UK Flood Risk
Flood Risk Consultants

# *Flood Risk Assessment*

## Norman Road, Rochdale OL11 4HP

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# Executive Summary

The proposed development at Norman Road, Rochdale involves the demolition of an existing MOT centre and scrapyard and the construction of seven industrial units with associated parking and landscaping.

The majority of the site lies within Flood Zone 2 (i.e. low probability flooding), with a very small area in Flood Zone 3 (high probability flooding), and is therefore subject to fluvial flood risk from the nearby River Roch. No historic flooding has been recorded. An assessment of the Environment Agency's modelling data indicates that the site is affected by the 1% AEP and 1% AEP plus climate change events, with maximum flood depths of up to 0.62 m, representing a moderate to high flood hazard during extreme events.

Surface water and other sources of flooding are considered low risk.

Mitigation measures include setting finished floor levels at a minimum of 114.12 mAOD (300 mm above the 1% AEP plus climate change level), provision of approximately 360m³ of compensatory flood storage via an open pond, and incorporation of flood resilience measures.

The development will not increase flood risk elsewhere and is considered safe for its design life and compliant with relevant policy.

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## Abbreviations

| Abbreviation | Description |
|---|---|
| mAOD | Metres Above Ordnance Datum |
| EA | Environment Agency |
| FRA | Flood Risk Assessment |
| LLFA | Lead Local Flood Authority |
| NPPF | National Planning Policy Framework |
| PFRA | Preliminary Flood Risk Assessment |

# 1.0 Background

UK Flood Risk has been commissioned to prepare this Flood Risk Assessment (FRA) in support of a proposal consisting of demolition of existing MOT centre and scrapyard and erection of 7 no. industrial units with car parking and landscaping located at Norman Road, Rochdale OL11 4HP.

This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF, February 2025), the Environment Agency's Flood Risk Assessment (FRA) Guidance Notes, and recognised best practices in flood risk management ensuring that the proposed development incorporates appropriate flood mitigation measures and addresses all relevant flood risk considerations.

# 2.0 FRA Requirements and Objectives

The key objectives of this Site-Specific Flood Risk Assessment (FRA) are to:

- Identify all potential sources of flooding that may affect the development site, including fluvial (river), surface water, groundwater, sewer, and reservoir flooding.
- Assess the level of flood risk to the proposed development, both in the present day and accounting for the potential impacts of climate change.
- Evaluate the suitability of the proposed development type and its location in relation to the identified flood risk, in accordance with the National Planning Policy Framework (NPPF) and relevant local policy.
- Demonstrate that the development will be safe for its lifetime without increasing flood risk elsewhere, through appropriate mitigation and resilience measures.
- Support the application of the Sequential Test and, where required, the Exception Test, to justify the location of development within a flood risk area.
- Comply with the requirements of the Environment Agency, Lead Local Flood Authority (LLFA), and the Local Planning Authority (LPA) for managing flood risk in the planning process.

# 3.0 General Description of the Site and the Proposals

## 3.1. Description of the site

The proposal site is located at Norman Road, Rochdale OL11 4HP approximately centred on the OS NGR SD 88726 12748 (**Appendix A Figure 1**). The site is located within the administrative boundary of Rochdale Metropolitan Borough Council, which acts as the Lead Local Flood Authority (LLFA) for the area and is responsible for the management of flood risk from surface water, groundwater, and ordinary watercourses, in accordance with the Flood and Water Management Act 2010.

The site occupies an area of approximately 0.49ha and is currently in use as an MOT centre and scrap yard. The surrounding area comprises a mix of residential and commercial land uses (**Appendix A, Figure 2).** Vehicular access to the site is provided via Norman Road (**Appendix B**).

The British Geological Survey geological maps provided in **Appendix C** indicate that the site is underlain by the Pennine Lower Coal Measures Formation, comprising mudstone, siltstone, and sandstone deposited during the Carboniferous period (approximately 319-318 million years ago). Superficial deposits at the site consist of alluvium, including clay, silt, sand, and gravel, formed during the Quaternary period (from approximately 11.8 thousand years ago to the present).

The site is located in close proximity to the River Roch with the risk of fluvial flooding.

The site topography is relatively flat and level, with ground elevations ranging from approximately 113.20mAOD to 113.70mAOD, as shown in **Appendix D**. The existing building on the site has a finished floor level of approximately 113.20mAOD. Further information regarding the existing site conditions is provided in **Appendix B**.

## 3.2. Proposed Development

The proposal is for the demolition of existing MOT centre and scrapyard and erection of 7 no. industrial units with car parking and landscaping. Further details about the proposals have been provided in **Appendix B**.

# 4.0 Development and Flood Risk Policy

## 4.1. National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF, February 2025) sets out the government's planning policies for England. The NPPF sets out planning and policies related to development planning and flood risk using a sequential characterisation of risk based on planning zones and the Environment Agency's Flood Maps. The aim of the flood risk assessment is to identify which Flood Zones the site is located in and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

## 4.2. Flood Zones

The Flood Zones refer to the probability of river and sea flooding which ignores the presence of defences. The national flood maps have been developed by the Environment Agency that shows the risk of tidal and/or fluvial flooding across England and Wales for different return period events. The Environment Agency's Flood Maps are the maps which have been developed using broad scale hydraulic modelling. It is therefore important to understand that the flood maps may not be very accurate at a site-specific level which may need further field observation and measurements. The Flood Zones do not take into account of the climate change impacts which must be considered in any flood risk assessment as required by the NPPF.

## 4.3. Sequential and Exception Tests

As set out in the NPPF, the overall aim of the Sequential Test should be to steer new development to Flood Zone 1 (Low Probability Flooding). Where there are no reasonably available sites in Flood Zone 1, the Local Authority should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required. Where there are no reasonably available sites in Flood Zones 1 or 2, the suitability of sites in Flood Zone 3 should be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

As the proposal is for the redevelopment of the existing site, the Sequential Test will not be required.

The Exception Test, as set out in the NPPF Framework, is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites

at lower risk of flooding are not available. There are two requirements to meet for the Exception Tests. The proposed development will provide wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

## 4.4. Vulnerability of Use and Flood Risk Assessment

The majority of the site is located in Flood Zone 2 (i.e. medium probability flooding). The proposed development is categorised as 'less vulnerable' (**Table 2**). The proposed development is therefore considered appropriate at this location (**Table 3**).

All types of flood risk are considered as part of the Flood Risk Assessment. A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

This FRA aims to demonstrate that the proposal will remain safe for its lifetime and will not increase flood risk elsewhere.

## 4.5. NPPF Flood Zones

Table 1 below shows the NPPF Flood Zones and the requirements and policy aims in terms of undertaking site-specific flood risk assessment.

Table 1 - NPPF Flood Zones and Requirements (NPPF Technical Guidance)

| **Zone 1: Low Probability Flood Zone** | **This is defined as the land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).** |
|---|---|
| **Appropriate uses** | All uses of land are appropriate in this zone. |
| **FRA requirements** | For development proposals on sites comprising 1 ha or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA. |
| **Policy aims** | Developers and local authorities should seek opportunities to reduce the overall level of flood risk through the layout and form of the development, and |

| | |
|---|---|
| | the appropriate application of sustainable drainage techniques. |
| **Zone 2: Medium Probability Flood Zone** | **This is defined as the land assessed as having 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.** |
| **Appropriate uses** | The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure in Table 2 are appropriate in this zone.<br>Highly vulnerable uses in Table 2 are only appropriate in this zone if the Exception Test is passed. |
| **FRA requirements** | All proposals in this zone should be accompanied by a FRA. |
| **Policy aims** | Developers and local authorities should seek opportunities to reduce the overall level of flood risk through the layout and form of the development, and the appropriate application of sustainable drainage techniques. |
| **Zone 3a: High Probability Flood Zone** | **This is defined as the land assessed as having a 1 in 100 or greater annual probability of river flooding (<1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.** |
| **Appropriate uses** | The water-compatible and less vulnerable uses of land in Table 2 are appropriate in this zone.<br>The highly vulnerable uses (Table 2) should not be permitted in this zone.<br>The more vulnerable and essential infrastructure uses in Table 2 should only be permitted in this zone if the Exception Test is passed. |
| **FRA requirements** | All proposals in this zone should be accompanied by a FRA. |
| **Policy aims** | Developers and local authorities should seek opportunities to: |

| | |
|---|---|
| | ❖ reduce the overall level of flood risk through the layout and form of the development and the appropriate application of sustainable drainage techniques;<br>❖ relocate existing development to land with a lower probability of flooding;<br>❖ create space for flooding to occur by allocating and safeguarding open space for flood storage. |
| **Zone 3b: Functional Floodplain** | **This is the land where water has to flow or be stored in times of flood. This zone is generally defined as the land which would flood with an annual probability of 1 in 20 (5%AEP) or greater in any year. The Local Council may define the Functional Floodplain area with a different annual probability of event.** |
| **Appropriate uses** | Only the water-compatible uses and the essential infrastructure listed in Table 2 that has to be there should be permitted. It should be designed and constructed to:<br>❖ remain operational and safe for users in times of flood;<br>❖ result in no net loss of floodplain storage;<br>❖ not impede water flows;<br>❖ not increase flood risk elsewhere. |
| **FRA requirements** | All proposals in this zone should be accompanied by a FRA. |
| **Policy aims** | In this zone, developers and local authorities should seek opportunities to:<br>❖ reduce the overall level of flood risk through the layout and form of the development and the appropriate application of sustainable drainage techniques;<br>❖ relocate existing development to land with a lower probability of flooding. |

Table 2 - Flood Risk Vulnerability Classification (NPPF Technical Guidance)

| | |
|---|---|
| **Essential Infrastructure** | Essential transport infrastructure and strategic utility infrastructure, including electricity generating power stations and grid and primary substations. |
| **Highly Vulnerable** | ❖ Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations and emergency dispersal points.<br>❖ Basement dwellings, caravans, mobile homes and park homes intended for permanent residential use.<br>❖ Installations requiring hazardous substances consent. |
| **More Vulnerable** | ❖ Hospitals, residential institutions such as residential care homes, children's homes,<br>❖ Social services homes, prisons and hostels.<br>❖ Buildings used for: dwelling houses, student halls of residence, drinking establishments, nightclubs, hotels and sites used for holiday or short-let caravans and camping.<br>❖ Non–residential uses for health services, nurseries and education.<br>❖ Landfill and waste management facilities for hazardous waste. |
| **Less Vulnerable** | ❖ Buildings used for shops, financial, professional and other services, restaurants and cafes, offices, industry, storage and distribution, and assembly and leisure.<br>❖ Land and buildings used for agriculture and forestry.<br>❖ Waste treatment (except landfill and hazardous waste facilities), minerals working and processing (except for sand and gravel).<br>❖ Water treatment plants and sewage treatment plants (if adequate pollution control measures are in place). |

| | |
|---|---|
| **Water-compatible Development** | ❖ Flood control infrastructure, water transmission infrastructure and pumping stations.<br>❖ Sewage transmission infrastructure and pumping stations.<br>❖ Sand and gravel workings.<br>❖ Docks, marinas and wharves, navigation facilities.<br>❖ MOD defence installations.<br>❖ Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location<br>❖ Water-based recreation (excluding sleeping accommodation).<br>❖ Lifeguard and coastguard stations.<br>❖ Amenity open space, nature conservation and biodiversity, outdoor sports and recreation.<br>❖ Essential sleeping or residential accommodation for staff required by uses in this category, subject to a warning and evacuation plan. |

Table 3 - Flood Risk Vulnerability and Flood Zone 'compatibility'

| **Vulnerability Classification (Refer Table 2)** | | **Essential Infrastructure** | **Water Compatible** | **Highly Vulnerable** | **More Vulnerable** | **Less Vulnerable** |
|---|---|---|---|---|---|---|
| Flood Zones | Flood Zone 1 | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Flood Zone 2 | ✓ | ✓ | Exception Test | ✓ | ✓ |
| | Flood Zone 3a | Exception Test | ✓ | ✗ | Exception Test | ✓ |
| | Flood Zone 3b | Exception Test | ✓ | ✗ | ✗ | ✗ |

✓ Development is appropriate

✗ Development should not be permitted

# 5.0 Assessment of Flood Risk

## 5.1. History of Flooding

The Bury Rochdale and Oldham Preliminary Flood Risk Assessment, PFRA (December 2009) and the Rochdale Borough's Strategy for Flood Risk Management 2014-2024 have provided brief information about past flooding events in the area. The reports reported some flooding incidents in the area, however, there were no records of any flooding event at the site. In addition, information on historic flooding was obtained from the Environment Agency's online records of historic flood events in the area. Information on historic floods was also obtained from the Environment Agency. There were no records of any flooding incidents around the site.

