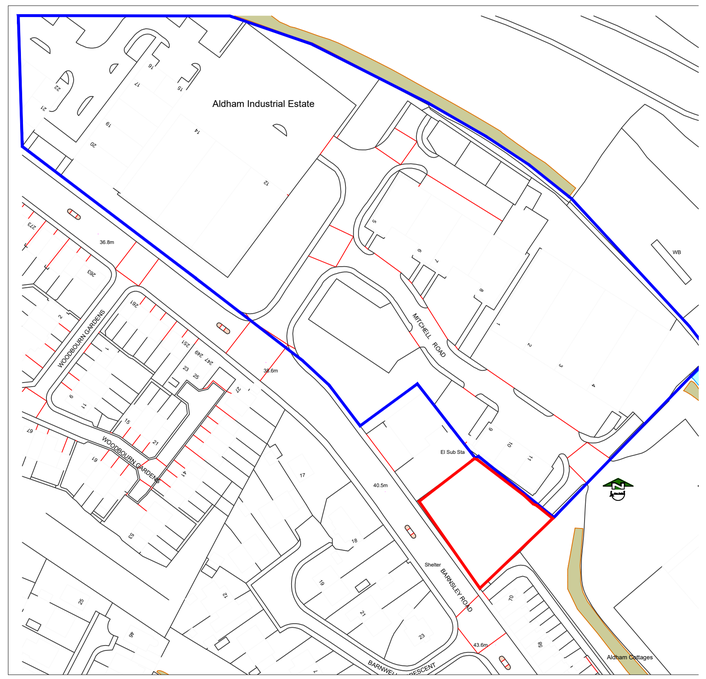
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Western House, Halifax Road, Bradford BD62SZ.
Registered in England and wales No. 2366682

SafeMove
A part of YorkshireWater

Appendix E – Proposed Development Plan





Existing Location Plan Scale; 1:1250

Rev:	ISSUE	Description:	By:	Date:
-	(IC)	Issued for Client comments		29/07/

Rev A-Z ISSUES Rev A-Z (PA) - Planning Application (BC) - Building Control Application (T) - For Tend
(P) - Preliminary (IC) - For Information/Comments (A) - For Approval (C) - For Constru

CIOB THE CHARTERED INSTITUTE OF BUILDING — Chartered Building Consultancy

Professionalism and Integrity in Construction

All work to be carried out in accordance with the requirements of the Building Regulations,Water Authority and the Construction (Design and Management) Regulations currently in force.

Do not scale from this drawing. Architect to be notified of any discrepancies.

Verify relevant dimensions on site before commencing work or preparing shop drawings.

Ald

KUDOS ARCHITECTURAL DESIGN & BUILDING CONSULTANTS
Website: www.kudosarchitecture.co.uk
Email: info@kudosarchitecture.co.uk
Mob: 07890 515 857 - Tel: 01709 380 947

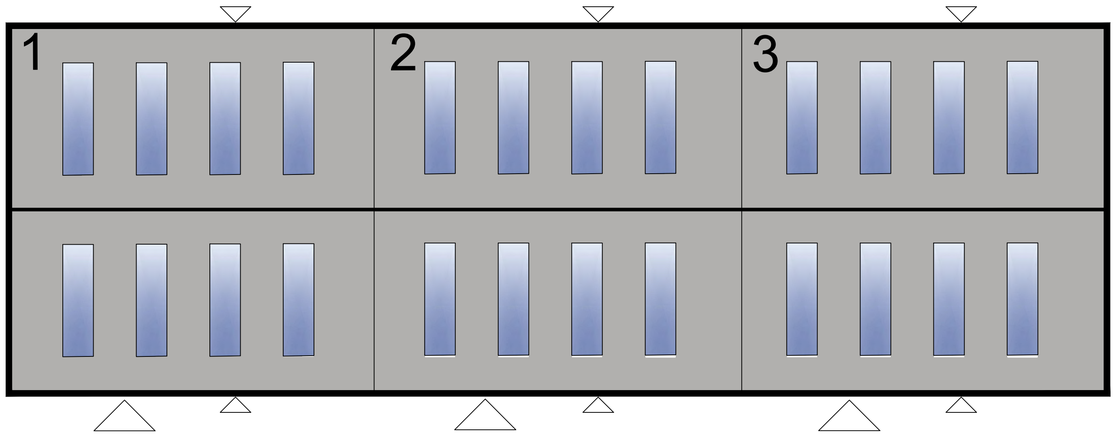
Project: Proposed Commercial Units at:
Aldham Ind Est, Mitchells Road, Barnsley, S73 8HA

