



# Flood Risk Assessment

28 Alford Avenue, Withington, M20 1AQ

Reference: 112- FRA- 002

Date: **16/07/2021**

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## Appendices

- A Site Location Plan
- B Existing and Proposed Site Layouts
- C Site Characteristics

## **Purpose of this report**

- 1.1 Urban Water has been appointed by the owner of 28 Alford Avenue to undertake a Level 2 Screening Flood Risk Assessment for a development located at M20 1AQ.

## **Objectives**

- 1.2 The objectives of this FRA are to demonstrate the following:
- \* Whether the proposed development is likely to be affected by current or future flooding.
  - \* Whether the proposed development will increase flood risk elsewhere.
  - \* Whether the flood risks associated with the proposed development can be satisfactorily managed.
  - \* Whether the measures proposed to deal with the flood risk are sustainable.

## **Documents Consulted**

- 1.3 To achieve these objectives the following documents have been consulted and/or referenced:

The National Planning Policy Framework (NPPF)

CIRIA C753 document The SuDS Manual, 2015

Local Flood Risk Management Strategy (LFRMS)

Level 1 Strategic Flood Risk Assessment (SFRA)

Aerial photographs and topographical survey of the site

British Geological Society Records

Environment Agency flood maps

The CIRIA publication 'C635 Designing for exceedance in urban drainage— Good practice'



## Development Site and Location

- 2.1 The site is located at Alford Avenue, Withington. The nearest post code is M20 1AQ. Refer to appendix A for site location plan.
- 2.2 The current use of the site is the garden of the property. The current use vulnerability classification of the site is Water compatible. The site is located in the River Flood Zone 2. Refer to Appendix B for more details.

## Development Proposals

- 2.3 The proposed development includes the extension to the current building to provide more internal space. Refer to Appendix B for layout of the proposed development.
- 2.4 The vulnerability classification of the proposed development is More vulnerable with an estimated lifetime between 50 and 100 years.

## Site Hydrology and Hydrogeology

- Surface Water 2.5 The tributary of the Platt Brook is approximately 150 m away from the development.
- Aquifer 2.6 The development is located within a principle aquifer area. A principle aquifer consists of layers of rock or deposits that provide a high level of water storage. It may support water supply and/or river base flow on a strategic scale. It is likely that principal aquifers are aquifers
- Source Protection Zone 2.7 The site is not located within a Source Protection Zone.
- Ground Water Levels 2.8 The ground water levels for this site are unknown. However it is likely that the water table is low.

## Site Geology

- Bedrock 2.9 The British Geological Society records of the site show that it is located within the Wilmslow Sandstone.
- Superficial Deposits 2.10 The British Geological Society records show that the superficial deposits are Till, Devensian.
- Contaminated Land 2.11 The contaminated land register has not been consulted. The owner suggested that the site is not contaminated



## **National Planning Policy Framework (NPPF)**

- 3.1 The NPPF and its technical guidance is a set of planning policies with the key objective to contribute to the achievement of sustainable development. As part of it, they ensure that flood risk and sustainability are taken into account during the planning process. This ensures that developments are not located in flood risk areas and directs developments to lower risk areas. The NPPF applies a sequential risk-based approach to determining the suitability of land for development in flood risk areas. The NPPF also encourages developers to seek opportunities to reduce the overall level of flood risk through the layout of the development and the application of Sustainable Drainage Systems (SuDS). Adoption of these principles at early stages of the project can ensure that the developments take into account appropriate mitigation which is included within the detailed design of the schemes.

## **The Flood and Water Management Act (2010)**

- 3.2 The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather events. It provides a robust management of flood risk for people, homes and businesses and also encourages the use of SuDS for developments. A robust SuDS strategy should take into account the recommendations given in this Flood Risk Assessment. The drainage strategy should incorporate SuDS within the design and also attenuate all flows to either the greenfield or brownfield run off and take into account the risk from other sources as necessary.

## **Level 1 Strategic Flood Risk Assessment (SFRA)**

- 3.3 The SFRA Level 1 identifies flood risk constraints in the local Area. It gives procedures that should be followed in planning to tackle flood risk during any development.

## **Level 2 Strategic Flood Risk Assessment (SFRA)**

- 3.4 The SFRA Level 2 provides more information on the area identified in the SFRA Level 1, in order to show whether the Exception Test can be passed.



- 4.1 The flood risks were determined by identifying the sources of flooding and assessing their possible impact and likelihood to the development.

## Fluvial Flood Risk - Assessment

- 4.2 Fluvial flood risk was assessed using the Environment Agency Flood Zone Maps and the standing advice approach recommended in the NPPF guidelines. The standing advice takes into account the size of the development and the flood risk vulnerability of land uses.

### Standing Advice Applicability

- Step 1** 4.3 The proposed development falls within the remit of the standing advice as it is a minor extension of a household with a floor space of no more than 250 square metres.  
Development Size

- Step 2** 4.4 The proposed development does not require a sequential test. The site is not in an area with increased flood risk as a result of multiple minor extensions.  
Sequential test

## Fluvial Flood Risk - Flood Levels

- 4.5 The site benefits from flood defences. The Environment Agency records show that the area around the site has not been flooded in the past.
- 4.6 The nearest undefended 1% AEP level for this site is 31.84 mAOD. Point 2 of the Level 4 information has been taken as a reference. The level of the flood defence is 32.25m AOD at location of the point 2. This level provides protection up to a 1% AEP.
- 4.6 The climate change allowances are as per table 1: peak river flow allowances by river basin district (based on a 1961 to 1990 baseline). The site is located within the North West Catchment. Due to the 'more vulnerable' nature of the development in relation to flood risk, the design life of the building (100 years), and the flood zone classification- Flood Zone 3.  
Climate Change Allowances:  
100+70% - Upper End  
100+35% - Higher Central  
The Environment Agency has not provided the climate change levels.

