Flood Risk Assessment for Planning

Prepared for:
Mr Andrew Haughney

Location:
56A Orchard Road West
Northenden
Manchester
M22 4ED

May 2021

Our reference:
90469-ATX-OrchardRd

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Document Issue Record

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Client:	Mr Andrew Haughney
Application:	Residential extensions and conversion of the property to form a pair of two storey semi-detached dwelling houses
Location:	56A Orchard Road West, Northenden, Manchester M22 4ED
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1. Key Facts

1.1 Flood Risk Posed:

- EA Flood Zone 2 (Medium Risk).
- Potential fluvial flood risk, from the River Mersey and its tributaries / drains.
- Risk of pluvial flooding would appear to be “very low”.
- No historical records of flooding provided.

1.2 Flood Risk Mitigation:

- The application is for residential extensions and conversion of the property to form 2 dwelling houses.
- Floor levels in the proposed extensions will be set no lower than existing adjacent floor levels.
- Internal access will be maintained from ground floor to the first-floor level.
- No bedrooms are proposed on the ground floor.
- Flood proofing of the development will be incorporated as appropriate.
- A flood warning and evacuation plan will be implemented post development.
- The applicant will register with the Environment Agency Floodline Alert/Warnings Direct service.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

2. Introduction

Unda Consulting Limited have been appointed by Mr Andrew Haughney (hereinafter referred to as "the applicant") to undertake a Flood Risk Assessment for planning for the proposed development at 56A Orchard Road West, Northenden, Manchester M22 4ED (hereinafter referred to as "the site"). The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the associated technical guidance.

The purpose of the study is to support an application for the proposed development. This report presents our findings based on the readily available information and data relating to the site and surrounding drainage area.

The site appears to be located within Flood Zone 2 as defined by the Environment Agency (EA) on their Flood Map for Planning. Under the National Planning Policy Framework (NPPF), a FRA is required if a proposed development:

- includes building or engineering works in Flood Zone 2 or 3;
- includes building or engineering works on land classified by the Environment Agency as having critical drainage problem;
- changes the use of land or buildings in a location at risk of flooding from rivers or the sea, or with critical drainage problems;
- changes the use of land or buildings in a way that increases the flood vulnerability of the development where it may be subject to other sources of flooding;
- is larger than 1 hectare.

The assessment should demonstrate to the Local Planning Authority (LPA) and EA how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its potential users.

- whether the proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate.

3. Existing Situation

3.1 Site Usage:

The site consists of an existing single-storey residential dwelling.

A site location plan is provided in the report Appendix.

Figure 1: Aerial photograph of site and surrounding area (Source: Google Earth)

3.2 Geography and Topography:

A topographical site survey undertaken by Chris Partington Land Surveyors in April 2021 shows that topographic site levels range between approximately 28.02mAOD to 28.40mAOD. The finished floor level is shown to range from 28.43mAOD to 28.50mAOD.

The topographic survey can be found in the report appendix.

3.3 Geology and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is Helsby Sandstone Formation - Sandstone, Pebbly (gravelly). Sedimentary Bedrock formed approximately 242 to 247 million years ago in the Triassic Period. Local environment previously dominated by rivers.

The British Geological Survey (BGS) Map indicates the superficial deposits underlying the site are Glaciofluvial Sheet Deposits, Devensian - Sand and Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by ice age conditions (UGF).

The soil type taken from the UK Soil Observatory website is relatively deep soils from glaciofluvial deposits soil parent material, with a sand to sandy loam soil texture.

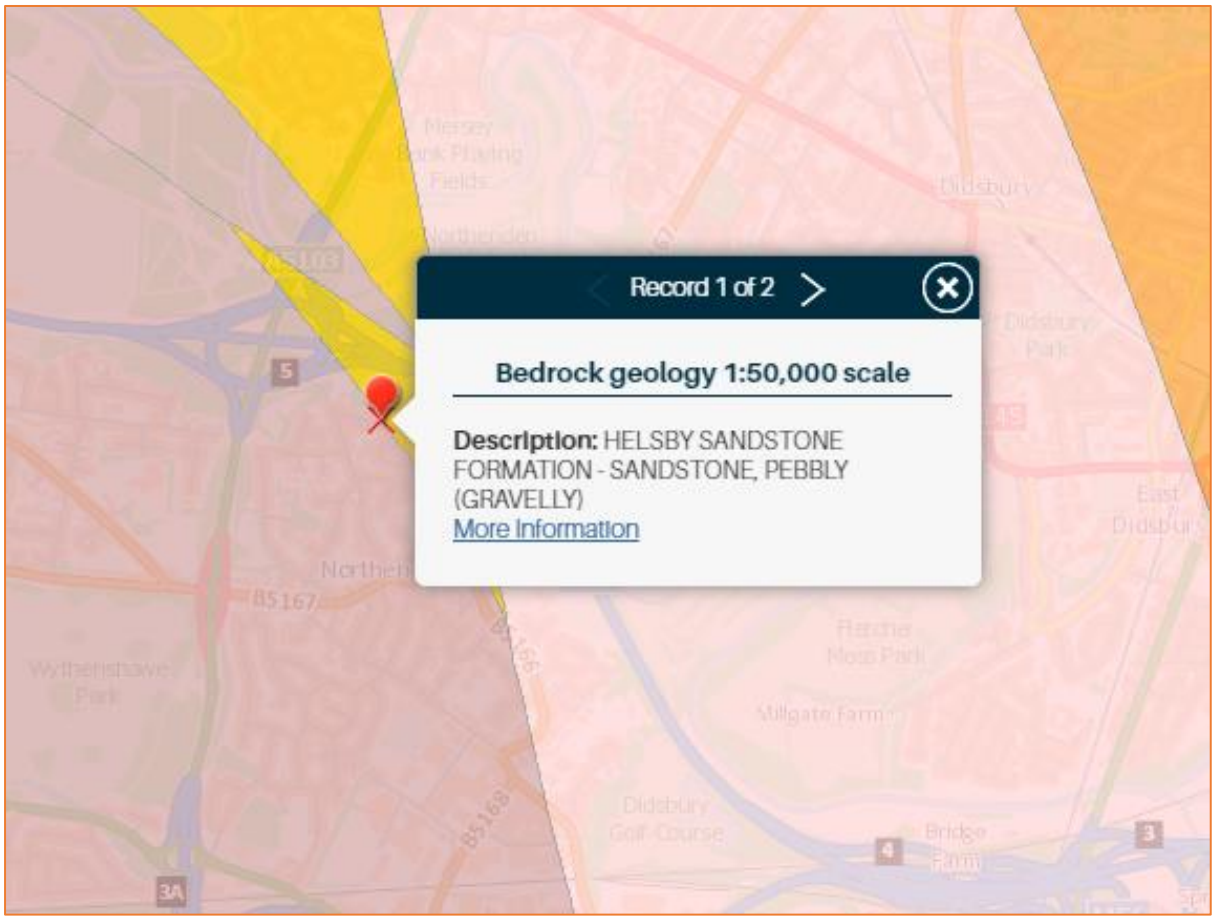


Figure 2: Local bedrock geology (Source: BGS)

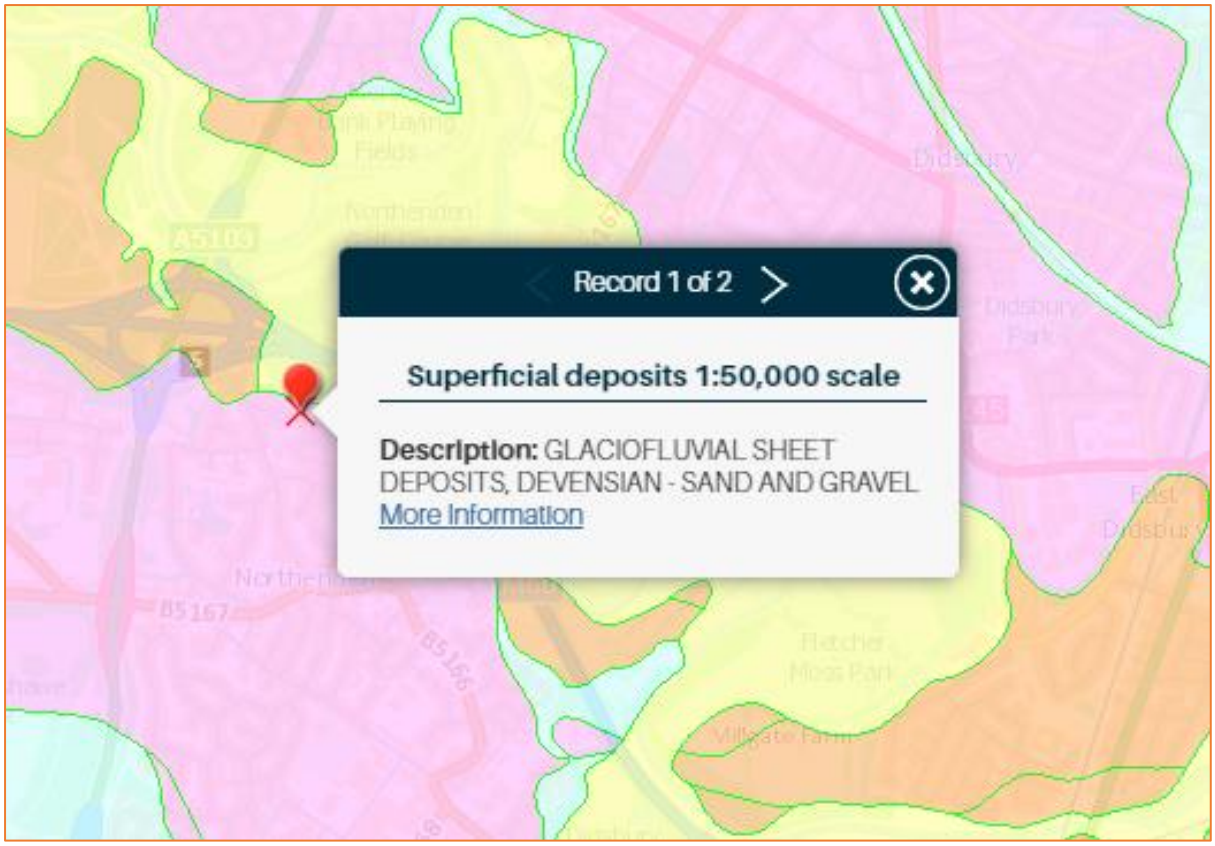


Figure 3: Local superficial deposits (Source: BGS)

