

Flood Risk Assessment & Drainage Strategy Report

Land At Newsome Mills, Ruth
Street / Hart Street Huddersfield
HD4 6JF

For True North Partnerships Ltd &
Connect Housing Association Ltd

Date 29/06/2026

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Introduction

Bright Young Consulting Ltd has been commissioned by True North Partnerships Ltd & Connect Housing Association Ltd to undertake a Flood Risk Assessment and Drainage Strategy for a proposed residential development at land At Newsome Mills, Ruth Street / Hart Street Huddersfield HD4 6JF.

On the Environment Agency (EA) Flood Map for Planning, the Site is shown to be located wholly within Flood Zone 1 on the EA Flood Map for Planning however the Site is in excess of 1 hectare and therefore, the application requires a Flood Risk Assessment and Drainage Strategy to support the application.

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 July 2021, and the National Planning Practice Guidance (NPPG) Flood Risk and Coastal Change.

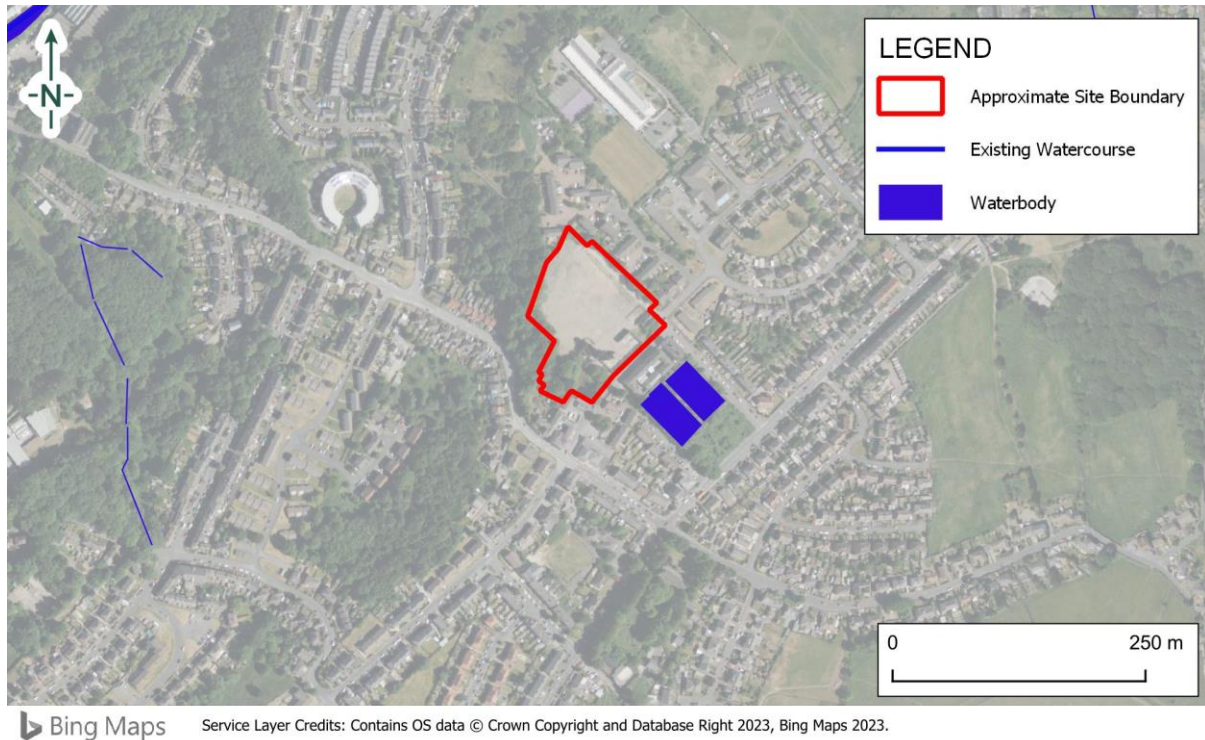
Kirklees Council as Lead Local Flood Authority (LLFA) is a statutory consultee for major planning applications in relation to surface water drainage, requiring that all planning applications are accompanied by a Sustainable Drainage Strategy. The aim of the Sustainable Drainage Strategy is to identify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

Existing Conditions

The site covers an area of approximately 1.12ha and is located at National Grid Reference (NGR): 414337 , 414910.

A site location plan and an aerial image are included as Figure 1 below.

Figure 1 – Site Location Plan



The Site is located at land off Ruth Street within Newsome, approximately 1.6 km south of Huddersfield town centre. A Site location map is provided as Figure 1. The Site is predominantly surrounded by residential buildings with Hillside Primary School located approximately 80 m to the north.

Online mapping (including Google Maps and Google Streetview imagery, viewed August 2022) as well as the topographical survey undertaken by Latitude Surveys (drawing No. TC1013-001, dated Nov 2018) included as Appendix A, show that the Site currently comprises vacant land with sparse vegetation. There is a derelict structure associated with Newsome Mill in the south-east of the Site. The remnants of Newsome Mill and the clocktower are present adjacent to the south of the Site.

The existing Site is partially demolished and has become overgrown with scrub making it difficult to assess existing hardstanding areas. The existing drainage which would have formerly served the Site will have been grubbed up and irreparably damaged. A review of aerial imagery and the topographical survey suggests that the remnant buildings, floor slabs and yard areas measure approximately 3,100m². However it is understood that most of the Site may actually be hard stood.

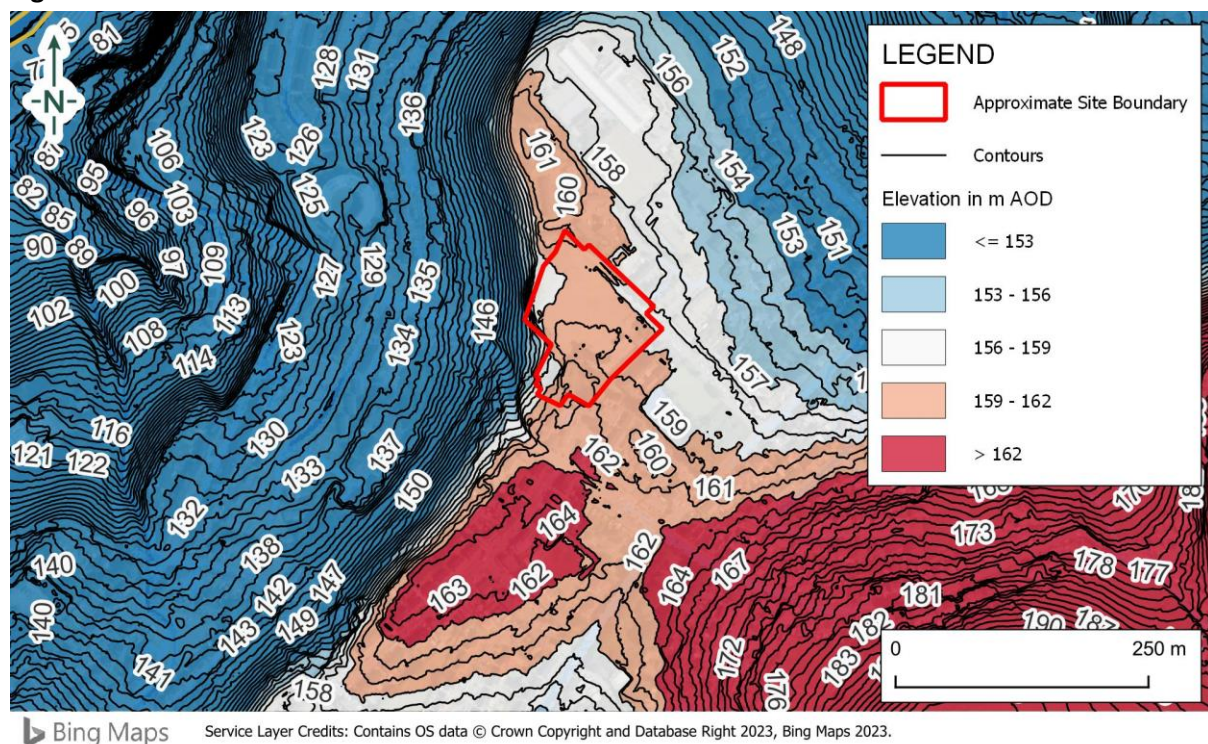
The Site is accessed from Ruth Street which forms the south-eastern boundary.

Local Topography

The topographical survey undertaken by Latitude Surveys (Appendix A) shows that the site is generally flat with levels ranging from 160.55 metres Above Ordnance Datum (m AOD) to 158.55m AOD.

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). The LiDAR plan is provided as Figure 2, a review of LiDAR data shows that it corroborates the topographical survey. It also shows the wider area tends to slope downwards to the north-east and north-west of the Site.

Figure 2 – LiDAR Plan



Hydrology

The nearest watercourse is an unnamed Ordinary Watercourse (responsibility of the LLFA to maintain) situated approximately 440m east of the Site at its closest point. The watercourse flows in a northerly direction in the vicinity of the Site.

The nearest Main River (responsibility of the EA to maintain) is the River Holme situated approximately 500m north-west of the Site at its closest point. The watercourse flows in a easterly direction in the vicinity of the Site.

Geology

Published Geology

Reference to the British Geological Survey (BGS) online mapping (1:50,000 scale) and the British Geological Survey (BGS) 1:50,000 geological map (Sheet Number 77, Huddersfield) indicates that the bedrock geology is predominately Stanningley Rock Formation (sandstone) with Pennine Lower Coal Measures (PLCM) Formation (mudstone, siltstone and sandstone) in western extent of the Site. No

superficial deposits are indicated to be present within the Site boundary.

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 are no publicly available historic BGS borehole records within close proximity to the Site.

Recorded Geology

Haigh Huddleston & Associates produced a Geo-environmental Ground Investigation Report dated August 2020. The report included the following:

- The surface of all the exploratory holes consisted of Made Ground containing a mixture of clay, bricks, crushed brick, gravel, sandstone cobbles and boulders, ash, glass, timber, fabric and tree roots, encountered to a maximum depth of 4.5 m below ground level (bgl). A concrete slab was encountered at 0.9 m bgl in the north of the Site.
- The chemical analysis of the Made Ground soils identified elevated aromatic hydrocarbon (carbon banding C21-C35), lead and Polycyclic Aromatic Hydrocarbons (PAH) including benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene. Asbestos fibres in the form of amosite or chrysotile was identified in six of the nine samples taken.

Delta-Simons carried out intrusive investigation work from 4th to 5th November 2021 to assess the potential linkages identified in their outline conceptual model, to collect data for preliminary waste classification and to provide preliminary geotechnical information.

The following geology was encountered:

Strata	Typical Strata Description	Depth Range of Strata Top (m)	Depth Range of Strata Base (m)	Thickness Range (m)	Comments
Made Ground: Topsoil	Grass over sandy gravelly CLAY with low to medium cobble content, rare metal, rare glass, rare plastic, and frequent roots.	0.0	0.3	0.3	Present in TP113 and TP116 only
Made Ground	Predominately SAND and GRAVEL, occasionally CLAY, of sandstone, red brick and occasionally mudstone with low to high cobble content, ash, rare wood, rare plastic, rare metal, rare glass, and occasional clinker.	0.0	0.3 - 3.9	0.3 – 3.9	Present in all locations. Deepest Made Ground identified in TP109
Weathered Stanningley Rock Sandstone	Completely weathered bedrock: soft to stiff sandy gravelly CLAY with sandstone and mudstone. Extremely weathered/weathered sandstone recovered as	0.3 – 3.9	1.2 – 3.5	0.3 – 2.35	Present in all locations except TP102, TP103 and TP109.

	sandy angular to subangular fine to coarse GRAVEL of sandstone with medium to high cobble content.				
Weathered PLCM	Extremely weathered light brown mudstone recovered as sandy angular to subangular fine to coarse GRAVEL of mudstone. Sand is fine to coarse.	0.8 - 3.9	3.5 - 4.4	0.5 – 2.7	Present in TP102, TP103 and TP109

Across the Site the general ground conditions are varying thicknesses of Made Ground, predominantly underlain by weathered Stanningley Rock Sandstone. The Made Ground is recorded as being deeper in the west of the Site. PLCM were identified in the north-west and south-west of the Site.