## 5.2. Risk of Fluvial Flooding

The site is located in close proximity to the River Roch with the risk of fluvial flooding. The Environment Agency's Flood Map around the site is shown in Appendix **E Figure 1** which shows that the majority of the site lies within the Flood Zone 2 (i.e. medium probability flooding). Flood Zone 2 outline shows a land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding. **Appendix E Figure 2** shows that the site will remain within the Flood Zone 2 (i.e. medium probability flooding) when climate change is considered for the future 2070-2125 time frame.

The flood maps also show that a small part of the site around the north west corner is located in Flood Zone 3 (i.e. high probability flooding). Flood Zone 3 is defined as the land assessed as having a 1 in 100 or greater annual probability of river flooding (< 1%) in any year.

## 5.3. Impact of Climate Change

In July 2021 the 'Flood Risk Assessments: Climate Change Allowances' were updated from the originally published Climate Change allowances on GOV.UK. The guidelines outline the peak river flow climate change allowances by management catchment. The range of Climate Change allowances is based on percentiles. A percentile is a measure used in statistics to describe the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flows fall below it and half fall above it. The central allowance is based on the 50th percentile, higher central is based on the 70th percentile and the upper end is based on the 90th percentile.

The proposal site is located within the Irwell Management Catchment and within the North West River Basin District. The relevant climate change allowances are summarised in **Table 4**.

Table 4 - Peak river flow allowances by Management Catchment and River Basin District

| Management Catchment Name / River Basin District | Climate Change allowance | Total potential change anticipated for the '2020s' (2015 to 2039) | Total potential change anticipated for the '2050s' (2040 to 2069) | Total potential change anticipated for the '2080s' (2070 to 2115) |
|---|---|---|---|---|
| Irwell / North West | Upper end | 24% | 43% | 75% |
| | Higher central | 15% | 26% | 46% |
| | Central | 12% | 19% | 35% |

**Using peak river flow allowances for flood risk assessments**

The guideline suggests to consider the flood zone and the appropriate flood risk vulnerability classification to decide which allowances applies to the development or plan.

In flood zones 2 or 3a for:

- essential infrastructure – use the higher central allowance
- highly vulnerable – use central allowance (development should not be permitted in flood zone 3a)
- more vulnerable – use the central allowance
- less vulnerable – use the central allowance
- water compatible – use the central allowance

In flood zone 3b for:

- essential infrastructure – use the higher central allowance
- highly vulnerable – development should not be permitted

- more vulnerable – development should not be permitted
- less vulnerable – development should not be permitted
- water compatible – use the central allowance

**Assessment of Climate Change Impact for the Site**

The proposal site is located within the Irwell Management Catchment and within the North West River Basin District. As the proposed development is categorised as 'less vulnerable' and the majority of the site is located in Flood Zone 2 (i.e. low probability flooding), the guideline recommends to use the Central allowance for assessing the impact of climate change. The Central allowance for the Irwell/North West River Basin District is 35% for the period between 2070 and 2115 (**Table 4**). This allowance has been used for assessing the impact of climate change on the flood risk to the site.

## 5.4. Assessment of Flood Hazard from a Range of Events

Information on modelled water levels has been obtained from the Environment Agency (refer to **Appendix F**). The site-specific flood levels for the proposed development are derived from the Rochdale and Littleborough 2013 Hydraulic Modelling Study.

**Appendix F** presents the modelled flood extent maps and estimated flood levels for a range of design flood events, which have been used to inform the flood risk assessment and mitigation strategy for the site.

**Appendix F** also includes the 1D and 2D model node location map for the area surrounding the site. Based on the map, the nearest 1D model node to the proposed development is Node 2, while the closest 2D model nodes are Nodes 5 and 6.

**Comparison Between Modelled Water Levels and the Site Levels**

The modelled water levels (i.e.1D and 2D) have been compared against the existing site levels (**Table 5**). Information on the site levels has been taken from the topographic map provided in **Appendix D**.

**Table 5** confirms that the site is not subject to flooding during the 5% Annual Exceedance Probability (AEP) event (i.e. 1 in 20-year flood), indicating a low flood hazard to people and property under this scenario. However, the site is predicted to experience flooding during the 1% AEP event (i.e. 1 in 100 year flood) and the 1%

AEP + 35% Central Climate Change (CC) allowance scenario. The maximum modelled flood depths for these events are approximately 0.42 metres and 0.62 metres, respectively. These results suggest that the flood hazard to people and property under more extreme flood events is relatively high, and appropriate mitigation measures are therefore essential to manage the residual flood risk.

Table 5 – Comparison between modelled water levels and the site levels

| Events | Modelled levels, mAOD | General Site Levels, mAOD | Max flood depth, m |
|---|---|---|---|
| 5% AEP (1 in 20 year) | 113.15 | 113.20-113.70 | No flooding |
| 1% AEP (1 in 100 year) | 113.62 | 113.20-113.70 | 0.42 |
| #1% AEP (1 in 100 year) plus 35% CC | 113.82 | 113.20-113.70 | 0.62 |
| 0.1 %AEP (1 in 1000 year) | 114.30 | 113.20-113.70 | 1.10 |

# 35% Central climate change allowance applicable for this site, see **Chapter 5.3**.

## 5.5. Risk of Tidal Flooding

The River Roch is not influenced by tidal waves at this location. The risk of tidal flooding is therefore low.

## 5.6. Risk of Flooding From Artificial Water Bodies

There were no known flood risks from any artificial water bodies near the site.

## 5.7. Risk of Groundwater Flooding

In recent years groundwater has been recognised as a significant source of flooding in the UK. According to the British Geological Survey, groundwater flooding occurs when the water table in permeable rocks rises to enter basements/cellars or comes up above the ground surface. Groundwater flooding is not necessarily linked directly to a specific rainfall event and is generally of longer duration than other causes of flooding (possibly lasting for weeks or even months).

Evidence of historical groundwater flooding within the PFRA is very limited, however it is important to recognise that the risk of groundwater flooding is highly variable and heavily dependent upon local conditions at any particular time.

According to the information available from the landowner, there were no records of any groundwater flooding incidents around the site. Based on these evidence and information, it is reasonable to consider that the risk of groundwater flooding to the site is low.

## 5.8. Risk of Surface Water Flooding

The surface water flooding arises when the infiltration capacity of land or the drainage capacity of a local sewer network is exceeded and the excess rainwater flows overland. The severity of surface water flooding depends on several factors such as the degree of saturation of the soil before the event, the permeability of soils and geology, hill slope steepness and the intensity of land use.

Information on the risk of surface water flooding is held by the Environment Agency. The Environment Agency's Surface Water Flood Risk Maps are provided in **Appendix E Figure 3, 4 and 5.** The flood maps indicate that the site is located outside of the flood risk from the 1 in 30 year surface water event. Also, the majority of the site is located outside of the 1 in 100 year and 1 in 1000 year surface water flood events. This implies that overall risk of surface water flooding from the extreme events is relatively low.

## 5.9. Risk of flooding from Reservoirs

The Environment Agency's reservoir flood map in **Appendix E Figure 6** indicated that the proposal site is located within the maximum extent of flooding from reservoir. However, according to the Environment Agency, the reservoir flooding is extremely unlikely to happen and reservoirs in the UK have an extremely good safety record; indeed there has been no loss of life in the UK from reservoir flooding since 1925. The Environment Agency is the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be inspected and supervised by reservoir panel engineers on a regular basis. It is therefore assumed that these reservoirs are regularly inspected, and essential safety work is carried out. These reservoirs therefore present a managed residual risk.

## 5.10. Flood Risk from Sewers

Sewer flooding is often caused by excess surface water entering the drainage network causing sewers to surcharge. The PFRA has provided very limited information on sewer flooding within the area, however, there were no records of sewer flooding incidents at the site. It is important to note that previous sewer flood incidents or the lack thereof do not indicate the current or future risk to the site as upgrade work could

have been carried out to alleviate any issues or conversely in areas that have not experienced sewer flooding incidents the local drainage infrastructure could deteriorate leading to future flooding.

# 6.0 Mitigation Measures

## 6.1. Recommended Finished Floor Level

In order to afford a level of protection against flooding it is normally recommended that finished floor levels are set a nominal 300mm above the 1 in 100-year annual probability fluvial flood (1% AEP) including an allowance for climate change. The Environment Agency's modelling data indicated that the 1 in 100 year (1%AEP) plus Central Climate Change water level near the site is 113.82mAOD. Therefore, it is proposed that the Finished Floor Level of the proposed units will be set not lower than 114.12mAOD which will provide a freeboard of 300mm.

## 6.2. Provision of Compensatory Flood Storage

When a development such as a new building is proposed in areas at risk of flooding, it can lead to the displacement of floodwater. If unmanaged, this displacement increases flood risk to adjacent areas. The Compensatory Flood Storage (CFS) ensures that any volume of floodwater lost due to development is offset by providing an equivalent volume of storage elsewhere on-site typically at the same or lower level to maintain the natural floodplain function. For the proposed development a CFS is proposed in the form of an open surface pond on a volume-for-volume basis, meaning that the total volume of flood storage lost due to development will be replaced by an equal volume within the site boundary.

***Estimation of Volumes for Compensatory Flood Storage (CFS) Requirements***

The compensatory volume has been estimated using the following method:

- Volume of floodwater displaced (V) = building footprint area × maximum flood depth
- The maximum flood depth corresponds to the 1 in 100-year + Climate Change event (as estimated from flood modelling data, see **Appendix F**).

Compensatory Flood Storage (CFS) volumes have been calculated based on the product of the maximum flood depths and the footprint of the proposed development. The maximum flood depth corresponds to the 1 in 100-year (1% AEP) event with an appropriate allowance for climate change. Detailed calculations are provided in **Appendix G**.

The total compensatory storage requirement is estimated to be 358.93m³ (rounded to 360m³) to offset the loss of floodplain storage resulting from the development. This volume will be provided through the creation of an open surface attenuation pond, designed to replicate and restore the displaced flood storage capacity.

The indicative layout of the proposed CFS pond is presented in **Appendix H**. Detailed earthworks design and finished levels will be developed at the detailed design stage to ensure compliance with relevant flood risk policy and local authority requirements.

## 6.3. Flood Proofing and Resilient Measures (Up to 600mm from Ground Levels)

The following flood proofing and resilient measures will be adopted, where practicable, to minimise the damage and to enable quick recovery and clean up after the flooding event:

- Automatic or manual covers will be used for air bricks to prevent water from entering through ventilation holes.
- Non-return valves will be fitted in the drainage system to prevent back-flow of diluted sewage in situations where there is an identified risk of the foul sewer surcharging.
- All service entries will be sealed (e.g. with expanding foam or similar closed cell material).
- Closed cell insulation will be used for pipes which are below the predicted flood levels.
- Wiring for telephone, TV, Internet and other services will be protected by suitable insulation to minimise damage.
- Important documents, electronics and valuable belongings will be stored on higher floors or in waterproof containers to avoid water damage.

- Waterproof coatings and sealants will be applied to walls and foundations.
- Flood-resistant doors will be installed.
- Cracks and gaps in walls, floors, and around pipes will be sealed.
- Building materials that are effective for a 'water exclusion strategy' will be used which include: engineering bricks, cement-based materials including water retaining concrete and dense stone.