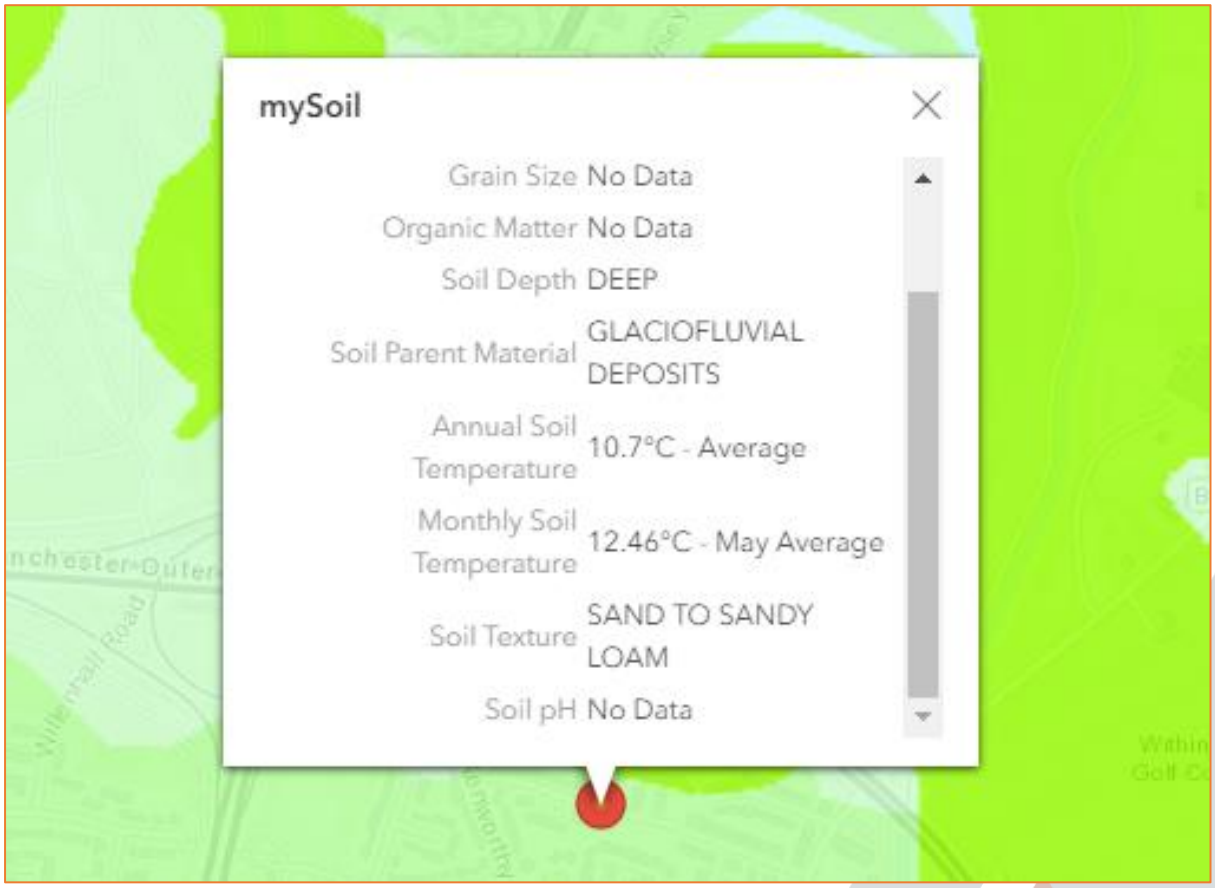


Figure 4: Local soil types (Source: UKSO)

4. Development Proposal

The proposed application is for erection of a first floor and part first floor and part two storey side extension in association with the conversion of the property to form a pair of two storey semi detached dwelling houses with rear dormer and associated car parking.

Proposed plans can be found in the report Appendix.

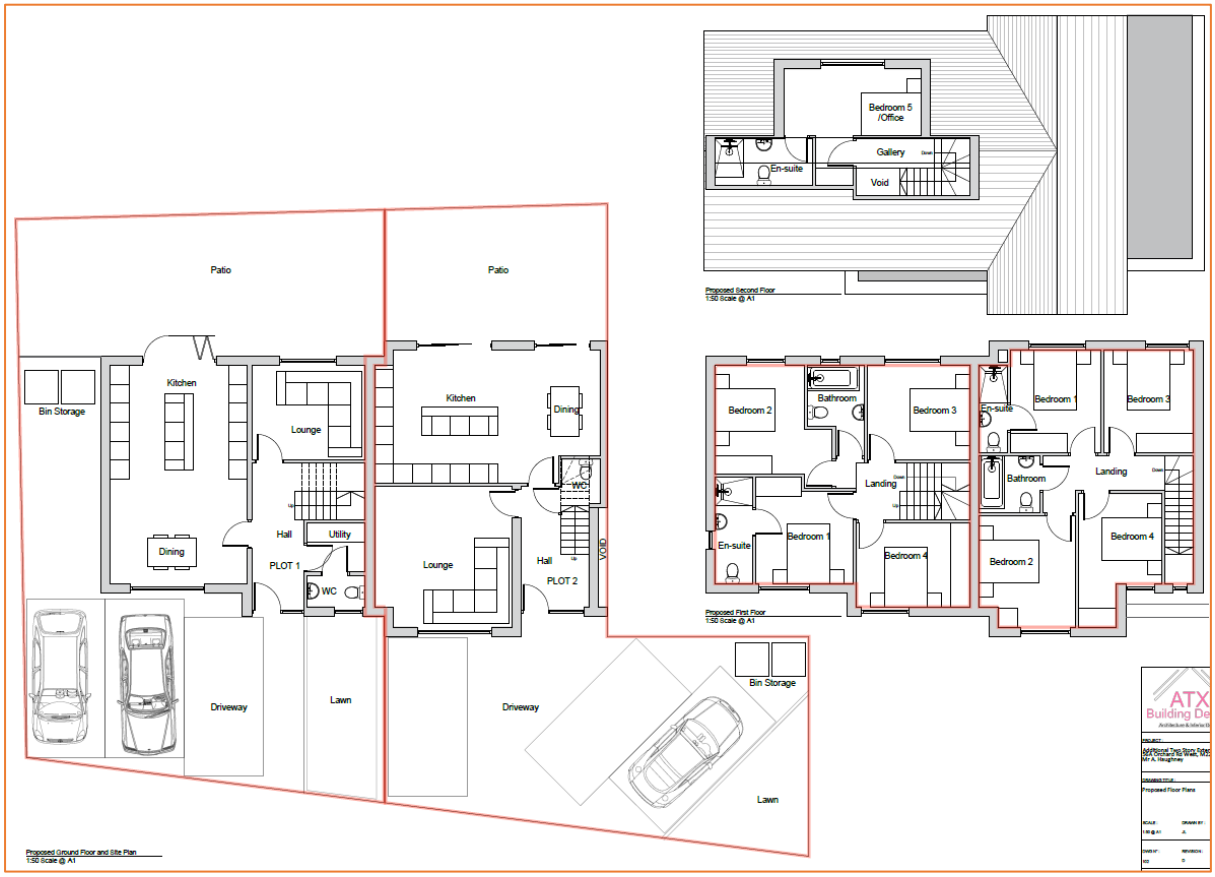


Figure 5: Proposed development plans (Source: ATX Building Design)

5. Assessment of Flood Risk

5.1 Flood Zones:

Within planning, Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's website.

Flood Zone	Definition
Zone 1 **Low Probability**	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 **Medium Probability**	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a **High Probability**	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b **The Functional Floodplain**	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 1: Flood Zones

The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

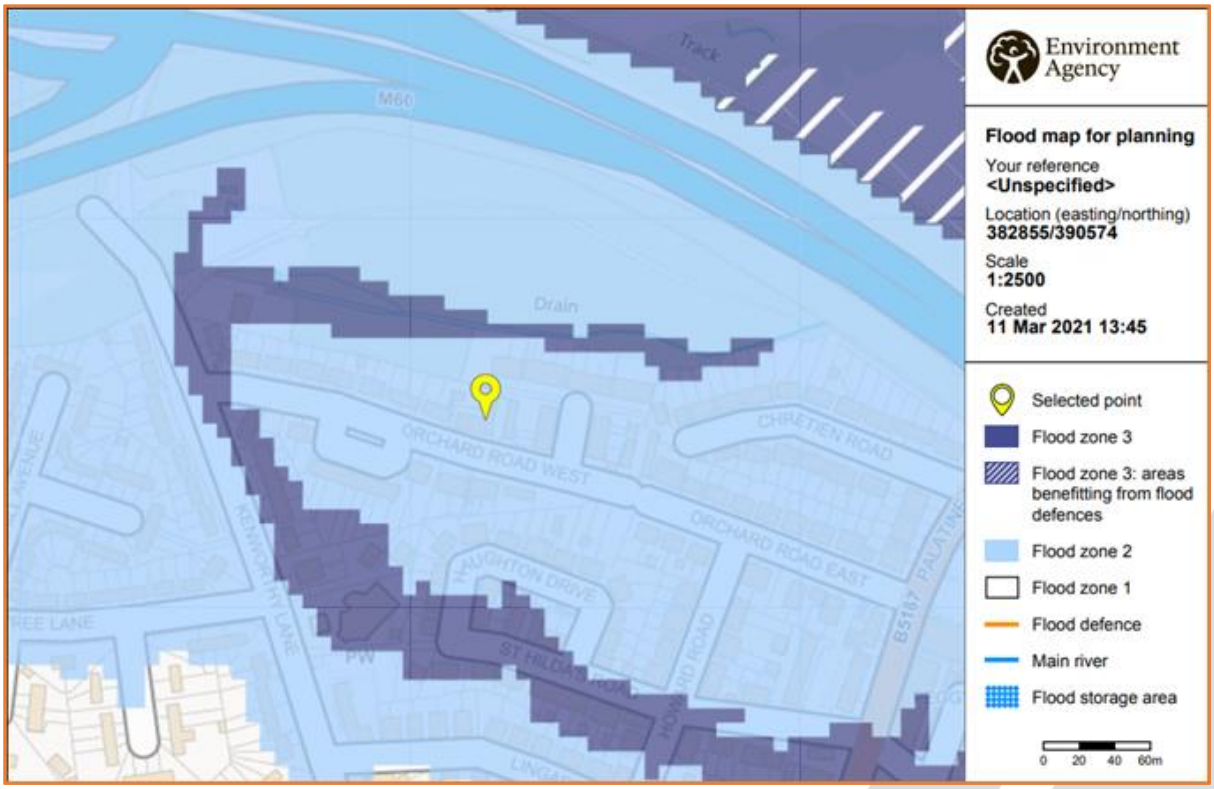


Figure 6: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is located within Flood Zone 2 (Medium Probability), which means it is defined as Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

The risk would appear to be potential fluvial flood risk, from the River Mersey and its tributaries / drains.

5.2 Fluvial (River Mersey):

The River Mersey is a river in North West England. It is 70 miles long and flows from Stockport, through Greater Manchester, and discharges at Liverpool Bay, Merseyside. For centuries, it formed part of the ancient county divide between Lancashire and Cheshire.

The Mersey is formed from three tributaries: The River Etherow, the River Goyt and the River Tame. The modern accepted start of the Mersey is at the confluence of the Tame and Goyt, in central Stockport, Greater Manchester.

A drain or tributary of the River Mersey is located approximately 40m to the north of the site, with the River Mersey approximately 350m to the east of the site.

5.2.1 Modelled flood levels and extents:

Product 4 modelled flood levels and extents have been requested from the Environment Agency for use within this report (EA ref: GMMC213333SW).

Modelled flood levels have been provided from the Upper Mersey Model Updated (2018) (Upper Mersey 2017 study).

The site is shown to be entirely outside of the defended and undefended 1:100 year flood extents at the present day.

Modelled in-channel defended and undefended flood levels have been provided for the River Mersey – which shows that the defended flood levels are generally higher than the undefended flood levels.

The following defended on-site (2D) flood levels have been provided for the site:

	1:100yr+35% (Higher Central)	**1:100yr+70% (Upper End)**	**1:1000yr**
Modelled flood level (MAOD)	28.64mAOD	29.43mAOD	29.49mAOD

Table 2: Modelled on-site defended flood levels (Source: EA)

Comparison of these modelled flood levels with topographic floor levels (28.43mAOD to 28.50mAOD), shows that the floor levels are below the design flood levels. The floor level is up to 0.21m below the 1:100yr+35% (Higher Central) flood level, up to 1.00m below the 1:100yr+70% (Upper End) flood level, and up to 1.06m below the present day 1:1000 year flood level.

5.2.3 Flood Defences

According to the EA, there are flood defences located around the River Mersey, which include 'High ground' and a 'Flood Wall'. These defences are to the 1:150 year design standard. As such, it would appear that the site is defended to at least the 1:150 year standard from fluvial flooding from the River Mersey.

