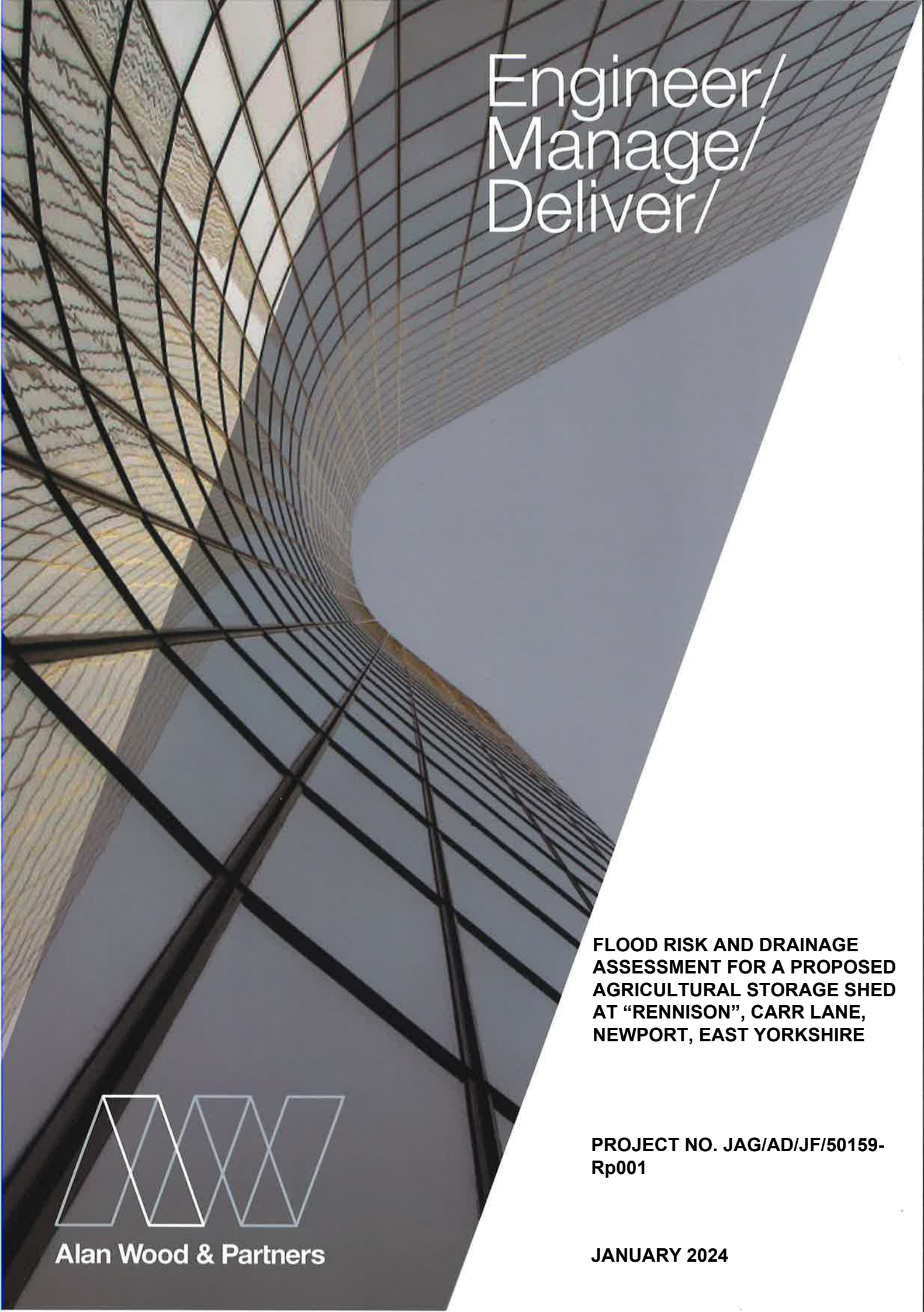

FLOOD RISK AND DRAINAGE ASSESSMENT FOR A PROPOSED AGRICULTURAL STORAGE SHED AT "RENNISON", CARR LANE, NEWPORT, EAST YORKSHIRE

PROJECT NO. JAG/AD/JF/50159-Rp001

JANUARY 2024

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Prepared by: A Dunn

Signed: ……
Date: 17th January 2024

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Director

Signed: ……
Date: 17th January 2024

Issue	Revision	Revised by	Approved by	Revised Date

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APPENDICES

1.0 INTRODUCTION

1.1 Background

1.1.1 Alan Wood & Partners were commissioned by JW Beaumont Ltd to prepare a Flood Risk and Drainage Assessment for a proposed agricultural storage shed at "Rennison", Carr Lane, Newport, Brough, East Yorkshire in support of an application for planning consent.

1.1.2 A Flood Risk and Drainage Assessment (FRDA) for the proposed development is required to assess the development's risk from flooding and the suitability of the site in terms of drainage.

1.2 Layout of Report

1.2.1 Section 1 provides an introduction to the FRDA, explains the layout of this FRDA and provides an introduction to flood risk and the latest guidance on development and flood risk in England.

1.2.2 Section 2 provides an introduction to the site. The site description is based upon a desktop study and information provided by the developer. In order to obtain further information on flood risk, consultation was undertaken with the Environment Agency.

1.2.3 Section 3 of this report details the development proposals and considers the development proposals in relation to the current planning policy on development and flood risk in England (and what type of development is considered appropriate in different flood risk zones). National Planning Policy Framework (NPPF): and its associated Technical Guidance (Communities and Local Government, July 2021) is the current planning policy on flood risk in England, and an introduction to NPPF is provided below.

1.2.4 Section 4 considers the surface water drainage arrangements for the proposed development.

1.2.5 Section 5 considers the operation and maintenance arrangements for the SuDS components of the proposed development.

1.2.6 Section 6 of this report considers the flood risk to site, and the potential for the development proposals to impact on flood risk. The assessment of flood risk is based on the latest planning policy and utilises all the information gathered in the preparation of the report.

1.2.7 Section 7 of this report provides details of any recommendations for further work to mitigate against possible flooding.

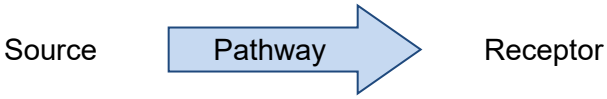
1.2.8 Section 8 of this report provides a summary of the report.

1.3 Flood Risk

1.3.1 Flood risk takes account of both the probability and the consequences of flooding.

1.3.2 Flood risk = probability of flooding x consequences of flooding

1.3.3 Probability is usually interpreted in terms of the return period, e.g. 1 in 100 and 1 in 200 year event, etc. In terms of probability, there is a 1 in 100 (1%) chance of one or more 1 in 100 year floods occurring in a given year. The consequences of flooding depends on how vulnerable a receptor is to flooding. The components of flood risk can be considered using a source-pathway-receptor model.



1.3.4 Sources constitute flood hazards, which are anything with the potential to cause harm through flooding (e.g. rainfall extreme sea levels, river flows and canals). Pathways represent the mechanism by which the flood hazard would cause harm to a receptor (e.g. overtopping and failure of embankments and flood defences, inadequate drainage and inundation of floodplains). Receptors comprise the people, property, infrastructure and ecosystems that could potentially be affected should a flood occur.

1.4 National Planning Policy Framework

1.4.1 General

1.4.1.1 NPPF and its associated Technical Guidance replaces Planning Policy Statement 25 and provides guidance on how to evaluate sites with respect to flood risk.

1.4.1.2 A summary of the requirements of the NPPF is provided below.

1.4.2 Sources of Flooding

1.4.2.1 The NPPF requires an assessment to flood risk to consider all forms of flooding and lists six forms of flooding that should be considered as part of a flood risk assessment. These forms of flooding are listed in Table 1, along with an explanation of each form of flooding.

Table 1: Forms of flooding

Flooding from Rivers (Fluvial Flooding)
Watercourses flood when the amount of water in them exceeds the flow capacity of the river channel. Flooding can either develop gradually or rapidly, depending on the characteristics of the catchment. Land use, topography and the development can have a strong influence on flooding from rivers.
Flooding from the Sea (Tidal Flooding)
Flooding to low-lying land from the sea and tidal estuaries is caused by storm surges and high tides. Where tidal defences exist, they can be overtopped or breached during a severe storm, which may be more likely with climate change.
Flooding from Land (Pluvial Flooding)
Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. In developed areas this flood water can be polluted with domestic sewage where foul sewers surcharge and overflow. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro-level can influence or exacerbate this. Overland flow paths should be taken into account in spatial planning for urban developments. Flooding can be exacerbated if development increases the percentage of impervious area.

Flooding from Groundwater
Groundwater flooding occurs when groundwater levels rise above ground levels (i.e. groundwater issues). Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). Chalk is the most extensive source of groundwater flooding.
Flooding from Sewers
In urban areas, rainwater is frequently drained into sewers. Flooding can occur when sewers are overwhelmed by heavy rainfall and become blocked. Sewer flooding continues until the water drains away.
Flooding from Other Artificial Sources (i.e. reservoirs, canals, lakes and ponds)
Non-natural or artificial sources of flooding can include reservoirs, canals and lakes. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and /or as a result of dam or bank failure.

1.4.3 Flood Zones

1.4.3.1 For river and sea flooding, the NPPF uses four Flood Zones to characterise flood risk. These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and are detailed in Table 2.

Table 2: Flood zones

Flood Zone	Definition
1	Low probability (less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium probability (between 1 in 100 and 1 in 1,000 annual probability of river flooding (1%-0.1%) or between 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%-0.1%) in any year).
3a	High probability (1 in 100 or greater annual probability of river flooding (>1%) in any year or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).
3b	This zone comprises land where water has to flow or be stored in times flood. Land which would flood with an annual probability of 1 in 20 (5%) or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

1.4.4 Vulnerability

1.4.4.1 NPPF classifies the vulnerability of developments to flooding into five categories. These categories are detailed in Table 3.

Table 3: Flood risk vulnerability classification

Flood Risk Vulnerability Classification	Examples of Development Types
Essential Infrastructure	- Essential utility infrastructure including electricity generating power stations and grid and primary substations - Wind turbines
Highly Vulnerable	- Police stations, ambulance stations, fire stations, command centres and telecommunications installations required to be operational during flooding. - Emergency dispersal points. - Basement dwellings. - Caravans, mobile homes and park homes intended for permanent residential use.
More Vulnerable	- Hospitals. - Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. - Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. - Non-residential uses for health services, nurseries and educational establishments. - Sites used for holiday or short-let caravans and camping.
Less Vulnerable	- Building used for shops, financial, professional and other services, restaurants and cafes, hot foot takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable" and assembly and leisure. - Land and buildings used for agriculture and forestry.
Water Compatible	- Docks, marinas and wharves. - Water based recreation (excluding sleeping accommodation). - Lifeguard and coastguard stations. - Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

1.4.4.2 Based on the vulnerability of a development, NPPF states within what Flood Zones(s) the development is appropriate. The flood risk vulnerability and Flood Zone 'compatibility' of developments is summarised in Table 4.

Table 4: Flood risk vulnerability and flood zone compatibility

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

1.4.5 The Sequential Test, Exception Test and Sequential Approach

1.4.5.1 The Sequential Test is a risk-based test that should be applied at all stages of development and aims to steer new development to areas with the lowest probability of flooding (Zone 1). This is applied by the Local Planning Authority by means of a Strategic Flood Assessment (SFRA).

1.4.5.2 The SFRA and NPPF may require the Exception Test to be applied to certain forms of new development. The test considers the vulnerability of the new development to flood risk and, to be passed, must demonstrate that:

- There are sustainability benefits that outweigh the flood risk and;
- The new development is safe and does not increase flood risk elsewhere.

1.4.5.3 The Sequential Approach is also a risk-based approach to development. In a development site located in several Flood Zones or with other flood risk, the sequential approach directs the most vulnerable types of development towards areas of least risk within the site.

1.4.6 Climate Change

1.4.6.1 There is a planning requirement to account for climate change in the proposed design. The recommended allowances should be based on the most relevant guidance from the Environment Agency and the Lead Local Flood Authority.