## 6.4. Flood Warning and Evacuation

As the site is located within a flood zone area, it will be necessary to make sure that the occupants are fully aware of the flood risk and flood warning and evacuation during an extreme event.

### 6.4.1. Flood Warnings Direct

The occupants are advised to utilise the Environment Agency's Flood Warnings Direct which is a free flood warning service called Floodline Warnings Direct (FWD). This service generally gives an advance notice of when flooding is likely to happen and time to prepare for a flood event. Property owners on the proposed development site will be able to sign up to FWD online using the following contact details (**Table 6**):

Table 6- Contacts for flood warning services

| Methods | Remarks |
|---|---|
| Online | https://fwd.environment-agency.gov.uk/app/olr/register |
| Telephone | 0345 988 1188 |

### 6.4.2. Flood Warning Service

The Flood Warning Service is provided by the Environment Agency across England and Wales in areas at risk of flooding from rivers or the sea. This is provided using up to date rainfall, river level and sea condition monitoring 24 hours a day to forecast the possibility of flooding. If flooding is forecast, the Environment Agency will issue warnings using a set of three different warning types **(Table 7).** Many areas of England are covered by the full four stages of the Environment Agency's Flood Warning Service. The site is located in an area covered by the Flood Alert Services**.** The Environment Agency's Flood Warning target lead time; the time between a flood

warning being issued and the onset of flooding is approximately two hours. Providing the Environment Agency can meet their target Flood Warning lead time, the occupants of the proposed development will have two hours to ensure that property is relocated to minimise risk and evacuation to safe locations can be carried out.

Table 7 - Environment Agency's Flood Warning Codes

| Flood Warning Code | Meaning | Actions to be taken |
|---|---|---|
| | Flooding is possible. Be prepared. | • Be prepared to act on your flood plan.<br>• Prepare a flood kit of essential items.<br>• Monitor local water levels and the flood forecast on our website. |
| | Flooding is expected. Immediate action required. | • Move family, pets and valuables to a safe place.<br>• Turn off gas, electricity and water supplies if safe to do so.<br>• Put flood protection equipment in place. |
| | Severe flooding. Danger to life. | • Stay in a safe place with a means of escape.<br>• Be ready should you need to evacuate from your home.<br>• Co-operate with the emergency services.<br>• Call 999 if you are in immediate danger. |
| **Warnings no longer in force** | No further flooding is currently expected in your area. | • Be careful. Flood water may still be around for several days. |

| | | |
|---|---|---|
| | | • If you've been flooded, ring your insurance company as soon as possible. |

## 7.0 Assessment of Impact on flow of floodwater

The proposed development comprises the demolition of the existing MOT centre and scrapyard and the construction of seven industrial units, along with associated car parking and landscaping works. To ensure that the proposed development does not increase flood risk elsewhere, a range of mitigation measures, particularly the Compensatory Flood Storage as outlined in this report- will be implemented. These measures are designed to manage all floodwater on-site, thereby preventing any redirection or displacement of floodwaters onto adjacent properties.

The development has been designed to:

- Avoid creating backwater effects;
- Prevent any diversion of floodwaters toward neighbouring land or properties;
- Maintain or improve the site's overall hydraulic performance.

## 8.0 Conclusion

The proposal is for the demolition of existing MOT centre and scrapyard and erection of 7 no. industrial units with car parking and landscaping located at Norman Road, Rochdale OL11 4HP.

The majority of the site is located in Flood Zone 2 (i.e. medium probability flooding). The proposed development is categorised as 'less vulnerable'. The proposed development is therefore appropriate at this location.

The site is located in close proximity to the River Roch with the risk of fluvial flooding.

According to the information available from the PFRA and the Environment Agency, there were no records of flooding events at the site.

The Environment Agency's Flood Maps show that the majority of the site lies within the Flood Zone 2 (i.e. medium probability flooding). The flood maps also show that a small part of the site in the north west corner is located in Flood Zone 3 (i.e. high

probability flooding). Flood Zone 3 is defined as the land assessed as having a 1 in 100 or greater annual probability of river flooding (< 1%) in any year.

The flood maps also show that the site will remain within the Flood Zone 2 (i.e. medium probability flooding) when climate change is considered for the future 2070-2125 time frame.

An assessment of the Environment Agency's modelling data indicated that the site is not subject to flooding from the 5% AEP (1 in 20 year) event. Therefore, the flood hazard to the people and the property from this event is low. However, the site is subject to flooding from the 1% AEP (1 in 100 year) and the 1% AEP (1 in 100 year) plus 35% Central CC events with the maximum flood depths of 0.42m and 0.62m respectively. This implies that the flood hazard to the people and the property from these extreme events is relatively high.

Flood risk from other sources including underground water, sewer and reservoir is low.

The Environment Agency's Surface Water Flood Risk Maps indicate that the site is located outside of the flood risk from the 1 in 30-year surface water event. Also, the majority of the site is located outside of the 1 in 100 year and 1 in 1000-year surface water flood events. This implies that overall risk of surface water flooding from the extreme events is relatively low.

In order to afford a level of protection against flooding it is normally recommended that finished floor levels are set a nominal 300mm above the 1 in 100-year annual probability fluvial flood (1% AEP) including an allowance for climate change. The Environment Agency's modelling data indicated that the 1 in 100 year (1%AEP) plus Central Climate Change water level near the site is 113.82mAOD. Therefore, it is proposed that the Finished Floor Level of the proposed units will be set not lower than 114.12mAOD which will provide a freeboard of 300mm.

Compensatory Flood Storage (CFS) requirements have been calculated for the 1 in 100-year plus climate change event, resulting in a total volume of approximately 360 $m^3$ to offset the loss of floodplain storage. This will be provided through an open surface pond. Detailed design, including earthworks and finished levels, will be developed at the detailed design stage to ensure compliance with relevant flood risk policies and local authority requirements.

A range of flood resilient measures will be implemented to minimise the damage and to enable quick recovery and clean up after the flooding event.

As the site is located within a flood zone area, it will be necessary to make sure that the occupants are fully aware of the flood risk and flood warning and evacuation during

an extreme event. The occupants are advised to utilise the Environment Agency's Flood Warning Service available in the area.

The development will not give rise to backwater affects or divert water towards other properties.

This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.

# Appendix A Site Location Maps

# Figure 1 Site Location Map

**(Source: Ordnance Survey Online Maps)**

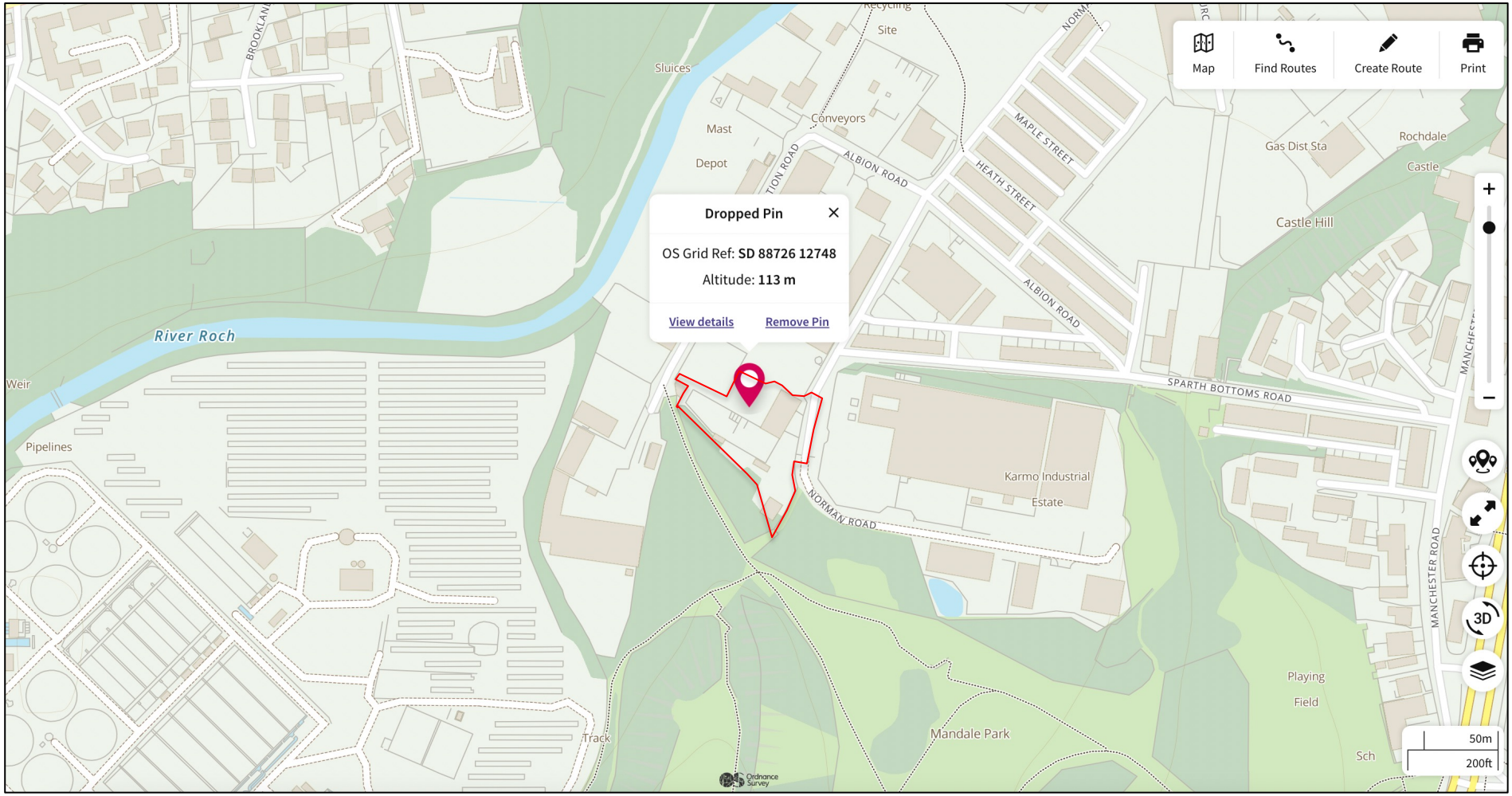
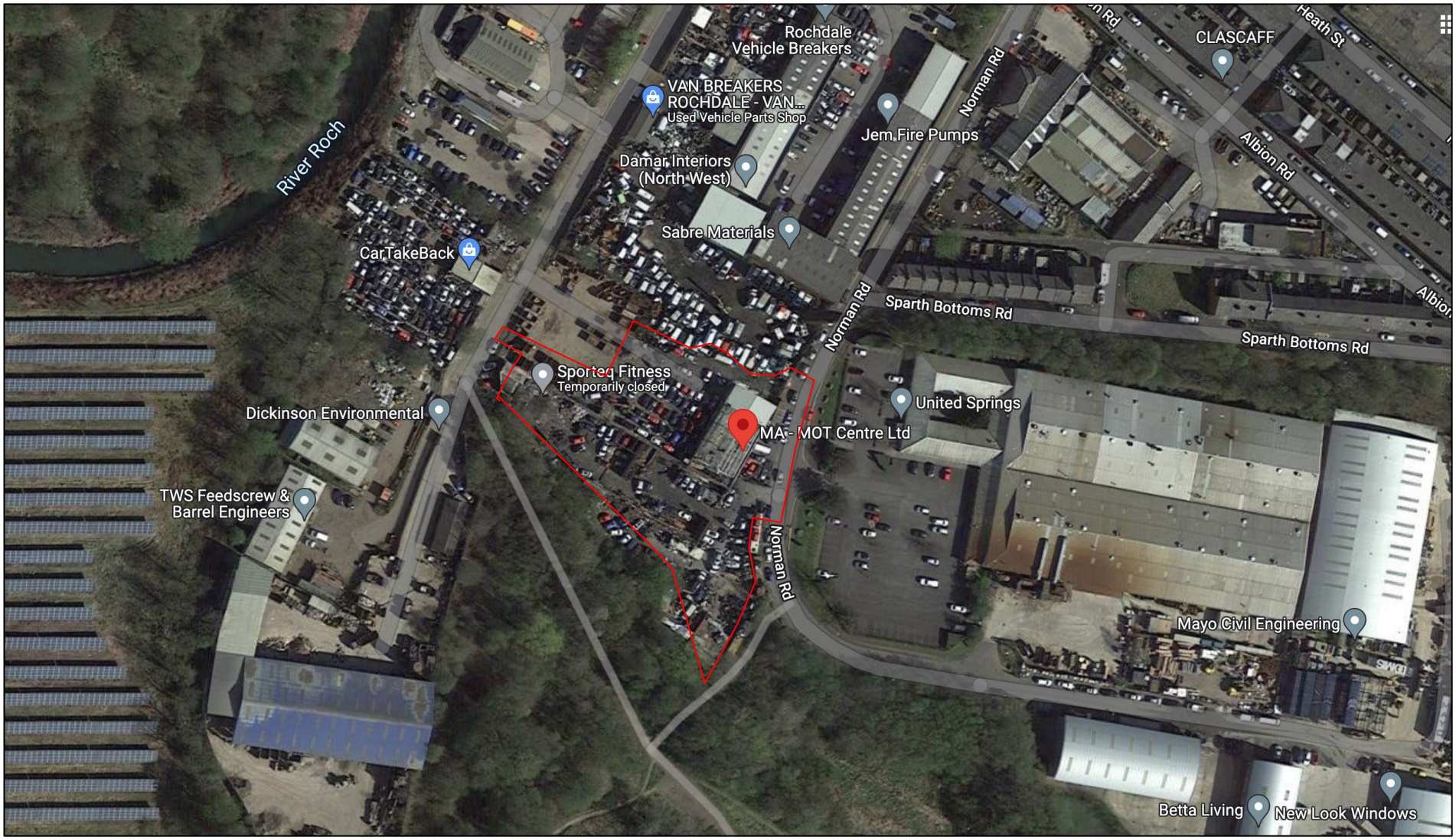