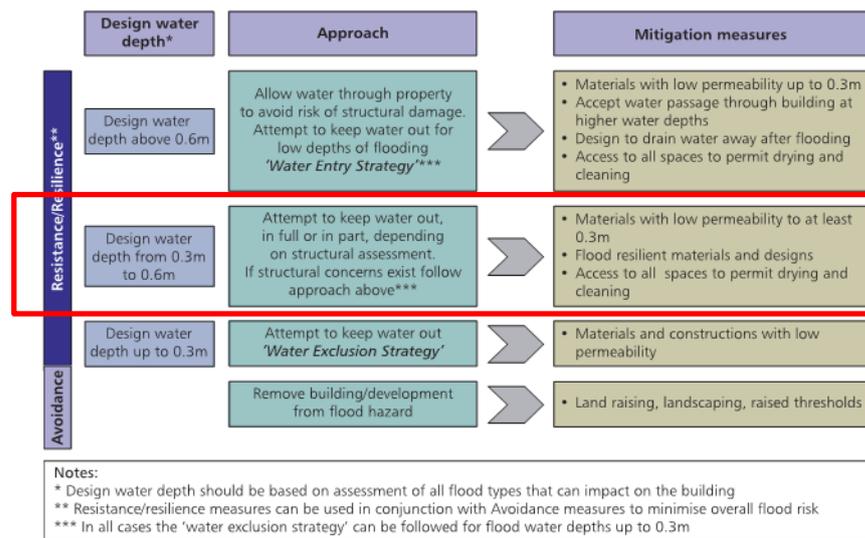
## Fluvial Flood Risk - Resistance and Resilience Plan

- 4.7 The final floor level of the building has been set as per the existing building's ground floor level. This level is no lower than existing levels and therefore the following flood proofing has been incorporated. The level of the property is 31.97 mAOD.



- 4.8 The flood resilience strategy for the development has been based on the CLG 2007 Improving the Flood Performance of New Buildings. See figure 1 below. The strategy is based on the water level within the proximity to the building.
- 4.9 Since the climate change levels is unknown. It has been assumed that it is up to 600mm above the 1% level. This level is: 32.44 mAOD. The water depth at the building is: 470mm deep. The water entry strategy approach has been used with a water exclusion strategy for up to 300mm depth flows.

Figure 1: Rationale for flood resilient and/or resistant design strategies.



- 4.10 The building should utilise building materials that are suitable for a 'water exclusion strategy'. Materials classified as "Good" (highlighted in red) in Figure 2 shall be used for construction of the new building.

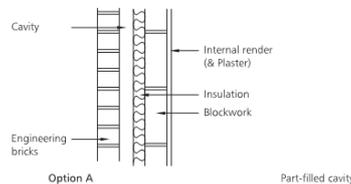
Figure 2: Flood resilience characteristics of building materials (based on laboratory testing)

Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
<b>Bricks</b>			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
<b>Blocks</b>			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aircrete	Medium	Poor	Good
<b>Timber board</b>			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
<b>Gypsum plasterboard</b>			
Gypsum Plasterboard, 9mm thick	Poor	Not assessed	Poor
<b>Mortars</b>			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good

\* Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanability and mould growth

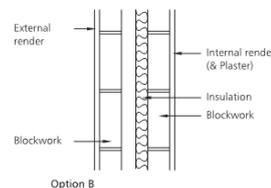


- 4.11 Foundations: Suspended concrete floor slabs at least 150mm thick is the preferred option. There should be a minimum space of 150mm ventilated void between the ground level and the bottom of the floor slab. Damp proof membranes should be included in the design. Floor insulation should be of the closed-cell type. Under floor services using ferrous materials should be avoided. Ceramic/concrete-based floor tiles, sitting on a bed of sand, cement render and water resistant grout can be used.
- 4.12 Concrete blocks used in foundations should be sealed with an impermeable material or encased in concrete to prevent water movement from the ground to the wall construction.
- 4.13 External Walls: Good quality facing bricks can be used for external face. External insulation is better than cavity insulation. See typical options below.



Part-filled cavity – Option A

- External face consisting of engineering bricks up to required level for flood protection (up to 0.6m maximum above floor level plus one course). Other external facing materials can be used above this level, but ensure interface is watertight.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective:
  - 1 cement : 6 sand: 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.
- Sacrificial plasterboard can be used, but it needs to be removed between ground floor and flood level. The board should be fitted horizontally to make removal easier. In some cases a dado rail can be used to cover the joints.



Part-filled cavity – Option B

- External cement based render, preferably with lime content. Composition depends on masonry; the following mixes are effective:
  - 1 cement : 4 sand: 1/2 lime on concrete blockwork
  - 1 cement : 6 sand: 1 lime on Aircrete.
- External face consisting of blocks.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective for flood resilience:
  - 1 cement : 6 sand: 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.

- 4.14 Services and fittings (communications wiring, hearing systems, electrical services, water, electricity and gas meters) should be placed at above the flood level. Where possible, all service entries should be sealed (e.g. with expanding foam or similar closed cell material). Closed cell insulation should be used for pipes which are below the predicted flood level.

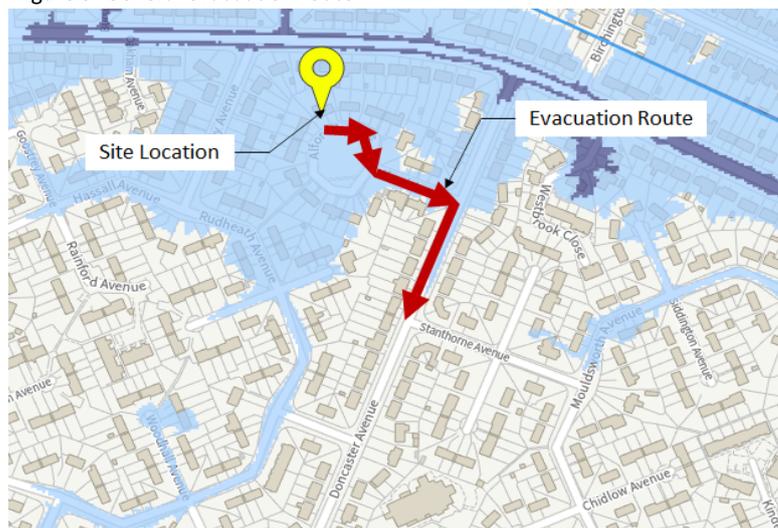


- 4.15 Fittings should be designed to be replaced after a flood, it is advisable to specify durable fittings that are not appreciably affected by water and can be easily cleaned (e.g. use of plastic materials or stainless steel). The cost of these units may need to be balanced against the predicted frequency of flooding. Avoid wood fibre based carcasses and use easily removable solid wood doors and drawers.

## Fluvial Flood Risk - Access and Evacuation

- 4.16 Safe egress is achievable by following Alford Avenue towards Doncaster Avenue, which is shown to be beyond the extent of flooding. See figure 3 below for details.
- 4.17 The site is within an Environment Agency Flood Warning Area. The occupants of the site are encouraged to sign up to the alerts and should use these to form an appropriate Flood Management and Evacuation Plan prior to occupation of the site.

Figure 3: General evacuation route



## Fluvial Flood Risk - Surface Water Management

- 4.18 The surface water run-off will be disposed using SuDS techniques. The aim is to provide a sustainable design that accommodates the proposed attenuation volume and replicated the existing drainage regime using the SuDS hierarchy is shown in the figure 4 below.