Hydrogeology

According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mapping viewed May 2023, indicates that the underlying bedrock is 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'; whereas

During the Delta-Simons ground investigation groundwater was encountered in 5 trial pits between 1.9 and 3.1 m.bgl.

There are no groundwater abstraction licences recorded within 250m of the site. There are no recorded licensed discharge consents within 250m of the site. There are no recorded surface water abstractions within 250m of the site. There are no recorded pollution incidents in controlled waters within 250m of the site.

The EA's 'Source Protection Zones' data, viewed from MAGIC Map's online mapping viewed May 2023, indicates that the site is not located within a Groundwater Source Protection Zone.

The Cranfield University 'Soilscapes' map viewed August 2022, indicates that the site is underlain by 'Freely draining slightly acid loamy soils'.

Local Drainage

Public Sewer Records

Public sewer records have been obtained from Yorkshire Water and are included in Appendix B. The Yorkshire Water sewer records show that there is 450mm diameter public combined sewer within Ruth Street which forms the south-eastern boundary of the Site. The sewer flows in a north-easterly direction within the road before discharging into a 300mm diameter public combined sewer which flows past the Site in a south-easterly direction within Hart Street.

The depth to invert of 300mm diameter public combined sewer which flows within Hart Street is recorded as between 2.27 and 2.44m.

No Surface water sewers apart from minor spurs discharging into the wider combined system are identified.

Measured Survey

A CCTV drainage survey was undertaken by Environmental Drainage Solutions Ltd in September 2022 (Appendix B). The drainage schematic corroborates the Yorkshire Water sewer records indicates that there are two existing spurs leading from the Site into the combined public sewer:

- A 150mm diameter surface water sewer discharging to the public combined sewer within Ruth Street at the southern extent: and
- A 100mm diameter combined sewer discharging to the combined sewer in Hart Street in the north-eastern extent.

The invert levels aren't provided on the survey plans.

Development Proposals

The proposed development is for the redevelopment of the Site to include 24 new build dwellings within 1-4 bed houses/ cottage flats on the cleared back site, alongside a further 44 new build apartments, with associated landscaping/ public realm/ amenity spaces across the whole site.

The proposed development will result in an increase in hardstanding areas. Hardstanding will occupy approximately 0.714ha or 64% of the total site area with 0.406ha or 26% becoming soft landscaping.

Policy Context

National Planning Policy Framework

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

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”.

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);
- Identified in a Strategic Flood Risk Assessment as being at increased risk in the future; and
- Where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

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.

Vulnerability Classification

In accordance with Table 2 of the NPPG: Flood Risk and Coastal Change, residential developments are considered to be ‘more vulnerable’.

Sequential Test

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.

Table 3 of the NPPG (reproduced below), states that ‘more vulnerable’ development is considered appropriate within Flood Zones 1 and 2. However, the Exception Test must be satisfied for development within Flood Zone 3a.

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	X	Exception Test required	✓	✓
Zone 3b	Exception Test required	X	X	X	✓

✓ development is permitted

X development is not permitted

Exceptions Test

The Exception Test determines whether the benefits of the proposed development will outweigh the potential flood risk. Within the NPPF, the Exception Test states that:

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared; and
- A Site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

The Site is located wholly within Flood Zone 1 and therefore passes the flood risk Sequential Test and the Exception Test does not need to be applied.

The latest NPPF guidance now requires that all sources of flood risk pass the Sequential Test depending on the level of risk. This will be broadly assessed as part of the formal assessment below.

Local Policy

The Kirklees Local Plan was adopted on 27 February 2019. It comprises the strategy and policies document, allocations and designations document and associated policies map. It contains the following policies relating to flood risk;

Policy LP 27 Flood risk

Proposals for development 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 involving 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 management plans to reduce flood risk and improve water quality.

Policy LP 28 Drainage

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.

Policy PLP 29 Management of water bodies

Where it is proposed to develop a site already containing a water area, this should normally be retained as part of the proposal and include a future management plan for the maintenance of the water area to ensure the safety of residents for the lifetime of the development. This includes bodies of water associated with existing buildings, even where they are remote from the building, and also includes ancillary elements linked to the operation of the water body.

Policy PLP 34 Conserving and enhancing the water environment

Proposals will be supported which:

- 1. Do not result in the deterioration of water courses or water bodies (including groundwater) and conserve and enhance: a. the natural geomorphology of watercourses, including reinstating watercourses to their natural state through removal of modifications resulting from past industrial uses; b. water quality; and c. the ecological value of the water environment, including the functionality of habitat networks.*
- 2. Make positive progress towards achieving 'good status or potential' under the Water Framework Directive in surface and groundwater bodies.*
- 3. Ensure Source Protection Zones are protected from contamination as a result of the proposal in line with national guidance.*
- 4. Manage water demand and improve water efficiency through appropriate water conservation techniques including rainwater harvesting and grey-water recycling as well as considering water availability from surface water and groundwater sources.*
- 5. Improve water quality through the incorporation of appropriately constructed and maintained Sustainable Drainage Systems and surface water management techniques taking into account the sensitivity of groundwater.*
- 6. Dispose of surface water appropriately (in accordance with the Local Plan drainage policy) adhering to the following networks in order of preference:*
 - a. to an infiltration based system wherever possible (such as soakaways);*
 - b. discharge into a watercourse with the prior approval of the landowner, navigation authority or Environment Agency, where applicable. To comply with part a this must be following treatment where necessary or where no treatment is required to prevent pollution of the receiving watercourse;*
 - c. discharge to a public sewer.*

The West Yorkshire Combined Authority (WYCA) Sustainable Drainage Systems Guidance contains the following aims relating to managing flood risk and drainage:

- Promote delivery of high performance sustainable drainage proposals that remain effective for the lifetime of the development, with such proposals considered from the outset by developers, consultees and approval bodies;
- Encourage sustainable development that is commensurate with the existing level of risk and that will be resilient to the predicted impacts of climate change;

- Encourage the use of sustainable techniques that have a benefit to the environment, including improvement to amenity and biodiversity, and the quality of runoff entering the drainage network and watercourses;
- Ensure that the current and future level of flood risk is not increased, and, where possible is decreased, to people, property and infrastructure through the implementation of the new development;
- Support an efficient and effective planning application process that enables developers to demonstrate that their proposals comply with flood risk policy, guidance and standards.

Reference has also been made to the following strategic documents throughout this report:

- Kirklees Local Flood Risk Management Strategy (FRMS) (Kirklees Council, 2009),
- Calder Catchment Strategic Flood Risk Assessment (SFRA) - Volume 1 (Level 1 SFRA) (JBA, 2016)
- Calder Catchment Strategic Flood Risk Assessment (SFRA) - Volume 2 (Level 2 SFRA) (JBA, 2016)

Consultation

Given the Sites location within Flood Zone 1 a pre development enquiry was not submitted to the EA.

Preliminary discussions have been undertaken with both the LLFA (Paul Farndale) and Yorkshire Water (Wendy Mullany). From the discussions, the following constraints have been established for considered within the Drainage Strategy for the Site:

- The proposed peak discharge rate from the Site must be restricted to 3.5l/s; and
- Infiltration cannot be utilised due to significant depths of Made Ground in combination with a steep embankment at the western boundary.
- Attenuation systems should be designed to be offered for adoption
- Oversized pipes beneath adopted roads should be restricted to less than 900 diameter
- Attenuation tanks should be 'on-line' with provision for desilting.

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

Sources of Flooding and Probability

Tidal Flood Risk

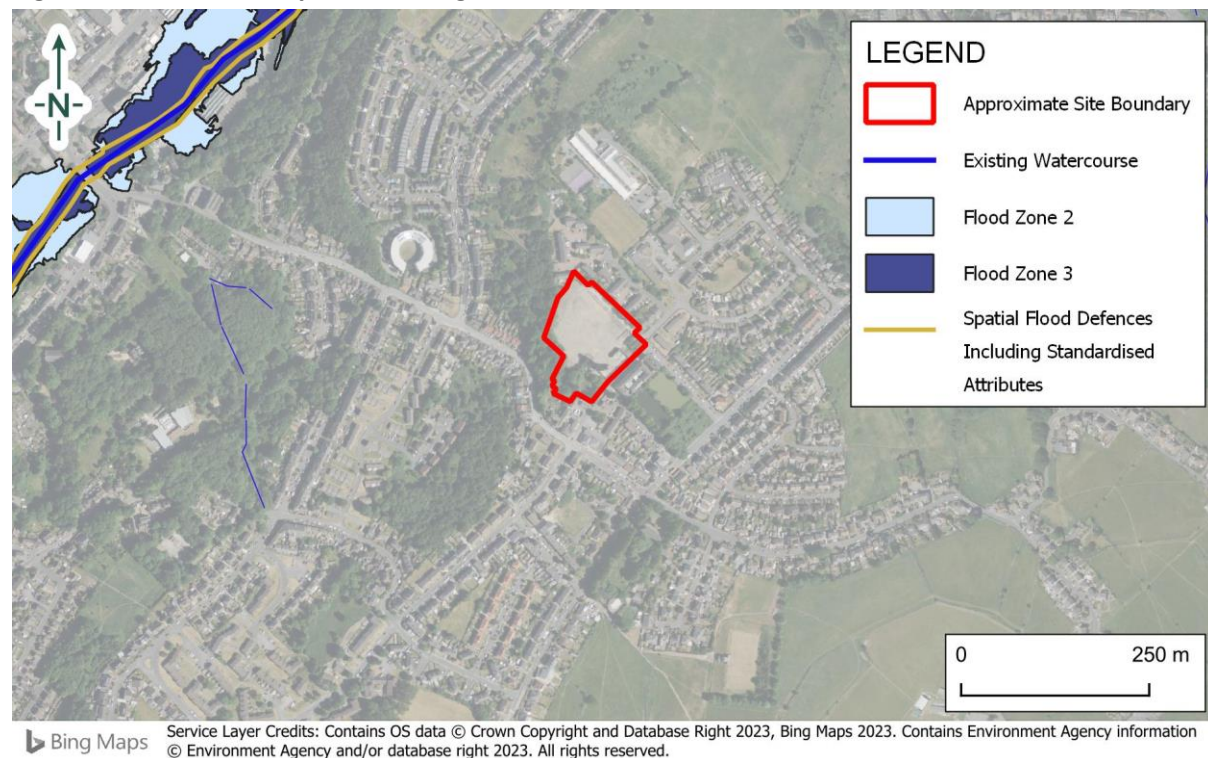
The Site is situated at a minimum of 158.55 AOD and is significantly above sea level. Therefore, there is no risk from tidal flooding.

Fluvial Flood Risk

The nearest watercourse is an unnamed Ordinary Watercourse which originates approximately 440m east of the Site which is also closest proximity to the Site. The ordinary watercourse flows away from the Site following the local topography and therefore, poses no risk to the Site.

The River Holme situated approximately 500m north-west of the Site at its closest point. The watercourse flows in a easterly direction in the vicinity of the Site. Figure 3 below reproduces the EA 'Flood Map for Planning' and identifies the local EA Flood Zones.

Figure 3 – EA 'Flood Map for Planning'



The Site is shown to be situated entirely within Flood Zone 1 with the nearest flood extent situated approximately 500m north-west of the site. Flood Zone 2 associated with the River Holme is shown to be constrained to the 75m AOD contour and is therefore 83.55m below the minimum Site level and therefore, poses an insignificant risk to the site.

The EA 'Historical Flood Map' online viewer [accessed May 2023] indicates that there have been no recorded flood events within the vicinity of the site.

The Site is therefore considered to be at very low risk of fluvial flooding.