**Figure 2 Site Location Map (Source: Google Maps)**



# Appendix B Existing Site and Proposed Plans

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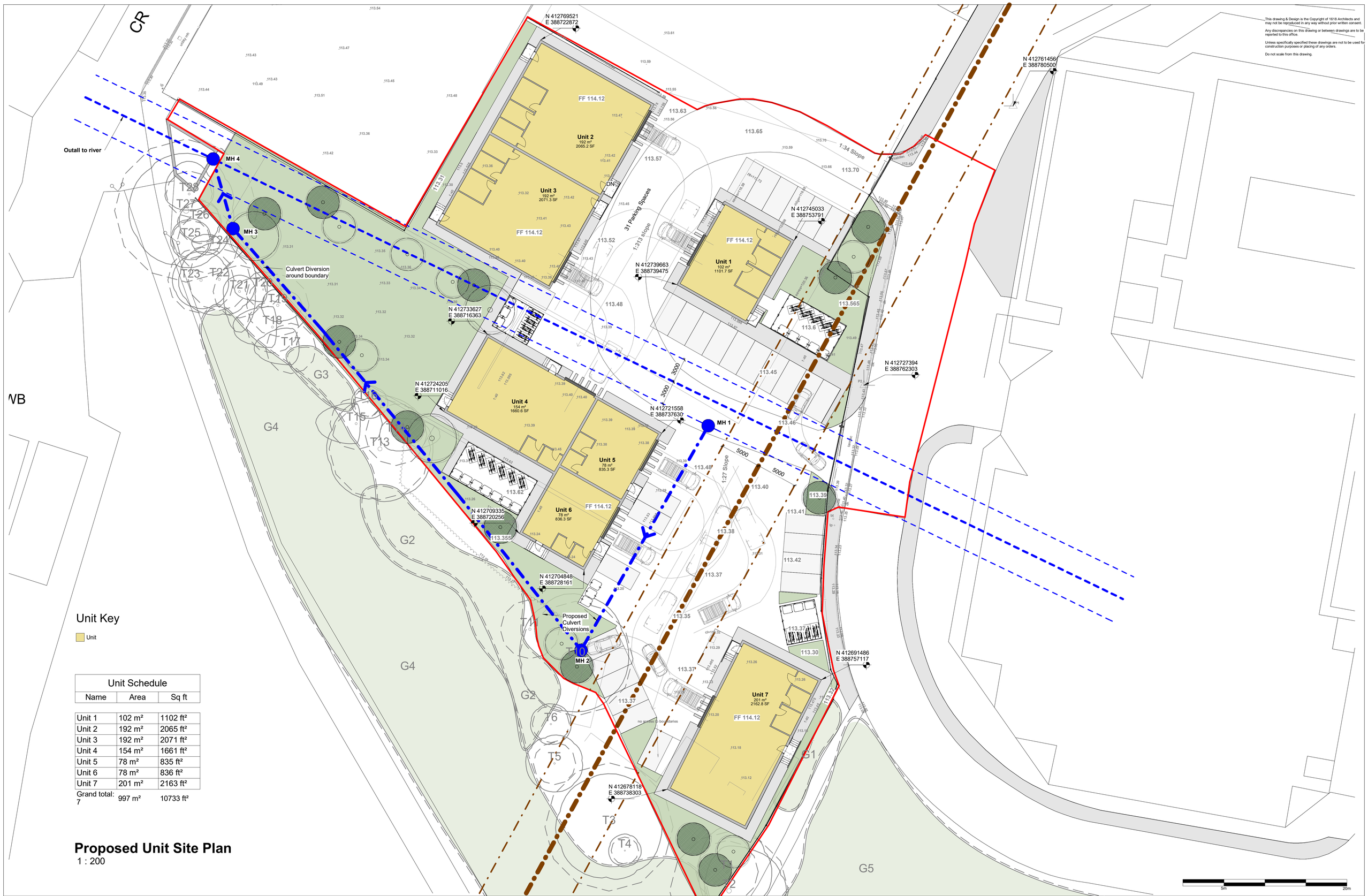


## Unit Key

Unit

| Unit Schedule | | |
|---|---|---|
| Name | Area | Sq ft |
| Unit 1 | 102 m² | 1102 ft² |
| Unit 2 | 192 m² | 2065 ft² |
| Unit 3 | 192 m² | 2071 ft² |
| Unit 4 | 154 m² | 1661 ft² |
| Unit 5 | 78 m² | 835 ft² |
| Unit 6 | 78 m² | 836 ft² |
| Unit 7 | 201 m² | 2163 ft² |
| Grand total: 7 | 997 m² | 10733 ft² |

# Proposed Unit Site Plan

1 : 200

| | | | |
|---|---|---|---|
| PROJECT: Norman Road, Industrial Park | CLIENT: Mr Shehzad | | |
| | Project number: 580 | Scale (@ A1): 1 : 200 | |
| SHEET: Proposed Unit Site Plan | DRAWING No: P-21 | Date: 30/04/2026 | REV: C |

- ☐ FEASIBILITY
- ☑ PLANNING APPROVAL
- ☐ BUILDING REGULATIONS
- ☐ TENDER
- ☐ CONSTRUCTION

NORTHERN OFFICE
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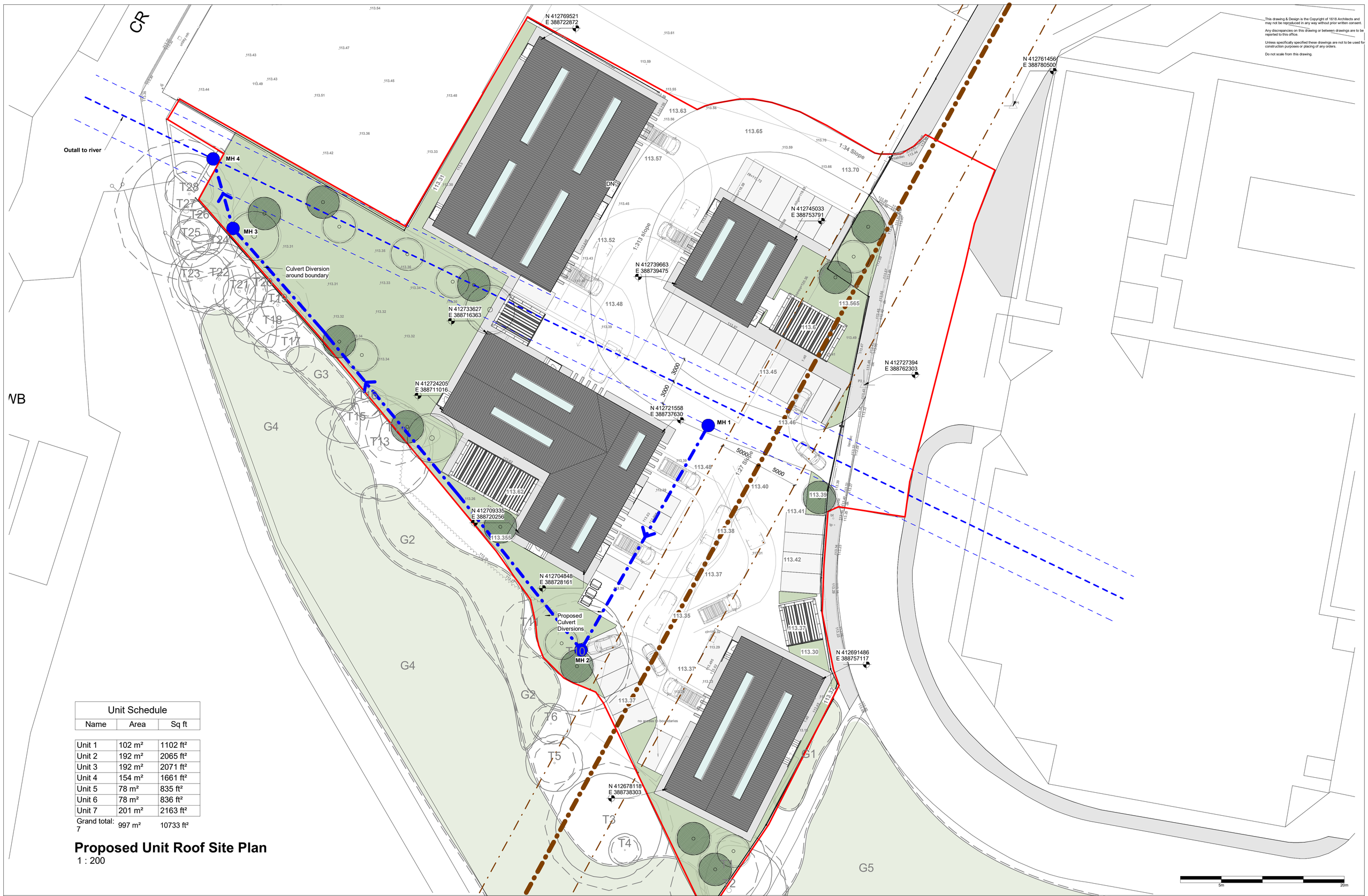


| Unit Schedule | | |
|---|---|---|
| Name | Area | Sq ft |
| Unit 1 | 102 m² | 1102 ft² |
| Unit 2 | 192 m² | 2065 ft² |
| Unit 3 | 192 m² | 2071 ft² |
| Unit 4 | 154 m² | 1661 ft² |
| Unit 5 | 78 m² | 835 ft² |
| Unit 6 | 78 m² | 836 ft² |
| Unit 7 | 201 m² | 2163 ft² |
| Grand total: 7 | 997 m² | 10733 ft² |

# Proposed Unit Roof Site Plan

1 : 200

| PROJECT | CLIENT | | |
|---|---|---|---|
| Norman Road, Industrial Park | Mr Shehzad | | |
| SHEET | Project number: 580 | Scale (@ A1): 1 : 200 | |
| Proposed Unit Roof Site Plan | DRAWING No: P-27 | Date: 30/04/2026 | REV: C |