4.19 The SuDS techniques highlighted in red below can be used on site. This assessment is based on the ground conditions and the potential discharge points available.

Figure 4: The SuDS Hierarchy (Source:EA Thames region, SuDS a practical guide)

Most Sustainable	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
↑	<b>Living roofs</b>	✓	✓	✓
	<b>Basins and ponds</b> - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✓	✓	✓
	<b>Filter strips and swales</b>	✓	✓	✓
	<b>Infiltration devices</b> - soakaways - infiltration trenches and basins	✓	✓	✓
↓	<b>Permeable surfaces and filter drains</b> - gravelled areas - solid paving blocks - porous paviers	✓	✓	
	<b>Tanked systems</b> - over-sized pipes/tanks - storms cells	✓		
Least Sustainable				

4.20 These SuDS techniques should be implemented and sized during the detailed design of the project

## Fluvial Flood Risk - Working next to a main river

4.21 The development is more than 8 metres of the bank of a main river, or 16 metres if it is a tidal main river. A Flood risk activity Environmental Permit is not required.

## Surface water (overland flows) flood risk

4.22 The basis of the surface water flood maps is defined by the Environment Agency as follows.

*"The nationally produced surface water flood mapping only indicates where surface water flooding could occur as a result of local rainfall*

- Ordinary watercourses
- Drainage systems or public sewers caused by catchment-wide rainfall events
- Rivers
- Groundwater.

*Due to the modelling techniques used, the mapping picks out depressions in the ground surface and simulates some flow along natural drainage channels, rivers, low areas in floodplains, and flow paths between buildings. Although the maps appear to show flooding from ordinary watercourses, they should not be taken as definitive mapping of flood risk from these as the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled. Also, structures (such as bridges, culverts and weirs) and flood risk management infrastructure (such as defences) are not represented.*

*The nationally produced surface water flood mapping does not take account of the effect of pumping stations in catchments with pumped drainage. No allowance is made for tide locking, high tidal or fluvial levels where sewers cannot discharge in to rivers or the sea."*



- 4.23 The Environment Agency maps show that the flood risk from surface water is very low. A residual risk of localised ponding remains unlikely.

## **Flooding from drainage systems in adjacent areas**

- 4.24 There are no records of sewer flooding within the site.
- 4.25 The site is outside of a critical drainage area. No mitigation required.

## **Reservoirs Risks**

- 4.26 The Reservoir Flood Map (RFM) produced by the Environment Agency do not show the risk to individual properties of dam breach flooding. The maps do not indicate or relate to any particular probability of dam breach flooding. The maps were prepared for emergency planning purposes and can be used to help reservoir owners produce on-site plans and the Local Resilience Forum produce off-site plans, and to prioritise areas for evacuation/early warning in the event of a potential dam failure. The RFM shows that the development could be within the possible dam breach flooding path. It is recommended that the Local Resilience Forum is contacted during detailed design. See Appendix C.

## **Groundwater flood risk**

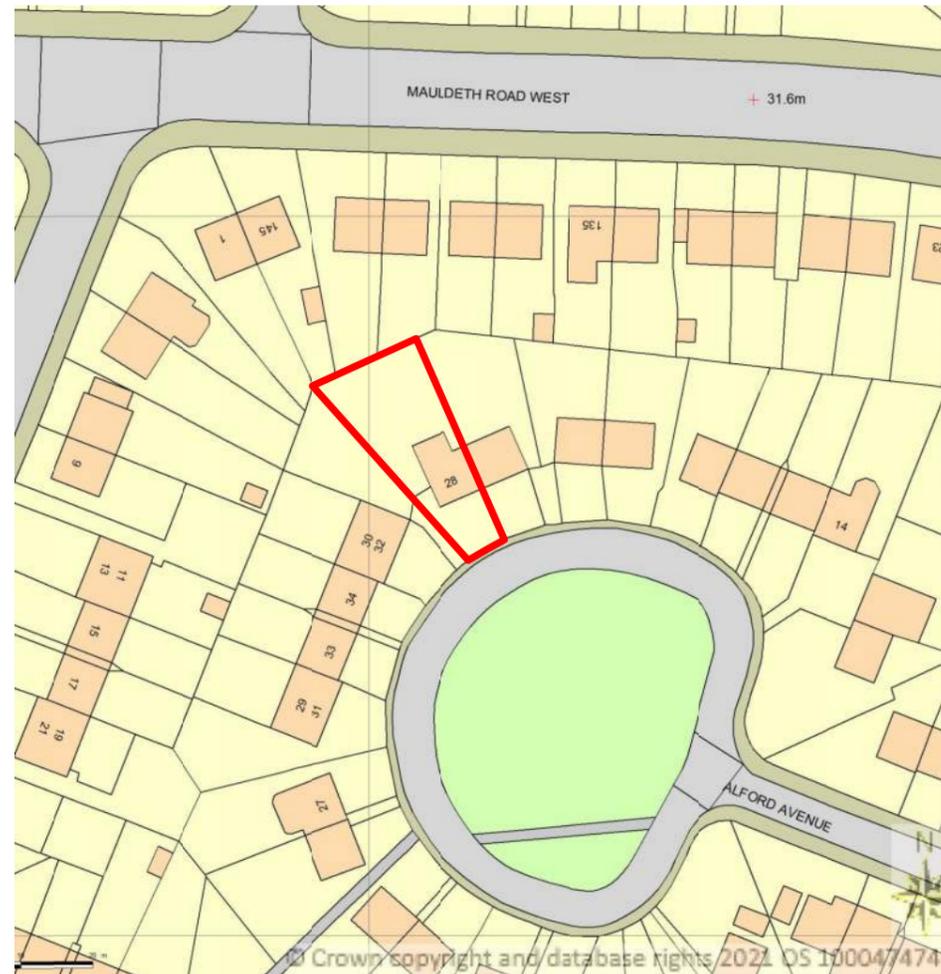
- 4.27 The Strategic Flood risk assessment shows that the site has limited ground water flooding. No mitigation is required.



- 5.1 The development fully complies with the NPPF as it has been designed for water entry and be safe for use. The drainage principles should be used in the detailed design of the surface water systems.
  
- 5.2 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.