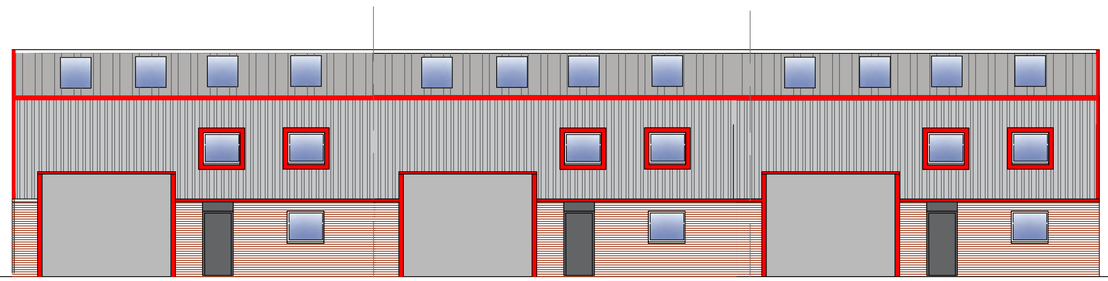
Drawing: Proposed Flor Plan and Elevations

Client:

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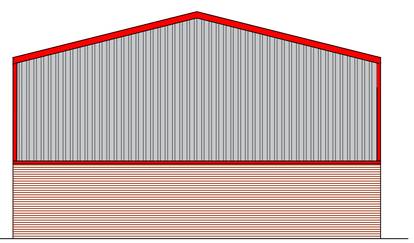
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1:100 & @ A1	Planning	
Drawing Number: MR-01	Revision: -	Drawn by: CAG



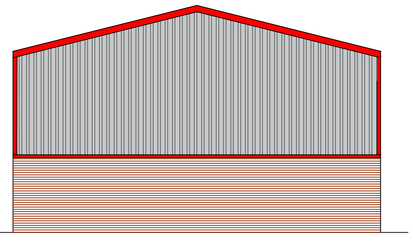


PROPOSED FRONT ELEVATION

FIRST FLOOR WINDOWS TO FRONT ELEVATION OPTIONAL

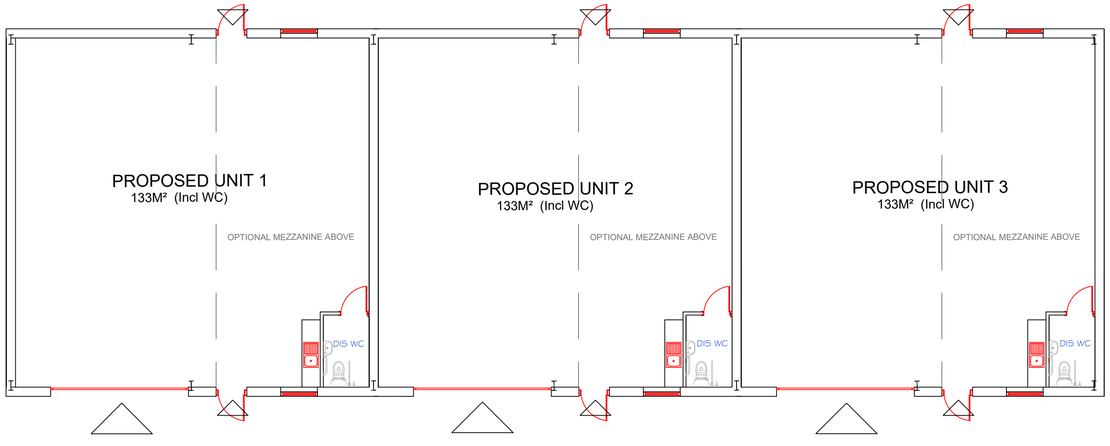


PROPOSED SIDE ELEVATION



PROPOSED SIDE ELEVATION

PROPOSED REAR ELEVATION



Rev:	ISSUE	Description:	By:	Date:
-	(P)	Issued for planning reports		16/08/
-	(IC)	Issued for Client comments		29/07/

Rev A-Z ISSUES Rev A-Z (PA) - Planning Application (BC) - Building Control Application (T) - For Tend
(P) - Preliminary (IC) - For Information/Comments (A) - For Approval (C) - For Constru

KUDOS
ARCHITECTURAL DESIGN & BUILDING CONSULTANTS
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Professionalism and Integrity in Construction

All work to be carried out in accordance with the requirements of the Building Regulations,Water Authority and the Construction (Design and Management) Regulations currently in force.

Do not scale from this drawing. Architect to be notified of any discrepancies.

Verify relevant dimensions on site before commencing work or preparing shop drawings.

Project: Proposed Commercial Units at:
Aldham Ind Est, Mitchells Road, Barnsley, S73 8HA

Drawing: Proposed Floor Plan and Elevations

Client:

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Scales:	Date:	
1:100 & @ A1	Planning	
Drawing Number: MR-02	Revision: -	Drawn by: CAG

Appendix F – Yorkshire Water Consultation

From:	Technical Sewerage
To:	Alexander Rea
Cc:	Dan Percival
Subject:	RE: 22-0573 Aldham Industrial Estate - U814524
Date:	14 October 2022 10:57:20
Attachments:	image001.png image002.gif

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Morning,

I can confirm that the 3M stand off distance is 3M on BOTH sides of the drain pipe, not 3M in total.