1.4.7 Sustainable Drainage

1.4.7.1 The key planning objectives in NPPF are to appraise, manage and where possible, reduce flood risk. Sustainable Drainage Systems (SuDS) provide an effective way of achieving some of these objectives, and NPPF and Part H of the Building Regulations (2015 Edition) direct developers towards the use of SuDS wherever possible.

2.0 EXISTING SITE DESCRIPTION

2.1 Location

2.1.1 The proposed development site is located at "Rennison", Carr Lane, Newport, East Yorkshire.

2.1.2 The application site lies to the east of Carr Lane and to the north of Green Lane.

2.1.3 The site lies approximately 2.2km to the north of the village of Newport, approximately 2.8km to the north east of the village of Gilberdyke and approximately 10km to the south west of Market Weighton.

2.1.4 An aerial photograph and location plan are included in Figures 1 and 2 below, which identify the location of the site.

Figure 1: Aerial Photograph

Figure 2: Site Location Plan

2.1.5 The Ordnance Survey grid reference for the centre of the site development is approximately 484205, 431960.

2.2 Site Description

2.2.1 The area of the proposed development currently comprises a dilapidated storage shed and an area of former undergrowth.

2.3 Surrounding Features

2.3.1 The site lies in an area of extensive agricultural land.

2.3.2 The existing farm house lies immediately to the north of the application site, with an extensive area of agricultural land and the River Foulness beyond.

2.3.3 Agricultural land lies to the east of the site, extending to Market Weighton Canal and beyond.

2.3.4 Agricultural land lies to the south, extending to the M62 Motorway and beyond.

2.3.5 There is an extensive area of agricultural land to the west of the site.

2.3.6 The River Foulness is situated approximately 0.7km to the north of the site.

2.3.7 Market Weighton Canal is situated approximately 0.8km to the east of the site.

2.3.8 The River Ouse is situated approximately 7.8km to the south of the site.

2.3.9 The River Humber is situated approximately 9.7km to the south east of the site.

2.3.10 There are a number of ponds located approximately 1.6km to the south east of the site.

2.3.11 There are a number of ponds located approximately 5km to the south east of the site.

2.3.12 There are a number of ponds located approximately 3.7km to the north east of the site.

2.4 Topography

2.4.1 LIDAR data has been obtained which shows that the existing ground levels over the area of the new development vary from approximately 0.92m to 1.85m OD(N). The average existing ground level over the footprint of the new building has been calculated at approximately 1.34m OD(N).

2.5 Ground Conditions

2.5.1 A desktop study of the British Geological Survey map shows that the local geology comprises superficial deposits of Alluvium – Clay, silt, sand and gravel overlaying a bedrock of Mercia Mudstone Group – Mudstone.

2.5.2 A study of the local groundwater maps show that the site overlays a Secondary B Aquifer and lies in an area where the groundwater vulnerability classification is ‘Medium – High’.

2.5.3 A borehole record in the local region shows the presence of clays extending to 3m below ground level.

2.5.4 The local ground conditions are therefore unsuitable for soakaways / infiltration methods to be used as the means for disposal of the surface water run-off from the development.

3.0 PROPOSED DEVELOPMENT

3.1 The Development

3.1.1 The proposed development comprises the construction of a new agricultural storage building.

3.1.2 A drawing showing details of the proposed development is included in Appendix A.

3.2 Flood Risk

3.2.1 In terms of flood risk vulnerability, the construction of buildings for agricultural use is classed as 'Less Vulnerable' development (Table 3).

3.2.2 In terms of flood zone compatibility, the construction of 'Less Vulnerable' development is considered to be appropriate in Flood Zone 3 (Table 4).

3.2.3 All of the land under the ownership of the applicant is shown to lie in Flood Zone 3 and consequently there is no opportunity to re-locate the proposed development into a lower flood risk area.

4.0 SURFACE WATER DRAINAGE

4.1 General

4.1.1 The surface water drainage has been designed in accordance with current CIRIA C753 SuDS Manual guidelines.

4.2 Existing Site

4.2.1 From the aerial photograph included in Figure 3 below, it can be seen that the area of the development comprises a dilapidated storage shed and cleared undergrowth with no positive drainage.

Figure 3: Aerial Photograph

4.3 Run-off Destination

4.3.1 Requirement H3 of the Building Regulations establishes a preferred hierarchy for disposal of surface water. Consideration should firstly be given to soakaway, infiltration, watercourse and sewer in that priority order.

4.3.2 The underlying strata in the vicinity of the development is considered to be unsuitable for soakaways to be used as the means for disposal of surface water run-off from the new development (see Section 2.5 of this report).

4.3.3 The second preferred option would be to discharge the surface water run-off from the development to a watercourse.

4.3.4 There is an open drainage ditch situated along the western boundary of the site which is the obvious point of discharge for the surface water run-off from the development. It is therefore proposed that the run-off from the development discharges to this drainage ditch.

4.3.5 This drainage ditch is not shown to lie under the jurisdiction of the Ouse and Humber Drainage Board who are the local internal drainage board in this area.

4.3.6 They have, however, been consulted regarding this proposal and they have confirmed that the ditch does not lie under their control, They have advised that a Land Drainage Consent will be required prior to the construction works being undertaken.

4.4 Flood Risk

4.4.1 For new developments, the current design criteria required for the surface water drainage will need to be based upon the critical 1 in 100 year storm event, with an additional allowance to account for climate change resulting from global warming. There should be no above ground flooding for the 1 in 30 year return period and no property flooding or off site flooding from the critical 1 in 100 year storm event, with the additional allowance to account for climate change.

4.5 Climate Change

4.5.1 An additional allowance of 30% has been included in the preliminary surface water drainage design to account for the anticipated increase in peak rainfall due to climate change resulting from global warming in accordance with East Riding of Yorkshire Council guidelines.

4.6 Peak Flow Control

4.6.1 Based upon the site layout drawing included in Appendix A, the new impermeable area created by the development which will need to be positively drained has been calculated at approximately 892m$^{2.}$

4.6.2 The uncontrolled surface water run-off from the new development could be approximately 12l/s based on BS EN 752 calculations, using a rainfall intensity of 50mm/hour. However, to meet the flood risk planning requirements, it is normally unacceptable to discharge flows freely from the proposed development site at an unrestricted rate.

4.6.3 SuDS Guidance advises that flows from the proposed development should be limited to the greenfield run-off rate.

4.6.4 However, based on an agricultural discharge rate of 1.4l/s/ha and the contributing area of the site, this would only equate to approximately 0.12l/s for this development which cannot be achieved in practical terms.

4.6.5 It is considered that the lowest discharge rate which can be achieved in order to avoid blockages and future maintenance issues is 2l/s, and consequently this discharge rate has been used for design purposes.

4.6.6 The Ouse and Humber Drainage Board have confirmed that this discharge rate is acceptable. A copy of the correspondence received is included in Appendix B.

4.7 Design Output

4.7.1 Based upon the design criteria set out above, hydraulic model calculations have been undertaken in order to assess the pipe sizes and pipe gradients and to determine the volume of surface water storage which will need to be provided.

4.7.2 The model output shows that the pipe sizes required will be 225mm in diameter.

4.7.3 The design work undertaken has shown that a gravity outfall can be achieved and consequently the required restriction to the discharge rate will be achieved by means of an appropriate vortex flow control.

4.7.4 A summary of the storage volumes required is set out in Table 5 below.

Table 5: Volume of Surface Water Storage Required

Storm Event	1 in 1 Probability Storm Event	1 in 30 Probability Storm Event	1 in 100 Probability Storm Event + 30%
Storage Volume Required	$37m^3$	$40m^3$	$46m^3$
Additional Storage Volume Required	Nil	$3m^3$	$6m^3$

4.7.5 For this development, it is proposed that the volume of storage required to accommodate the peak flow from the 1 in 100 probability storm event, including climate change, will be stored within the existing attenuation pond located to the north of the farm house, which will be enlarged to accommodate the storage volume required for the development.

4.7.6 A copy of the hydraulic calculations is included in Appendix C.

4.8 Drawing

4.8.1 Drawings showing the proposed surface water drainage strategy and SuDS details for the development are included in Appendix D.

4.9 Volume Control

4.9.1 SuDS guidance advises that the run-off volume from the developed site for the 1 in 100 year 6-hour rainfall event should not exceed the greenfield run-off volume for the same event.

4.9.2 However, as detailed above, for this development a discharge rate of 2l/s has been used for design purposes.

4.9.3 Whilst the greenfield run-off rate will be marginally exceeded at times of peak flow, it is considered that such a small discharge rate will not have any detrimental effect on the drainage network or other parties downstream of the development.

4.9.4 The impact on the receiving watercourse is therefore considered to be acceptable.

4.9 Pollution Control

4.9.1 It is a requirement to ensure that the quality of any receiving body is not adversely affected by the development.

4.9.2 Adequate pollution control measures will consequently need to be incorporated in the detailed design of the drainage network.

4.9.3 Investigations have revealed that the development site overlays a Secondary B Aquifer and lies within a Groundwater Vulnerability Zone classified as 'Medium – High'.

4.9.4 In order to minimise the risk of pollution to the final watercourse, clean roof water drainage should discharge directly into the sealed drainage network and then directly towards the watercourse.

4.9.5 On this basis the risk of pollutants entering the watercourse is considered to be extremely remote.

4.10 Designing for Exceedance

4.10.1 Flood risk from overland exceedance flows from the new surface water drainage network and from off-site sources should be mitigated to a large extent by the new surface water drainage system.

4.10.2 The ground floor construction level of the building will be raised above external ground levels to shed water away from the building.

4.10.3 The existing overland flow routes should generally be maintained within the final layout of the development site without increasing the flood risk to off-site parties.

4.10.4 Any existing flood risk may reduce by the creation of a formal surface water drainage system but cannot be entirely removed.

4.10.5 A drawing showing the existing and anticipated overland surface water exceedance flood routing resulting from the development is included in Appendix E.

4.11 Highways Drainage

4.11.1 The development does not incorporate any formal highway drainage.

5.0 OPERATION AND MAINTENANCE

5.1 The drainage pipework is designed with self-cleansing gradients and consequently the network should require little or no maintenance.

5.2 All road gullies or drainage channel systems serving areas of hardstanding will need to be regularly inspected to ensure the system remains operable. See Table 6 below.

5.3 The inspection chambers should be regularly inspected to ensure the system is free flowing. See Table 6 below.

Table 6: Operation and Maintenance Requirements for Silt Traps/Trapped Gullies (Based on CIRIA C753 Table 14.2)

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	6 monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	6 monthly
	Inspect filter media and establish appropriate replacement frequencies	6 monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every 6 months
*During the first year of operation, inspections should be carried out at least monthly (and after significant storm events) to ensure that the system is functioning as designed and that no damage is evident.		

5.4 Operation and maintenance requirements for the attenuation lagoon are set out in Table 7 below.

Table 7: Operation and Maintenance Requirements for the Attenuation Lagoon

Maintenance schedule	Required action	Typical frequency*
Routine maintenance	Remove litter and debris	6 monthly
	Vegetation management	As required
Occasional maintenance	Clean inlet/outlet pipe	As required
Remedial actions	Repair/re-construct damaged component/structure	As required
	Remove silt and debris	As required
Monitoring	Inspect for evidence of damage or erosion	6 monthly
	Inspect sediment accumulation	Yearly
*During the first year of operation, inspections should be carried out at least monthly (and after significant storm events) to ensure that the system is functioning as designed and that no damage is evident.		

5.5 Operation and maintenance requirements of the drainage components, as listed above, should be undertaken in accordance with Chapter 32 of the CIRIA SuDS Manual, along with the relevant tables and any relevant manufacturer's recommendations. See also BS 8582:2013 Code of Practice for Surface Water Management for Development Sites Section 11 and Susdrain Fact Sheet on SuDS Maintenance and Adoption Options (England) dated September 2015.