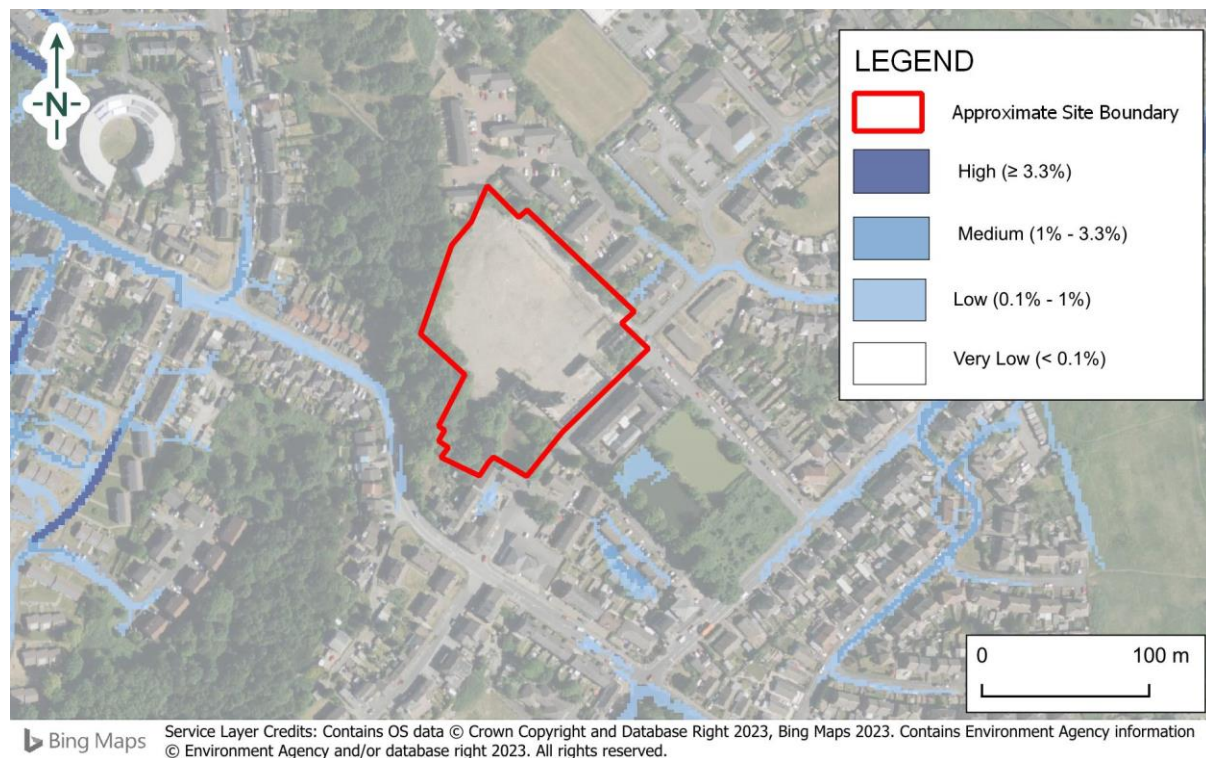
Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also

occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The EA 'Flood Risk from Surface Water' map provided as figure 5 below indicates that entire site and surrounding access is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding. Furthermore, the EA mapping does not consider local surface water drainage systems which will further reduce the extent and depth of surface water flooding in the surrounding area.

Figure 4 – EA 'Flood Risk from Surface Water'



The Level 1 and Level 2 SFRA's do not identify any surface water flooding records or identified problems within the vicinity of the Site.

There are no distinct flow routes in the area which would direct any potential surface water flooding towards the site.

It can therefore be concluded that the site is at a very low risk of surface water flooding.

Groundwater

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

BGS mapping and further intrusive investigation have identified that across the Site the general ground conditions are varying thicknesses of Made Ground, predominantly underlain by weathered Stanningley Rock Sandstone. The Made Ground is recorded as being deeper in the west of the Site. PLCM were identified in the north-west and south-west of the Site. During the Delta-Simons ground investigation groundwater was encountered in 5 trial pits between 1.9 and 3.1 m.bgl.

The Level 2 SFRA states that, *'Figure 3-5 illustrates the AStGWF map. It shows that the risk of groundwater emergence is very high in parts of Huddersfield, Meltham, Dewsbury, Mirfield, Ravensthorpe and Kirkburton. There could however be localised problems in other areas, which are not identified on this strategic map. KC [Kirklees Council] has not specified any significant issues associated with groundwater flooding however'*. The AStGWF map shows the site to be within an area with $\geq 25\%$ $< 50\%$ risk of groundwater emergence.

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

It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources

Sewer

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

The Yorkshire Water sewer records locate a 450mm diameter public combined sewer within Ruth Street which discharges into a 300mm diameter public combined sewer which flows past the Site in a south-easterly direction within Hart Street. Any potential flooding arising from the 450mm sewer in Ruth Street or the 300mm sewer in Hart street would be directed north-east and south east respectively, following the local topography away from the Site.

Historical records of sewer flooding within the Level 2 SFRA do not identify any properties impacted by flooding from artificial sources within the general postcode area of the Site.

It can therefore be concluded that the risk of sewer flooding is low.

Reservoir and Canal Flooding

There are no canals within the vicinity of the Site, and the Site is not shown to be at risk on the EA's 'Flood Risk from Reservoirs' map [accessed May 2023].

The EA state that reservoir flooding is extremely unlikely to happen. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the EA ensure that reservoirs are inspected regularly, and essential safety work is carried out.

It can therefore be concluded that there is no risk of flooding from artificial sources.

Summary of Potential Flooding

It can be concluded that the Site is at 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.

Residual Risks

A residual risk is an exceedance event, such as the 1 in 1000 year (0.1% AEP) flood event that would overtop the unnamed watercourse or the River Holme and potentially impact the Site. As the probability of a 1 in 1000 year flood event occurring is 0.1% in any given year, the probability is low and, therefore, no further mitigation beyond what is proposed is required.

Drainage Strategy

Introduction

The Site is currently occupied by the remnants of the former Newsome Mill building. The proposed development is for the redevelopment of the Site to include The proposed development is to include 24 new build dwellings within 1-4 bed houses/ cottage flats on the cleared back site, alongside a further 44 new build apartments, with associated landscaping/ public realm/ amenity spaces across the whole site.

A CCTV drainage survey for the site indicates that although mostly demolished the site previously discharged to the public combined sewer to the south and east of the Site at an unrestricted rate.

The proposed development will result in a hardstanding area of 0.714ha in the form of buildings and pedestrian/ vehicular surfacing.

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.

The below Drainage Strategy has been developed in line with Kirklees Local Plan and the WYCA Sustainable Drainage Systems Guidance.

Drainage Hierarchy

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.

Surface Water Discharge to Soakaway

The first consideration for the disposal of surface water is infiltration (soakaways and permeable surfaces). As described above the Site is underlain by Made Ground over by weathered Stanningley Rock Sandstone. And PLCM in the north-west and south-west of the Site. Groundwater was encountered in 5 trial pits between 1.9 and 3.1 m.bgl.

Soakaways were discussed with the LLFA and it was agreed that due to the presence of a significant thickness of Made Ground, shallow groundwater in places and a steep embankment at the western boundary, soakaways do not provide a suitable for the discharge of surface water runoff.

Surface Water Discharge to Watercourse

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

The Site is separated from all local watercourses including the River Holme by third party, urbanised land. Therefore, discharge to watercourse is not feasible.

Surface Water Discharge to Sewer

Where disposal of surface water to watercourse is not possible, a connection to the public sewer system is the final consideration. 450mm diameter public combined sewer within Ruth Street which discharges into a 300mm diameter public combined sewer which flows past the Site in a south-easterly direction within Hart Street. A connection to either sewer appears to be a feasible option and it is understood that the wider site already previously benefitted from a connection to this combined sewer.

The depth to invert of 300mm diameter public combined sewer which flows within Hart Street is recorded as between 2.27 and 2.44m, therefore, a gravity fed connection is feasible.

Given it has been determined that infiltration is not possible at this site, and there are no watercourse within the boundary, discharge to the combined sewer at a restricted rate (detailed below) is the next viable alternative in line with the drainage hierarchy. Any discharge to the public sewer would need to be agreed with Yorkshire Water.

Surface Water Discharge

Based on a pre-development discussions with the LLFA and Yorkshire Water it has been agreed that the maximum peak discharge rate from the site should be restricted to 3.5l/s.

Attenuation Storage

In order to achieve a discharge rate of 3.5l/s, 513m³ of attenuation storage will be required. Storage estimates have been provided using MicroDrainage and are included in Appendix C. The storage estimates are based on storage within a proprietary on-line tank system s with a single outfall to the public sewer based 1:100 year plus 45% CC, an impermeable drainage area of 0.612ha, a design head of 2.4m and HydroBrake flow control. Approximately 0.1ha of the site (Hart Street) will continue to drain as existing.

Sustainable Drainage Systems

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

Soakaways

As described above, the use of soakaways is precluded as agreed with the LLFA given the presence of Made Ground, locally high groundwater and the potential for the break-out of infiltrated surface water from the steep slopes to the west of the site.

Green Roofs

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.

Underground Attenuation Tanks

Storage could be provided within underground attenuation tanks or within oversized pipes. Sufficient space for underground tanks is provided within the landscape feature to the southwest of the development footprint. A single tank is proposed with the following specifications:

- 45m x 7.5m x 1.6m with a 450Ø central inspection channel, providing 513m³ attenuation.

Preferred Drainage Scheme

As soakaways are not feasible, surface water runoff will be discharged to the existing public combined sewer system located within Hart Street at a rate of 3.5 l/s as agreed with the LLFA.

Surface water runoff up to the 1 in 100 year plus 45% climate change allowance event will be attenuated on Site and will be provided in the form of a single attenuation tank located beneath the landscaped area to the southwest of the site.

The proposed surface water drainage scheme will create betterment over the existing uncontrolled drainage scheme. The proposed drainage drawing and supporting MicroDrainage model are included as Appendix C.

Event Exceedance

Storage will be provided for the 1 in 100 year plus 45% CC event. Storm events in excess of the 1 in 100 year plus 45% CC event should be permitted to produce temporary shallow depth flooding within the car parking, access and landscaped areas. Finished floor levels will be set at a minimum of 150mm above surrounding ground levels ensuring exceedance flooding will not affect the buildings.

Surface Water Treatment

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), residential roofs have a 'very low' pollution hazard level, with low traffic roads classified as having a 'low' pollution hazard level. Table 3 below shows the pollution hazard indices for each land use.

Table 1 - Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2*	0.2	0.05
Low Traffic Roads	Low	0.5	0.4	0.4

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

* Indices values range from 0-1.

Maintenance

All principal site drainage will be offered for adoption. Associated maintenance issues will, on adoption, pass to Yorkshire Water. In the intervening period maintenance will be provided by Connect Housing as part of their wider maintenance responsibilities across all of their retained portfolio.

Foul Water Discharge

Foul flows should be discharged to the 300 mm public combined sewer in Hart Street.

Conclusions and Recommendations

Conclusions

The proposed development is for the redevelopment of the Site to include 24 new build dwellings within 1-4 bed houses/ cottage flats on the cleared back site, alongside a further 44 new build apartments, with associated landscaping/ public realm/ amenity spaces across the whole site.

The Site is shown to be situated entirely 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. The nearest flood extent situated approximately 500m north-west of the site and is the Flood Zone 2 extent associated with the River Holme situated 83.55m below the minimum Site level and therefore poses an insignificant risk to the site.

The risk of flooding from all other sources has been assessed as no risk to very low risk.

The proposed development will increase impermeable drainage area in the form of buildings and external areas. This will result in an increase in surface water runoff. In order to ensure the surface water runoff will not increase flood risk elsewhere, flow control will be used, and attenuation provided.

All methods of surface water discharge have been assessed. As soakaways are not appropriate and there are no on-site or adjacent watercourses, discharge of surface water to the public combined sewer at a rate of 3.5 l/s is the most practical option.

Attenuation storage will be required on Site to restrict surface water discharge to 3.5l/s. Attenuation can be provided in the form of a single attenuation tank located beneath the landscaped zone to the southwest of the development footprint.

Foul flows can be discharged to the 300 mm public combined sewer in Hart Street.