- ☐ FEASIBILITY
- ☑ PLANNING APPROVAL
- ☐ BUILDING REGULATIONS
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# Appendix C Geological Map

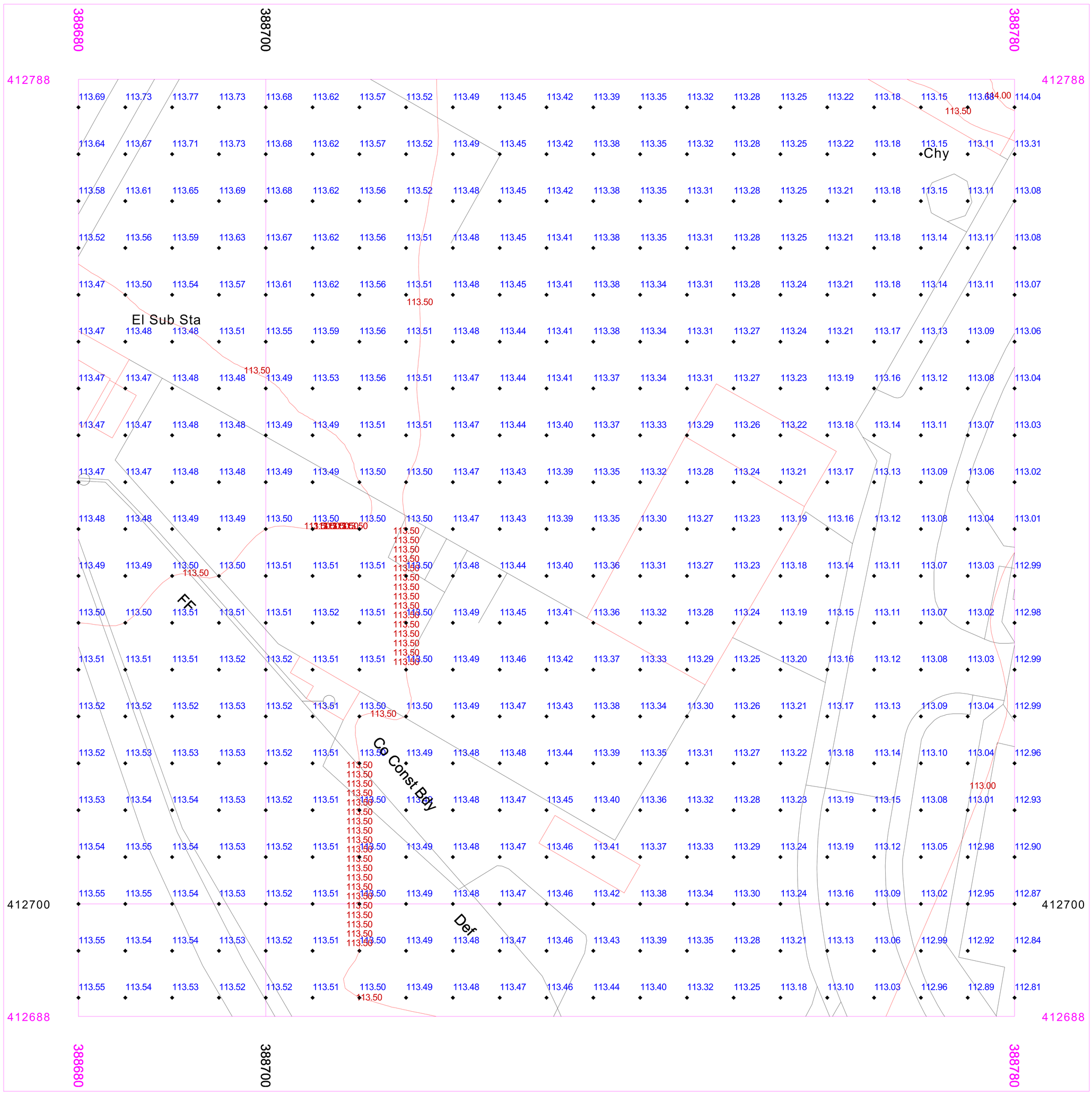
**Figure 1 Geological Map of the Site**
**(Source: British Geological Survey Geological Britain Viewer)**

## Site Geology

**Bedrock geology description:** Pennine Lower Coal Measures Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 319 and 318 million years ago during the Carboniferous period.
**Superficial deposits description:** Alluvium - Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.

# Appendix D Topographic Map

Ordnance Survey ®
Ukmapcentre.com

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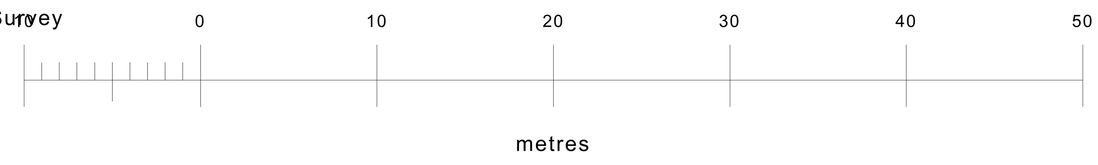
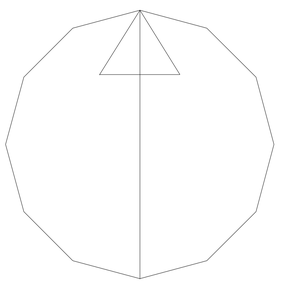