5.6 The personnel undertaking the maintenance should have appropriate experience of SuDS and drainage maintenance and should be capable of keeping sufficiently detailed records of any inspections. An example of a checklist for SuDS maintenance can be found within Appendix B of the CIRIA C753 SuDS Manual v2. If personnel do not have appropriate experience, then specific inspection visits may be necessary. During the first year of operations of SuDS, inspections should usually be carried out at monthly intervals (and after significant storm events).

5.7 The responsibility for the operation and maintenance of the drainage and SuDS will lie with JW Beaumont Ltd, or any subsequent landowner of the site.

6.0 FLOOD RISK ASSESSMENT

6.1 Flood Zone

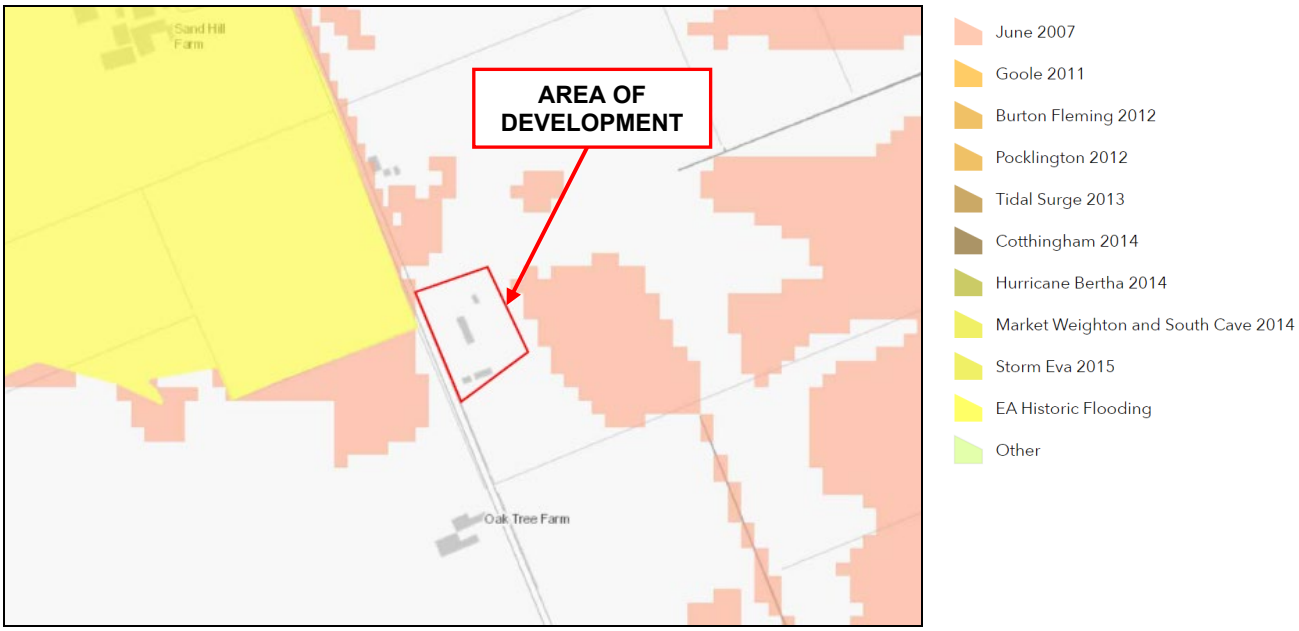
6.1.1 A copy of the Environment Agency Flood Map for Planning is included in Figure 4 below, which identifies the development site to be located within an area designated as Flood Zone 3, (high probability of flooding), comprising land assessed as having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 year or greater annual probability of flooding from the sea.

Figure 4: Environment Agency Flood map for planning dated January 2024

6.2 Historical Flooding

6.2.1 An abstract from the historical flood extent map incorporated in the East Riding of Yorkshire Council Strategic Flood Risk Assessment is included in Figure 5 below.

Figure 5: East Riding of Yorkshire Council's SFRA map showing the Extent of Historical Flooding



6.22 The map shows that the site has not been affected by historical flood events. The land to the west and to the east of the site is shown to have flooded in the 2007 flood event.

6.3 Fluvial Flooding

6.3.1 The River Foulness is situated approx. 0.7km to the north of the application site. Due to the scale of this watercourse and its` distance from the site it is not considered to pose any risk of flooding to the development.

6.3.2 The River Ouse lies approximately 7.8km to the south of the site. The river outfalls into the River Humber which is a tidal estuary. The River Ouse is therefore tidally influenced.

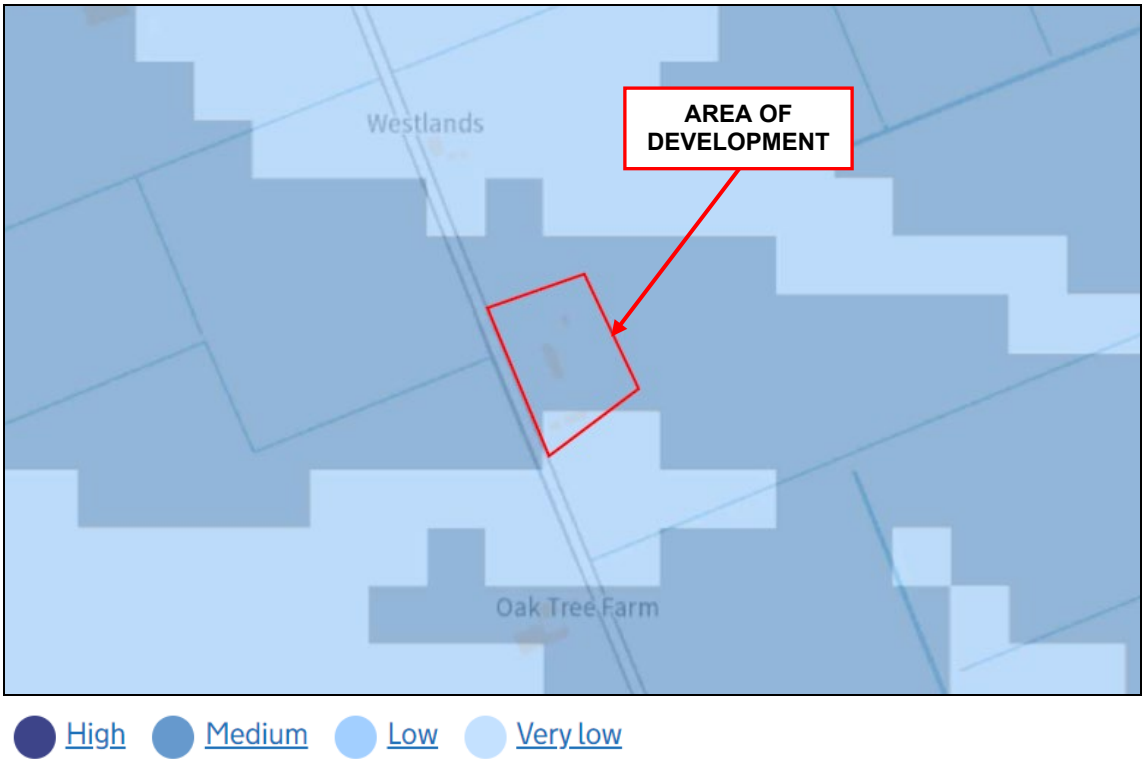
6.4 Tidal Flooding

6.4.1 When tidal levels in the River Humber are high the discharge of water from the River Ouse is restricted and consequently there is a risk of potential flooding should the river waters breach or overtop the river defences during an extreme rainfall event.

6.4.2 The application site is shown to be prone to flooding during a flood event. However, this is a residual risk as the river defences are the responsibility of the Environment Agency who carry out any required maintenance or repair works.

6.4.3 A copy of the flood map produced from the Environment Agency showing the extent of flooding from rivers or the sea is included in Figure 6 below.

Figure 6: Environment Agency map dated January 2023 showing the extent of Flooding from rivers or the sea



6.4.4 The map shows the site lies in an area classed as being at 'medium risk' from flooding.

6.4.5 Flood data previously obtained from the Environment Agency shows that for the Upper End Epoch 2071 scenario, which is appropriate for the lifetime of the development, the predicted flood level for the River Humber for the 1 in 200 probability event including climate change is 6.20m OD(N).

6.4.6 With the nearest potential source of the flooding being at a distance of approximately. 8km, the flood waters would dissipate as they spread out from the source of the flood over a large area of the land. The Hull to Selby railway lines and the A63 roadway which lie to the south of the site form natural flood barriers and will prevent flood waters reaching the site in all but extreme flood events. The likely flood depth at the location of the application site would therefore not be significant.

6.4.7 The breach mapping previously obtained shows that for the 2115 scenario the extent of flooding beyond the A63 is minimal. On this basis it is considered that the site is unlikely to be affected by flooding during the lifetime of the development.

6.4.8 A copy of the flood data previously received from the Environment Agency is included in Appendix F.

6.4.9 However, as the site is shown to lie in Flood Zone 3, flood mitigation measures will need to be considered within the design of the development.

6.4.10 Details of any such measures are included in Section 7 of this report.

6.5 Surface Water Flooding

6.5.1 A copy of the Environment Agency map showing the extent of flooding from surface water is included in Figure 7 below.

Figure 7: Environment Agency map dated January 2024 showing the extent of flooding from surface water

6.5.2 The map shows that the site lies in an area which is considered to be at 'very low risk' from overland surface water flooding (the areas highlighted in blue are the existing pond and watercourses).

6.5.3 The risk of flooding from this potential flood source is therefore considered to be low and acceptable.

6.6 Flooding from Open Drainage Ditches

6.6.1 There are a large number of open drainage ditches within the surrounding agricultural land which drain the low-lying land towards the River Ouse / River Humber. Due to their small scale and localised catchment areas these drainage ditches are not shown to pose any risk of flooding to the development should they overtop during an extreme rainfall event.

6.6.2 The risk of flooding from this potential flood source is therefore considered to be low and acceptable.

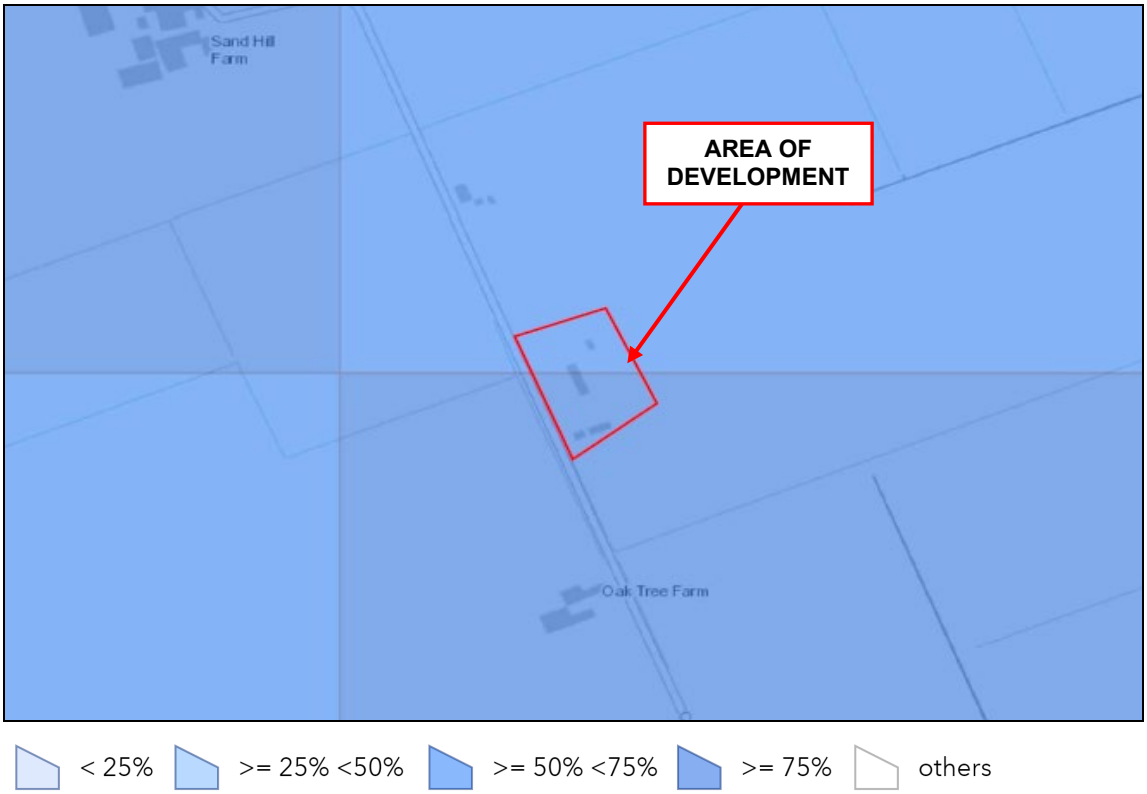
6.7 Groundwater Flooding

6.7.1 Groundwater flooding can occur when the sub-surface water levels are high and emerges above ground level.

6.7.2 The site is shown to overlay a Secondary B Aquifer and to lie in an area where the groundwater vulnerability classification is 'medium-high'.