5.2.4 Residual risk (breach or overtopping of flood defences):

Breaching of flood defences can cause rapid inundation of areas behind flood defences as flow in the river channel discharges through the breach. A breach can occur with little or no warning, although they are much more likely to concur with extreme river levels or tides when the stresses on flood defences are highest. Flood water flowing through a breach will normally discharge at a high velocity, rapidly filling up the areas behind the defences, resulting in significant damage to buildings and a high risk of loss of life. Breaches are most likely to occur in soft defences such as earth embankments although poorly maintained hard defences can also be a potential source of breach.

Overtopping of flood defences occurs when water levels exceed the protection level of raised flood defences. The worst case occurs when the fluvial or tidal levels exceed the defence level as this can lead to prolonged flooding. Less severe overtopping can occur when flood levels are below defence levels, but wave action causes cyclic overtopping, with intermittent discharge over the crest level of the defence. Flood defences are commonly designed with a freeboard to provide protection against overtopping from waves. The risk from overtopping due to exceedance of the flood defence level is much more significant than the risk posed by wave overtopping. Exceedance of the flood defence level can lead to prolonged and rapid flooding with properties immediately behind the defences at highest risk.

Flood defences act to defend the site from direct inundation, but there is residual risk from breach (failure) and overtopping (exceedance) of flood defences.

5.2.5 Historical flood events:

The site is not located within a recorded historical flood extent and no further information has been provided to suggest that the site has flooded in the past. The site is shown to be entirely outside of the 1964 historic flood extent that the EA has provided for the local area.

5.3 Pluvial (Surface Water):

Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

In 2013 the EA, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used are considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.

The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- 1:30 (3.3%)
- 1:100 (1%)
- 1:1000 (0.1%)

The mapping below shows the Risk of Flooding from Surface Water centred on the postcode. Please note that the EA to not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very low" risk of flooding from surface water.

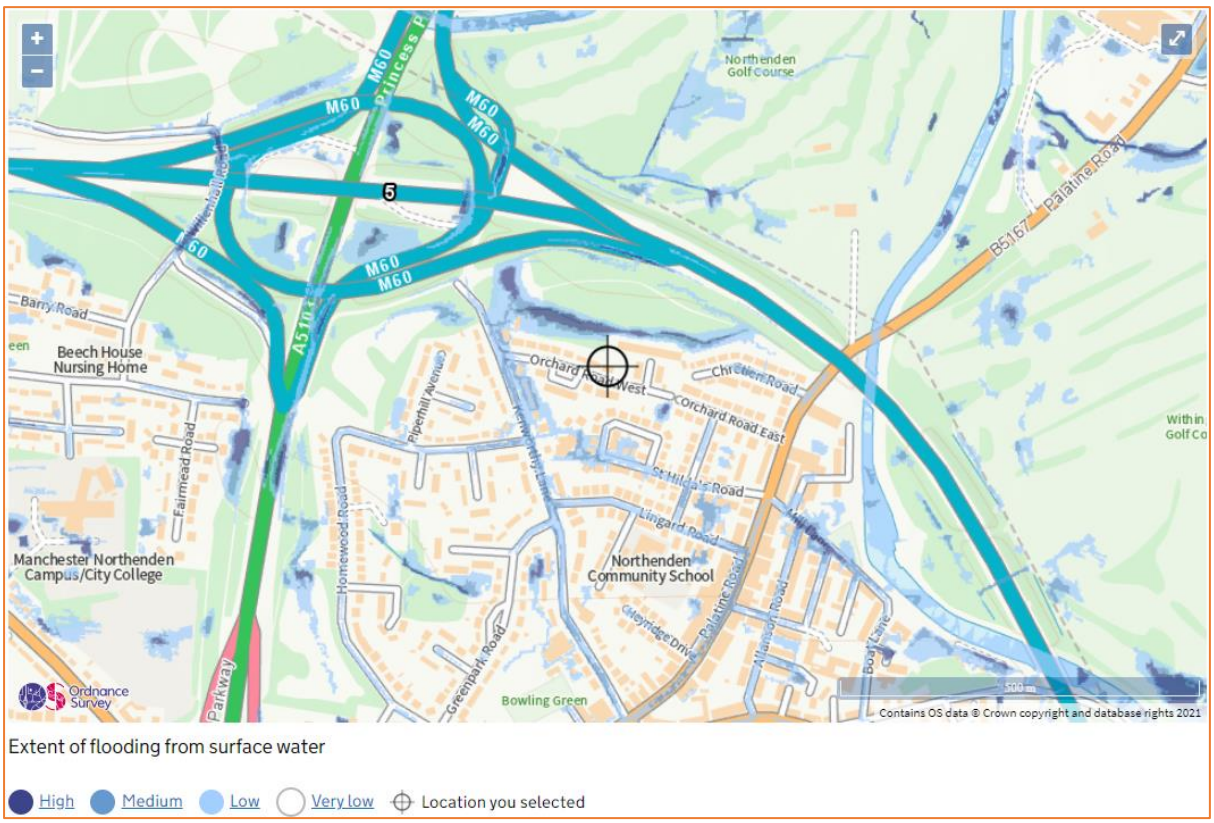


Figure 7: Extract from Environment Agency Surface Water Flood Map (Source: EA)

5.4 Groundwater:

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower

depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.

The Manchester City Council SFRA indicates that the site is located within an area at potential risk from groundwater flooding. No records of groundwater flooding at the site previously have been provided however, and it is understood that no basements are proposed as part of the development.

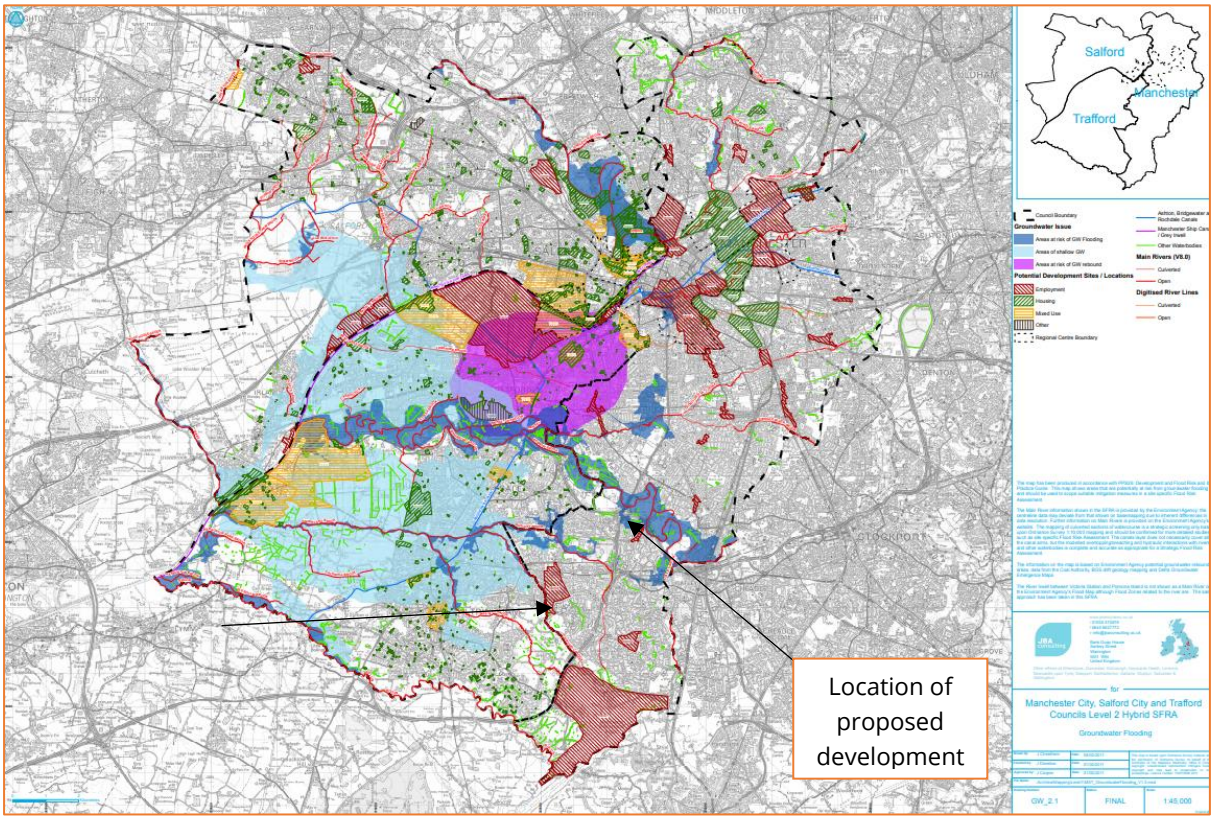


Figure 8: Areas susceptible to Groundwater (Manchester City Council SFRA)

No further records have been provided to suggest that the building has been affected by groundwater flooding previously.

The Environment Agency has defined Source Protection Zones for groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area.

The zones are used in conjunction with the EA Groundwater Protection Policy to set up pollution prevention measures in areas that are at a higher risk, and to monitor the activities of potential polluters nearby.

The published Environment Agency Groundwater Vulnerability map shows the site to be located outside a Source Protection Zone.

5.5 Sewer Surcharge:

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.

All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.

The Manchester City Council SFRA indicates that some areas within Manchester have sewer and drainage problems during rainfall events. These areas include Northenden, Didsbury, Fallowfield and in the city centre.

No further information has been provided to suggest that the site is susceptible to sewer surcharge flooding.

5.6 Other Sources:

Reservoirs with an impounded volume in excess of 25,000 cubic metres (measured above natural ground level) are governed by the Reservoirs Act and are listed on a register held by the Environment Agency. The site lies within the maximum inundation extent on the EA Reservoir Inundation Map. The EA also advise on their website that reservoir flooding is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. In accordance with the Reservoirs Act 1975 in England, these inspections are monitored and enforced by the EA themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial / tidal flooding to occur. The Environment Agency Reservoir Flood Map illustrated below, illustrates the largest area that might be flooded if the storage area were to fail and release the water it is designed to hold during a flood event.

Records of flooding from reservoirs and canals are erratic as there is no requirement for the Environment Agency to provide information on historic flooding from canals and raised reservoirs on plans. In particular, the NPPF does not require flood risk from canals and raised reservoirs to be shown on the Environment Agency flood zones.

Overflows from canals can be common as they are often fed by land drainage, and often do not have controlled overflow spillways. Occasionally, major bank breaches also occur, leading to rapid and deep flooding of adjacent land.