Kind Regards



Developer Services Customer Centre
Do you know you can now apply and pay your application fees on line? We are working hard to continually develop and improve your customer experience, for more information and applications please follow this link https://www.yorkshirewater.com/developers/apply-online/

From: Alexander Rea <Alexander.Rea@deltasimons.com>
Sent: 13 October 2022 10:40
To: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>
Cc: Dan Percival <Dan.Percival@deltasimons.com>
Subject: RE: 22-0573 Aldham Industrial Estate - U814524

EXTERNAL SOURCE - THINK BEFORE YOU CLICK

Hi,

Thank you so much for getting back to us regarding our query,

Could we just seek clarification if this is 3 meters either side of the centre line of the sewer or 3 m in total (i.e 1.5 m either side of the centre line of the sewer).

Thank you so much,

Kind Regards,

From: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>
Sent: 13 October 2022 10:25
To: Alexander Rea <Alexander.Rea@deltasimons.com>
Subject: 22-0573 Aldham Industrial Estate - U814524

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Morning,

I have checked our records and I can confirm that the stand off distance that is needed for the public surface water main sewer that is running along side the south / east side of the site is 3 Meters.

I hope this helps.

Kind Regards





Developer Services Customer Centre
Do you know you can now apply and pay your application fees on line? We are working hard to continually develop and improve your customer experience, for more information and applications please follow this link https://www.yorkshirewater.com/developers/apply-online/

Want to know a bit more about Yorkshire Water? Our website is full of useful info, from how to apply for a water meter to planning your next walk at one of our beautiful reservoirs - it's all at yorkshirewater.com

Need to talk to us? For the best way to get in touch with us, go to yorkshirewater.com/contact

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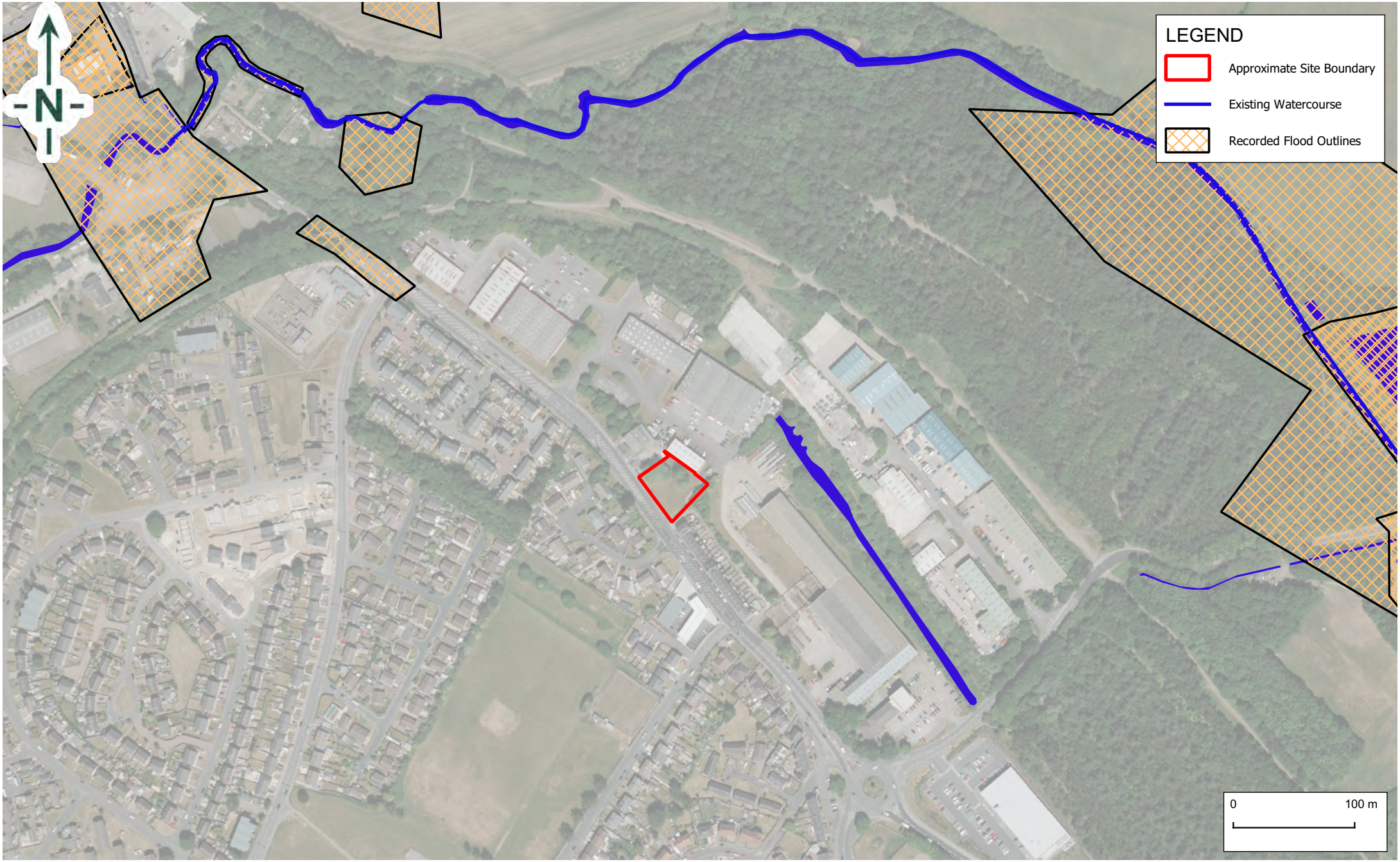
Yorkshire Water Services Limited
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Registered in England and Wales No 2366682