6.7.3 The map produced with the East Riding of Yorkshire Council Strategic Flood Risk Assessment showing areas susceptible to groundwater flooding is included in Figure 8 below.

Figure 8: Abstract from East Riding of Yorkshire Council's SFRA Groundwater Flooding map



6.7.4 The map shows that the area of the development has a >= 50% <75% risk of groundwater flooding.

6.7.5 It is not anticipated that the proposed development will involve deep excavation works and consequently the risk to the development from this potential flood source is considered to be low and acceptable.

6.8 Flood Risk from Existing Water Mains

6.8.1 There are no existing water mains in the location of the proposed development.

6.8.2 The risk to the development from this potential flood source is therefore considered to be low and acceptable.

6.9 Flood Risk from Existing Drainage Services/Sewers

6.9.1 There are no existing sewers in the location of the proposed development.

6.9.2 The risk to the development from this potential flood source is therefore considered to be low and acceptable.

6.10 Flood Risk from New Drainage Services

6.10.1 The drainage will be designed to the required standard and therefore the risk of flooding to the development or to other parties beyond the curtilage of the site will be adequately addressed.

6.10.2 The risk of flooding to the development from this potential flood source is therefore considered to be low and acceptable.

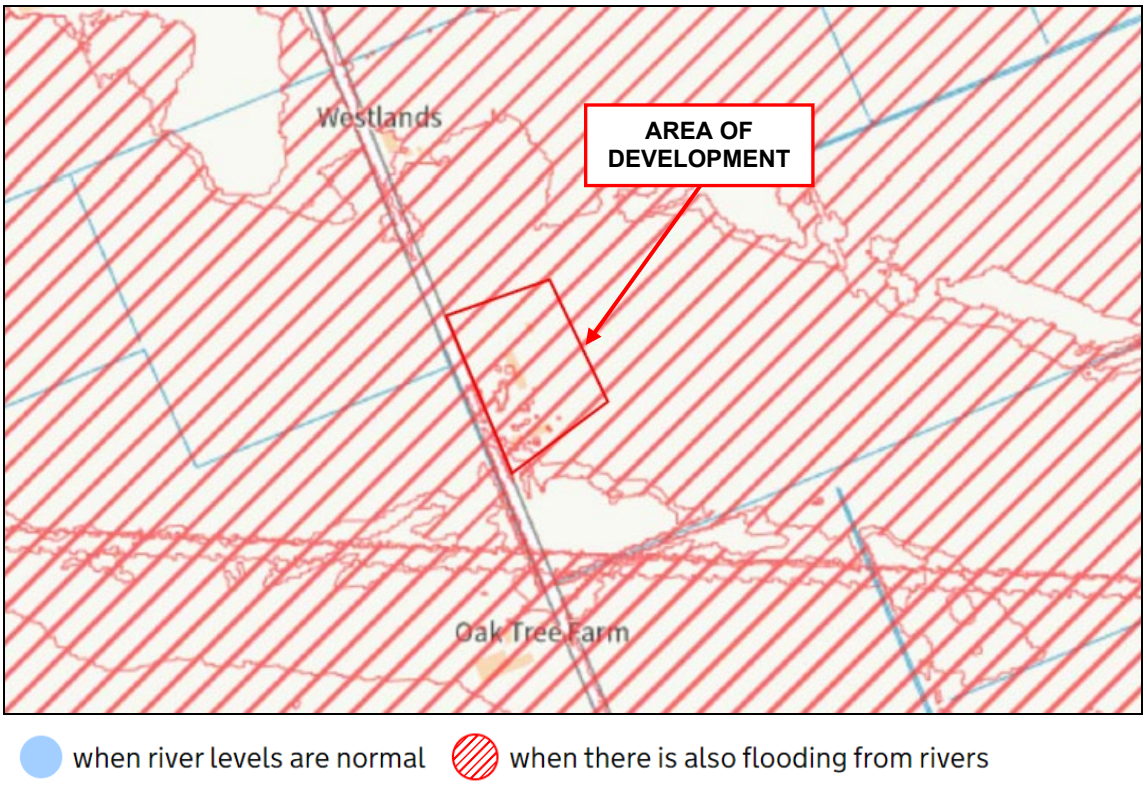
6.11 Flooding from Reservoirs, Canals and Other Artificial Sources

6.11.1 There are a large number of ponds present within the surrounding area. Due to their small scale and their distance from the site these water features are not considered to pose any risk of flooding to the development should they overtop during an extreme rainfall event.

6.11.2 Market Weighton Canal is situated approximately 0.8km to the east of the site. Water levels in the canal are controlled by a series of lock gates and the volume of water in the canal is low. Should the canal overtop its` banks during an extreme rainfall event any flood waters arising from such a situation would not extend as far as the application site.

6.11.3 A copy of the map produced by the Environment Agency showing the extent of flooding from reservoirs is included in Figure 9 below.

Figure 9: Environment Agency map dated January 2024 showing the extent of flooding from reservoirs



6.11.4 The map shows that the development site is not considered to be at risk from reservoir flooding during normal river conditions but is at risk if there is a combined failure of the local reservoir defences when there is a major fluvial flood event in the local region. However, the likelihood of both these events occurring concurrently is extremely remote and consequently the risk to the development from reservoir flooding is considered to be low and acceptable.

6.11.5 The risk to the development from reservoir flooding is considered to be low and acceptable.

6.11.6 The risk to the development from any such potential flood source is therefore considered to be low and acceptable.

7.0 FLOOD MITIGATION MEASURES

7.1 Passive Flood Protection

7.1.1 For new developments lying within Flood Zone 3, the normal requirement is to elevate the ground floor by a minimum of 600mm above the existing ground level or above the predicted flood level where that information is available.

7.1.2 The average existing ground level over the footprint of the new building has been calculated at approximately 1.34m OD(N).

7.1.3 The minimum floor level for the new building should therefore be set at 1.94m OD(N).

7.1.4 At this level of construction, it is considered that the risk of flooding to the storage building has been adequately addressed.

7.2 Flood Resilience

7.2.1 For developments lying within Flood Zone 3(a), the normal requirement is to provide flood resilient construction up to a height of 300mm above the elevated ground floor construction level in order to minimise the extent of flood damage, should flood waters enter the building and to enable ease of reconstruction and minimise the timescale of any repair works.

7.2.2 For this development, this would result in a flood resilient construction level of 2.24m OD(N).

7.2.3 The building is to be used for agricultural general storage and will not have any internal finishes which could be damaged should flood waters affect the site.

7.2.4 However, the following measures should be incorporated within the new development construction:-

- The floor should be constructed from concrete on a waterproof membrane.
- There should be no voids within the external walls, other than doorways, within 300mm of the adjacent ground level which could allow flood waters to enter the building.
- All electrical apparatus or other food sensitive equipment should be elevated to a minimum height of 300mm above floor level in order to prevent damage occurring should flood waters enter the buildings.
- All cables should be routed at high level with vertical drops to the fittings.

7.3 Safe Refuge

7.3.1 For new developments which lie in Flood Zone 3, it is a requirement to provide safe refuge to ensure there is no reliance on evacuation measures by the Emergency Services should a more severe flood event occur and flood waters affect the building.

7.3.2 The building will not be permanently occupied and therefore the likelihood of personnel being present within the building during a major flood situation is low.

7.3.3 However, the adjacent farm house building is of two-storey construction and therefore incorporates accommodation at first floor level which can easily be accessed by any occupants of the new storage building in the event of a flood situation should the need arise.

7.3.4 The requirement for safe refuge provision is therefore considered to be satisfactory.

7.4 Management

7.4.1 If it is not already registered, the development should subscribe to the Environment Agency's early 'Flood Direct' warning service which will alert the development of any likely flood situations. This will then enable a safe evacuation of the storage building should the need arise.

7.5 Access/Egress

7.5.1 The adjacent public road network is shown to lie in Flood Zone 3 (high probability of flooding) and consequently access to / egress from the development could be affected during a major flood situation.

7.5.2 However, this situation already exists in respect of the existing development and therefore the new building will not create any additional access issues.

7.5.3 The flooding in this area is tidal and consequently restrictions will not be for an extensive period of time. Access will therefore be predominantly available.

7.5.4 The site will be made aware of any likely flood event which will enable safe evacuation measures and travel arrangements to be put in place as necessary.

8.0 SUMMARY

8.1 This report has been prepared to assess the flood risk implications for a proposed agricultural storage building which is located at "Rennison", Carr Lane, Newport, East Yorkshire.

8.2 The site falls in Flood Zone 3 (high probability of flooding) on the Environment Agency Flood Map for Planning. The proposed development is classified as 'Less Vulnerable' in terms of flood risk vulnerability, which is appropriate in this location.

8.3 This report has considered potential sources of flooding to the site, including fluvial, tidal, surface water, groundwater, existing sewers, water mains and other artificial sources.

8.4 The main potential risk of flooding to the development which has been identified in the preparation of this report is considered to be from tidal flooding from the River Ouse / River Humber during an extreme flood event.

8.5 Mitigation measures are proposed, which it is considered will reduce the risk of flooding to the development to an acceptable level, will ensure the building is safe for the lifetime of the development and will not increase the risk of flooding to others.

8.6 Overall, this report demonstrates that the flood risk to the proposed development is reasonable and acceptable providing any mitigation measures detailed in Section * of this report are incorporated into the design of the development.

8.7 This report also demonstrates that the site can be suitably drained, with the drainage network serving the development designed and constructed to the required standards in compliance with local and national planning policies.

8.8 Surface water run-off from the development will be discharged to the existing open drainage ditch to the west of the site at a restricted rate of discharge with adequate storage provided by enlarging the existing attenuation pond situated to the north of the existing farmhouse building.