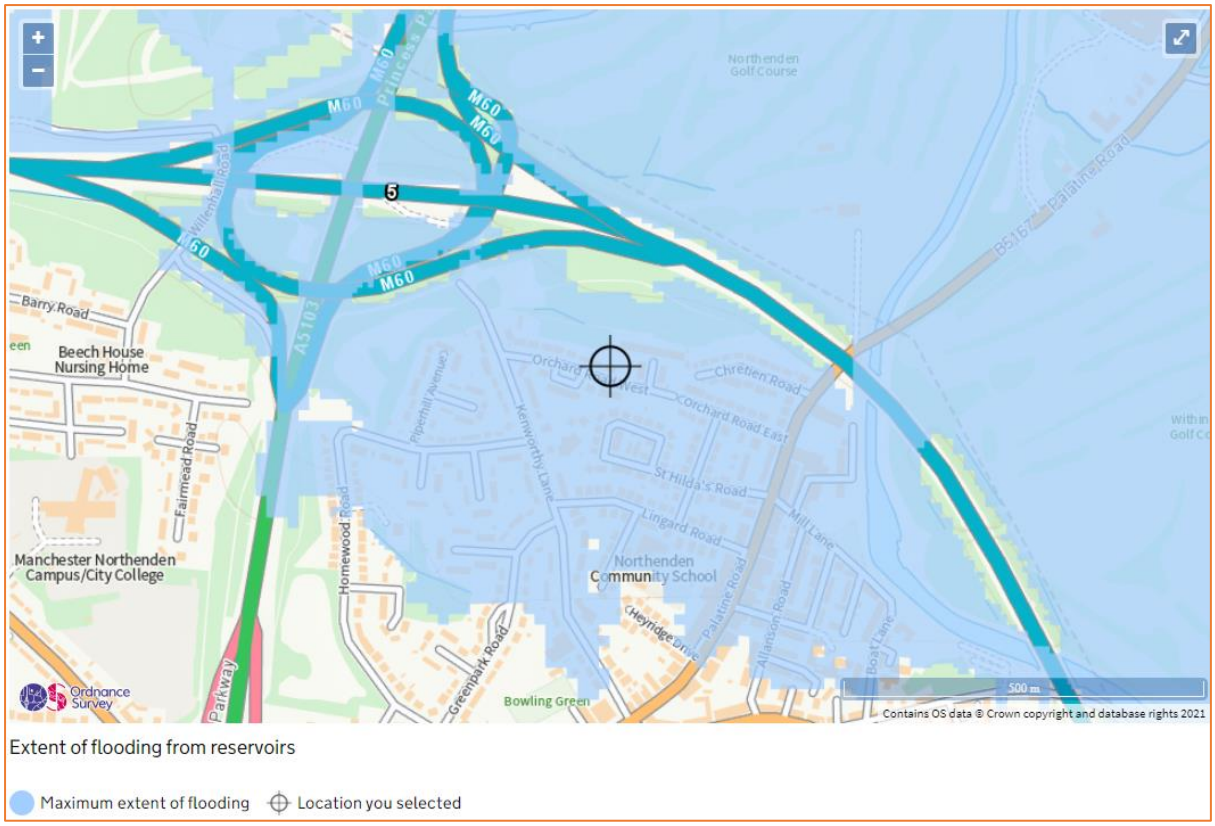


Figure 9: Extract from Environment Agency Risk of Flooding from Reservoirs Map (Source: EA)

6. Flood Risk Management

6.1 Vulnerability to flooding:

The NPPF classifies property usage by vulnerability to flooding.

The existing building is a residential dwelling which is classified as “more vulnerable” under the NPPF.

Post development, the site will remain “more vulnerable”, but with the introduction of an additional residential unit.

The proposed application is for erection of a first floor and part first floor and part two storey side extension in association with the conversion of the property to form a pair of two storey semi-detached dwelling houses with rear dormer and associated car parking.

6.2 EA Standing Advice:

The EA Standing Advice guidance is for domestic extensions and non-domestic extensions where the additional footprint created by the development does not exceed 250m^2. It should not be applied if an additional dwelling is being created, e.g. a self-contained annexe or additional commercial unit.

6.3 Physical Design Measures:

The NPPF requires new residential floor levels be set at least 300mm above suitable modelled 1:100 year plus allowance for climate change flood levels. Given that the proposed application is for extensions to the existing property and the conversion to form a pair of semi-detached houses, it is not possible to raise the finished floor levels above existing levels. As such, the finished floor levels post development will be set no lower than existing floor levels, and internal access will be maintained from the ground floor to the first floor within each property. Based on the plans provided, there will also be no bedrooms located at ground floor level.

To help protect against flooding during extreme events, the applicant has agreed to implement flood resistant design measures into the proposal, in consultation with the Local Authority building control department. These measures can include the following:

- Waterproof screed used on ground floor;
- Closed-cell foam used in wall cavities;
- Waterproof internal render at ground floor level;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-syphon fitted to all toilets;

- New kitchen units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level;
- New wiring or electrical circuit run from ceiling, with raised sockets at ground floor level;
- Electrical main ring run from ceiling level;
- Electrical incomer and meter situated at a high level;
- Boilers, control and water storage / immersion installed at a high level;
- Plumbing insulation of closed-cell design;

A flood proof door should be installed for external ground floor level doors, or demountable flood defence barrier to defend lower ground level doorways and low windows if flood doors are not practical or other planning constraints prevent it.

Based on the plans provided, all bedrooms are located at first floor level. No sleeping accommodation is located on the ground floor and internal access is maintained from the ground floor to the above floors within each dwelling.

6.4 Safe Escape and Flood Action Plan:

The NPPF requires a route of safe escape for all residents and users to be provided from new residential properties in Flood Zone 3. Safe escape is usually defined as being through slow moving flood water no deeper than 25cm.

The site is situated within Flood Zone 2 when using the Environment Agency Flood Map for Planning (Rivers and Sea).

With a potential flood depth on site for the 1:100 year flood level with Upper End allowance for climate change of up to 1.00m it is not possible to provide a safe escape route during the design flood event.

It should be noted however, that there is already a residential unit on site, and internal access will be maintained within each dwelling from the ground floor to the first floor.

As such, safe escape will be provided by a flood warning and evacuation plan, which will be prepared in liaison with the Council's Emergency Planners and tied in with the existing emergency plans for the area.

In the case of an extreme flood event without warning, occupants and users should seek refuge on the upper floors of the building.

Residents and users should follow the warning and evacuation procedure detailed in the following section

6.5 Flood Warning:

The EA is responsible for issuing flood warnings. Flood warnings are issued to the emergency services and local authorities. Both private individuals and organisations can sign-up to receive warnings via phone, text or email. This system of receiving warnings is currently voluntary.

Advice regarding severe flood warnings will generally be given during weather forecasts on local radio and TV. In the case of extreme events, warnings can also be disseminated via door to door visits by the police or locally appointed flood wardens.

The site lies within an Environment Agency Flood Warning Area. The EA issue flood warnings/alerts to specific areas when flooding is expected. It is recommended that the applicant registers online with the free Environment Agency Floodline Warnings/Alert Direct service at www.gov.uk/sign-up-for-flood-warnings to receive flood warnings by phone, text or email.

The flood warning service has three types of warnings that will help you prepare for flooding and take action:

Flood Warning	**Flood Alert**	**Flood Warning**	**Severe Flood Warning**
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.
When it's used?	Two hours to two days in advance of flooding.	Half an hour to one day in advance of flooding.	When flooding poses a significant threat to life.
What to do?	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.

Table 3: EA Flood Warning Service

6.6 Flood Plan:

It is recommended that the applicant and future owners, occupiers and Landlords of the properties prepare a flood plan to protect life and property during a flood event:

Before a flood:

- Prepare and keep a list of all your important contacts to hand or save them on your mobile phone.
- Think about what items you can move now and what you would want to move to safety during a flood.
- Know how to turn off electricity and water supplies to the site.

- Prepare a flood kit of essential items and keep it handy. It can include copies of important documents, a torch, a battery-powered or wind-up radio, blankets and warm clothing, waterproofs, rubber gloves and a first aid kit including all essential medication.

During a flood:

- Activate the evacuation plan and evacuate the site.
- Remove cars from the site if there is sufficient warning and the water levels are not rising rapidly.
- Switch off water and electricity for the site.
- Tune into your local radio station on a battery or wind-up radio.
- Listen to the advice of the emergency service and evacuate if told to do so.
- Avoid walking or driving through flood water. Six inches of fast-flowing water can knock over an adult and two feet of water can move a car.

After a flood:

- If you have flooded, contact your insurance company as soon as possible.
- Take photographs and videos of your damaged property as a record for your insurance company.
- If you don't have insurance, contact your local authority for information on grants and charities that may help you.
- Flood water can contain sewage, chemicals and animal waste. Always wear waterproof outerwear, including gloves, wellington boots and a face mask.
- Have your electrics and water checked by qualified engineers before switching them back on.

6.7 Off-Site Impacts:

6.7.1 Fluvial floodplain storage:

The NPPF requires that where development is proposed in undefended areas of floodplain, which lie outside of the functional floodplain, the implications of ground raising operations for flood risk elsewhere needs to be considered. Raising existing ground levels may reduce the capacity of the floodplain to accommodate floodwater and increase the risk of flooding by either increasing the depth of flooding to existing properties at risk or by extending the floodplain to cover properties normally outside of the floodplain. Flood storage capacity can be maintained by lowering ground levels either within the curtilage of the development or elsewhere in the floodplain, in order to maintain at least the same volume of flood storage capacity within the floodplain.

In undefended tidal areas, raising ground levels is unlikely to impact on maximum tidal levels so the provision of compensatory storage should not be necessary.

For development in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.

The site is situated in Flood Zone 2 when using the Environment Agency Flood Map for Planning (Rivers and Sea). Based on the plans provided, the proposed extensions are at first floor level and above, and as such there will be no significant increase in built footprint at ground floor level. Therefore there will be no unacceptable loss of floodplain storage post development.

6.7.2 Surface Water Drainage:

The development will utilise Sustainable drainage systems (SuDS) design in accordance with the NPPF for Planning Applications and the drainage hierarchy as follows:

1. Store rainwater for later use;
2. Infiltration techniques;
3. Attenuate rainwater by storing in tanks for gradual release;
4. Discharge rainwater direct into watercourse;
5. Discharge rainwater into surface water sewer;
6. Discharge rainwater into a combined sewer;

Due to the scale of the development, a full Surface Water Drainage Strategy is not required at this stage of planning.

7. Sequential and Exception Test

The Sequential Test aims to ensure that development does not take place in areas at high risk of flooding when appropriate areas of lower risk are reasonably available.

The site is situated within Flood Zone 2 when using the Environment Agency Flood Map for Planning (Rivers and Sea). Post development, the site will remain "more vulnerable.

Flood Zones	**Flood Risk Vulnerability Classification**				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

Table 4: Flood risk vulnerability and flood zone 'compatibility'

Using the table above, the proposed application is considered to be suitable within Flood Zone 2. The Sequential and Exception Tests do not need to be applied to minor developments and changes of use.

8. Discussion and Conclusions

Unda Consulting Limited have been appointed by Mr Andrew Haughney to undertake a Flood Risk Assessment for the proposed development at 56A Orchard Road West, Northenden, Manchester M22 4ED. The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the associated technical guidance.

The existing site is occupied by a single-storey residential dwelling.

The proposed application is for erection of a first floor and part first floor and part two storey side extension in association with the conversion of the property to form a pair of two storey semi detached dwelling houses with rear dormer and associated car parking.

The site is located within Flood Zone 2 (Medium Probability), which means it is defined as Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

The risk would appear to be potential fluvial flood risk, from the River Mersey and its tributaries / drains.

Product 4 modelled flood levels and extents have been requested from the Environment Agency for use within this report.

Modelled flood levels have been provided from the Upper Mersey Model Updated (2018) (Upper Mersey 2017 study).

The site is shown to be entirely outside of the defended and undefended 1:100 year flood extents at the present day. Comparison of the modelled on-site flood levels provided with topographic floor levels (28.43mAOD to 28.50mAOD), shows that the floor levels are below the design flood levels. The floor level is up to 0.21m below the 1:100yr+35% (Higher Central) flood level, up to 1.00m below the 1:100yr+70% (Upper End) flood level, and up to 1.06m below the present day 1:1000 year flood level

The Manchester City Council SFRA indicates that the site is located within an area at potential risk from groundwater flooding. No records of groundwater flooding at the site previously have been provided however, and it is understood that no basements are proposed as part of the development.

The Manchester City Council SFRA indicates that some areas within Manchester have sewer and drainage problems during rainfall events. These areas include Northenden, Didsbury, Fallowfield and in the city centre.

No further information has been provided to suggest that the site is susceptible to groundwater or sewer surcharge flooding.

