



Hinchliffe Mill, Water Street, Holmbridge, Holmfirth,
HD9 2NX

Flood Risk Assessment

For MD One Ltd

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Hinchliffe Mill, Water Street, Holmbridge, Holmfirth, HD9 2NX

Project	Flood Risk Assessment
Client	MD One Ltd
Status	Final
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EXECUTIVE SUMMARY

The Site would be expected to remain dry in all but the most extreme conditions. The consequences of flooding are acceptable, and the development would be in accordance with the requirements of the National Planning Policy Framework (NPPF). The Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the NPPF.

The Proposed Development should not therefore be precluded on the grounds of flood risk or drainage.

1.0 INTRODUCTION

1.1 Background

This Flood Risk Assessment (FRA) has been prepared by KRS Enviro at the request of MD One Ltd to support a planning application for residential uses (“the Proposed Development”) at Hinchliffe Mill, Water Street, Holmbridge, Holmfirth, HD9 2NX (“the Site”).

This FRA has been carried out in accordance with guidance contained in the National Planning Policy Framework (NPPF)¹, associated Planning Practice Guidance on flood risk and coastal change² (PPG) and the PPG ‘Site-specific flood risk assessment checklist. This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 National Planning Policy Framework (NPPF)

One of the key aims of the NPPF is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

It advises that where new development is exceptionally necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible, reduce flood risk overall. A risk-based approach is adopted at stages of the planning process, applying a source pathway receptor model to planning and flood risk. To demonstrate this, an FRA is required and should include:

- whether a Proposed Development is likely to be affected by current or future flooding from all sources;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate;
- if necessary, provide the evidence to the Local Planning Authority (LPA) that the Sequential Test can be applied; and
- whether the development will be safe and pass part c) of the Exception Test if this is appropriate.

The report findings are based upon professional judgement and are summarised below with detailed recommendations provided at the end of the report. The report includes rainfall data from the Flood Estimation Handbook (FEH) and hydrogeological information from the British

¹ Ministry for Housing, Communities and Local Government (2021) National Planning Policy Framework: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

² Communities and Local Government (2014) Planning Practice Guidance - Flood Risk and Coastal Change: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

1.3 Report Structure

This FRA has the following report structure:

- Section 2 describes the location and the existing and Proposed Development;
- Section 3 outlines the flood risk to the existing and Proposed Development;
- Section 4 outlines the mitigation measures used to reduce the overall level of flood risk;
- Section 5 provides details of the Sequential and Exception Tests; and
- Section 6 presents a summary and conclusions.

2.0 LOCATION & DEVELOPMENT DESCRIPTION

2.1 Site Location

The Site is located at Hinchliffe Mill, Water Street, Holmbridge, Holmfirth, HD9 2NX (see Figure 1). The National Grid Reference for the Site is 412727, 407097.

The Site is allocated for housing in the Kirklees Local Plan (ref: HS190), which was adopted in February 2019. The Site allocation (ref: HS190) requires that the original buildings are retained and reused as part of any development proposals. The Site is located within the Hinchliffe Mill Conservation Area.

Access to the Site is shared between Spring Lane to the south and Water Street to the north, with access along Co-op Lane and/or Dobb Lane linking the Site to Woodhead Road.

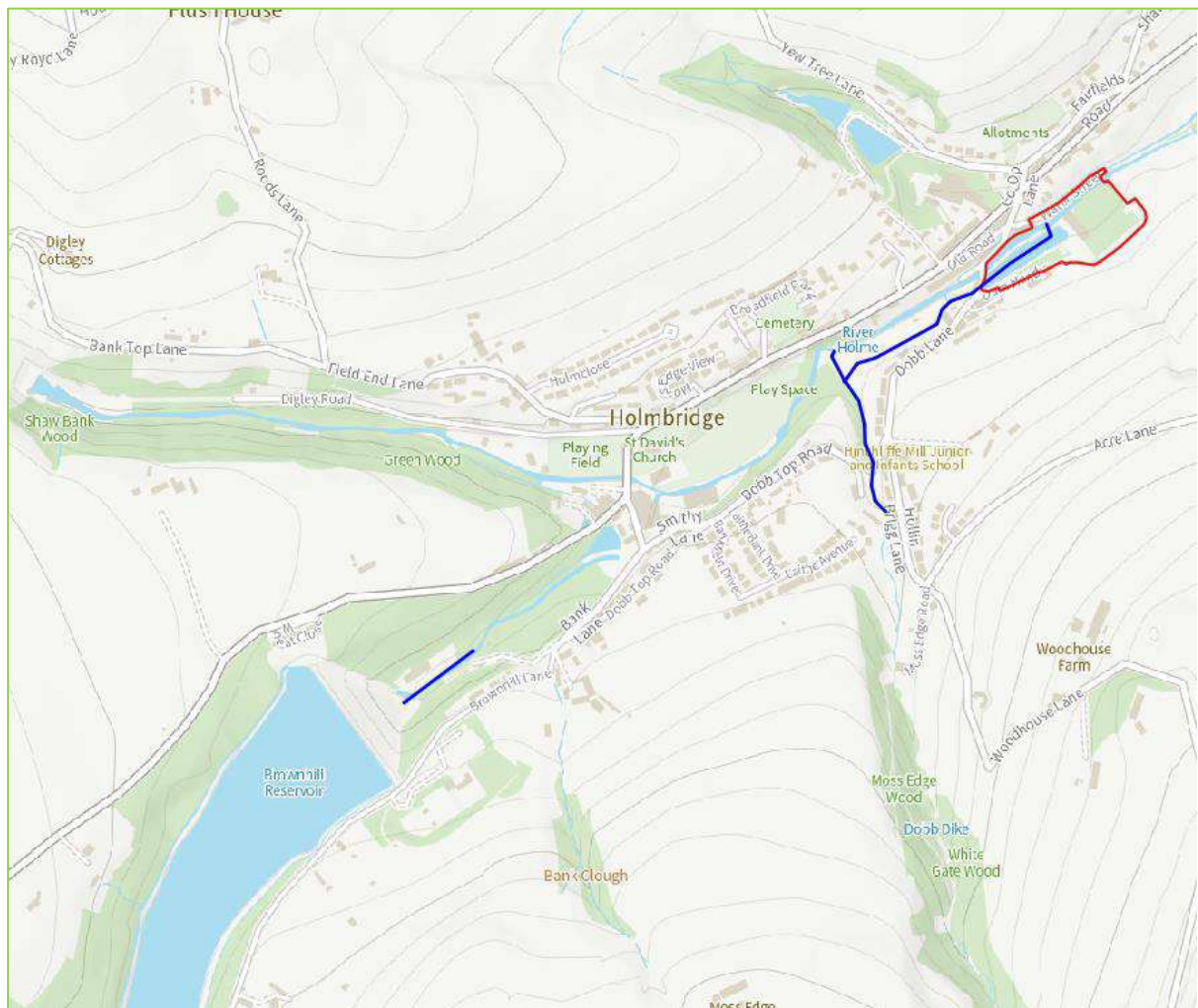


Figure 1 - Site Location

2.2 Existing Development

The Site is a former mill which has been unused for some considerable period of time. The mill building and the associated pond remain on Site with the mill pond being located to the west of the Site parallel with the River Holme.

The Site originally comprised a complex of buildings and adjoining land previously used as an “integrated” woollen mill. Various buildings were adapted / built whilst in use. However, it ceased its principal use in the late 20th Century. Demolitions since that period have left Cross Mill as the only existing building on Site. At present the Site comprises the following elements:

- Cross Mill – the only remaining building on the Site. The central part of the complex is a 2/3 storey, 18 bay long and 4 bay wide building with stone walls, stone dressings and hipped, double pitched, stone slate roofs. It is in a dilapidated, though structurally sound condition according to a report by Collinshall Green Ltd dated January 2021.
- Adjacent to the remaining building to the northeast is an area cleared of other buildings in 2011 which is now overgrown with self-set vegetation.
- Adjacent to the remaining building to the southeast is an area of land cleared of buildings and overgrown as per the above.
- Adjacent to the remaining building to the northwest is the River Holme (which runs through the Site from northeast to southwest) with a bridge over and, beyond it, most of the access road of Water Street (although the Site boundary does not include the terraced houses on Water Street).
- Adjacent to the remaining building to the southwest is the former mill pond with its surrounds.
- To the southeast of the mill pond is another access road into the Site (Spring Lane) which also permits access to dwellings not within the Site boundary.

The Site has two existing bridges (one pedestrian to east of Site and one central with access for vehicles from Water Street) over the River Holme and a third adopted highways bridge is located upstream beyond the western boundary of the Site.

2.3 Proposed Development

It is understood the Proposed Development is a residential development of 19 dwellings (part conversion, part new build) (see Appendix 1). The proposals include the conversion of the existing mill building to 7 dwellings, the erection of a further 12 dwellings (total 19 unit), the formation and improvement to access roads, parking for 58 cars (43 spaces / 15 garage spaces) and associated landscaping.

Units 1 and 2 comprise of two house types, both of which are two-storey 4-bed detached properties (Unit 1 having an additional sun room) and with contemporary northlight-style double bay roofs. These dwellings would be accessed via Spring Lane and are located directly south of and adjacent to the mill pond. Each dwelling would have three designated parking spaces and private outdoor amenity space.

The proposed mill conversion units (units 3-9) are located in the former mill building and are all 3/4- bed ‘terraced’ properties. Vehicular access to these units would be via Water Street and the existing bridge over the River Holme. Unit’s 3 to 5 would utilise the top two storeys of the former mill building, whilst the other units would occupy all three floors, and have two parking spaces and utility space in the basement area. Each unit would have a minimum of two or three parking spaces each. Each unit would also have its own outdoor private amenity space on the south-western side of the building.

Units 10-16 comprise of two detached house types in contemporary north-light style (Unit 16 having an additional projecting side window facing north-east), all of which are three-storey, and offer 3 or 4 bed accommodation (the fourth bed potentially a home office or vice versa).

The dwellings would be located east of the mill facing towards the River Holme with vehicular access via Water Street. Each unit would have two or three designated off-street car parking spaces, including a detached garage per unit. Each dwelling would also have its own outdoor private amenity space.

Units 17-19 would be positioned on the upper section of the Site, also east of the mill, and would be accessed via Spring Lane. Each two storey unit is slightly different in design (contemporary north-light style) with Unit's 17 & 18 being three bed and Unit 19 four bed. At least two off-street parking spaces, plus visitor spaces would be located in a dedicated parking court to the west of the properties, and private outdoor amenity space.

Further details with regard to the Proposed Development can be found in the accompanying information submitted with the planning application.

2.4 Ground Levels

A topographical survey of the Site and local watercourses has recently been completed (see Appendix 2). The ground level of the Site falls from west to east, with ground levels between 170 metres Above Ordnance Datum and 167mAOD. The top of bank level at the west of the Site is 169.05mAOD and at the east of the Site is 163.55mAOD. Dobb Lane at the entrance to the Site has a ground level of 170mAOD and the ground level of Water Street rises rapidly to the junction with Dobb Lane/Co-op Lane with ground levels of over 170mAOD.

2.5 Catchment Hydrology

The River Holme flows adjacent to the north of the Site and flows in an easterly direction, a mill leat and mill pond are both located within the Site, and the Dobb Dike is located approximately 300m to the south west of the Site where it joins the River Holme. There are no other watercourses evident either on, or within the vicinity of the Site.

The River Holme is characterised by steep walled sides along sections of the reach with fast flows within the main channel. The upstream catchment measures approximately 24km² and includes two large artificial reservoir complexes, namely Digley Reservoir and Brownhill / Ramsden / Yateholme Reservoir.

2.6 Ground Conditions

The Site is likely to be underlain by Made Ground. The British Geological Survey (BGS) map³ shows that the bedrock deposits underneath the Site consist of Upper Kinderscout Grit - sandstone. Sedimentary bedrock formed between 322 and 321.5 million years ago during the Carboniferous period. No superficial deposits are shown to underlie the Site.

Information from the National Soil Resources Institute⁴ details the Site area as being situated on freely draining slightly acid loamy soils.