Recommendations

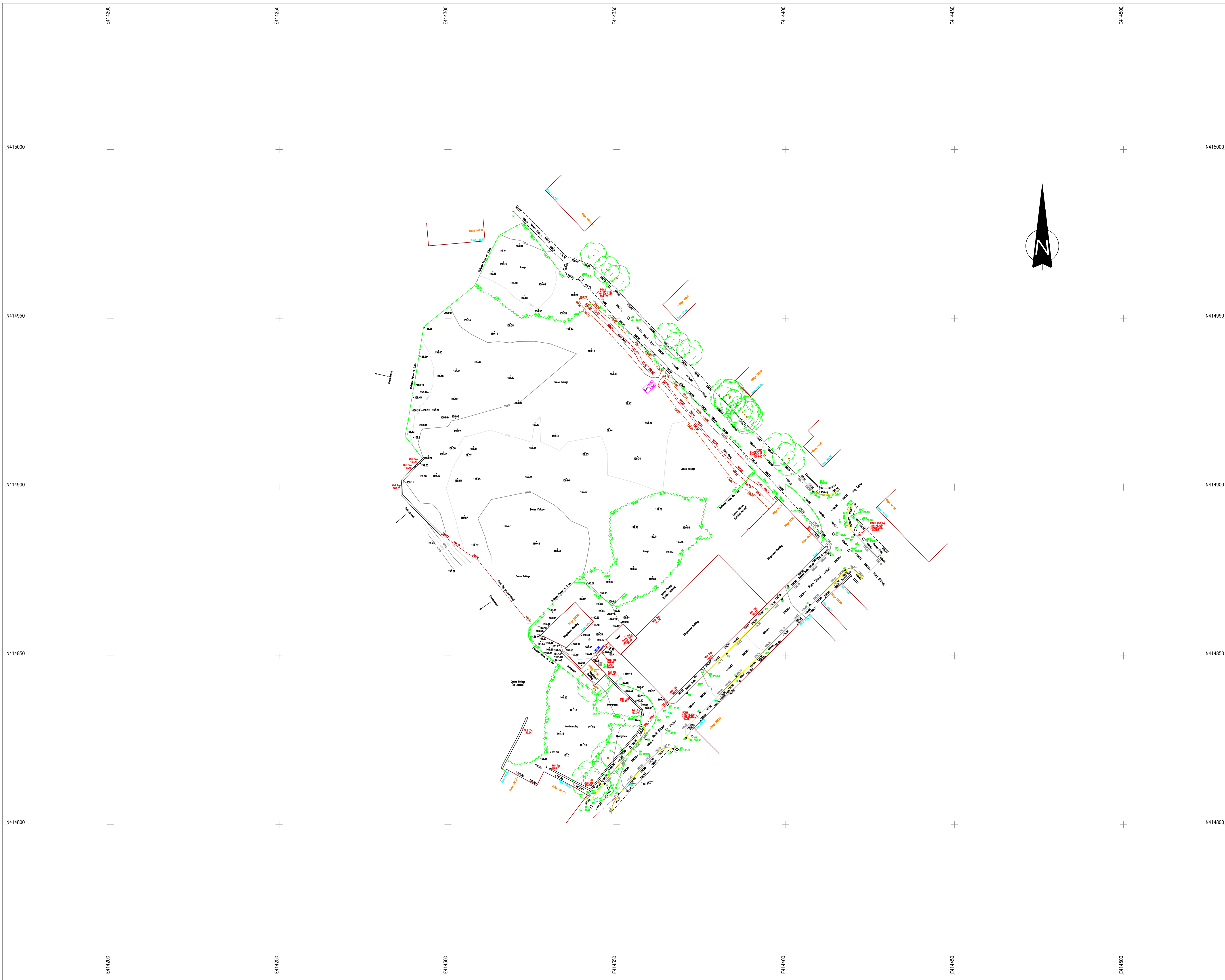
Flood Risk

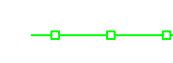
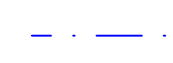
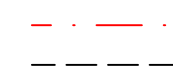
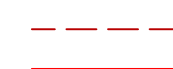
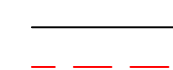
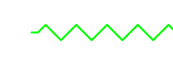
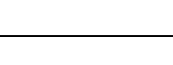
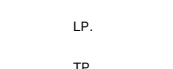
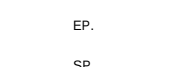
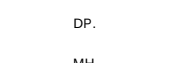
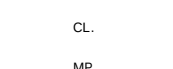
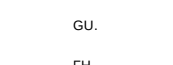
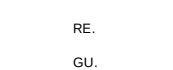
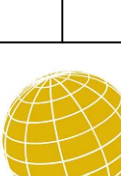
- Establish a developed and demonstrable overland surface water route through the new development towards the public highway for extreme storm events (over and above the design events catered for in the drainage design).

Drainage Strategy

- Complete the detailed drainage design utilising the principles established in this drainage strategy report along with a detailed maintenance strategy for each of the approved drainage elements.
- Make a formal s104 application to Yorkshire water for the adoption of the drainage system.

APPENDIX A – Topographical Information



SYMBOL LEGEND  Borehole  Benchmark  Bollard  Bus Stop  Electric Box  Electricity Pole  Fence Post  Gas Stop Valve  Gate Post  Gas Marker  Gully  Gas Well  Kerb Outlet  Litter Bin  Leachate Chamber  Lamp Post  Manhole  Mini Triangular  Wooden Peg  Ground Marker  Marker Post  Pylon  Earth Rod  Sample Point  Mugshot Point  Spot Height  Eave Level  Ridge Level  Sole  Survey Station  Traffic Camera  Telephone Box  Trial Pit  Telegraph Pole  Deciduous Tree  Road Sign  Valve  Vent  Water Meter  Letter Box  Mini Circular  Knockout		LINE/TYPE LEGEND  Bridge  Bottom of Bank  Building  Canopy Edge  Concrete Edge  Ditch  Drop Kerb  Overhead Cable  Fence  Gate  Kerb  Path  Peg Line  River  Surface Water Drain  Road Centre Line  Tarmac Edge  Top of Bank  Track  Wall  Verge  Flagstone Paving  Stone  Hedge/Line  Grass Edge	
MANHOLE LEGEND  M1CT  M1EL  M1GA  M1SW  M1FW  M1BT  M1WT  CL		ABBREVIATIONS  LP  TP  EP  SP  DP  MH  CL  MP  GU  FH  CATV  WM  WSV  GSV  RE  GU  FH  CATV  WM  WSV  GSV  IC	
SURVEY IS ORIENTED TO ORDNANCE SURVEY NATIONAL GRID. POSITIONS FIXED BY GPS ACTIVE NETWORK TO OS FLAT PLANE, ORIGIN POINT - PGM1. LEVELS TO OSGM15. THIS SURVEY SHOWS PHYSICAL SITE BOUNDARIES ONLY. CONFIRMATION OF LEGAL OWNERSHIP BOUNDARIES SHOULD BE OBTAINED BY REFERENCE TO THE H.M. LAND REGISTRY TITLE PLAN. THE PLAN SCALE IS FOR GUIDANCE ONLY. DO NOT SCALE DIRECTLY. IF IN DOUBT, CONSULT LATITUDE SURVEYS			
REV	DESCRIPTION	DATE	
 LATITUDE SURVEYS Chartered Land Surveyors			
 the mark of property professionalism worldwide			
CLIENT			
JOB TITLE			
NEWSOME MILLS, RUTH STREET, HUDDERSFIELD			
DRAWING TITLE			
TOPOGRAPHICAL SURVEY			
DRAWN	SIGNATURE	DATE	STATUS
TD		15/11/2018	FOR COMMENT ☐
APPROVED	SIGNATURE	DATE	FOR APPROVAL ☐
			DRAFT ☐
			FINAL ☒
SCALE	SHEET	DRAWING NO.	REVISION
1:500	A1	TC1013-001	

APPENDIX B – Public sewer records and services information



YorkshireWater

Mr C McDonald
Haigh Huddleston & Associates
Firth Buildings
99-101 Leeds Road
Dewsbury
West Yorkshire
WF12 7BU

Redacted

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482
Fax: (01274) 372 834

Email:
technical.sewerage@yorkshirewater.co.uk

Your Ref: 7413
Our Ref: V019526

For telephone enquiries ring:
Chris Roberts on Redacted

27th November 2019

Dear Mr McDonald,

**Land Off Ruth Street, Newsome, HD4 6JF - Pre-Planning Sewerage Enquiry - T631334
(RESIDENTIAL)**

Thank you for your recent enquiry. Our charge of £164.00 (plus VAT) will be added to your account with us, reference MWA057. You will receive an invoice for your account in due course.

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.

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.

Foul Water

Foul water domestic waste should discharge to the 450 mm diameter public combined sewer recorded in Ruth Street, at a point to the south of site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2000. 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.

If other methods of surface water disposal are not viable and subject to providing satisfactory evidence as to why they have been discounted, curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site less a 30% reduction in the existing discharge. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage, based on a 1 in 1 year storm, to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.



YorkshireWater

To do this, Yorkshire Water requires to see existing and proposed drainage layouts with pipe sizes, gradients and connection points, measured impermeable areas of the present and proposed use of the site, along with the calculations that show the existing and proposed discharge rate from the site to the public sewer.

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 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 on line or obtain an application form from our website (www.yorkshirewater.com) 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 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 WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Developer Services Team (telephone 0345 120 84 82) for further information.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. 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



We are open Monday to Friday
0800 – 1700
We are closed Bank Holidays and
Weekends

Redacted

Chris Roberts
Sewerage Technical Team
Developer Services
Tel: Redacted



UPN:	Undefined	Originator:	L MULLOCK, Safe-Move, 75 4506
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environmental
drainage solutions ltd

DRAINAGE INVESTIGATION REPORT

CLIENT CONNECT HOUSING
ASSOCIATION LTD

SITE NEWSOME MILL
HUDDERSFIELD

DATE 05/09/2022 JOB No. 8203

- **Comprehensive Site Surveys**
- **Drainage Rehabilitation**
- **Pipeline and Ancillary Installation**
- **Maintenance Programme
Appraisal & implementation**

LIBERTY STEEL MILLS, SHEFFIELD RD, S60 1BN
Telephone 0845 2300 939
email: cctv@eds.uk.net www.eds.uk.net

CCTV REPORT HEADER CODE EXPLANATION



Detailed below are explanations for the standard Water Research Council (WRC) CCTV report header codes. Whilst WRC defect codes are also included within the body of the report, they are accompanied by an explanation in the "Observation" column. Please contact Environmental Drainage Solutions on the number below if you wish to discuss any aspect of this report.

CODE	LOCATION DESCRIPTION
A	Main road - urban (town or city centre with heavy goods vehicles)
B	Main road - suburban/rural (all other roads with heavy goods vehicles)
C	Light road (rural roads with light traffic, town and city back streets, estate roads and parking areas)
D	Footpath or verge (within the highway boundary)
E	Fields (farmland and public open space)
F	Gardens (within private property)
G	Woodland
X	Difficult access (Motorway, railway, watercourse, inside building).