# Appendix E Environment Agency's Flood Maps

**Figure 1 Environment Agency's Flood Map (Present Day)**

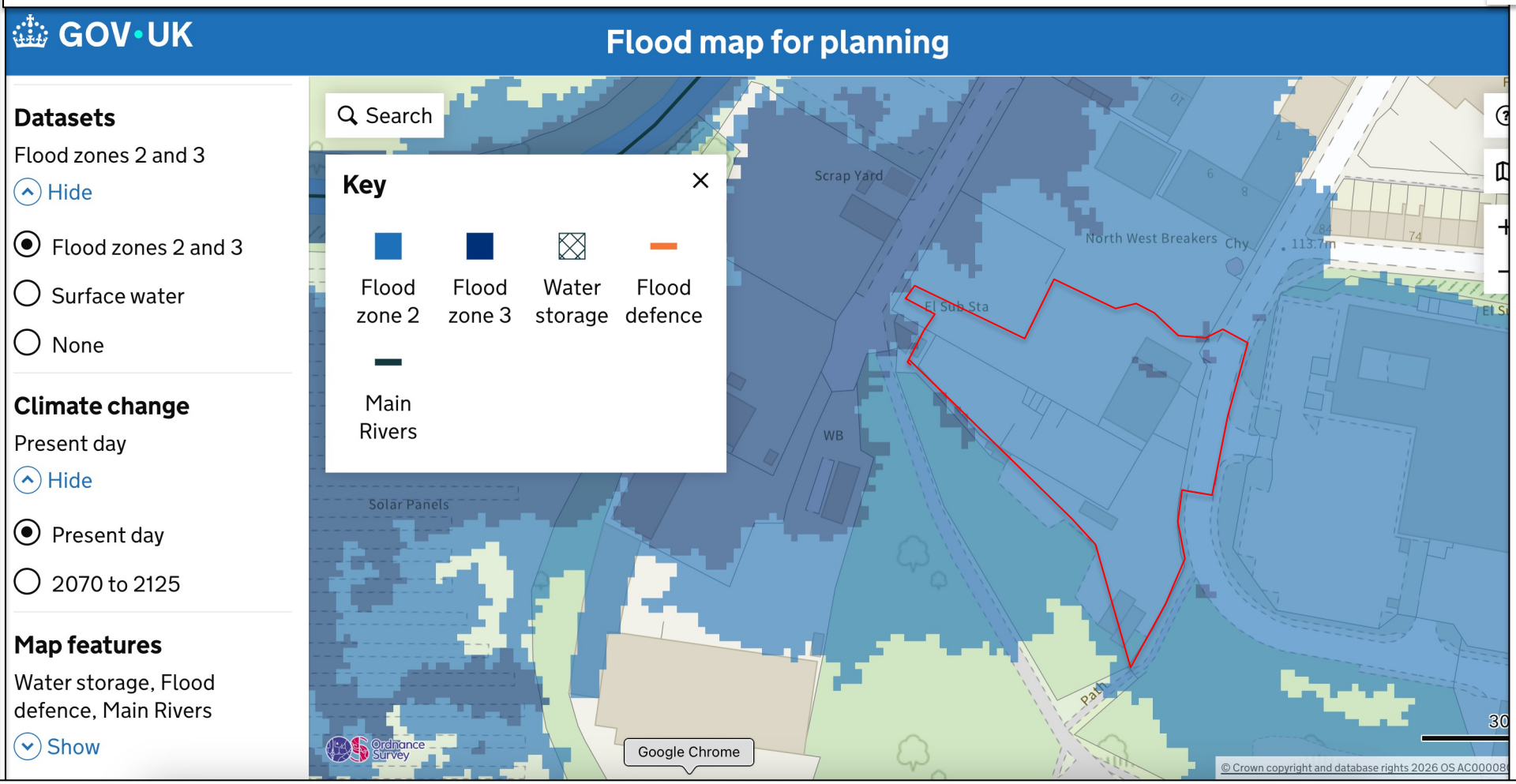


**Figure 2 Environment Agency's Flood Map (Climate Change, 2070-2115)**

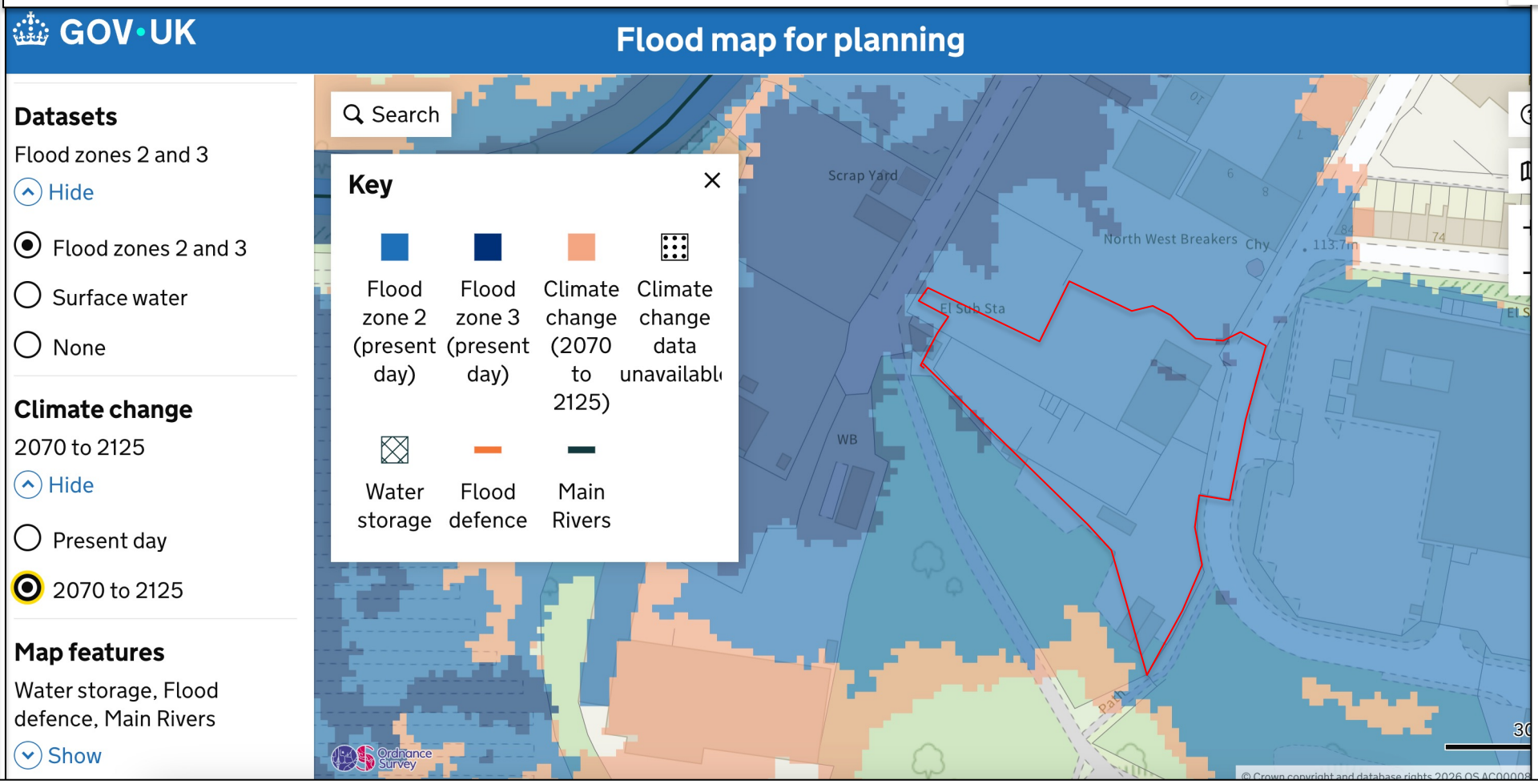


**Figure 3 Environment Agency's Surface Water Flood Map (1 in 30 year)**

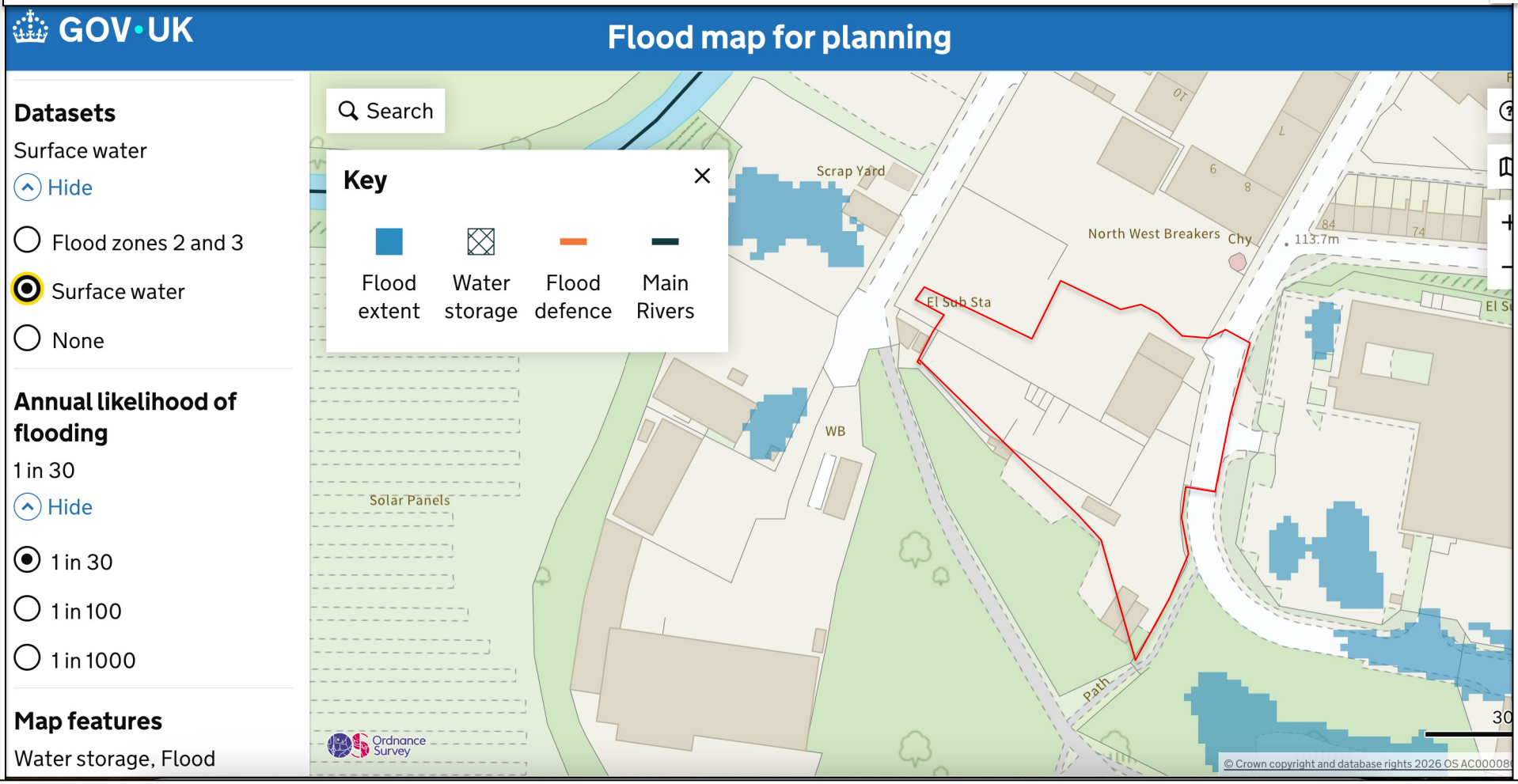


**Figure 4 Environment Agency's Surface Water Flood Map (1 in 100 year)**

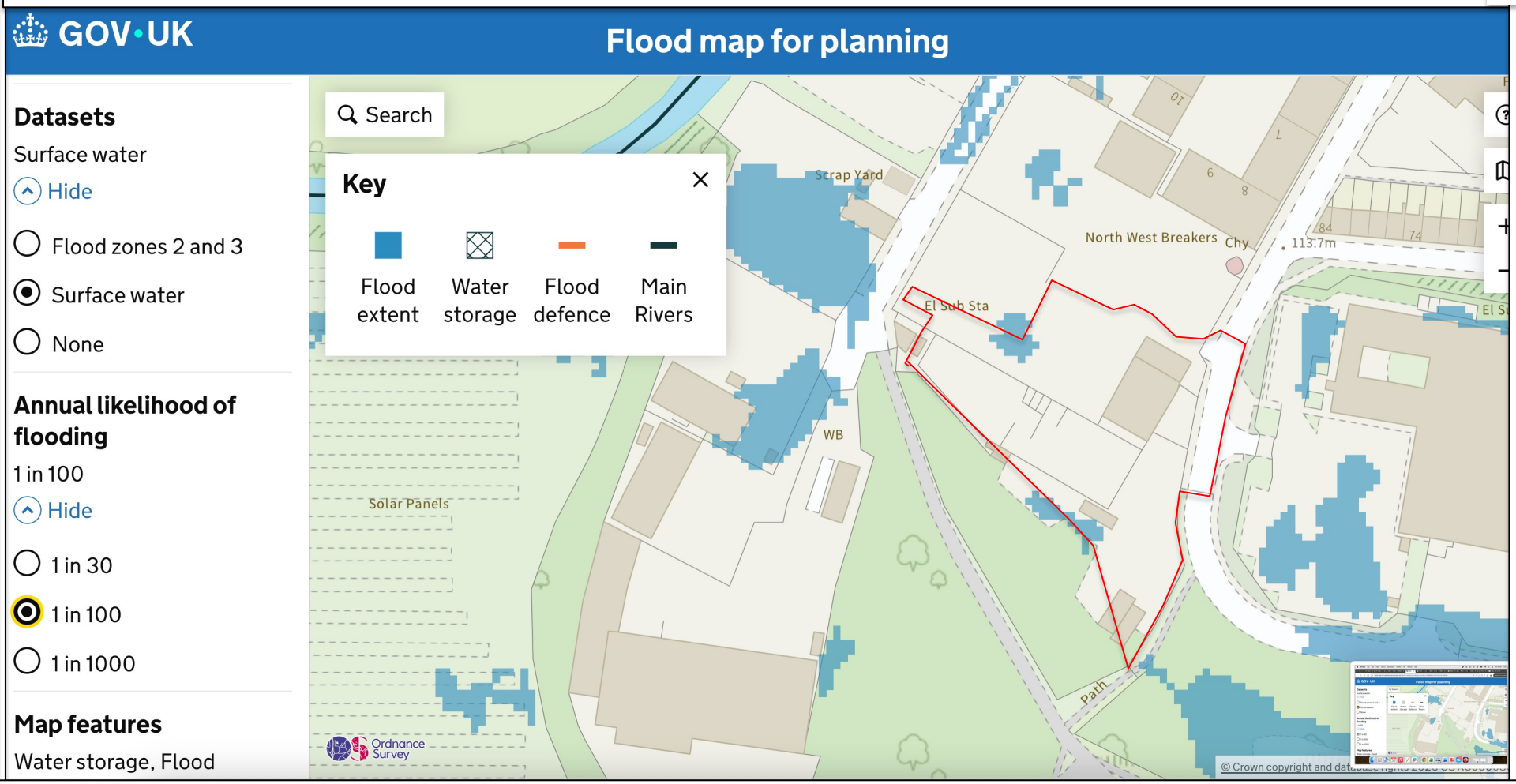
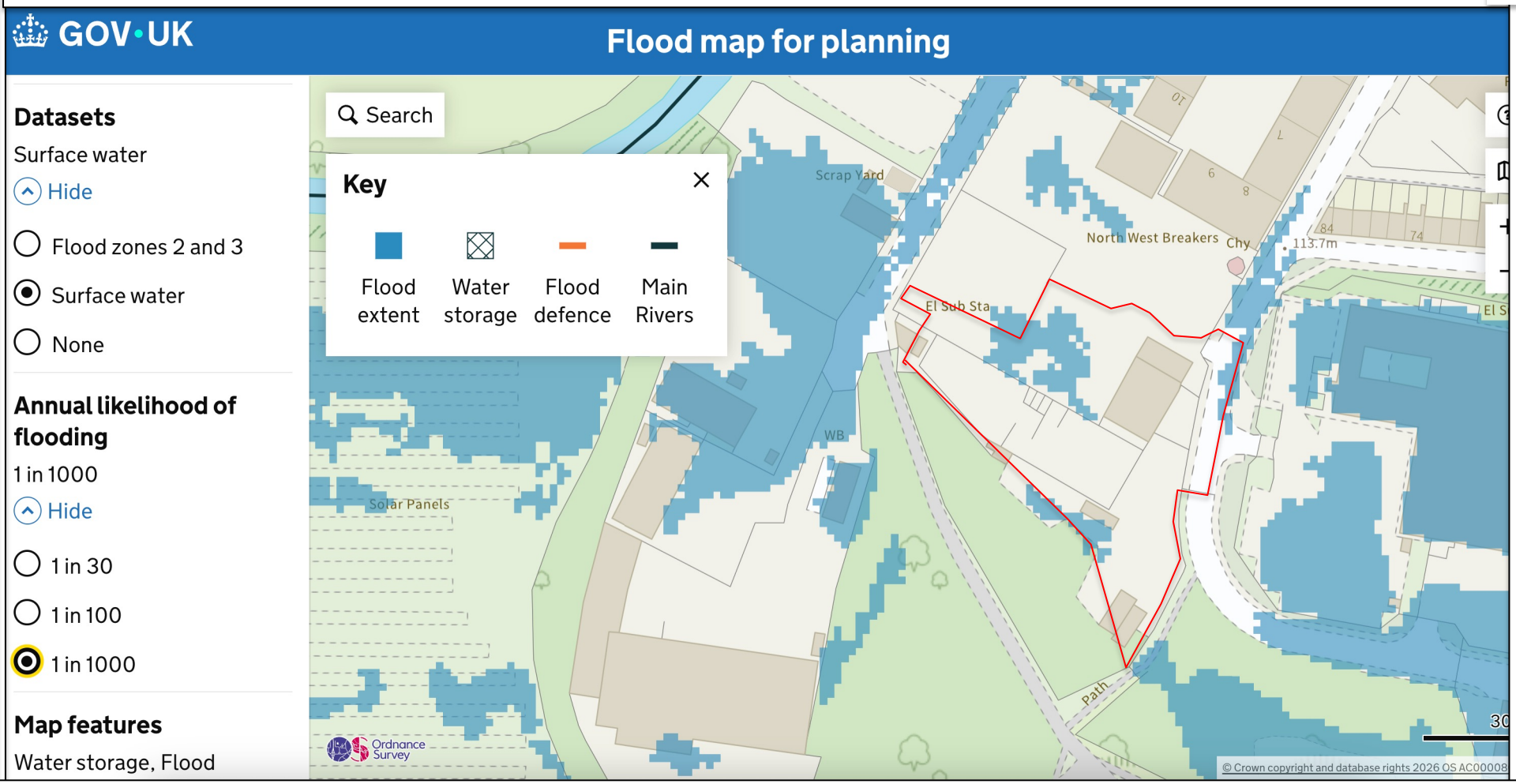
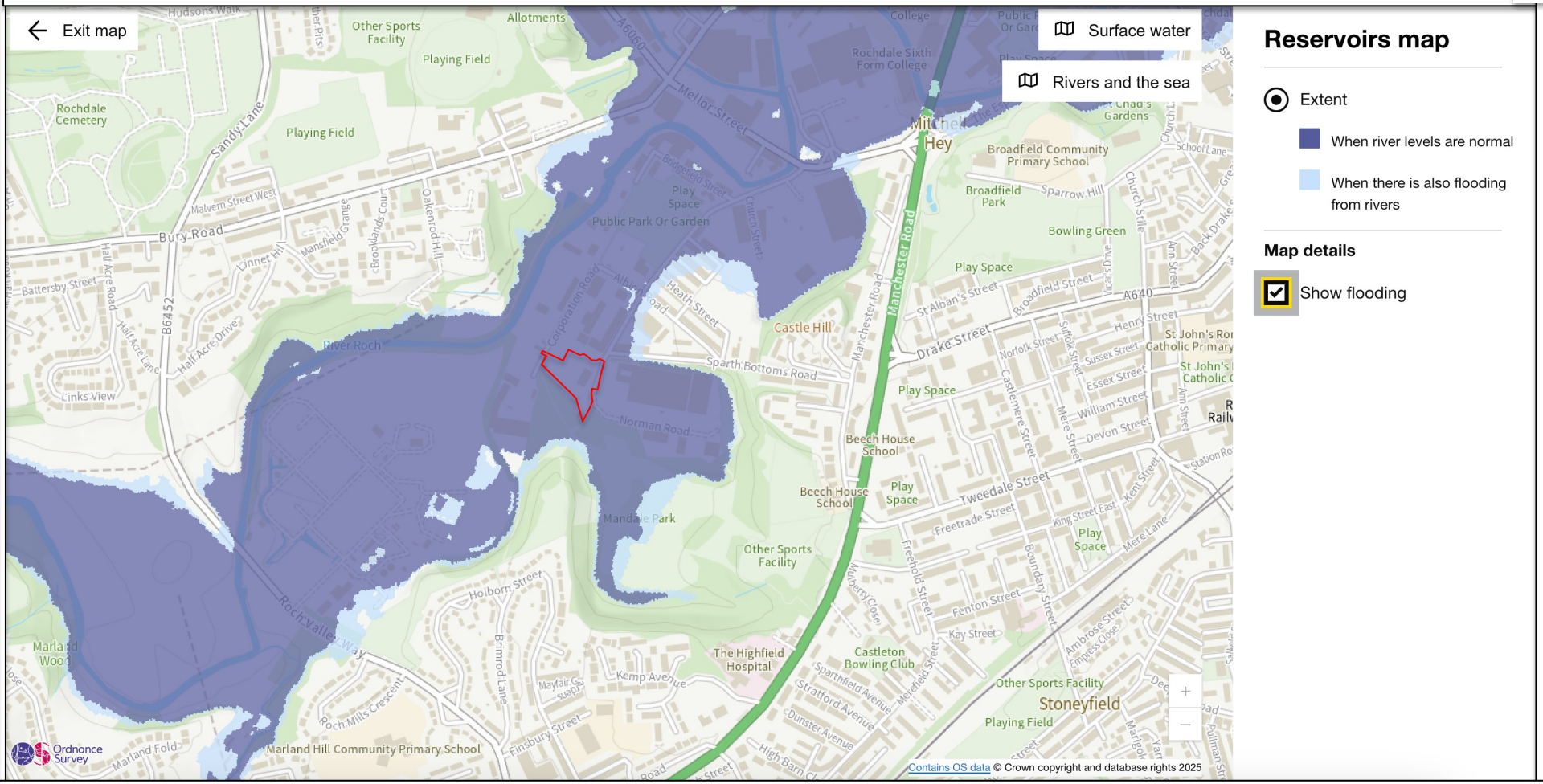