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Lucion Logo	

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Appendix G – EA Historical Flood Map



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DeltaSimons

TITLE:

EA Historical Flood Map
Aldham Industrial Estate, off Mitchells Road, Wombwell, Barnsley, S73 8HA

DRAWN BY: AR	SCALE (@A4): 1:4,000	PROJECT NO: 22-0573	
CHECKED BY: JR	REVISION: -	APPENDIX: G	
DATE: 28 October 2022			

Appendix H – 1 in 100 + 40% CC Storage Estimates

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 932 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	98.770	0.370	0.0	0.8	0.8	35.1	O K
30 min Summer	98.890	0.490	0.0	0.8	0.8	46.6	O K
60 min Summer	99.015	0.615	0.0	0.8	0.8	58.4	O K
120 min Summer	99.116	0.716	0.0	0.9	0.9	68.0	O K
180 min Summer	99.174	0.774	0.0	0.9	0.9	73.5	O K
240 min Summer	99.211	0.811	0.0	0.9	0.9	77.0	O K
360 min Summer	99.250	0.850	0.0	0.9	0.9	80.7	O K
480 min Summer	99.264	0.864	0.0	0.9	0.9	82.0	O K
600 min Summer	99.264	0.864	0.0	0.9	0.9	82.1	O K
720 min Summer	99.257	0.857	0.0	0.9	0.9	81.4	O K
960 min Summer	99.240	0.840	0.0	0.9	0.9	79.8	O K
1440 min Summer	99.199	0.799	0.0	0.9	0.9	75.9	O K
2160 min Summer	99.137	0.737	0.0	0.9	0.9	70.0	O K
2880 min Summer	99.080	0.680	0.0	0.8	0.8	64.6	O K
4320 min Summer	98.978	0.578	0.0	0.8	0.8	54.9	O K
5760 min Summer	98.887	0.487	0.0	0.8	0.8	46.3	O K
7200 min Summer	98.788	0.388	0.0	0.8	0.8	36.9	O K
8640 min Summer	98.704	0.304	0.0	0.8	0.8	28.9	O K
10080 min Summer	98.644	0.244	0.0	0.8	0.8	23.1	O K
15 min Winter	98.815	0.415	0.0	0.8	0.8	39.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	145.521	0.0	35.5	26
30 min Summer	96.840	0.0	47.2	41
60 min Summer	61.580	0.0	60.7	70
120 min Summer	36.938	0.0	72.9	128
180 min Summer	27.369	0.0	81.0	188
240 min Summer	22.090	0.0	87.1	246
360 min Summer	16.265	0.0	96.2	364
480 min Summer	13.048	0.0	102.8	482
600 min Summer	10.980	0.0	108.1	600
720 min Summer	9.527	0.0	112.5	676
960 min Summer	7.607	0.0	119.5	788
1440 min Summer	5.508	0.0	127.0	1042
2160 min Summer	3.971	0.0	141.4	1456
2880 min Summer	3.146	0.0	149.3	1876
4320 min Summer	2.264	0.0	161.1	2688
5760 min Summer	1.797	0.0	170.8	3520
7200 min Summer	1.507	0.0	179.0	4256
8640 min Summer	1.309	0.0	186.6	4928
10080 min Summer	1.166	0.0	193.6	5552
15 min Winter	145.521	0.0	39.8	26

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	98.950	0.550	0.0	0.8	0.8	52.3	O K
60 min Winter	99.091	0.691	0.0	0.8	0.8	65.6	O K
120 min Winter	99.207	0.807	0.0	0.9	0.9	76.7	O K
180 min Winter	99.275	0.875	0.0	0.9	0.9	83.2	O K
240 min Winter	99.320	0.920	0.0	1.0	1.0	87.4	O K
360 min Winter	99.370	0.970	0.0	1.0	1.0	92.1	O K
480 min Winter	99.391	0.991	0.0	1.0	1.0	94.2	O K
600 min Winter	99.397	0.997	0.0	1.0	1.0	94.8	O K
720 min Winter	99.395	0.995	0.0	1.0	1.0	94.5	O K
960 min Winter	99.374	0.974	0.0	1.0	1.0	92.5	O K
1440 min Winter	99.322	0.922	0.0	1.0	1.0	87.6	O K
2160 min Winter	99.238	0.838	0.0	0.9	0.9	79.6	O K
2880 min Winter	99.155	0.755	0.0	0.9	0.9	71.7	O K
4320 min Winter	99.004	0.604	0.0	0.8	0.8	57.4	O K
5760 min Winter	98.865	0.465	0.0	0.8	0.8	44.2	O K
7200 min Winter	98.704	0.304	0.0	0.8	0.8	28.9	O K
8640 min Winter	98.605	0.205	0.0	0.8	0.8	19.5	O K
10080 min Winter	98.544	0.144	0.0	0.8	0.8	13.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	96.840	0.0	52.6	40
60 min Winter	61.580	0.0	68.0	70
120 min Winter	36.938	0.0	81.6	126
180 min Winter	27.369	0.0	90.7	184
240 min Winter	22.090	0.0	97.6	242
360 min Winter	16.265	0.0	107.7	358
480 min Winter	13.048	0.0	115.1	470
600 min Winter	10.980	0.0	120.9	582
720 min Winter	9.527	0.0	125.7	690
960 min Winter	7.607	0.0	132.7	890
1440 min Winter	5.508	0.0	133.5	1108
2160 min Winter	3.971	0.0	158.4	1568
2880 min Winter	3.146	0.0	167.3	2024
4320 min Winter	2.264	0.0	180.4	2904
5760 min Winter	1.797	0.0	191.3	3800
7200 min Winter	1.507	0.0	200.5	4400
8640 min Winter	1.309	0.0	209.0	5016
10080 min Winter	1.166	0.0	216.9	5640