CODE	PIPE MATERIAL DESCRIPTION
AC	Asbestos cement
AK	Alkathene
BR	Brick
CC	Concrete box culvert
CI	Cast Iron
CO	Concrete
CSB	Concrete segments (bolted)
CSU	Concrete segments (unbolted)
DI	Ductile iron
GRC	Glass reinforced cement
GRP	Glass reinforced plastic
MAC	Masonry - in regular courses
MAR	Masonry - randomly coursed
PE	Polyethylene
PF	Pitch fibre
PP	Polypropylene
PSC	Plastic/steel composite
PVC	Polyvinyl chloride
RPM	Reinforced plastic matrix
SI	Spun (grey) iron
ST	Steel
VC	Vitrified clay (ie all clayware)
XXX	Other (state in comments)
ZZZ	Not known

CODE	PIPE SHAPE DESCRIPTION
A	Arched (with flat bottom)
B	Barrel (e.g. beer barrel shape)
C	Circular
E	Egg shaped
H	Horshoe (i.e. inverted U)
O	Oval
R	Rectangular
S	Square
T	Trapezoidal
U	U-shaped with flat top
X	Other (state in comments)

CODE	WEATHER DESCRIPTION
1	Dry
2	Heavy rain
3	Light rain
4	Showers
5	Snow

CODE	PIPE LINING DESCRIPTION
BL	Bitumen
CL	Cement
IS	Soft inversion type liner
PL	Plastic
RL	Resin
XXX	Other (state in comments)
ZZZ	Not known

CODE	PIPE USE DESCRIPTION
C	Combined
F	Foul
S	Surface Water
T	Trade Effluent
W	Watercourse
X	Other
Z	Not known

CODE	SURVEY DIRECTION DESCRIPTION
D	Downstream
U	Upstream

STRUCTURAL PERFORMANCE ASSESSMENT CRITERIA

CLAYWARE AND CONCRETE DRAINAGE

Detailed below are the criteria used for the assessment of severity of defects in accordance with the Water Research Council (WRC). Proposed remedial works are based upon these assessments in conjunction with many other issues such as nature of original problem (if any), implications of collapse (depth, location etc), frequency of surcharging, and many more. Most drainage systems exhibit structural defects of some sort and the WRC assessments can only be a guideline. In the right ground conditions, quite serious defects can be stable for many years. We aim to provide a reasonable, balanced recommendation for remedial works, based upon our experience and following consultation with the client. Please contact Environmental Drainage Solutions if you wish to discuss any aspect of this report.

DEFECT	STRUCTURAL IMPLICATION
CIRCUMFERENTIAL CRACK	MINIMAL COLLAPSE RISK IN SHORT TERM, BUT POTENTIAL FOR FURTHER DETERIORATION
MEDIUM JOINT DISPLACEMENT	MINIMAL COLLAPSE RISK IN SHORT TERM, BUT POTENTIAL FOR FURTHER DETERIORATION
MEDIUM OPEN JOINT	MINIMAL COLLAPSE RISK IN SHORT TERM, BUT POTENTIAL FOR FURTHER DETERIORATION
SLIGHT SPALLING OR WEAR	MINIMAL COLLAPSE RISK IN SHORT TERM, BUT POTENTIAL FOR FURTHER DETERIORATION
FRACTURE WITH DEFORMATION <5%	COLLAPSE UNLIKELY IN NEAR FUTURE BUT FURTHER DETERIORATION LIKELY
LONGITUDINAL OR MULTIPLE CRACKING	COLLAPSE UNLIKELY IN NEAR FUTURE BUT FURTHER DETERIORATION LIKELY
MINOR LOSS OF LEVEL (i.e. DIP IN PIPE)	COLLAPSE UNLIKELY IN NEAR FUTURE BUT FURTHER DETERIORATION LIKELY
LARGE DISPLACED JOINT	COLLAPSE UNLIKELY IN NEAR FUTURE BUT FURTHER DETERIORATION LIKELY
LARGE OPEN JOINT	COLLAPSE UNLIKELY IN NEAR FUTURE BUT FURTHER DETERIORATION LIKELY
SLIGHT SPALLING OR WEAR	COLLAPSE UNLIKELY IN NEAR FUTURE BUT FURTHER DETERIORATION LIKELY
BROKEN PIPEWORK	COLLAPSE LIKELY IN FORESEEABLE FUTURE
BROKEN PIPEWORK WITH DEFORMATION <10%	COLLAPSE LIKELY IN FORESEEABLE FUTURE
FRACTURE WITH DEFORMATION <10%	COLLAPSE LIKELY IN FORESEEABLE FUTURE
MULTIPLE FRACTURE	COLLAPSE LIKELY IN FORESEEABLE FUTURE
SERIOUS LOSS OF LEVEL	COLLAPSE LIKELY IN FORESEEABLE FUTURE
LARGE SPALLING OR WEAR	COLLAPSE LIKELY IN FORESEEABLE FUTURE
ALREADY COLLAPSED	COLLAPSED OR COLLAPSE IMMINENT
BROKEN PIPEWORK WITH DEFORMATION >10%	COLLAPSED OR COLLAPSE IMMINENT
EXTENSIVE AREAS OF FABRIC MISSING	COLLAPSED OR COLLAPSE IMMINENT
FRACTURE WITH DEFORMATION >10%	COLLAPSED OR COLLAPSE IMMINENT

CCTV REPORT SUMMARY



SITE ADDRESS: NEWSOME MILL HUDDERSFIELD

DATE: 05/09/2022

No.	FROM	TO	DIR	DIA(MM)	JET	COMMENTS
1	EDS1	EDS3	U	300		
2	EDS1	EDS2	D	300		
3	EDS1	BR B	U	150		
4	EDS4	EDS5	D	225		
5	EDS5	EDS4	D	225		
6	EDS9	BR A	U	150		
7	EDS9	BR B	U	150		
8	EDS9	BR X	D	150		
9	EDS6	EDS2	D	450		
10	EDS8	EDS6	D	300		
11	EDS8	EDS10	U	225		

CCTV REPORT SHEET

Client:	CONNECT HOUSING ASSOCIATION LTD	Sheet No:	1
Site:	NEWSOME MILL, HUDDERSFIELD	Date:	05/09/2022

Job No.	Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.
8203	KB	C	1		C		1

Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)
EDS1	2.46	EDS3	2.2	U	300	0	VC	C	

General comments	

Count	Code	Observation	Remarks
0.0	ST	Start of survey	
0.0	MH	Manhole or node	EDS1
0.0	WL	Water Level	5%
10.0	JN	Junction	100MM DIA@ 1 O'CLOCK
11.0	JN	Junction	150MM DIA@ 11 O'CLOCK
13.7	JN	Junction	150MM DIA@ 3 O'CLOCK
30.9	JN	Junction	100MM DIA@ 1 O'CLOCK
32.0	JN	Junction	150MM DIA@ 11 O'CLOCK
39.6	CXI	Intruding defective connection	100MM DIA@ 12 O'CLOCK
40.6	GO	General observation	PARTIAL BLOCKAGE 50%
42.5	WL	Water Level	40%
47.0	WL	Water Level	5%
51.4	JN	Junction	100MM DIA@ 1 O'CLOCK
52.7	JN	Junction	100MM DIA@ 11 O'CLOCK
64.7	JN	Junction	150MM DIA@ 11 O'CLOCK
73.0	JN	Junction	100MM DIA@ 1 O'CLOCK
73.8	JN	Junction	100MM DIA@ 11 O'CLOCK
87.3	MH	Manhole or node	EDS3
87.3	GO	General observation	BLOCKAGE IN CHAMBER
87.3	FH	Finish survey	

Client:		CONNECT HOUSING ASSOCIATION LTD					Sheet No:		2		
Site:		NEWSOME MILL, HUDDERSFIELD					Date:		05/09/2022		
Job No.		Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.			
8203		KB	C	1		C		1			
Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)		
EDS1	2.46	EDS2	2.55	D	300	0	VC	C			
General comments											
Count	Code	Observation			Remarks						
0.0	ST	Start of survey									
0.0	MH	Manhole or node			EDS1						
0.0	WL	Water Level			5%						
0.9	JN	Junction			150MM DIA@ 2 O'CLOCK						
3.8	CXI	Intruding defective connection			100MM DIA@ 12 O'CLOCK						
5.3	MH	Manhole or node			EDS2						
5.3	FH	Finish survey									

Client:		CONNECT HOUSING ASSOCIATION LTD					Sheet No:		3		
Site:		NEWSOME MILL, HUDDERSFIELD					Date:		05/09/2022		
Job No.		Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.			
8203		KB	C	1		C		1			
Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)		
EDS1	2.46	BR B		U	150	0	VC	C			
General comments											
		BR B = NO DEPTH (UNKNOWN)									
Count	Code	Observation			Remarks						
0.0	ST	Start of survey									
0.0	MH	Manhole or node			EDS1						
0.0	WL	Water Level			0%						
1.3	DE	Debris			5% STONES - STARTS						
2.6	DE	Debris			30% STONES						
3.1	SA	Survey abandoned			DUE TO DEBRIS						

CCTV REPORT SHEET

Client:	CONNECT HOUSING ASSOCIATION LTD						Sheet No:	4	
Site:	NEWSOME MILL, HUDDERSFIELD						Date:	05/09/2022	
Job No.	Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.		
8203	KB	C	1		C		1		
Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)
EDS4	2.05	EDS5	1.4	D	225	0	VC	C	
General comments									
Count	Code	Observation	Remarks						
0.0	ST	Start of survey							
0.0	MH	Manhole or node	EDS4						
0.0	WL	Water Level	5%						
0.1	LR	Line of pipe deviates right	MEDIUM						
3.0	LL	Line of pipe deviates left	SLIGHT						
3.9	DE	Debris	20% - PAPER/FOUL						
6.5	JDM	Medium joint displacement							
14.2	JN	Junction	150MM DIA@ 10 O'CLOCK						
25.0	JDM	Medium joint displacement							
36.9	CXI	Intruding defective connection	150MM DIA@ 3 O'CLOCK						
36.9	CM	Multiple cracks							
39.1	CXI	Intruding defective connection	100MM DIA@ 1 O'CLOCK						
41.4	JN	Junction	100MM DIA@ 11 O'CLOCK						
46.0	WL	Water Level	20%						
46.0	MH	Manhole or node	EDS5						
46.0	GO	General observation	BLOCKAGE IN MH						
46.0	FH	Finish survey							

Client:		CONNECT HOUSING ASSOCIATION LTD					Sheet No:		5		
Site:		NEWSOME MILL, HUDDERSFIELD					Date:		05/09/2022		
Job No.		Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.			
8203		KB	C	1		C		1			
Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)		
EDS5	1.4	EDS4	2.05	D	225	0	VC	C			
General comments											
Count	Code	Observation			Remarks						
0.0	ST	Start of survey									
0.0	MH	Manhole or node			EDS5						
0.0	WL	Water Level			5%						
5.0	LR	Line of pipe deviates right			SLIGHT						
7.5	LL	Line of pipe deviates left			SEVERE						
7.5	SA	Survey abandoned			UNABLE TO GO ROUND BEND						
7.5	GO	General observation			EDS4 IN VIEW						

CCTV REPORT SHEET

Client:	CONNECT HOUSING ASSOCIATION LTD						Sheet No:	6	
Site:	NEWSOME MILL, HUDDERSFIELD						Date:	05/09/2022	

Job No.	Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.
8293	KB	C	1		C		1

Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)
EDS9	1.11	BR A		U	150	0	VC	S	

General comments	
	BR A = NO DEPTH (UNKNOWN)

Count	Code	Observation	Remarks
0.0	ST	Start of survey	
0.0	MH	Manhole or node	EDS9
0.0	WL	Water Level	0%
1.9	DE	Debris	10% - ROOTS AND SOIL CONTINUES THROUGHOUT SU
2.1	CXI	Intruding defective connection	100MM DIA@ 12 O'CLOCK
2.1	DE	Debris	50%
2.1	SA	Survey abandoned	DUE TO TO DEBRIS

Client:		CONNECT HOUSING ASSOCIATION LTD					Sheet No:		7		
Site:		NEWSOME MILL, HUDDERSFIELD					Date:		05/09/2022		
Job No.		Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.			
8203		KB	C	1		C		1			
Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)		
EDS9	1.11	BR B		U	150	0	VC	S			
General comments											
		BR B = NO DEPTH (UNKNOWN)									
Count	Code	Observation			Remarks						
0.0	ST	Start of survey									
0.0	MH	Manhole or node			EDS9						
0.0	WL	Water Level			0%						
0.2	LL	Line of pipe deviates left			SEVERE						
0.7	DE	Debris			100% RUBBLE						
0.7	SA	Survey abandoned									

CCTV REPORT SHEET

Client:	CONNECT HOUSING ASSOCIATION LTD	Sheet No:	8
Site:	NEWSOME MILL, HUDDERSFIELD	Date:	05/09/2022

Job No.	Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.
8203	KB	C	1		C		1

Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)
EDS9	1.11	BR X		D	150	0	VC	S	

General comments	
	BR X = NO DEPTH (UNKNOWN)