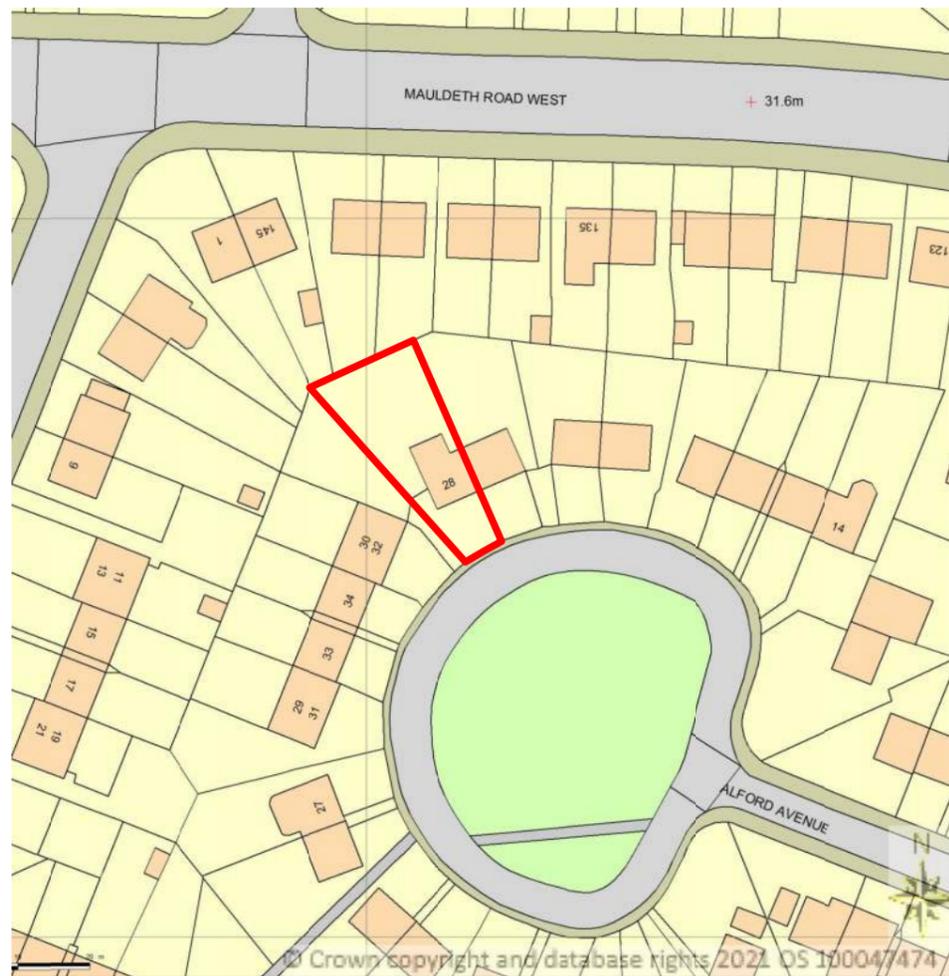
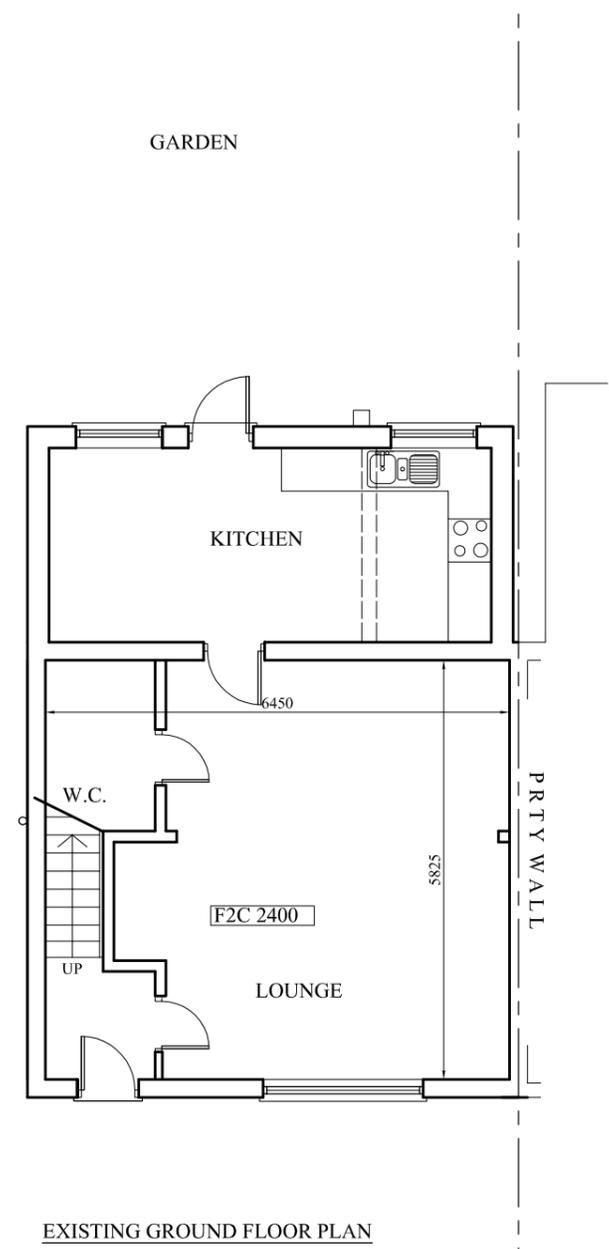
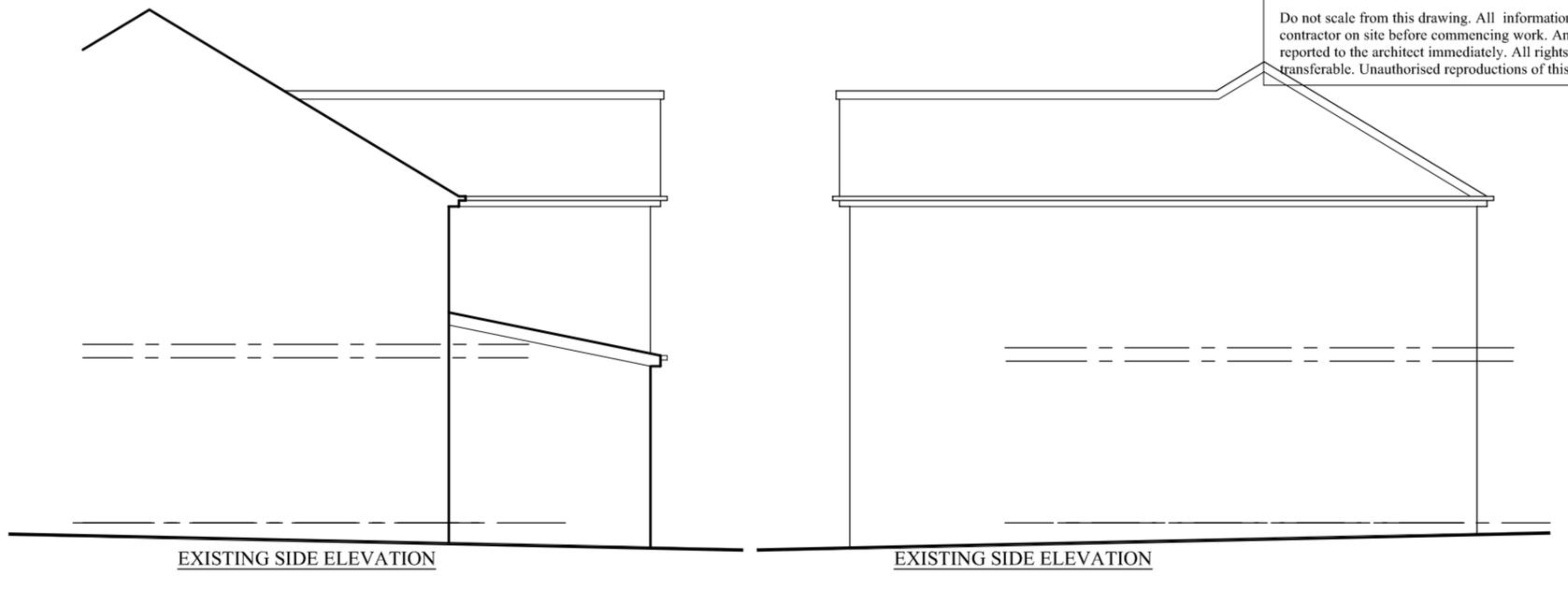
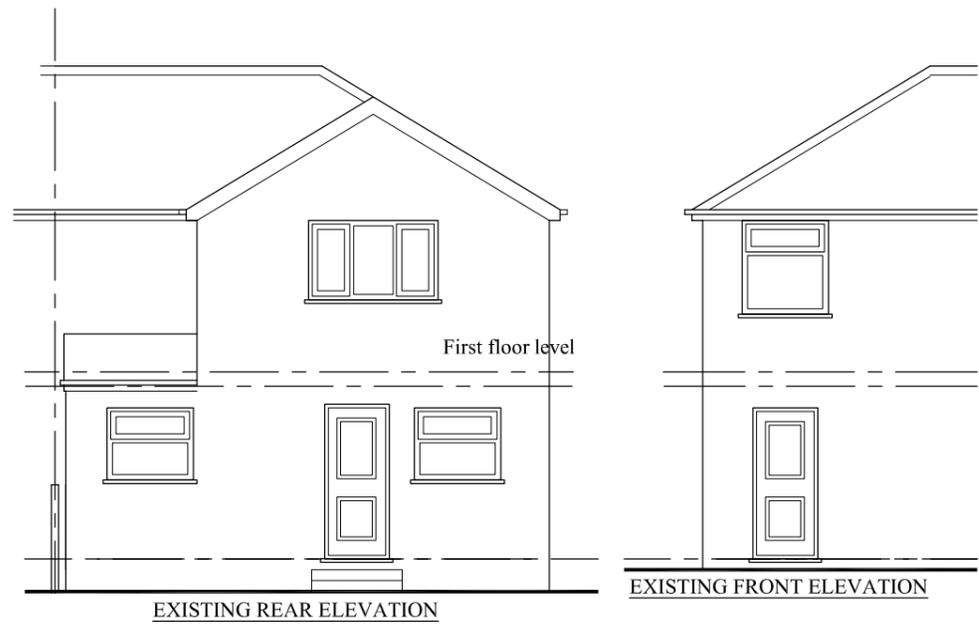
# Appendix A