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 439058 404111 SE 39058 04111
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.132

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.044	4	8	0.044	8	12	0.044

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Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 98.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	1.001	0.0	0.0
1.000	100.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0047-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	47
Invert Level (m)	98.400
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

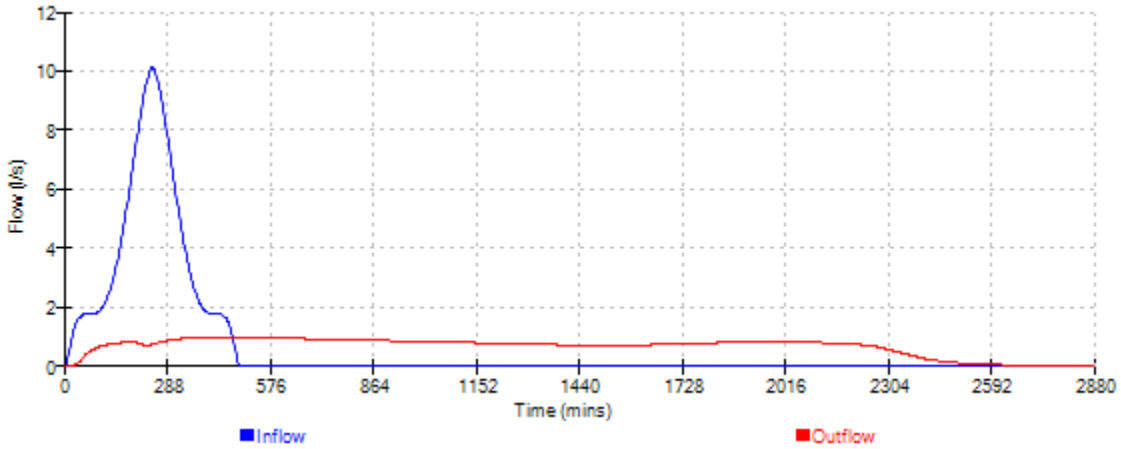
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	1.0
Flush-Flo™	0.205	0.8
Kick-Flo®	0.415	0.7
Mean Flow over Head Range	-	0.8

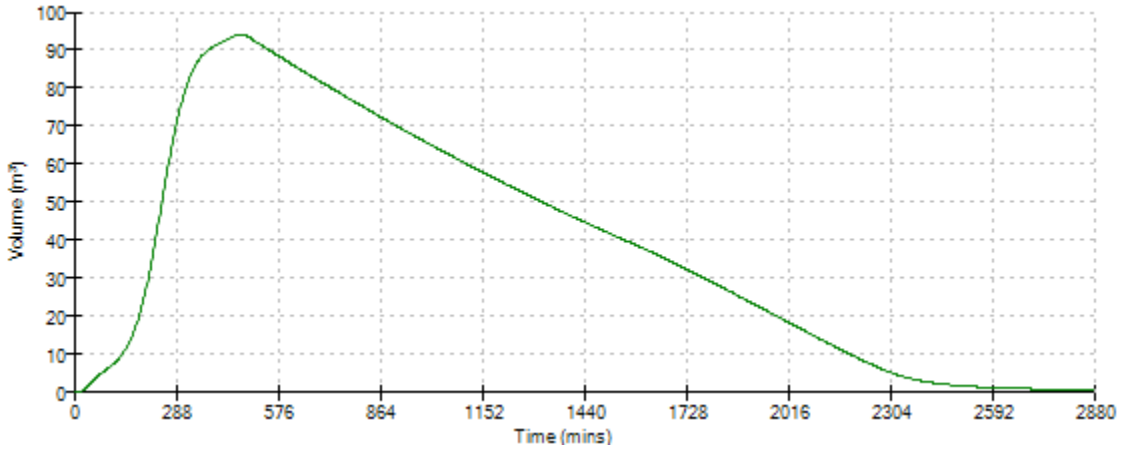
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