Count	Code	Observation	Remarks
0.0	ST	Start of survey	
0.0	MH	Manhole or node	EDS9
0.0	WL	Water Level	0%
0.8	LL	Line of pipe deviates left	SLIGHT
0.8	LD	Line of pipe deviates down	SLIGHT
1.3	CM	Multiple cracks	
2.4	LL	Line of pipe deviates left	SLIGHT
2.4	LD	Line of pipe deviates down	SLIGHT
2.9	LR	Line of pipe deviates right	SEVERE
2.9	DE	Debris	50% SOIL
2.9	SA	Survey abandoned	DUE TO BEND AND DEBRIS

CCTV REPORT SHEET

Client:	CONNECT HOUSING ASSOCIATION LTD	Sheet No:	9
Site:	NEWSOME MILL, HUDDERSFIELD	Date:	05/09/2022

Job No.	Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.
8302	KB	C	1		C		1

Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)
EDS6	3.16	EDS2	2.55	D	450	0	VC	C	

General comments	

Count	Code	Observation	Remarks
0.0	ST	Start of survey	
0.0	MH	Manhole or node	EDS6
0.0	WL	Water Level	5%
2.2	CN	Connection at	150MM DIA@ 11 O'CLOCK
4.7	CN	Connection at	150MM DIA@ 12 O'CLOCK
9.4	CN	Connection at	150MM DIA@ 1 O'CLOCK
11.8	CN	Connection at	150MM DIA@ 1 O'CLOCK
12.9	CN	Connection at	150MM DIA@ 11 O'CLOCK
18.2	CN	Connection at	150MM DIA@ 11 O'CLOCK
27.1	CN	Connection at	150MM DIA@ 1 O'CLOCK
28.5	MH	Manhole or node	EDS2A - BURIED
33.2	CN	Connection at	150MM DIA@ 11 O'CLOCK
41.9	CN	Connection at	150MM DIA@ 11 O'CLOCK
53.0	CN	Connection at	150MM DIA@ 1 O'CLOCK
57.8	CN	Connection at	150MM DIA@ 1 O'CLOCK
69.4	CN	Connection at	150MM DIA@ 3 O'CLOCK
72.2	CN	Connection at	150MM DIA@ 1 O'CLOCK
72.7	CXI	Intruding defective connection	150MM DIA@ 11 O'CLOCK
74.5	MH	Manhole or node	EDS2
74.5	FH	Finish survey	

Client:		CONNECT HOUSING ASSOCIATION LTD					Sheet No:		10		
Site:		NEWSOME MILL, HUDDERSFIELD					Date:		05/09/2022		
Job No.		Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.			
8203		KB	C	1		C		1			
Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)		
EDS8	3.09	EDS6	3.16	D	300	0	VC	C			
General comments											
Count	Code	Observation			Remarks						
0.0	ST	Start of survey									
0.0	MH	Manhole or node			EDS8						
0.0	WL	Water Level			5%						
5.4	MH	Manhole or node			EDS6						
5.4	FH	Finish survey									

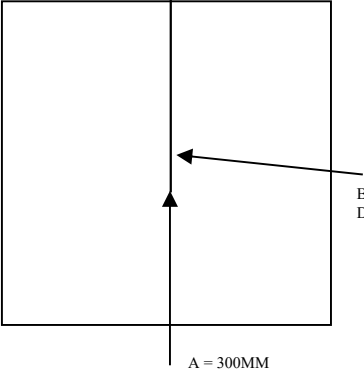
Client:		CONNECT HOUSING ASSOCIATION LTD					Sheet No:		11		
Site:		NEWSOME MILL, HUDDERSFIELD					Date:		05/09/2022		
Job No.		Operator	Location code	Weather	Pre clean	Shape	Lining	Tape No.			
8203		KB	C	1		C		1			
Start MH	Depth(m)	Finish MH	Depth(m)	Direction	Dia(mm)	Dim(mm)	Material	Use	Length(M)		
EDS8	3.09	EDS10	2.68	U	225	0	VC	C			
General comments											
Count	Code	Observation			Remarks						
0.0	ST	Start of survey									
0.0	MH	Manhole or node			EDS8						
0.0	WL	Water Level			5%						
39.2	MH	Manhole or node			EDS10						
39.2	FH	Finish survey									

MANHOLE RECORD CARD

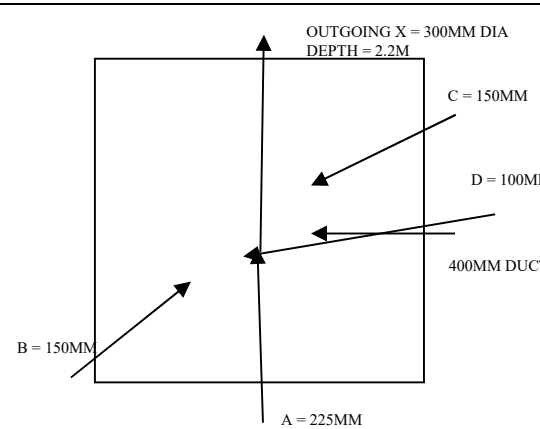


JOB No. 8203 SHEET 1 OF 4

CLIENT:- CONNECT HOUSING SITE:- NEWSOME MILL

NODE REF	EDS1	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	2.46M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

NODE REF	EDS2	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	2.55M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)	BRICK RUBBLE IN CHANNEL	

NODE REF	EDS3	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	2.2M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)	BRANCH D RUNS ALONG 400MM DUCT OBSTRUCTING FLOW IN CHAMBER	

MANHOLE RECORD CARD



JOB No. 8203 SHEET 2 OF 4

CLIENT:- CONNECT HOUSING

SITE:- NEWSOME MILL

NODE REF	EDS4	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	2.05M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

NODE REF	EDS5	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	1.4M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

NODE REF	EDS6	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	3.16M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

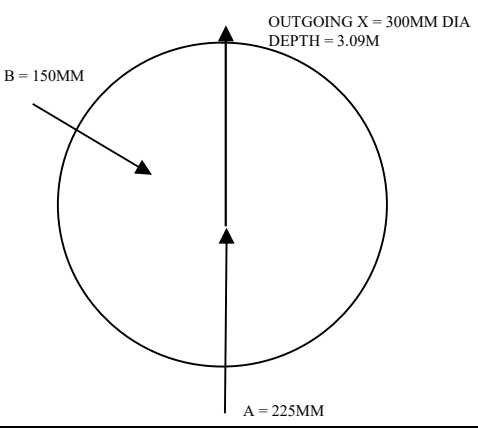
MANHOLE RECORD CARD

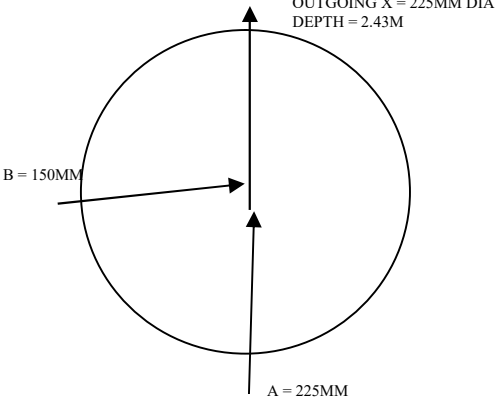


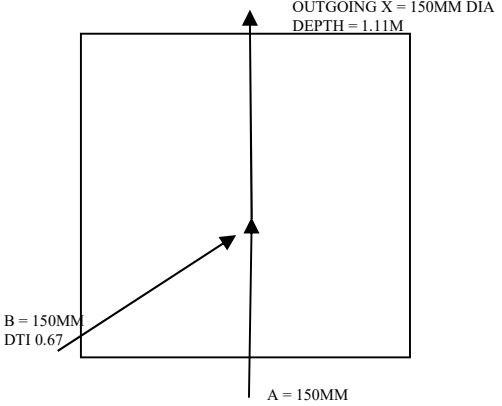
JOB No. **8203** SHEET **3** OF **4**

CLIENT:- **CONNECT HOUSING**

SITE:- **NEWSOME MILL**

NODE REF	EDS7	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	3.09M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)	BR B FROM ROAD GULLY	

NODE REF	EDS8	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	2.43M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

NODE REF	EDS9	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	1.11M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

MANHOLE RECORD CARD



JOB No. 8203 SHEET 4 OF 4

CLIENT:- CONNECT HOUSING SITE:- NEWSOME MILL

NODE REF	EDS10	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	2.68M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

NODE REF	EDS11	
SURVEY DATE	05/09/22	
NODE TYPE	MH/IC/GULLY/OTHER	
STATUS	PU/PR	
FUNCTION	F/SW/C	
INVERT DEPTH(M)	1.4M	
CONSTRUCTION	BR/PCC/OTHER	
REMARKS (Photos etc)		

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP1 EDS1



GP2 EDS1 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP3 EDS2
BRICK RUBBLE IN CHANNEL



GP4 EDS2 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP5 EDS3
CABLE DUCT INTO CHAMBER. BR D OBSTRUCTING FLOW, NO
ACCESS TO CCTV SURVEY. NO VEHICULAR ACCESS.



GP6 EDS3 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP7 EDS4



GP8 EDS4 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP9 EDS5



GP10 EDS5 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



EDS6
GP11



GP12 EDS6 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



EDS7
GP13



GP14 EDS7 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



EDS8
GP15



GP16 EDS8 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP17 EDS9



GP18 EDS9 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP19 EDS10



GP20 EDS10 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP21 EDS11



GP22 EDS11 LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP23 EDS3 - VIEW UP DUCT FROM CHAMBER