³ https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.14476159.932338379.1655890995-1831306757.1655472887

⁴ <http://www.landis.org.uk/soilscapes/>

3.0 FLOOD RISK

3.1 Sources of Flooding

All sources of flooding have been considered, these are; fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

3.2 Environment Agency

The Flood and Water Management Act 2010 gives the Environment Agency a strategic overview role for all forms of flooding and coastal erosion. They also have direct responsibility for the prevention, mitigation and remediation of flood damage for main rivers and coastal areas. The Environment Agency is the statutory consultee with regards to flood risk and planning. Environment Agency Flood Risk Standing Advice for England, the NPPF and Planning practice Guidance to the NPPF has been consulted and reviewed during this FRA.

Information regarding the current flood risk at the Site and local flood defences has been obtained from the Environment Agency (see Appendix 3). The existing Environment Agency hydraulic model of the River Holme has been updated and extended to inform the flood risk at the Site (see Appendix 4). New topographical survey data along three distinct river sections, the River Holme, Dobb Dike and mill leat has been obtained to supplement a survey conducted in 2005 of the River Holme (included within the existing Environment Agency hydraulic model).

3.3 Kirklees Council

Kirklees Council is the Local Planning Authority (LPA), and the Lead Local Flood Authority (LLFA) and has responsibilities for 'local flood risk', which includes surface runoff, groundwater and ordinary watercourses. Planning guidance written by Kirklees Council regarding flood risk was consulted to assess the mitigation policies in place. The Kirklees Council Strategic Flood Risk Assessment (SFRA) and the Kirklees Council Preliminary Flood Risk Assessment (PFRA) which cover the Site have been reviewed.

3.4 Historic Flooding

A search on the British Hydrological Society Chronology of British Hydrological Events website⁵ found records of significant flooding of the River Holme in 1738, 1777, 1821, 1822, 1852, and 1944. It could not be established whether the Site was affected by all the recorded flood events. The 1852 flood event was as a result of the embankment of the Bilberry reservoir collapsing causing the deaths of 81 people. Cottages adjacent to the mill on Water Street were swept away. Many of these perished in the area immediately around the mill and the mill itself suffered flood damage.

Environment Agency data and the Kirklees Council SFRA mapping (see Figure 2) shows that the Site has not historically flooded.

⁵ <http://www.dundee.ac.uk/geography/cbhe/>

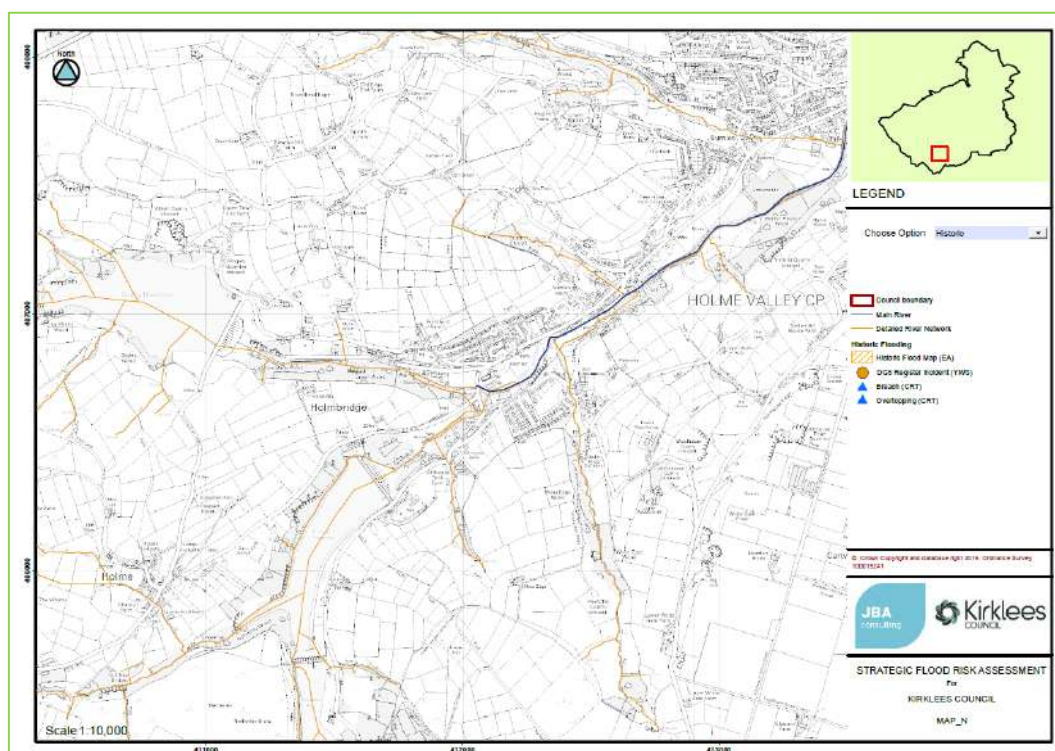


Figure 2 - Historic Flood Map

3.5 Existing and Planned Flood Defence Measures

Environment Agency data confirms that the Site is protected against flooding by existing flood defence measures. The risk from the all source of flooding will need to be further managed and mitigated by using a number of flood risk mitigation measures to reduce the overall flood risk at the Site (see Section 4.0).

3.6 Environment Agency Flood Zones

A review of the Environment Agency's Flood Zones indicates that the Site is located within Flood Zones 1, 2 and 3 and therefore has a 'low to high probability' of flooding as shown in Figures 3 and 4.

It should be noted that Flood Zone 3 is associated with areas immediately adjacent to the River Holme, mill leat and mill pond and the proposed residential buildings will be located away from these flood sources.

The Site is not located within Flood Zone 3b 'Functional Floodplain'. Flood Zone 3b 'Functional Floodplain' is defined as those areas in which "water has to flow or be stored in times of flood". However, areas which are developed are not considered as Flood Zone 3b 'Functional Floodplain'. The Site is currently developed and is therefore designated as Flood Zone 3a.

The Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development. They show the worst-case scenario.

The Environment Agency Flood Zones and acceptable development types are explained in Table 1. Table 1 shows that some development types are generally acceptable in Flood Zones

1, 2 and 3a. It should be noted that the majority of the proposed buildings are to be located within Flood Zone 1.

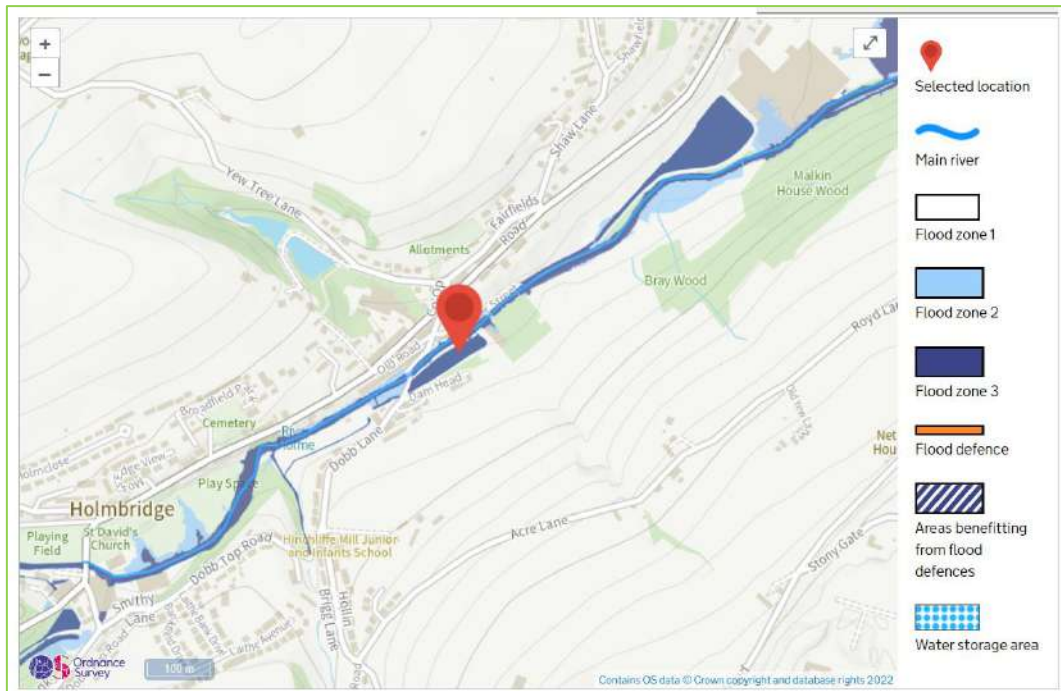


Figure 3 - Environment Agency Flood Zones

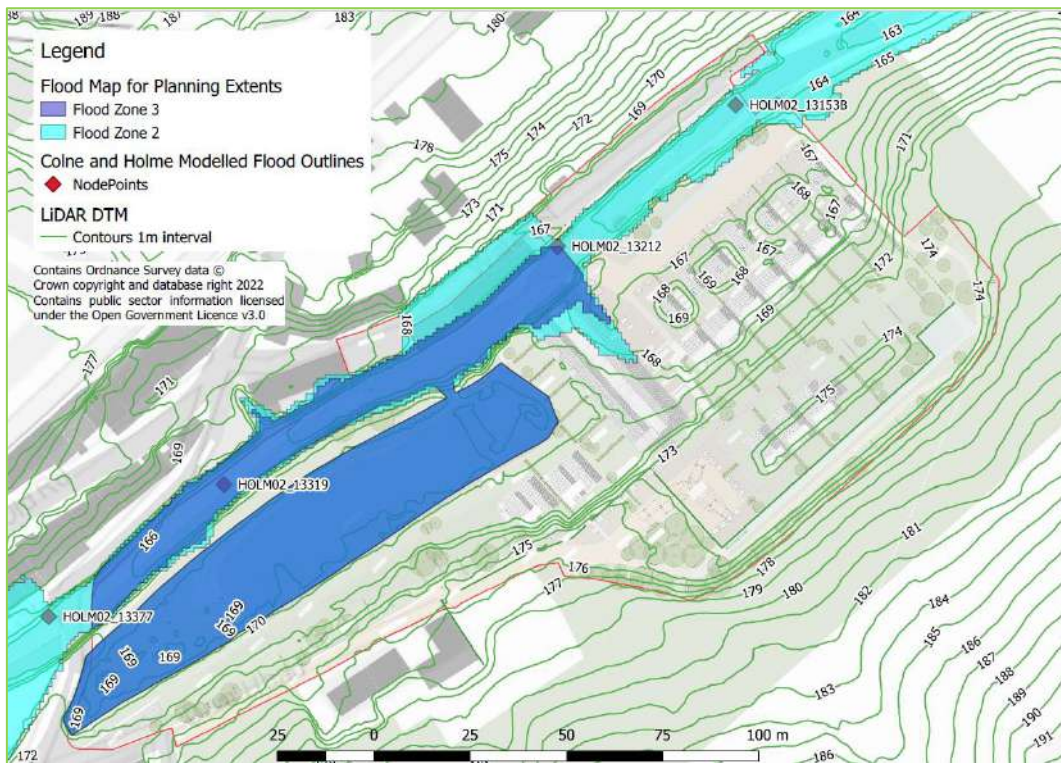


Figure 4 - Environment Agency Flood Zones

Table 1 - Environment Agency Flood Zones and Appropriate Land Use

Flood Zone	Probability	Explanation	Appropriate Land Use
Zone 1	Low	Less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%)	All development types generally acceptable
Zone 2	Medium	Between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% 0.1%) in any year	Most development type are generally acceptable
Zone 3a	High	A 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year	Some development types not acceptable
Zone 3b	'Functional Floodplain'	Land where water has to be flow or be stored in times of flood. SFRA should identify this zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1% flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes)	Some development types not acceptable

3.7 Kirklees Council Strategic Flood Risk Assessment

A review of the Kirklees Council SFRA mapping indicates that the Site is located within Flood Zone 2 and therefore has a 'medium probability' of flooding as shown in Figure 5, with between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% 0.1%) in any year.