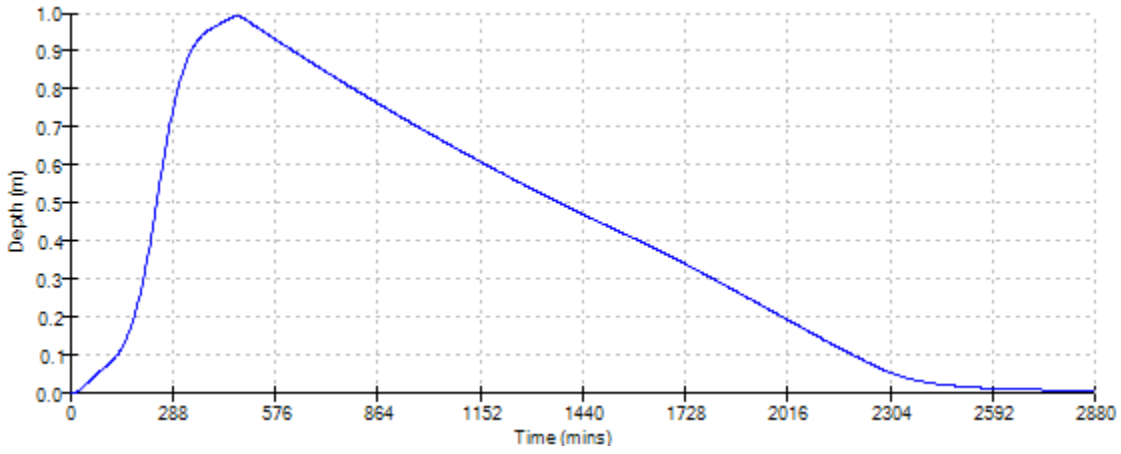
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.1	3.000	1.6	7.000	2.4
0.200	0.8	1.400	1.2	3.500	1.8	7.500	2.5
0.300	0.8	1.600	1.2	4.000	1.9	8.000	2.6
0.400	0.7	1.800	1.3	4.500	2.0	8.500	2.7
0.500	0.7	2.000	1.4	5.000	2.1	9.000	2.7
0.600	0.8	2.200	1.4	5.500	2.2	9.500	2.8
0.800	0.9	2.400	1.5	6.000	2.3		
1.000	1.0	2.600	1.5	6.500	2.3		