GP24 EDS2A - BURIED

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP25 SERVICE DUCT



GP26 SERVICE DUCT LOCATION

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP27 NO VEHICULAR ACCESS ALONG LINE OF PUBLIC SEWER



GP28 UNABLE TO LOCATE ANY FURTHER CHAMBERS ON SITE

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

JS:- 8203



GP29 UNABLE TO LOCATE ANY FURTHER CHAMBERS ON SITE



GP30 UNABLE TO LOCATE ANY FURTHER CHAMBERS ON SITE

SITE PHOTOS

DATE :- 05/09/22



SITE :- NEWSOME MILL

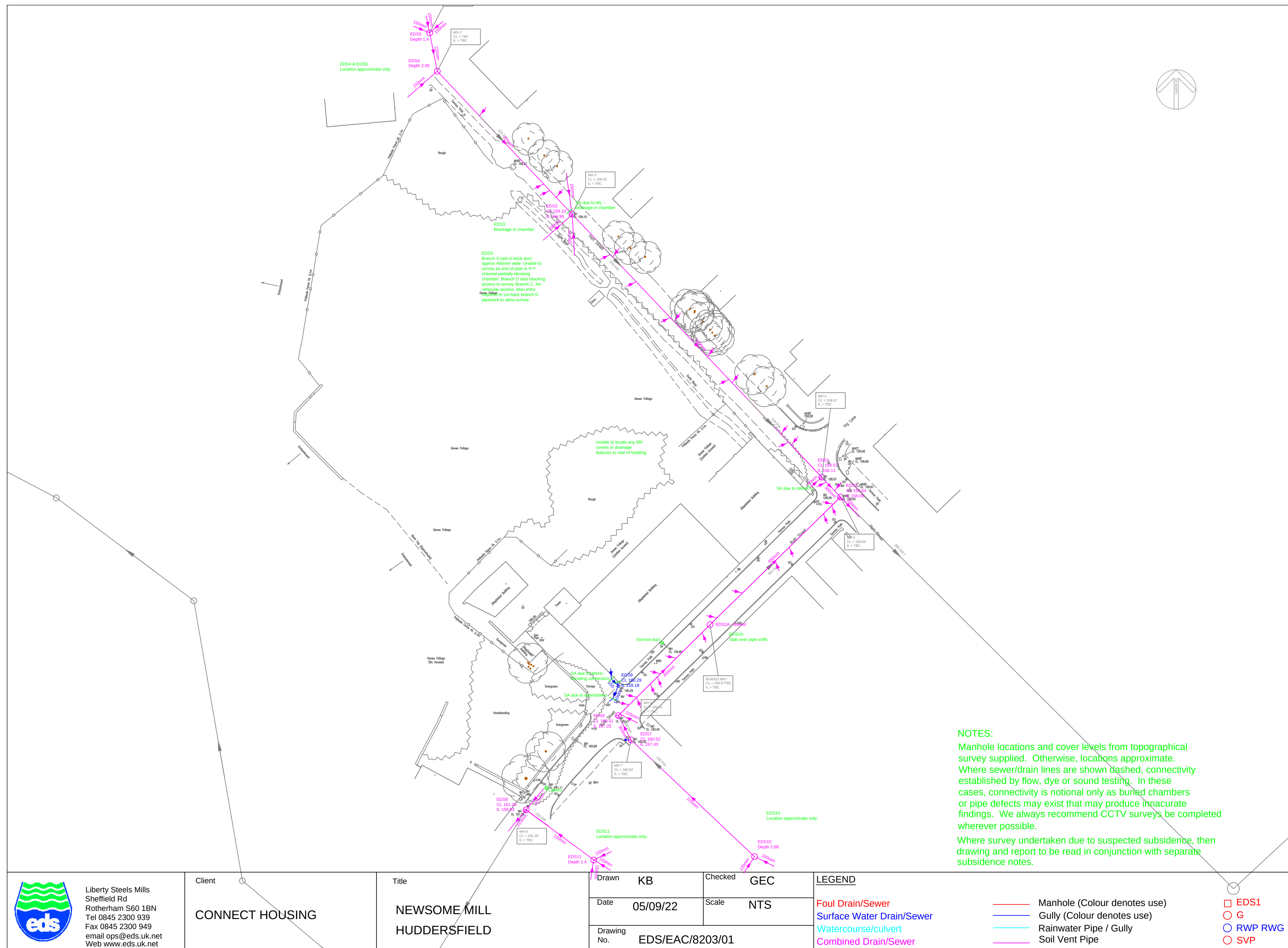
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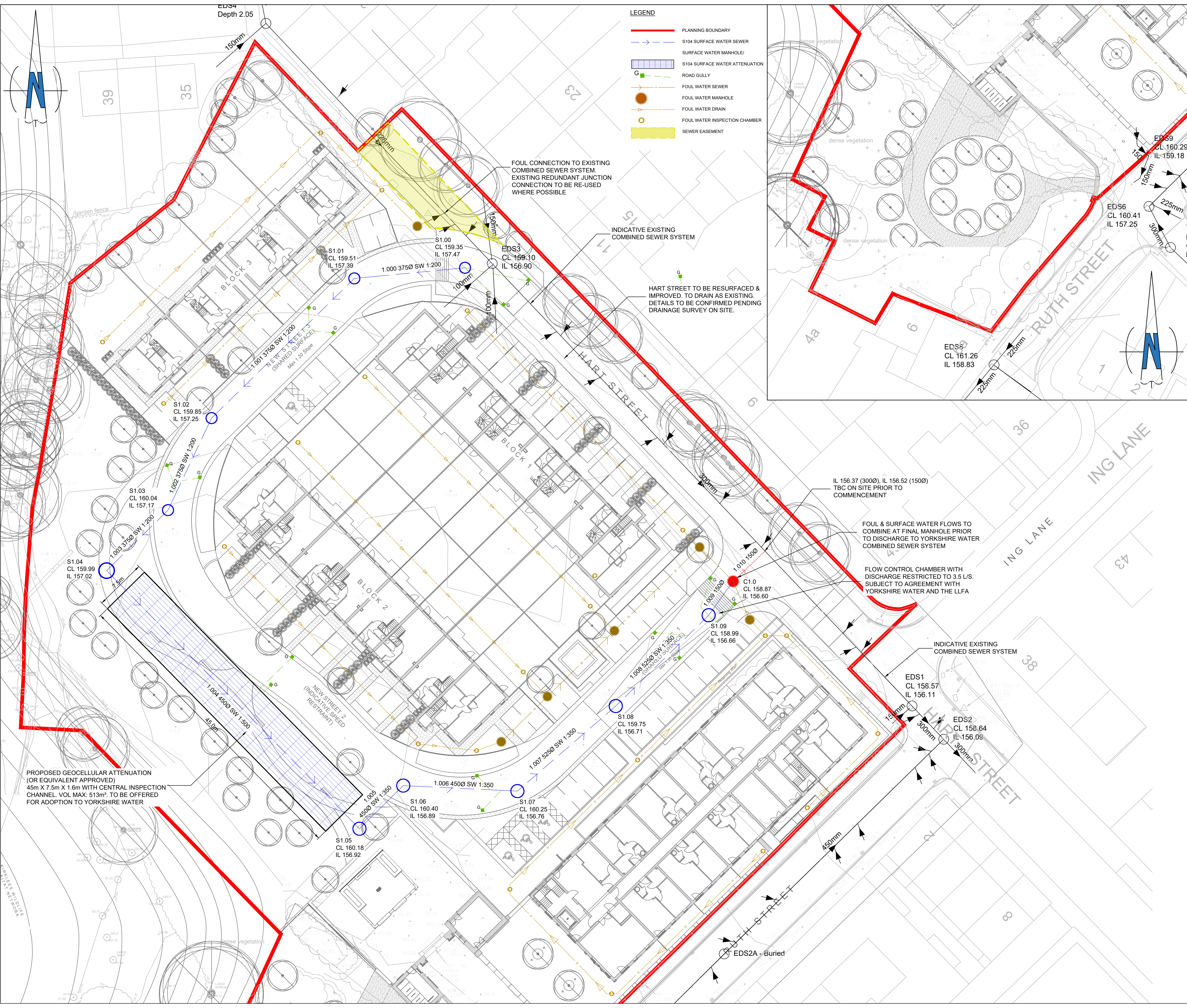
GP31 UNABLE TO LOCATE ANY FURTHER CHAMBERS ON SITE



GP32 UNABLE TO LOCATE ANY FURTHER CHAMBERS ON SITE



APPENDIX C – Drainage strategy drawings and preliminary calculations



- LEGEND**
- PLANNING BOUNDARY
 - S104 SURFACE WATER SEWER
 - SURFACE WATER MANHOLE/ S104 SURFACE WATER ATTENUATION
 - ROAD GULLY
 - FOUL WATER SEWER
 - FOUL WATER MANHOLE
 - FOUL WATER DRAIN
 - FOUL WATER INSPECTION CHAMBER
 - SEWER EASEMENT

- NOTES**
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.
 - ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
 - UNDERGROUND SERVICES ARE PRESENT IN THE AREA. DETAILS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS. REFER TO RISE GUIDANCE DOCUMENT HS47 (3rd EDITION).
 - BEFORE STARTING ANY WORKS, CONTRACTOR TO CHECK INVERT LEVELS AND POSITIONS OF EXISTING DRAINS, SEWERS, INSPECTION CHAMBERS AND MANHOLES AGAINST INFORMATION SHOWN ON THIS DRAWING.
 - ALL ADAPTABLE SEWER WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 6TH EDITION (CESWI) AS PUBLISHED BY THE UK WATER INDUSTRY RESEARCH LTD (CESWI). SEWERAGE SECTOR DESIGN & CONSTRUCTION GUIDANCE (DCG) PUBLISHED BY WATER UK AND SEVERN TRENT WATERS STANDARDS/ REQUIREMENTS/ ADDENDUMS.
 - ADAPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERB FACES AND SERVICE MARGINS.
 - ADAPTABLE SEWERS MUST HAVE A MINIMUM 5 METRES CLEARANCE FROM TREES AND HEDGES.
 - SEWERS TO BE LAID IN CLASS "B" BED & SURROUND, WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NON-VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDED ABOVE GRANULAR BED & SURROUND.
 - THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm Ø 40kN/m, 150mm Ø 40kN/m, 225mm Ø 45kN/m AND 300mm Ø 72kN/m. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE CLASS 120 TO EN 1916BS9911-1:2002. PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
 - ADAPTABLE PLASTIC SEWER PIPES TO BE BS1 KITEMARKED (CERTIFIED TO WIS 4-35-01 AND BS EN13476). ADAPTABLE PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
 - ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH BS EN 752 AND BUILDING REGULATIONS APPROVED DOCUMENT PART H.
 - ALL PIPES SHALL BE LAID WITH SOFFITS LEVEL (UNLESS OTHERWISE SHOWN) AND ALL MANHOLE/ INSPECTION CHAMBER INVERT LEVELS SHOWN ARE FOR THE OUTLET PIPE (UNLESS OTHERWISE SHOWN). PIPE RUNS SHALL BE LAID TO THE LEVELS INDICATED, AND ALL PIPE GRADIENTS INDICATED ARE APPROXIMATE.
 - THE PROPOSED COVER LEVELS SHOWN ARE APPROXIMATE AND SHOULD BE SET TO SUIT THE FINAL FINISHED SURFACE LEVEL BY THE CONTRACTOR.
 - POSITIONS OF SOIL PIPES, STUBSTACKS, WC OUTLETS, RWP's ETC TO BE CHECKED AGAINST HOUSETYPE LAYOUTS.
 - FOR PRIVATE DRAINS WHERE COVER IS LESS THAN 900mm IN VEHICULAR AREAS OR 600mm IN OTHER AREAS, PROTECTION ON THE FORM OF CLASS 2 CONCRETE SURROUND TO BE USED.
 - WHERE DRAINS PASS WITHIN 1m OF BUILDINGS, THE PIPE IS TO BE PROVIDED WITH CONCRETE PROTECTION AND TRENCH BACKFILLED WITH CONCRETE UP TO A LEVEL BELOW THE BUILDING EQUAL TO THE DISTANCE FROM THE BUILDING LESS 150mm.
 - ALL GULLIES AND RWPs CONNECTED DIRECTLY TO DRAINS SHALL BE ROADABLE.
 - ALL PRIVATE PLOT DRAINAGE TO BE 100mm UNLESS NOTED OTHERWISE AND ALL CONNECTIONS TO S104 SEWERS SHALL BE 150mm UNLESS NOTED OTHERWISE.
 - ALL PIPES UNDER BUILDINGS WITHOUT SUSPENDED FLOORS SHALL HAVE CLASS 3 BED & SURROUND AND SHALL BE LAID AT GRADIENTS OF 1:40 MIN. FOR FOUL PIPEWORK AND 1:60 MIN. FOR SURFACE WATER UNLESS NOTED OTHERWISE. ALL UNDERSLAB DRAINS SHALL BE CLEAR OF FOUNDATIONS UNLESS SHOWN OTHERWISE. USE OF SHORT/ LONG RADIUS BENDS IS ACCEPTABLE PROVIDED THEY ARE KEPT TO A MINIMUM AND USED WHERE UNAVOIDABLE.
 - ALL PRIVATE INSPECTION CHAMBERS SITED IN PRIVATE VEHICULAR AREAS TO HAVE MINIMUM B125 COVER AND FRAME.
 - ALL ADAPTABLE INSPECTION CHAMBERS IN ADAPTABLE VEHICULAR AREAS TO HAVE D400 COVER AND FRAME.
 - THE INVERT LEVEL OF A RODDING EYE AT THE HEAD OF A SURFACE WATER DRAIN IS TO BE SET 450mm BELOW FINISHED GROUND LEVEL UNLESS NOTED OTHERWISE.
 - AT LEAST ONE SOIL PIPE AT THE HEAD OF EACH FOUL RUN SHALL BE VENTED TO THE ATMOSPHERE. ALL RAINWATER PIPES SHALL HAVE ABOVE GROUND RODDING ACCESS.
 - NO FOUL BACKDROPS TO BE IMPLEMENTED/ INSTALLED ON THE ADAPTABLE PUBLIC FOUL AND SURFACE WATER SEWER.
 - TEMPORARY GRILLS ARE TO BE INSTALLED PRIOR TO CONSTRUCTION TO PROTECT THE EXISTING NETWORK.