The site is not located within a recorded historical flood extent and no further information has been provided to suggest that the site has flooded in the past. The site is shown to be entirely outside of the 1964 historic flood extent that the EA has provided for the local area.

Given that the proposed application is for extensions to the existing property and the conversion to form a pair of semi-detached houses, it is not possible to raise the finished floor levels above existing levels. As such, the finished floor levels post development will be set no lower than existing floor levels, and internal access will be maintained from the ground floor to the first floor within each property. Based on the plans provided, there will also be no bedrooms located at ground floor level.

Safe escape will be provided by a flood warning and evacuation plan, which will be prepared in liaison with the Council's Emergency Planners and tied in with the existing emergency plans for the area.

In the case of an extreme flood event without warning, occupants and users should seek refuge on the upper floors of the building.

Based on the plans provided, all bedrooms are located at first floor level. No sleeping accommodation is located on the ground floor and internal access is maintained from the ground floor to the above floors within each dwelling.

To mitigate against ingress of floodwater, it is suggested the applicant implement flood resistant design measures into the ground floor of the development, including flood defence windows and doors.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very low" risk of flooding from surface water.

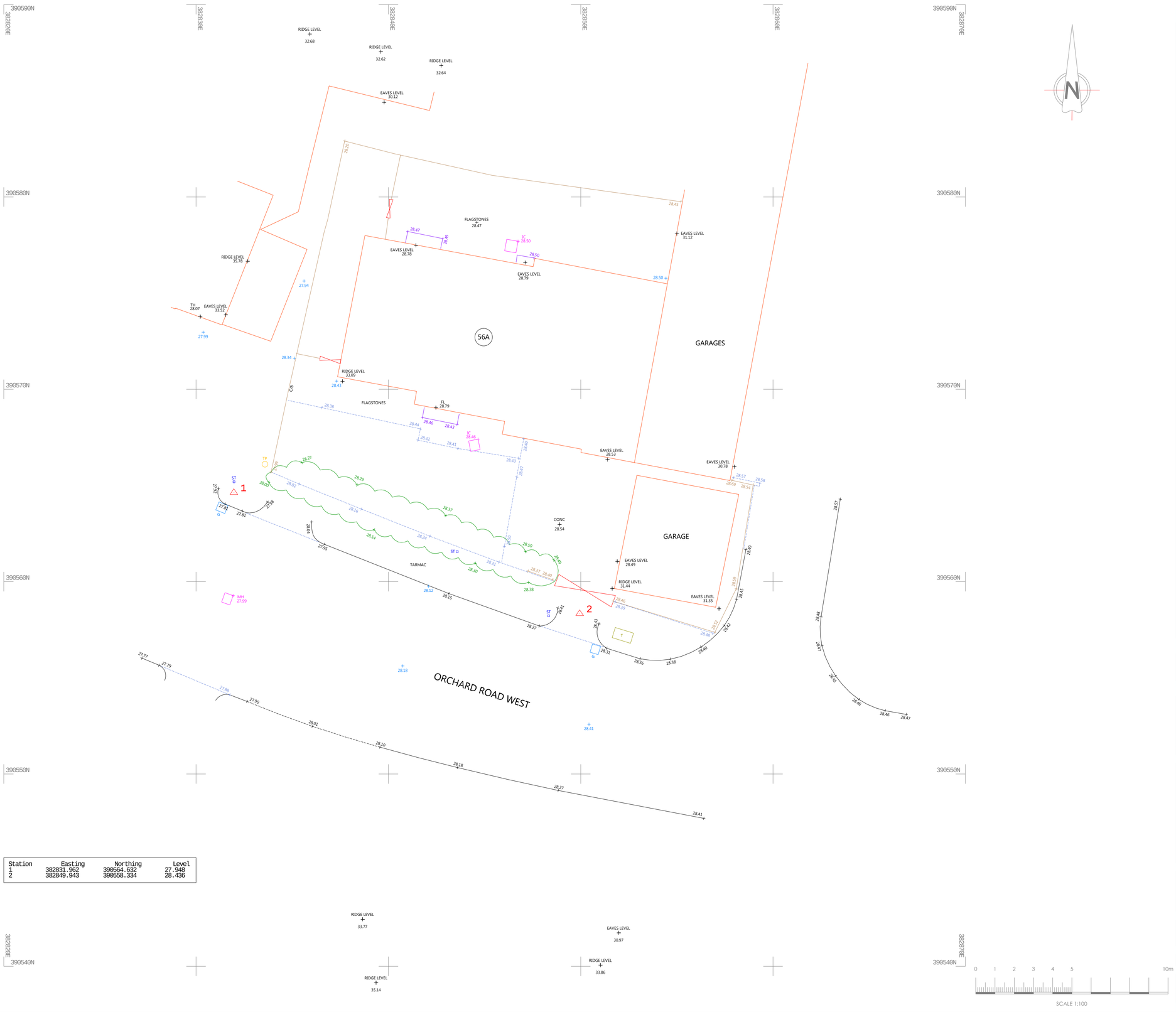
In summary:

- EA Flood Zone 2 (Medium Risk).
- Potential fluvial flood risk, from the River Mersey and its tributaries / drains.
- Risk of pluvial flooding would appear to be "very low".
- No historical records of flooding provided.
- The application is for residential extensions and conversion of the property to form 2 dwelling houses.
- Floor levels in the proposed extensions will be set no lower than existing adjacent floor levels.
- Internal access will be maintained from ground floor to the first-floor level.
- No bedrooms are proposed on the ground floor.
- Flood proofing of the development will be incorporated as appropriate.
- A flood warning and evacuation plan will be implemented post development.
- The applicant will register with the Environment Agency Floodline Alert/Warnings Direct service.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

9. Appendix

- Topographical site survey.
- Existing and Proposed Plans;
- EA Product 4 Flood Data.



Station	Easting	Northing	Level
1	382831.962	390564.632	27.948
2	382849.943	390558.334	28.436

Abbreviations/Symbols (Measured Building Surveys):

C:	Window Cill Height
H:	Window Head Height
BH:	Beam Height
DH:	Door Height
COL:	Column
SVP:	Soil Vent Pipe
FL:	Floor Level
TH:	Threshold Level
2.50	Floor to Ceiling Height
	Vaulted Ceiling

Line types

	Hedge Lines
	Drainage Runs
	Overhead Electricity Cables
	Overhead Telephone Cables

Symbols

	Tree/Bush		Glass House
	Control Station		Osbm
	Borehole		
	Trial Hole		

Abbreviations (Topographic Survey):

AH:	Arch Height
AV:	Air Valve
BB:	Belisha Beacon
BOX:	Electricity Box, Cables Box, Etc.
BOL:	Bollard
BT/IC:	British Telecom Inspection Chamber
BS:	Bus Stop
BS/LP:	Bus Stop / Lamp Post
CATV:	CATV Inspection Chamber
CCTV:	Closed Circuit Television
CL:	Cellar Light
C.PIT:	Catch Pit
ER:	Earth Rod
EC:	Electricity Inspection Chamber
EP:	Electricity Pole
FH:	Fire Hydrant
FP:	Flag Pole
GV:	Gas Valve
G:	Gully
IC:	Inspection Chamber
KO:	Kerb Outlet
LP:	Lamp Post
LB:	Letter Box
LC:	Lighting Column
MKR:	Marker
MH:	Manhole
MP:	Mooring Point
MS:	Mile Stone
NYNEX:	Nynex Inspection Chamber
O/H:	Over Hang
P:	Post
PO/IC:	Post Office Inspection Chamber
R/S:	Road Sign
RE:	Rodding Eye
RTW:	Retaining Wall
S/P:	Sign Post
SNP:	Street Name Plate
ST:	Stop Tap
SV:	Stop Valve
T:	Telecom Inspection Chamber
TCB:	Telephone Call Box
TH:	Threshold Level
TL:	Traffic Light
TP:	Telegraph Pole
TROUGH:	Trough
WO:	Water Outlet
WM:	Water Meter

Fence Descriptions:

B/W:	Barbed Wire
C/B:	Close Boarded
C/BARRIER:	Crash Barrier
C/L:	Chain Link
C/P:	Chestnut Paling
C/I:	Corrugated Iron
I/R:	Iron Railing
MISC:	Miscellaneous
P/R:	Post & Rail
P/W:	Post & Wire
P/C:	Post & Chain
S/PAL:	Steel Palisade
W/M:	Wire Mesh

Survey Notes:

Coordinates and Levels related to Ordnance Survey Datum - GPS OSGB36

Revision	Date	Description

CPLS
ices
Chris Partington Land Surveyors
44a Green Lane
Sale
Cheshire
M33 5PP
t: 0161 976 1194
www.cpls.co.uk e:survey@cpls.co.uk

Client
ATX Building Design

Project
56a Orchard Road West, Northenden
Site Survey

Scale 1:100	Surveyed By C G P	Date 19.04.21
Drawing No. 190421CP-01	Checked By CPLS	Date 21.04.21
	Drawn By J C	Date 21.04.21

0 1 2 3 4 5 10m

SCALE 1:100

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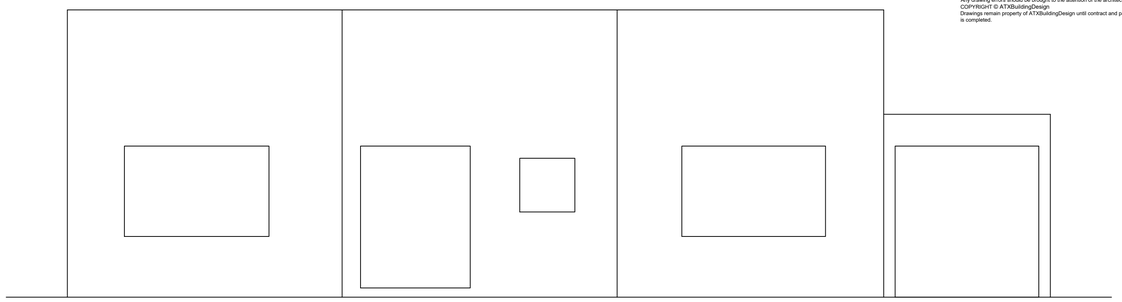
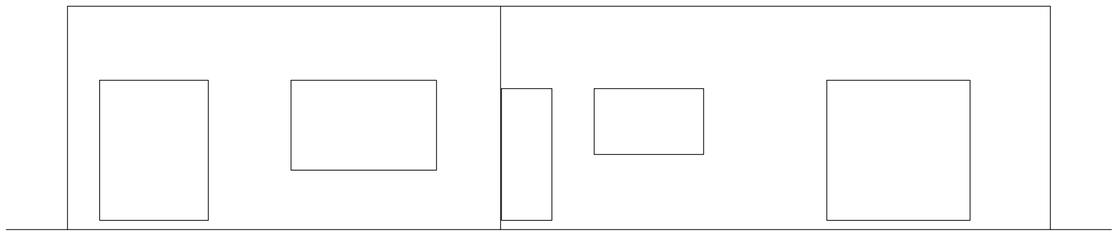


Existing Front Elevation
1:50 Scale @ A1



Existing Rear Elevation
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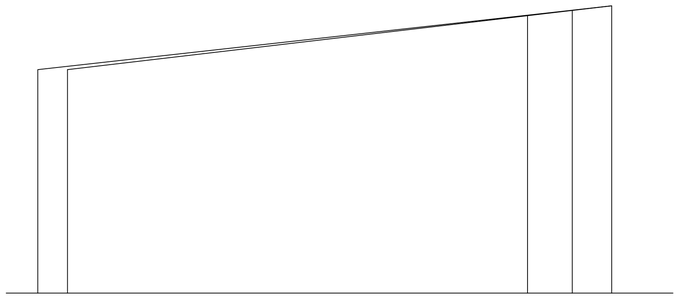