LOCATION PLAN 1:1000

# Appendix B

Do not scale from this drawing. All information should be checked by the contractor on site before commencing work. Any discrepancies should be reported to the architect immediately. All rights are reserved and are not transferable. Unauthorised reproductions of this drawing are not permitted.

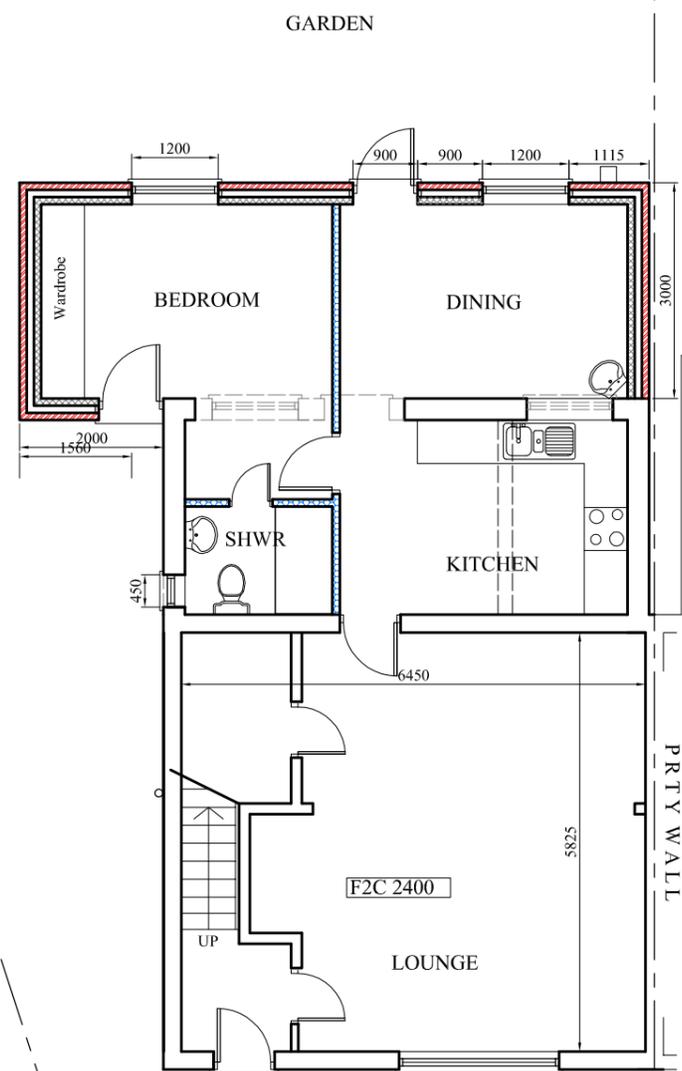


LOCATION PLAN 1:1000

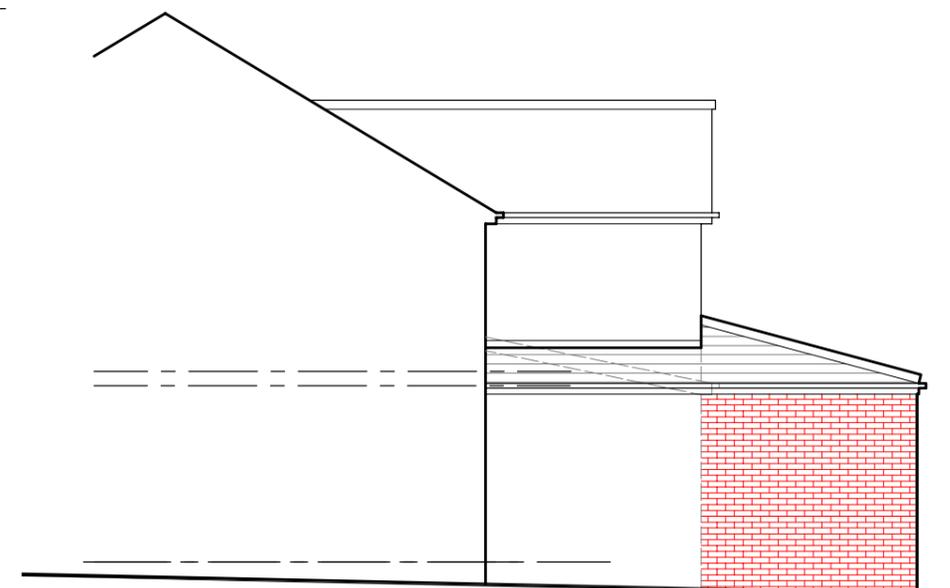
PROJECT  
**28, Alford Avenue,  
 Withington**  
 CLIENT  
**Mr. Joseph Mathew**  
 DRAWING TITLE  
**Existing Plan**  
 JOB No - DRAWING No  
**NA-P01**  
 SCALE 1:100@A3 DATE Apr. 2021 REVISION -  
 t: 0782 895 3405  