JB	4	ISSUED FOR APPROVAL	30/06/26
Checked	Revisions	Description	Date

Client
TRUE NORTH PARTNERSHIPS LTD & CONNECT HOUSING ASSOCIATION LTD

Job Title
NEWSOME MILLS HUDDERSFIELD

BRIGHT

YOUNG

Consulting Limited

Tel: 01484 487950
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The Media Centre, 7 Northumberland Street, Huddersfield, HD1 1RL

Email: info@brightyoung.co.uk
Web: www.brightyoung.co.uk

Drawing Title
FEASIBILITY ASSESSMENT

OUTLINE DRAINAGE STRATEGY

Scale	Date	Drawn	Checked
1:250	01/26	ARJ	JB
Drg No.	21197/0500		Rev
			4

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	30	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	150	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min vel for Auto Design only (m/s)	1.00
volumetric Runoff Coeff.	1.000	Min Slope for optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.360	4-8	0.261

Total Area Contributing (ha) = 0.621

Total Pipe Volume (m³) = 29.307

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	16.059	0.080	200.0	0.071	4.00	0.0	0.600	o	375	Pipe/Conduit	
S1.001	28.849	0.144	200.0	0.086	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.002	14.702	0.074	200.0	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.003	14.925	0.075	200.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.004	52.182	0.104	500.0	0.090	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.005	11.348	0.032	350.0	0.071	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.006	16.506	0.047	350.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.007	18.783	0.054	350.0	0.185	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.008	18.757	0.054	350.0	0.059	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.009	6.040	0.060	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.010	6.367	0.081	78.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	121.10	4.21	157.475	0.071	0.0	0.0	0.0	1.28	141.1	31.0
S1.001	117.52	4.59	157.395	0.157	0.0	0.0	0.0	1.28	141.1	66.6
S1.002	115.80	4.78	157.250	0.216	0.0	0.0	0.0	1.28	141.1	90.3
S1.003	114.12	4.97	157.177	0.216	0.0	0.0	0.0	1.28	141.1	90.3
S1.004	106.60	5.94	157.027	0.306	0.0	0.0	0.0	0.90	143.5	117.8
S1.005	105.37	6.11	156.923	0.377	0.0	0.0	0.0	1.08	171.9	143.4
S1.006	103.64	6.37	156.891	0.377	0.0	0.0	0.0	1.08	171.9	143.4
S1.007	101.92	6.63	156.768	0.562	0.0	0.0	0.0	1.19	257.9	206.8
S1.008	100.28	6.89	156.715	0.621	0.0	0.0	0.0	1.19	257.9	224.9
S1.009	122.19	4.10	156.661	0.000	3.5	0.0	0.0	1.00	17.8	3.5
S1.010	121.25	4.19	156.601	0.000	3.5	0.0	0.0	1.13	20.1	3.5



Designed by ARJ
Checked by JB

Network 2020.1.3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1.00	159.350	1.875	Open Manhole	1500	S1.000	157.475	375				
S1.01	159.510	2.115	Open Manhole	1500	S1.001	157.395	375	S1.000	157.395	375	
S1.02	159.850	2.600	Open Manhole	1500	S1.002	157.250	375	S1.001	157.250	375	
S1.03	160.050	2.873	Open Manhole	1500	S1.003	157.177	375	S1.002	157.177	375	
S1.04	160.240	3.213	Open Manhole	1800	S1.004	157.027	450	S1.003	157.102	375	
S1.05	160.240	3.317	Open Manhole	1800	S1.005	156.923	450	S1.004	156.923	450	
S1.06	160.380	3.489	Open Manhole	1800	S1.006	156.891	450	S1.005	156.891	450	
S1.07	160.250	3.482	Open Manhole	1800	S1.007	156.768	525	S1.006	156.843	450	
S1.08	159.750	3.035	Open Manhole	1800	S1.008	156.715	525	S1.007	156.715	525	
S1.09	158.990	2.329	Open Manhole	1800	S1.009	156.661	150	S1.008	156.661	525	
SC1.0	158.870	2.269	Open Manhole	1200	S1.010	156.601	150	S1.009	156.601	150	
S	158.850	2.330	Open Manhole	0		OUTFALL		S1.010	156.520	150	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.071	0.071	0.071
1.001	-	-	100	0.086	0.086	0.086
1.002	-	-	100	0.059	0.059	0.059
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.090	0.090	0.090
1.005	-	-	100	0.071	0.071	0.071
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.185	0.185	0.185
1.008	-	-	100	0.059	0.059	0.059
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.621	0.621	0.621

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
		Number of Storage Structures	1
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	30	Cv (Summer)	1.000
Region	England and wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S1.09, DS/PN: S1.009, Volume (m³): 9.6

Unit Reference	MD-SHE-0079-3500-1750-3500
Design Head (m)	1.750
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	79
Invert Level (m)	156.661
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.750	3.5	Kick-Flo®	0.700	2.3
Flush-Flo™	0.341	2.9	Mean Flow over Head Range	-	2.8

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)	Depth (m)	Flow (l/s)
0.100	2.2	0.800	2.4	2.000	3.7	4.000	5.1	7.000	6.7
0.200	2.7	1.000	2.7	2.200	3.9	4.500	5.4	7.500	6.9
0.300	2.9	1.200	2.9	2.400	4.0	5.000	5.7	8.000	7.1
0.400	2.9	1.400	3.2	2.600	4.2	5.500	6.0	8.500	7.3
0.500	2.8	1.600	3.4	3.000	4.5	6.000	6.2	9.000	7.5
0.600	2.6	1.800	3.5	3.500	4.8	6.500	6.5	9.500	7.7

Storage Structures for Storm

Cellular Storage Manhole: S1.05, DS/PN: S1.005

Invert Level (m) 156.848 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	337.5	337.5	1.600	337.5	526.5	1.601	0.0	526.5

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR M5-60 (mm)	Cv (Summer)	1.000
Region	England and Wales	Ratio R	0.350 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 40, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1.00	15 Summer	2	+0%	30/15 Summer				157.573	-0.277	0.000
S1.001	S1.01	15 Summer	2	+0%	30/15 Summer				157.523	-0.247	0.000
S1.002	S1.02	15 Summer	2	+0%	30/15 Summer				157.412	-0.213	0.000
S1.003	S1.03	15 Summer	2	+0%	30/15 Summer				157.337	-0.214	0.000
S1.004	S1.04	15 Summer	2	+0%	30/15 Summer				157.233	-0.244	0.000
S1.005	S1.05	960 Summer	2	+0%	30/60 Summer				157.180	-0.193	0.000
S1.006	S1.06	960 Summer	2	+0%	30/15 Summer				157.180	-0.161	0.000
S1.007	S1.07	30 Summer	2	+0%	30/15 Summer				157.258	-0.036	0.000
S1.008	S1.08	30 Summer	2	+0%	2/30 Summer				157.260	0.020	0.000
S1.009	S1.09	30 Summer	2	+0%	2/15 Summer				157.259	0.448	0.000
S1.010	SC1.0	4320 Winter	2	+0%					156.642	-0.109	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00	0.15			16.5	OK	
S1.001	S1.01	0.25			30.8	OK	
S1.002	S1.02	0.39			41.3	OK	
S1.003	S1.03	0.38			41.1	OK	
S1.004	S1.04	0.42			55.5	OK	
S1.005	S1.05	0.05		574	6.3	OK	
S1.006	S1.06	0.05			6.1	OK	
S1.007	S1.07	0.07			14.5	OK	
S1.008	S1.08	0.06			12.9	SURCHARGED	
S1.009	S1.09	0.19			2.9	SURCHARGED	
S1.010	SC1.0	0.17			2.9	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
		Number of Storage Structures	1
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	Cv (Summer)	1.000
Region	England and Wales	Ratio R	0.350
		Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second	Increment (Extended)	
DTS Status			ON
DVD Status			ON
Inertia Status			OFF
Profile(s)		Summer and Winter	
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080		
Return Period(s) (years)		2, 30, 100	
Climate Change (%)		0, 40, 45	

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1.00	960 winter	30	+40%	30/15 Summer				157.949	0.099	0.000
S1.001	S1.01	960 winter	30	+40%	30/15 Summer				157.949	0.179	0.000
S1.002	S1.02	960 winter	30	+40%	30/15 Summer				157.949	0.324	0.000
S1.003	S1.03	960 winter	30	+40%	30/15 Summer				157.949	0.397	0.000
S1.004	S1.04	960 winter	30	+40%	30/15 Summer				157.948	0.471	0.000
S1.005	S1.05	960 winter	30	+40%	30/60 Summer				157.948	0.575	0.000
S1.006	S1.06	960 winter	30	+40%	30/15 Summer				157.969	0.629	0.000
S1.007	S1.07	960 winter	30	+40%	30/15 Summer				157.991	0.698	0.000
S1.008	S1.08	960 winter	30	+40%	2/30 Summer				157.999	0.759	0.000
S1.009	S1.09	960 winter	30	+40%	2/15 Summer				158.001	1.190	0.000
S1.010	SC1.0	960 winter	30	+40%					156.644	-0.107	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00	0.02			2.7	SURCHARGED	
S1.001	S1.01	0.05			5.9	SURCHARGED	
S1.002	S1.02	0.08			8.1	SURCHARGED	
S1.003	S1.03	0.08			8.1	SURCHARGED	
S1.004	S1.04	0.09			11.5	SURCHARGED	
S1.005	S1.05	0.22			24.8	SURCHARGED	
S1.006	S1.06	0.16			20.6	SURCHARGED	
S1.007	S1.07	0.08			15.4	SURCHARGED	
S1.008	S1.08	0.05			9.1	SURCHARGED	
S1.009	S1.09	0.21			3.1	SURCHARGED	
S1.010	SC1.0	0.18			3.1	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
		Number of Storage Structures	1
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	Cv (Summer)	1.000
Region	England and Wales	Ratio R	0.350
		Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second	Increment (Extended)	
DTS Status			ON
DVD Status			ON
Inertia Status			OFF
Profile(s)		Summer and Winter	
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080		
Return Period(s) (years)		2, 30, 100	
Climate Change (%)		0, 40, 45	

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1.00	960 winter	100	+45%	30/15 Summer				158.387	0.537	0.000
S1.001	S1.01	960 winter	100	+45%	30/15 Summer				158.387	0.618	0.000
S1.002	S1.02	960 winter	100	+45%	30/15 Summer				158.387	0.762	0.000
S1.003	S1.03	960 winter	100	+45%	30/15 Summer				158.387	0.835	0.000
S1.004	S1.04	960 winter	100	+45%	30/15 Summer				158.386	0.909	0.000
S1.005	S1.05	960 winter	100	+45%	30/60 Summer				158.386	1.013	0.000
S1.006	S1.06	960 winter	100	+45%	30/15 Summer				158.407	1.067	0.000
S1.007	S1.07	960 winter	100	+45%	30/15 Summer				158.429	1.135	0.000
S1.008	S1.08	960 winter	100	+45%	2/30 Summer				158.437	1.197	0.000
S1.009	S1.09	960 winter	100	+45%	2/15 Summer				158.439	1.628	0.000
S1.010	SC1.0	960 winter	100	+45%					156.647	-0.104	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00	0.03			3.6	SURCHARGED	
S1.001	S1.01	0.06			7.9	SURCHARGED	
S1.002	S1.02	0.10			10.8	SURCHARGED	
S1.003	S1.03	0.10			10.5	SURCHARGED	
S1.004	S1.04	0.11			14.6	SURCHARGED	
S1.005	S1.05	0.22			24.8	SURCHARGED	
S1.006	S1.06	0.16			20.7	SURCHARGED	
S1.007	S1.07	0.08			15.9	SURCHARGED	
S1.008	S1.08	0.05			9.9	SURCHARGED	
S1.009	S1.09	0.24			3.5	SURCHARGED	
S1.010	SC1.0	0.21			3.5	OK	

APPENDIX D – Limitations

The discussion, conclusions and recommendations contained in this Report represent the professional opinions of Bright Young Consulting Limited (BYC), based upon the information listed in the Report, exercising the duty of care required of an experienced Engineering Consultant. BYC does not warrant the accuracy of the information or data forming the basis of the report and will not be responsible for any opinions which BYC has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

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