Existing Side Elevation
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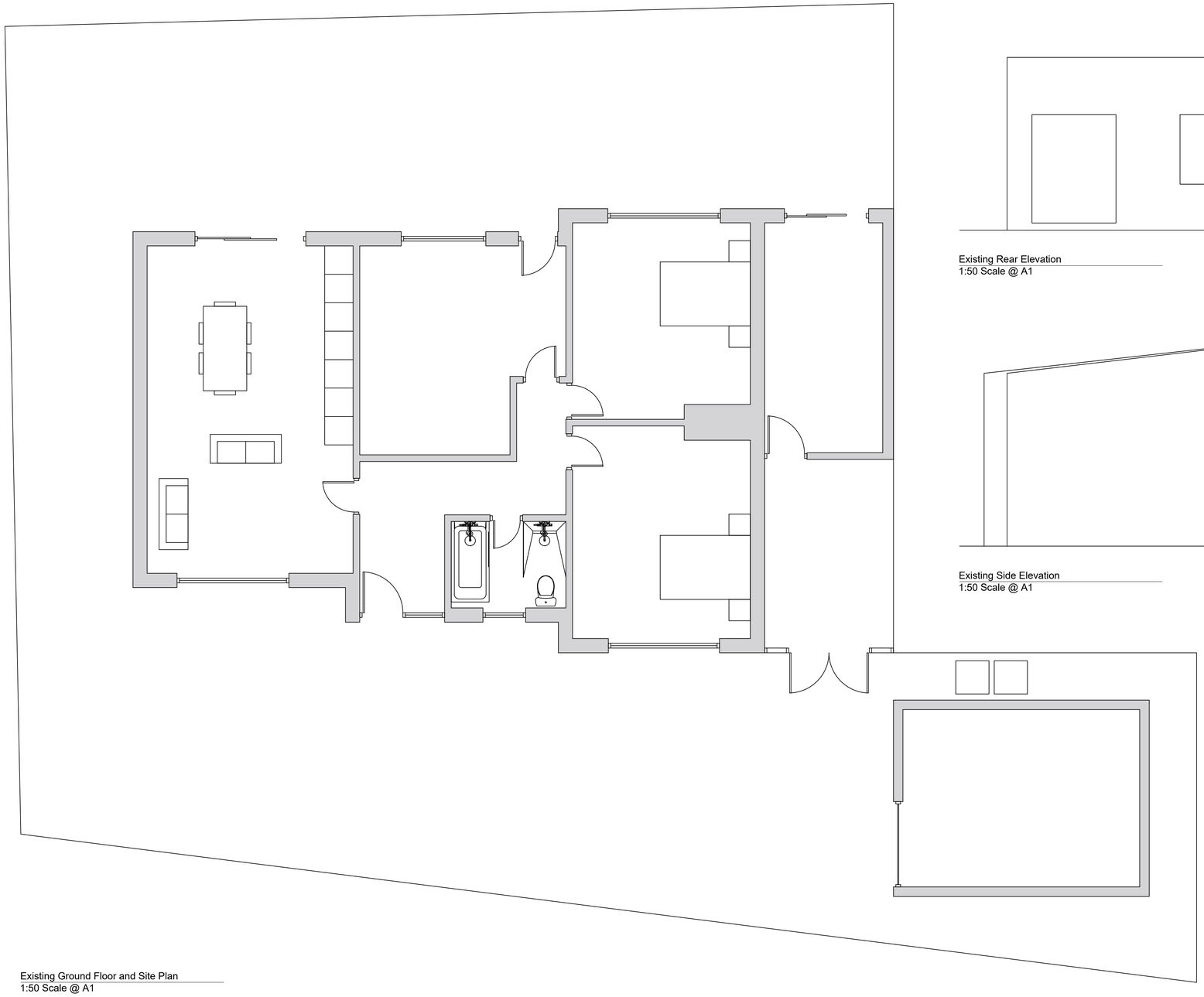

Existing Ground Floor and Site Plan
1:50 Scale @ A1

ATX
Building Design
Architecture & Interior Design

PROJECT :
Additional Two Story Extension
56A Orchard Rd West, M22 4ED
Mr A. Haughney

DRAWING TITLE :
Existing Plans and Elevation

SCALE :	DRAWN BY :	DATE :
1:50 @ A1	JL	09.2020

DWG N° :	REVISION :	CHECKED :
001	A	----

Mobile: 07557919149
Email: info@atxbuildingdesign.co.uk

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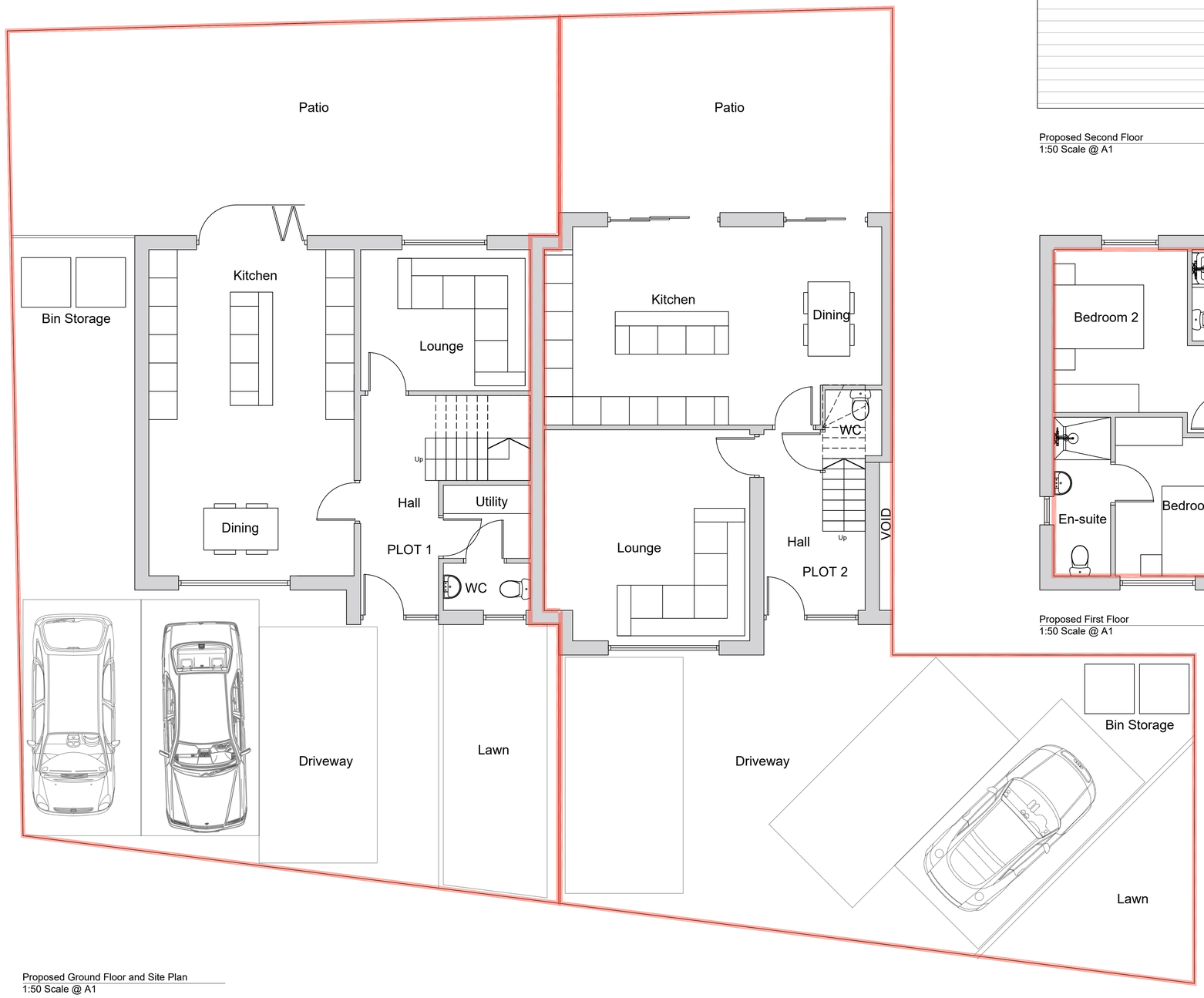
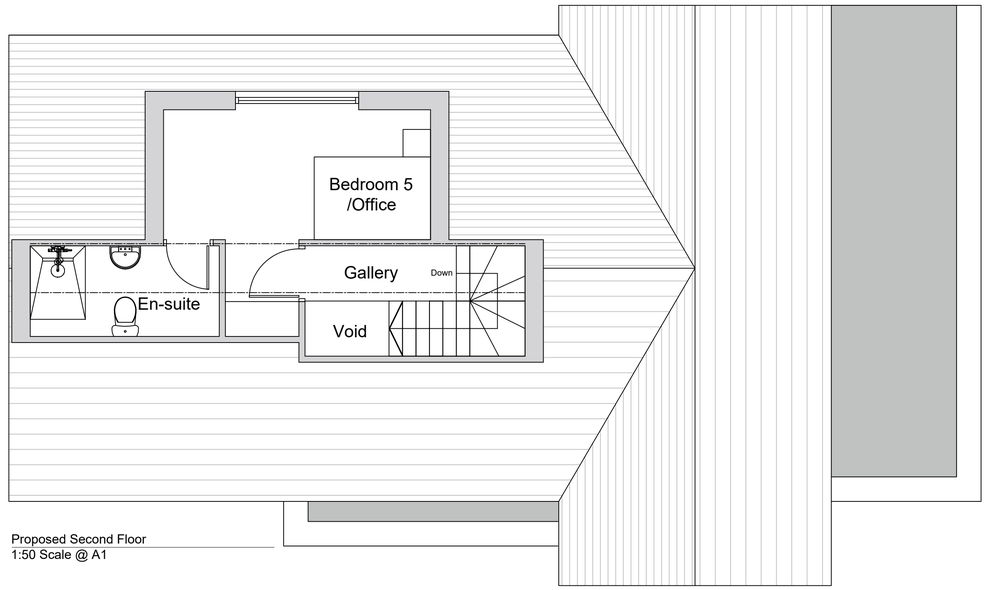
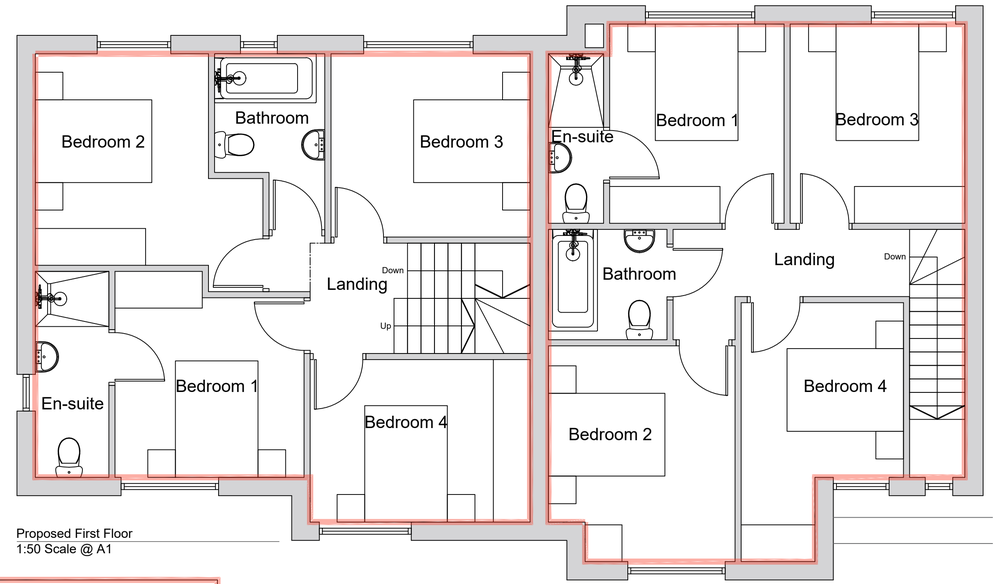