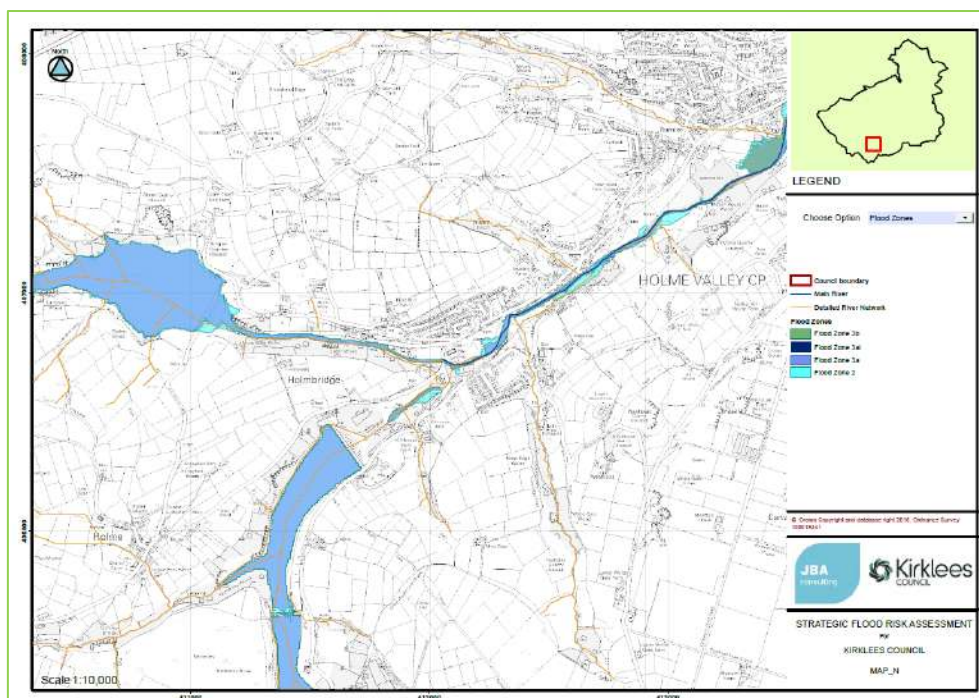


Figure 5 - Kirklees Council SFRA Flood Zones

3.8 Flood Vulnerability

In the Planning Practice Guidance to the NPPF, appropriate uses have been identified for the Flood Zones. Applying the Flood Risk Vulnerability Classification in the Planning Practice Guidance to the NPPF, the proposed use is classified as ‘more vulnerable’.

The only viable use of the Site would be ‘highly vulnerable’ or ‘more vulnerable’ such as residential purposes. The Site is allocated for housing in the Kirklees Local Plan (ref: HS190), which was adopted in February 2019. The Site allocation (ref: HS190) requires that the original buildings are retained and reused as part of any development proposals. The Site is located within the Hinchliffe Mill Conservation Area.

Table 2 of this report and the Planning Practice Guidance to the NPPF state that ‘more vulnerable’ uses are appropriate within Flood Zones 1, 2 and 3a after the completion of a satisfactory FRA. It should be noted that the majority of the proposed buildings are to be located within Flood Zone 1.

Table 2 - Flood Risk Vulnerability and Flood Zone ‘Compatibility’

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception test required	✓	✓
Zone 3a	Exception test required	✓	✗	Exception test required	✓
Zone 3b ‘Functional Floodplain’	Exception test required	✓	✗	✗	✗

Key: ✓: Development is appropriate, ✗: Development should not be permitted.

3.9 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within the NPPF recommends that the effects of climate change are incorporated into FRA’s. Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the flood risk assessments: climate change allowances guidance⁶.

The flood risk assessments: climate change allowances guidance recommends that for ‘more vulnerable’ uses is that the central allowances are used to assess climate change throughout the lifetime of the development which is 100 years. Table 3 shows the peak river flow allowances by river management catchment. Therefore, the design event for the Site is the 1 in 100 year (+23%) event.

⁶ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#high-allowances>

Table 3 - Peak River Flow Allowances by River Management Catchment

River Catchment	Allowance Category	2020s	2050s	2080s
Aire and Calder Management Catchment	Upper	+24%	+31%	+51%
	Higher	+15%	+18%	+31%
	Central	+11%	+13%	+23%

3.10 Fluvial (River) Flooding

The principal flood risk posed to the Site is from fluvial flooding from the River Holme. Table 4 shows the Environment Agency modelled water levels for the Site from the River Colne & Holme Flood Mapping Study, Flood Estimation, Modelling and Floodplain Mapping from March 2006. The modelled water levels have been compared to the ground level of the Site and areas within the vicinity of the Site to assess the flood risk at the Site in detail. Node 13377 is located at the upstream extent of the Site and node 13153B is located at the downstream extent of the Site.

For all events up to and including the 1 in 100 year event the flow would be contained with the channel of the River Holme and the Site would be flood free during the 1 in 100 year event. During the 1 in 1000 year event very minor (1,1000m²) flooding may occur on the Site, not including the area occupied by the mill pond.

Table 4 - Environment Agency 2006 Modelled Water Levels (mAOD)

Node	Return Period (yrs)				
	10	25	50	100	1000
13377	167.65	167.96	168.16	168.49	170.32
13319	166.72	166.97	167.14	167.45	169.06
13212	165.66	166.04	166.34	166.82	168.94
13153B	164.56	164.76	164.87	165.01	165.39

Table 5 shows the Environment Agency modelled water levels and flows for the Site from the ASM River Colne & Holme - Flood Modelling report from 2010. For all events up to and including the 1 in 100 year event the flow would be contained with the channel of the River Holme and the Site would be flood free during the 1 in 100 year event.

Table 5 - Environment Agency 2010 Modelled Water Levels (mAOD)

Node	Parameter	Return Period (yrs)				
		10	25	50	75	100
13377	Water Level (mAOD)	168.01	168.44	168.91	169.21	169.42
	Flow (m ³ /s)	39.12	49.94	59.44	64.75	68.10
13319	Water Level (mAOD)	167.00	167.39	167.82	168.13	168.36
	Flow (m ³ /s)	39.12	49.94	59.43	64.74	68.10
13212	Water Level (mAOD)	166.10	166.73	167.37	167.81	168.11
	Flow (m ³ /s)	39.12	49.93	59.43	64.73	68.08
13153B	Water Level (mAOD)	164.81	164.99	165.15	165.24	165.29
	Flow (m ³ /s)	39.12	49.43	59.43	64.73	68.08

Figure 6 shows the Environment Agency 1 in 100 year water levels from 2010 and the 1 in 1000 year water levels from 2006 overlain on the Site location plan.

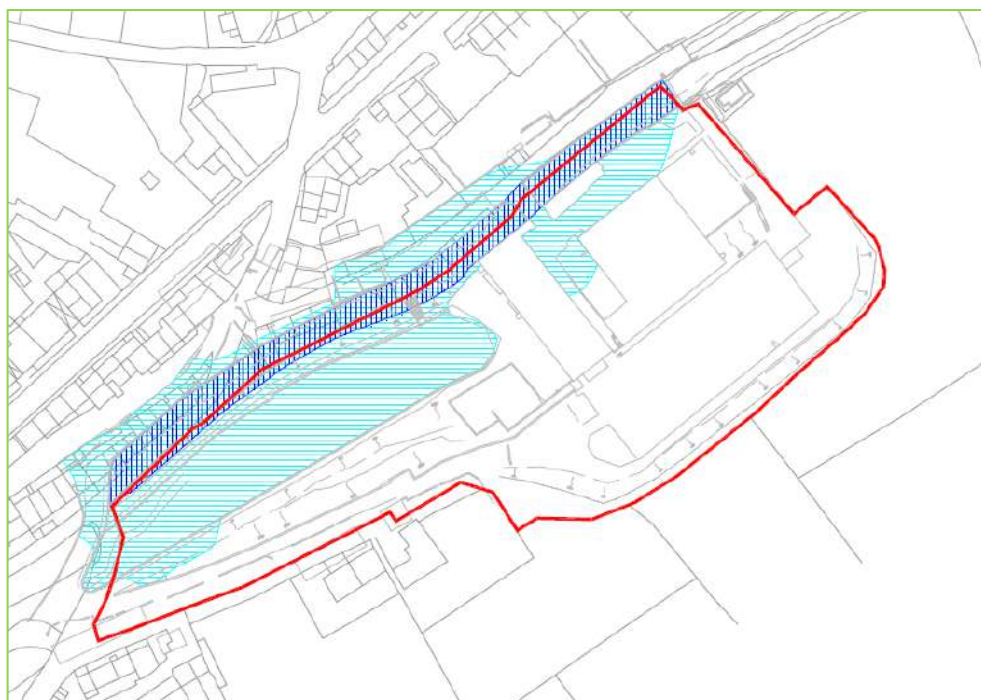


Figure 6 - Environment Agency Flood Levels Overlain on Site Plan

A hydraulic model of the River Holme catchment supplied by the Environment Agency has been utilised to assess the flood risk to the Site in detail. The model has been updated to the latest software and the latest Environment Agency climate change allowances.

The previous, out of date blanket approach for climate change was superseded by new national climate change guidance, dependant on which river basin district the catchment falls in. The central allowance of 23% was used for “more vulnerable” development to represent climate change. The upstream reservoirs have not been included in the model yet (due to timeframe and instability issues) therefore, the current flood risk shown is conservative as the influence of these has not been accounted for. The model results are discussed below and the Hydraulic Modelling Report is attached as Appendix 4.

1 in 100 Year (+23%) Event

As shown in Figure 7, the 1 in 100 year (+23%) event affects only a small proportion of the Site, adjacent to the River Holme. The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.06m AOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 167.30m AOD.

The flooding will only inundate the Site to a relatively low water depth (i.e. less than 600mm) and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the Site.

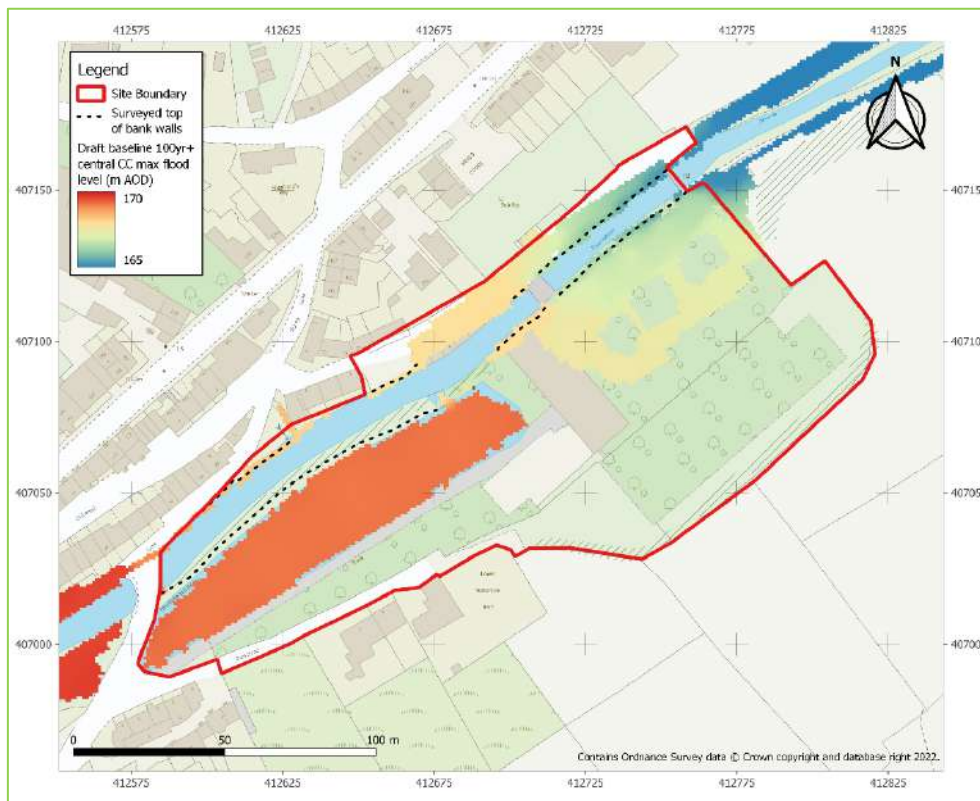


Figure 7 - 1 in 100 Year (+23%) Flood Outline

1 in 1000 Year Event

The extent of flooding has not changed significantly from the 1 in 100 year (+23%) event to the 1 in 1000 year event. As shown in Figure 8, the 1 in 1000 year event affects only a small proportion of the Site, adjacent to the River Holme. The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.78mAOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 168.00mAOD.