 e: niamat@hotmail.co.uk

na design

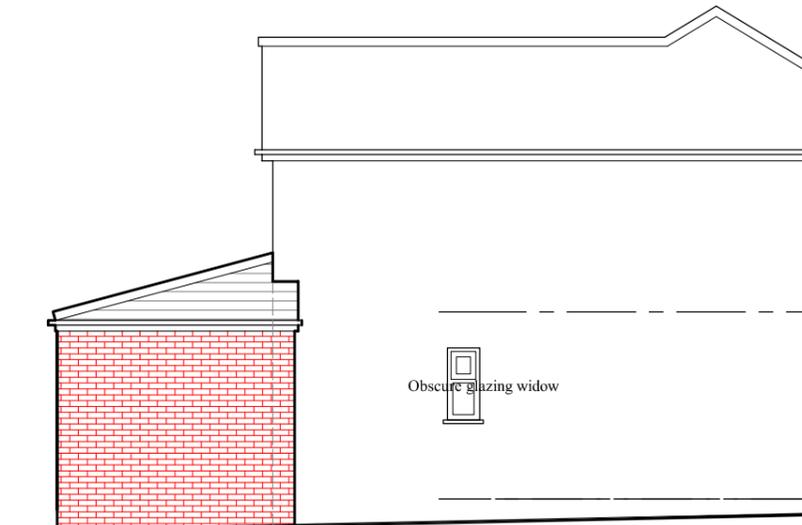
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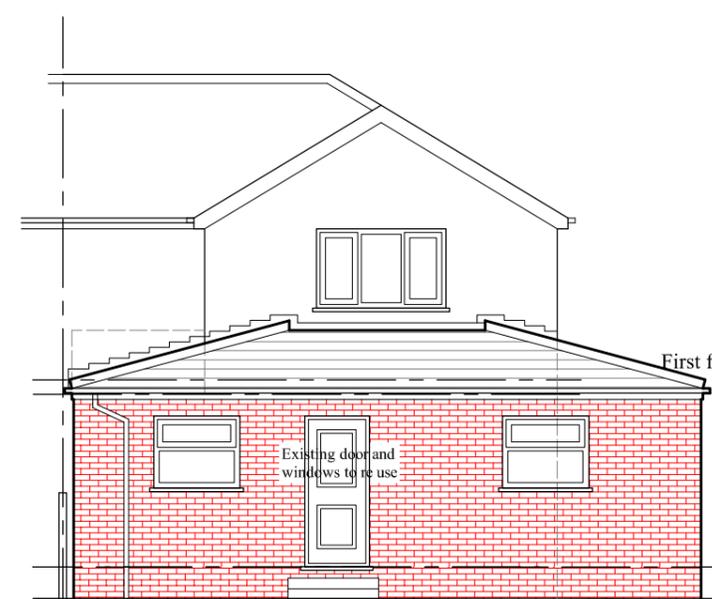
PROPOSED GROUND FLOOR PLAN



PROPOSED SIDE ELEVATION



PROPOSED SIDE ELEVATION



PROPOSED REAR ELEVATION



PROPOSED FRONT ELEVATION

PROJECT  
**28, Alford Avenue,  
 Withington**  
 CLIENT  
**Mr. Joseph Mathew**  
 DRAWING TITLE  
**Proposed Plan**  
 JOB No - DRAWING No  
**NA-P02**  
 SCALE 1:100@A3 DATE Apr. 2021 REVISION -  
 t: 0782 895 3405  
 e: niamat@hotmail.co.uk

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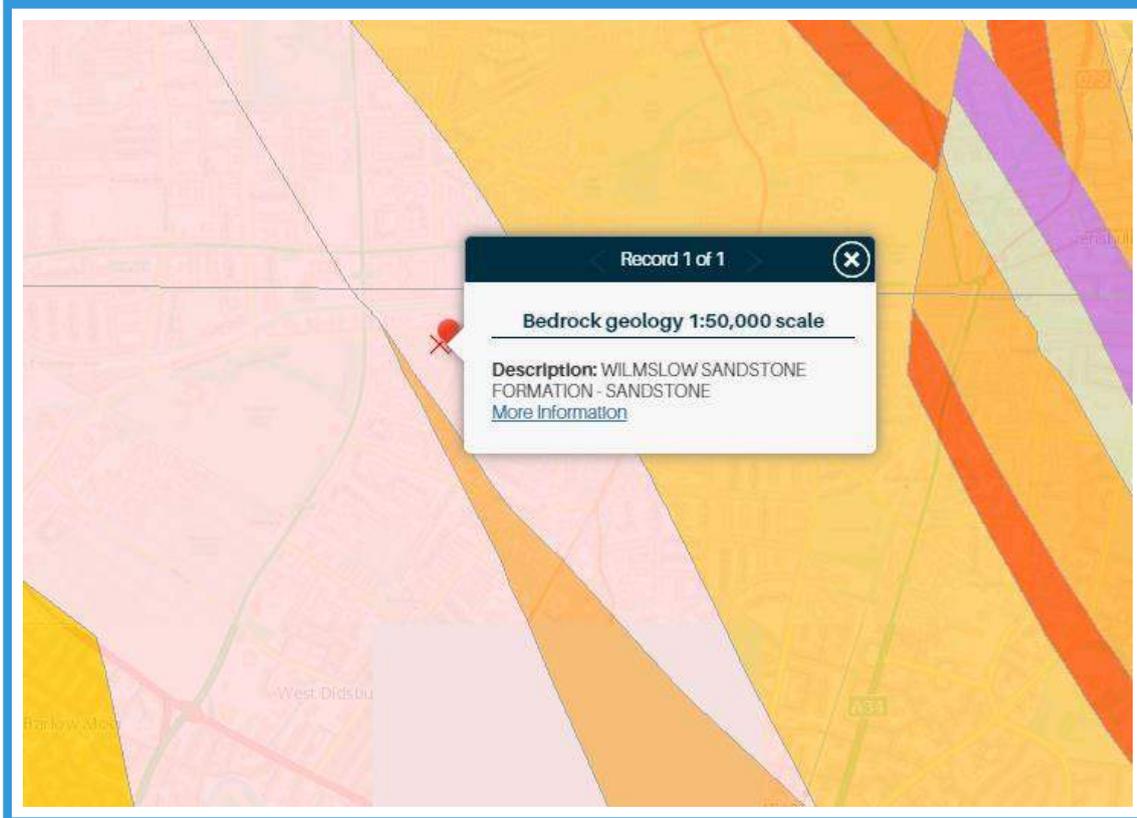