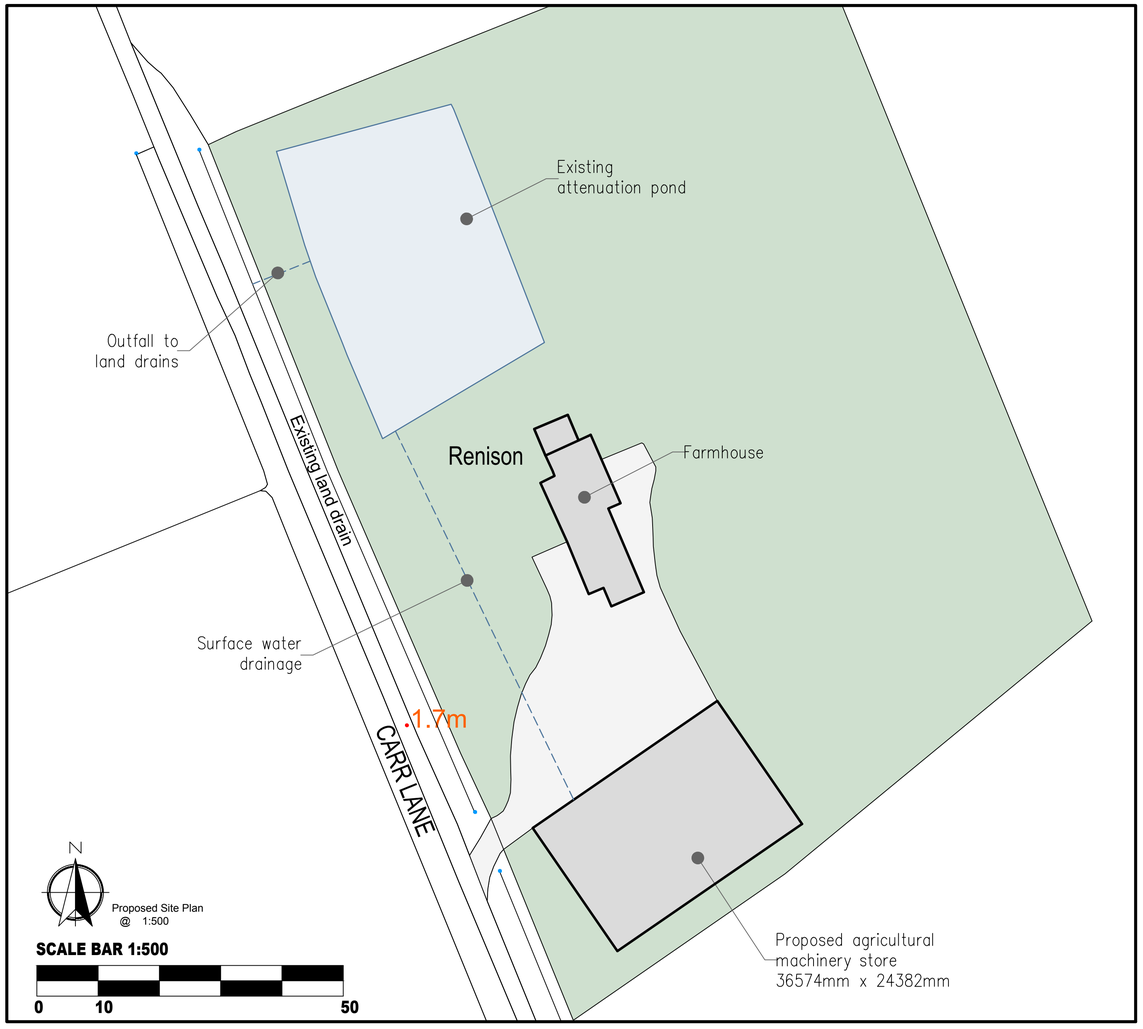
8.9 The sewers will be designed and constructed to meet the requirements of the Building Regulations.

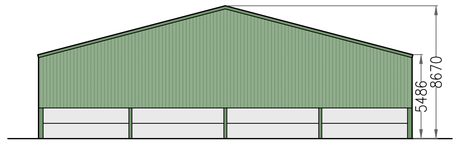
8.10 Based on the findings of this report, it is considered that planning consent for the development can be granted in terms of the flood risk and drainage implications of this application.

Alan Wood & Partners

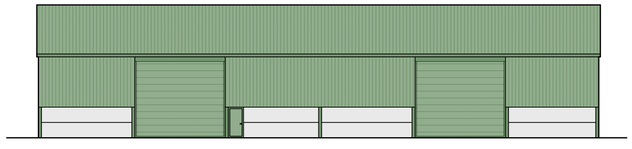
APPENDIX A

Layout Drawing

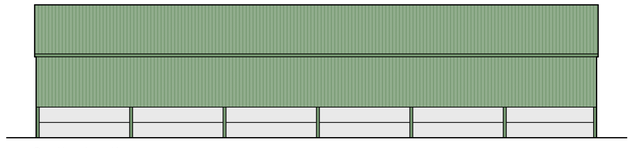




East elevation
(west identical)
@ 1=200

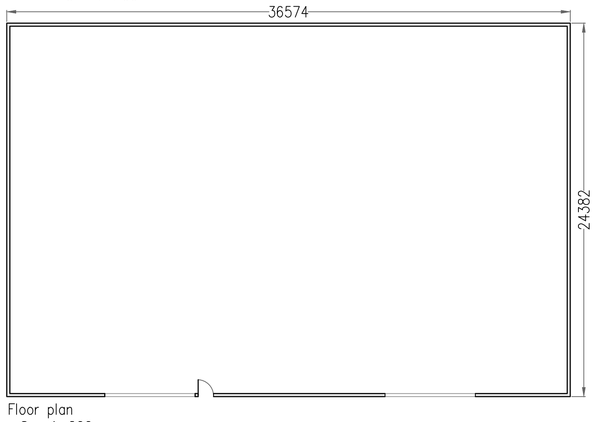


North elevation
@ 1=200

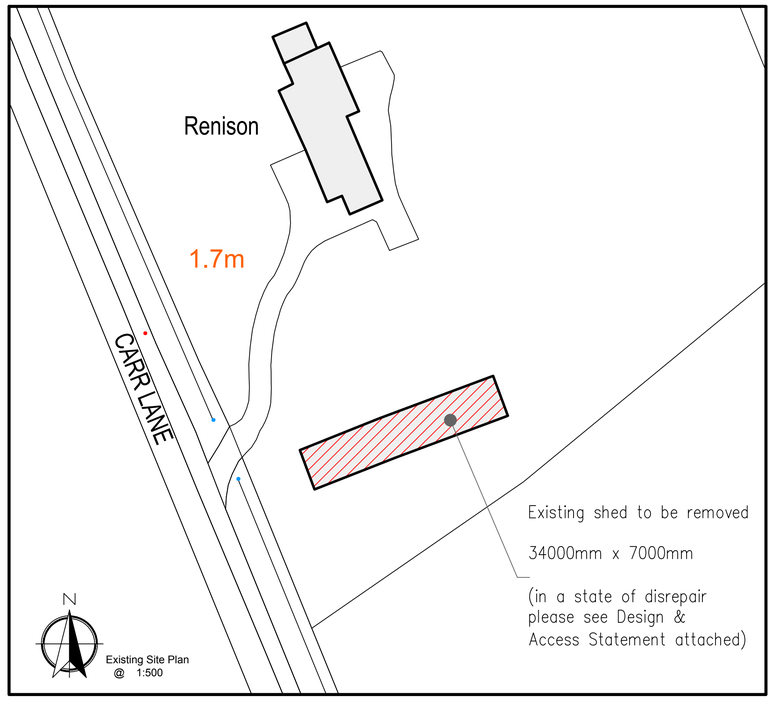


South elevation
@ 1=200

SCALE BAR 1:200
0 5 10 20



Floor plan
@ 1=200



Drawing

Site Location Plan & Elevations A1

IAN PICK ASSOCIATES LTD
Specialist Agricultural & Rural Planning Consultants

Station Farm Offices, Wansford Road, Nafferton,
Driffield, East Yorkshire, YO25 8NJ

T : 01377 253363
E : mail@ianpick.co.uk
W : www.ianpickassociates.co.uk

Project

JW Beaumont Ltd

Scale	1:200 1:500 1:2500	@	A1
Drw No.	JB011223	Rev:	-
Drawn by:	S H	Date:	Dec 2023

APPENDIX B

Ouse & Humber Drainage Board Response

From: Liam Plater <Liam.Plater@yorkshirehumberdrainage.gov.uk>
Sent: Wednesday, January 3, 2024 12:34 PM
To: Alan Dunn <alan.dunn@alanwood.co.uk>
Subject: [Pending]Ref 50159 Proposed Agricultural Building at "Rennison", Carr Lane, Newport

Dear Alan,

Thank you for your emaii regarding the proposed development at Carr Lane, Newport.

I can confirm that we are happy with the discharge rate of 2l/s. While the outfall is not to a Board maintained watercourse, it will still require Land Drainage Consent before construction begins. I have attached the relevant application form for your information.

If you require anything further from us at this stage please let me know.

Kind regards,

Liam

Liam Plater
Senior Development Control Officer

From: Alan Dunn alan.dunn@alanwood.co.uk
Sent on: Tuesday, January 2, 2024 11:13:24 AM
To: Info Info@yorkshirehumberdrainage.gov.uk
Subject: Ref 50159 Proposed Agricultural Building at "Rennison", Carr Lane, Newport

Attachments: JB011223 - Site Location Plan A1.pdf (338.15 KB)

Dear Sirs,

We have been appointed to prepare a flood risk and drainage assessment in support of an application for planning consent for a new agricultural storage building which lies at “Rennison”, to the east of Carr Lane, Newport, East Yorkshire. The development is centred at approx. O.S. grid reference 484205, 431960.

We attach a copy of the site plan and location plan for your information.

It is proposed that the surface water run-off from the new building will be discharged to an existing open drainage ditch fronting the site on Carr Lane. We are proposing a discharge rate of 2l/s ,with storage provided to accommodate the 1 in 100 probability storm plus 30% climate change.

We have checked your asset map which doesn`t show this drainage ditch to lie under your jurisdiction. However, this may outfall to your assets which lie to the north and to the south of the site, lying between Carr Lane and Market Weighton Canal.

We would be grateful if you could advise whether any consents are required from yourselves for this proposal and if so whether our proposed discharge rate will be acceptable.

We wait to hear back from you regarding this matter at your earliest convenience.

Office locations:
Hull
Leeds
Lincoln
Scarborough
Sheffield
York

Kind Regards

Alan Dunn
e: alan.dunn@alanwood.co.uk | **t:** 01482 442138
a: 341 Beverley Road | Hull | HU5 1LD
w: www.alanwood.co.uk

Alan Wood & Partners

APPENDIX C

Hydraulic Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	19.300	Add Flow / Climate Change (%)	0
Ratio R	0.402	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	35.745	0.238	150.2	0.045	1.00	0.0	0.600		o	225	Pipe/Conduit	
S1.001	29.450	0.196	150.3	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S2.000	30.813	0.434	71.0	0.045	1.00	0.0	0.600		o	225	Pipe/Conduit	
S1.002	70.157	0.593	118.3	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.003	6.125	0.032	191.4	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.004	28.139	0.028	1000.0	0.000	0.00	0.0		0.017	→_/		Pond/Tank	
S1.005	5.997	0.035	171.3	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.006	5.339	0.005	1000.0	0.000	0.00	0.0	0.600		o	70	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	1.56	1.100	0.045	0.0	0.0	0.0	1.06	42.3	6.0
S1.001	50.00	2.02	0.862	0.045	0.0	0.0	0.0	1.06	42.3	6.0
S2.000	50.00	1.33	1.100	0.045	0.0	0.0	0.0	1.55	61.8	6.0
S1.002	50.00	2.99	0.666	0.089	0.0	0.0	0.0	1.20	47.8	12.1
S1.003	50.00	3.10	0.072	0.089	0.0	0.0	0.0	0.94	37.4	12.1
S1.004	50.00	3.47	0.040	0.089	0.0	0.0	0.0	1.27	3690.9	12.1
S1.005	50.00	3.60	0.600	0.089	0.0	0.0	0.0	0.76	13.5	12.1
S1.006	50.00	4.09	0.565	0.089	0.0	0.0	0.0	0.18	0.7«	12.1

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.045	0.045	0.045
1.001	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.045	0.045	0.045
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.089	0.089	0.089

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	1.000	0.560	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.300	Storm Duration (mins)	30
Ratio R	0.402		

Storage Structures for Storm

Tank or Pond Pipe: S1.004

Manning's N 0.017 Invert Level (m) 0.040

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	40.0	0.960	130.6

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.402
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Summer	1	+0%				
S1.001	S2	15 Summer	1	+0%	100/15 Summer			
S2.000	S3	15 Summer	1	+0%				
S1.002	S3	15 Summer	1	+0%	100/15 Summer			
S1.003	S4	10080 Winter	1	+0%	1/360 Winter			
S1.004	S5	10080 Winter	1	+0%				
S1.005	S6	10080 Winter	1	+0%				
S1.006	S7	7200 Winter	1	+0%	100/180 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	1.175	-0.150	0.000	0.20			7.9	OK
S1.001	S2	0.934	-0.153	0.000	0.20			8.1	OK
S2.000	S3	1.162	-0.163	0.000	0.15			8.6	OK