The mechanism for fluvial flooding at the Site generally prolonged episodes of heavy rainfall, which affords good time for flood warnings to be issued. The Site is located within an Environment Agency Flood Warning area therefore water levels within the River Holme will be monitored, and information relayed quickly to the management company and residents in the event of a flood to provide sufficient evacuation time.

Given the scale and nature of the proposed development and the size and location of the fluvial flooding sources it has been concluded that the risk of fluvial flooding is considered to be of **medium significance**. The risk from the all source of flooding will need to be further managed and mitigated by using a number of flood risk mitigation measures to reduce the overall flood risk at the Site (see Section 4.0).

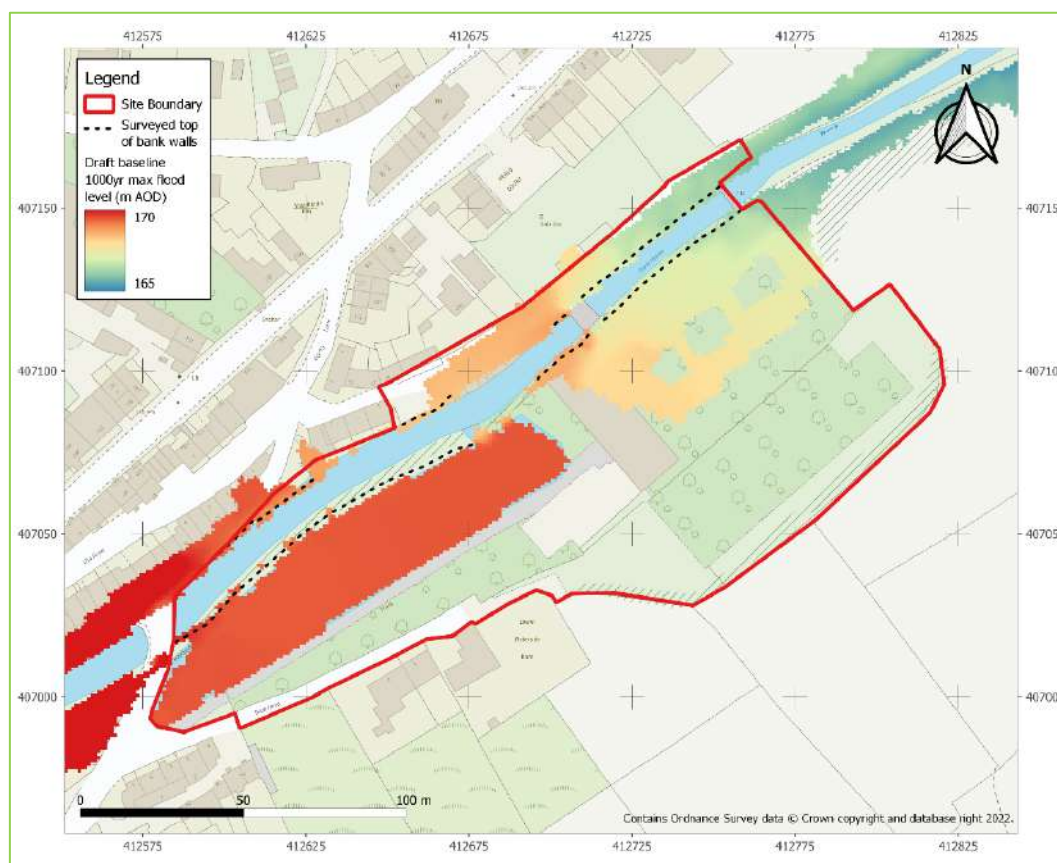


Figure 8 - 1 in 1000 Year Flood Outline

3.11 Tidal (Coastal) Flooding

The Site is not located within the vicinity of tidal flooding sources and the risk of tidal flooding is considered to be **not significant**.

3.12 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers). Site ground conditions suggest a low potential for groundwater flooding. The risk of flooding from groundwater flooding is considered to be **not significant**.

3.13 Surface Water (Pluvial) Flooding

The soil condition at the Site, within the vicinity of the Site, the topography of the Site suggest that the Site is relatively well drained and surface water flooding would not be expected to accumulate to any significant depths. Surface water flooding tends to occur sporadically in both location and time such surface water would tend to be confined to the streets around the development.

The Environment Agency Surface Water flood map shows that the Site has a very low to low risk of surface water flooding (see Figure 9) with a chance of flooding of less than 1 in 1000 (0.1%) to 1 in 100 (1%) years. This may result in water depths of less than 300mm. It should be noted that is associated with areas immediately adjacent to the River Holme, mill leat and mill pond. Therefore the risk of flooding from surface water flooding is considered to be of **low significance**. The risk from the all source of flooding will need to be further managed and mitigated by using a number of flood risk mitigation measures to reduce the overall flood risk at the Site (see Section 4.0).



Figure 9 - Environment Agency Surface Water Flood Map

3.14 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

There are existing sewers located within the vicinity of the Site and these will inevitably have a limited capacity so in extreme conditions there would be surcharges, which may in turn cause flooding. Flood flows could also be generated by burst water mains, but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for the purposes of this assessment.

Given the design parameters normally used for drainage design in recent times and allowing for some deterioration in the performance of the installed systems, which are likely to have been in place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 20 years. The provision of adequate level difference between the ground floors and adjacent ground level would reduce the annual probability of damage to property from this source to 1 in 100 years or less. Therefore, the risk of flooding from sewer flooding is considered to be of **low significance**.

3.15 Flooding from Artificial Drainage Systems/Infrastructure Failure

The Site is located within the vicinity of reservoirs. Figure 10 shows that the Site is at risk of flooding from reservoir failure along the southern boundary. This map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds.

The Environment Agency Reservoir flood map has been prepared for emergency planning purposes and for this reason they reflect a worst case scenario. Since this is a prediction of a worst case scenario, it is unlikely that any actual flood would be this large. Reservoir flooding is extremely unlikely; reservoirs in the UK have a very good safety record. There has been no loss of life in the UK from reservoir flooding since 1925.

Since then reservoir safety legislation has been introduced to make sure reservoirs are well maintained. The hazard is well managed through effective legislation and it is unlikely that the impact zone downstream of these reservoirs should not allow the Proposed Development. Reservoir flooding poses a very low flood risk to the Site therefore, the risk of flooding from reservoir flooding is considered to be **not significant**.

There are no other nearby artificial water bodies, water channels and artificial drainage systems that could be considered a flood risk to the Site. The risk of flooding from artificial drainage systems/infrastructure failure is considered to be **not significant**.

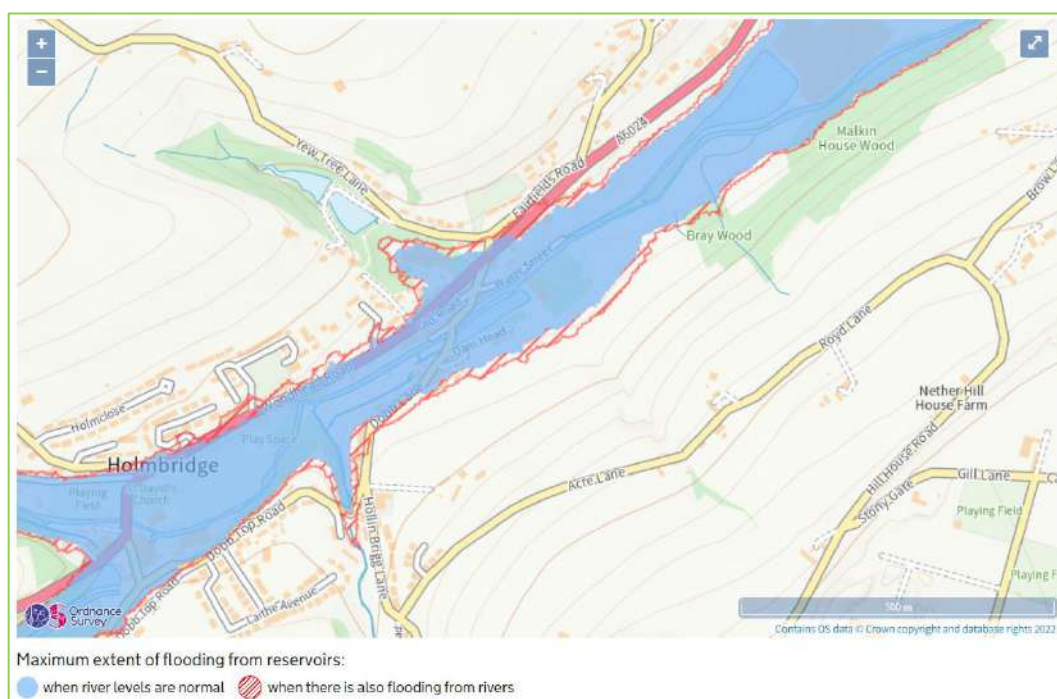


Figure 10 - Environment Agency Reservoir Flood Map

3.16 Effects of the Development on Flood Risk

The Proposed Development will have no impact on the movement of floodwater across the Site. The overall direction of the movement of water will be maintained within the developed Site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. There will be no increase in the flood water levels due to the Proposed Development.

3.17 Summary of Site Specific Flood Risk

A summary of the sources of flooding and a review of the risk posed by each source at the Site is shown in Table 6.

Table 6 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	Yes	River Holme	Medium
Tidal Flooding	No	None Reported	None
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	Yes	Low Spots/Poor Permeability	Low
Sewer Flooding	Yes	Local Sewers	Low
Flooding from Artificial Drainage Systems/Infrastructure Failure	Yes	Reservoirs	None

The Site is unlikely to flood except in extreme conditions. The primary, but unlikely, flood risk to the Site is from fluvial flooding from the River Holme; the flood defence measures identified are expected to afford the Site protection from fluvial flooding.

The Site is located within Flood Zones 1, 2 and 3a and therefore has a 'low to high probability' of flooding. It should be noted that Flood Zone 3a is associated with areas immediately adjacent to the River Holme, mill leat and mill pond and the proposed residential buildings will be located away from these flood sources. The Site is currently developed and is therefore designated as Flood Zone 3a.

The proposed use is classified as 'more vulnerable', 'more vulnerable' uses are appropriate within Flood Zones 1, 2 and 3a after the completion of a satisfactory FRA. The only viable use of the Site would be 'highly vulnerable' or 'more vulnerable' such as residential purposes. The Site is allocated for housing in the Kirklees Local Plan (ref: HS190), which was adopted in February 2019. The Site allocation (ref: HS190) requires that the original buildings are retained and reused as part of any development proposals. The Site is located within the Hinchliffe Mill Conservation Area. It should be noted that the majority of the proposed buildings are to be located within Flood Zone 1.

The Environment Agency data shows that all events up to and including the 1 in 100 year event the flow would be contained with the channel of the River Holme and the Site would be flood free during the 1 in 100 year event.

A hydraulic model of the River Holme catchment supplied by the Environment Agency has been utilised to assess the flood risk to the Site in detail. The model has been updated to the latest software and the latest Environment Agency climate change allowances.

The 1 in 100 year (+23%) event affects only a small proportion of the Site, adjacent to the River Holme. The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.06m AOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 167.30m AOD.

The flooding will only inundate the Site to a relatively low water depth (i.e. less than 600mm) and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the Site.

The extent of flooding has not changed significantly from the 1 in 100 year (+23%) event to the 1 in 1000 year event. The 1 in 1000 year event affects only a small proportion of the Site, adjacent to the River Holme. The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.78mAOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 168.00mAOD.

Given the scale and nature of the proposed development and the size and location of the fluvial flooding sources it has been concluded that the risk of fluvial flooding is considered to be of **medium significance**. A number of secondary flooding source has been identified which may pose a **low significant** risk to the Site. These are:

- Surface Water Flooding
- Sewer Flooding

The flooding sources will only inundate the Site to a relatively low water depth and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the Site. The risk from the all source of flooding will need to be further managed and mitigated by using a number of flood risk mitigation measures to reduce the overall flood risk at the Site (see Section 4.0).