Proposed Ground Floor and Site Plan
1:50 Scale @ A1



Proposed Second Floor
1:50 Scale @ A1



Proposed First Floor
1:50 Scale @ A1

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Building Design
Architecture & Interior Design

PROJECT :
Additional Two Story Extension
56A Orchard Rd West, M22 4ED
Mr A. Haughney

DRAWING TITLE :
Proposed Floor Plans

SCALE :	DRAWN BY :	DATE :
1:50 @ A1	JL	01.2021

DWG N° :	REVISION :	CHECKED :
102	D	----

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027

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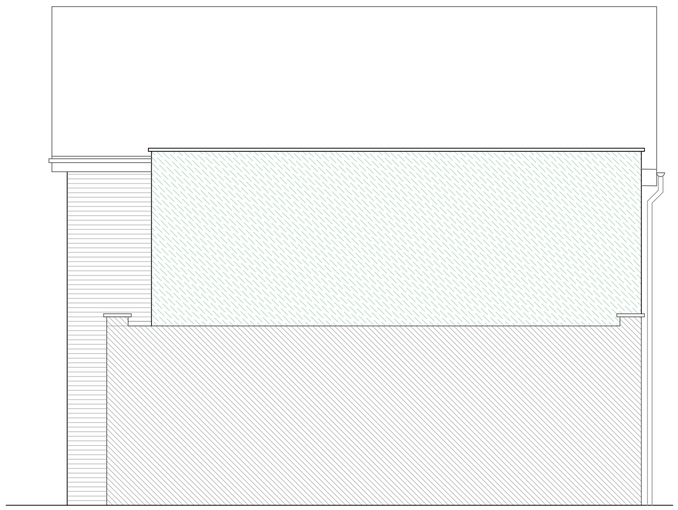
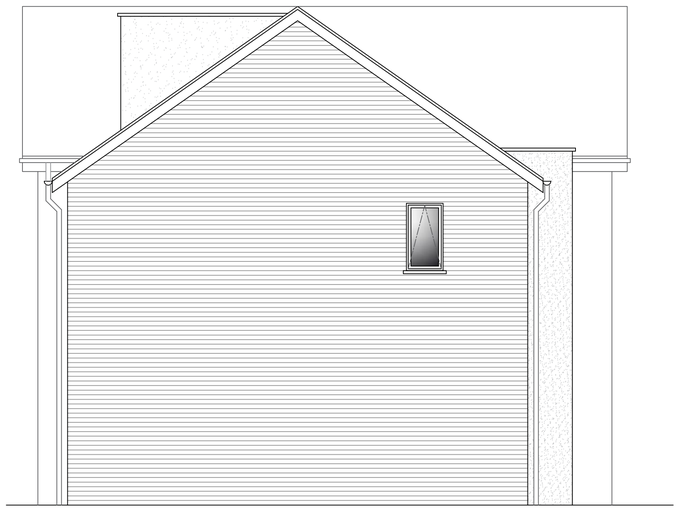
Proposed Front/South Elevation
1:50 Scale @ A1



Proposed Side/East Elevation
1:50 Scale @ A1

Proposed Rear/North Elevation
1:50 Scale @ A1



Proposed Side/West Elevation
1:50 Scale @ A1

ATX
Building Design
Architecture & Interior Design

PROJECT :

Additional Two Story Extension
56A Orchard Rd West, M22 4ED
Mr A. Haughney

DRAWING TITLE :

Proposed Elevations

SCALE :	DRAWN BY :	DATE :
1:50 @ A1	JL	01.2021

DWG N° :	REVISION :	CHECKED :
103	B	----

Mobile: 07557919149
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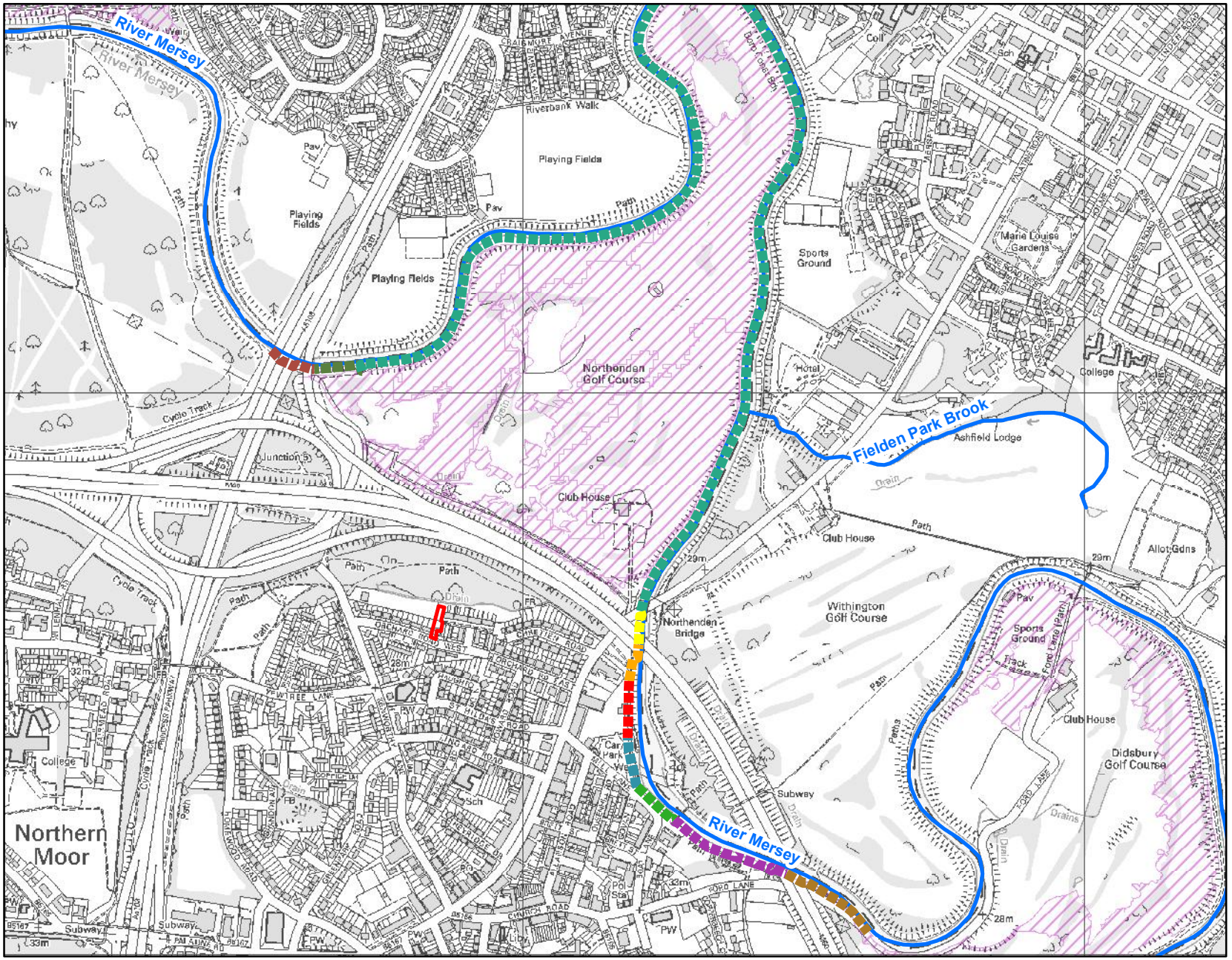
Flood Defence Map centred on Orchard Road West, Manchester, M22 4ED. Created on 20/04/2021 [GMMC213333SW]



Environment Agency

1:10,001

N

Legend

Site Location

Defences (EA maintained)

Asset ID

- 43272
- 58940
- 58941
- 59069
- 59245
- 120542
- 120550
- 120551
- 122141
- 411052

Main River

Areas Benefiting

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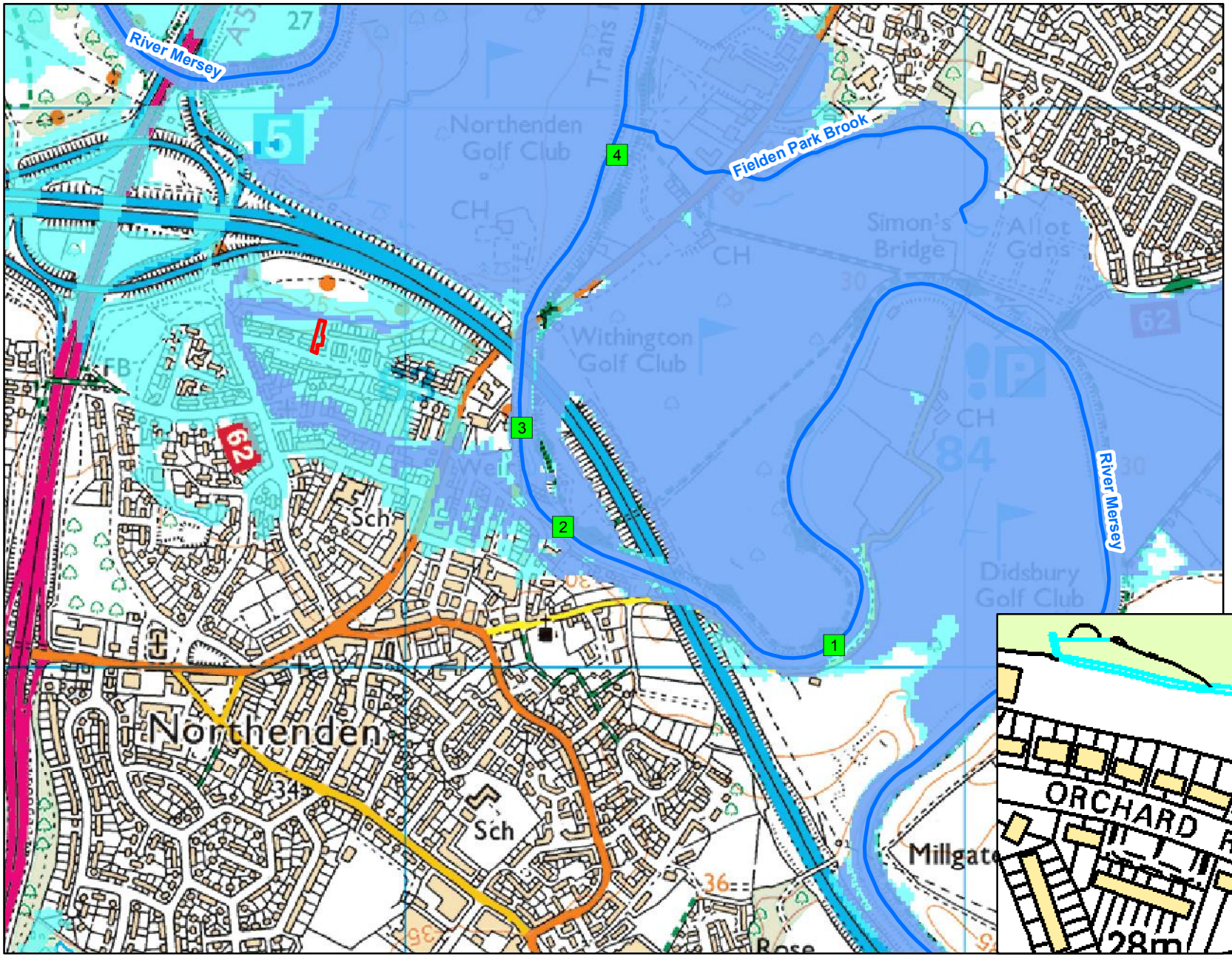
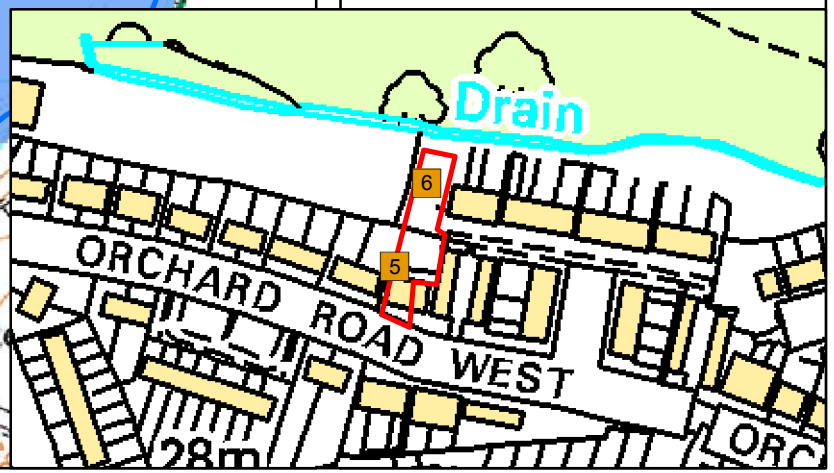
Detailed Flood Map centred on Orchard Road West, Manchester, M22 4ED. Created on 20/04/2021 [GMMC213333SW]