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.002	S3	0.760	-0.131	0.000	0.29			13.6	OK
S1.003	S4	0.582	0.285	0.000	0.01			0.2	SURCHARGED
S1.004	S5	0.582	-0.418	0.000	0.00			0.2	OK
S1.005	S6	0.582	-0.168	0.000	0.00			0.0	OK
S1.006	S7	0.567	-0.068	0.000	0.00			0.0	OK

PN	US/MH Name	Level Exceeded
S1.000	S1	
S1.001	S2	
S2.000	S3	
S1.002	S3	
S1.003	S4	
S1.004	S5	
S1.005	S6	
S1.006	S7	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.402
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Summer	30	+0%				
S1.001	S2	15 Summer	30	+0%	100/15 Summer			
S2.000	S3	15 Summer	30	+0%				
S1.002	S3	15 Summer	30	+0%	100/15 Summer			
S1.003	S4	2880 Winter	30	+0%	1/360 Winter			
S1.004	S5	2880 Winter	30	+0%				
S1.005	S6	2880 Winter	30	+0%				
S1.006	S7	2880 Winter	30	+0%	100/180 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	1.226	-0.099	0.000	0.48			19.2	OK
S1.001	S2	0.980	-0.107	0.000	0.50			19.7	OK
S2.000	S3	1.201	-0.124	0.000	0.37			21.1	OK

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.002	S3	0.823	-0.068	0.000	0.73			34.0	OK
S1.003	S4	0.619	0.322	0.000	0.03			0.8	SURCHARGED
S1.004	S5	0.619	-0.381	0.000	0.00			0.8	OK
S1.005	S6	0.619	-0.131	0.000	0.04			0.4	OK
S1.006	S7	0.592	-0.043	0.000	0.33			0.4	OK

PN	US/MH Name	Level Exceeded
S1.000	S1	
S1.001	S2	
S2.000	S3	
S1.002	S3	
S1.003	S4	
S1.004	S5	
S1.005	S6	
S1.006	S7	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.402
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	100	+30%					1.325
S1.001	S2	15 Summer	100	+30%	100/15 Summer				1.113
S2.000	S3	15 Summer	100	+30%					1.240
S1.002	S3	15 Summer	100	+30%	100/15 Summer				1.039
S1.003	S4	600 Winter	100	+30%	1/360 Winter				0.680
S1.004	S5	600 Winter	100	+30%					0.678
S1.005	S6	600 Winter	100	+30%					0.678
S1.006	S7	600 Winter	100	+30%	100/180 Winter				0.673

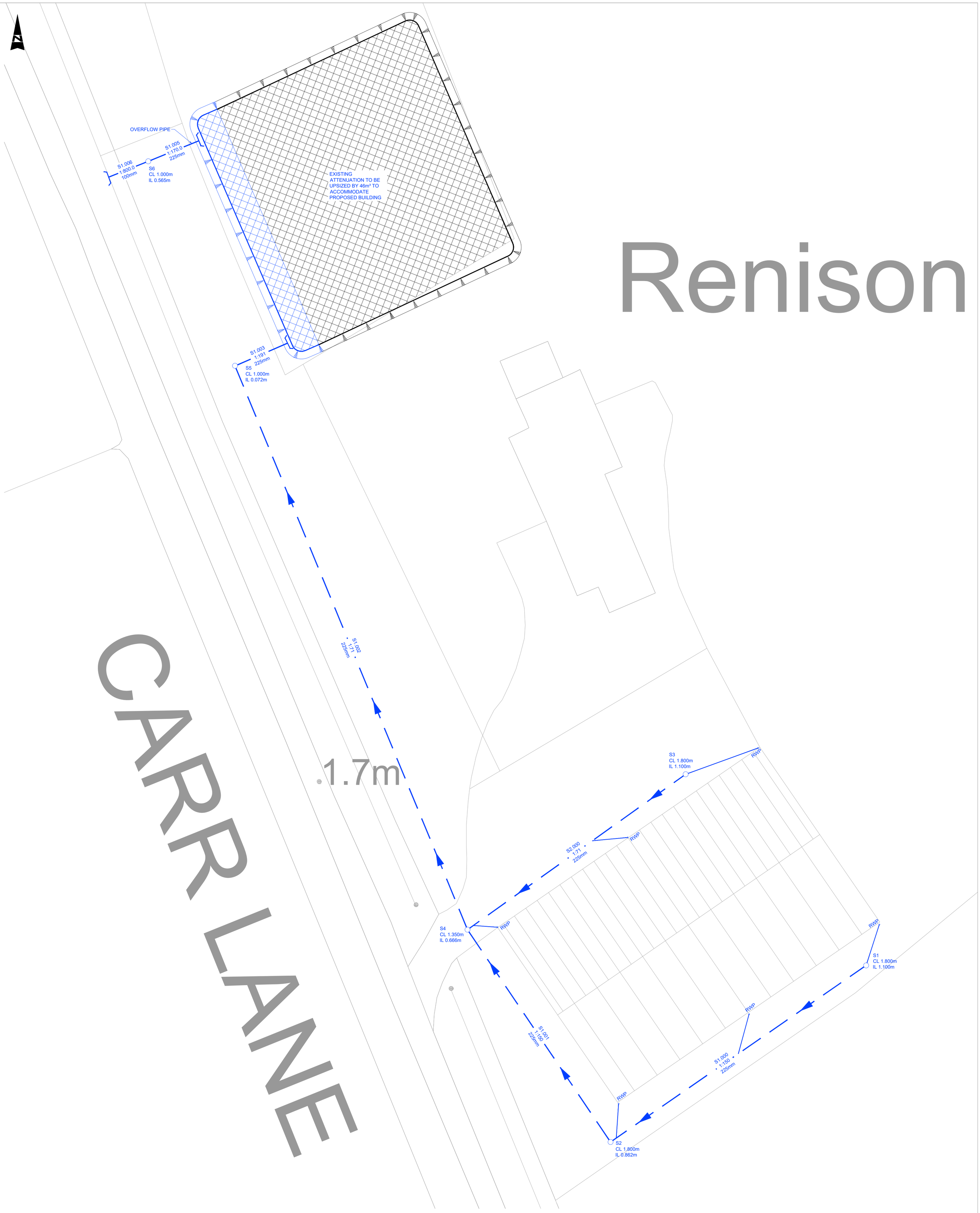
PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.000	0.000	0.82			32.6	OK	
S1.001	S2	0.026	0.000	0.69			27.3	SURCHARGED	
S2.000	S3	-0.085	0.000	0.62			35.7	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S3	0.148	0.000	1.01			46.8	SURCHARGED	
S1.003	S4	0.383	0.000	0.15			4.4	SURCHARGED	
S1.004	S5	-0.322	0.000	0.00			4.4	OK	
S1.005	S6	-0.072	0.000	0.18			2.0	OK	
S1.006	S7	0.038	0.000	1.53			2.0	SURCHARGED	

APPENDIX D

Drainage Strategy and SuDS Details Drawings



Renison

NOTES:

1. THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.
3. DRAWINGS NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.
4. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE AND ENSURE THAT THE BUILDING AND ITS COMPONENTS ARE SAFE DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE-DOWNS WHICH MAY BE NECESSARY, SUCH MATERIAL REMAINING THE THE PROPERTY OF THE CONTRACTOR ON COMPLETION, AND FOR ENSURING THAT THE WORKS AND ANY ADJACENT PROPERTIES ARE SAFE IN THE TEMPORARY CONDITION.

DRAINAGE LEGEND:

	SURFACE WATER PIPEWORK
	SURFACE WATER MANHOLE
RWP	RAIN WATER PIPE

100mm at A1

Rev	Description	Date	By	Chk	App
P1	FIRST ISSUE	15.01.24	HD	AD	--

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Sheffield	T. 01142 440077
York	T. 01904 611594

Project: Rennison, Carr Lane, Newport, Brough

Client: J W Beaumont Ltd

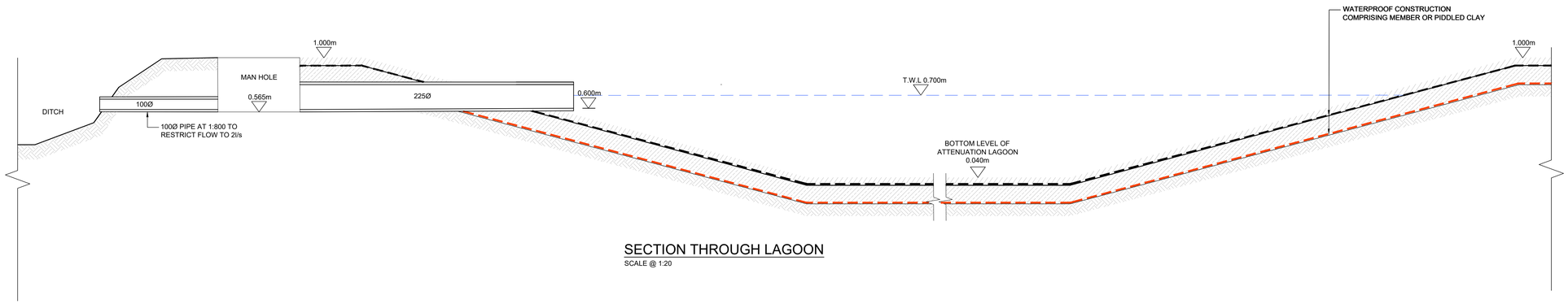
Drawing: Proposed Drainage Strategy

Role: Civil Engineer

Drawing Status: FOR APPROVAL | Suitability Code: -

Job. no. 50159 | Scale@ A1: 1:200 | Rev. P1

Project	Originator	Volume	Level	Type	Role	Number
JWB	AWP	ZZ	XX	DR	C	3300



SECTION THROUGH LAGOON

SCALE @ 1:20

100mm at A1

NOTES:

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Rev	Description	Date	By	Chk	App
P1	FIRST ISSUE	12.01.24	TG	AD	--

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Sheffield T. 01142 440077
York T. 01904 611594

Project:
Rennison, Carr Lane, Newport, Brough

Client:
J W Beaumont Ltd

Drawing:
Drainage Detail Drawing

Role: Civil Engineer

Drawing Status: FOR APPROVAL

Suitability Code: -

Job. no. 50159

Scale@ A1: As Noted

Rev. P1

Project Originator Volume Level Type Role Number
JWB - AWP - ZZ - XX - DR - C - 3600

APPENDIX E

Surface Water Exceedance Flood Routing Drawing

NOTES:

1. THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.
3. DRAWINGS NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.
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KEY

= PROPOSED SURFACE WATER EXCEEDANCE FLOW PATH ROUTE

= EXISTING SURFACE WATER EXCEEDANCE FLOW PATH ROUTE

Rev	Description	Date	By	Chk	App
P1	FIRST ISSUE	10.01.24	HD	AD	--

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Sheffield T. 01142 440077
York T. 01904 611594