The Proposed Development will have no impact on the movement of floodwater across the Site. The overall direction of the movement of water will be maintained within the developed Site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. There will be no increase in the flood water levels due to the Proposed Development.

The overall risk of flooding at the Site, assuming flood defence measures fail and/or are overtopped is medium however, there are existing flood defence measures that protect the Site and further property level protection measures are used to managed and mitigate the flood risk to a low level of flood risk.

4.0 RISK MANAGEMENT

4.1 Introduction

The flood risk at this location is considered suitable for 'more vulnerable' developments within the NPPF. In this flood zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the use of flood mitigation measures.

The flooding sources will be mitigated on the Site by using a number of techniques, and mitigation strategies to manage and reduce the overall flood risk at the Site. This will ensure the development will be safe and there is:

- Minimal risk to life;
- Minimal disruption to people living and working in the area;
- Minimal potential damage to property;
- Minimal impact of the Proposed Development on flood risk generally; and;
- Minimal disruption to natural heritage.

The flood risk at the Site will be reduced by mitigation measures; these are discussed in more detail below.

4.2 Sequential Approach

The sequential approach has been applied within the Site layout by locating the most vulnerable elements of the development, the proposed buildings, in the lowest risk areas. The Environment Agency data shows that all events up to and including the 1 in 100 year event the flow would be contained with the channel of the River Holme and the Site would be flood free during the 1 in 100 year event. It should be noted that the majority of the proposed buildings are to be located within Flood Zone 1.

4.3 Finished Floor Levels

The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.06mAOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 167.30mAOD. For the new buildings the finished floor levels provide a more than adequate freeboard above the 1 in 100 year (+23%) event.

For the existing mill building all residential living accommodation will be located on the higher levels at a minimum of 169.84mAOD which provides a more than adequate freeboard above the 1 in 100 year (+23%) event.

The finished floor level of the lower ground floor will be set at 166.50mAOD, to conserve and re-use this building it is not possible to raise the finished floor levels further. The Site allocation (ref: HS190) requires that the original buildings shall be retained and reused as part of any development proposals. However, it should be noted that no residential living space will be located on the lower ground floor, only utility rooms, garage/parking, entrance lobby, cloak room etc will be located on the lower ground floor.

It is recognised however that owing to limited headroom constraints, massing, planning policy and Building Regulations it is considered impractical to raise the finished floor levels further. Therefore in order to mitigate against this, it is recommended that the occupants of the Site sign up to receive flood warnings from the Environment Agency and implement a Flood Plan to a safe area away from the Site during times of flood. It is also proposed that flood protection measures are employed within the building design to reduce the overall risk to the occupants. This is discussed below.

Table 7 - Finished Floor Levels

Units	100 (+23%) Water Level (mAOD)	1000 Water Level (mAOD)	Finished Floor Level (mAOD)	Freeboard (m) Above 100 (+23%) Year Event	First Floor Level (mAOD)	Second Floor Level (mAOD)
1 - 2	167.30	168.00	170.50	3.20	173.70	None
3 - 9			166.50	N/A	169.84	173.44
10 - 16			167.60	0.30	170.30	173.30
17 - 19			173.55	6.25	176.25	None

4.4 First Floor Accommodation

Safe refuge above floodwater levels should be designed into new developments within flood risk zones. For the new buildings the finished floor levels provide a more than adequate freeboard above the 1 in 100 year (+23%) event and will therefore, be flood free during the design flood event. For the existing mill building all residential living accommodation will be located on the higher levels at a minimum of 169.84mAOD which provides a more than adequate freeboard above the 1 in 100 year (+23%) event and will therefore, be flood free during the design flood event.

It is good industry practice to provide a 'fail safe' safe refuge above the worst predicted flood level or if advance flood warnings are not heeded, safe refuge would be afforded to Site users within both the proposed buildings, on the upper floors with internal access being provided. This will allow occupants to retreat further to higher floor levels if needed and will provide a 'safe haven' above any floodwater levels.

This will enable rapid escape should flooding occur which is unlikely. The upper floors are accessed via internal stairs and are sufficient in size to safely house all occupants of the buildings. The 'safe haven' will only be required in very extreme events or if a flood warning has not been received. The 'safe haven' will help make the development safe.

4.5 Flood Resistance Measures

Flood risk can be mitigated through the design of the building. Flood resistance measures are measures that help resist floodwaters entering a property (airbrick covers are an example of a flood resistance measure). Flood resistant measures will be used, including:

- The walls of the buildings will be thick.
- Sealant will be used around external doors and windows.
- All external doors and windows will be constructed from hard wearing materials.

- Additionally ground levels will be profiled to fall away from the built development to mitigate any potential residual flood risk posed by localised surface water runoff.

4.6 Flood Resilience Measures

Flood resilience measures are designed in such a way as to reduce the cost and time required to reinstate the property should it be flooded (tiled floors are an example of a flood resilience measure). The building will be constructed in such a way that although floodwater may enter the building, elements that are damaged by floodwater can be easily repaired or replaced. This is a form of flood resilience. They are suitable as no other measure is practicable.

Robust materials and finishes will be used, including:

- Laying 1 or 2 layers of plasterboards at base of internal studwork construction to ground floors.
- Plasterboard will be fixed horizontally, with water resistant plaster at lower levels.
- Fixings to be galvanised/stainless steel or copper - no mild steel to be used - cause rust/staining or walls.
- Water resistant render will be used.
- Low permeability paints to be used rather than emulsion - allows walls to dry out quickly.
- Cavities insulated with Polyisocyanurate (PIR) closed cell type insulation (e.g. celotex).
- All electrics wiring, switches, sockets, socket outlets, gas meters etc. to be located a minimum of 450mm above the finished floor level.
- A non-return valves/anti flow valve will be fitted at the last inspection chamber before connection to the drains.

4.7 Flood Warning and Evacuation

The Site is located in a flood risk area therefore; the Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency' Flood Warnings Service (Floodline 0845 988 1188) in order to receive Flood Warnings. The Environment Agency operate a free flood warning service providing alerts by phone, text or email when flooding is anticipated providing an opportunity for home owners to take necessary precautions, giving enough time for the building to be safely evacuated and mitigation measures to be put in place.

All occupants/visitors of the Site will be made aware of the Environment Agency Floodline telephone number (Call Floodline on 0345 988 1188 or 0845 988 1188 to get more information) and the three Flood Warning Codes and their meaning. The owner of the Site will carry out the role of Flood Warden for the Site and ensure they have an understanding of the flood mechanisms of the Site and will ensure that the safety of the occupants and visitors will not be compromised.

The Environment Agency uses three Flood Warnings Codes. They can be issued in any order, usually ending with an 'all clear'. They are issued by the Environment Agency through their website and Floodline Warning Service. The flood warning will be passed onto the occupier/visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

4.8 Flood Plan

A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed. Sensible precautions would include raising electrical items, irreplaceable items and sentimental items off the ground or where possible moving them to a higher floor, rolling up carpets and rugs and turning off utilities. In addition, consider what actions you would take should the property need to be evacuated including access and egress routes and preparing a flood kit in advance containing warm clothing, medication, a torch, food and wellingtons.

The Flood Plan is a 'living' document and therefore should be periodically reviewed and updated to provide advice and guidance to occupants in the event of an extreme flood. The Flood Plan will therefore reduce the vulnerability of the occupants to flooding and makes them aware of the mechanisms of flooding at the Site. If flooding starts to affect the Site without any pre-warning i.e. in real time (e.g. through a failure of the flood warning delivery) the following actions will be taken:

- Occupants and visitors should consider evacuating the Site.
- If flood levels continue to rise, occupants and visitors are advised to evacuate before safe access is lost. Occupants and visitors should monitor the flood progression and evacuate.

The flood levels will be monitored, and the occupants and visitors will be kept informed. If required a 'safe haven' can also be maintained and may be required in very extreme events if a flood warning has not been received.

4.9 Safe Access and Egress Routes

The NPPF requires that, where required, safe access and escape is available to/from new developments in flood risk areas. Access routes should be such that occupants can safely access and exit their dwellings in design flood conditions. These routes must also provide the emergency services with access to the development during a flood event and enable flood defence authorities to carry out any necessary duties during the period of flood.

The strategy is for evacuation to occur if it is safe to do so. If evacuation is not possible (e.g. a flood warning was not received, or a flood of a greater magnitude was to occur etc.) then the advice is to stay in the buildings until the Emergency Services arrive internally the buildings will be dry for the vast majority of flood events. The Safe Access and Egress Routes shown in Figure 11 indicates the exit routes that all people (i.e. occupants and visitors) on the Site should follow once a flood warning has been received.

Given the nature of the fluvial flooding occupants should be able to seek prior evacuation to the place of safe refuge before flood waters reach the Site, or worst case refuge on the first floor level. People should make their way to areas outside of the Flood Zones. Facilities such as community centres, shops etc. are located within the vicinity of the Site which may be used in the event of a flood event. In the event of a Flood Warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site using the routes shown in Figure 11.

Safe access and egress routes, including emergency access, have been identified by foot/vehicles, in accordance with the NPPF and Environment Agency Guidance during the 1 in 100 year (+23%) event, as discussed below:

Units 1 – 2: via Spring Lane to the south

The finished floor level is set at 170.50mOAD and the ground level of the access rises from 174.50mAOD to 175.46mAOD, and the ground level of Dobb Lane adjacent to the entrance is 170mAOD.

Access by foot is also available to the north of these units and then onto Water Street as detailed below.

Units 17 – 19: via Spring Lane to the south

The finished floor level is set at 173.55mAOD and external ground levels will be 173.40mAOD. The ground level of the access rises from 174.50mAOD to 175.46mAOD, and the ground level of Dobb Lane adjacent to the entrance is 170mAOD.

Access by foot is also available to the north of these units and then onto Water Street as detailed below.

Units 3 – 9: via Water Street to the north

For the existing mill building all residential living accommodation will be located on the higher levels at a minimum of 169.84mAOD. The finished floor level of the lower ground floor will be set at 166.50mAOD however, it should be noted that no residential living space will be located on the lower ground floor, only utility rooms, garage/parking, entrance lobby, cloak room etc will be located on the lower ground floor.

The ground level of the access rises from 166.54mAOD to 166.88mAOD, and the ground level of Water Street rises rapidly to the junction with Dobb Lane/Co-op Lane with ground levels of over 170mAOD

Access by foot is also available to the south of these units and then onto Spring Lane as detailed above with external levels set at 169.50 to 169.80mAOD to the east of the units.

Units 10 – 16: via Water Street to the north

The finished floor level is set at 167.70mAOD and external ground levels will be 167.45mAOD. The ground level of the access rises from 166.54mAOD to 166.88mAOD, and the ground level of Water Street rises rapidly to the junction with Dobb Lane/Co-op Lane with ground levels of over 170mAOD.

Access by foot is also available to the south of these units and then onto Spring Lane as detailed above with external levels set at 169.70mAOD to the south of the units.