**Figure 5 Environment Agency's Surface Water Flood Map (1 in 1,000 year)**

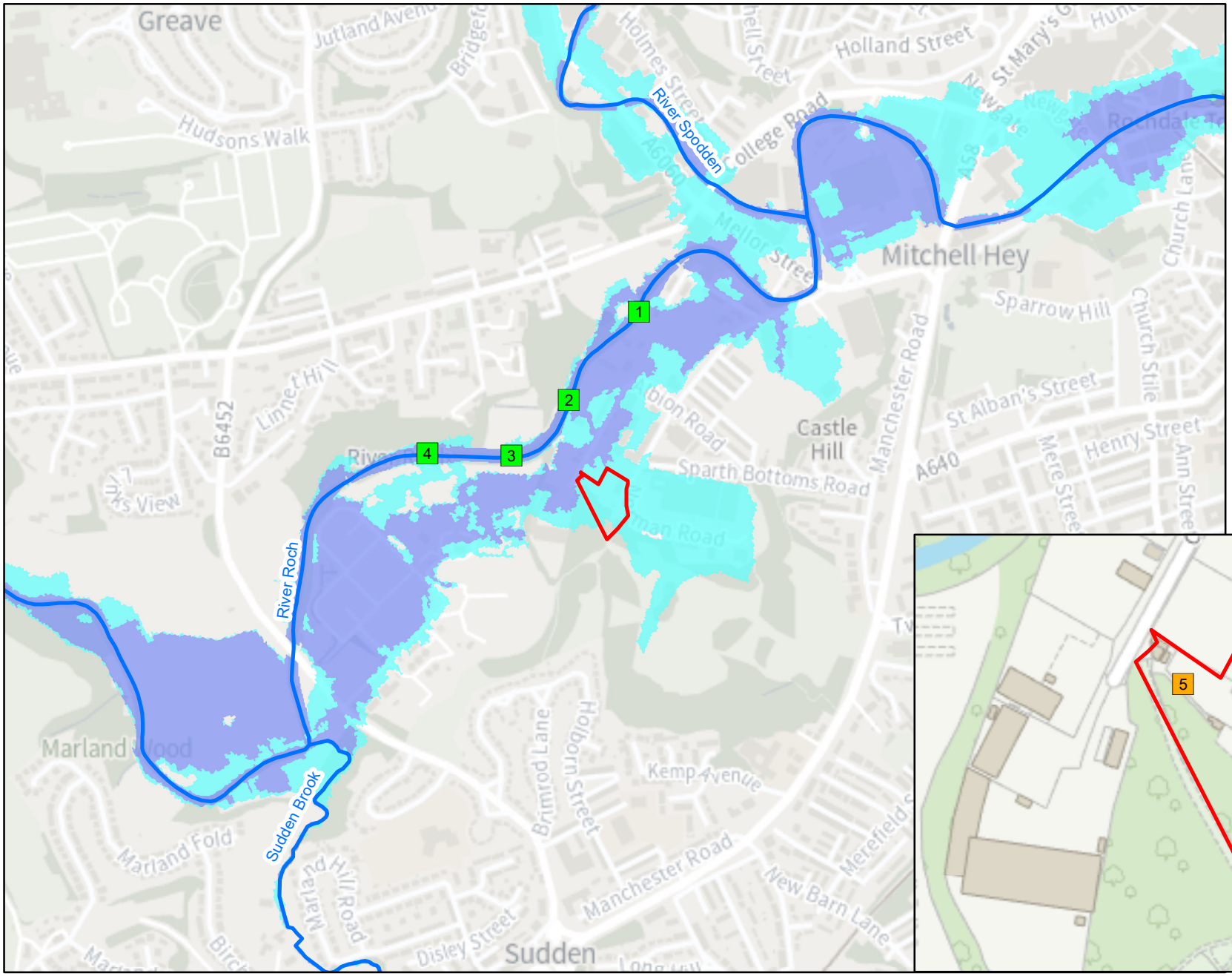


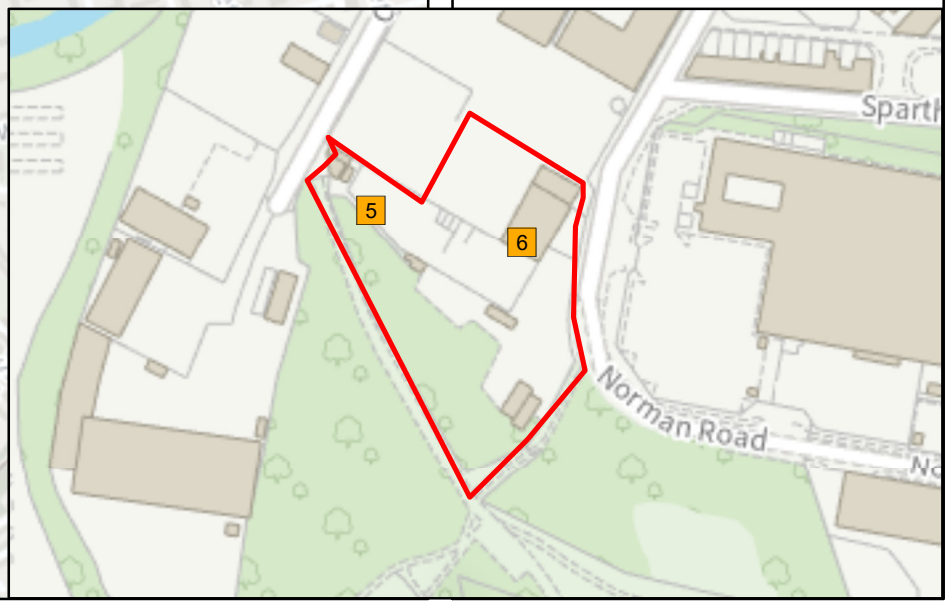
# Figure 6 Environment Agency's Reservoir Flood Risk Map



# Appendix F Environment Agency's Data and Information

# Detailed Flood Map centred on Norman Road, Rochdale, OL11 4HS. Created on 06/10/2022 [GMMC276090SW]




Environment Agency

1:10,001

N

## Legend

- Site Location
- Model Measurements
- 2D Level
- Main River
- Flood Zone 3
- Flood Zone 2