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Event: 480 min Winter

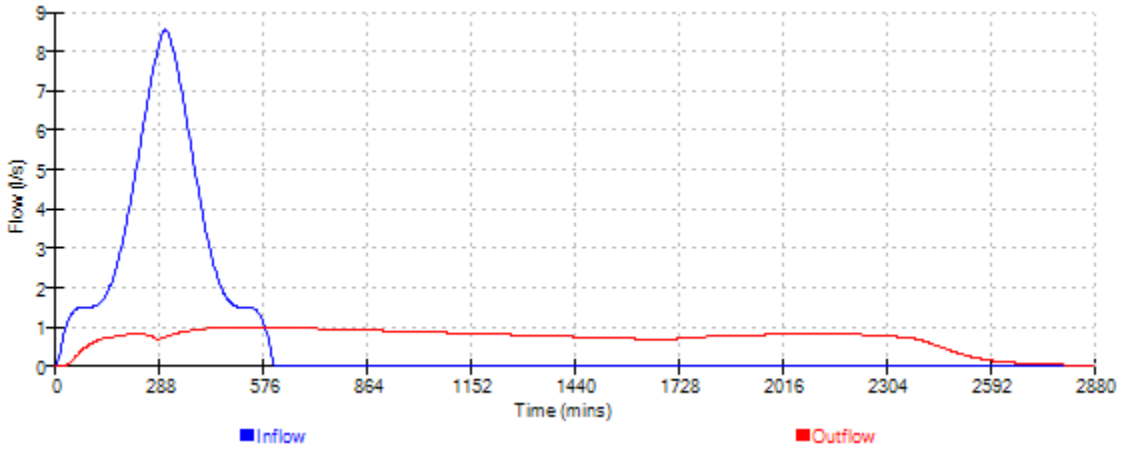


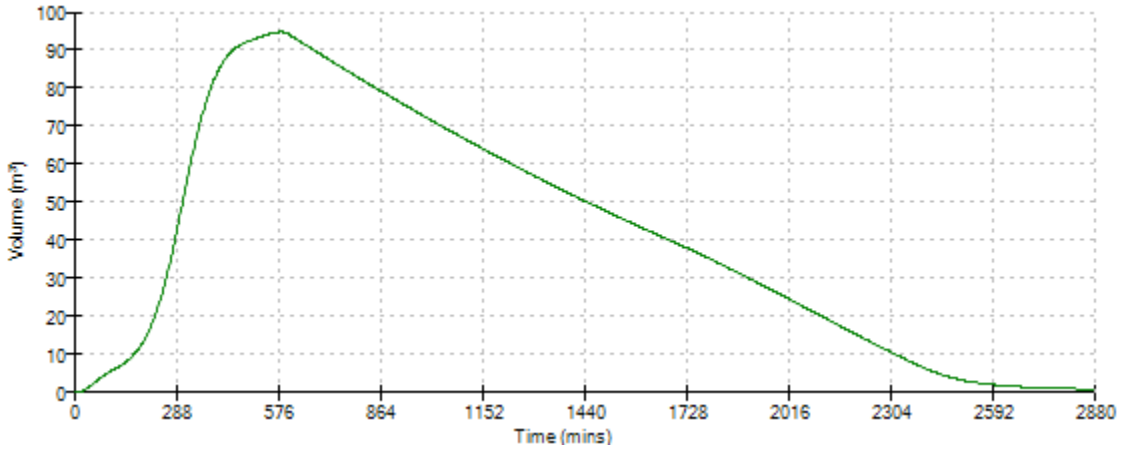


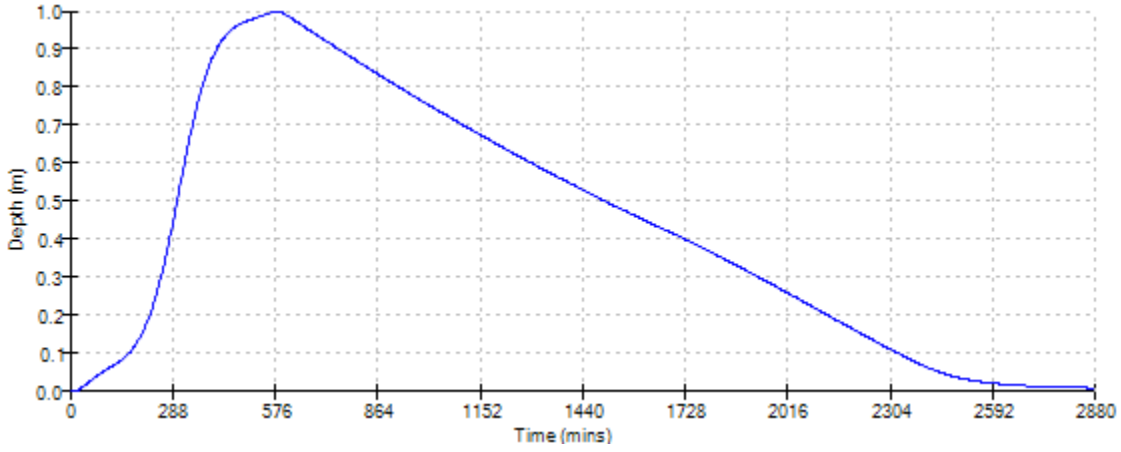


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Event: 600 min Winter

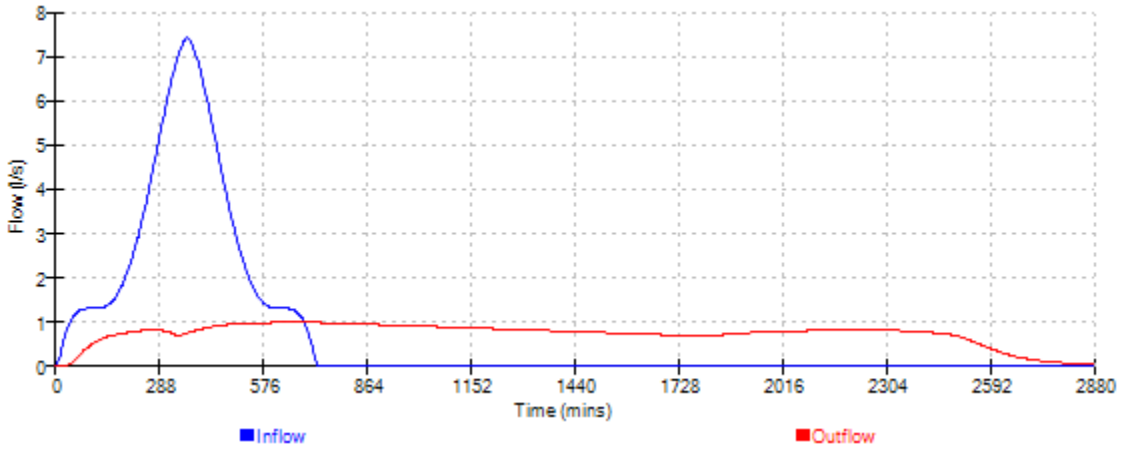


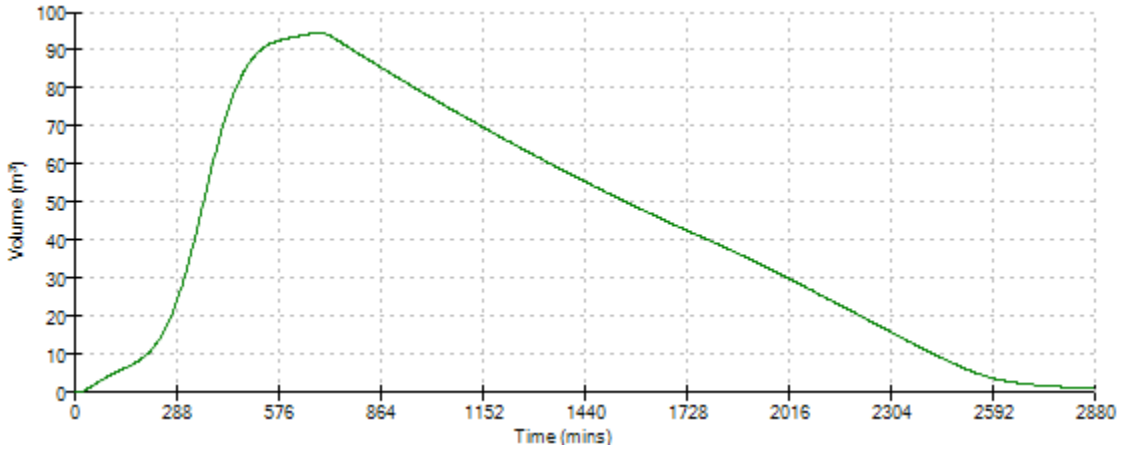


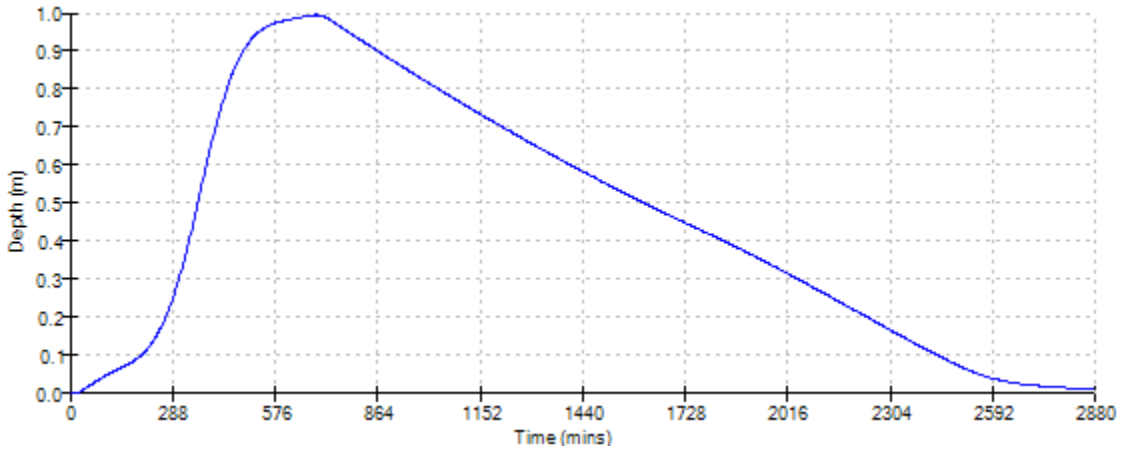


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Event: 720 min Winter







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Appendix I – Concept Drainage Sketch



LEGEND

- SW — Proposed Surface Water Connection
- Proposed Surface Water Manhole
- Proposed Flow Control Device (Hydrobrake or similar)
- Proposed Foul Water Sewer

NOTES

1. All dimensions in millimetres and all levels in metres above ordnance datum unless shown otherwise .

2. This drawing provides a concept only and is not intended for detailed design. Detailed drainage design will be required at the detailed design stage.

3. Concept drawing based on Proposed Floor Plan prepared by Kudos Architecture (dwg. MR-01, dated July 2022).

4. Surface water runoff generated by proposed development to be restricted to 1 l/s which represents minimum practical flow rate for Hydrobrake or similar flow control device to achieve a less than 24 hour half drain time.

5. Attenuation to be provided in the form of underground geocellular storage crates for all events up to to and including the 1 in 100 year plus 40% climate change event.

6. Dimensions and route of proposed surface water connection to be confirmed at the detailed design stage.

7. Surface water runoff to discharge to existing public surface water sewer network subject to agreement with Yorkshire Water. Survey to confirm location and depth of existing public sewer will be required at the detailed design stage.

Site Plan Provided by Client

DeltaSimons

TITLE:
Concept Surface Water Drainage Sketch
Aldham Industrial Estate, Barnsley

DRAWN BY: DP	SCALE: Not to Scale	PROEJCT NO: 22-0573
CHECKED BY: JR	REVISION: 1	APPENDIX: -
DATE: 27/10/22		

Appendix J – Attenuation Storage Tank Maintenance Schedule

Attenuation Storage Tank Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the 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, outlet, 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 build-up and remove If necessary	Every 5 years or as required

Ref. Table 21.3, CIRIA C753 'The SuDS Manual'

Appendix K – Permeable Paving Maintenance Schedule

Permeable Paving Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on Site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and move contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level or the paving	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Inspect for evidence of poor operation and / or weed growth – if required, take remedial action	Three-monthly, 48hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Ref. Table 20.15, CIRIA C753 'The SuDS Manual'