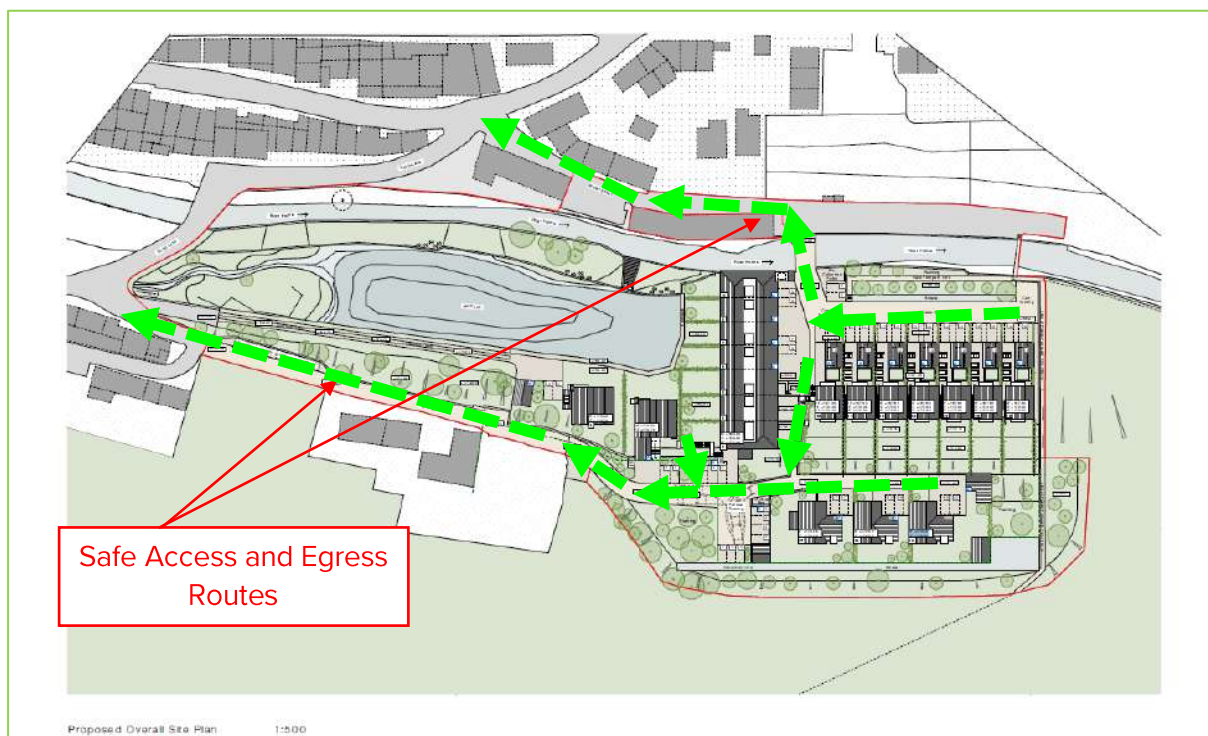


Figure 11 - Safe Access and Egress Routes

4.10 Flood Warning Codes / Flood Evacuation Procedures

In order for the following evacuation procedures to be effective:

- The Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency' Flood Warnings Service (Floodline 0345 988 1188) in order to receive Flood Warnings/Alerts.
- The flood warning will be passed onto the visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

Flood Alert



'Flooding of low-lying land and roads is expected. Be aware, be prepared, watch out!'

The Environment Agency will issue a Flood Alert status when flooding is possible, based upon weather and river/sea conditions. Be prepared to act on your Flood Plan. At this stage occupants and visitors should make themselves aware of the Flood Plan and evacuation routes. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast.

Flood Warning



'Flooding of homes and businesses is expected. Act now!'

The Flood Warning alert will be issued when water levels are rising, and further rain is expected. The Site will be evacuated. Move family, pets and valuables to a safe place.

Safe access and egress, including emergency access can be maintained for vehicles and/or by foot. Water, electricity and gas supplies should be located and switched off before evacuating. The Environment Agency Floodline on 0345 988 1188 to get more information should be contacted to get more information, periodically and listen to and watch for weather and flood warnings on local radio and television stations.

Severe Flood Warning



'Severe Flooding is expected. There is extreme danger life and property. Act now!'

If the Site has not already been evacuated, it will be evacuated immediately. Co-operate with the emergency services and call 999 if immediately in danger. Safe access and egress, including emergency access can be maintained for vehicles and/or by foot.

Warning No Longer in Force

'Flood Watches or Flood Warnings are no longer in force for this area'.

Occupants and visitors should contact the Council to check that it is safe to return to the Site. Please be careful water may be around for several days. If there is any doubt that appliances may be water damaged, they must be checked before switching the power or gas back on. Contact your insurance company as soon as possible to get their approval before arranging any clean-up or repairs.

4.11 Flooding Consequences

The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable.

5.0 SEQUENTIAL APPROACH

5.1 Sequential and Exception Tests

The risk-based Sequential Test in accordance with the NPPF aims to steer new development to areas at the lowest probability of flooding (i.e. Flood Zone 1). However, the Site is allocated for housing in the Kirklees Local Plan (ref: HS190), which was adopted in February 2019. Kirklees Council have produced the Kirklees Publication Draft Local Plan Technical Paper: Flood Risk in November 2016, this allocates development sites within Kirklees based on flood risk and the Site is assessed as Site (ref: H2585).

The Site should, therefore, be deemed to have passed the Sequential and Exception Tests. It has been confirmed with Kirklees Council that if a site is allocated and is assessed within the Kirklees Publication Draft Local Plan Technical Paper: Flood Risk, it is deemed to have passed the Sequential and Exception Tests (see planning ref: 2019/62/91467/E and appeal ref: APP/Z4718/W/21/3279040).

Furthermore, prior to the Kirklees Local Plan adoption and allocation of the Site for housing, two other earlier applications to re-develop the Site for housing were approved in 2008 (planning ref: 2006/91183) and 2011 (planning ref: 2010/91519) respectively.

As noted in the previous appeal (planning ref: APP/Z4718/A/08/2071373) the need for regeneration of the Site was considered to be important given the redundant nature of the existing mill complex. The inspector noted that *“The mill buildings which occupy a prominent position in the Holme Valley, ..., are currently in an unsightly and run-down state”*.

The Proposed Development is required on this Site for the wider reasons of improving the existing run down mill complex which presently has, by reason of its neglected state, a detrimental impact upon the character and appearance of the Conservation Area. The area of search should be limited to the defined Hinchliffe Mill Conservation Area in order that the primary objective, of improving the character and appearance of the Conservation Area can be achieved and will secure a viable use for the mill complex which is an important part of the Hinchliffe Mill Conservation Area.

There are no other available (which are suitable and appropriate), sites within the Hinchliffe Mill Conservation Area that would accept the proposed new residential uses. Moreover any other site would not achieve the improvements on the derelict Site.

This FRA has demonstrated that the development will be safe, without increasing flood risk elsewhere. From the above it is shown that there are overriding sustainability reasons for the development to be granted planning permission within Flood Zone 3a.

5.2 Summary

The development proposals should therefore be considered by the LPA to satisfy the Sequential and Exception Tests as set out in the NPPF.

6.0 SUMMARY AND CONCLUSIONS

6.1 Introduction

This report presents a FRA in accordance with the NPPF for the Proposed Development at Hinchliffe Mill, Water Street, Holmbridge, Holmfirth, HD9 2NX.

This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

6.2 Flood Risk

The Site is unlikely to flood except in extreme conditions. The primary, but unlikely, flood risk to the Site is from fluvial flooding from the River Holme; the flood defence measures identified are expected to afford the Site protection from fluvial flooding.

The Site is located within Flood Zones 1, 2 and 3a and therefore has a 'low to high probability' of flooding. It should be noted that Flood Zone 3a is associated with areas immediately adjacent to the River Holme, mill leat and mill pond and the proposed residential buildings will be located away from these flood sources. The Site is currently developed and is therefore designated as Flood Zone 3a.

The proposed use is classified as 'more vulnerable', 'more vulnerable' uses are appropriate within Flood Zones 1, 2 and 3a after the completion of a satisfactory FRA. The only viable use of the Site would be 'highly vulnerable' or 'more vulnerable' such as residential purposes. The Site is allocated for housing in the Kirklees Local Plan (ref: HS190), which was adopted in February 2019. The Site allocation (ref: HS190) requires that the original buildings are retained and reused as part of any development proposals. The Site is located within the Hinchliffe Mill Conservation Area. It should be noted that the majority of the proposed buildings are to be located within Flood Zone 1.

The Environment Agency data shows that all events up to and including the 1 in 100 year event the flow would be contained within the channel of the River Holme and the Site would be flood free during the 1 in 100 year event.

A hydraulic model of the River Holme catchment supplied by the Environment Agency has been utilised to assess the flood risk to the Site in detail. The model has been updated to the latest software and the latest Environment Agency climate change allowances.

The 1 in 100 year (+23%) event affects only a small proportion of the Site, adjacent to the River Holme. The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.06mAOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 167.30mAOD.

The flooding will only inundate the Site to a relatively low water depth (i.e. less than 600mm) and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the Site.

The extent of flooding has not changed significantly from the 1 in 100 year (+23%) event to the 1 in 1000 year event. The 1 in 1000 year event affects only a small proportion of the Site, adjacent to the River Holme. The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.78mAOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 168.00mAOD.

Given the scale and nature of the proposed development and the size and location of the fluvial flooding sources it has been concluded that the risk of fluvial flooding is considered to be of **medium significance**. A number of secondary flooding source has been identified which may pose a **low significant** risk to the Site. These are:

- Surface Water Flooding
- Sewer Flooding

The flooding sources will only inundate the Site to a relatively low water depth and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the Site. The risk from the all source of flooding will need to be further managed and mitigated by using a number of flood risk mitigation measures to reduce the overall flood risk at the Site.

The Proposed Development will have no impact on the movement of floodwater across the Site. The overall direction of the movement of water will be maintained within the developed Site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. There will be no increase in the flood water levels due to the Proposed Development.

The overall risk of flooding at the Site, assuming flood defence measures fail and/or are overtopped is medium however, there are existing flood defence measures that protect the Site and further property level protection measures are used to managed and mitigate the flood risk to a low level of flood risk.

6.3 Risk Management

The flood risk at the Site will be reduced by the following mitigation measures, which are discussed below.

Sequential Approach: The sequential approach has been applied within the Site layout by locating the most vulnerable elements of the development, the proposed buildings, in the lowest risk areas. The Environment Agency data shows that all events up to and including the 1 in 100 year event the flow would be contained with the channel of the River Holme and the Site would be flood free during the 1 in 100 year event. It should be noted that the majority of the proposed buildings are to be located within Flood Zone 1.

Finished Floor Levels: The maximum level varies across the Site given the slope of the river but the maximum level in the western flooded adjacent to the River Holme is 168.06mAOD and adjacent to the proposed buildings (i.e. units 3 – 16) is 167.30mAOD. For the new buildings the finished floor levels provide a more than adequate freeboard above the 1 in 100 year (+23%) event.

For the existing mill building all residential living accommodation will be located on the higher levels at a minimum of 169.84mAOD which provides a more than adequate freeboard above the 1 in 100 year (+23%) event.

The finished floor level of the lower ground floor will be set at 166.50mAOD, to conserve and re-use this building it is not possible to raise the finished floor levels further. The Site allocation (ref: HS190) requires that the original buildings shall be retained and reused as part of any development proposals. However, it should be noted that no residential living space will be located on the lower ground floor, only utility rooms, garage/parking, entrance lobby, cloak room etc will be located on the lower ground floor.

It is recognised however that owing to limited headroom constraints, massing, planning policy and Building Regulations it is considered impractical to raise the finished floor levels further. Therefore in order to mitigate against this, it is recommended that the occupants of the Site sign up to receive flood warnings from the Environment Agency and implement a Flood Plan to a safe area away from the Site during times of flood. It is also proposed that flood protection measures are employed within the building design to reduce the overall risk to the occupants. This is discussed below.

First Floor Accommodation: Safe refuge above floodwater levels should be designed into new developments within flood risk zones. For the new buildings the finished floor levels provide a more than adequate freeboard above the 1 in 100 year (+23%) event and will therefore, be flood free during the design flood event. For the existing mill building all residential living accommodation will be located on the higher levels at a minimum of 169.84mAOD which provides a more than adequate freeboard above the 1 in 100 year (+23%) event and will therefore, be flood free during the design flood event.

It is good industry practice to provide a 'fail safe' safe refuge above the worst predicted flood level or if advance flood warnings are not heeded, safe refuge would be afforded to Site users within both the proposed buildings, on the upper floors with internal access being provided. This will allow occupants to retreat further to higher floor levels if needed and will provide a 'safe haven' above any floodwater levels.

This will enable rapid escape should flooding occur which is unlikely. The upper floors are accessed via internal stairs and are sufficient in size to safely house all occupants of the buildings. The 'safe haven' will only be required in very extreme events or if a flood warning has not been received. The 'safe haven' will help make the development safe.

Flood Resistance Measures: Flood resistant measures will be used, including:

- The walls of the buildings will be thick.
- Sealant will be used around external doors and windows.
- All external doors and windows will be constructed from hard wearing materials.
- Additionally ground levels will be profiled to fall away from the built development to mitigate any potential residual flood risk posed by localised surface water runoff.