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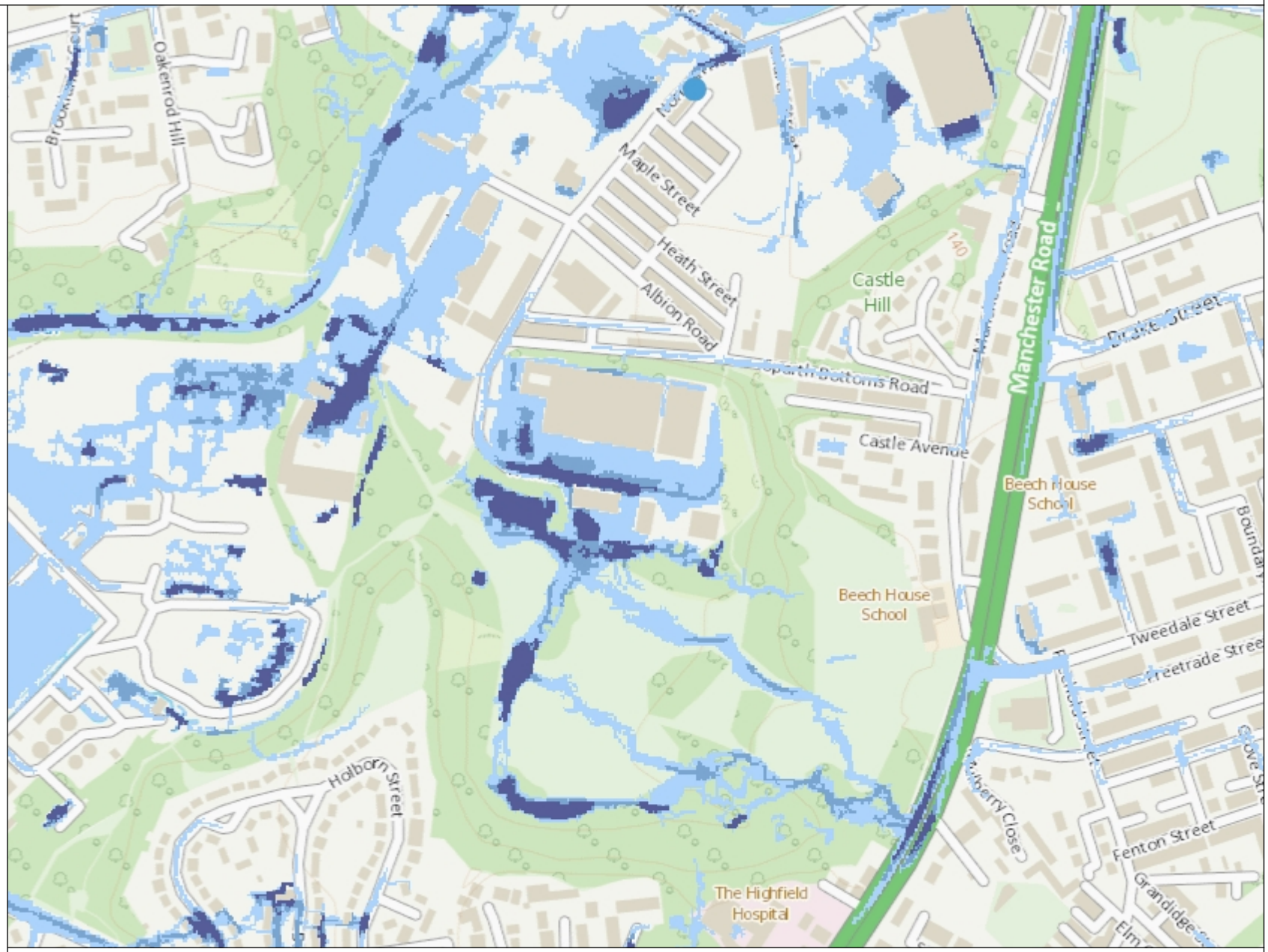
**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

# GMMC276090SW - Surface Water

Environment Agency

Legend

- Flood Extent 1 in 30
- Flood Extent 1 in 100
- Flood Extent 1 in 1000




1: 5,000

0 125

Metres

N W E S

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| | | | | | Undefended | | | | | | | Defended | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map Reference | Model Node Reference | Easting | Northing | Data | 5 % AEP (1 in 20 year) | 1.33 % AEP (1 in 75 year) | 1 % AEP (1 in 100 year) | 1 % AEP (1 in 100 year) + 35% increase in flow | 1 % AEP (1 in 100 year) + 70% increase in flow | 0.5 % AEP (1 in 200 year) | 0.1 % AEP (1 in 1000 year) | 5 % AEP (1 in 20 year) | 1.33 % AEP (1 in 75 year) | 1 % AEP (1 in 100 year) | 1 % AEP (1 in 100 year) + 35% increase in flow | 1 % AEP (1 in 100 year) + 70% increase in flow | 0.5 % AEP (1 in 200 year) | 0.1 % AEP (1 in 1000 year) |
| 1 | ea013_0180_ROCH04_0731 | 388779 | 413052 | Modelled Water Level (m aodN) | 113.77 | 114.21 | 114.32 | 114.94 | 115.17 | 114.63 | 115.31 | 113.80 | 114.23 | 114.36 | 114.96 | 115.31 | 114.60 | 115.30 |
| | | | | Modelled Flow (cumecs) | 77.63 | 94.14 | 98.06 | 115.90 | 122.50 | 108.01 | 126.98 | 80.34 | 99.59 | 105.21 | 131.78 | 141.47 | 115.18 | 140.55 |
| 2 | ea013_0180_ROCH04_0526 | 388658 | 412891 | Modelled Water Level (m aodN) | 113.15 | 113.53 | 113.62 | 114.10 | 114.27 | 113.86 | 114.37 | 113.18 | 113.55 | 113.65 | 114.14 | 114.39 | 113.85 | 114.37 |
| | | | | Modelled Flow (cumecs) | 79.64 | 102.03 | 108.02 | 144.92 | 160.48 | 125.47 | 169.55 | 80.92 | 103.40 | 110.57 | 148.67 | 170.84 | 124.34 | 170.36 |
| 3 | ea013_0180_ROCH04_0376 | 388555 | 412795 | Modelled Water Level (m aodN) | 112.83 | 113.21 | 113.31 | 113.82 | 114.00 | 113.56 | 114.09 | 112.86 | 113.23 | 113.34 | 113.87 | 114.11 | 113.54 | 114.09 |
| | | | | Modelled Flow (cumecs) | 79.63 | 102.02 | 108.01 | 144.12 | 159.21 | 125.47 | 169.18 | 80.92 | 103.40 | 110.56 | 147.57 | 170.83 | 124.34 | 169.58 |
| 4 | ea013_0180_ROCH04_0226 | 388403 | 412799 | Modelled Water Level (m aodN) | 112.51 | 112.89 | 112.99 | 113.49 | 113.65 | 113.24 | 113.73 | 112.53 | 112.91 | 113.03 | 113.53 | 113.75 | 113.23 | 113.73 |
| | | | | Modelled Flow (cumecs) | 79.63 | 102.03 | 108.02 | 144.51 | 159.05 | 125.29 | 167.38 | 80.91 | 103.40 | 110.55 | 148.16 | 168.98 | 124.19 | 167.85 |

| | | | | | Undefended | | |
|---|---|---|---|---|---|---|---|
| Map Reference | Model Node Reference | Easting | Northing | Data | 1 % AEP (1 in 100 year) + 35% increase in flow | 1 % AEP (1 in 100 year) + 70% increase in flow | 0.1 % AEP (1 in 1000 year) |
| 5 | 2D Level | 388692 | 412740 | Modelled Water Level (m aodN) | 113.80 | 114.04 | 114.19 |
| 6 | | 388740 | 412730 | Modelled Water Level (m aodN) | 113.82 | 114.15 | 114.30 |

Model data taken from Rochdale and Littleborough 2013 Study

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

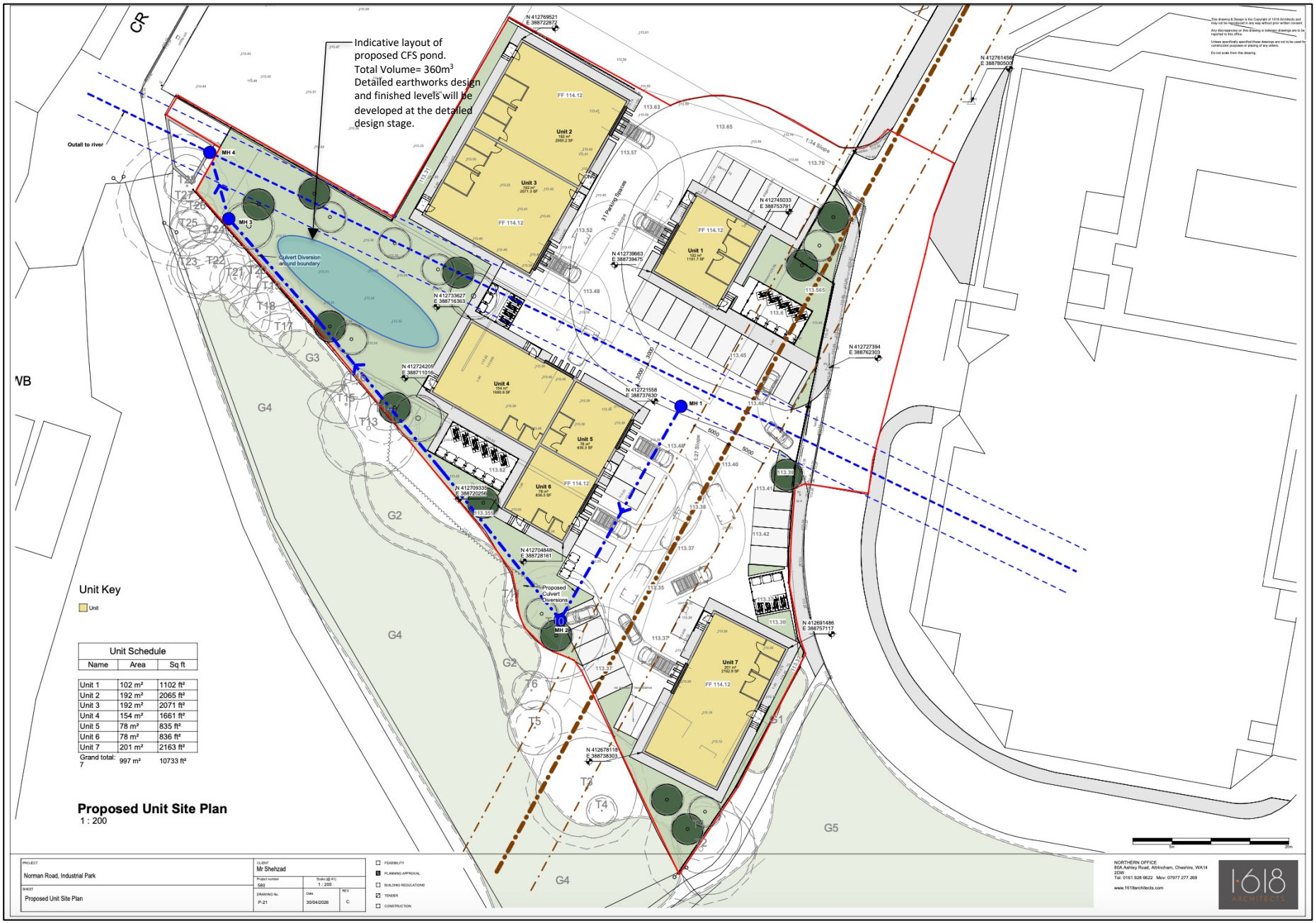
*Climate Change Scenario - We only hold climate change measurements based on the previous climate change guidance (20% increase in flow). The new climate change guidance is available at https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

# Appendix G Estimation of Volumes for Compensatory Flood Storage Requirements

## Appendix G Estimation of Volumes for Compensatory Flood Storage (CFS) Requirements

| Unit | Footprint Area, m2 | Existing GLs, mAOD | Minimum GLs, mAOD | 1/100 +CC Water Levels, mAOD | Maximum Flood Depths, m | Compensatory Flood Storage V, m3 |
|---|---|---|---|---|---|---|
| 1 | 102 | 113.12-113.26 | 113.12 | 113.82 | 0.70 | 71.40 |
| 2 | 192 | 113.24-113.39 | 113.24 | 113.82 | 0.58 | 111.36 |
| 3 | 192 | 113.30-113.39 | 113.30 | 113.82 | 0.52 | 99.84 |
| 4 | 154 | 113.30-113.47 | 113.30 | 113.82 | 0.52 | 80.08 |
| 5 | 78 | 113.41-113.44 | 113.41 | 113.82 | 0.41 | 31.98 |
| 6 | 78 | 113.40-113.60 | 113.40 | 113.82 | 0.42 | 32.76 |
| 7 | 201 | 113.31-113.36 | 113.31 | 113.82 | 0.51 | 102.51 |
| Existing unit | 380 | 113.37-113.60 | 113.37 | 113.82 | 0.45 | -171.00 |
| | | | | | **Total Volume for CFS , m3** | **358.93** |

Note: Deduction of CFS Volume for existing unit

# Appendix H Indicative Layout of Proposed FCS Pond

# Appendix H Indicative Layout of Proposed FCS Pond