Project: Rennison, Carr Lane, Newport, Brough

Client: J W Beaumont Ltd

Drawing: Proposed and Existing Surface water Exceedance

Role: Civil Engineer

Drawing Status: FOR APPROVAL

Suitability Code: -

Job. no. 50159

Scale@ A1: N.T.S

Rev. P1

Project Originator Volume Level Type Role Number

JWB - AWP - ZZ - XX - DR - C - 3400

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APPENDIX F

ENVIRONMENT AGENCY FLOOD DATA

2020 Humber Tribs - Market Weighton defended modelled measurements

Node Point	Annual Exceedance Probability (AEP)																																			
	2	2	5	5	10	10	20	20	25	25	25+CC	25+CC	30	30	50	50	75	75	100	100	100+20%CC	100+20%CC	100+30%CC	100+30%CC	100+50%CC	100+50%CC	200	200	200+20%CC	200+20%CC	200+30%CC	200+30%CC	200+50%CC	200+50%CC	1000	1000
	50% AEP (1 in 2)		20% AEP (1 in 5)		10% AEP (1 in 10)		5% AEP (1 in 20)		4% AEP (1 in 25)		4% AEP (1 in 25) +50% CC		3.33% AEP (1 in 30)		2% AEP (1 in 50)		1.33% AEP (1 in 75)		1% AEP (1 in 100)		1% AEP (1 in 100) +20% CC		1% AEP (1 in 100) +30% CC		1% AEP (1 in 100) +50% CC		0.5% AEP (1 in 200)		0.5% AEP (1 in 200) +20% CC		0.5% AEP (1 in 200) +30% CC		0.5% AEP (1 in 200) +50% CC		0.1% AEP (1 in 1000)	
	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)
EA12321445e_MKWC01_4815	0.8	13.24	0.96	15.32	1.08	17.45	1.23	18.65	1.27	19.52	1.84	26.22	1.31	20.06	1.41	21.27	1.49	22.51	1.55	23.46	1.73	26.07	12.2	27.67	1.86	29.9	1.7	25.89	1.82	28.38	1.86	29.71	1.95	34.05	1.9	32.34
EA12321445e_MKWC01_5252i	0.81	13.19	0.98	15.18	1.1	17.23	1.24	18.54	1.29	19.32	1.85	26.07	1.33	19.96	1.43	21.25	1.51	22.47	1.57	23.34	1.74	25.87	12.07	27.57	1.88	29.75	1.71	25.87	1.84	28.35	1.88	29.65	1.98	33.99	1.93	32.18
EA12321445e_MKWC01_5670i	0.83	13.14	1	15.07	1.12	17.22	1.27	18.45	1.32	19.29	1.87	25.92	1.35	19.97	1.45	21.19	1.53	22.35	1.6	23.19	1.77	25.83	11.99	27.5	1.9	29.7	1.74	25.85	1.87	28.18	1.9	29.55	2.01	33.95	1.96	32.15

2020 Humber Tribs - Market Weighton defences removed modelled measurements

Node Point	Annual Exceedance Probability (AEP)																																			
	2	2	5	5	10	10	20	20	25	25	25+CC	25+CC	30	30	50	50	75	75	100	100	100+20%CC	100+20%CC	100+30%CC	100+30%CC	100+50%CC	100+50%CC	200	200	200+20%CC	200+20%CC	200+30%CC	200+30%CC	200+50%CC	200+50%CC	1000	1000
	50% AEP (1 in 2)		20% AEP (1 in 5)		10% AEP (1 in 10)		5% AEP (1 in 20)		4% AEP (1 in 25)		4% AEP (1 in 25) +50% CC		3.33% AEP (1 in 30)		2% AEP (1 in 50)		1.33% AEP (1 in 75)		1% AEP (1 in 100)		1% AEP (1 in 100) +20% CC		1% AEP (1 in 100) +30% CC		1% AEP (1 in 100) +50% CC		0.5% AEP (1 in 200)		0.5% AEP (1 in 200) +20% CC		0.5% AEP (1 in 200) +30% CC		0.5% AEP (1 in 200) +50% CC		0.1% AEP (1 in 1000)	
	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)
EA12321445e_MKWC01_4815	0.74	12.2	0.89	14.09	0.99	15.52	1.1	17.04	1.14	17.56	1.73	23.66	1.17	18.04	1.26	19.33	1.34	20.32	1.39	21.18	1.56	23.82	1.65	25.51	1.77	29.01	1.53	23.26	1.71	26.94	1.77	28.91	1.89	33.58	1.84	31.6
EA12321445e_MKWC01_5252i	0.75	12.07	0.9	14.01	1	15.44	1.12	16.95	1.16	17.47	1.73	23.55	1.19	17.94	1.28	19.24	1.36	20.24	1.41	21.09	1.58	23.73	1.66	25.43	1.79	28.98	1.55	23.18	1.73	26.85	1.78	28.89	1.91	33.54	1.86	31.55
EA12321445e_MKWC01_5670i	0.77	11.99	0.92	13.94	1.03	15.37	1.14	16.88	1.18	17.39	1.74	23.45	1.22	17.86	1.31	19.16	1.38	20.18	1.44	21.02	1.61	23.65	1.68	25.34	1.8	28.96	1.57	23.1	1.74	26.77	1.8	28.89	1.94	33.52	1.88	31.51

2020 Humber Strategy Modelling –
Extreme Water Levels

Emission Scenario: Extreme
(H++)

	Emission Scenario: Extreme (H++)									Emission Scenario: Extreme (H++)									Emission Scenario: Extreme (H++)				
	Epoch: 2021				Epoch: 2040					Epoch: 2046				Epoch: 2071					Epoch: 2121				
	% flow increase and sea level rise (SLR)				% flow increase and sea level rise					% flow increase and sea level rise (SLR)				% flow increase and sea level rise					% flow increase and sea level rise (SLR)				
	20% flow increase, 0.03 m SLR				35% flow increase, 0.28 m SLR					35% flow increase, 0.37 m SLR				65% flow increase, 0.97 m SLR					65% flow increase, 2.64 m SLR				
	Annual Exceedance Probability (AEP)				Annual Exceedance Probability (AEP)					Annual Exceedance Probability (AEP)				Annual Exceedance Probability (AEP)					Annual Exceedance Probability (AEP)				
	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)		5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)		5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)
Node points	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	**Node points**	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	**Node points**	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)
HU_0_008	5.49	5.79	5.95	6.13	5.74	5.98	6.09	6.23	HU_0_008	5.82	6.03	6.13	6.26	6.17	6.28	6.37	6.49	HU_0_008	6.87	6.97	7.04	7.17
HU_0_009	5.47	5.78	5.94	6.13	5.72	5.97	6.09	6.23	HU_0_009	5.81	6.03	6.13	6.26	6.17	6.29	6.36	6.49	HU_0_009	6.9	7.01	7.08	7.21
HU_0_010	5.45	5.76	5.92	6.11	5.7	5.96	6.08	6.23	HU_0_010	5.79	6.01	6.12	6.26	6.17	6.29	6.34	6.49	HU_0_010	6.91	7.03	7.1	7.23
HU_0_011	5.44	5.74	5.91	6.12	5.69	5.95	6.07	6.24	HU_0_011	5.78	6.01	6.12	6.27	6.18	6.3	6.36	6.5	HU_0_011	6.97	7.1	7.17	7.32

2020 Humber Strategy Modelling –
Extreme Water Levels

	Emission Scenario: High (Upper End)									Emission Scenario: High (Upper End)									Emission Scenario: High (Upper End)				
	Epoch: 2021				Epoch: 2040					Epoch: 2046				Epoch: 2071					Epoch: 2121				
	% flow increase and sea level rise (SLR)				% flow increase and sea level rise					% flow increase and sea level rise (SLR)				% flow increase and sea level rise					% flow increase and sea level rise (SLR)				
	20% flow increase, 0.03 m SLR				30% flow increase, 0.18 m SLR					30% flow increase, 0.23 m SLR				50% flow increase, 0.54 m SLR					50% flow increase, 1.38 m SLR				
	Annual Exceedance Probability (AEP)				Annual Exceedance Probability (AEP)					Annual Exceedance Probability (AEP)				Annual Exceedance Probability (AEP)					Annual Exceedance Probability (AEP)				
	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)		5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)		5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)
Node points	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	**Node points**	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	**Node points**	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)
HU_0_008	5.49	5.79	5.95	6.13	5.64	5.91	6.04	6.19	HU_0_008	5.69	5.95	6.07	6.21	5.95	6.12	6.2	6.31	1	6.34	6.46	6.51	6.59
HU_0_009	5.47	5.78	5.94	6.13	5.63	5.9	6.03	6.19	HU_0_009	5.68	5.94	6.06	6.21	5.94	6.12	6.2	6.32	2	6.33	6.46	6.52	6.59
HU_0_010	5.45	5.76	5.92	6.11	5.61	5.88	6.02	6.18	HU_0_010	5.66	5.92	6.05	6.21	5.92	6.11	6.2	6.32	3	6.32	6.45	6.51	6.6
HU_0_011	5.44	5.74	5.91	6.12	5.6	5.88	6.01	6.19	HU_0_011	5.64	5.91	6.04	6.22	5.92	6.11	6.21	6.34	4	6.34	6.46	6.52	6.62

2020 Humber Strategy Modelling –
Extreme Water Levels

	Emission Scenario: Medium (Higher Central)									Emission Scenario: Medium (Higher Central)									Emission Scenario: Medium (Higher Central)			
	Epoch									Epoch									Epoch			
	Baseline - 2021				2040					2046				2071					2121			
	% flow increase and sea level rise (SLR)				% flow increase and sea level rise					% flow increase and sea level rise (SLR)				% flow increase and sea level rise					% flow increase and sea level rise (SLR)			
	15% flow increase, 0.02 m SLR				20% flow increase, 0.14 m SLR					20% flow increase, 0.19 m SLR				30% flow increase, 0.42 m SLR					30% flow increase, 1.02 m SLR			
	Annual Exceedance Probability (AEP)				Annual Exceedance Probability (AEP)					Annual Exceedance Probability (AEP)				Annual Exceedance Probability (AEP)					Annual Exceedance Probability (AEP)			
	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)		5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)	5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)		5% (1 in 20)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)
Node points	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	**Node points**	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	**Node points**	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)	Max level (mAOD)
HU_0_008	5.48	5.78	5.94	6.12	5.6	5.88	6.02	6.18	HU_0_008	5.65	5.92	6.04	6.2	5.86	6.06	6.16	6.28	HU_0_008	6.2	6.3	6.39	6.5
HU_0_009	5.46	5.77	5.93	6.12	5.59	5.87	6.01	6.18	HU_0_009	5.64	5.91	6.04	6.2	5.85	6.05	6.15	6.28	HU_0_009	6.2	6.3	6.38	6.51
HU_0_010	5.44	5.75	5.91	6.11	5.56	5.85	5.99	6.17	HU_0_010	5.62	5.89	6.02	6.19	5.83	6.04	6.14	6.28	HU_0_010	6.19	6.3	6.36	6.5
HU_0_011	5.43	5.73	5.9	6.11	5.55	5.84	5.98	6.17	HU_0_011	5.6	5.88	6.02	6.2	5.82	6.04	6.15	6.29	HU_0_011	6.2	6.32	6.38	6.52