Flood Resilience Measures: Robust materials and finishes will be used, including:

- Laying 1 or 2 layers of plasterboards at base of internal studwork construction to ground floors.
- Plasterboard will be fixed horizontally, with water resistant plaster at lower levels.
- Fixings to be galvanised/stainless steel or copper - no mild steel to be used - cause rust/staining on walls.
- Water resistant render will be used.
- Low permeability paints to be used rather than emulsion - allows walls to dry out quickly.
- Cavities insulated with Polyisocyanurate (PIR) closed cell type insulation (e.g. celotex).
- All electrics wiring, switches, sockets, socket outlets, gas meters etc. to be located a minimum of 450mm above the finished floor level.
- A non-return valves/anti flow valve will be fitted at the last inspection chamber before connection to the drains.

Flood Warning and Evacuation: The Site is located in a flood risk area therefore; the Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency' Flood Warnings Service (Floodline 0845 988 1188) in order to receive Flood Warnings.

Flood Plan: A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed.

Safe Access and Egress Routes: The strategy is for evacuation to occur if it is safe to do so. If evacuation is not possible (e.g. a flood warning was not received, or a flood of a greater magnitude was to occur etc.) then the advice is to stay in the buildings until the Emergency Services arrive internally the buildings will be dry for the vast majority of flood events. The Safe Access and Egress Routes indicate the exit routes that all people (i.e. occupants and visitors) on Site should follow once a flood warning has been received.

Given the nature of the fluvial flooding occupants should be able to seek prior evacuation to the place of safe refuge before flood waters reach the Site, or worst case refuge on the first floor level. People should make their way to areas outside of the flood zone. Facilities such as community centres, shops etc. are located within the vicinity of the Site which may be used in the event of a flood event. In the event of a Flood Warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site using the routes via Spring Lane to the south and/or Water Street to the north. Safe access and egress routes, including emergency access, have been identified by foot/vehicles, in accordance with the NPPF and Environment Agency Guidance.

Flood Warning Codes / Flood Evacuation Procedures: Flood warning procedures have been developed based on the Environment Agency' Flood Warnings Service (Floodline 0345 988 1188). The flood warning will be passed onto the visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

6.4 Sequential Approach

The development proposals should be considered by the LPA to satisfy the Sequential and Exception Tests as set out in the NPPF.

6.5 Conclusion

In conclusion, the Proposed Development would be expected to remain dry in all but the most extreme conditions. The Proposed Development will provide betterment compared to the existing situation. The Site is unlikely to flood except in extreme conditions.

Providing the recommendations made in this FRA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable, and the development would be in accordance with the requirements of the NPPF. This FRA demonstrates that the Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the NPPF. The development should not therefore be precluded on the grounds of flood risk.



APPENDICES

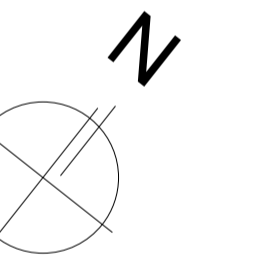
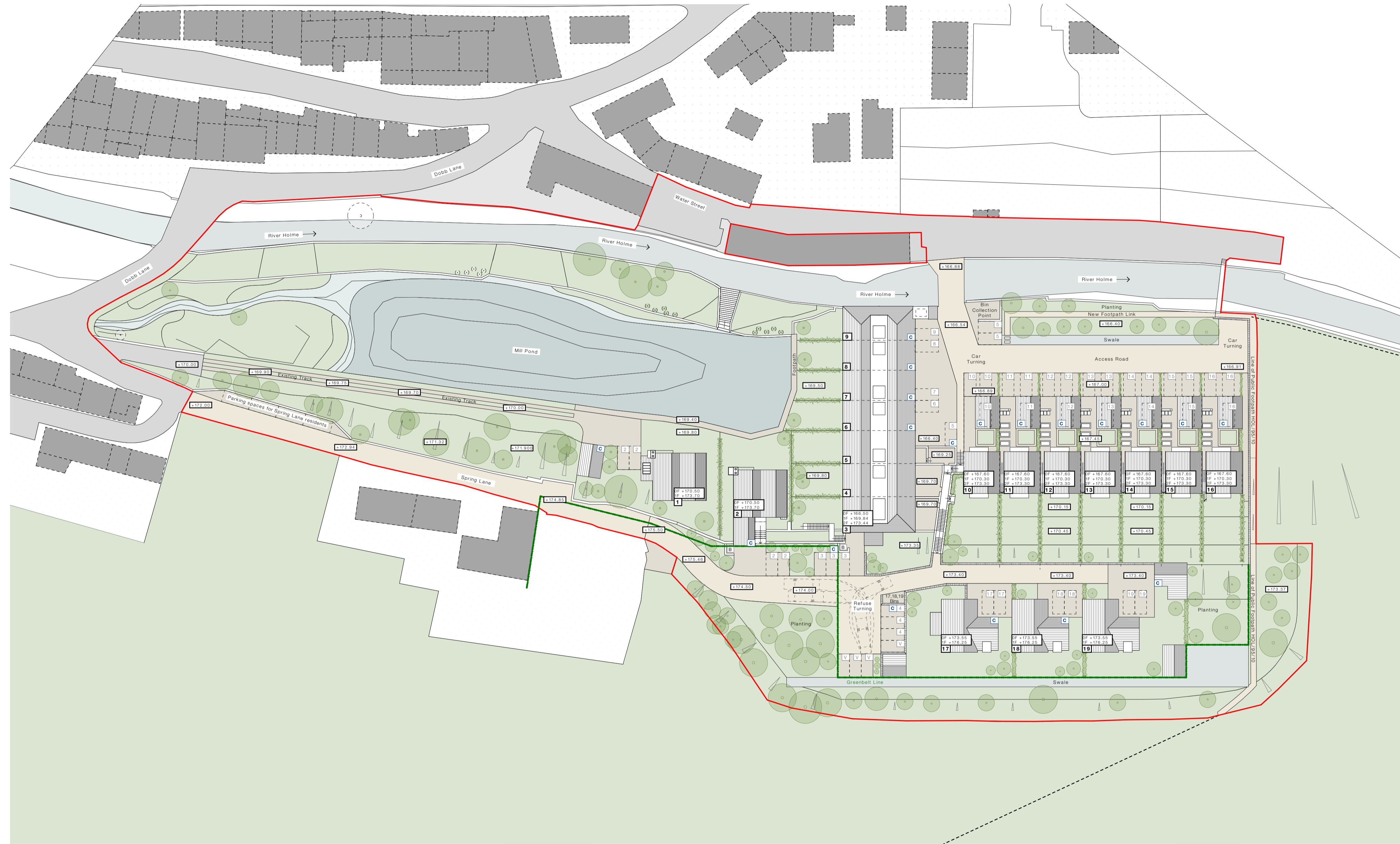


APPENDIX 1 – Proposed Site Layout

Notes

Do not scale from drawing, use figured dimensions only.
 All dimensions must be checked and verified on site prior to commencement of work and architect to be notified of any discrepancies.
 This drawing is intended to permit overall scheme proposals only and cannot be used for construction purposes without further information.

Rev	Description	Drawn	Checked	Date
A	Scheme revised	FWG		01.08.2021
B	Scheme revised	FWG		08.02.2021
C	Scheme revised	FWG		09.11.2021
D	General updates to scheme prior to re-submission to planning	FWG		09.12.2021
E	Units 17 to 19 spread apart following feedback from planning	FWG		01.02.2022
F	General revisions	FWG		05.07.2022
G	General revisions following feedback from planning officer	FWG		18.08.2022



KEY

- B Bin Collection Point
- C Electric Car Charging Point

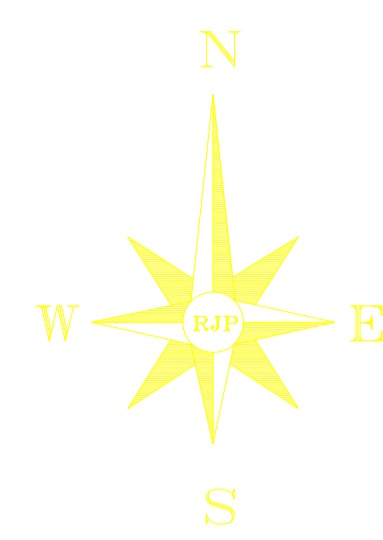
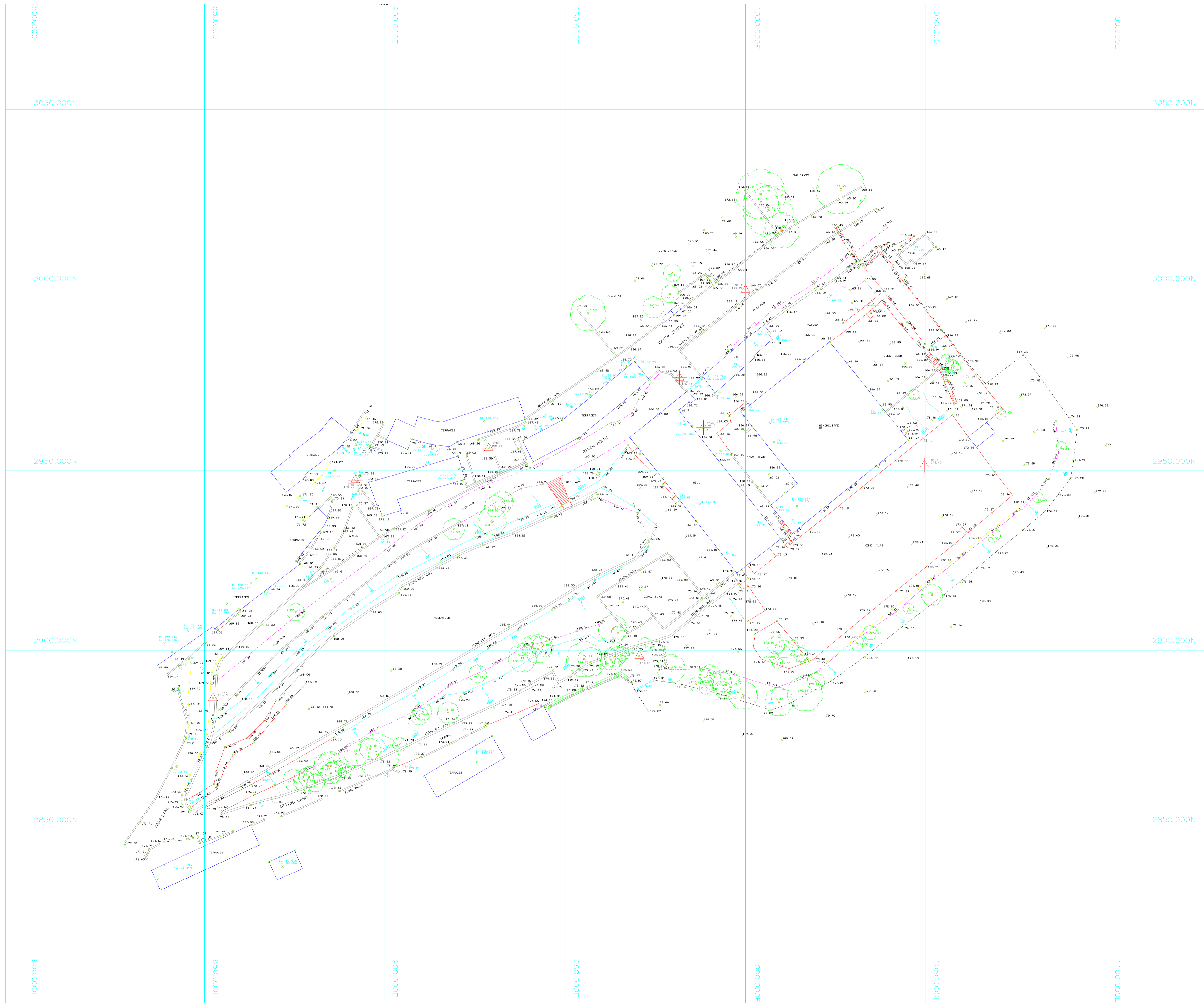
Job Title Proposed Residential Development, Hinchcliffe Mill, Holmfirth, HD9 2NX	
Client MD One Ltd	Company AD
Drawing Overall Site Plan	
Date Jan '21	Scale @ A1 1:500
Drawn FWG	Checked FWG
Drawing No. 3372 (0-) 623	Revision G