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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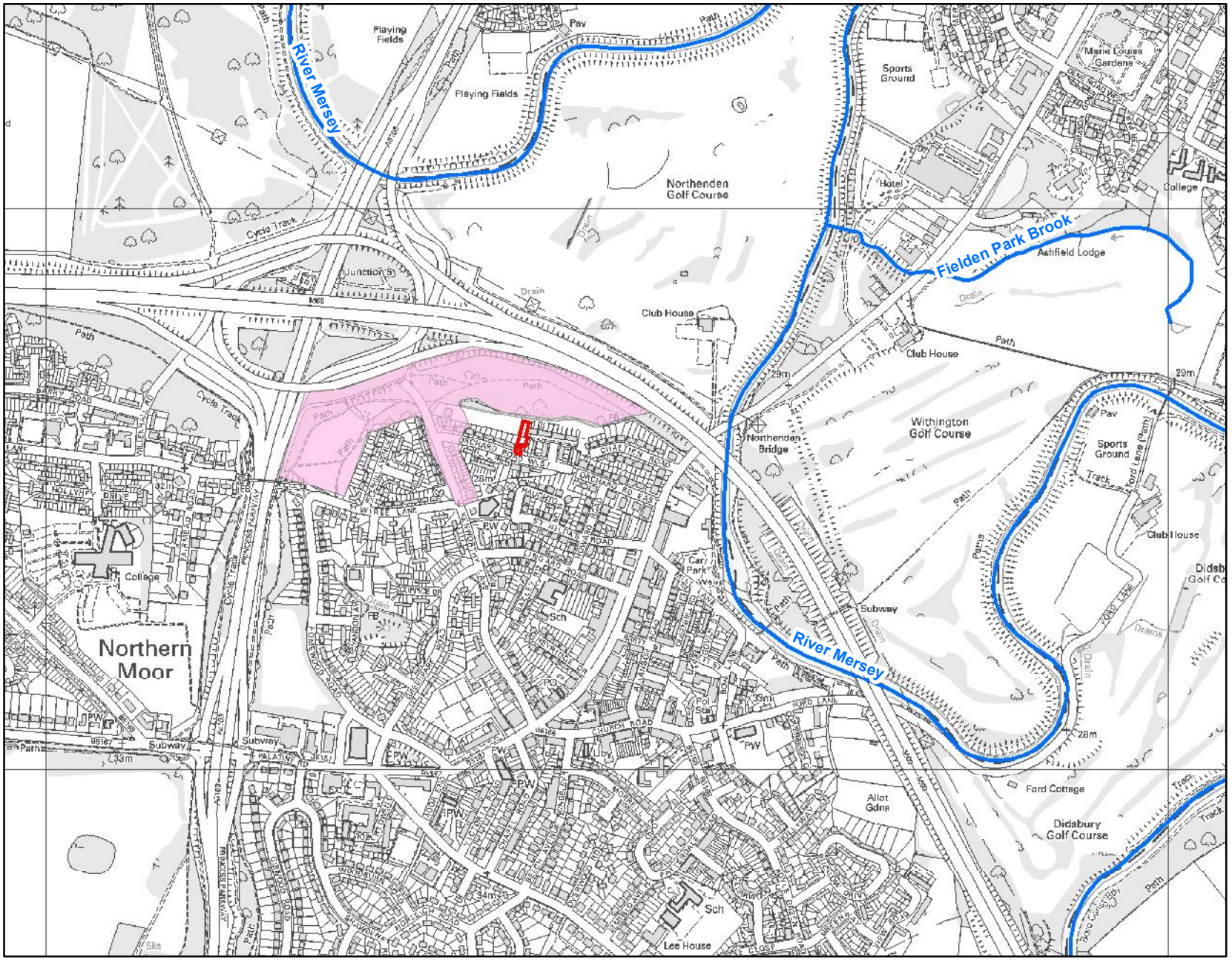
Recorded Flood Outline Map centred on Orchard Road West, Manchester, M22 4ED.
Created on 20/04/2021 [GMMC213333SW]


River Mersey
Fielden Park Brook
Northenden Golf Course
Withington Golf Course
Northern Moor
Northenden Bridge
Club House
Sports Ground
Playing Fields
Ashfield Lodge
Marie Louise Gardens
Hotel
College
Subway
Ford Cottage
Didsbury Golf Course
Allot Gdns
Lee House
Sch
Cycle Track
Junction 5
M60
Drain
Path
Track
Pav
Car Park
PW
PO
Sta
Church
Ford Lane
Palatine Rd
Princess Parkway
Wilmslow Road
Barlow Moor Road
Mauldeth Road
Orchard Road West
Orchard Rd East
Sheltren Road
Packhars Road
Wilmslow Road
Lindard Road
Lime Tree Lane
Cromwell Road
Lomewood Road
Wolstan Road
Wolverhampton Road
Wolverhampton Close
Wolverhampton Drive
Wolverhampton Way
Wolverhampton Avenue
Wolverhampton Grove
Wolverhampton Gardens
Wolverhampton Crescent
Wolverhampton Mews
Wolverhampton Court
Wolverhampton Close
Wolverhampton Place
Wolverhampton Terrace
Wolverhampton Square
Wolverhampton Walk
Wolverhampton Lane
Wolverhampton Road

					Undefended														Defended													
Map Reference	Model Node Reference	Easting	Northing	Data	50 % AEP(1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP(1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% Increase in Flow	1 % AEP (1 in 100 year) + 70% 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)	0.1 % AEP (1 in 1000 year) + 30% Increase in Flow	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP(1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% Increase in Flow	1 % AEP (1 in 100 year) + 30% 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)	0.1 % AEP (1 in 1000 year) + 30% Increase in Flow
1	ea013_0242_MR5924_0629	382768	390027	Modelled Water Level (m ausDN)	28.70	28.92	29.18	29.34	29.39	29.52	29.58	29.63	29.69	29.93	30.24	29.74	30.27	30.50	29.01	29.49	29.81	29.90	29.95	30.04	30.08	30.11	30.25	30.27	30.29	30.16	30.22	30.30
				Modelled Flow (cumecs)	98.33	99.95	100.64	101.05	101.17	101.42	101.56	101.65	102.25	102.22	104.61	101.85	149.19	149.32	184.68	224.10	247.64	262.38	266.75	288.50	302.41	304.73	312.04	335.38	349.81	310.27	352.80	359.68
2	ea013_0242_MR5924_0068	383281	390252	Modelled Water Level (m ausDN)	27.61	27.91	28.10	28.27	28.32	28.48	28.58	28.65	29.18	29.26	29.54	28.85	29.62	30.04	28.17	28.67	28.81	29.10	29.16	29.25	29.29	29.43	29.85	29.90	30.11	29.52	30.15	30.36
				Modelled Flow (cumecs)	109.52	116.09	246.31	267.24	271.74	293.65	298.30	291.34	302.47	303.76	292.38	297.18	299.02	300.70	184.79	233.59	247.63	265.14	268.19	297.12	300.68	302.65	309.98	311.11	318.75	306.85	319.96	326.48
3	ea013_0242_MR5921_3663	383212	390426	Modelled Water Level (m ausDN)	27.50	27.76	27.91	28.08	28.14	28.32	28.43	28.52	28.12	29.20	29.51	28.74	29.58	30.02	28.13	28.65	28.78	29.07	29.13	29.23	29.27	29.41	29.82	29.88	30.11	29.50	30.15	30.35
				Modelled Flow (cumecs)	171.63	223.02	253.60	274.04	278.87	291.24	296.02	298.68	309.91	311.13	297.31	304.62	299.93	305.66	184.10	233.43	247.32	279.41	285.72	297.10	300.29	302.33	309.77	310.93	318.52	308.86	317.75	327.40
4	ea013_0242_MR5921_3127c	383381	390618	Modelled Water Level (m ausDN)	26.70	26.77	26.97	27.23	27.32	27.59	27.76	27.89	28.71	28.82	29.39	28.21	29.48	29.94	27.57	28.08	28.22	28.52	28.57	28.87	28.77	28.90	29.27	29.32	29.56	29.00	29.62	30.01
				Modelled Flow (cumecs)	136.99	165.17	176.59	182.12	183.49	195.72	202.22	207.00	233.22	236.11	220.55	217.68	222.09	224.83	184.45	233.20	247.34	279.38	285.54	297.08	300.51	308.03	360.08	365.99	382.67	320.14	385.56	403.99

					Undefended				Defended			
Map Reference	Model Node Reference	Easting	Northing	Data	0.1 % AEP (1 in 1000 year) + 30% Increase in Flow	1 % AEP (1 in 100 year) + 30% Increase in Flow	1 % AEP (1 in 100 year) + 70% Increase in Flow	1 % AEP (1 in 100 year) + 70% Increase in Flow	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% Increase in Flow		
5	2D Level	382642	390582	Modelled Water Level (m ausDN)	29.74	28.40	28.64	29.42	29.49	29.61		
6		382851	390610	Modelled Water Level (m ausDN)	29.74	28.40	28.64	29.42	29.49	29.61		

Model data taken from Upper Mersey 2017 Study

AEP - Annual Exceedence Probability

m ausdn - metres above ordnance datum New lyn

cumecs - cubic metres per second

Notes: *Climate Change Scenario - 30%, 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.

Recorded Flood Outlines

Flood Point Code	Name	Start Date	End Date	Source of Flooding	Cause of Flooding
18123	Mers	01/01/1964	02/01/1964	Unknown	Unknown

Flood Defences

Start Date	Asset Type	Asset ID	Standard of Protection	Upstream Actual Crest Level (m aod)	Downstream Actual Crest Level (m aod)
01/01/2005	High Ground	42072	100	24.65	30.58
01/01/2005	Wall	58940	100	30.84	30.38
01/01/2005	Wall	58941	100	30.07	33.28
01/01/2005	High Ground	59089	100	35.14	27.28
01/01/2005	High Ground	59245	100	22.71	28.73
01/01/2005	Wall	120542	100	30.38	30.35
01/01/2005	High Ground	120550	100	28.73	28.73
01/01/2005	Embankment	120551	100	29.16	27.48
01/01/2005	High Ground	120141	100	30.85	30.58
Unknown	High Ground	411052	100	Unknown	Unknown