2020 Humber Tribs - Market Weighton defended modelled measurements

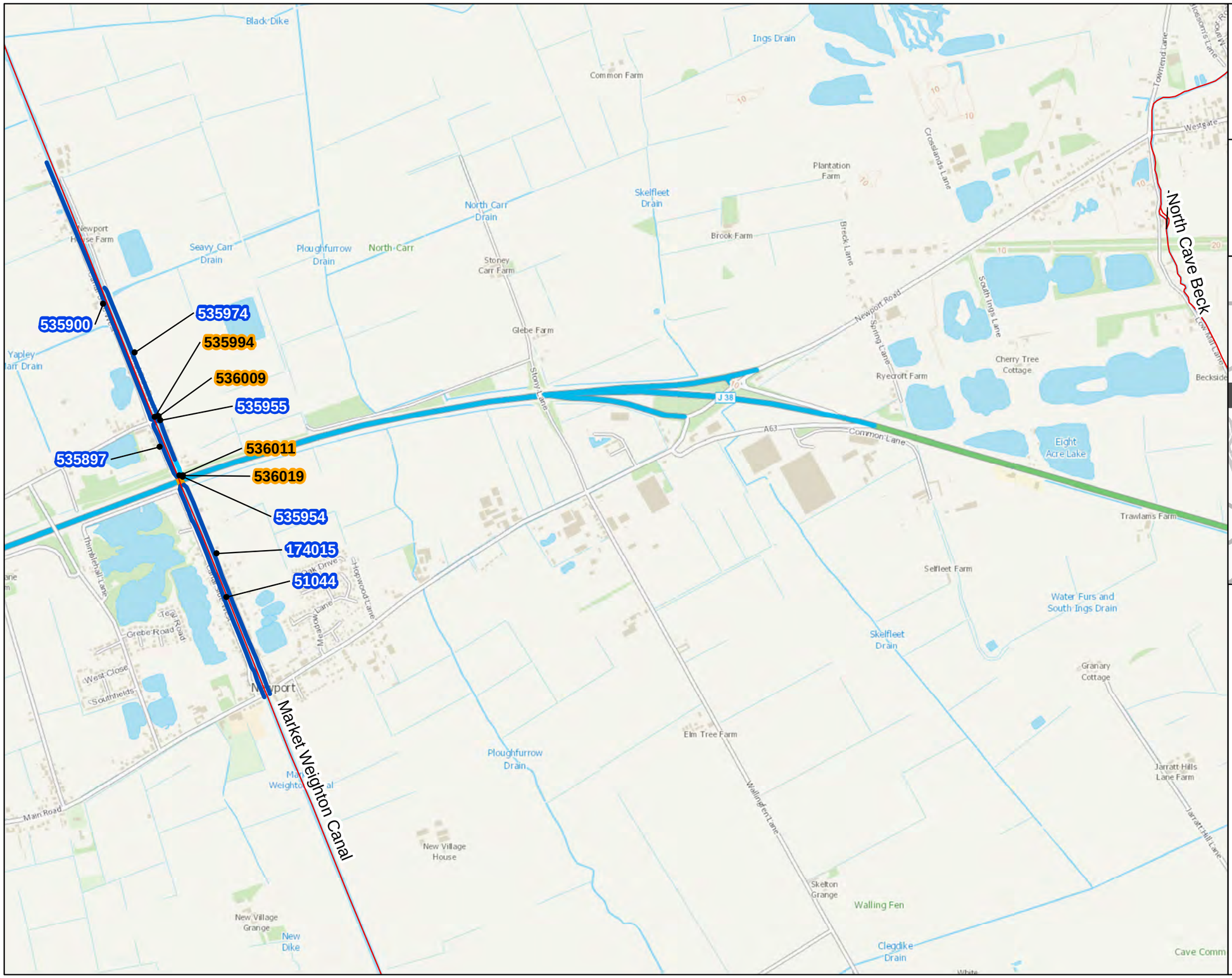
Node Point	Annual Exceedance Probability (AEP)																																			
	2	2	5	5	10	10	20	20	25	25	25+CC	25+CC	30	30	50	50	75	75	100	100	100+20%CC	100+20%CC	100+30%CC	100+30%CC	100+50%CC	100+50%CC	200	200	200+20%CC	200+20%CC	200+30%CC	200+30%CC	200+50%CC	200+50%CC	1000	1000
	50% AEP (1 in 2)		20% AEP (1 in 5)		10% AEP (1 in 10)		5% AEP (1 in 20)		4% AEP (1 in 25)		4% AEP (1 in 25) +50% CC		3.33% AEP (1 in 30)		2% AEP (1 in 50)		1.33% AEP (1 in 75)		1% AEP (1 in 100)		1% AEP (1 in 100) +20% CC		1% AEP (1 in 100) +30% CC		1% AEP (1 in 100) +50% CC		0.5% AEP (1 in 200)		0.5% AEP (1 in 200) +20% CC		0.5% AEP (1 in 200) +30% CC		0.5% AEP (1 in 200) +50% CC		0.1% AEP (1 in 1000)	
	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)
EA12321445e_MKWC01_4815	0.8	13.24	0.96	15.32	1.08	17.45	1.23	18.65	1.27	19.52	1.84	26.22	1.31	20.06	1.41	21.27	1.49	22.51	1.55	23.46	1.73	26.07	12.2	27.67	1.86	29.9	1.7	25.89	1.82	28.38	1.86	29.71	1.95	34.05	1.9	32.34
EA12321445e_MKWC01_5252i	0.81	13.19	0.98	15.18	1.1	17.23	1.24	18.54	1.29	19.32	1.85	26.07	1.33	19.96	1.43	21.25	1.51	22.47	1.57	23.34	1.74	25.87	12.07	27.57	1.88	29.75	1.71	25.87	1.84	28.35	1.88	29.65	1.98	33.99	1.93	32.18
EA12321445e_MKWC01_5670i	0.83	13.14	1	15.07	1.12	17.22	1.27	18.45	1.32	19.29	1.87	25.92	1.35	19.97	1.45	21.19	1.53	22.35	1.6	23.19	1.77	25.83	11.99	27.5	1.9	29.7	1.74	25.85	1.87	28.18	1.9	29.55	2.01	33.95	1.96	32.15

2020 Humber Tribs - Market Weighton defences removed modelled measurements

Node Point	Annual Exceedance Probability (AEP)																																			
	2	2	5	5	10	10	20	20	25	25	25+CC	25+CC	30	30	50	50	75	75	100	100	100+20%CC	100+20%CC	100+30%CC	100+30%CC	100+50%CC	100+50%CC	200	200	200+20%CC	200+20%CC	200+30%CC	200+30%CC	200+50%CC	200+50%CC	1000	1000
	50% AEP (1 in 2)		20% AEP (1 in 5)		10% AEP (1 in 10)		5% AEP (1 in 20)		4% AEP (1 in 25)		4% AEP (1 in 25) +50% CC		3.33% AEP (1 in 30)		2% AEP (1 in 50)		1.33% AEP (1 in 75)		1% AEP (1 in 100)		1% AEP (1 in 100) +20% CC		1% AEP (1 in 100) +30% CC		1% AEP (1 in 100) +50% CC		0.5% AEP (1 in 200)		0.5% AEP (1 in 200) +20% CC		0.5% AEP (1 in 200) +30% CC		0.5% AEP (1 in 200) +50% CC		0.1% AEP (1 in 1000)	
	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)	Level (mAOD)	Flow (m3/s)
EA12321445e_MKWC01_4815	0.74	12.2	0.89	14.09	0.99	15.52	1.1	17.04	1.14	17.56	1.73	23.66	1.17	18.04	1.26	19.33	1.34	20.32	1.39	21.18	1.56	23.82	1.65	25.51	1.77	29.01	1.53	23.26	1.71	26.94	1.77	28.91	1.89	33.58	1.84	31.6
EA12321445e_MKWC01_5252i	0.75	12.07	0.9	14.01	1	15.44	1.12	16.95	1.16	17.47	1.73	23.55	1.19	17.94	1.28	19.24	1.36	20.24	1.41	21.09	1.58	23.73	1.66	25.43	1.79	28.98	1.55	23.18	1.73	26.85	1.78	28.89	1.91	33.54	1.86	31.55
EA12321445e_MKWC01_5670i	0.77	11.99	0.92	13.94	1.03	15.37	1.14	16.88	1.18	17.39	1.74	23.45	1.22	17.86	1.31	19.16	1.38	20.18	1.44	21.02	1.61	23.65	1.68	25.34	1.8	28.96	1.57	23.1	1.74	26.77	1.8	28.89	1.94	33.52	1.88	31.51

RFI/2021/240379 Assets Map centred on your site at Newport, East Yorkshire

Date created: 07/01/2022



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N W E S

LEGEND

Main River

Defences (EA maintained)

asset_sub_

Embankment

Wall

Defences (3rd party maintained)

asset_sub_

Bridge Abutment

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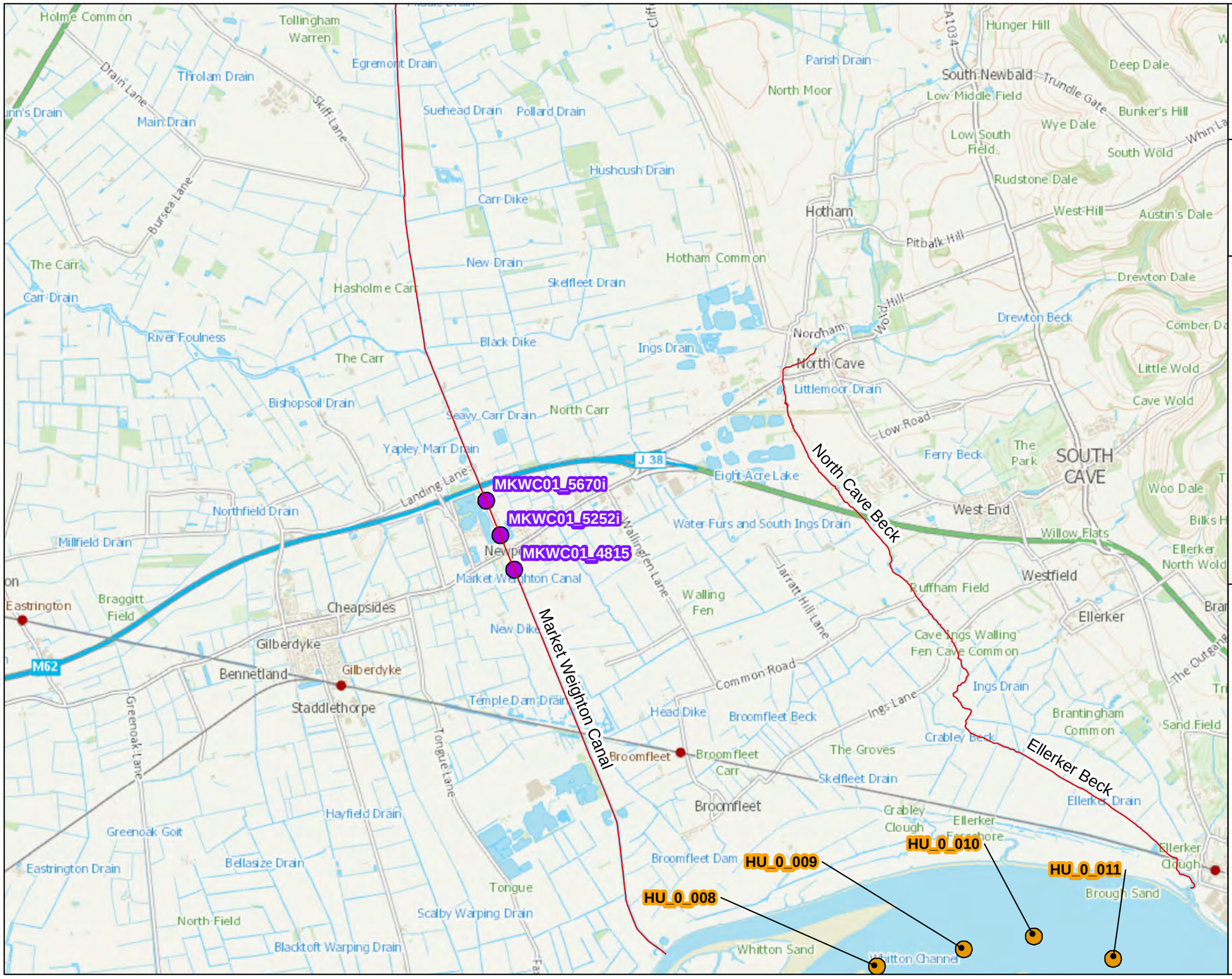
Defences (EA Maintained) - RFI/2021/240379										
ASSET ID	DESCRIPTION	ASSET MAINTAINER	ASSETS TYPE	LENGTH (m)	ACTUAL Downstream Crest Level (mAOD)	ACTUAL Upstream Crest Level (mAOD)	PROTECTION	TARGET CONDITION	OVERALL CONDITION	DESIGN STANDARD OF PROTECTION (SOP)
174015		Environment Agency	Wall	816.71	3.22	1.90	Fluvial	2	4	50
51044		Environment Agency	Wall	826.41	3.00	3.00	Fluvial	2	4	50
535897		Environment Agency	Wall	217.07			Fluvial	2	4	50
535900		Environment Agency	Wall	1009.09			Fluvial	2	4	50
535954		Environment Agency	Embankment	61.18			Fluvial	2	4	
535955		Environment Agency	Wall	155.76			Fluvial	2	5	50
535974		Environment Agency	Wall	510.54			Fluvial	2	5	50

Defences (3rd Party Maintained) - RFI/2021/240379										
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)
535994		Local Authority	Bridge Abutment	10.76			Fluvial			
536009		Local Authority	Bridge Abutment	10.96			Fluvial			
536011		Local Authority	Bridge Abutment	34.68			Fluvial			
536019		Local Authority	Bridge Abutment	35.19			Fluvial			

RFI/2021/240379 Node Point Map centred on your site at Newport, East Yorkshire

Date created: 07/01/2022



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LEGEND

- Main River
- 2020 Humber Extreme Water Levels
- 2021 Humber Tribs Node Points

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