Proposed Overall Site Plan 1:500

ONE17
 ARCHITECTS & INTERIOR DESIGNERS

The Dyehouse, Armitage Bridge
 Huddersfield, West Yorkshire HD4 7PD
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 E solutions@one17design.com
ONE17DESIGN.COM

APPENDIX 2 – Topographical Surveys



CO-ORDINATED STATIONS

STATION	EASTING	NORTHING	LEVEL (m)
A	1000.000	3000.000	165.99
B	981.671	2975.669	166.94
C	928.838	2956.160	166.56
D	1034.987	2995.755	166.87
E	891.777	2947.284	170.76
F	852.364	2886.833	169.73

ABBREVIATIONS

AV	AIR VALVE/VENT	IC	INSPECT CHAMBER
BOL	BOLLARD	IL	INVERT LEVEL
BB	BELISHA BEACON	JKW	JAPANESE KNOTT WEED
BM	BENCH MARK	LH	LAMP HOLE
BL	BED LEVEL	LP	LAMP POST
BS	BUS STOP	NP	NAME PLATE
BT	BRITISH TELECOM	MH	MANHOLE
CL	COVER LEVEL	PS	POST/SIGN POST
DII	DILAPIDATED	PB	POST BOX
Dis	DISUSED	RE	RODDING EYE
EL	EAVES LEVEL	RS	ROAD SIGN
ELE	ELEC. JUNCT. BOX	ST	STOP TAP
EP	ELECTRICITY POLE	TH	TRIAL HOLE
FH	FIRE HYDRANT	TL	TRAFFIC LIGHT
FL	FLOOR LEVEL	TP	TELEGRAPH POLE
FOS	FULL OF SEDIMENT	TV	CABLE TV BOX
FP	FLAG POLE	UH	UNABLE TO LIFT
G	GULLY	WM	WATER METER
GM	GAS METER		
GV	GAS VALVE		

SYMBOLS

	SURVEY STATION		TREE
	O/H ELEC CABLE		BENCH MARK
	O/H PHONE LINE		TRIAL PIT
	CANOPY/HEDGE		BOREHOLE

NOTES

- A) ONLY MANHOLES AND SERVICES VISIBLE AT TIME OF SURVEY SHOWN
- B) LOCAL GRID USED AND ORIENTATED TO MAGNETIC NORTH
- C) LEVELS IN METRES RELATED TO O.S.B.M.
- D) DRAINAGE INFORMATION TAKEN FROM LOCAL AUTHORITY RECORDS. INFORMATION MUST BE CHECKED PRIOR TO WORK COMMENCING
- E) SURVEY UNDERTAKEN IN HEAVY SNOW CONDITIONS

Rev	Description	Date
	HINCHCLIFFE MILL, WATER STREET, HOLMBRIDGE, HUDDERSFIELD	
	ONE 17 ARCHITECTS	
	TOPOGRAPHICAL SURVEY	

OA046/TOO	Drawn	S. FAIRHURST
	Date	JAN 2010
	Scale	1:500

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FAX: 01257 251554
MOBILE: 07710 308709
E-MAIL: surveys.rjp99@btopenworld.com



APPENDIX 3 – Environment Agency Data

Defences (3rd Party Maintained) - RFI/2020/198497

ASSET ID	DESCRIPTION	ASSET MAINTAINER	ASSETS TYPE	LENGTH (m)	ACTUAL Downstream Crest Level (mAOD)	ACTUAL Upstream Crest Level (mAOD)	PROTECTION	TARGET CONDITION	OVERALL CONDITION	DESIGN STANDARD OF PROTECTION (SOP)
25626	high_ground	private	flood_risk_management	34.22			fluvial	3	2	
51240	high_ground	private	flood_risk_management	155.38			fluvial	3	3	
25625	high_ground	private	flood_risk_management	6.63			fluvial	3	2	
25624	high_ground	private	flood_risk_management	52.03			fluvial	3	3	
51239	high_ground	private	flood_risk_management	17.74			fluvial	3	3	
27883	high_ground	private	flood_risk_management	402.35			fluvial	3	3	
51241	high_ground	private	flood_risk_management	652.19			fluvial	3	3	

RFI/2020/198497 Assets Map centred on your site, Holmfirth, HD9 2PB

Date created: 02/03/2021

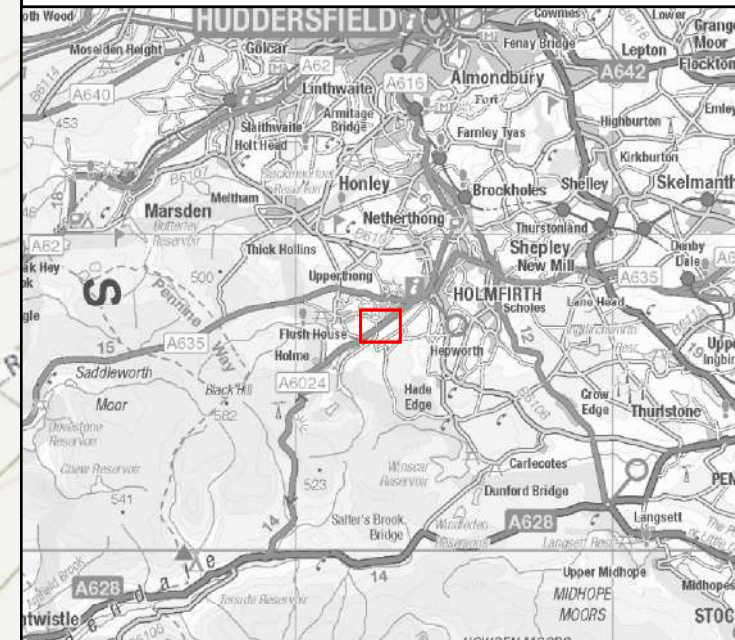


www.environment-agency.gov.uk

Scale: 1:4,000



when reproduced @ A3



LEGEND

— Main River

Defences (3rd party maintained)

ASSET_ID

— 25624

— 25625

— 25626

— 27883

— 51239

— 51240

— 51241



Please find the required modelled data for **2010 ASM River Colne & Holme - Flood Modelling** available in the following link:

<https://ea.sharefile.com/d-s6f92cb3cb0044f2181189fe0d098e568>

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

RE: Hydraulic Model (for Product 7) Outputs (for Product 6) Report (for Product 5) for 2010 ASM River Colne & Holme - Flood Modelling

Request for information under the Freedom of Information Act 2000 (FOIA) / Environmental Information Regulations 2004 (EIR)

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

Title: 2010 ASM River Colne & Holme - Flood Modelling
- Third Party Rights: Centre for Ecology and Hydrology

The condition below applies to this model:

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

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

I hope that we have correctly interpreted your request.

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

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



Planning advice for developers – FAQs

INTRODUCTION

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

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

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

DEVELOPMENT AND FLOOD RISK

Is my development proposal at risk of flooding?

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

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

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

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

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

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

What information should I include in my flood risk assessment?

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

Can I undertake my own flood risk assessment?

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

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

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

Where can I get modelled or historic flood levels from?

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

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

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

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

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

SURFACE WATER AND DRAINAGE

Who's responsible for managing surface water?

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

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

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

Do I need to install sustainable drainage systems?

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

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

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

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

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

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

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

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

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

OTHER ENVIRONMENTAL CONSIDERATIONS

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

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

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

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

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

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

- **Water framework directive**

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

- **River buffer zone**

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

- **Culverting**

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

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

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

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

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

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

PRE-APPLICATION ADVICE

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

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

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

Who should I contact for further information?

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

General enquiries: 03708 506 506

Environment Agency, Lateral, 8 City Walk, Leeds LS11 9AT

<https://www.gov.uk/government/organisations/environment-agency>

The Flood Map for Planning

The Flood Map for Planning (Rivers and Sea) can be viewed and downloaded as a PDF file on GOV.UK by following this link: <https://flood-map-for-planning.service.gov.uk> or downloaded in GIS format under an open data licence from the following address: <https://data.gov.uk/publisher/environment-agency>

Please type Flood Map for Planning in the search box.

What is the Flood Map for Planning?

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

The Flood Map for Planning shows the following:

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

Flood History

To the best of our knowledge there is no known flood history for this site. The extent of flooding, and/or flood level information is only shown for those watercourses surveyed after the flood. Other flooding may have occurred which is not shown. This is the best information currently available. For local drainage information please contact your water utility company and your local council.

Water causing flooding can come from different places, for example from rivers or the sea; surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewers or drainage systems which have been overwhelmed or from groundwater rising up from underground aquifers.

Please note that this record doesn't include all of the flooding that may have occurred during and since February 2020. Given the process of recording, verifying and updating our record from major floods is extensive and may take a considerable amount of time.'

Assets

Asset Location Map

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

Description of Works

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

Risk of Flooding – Environment Agency Defences

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

Risk of Flooding – Privately Maintained Defences

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

Asset Condition Ratings

The performance of a flood defence asset is recorded as the condition of the asset. Our asset inspectors subjectively assess the conditions of assets (during visual inspection site visits) with reference to a national standard template. Each asset is given a rating

between one and five with one being very good condition and five being very poor. A condition rating of 3, or 'fair' is the minimal acceptable standard for a critical asset, such as a defence wall that protects properties. We are striving to improve all assets below 'fair' to an acceptable standard.

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

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

Asset Standard of Protection

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

Modelling

Please note that as you requested both Product 4 and 6, in order to avoid duplication of information, data provided in digital form such as in-channel water levels, flows and location of the cross sections are not provided as maps and tables in pdf format.

2010 ASM River Colne & Holme - Flood Modelling

We have provided you with a copy of the Model Data Files for the 2010 ASM River Colne & Holme - Flood Modelling. Also provided is a copy of the Modelling Reports (Product 5). They can be downloaded from the ShareFile link below:

<https://ea.sharefile.com/d-s6f92cb3cb0044f2181189fe0d098e568>

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

Climate Change

Updated guidance on how climate change could affect flood risk to new development - '[Flood risk assessments: climate change allowances](#)' was published on gov.uk on 19 February 2016. You should confirm the flood risk vulnerability classification and lifetime of your proposed development in line with NPPF and apply the appropriate climate change allowances.

Bespoke Flood Risk Assessment (FRA) advice:

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

Other

Surface Water Map

Lead Local Flood Authorities (LLFA) are responsible for managing local flood risk from surface water flooding and groundwater flooding. You should check with the LLFA as they may have more up to date information regarding this type of flooding.

The Risk of Flooding from Surface Water Flood Map can be viewed and downloaded as a PDF file on GOV.UK by following this link: <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

Surface Water Drainage

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

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

A permit may be required, under the Environmental Permitting Regulations 2016 from the Environment Agency for any proposed works or structures in, under, over or within eight metres of a 'main river' (e.g. a new outfall). A permit is separate to and in addition to any planning permission granted. Further details and guidance are available on the GOV.UK website:

<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

Risk of Flooding from Reservoirs Map

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

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

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

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

Flood Warning

The site is covered by a Flood Warning. **To register to receive this service, you can call Floodline 24 hours a day on 0845 988 1188.**

LIDAR Data

Please note that our LiDAR data is now available free of charge (Open Data) from

<http://environment.data.gov.uk/ds/survey/index.jsp#/survey> (once zoomed to the relevant location the available LiDAR products will be listed below the map).

Two LIDAR products are available:

1. Tiled LIDAR data - The full tiled dataset consists of historic LIDAR data which has been gathered since 1998. For some areas we have carried out repeat surveys and data is available in a range of resolutions.
2. Composite LIDAR data - The composite dataset is derived from a combination of our full tiled dataset which has been merged and re-sampled to give the best possible spatial coverage.

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

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

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

The Rights & Responsibilities of a Riverside Owner

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

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

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

Ordnance Survey Data

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



APPENDIX 4 – Modelling Report/Model