# Appendix C

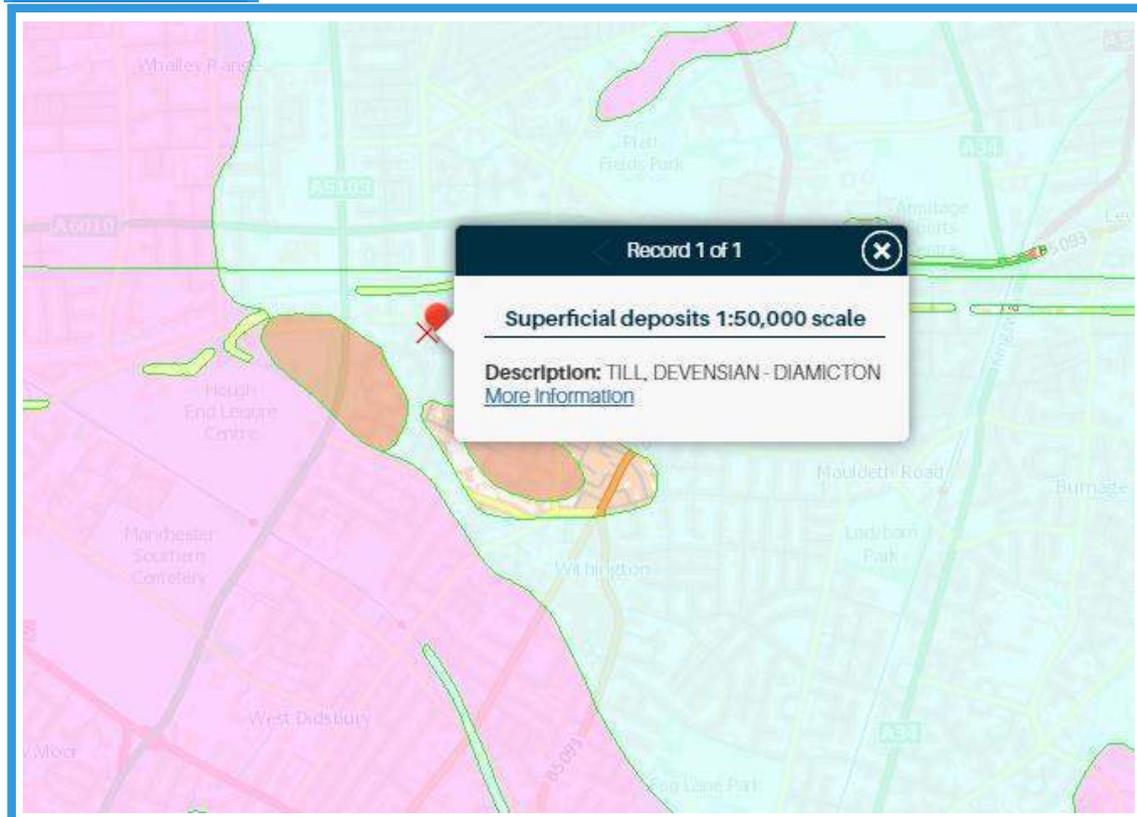
# SITE GEOLOGY

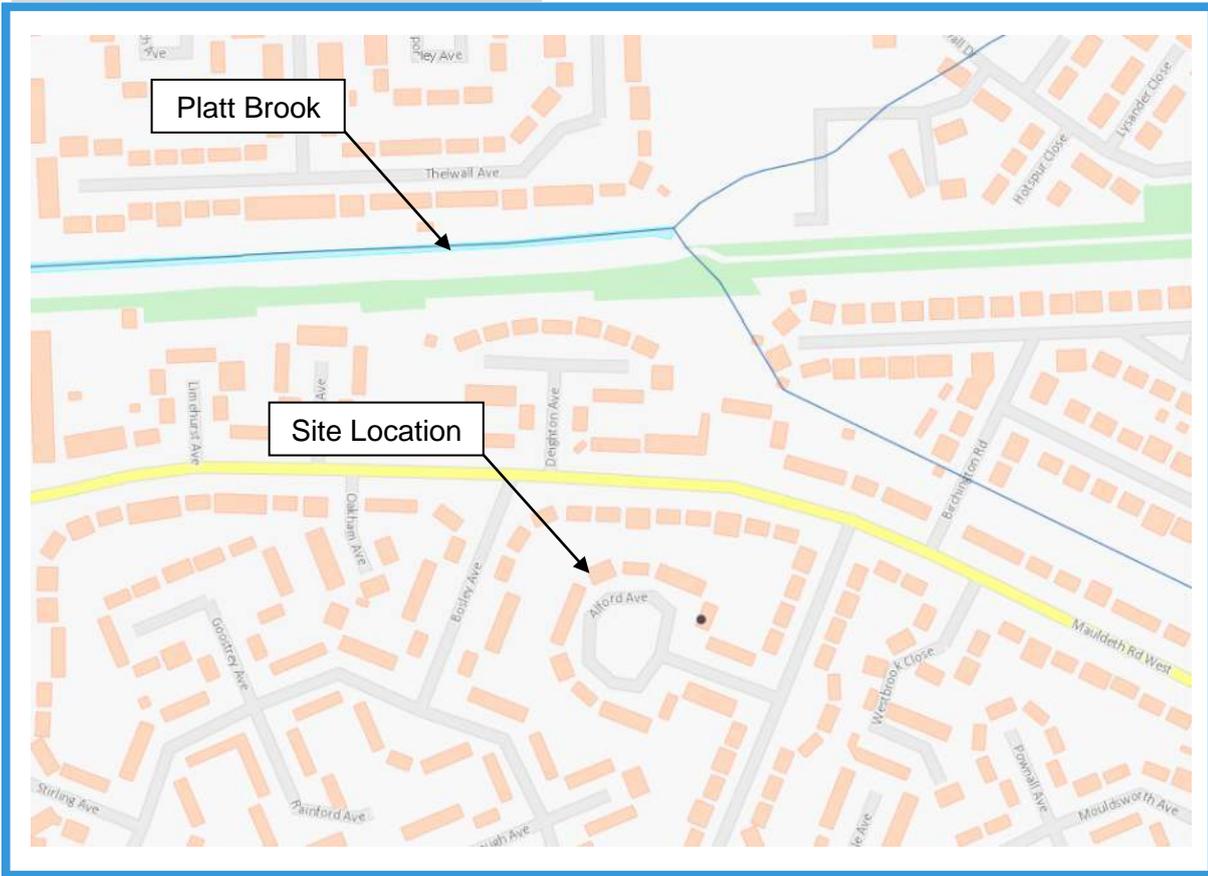


## GEOLOGY - BEDROCK - WILMSLOW SANDSTONE FORMATION



## GEOLOGY - SUPERFICIAL DEPOSITS - TILL, DEVENSIAN



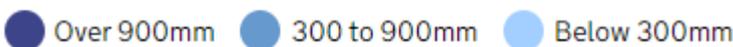


# SITE FLOOD RISK

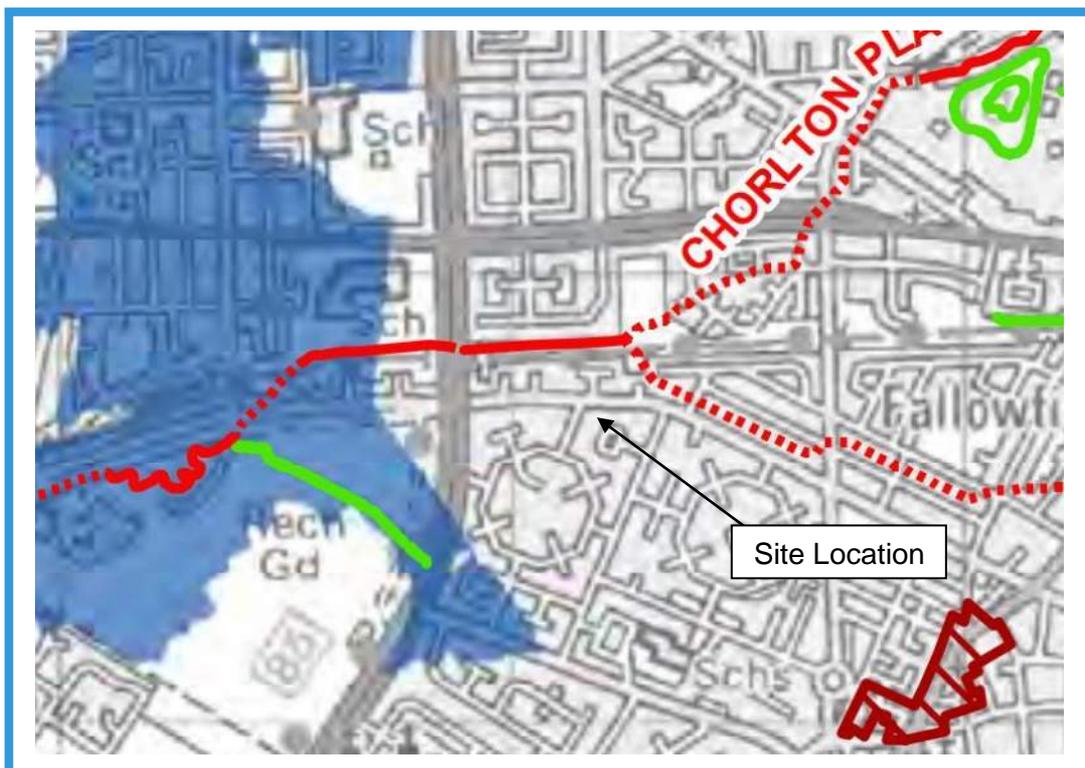
Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

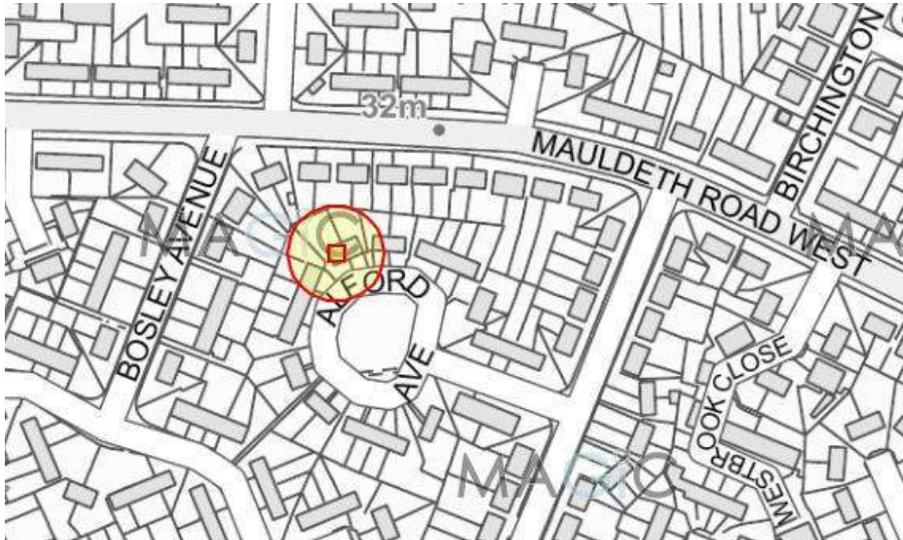
Flood risk from surface water

Extent of flooding



## GROUND WATER FLOOD RISK





### Site Check Results

Site Check Report Report generated on Sun Jul 11 2021  
**You selected the location:** Centroid Grid Ref: SJ84209366  
The following features have been found in your search area:

- Aquifer Designation Map (Bedrock) (England)**  
Typology Principal
- Aquifer Designation Map (Superficial Drift) (England)**  
Typology Secondary (undifferentiated)
- Source Protection Zones merged (England)**  
No Features found

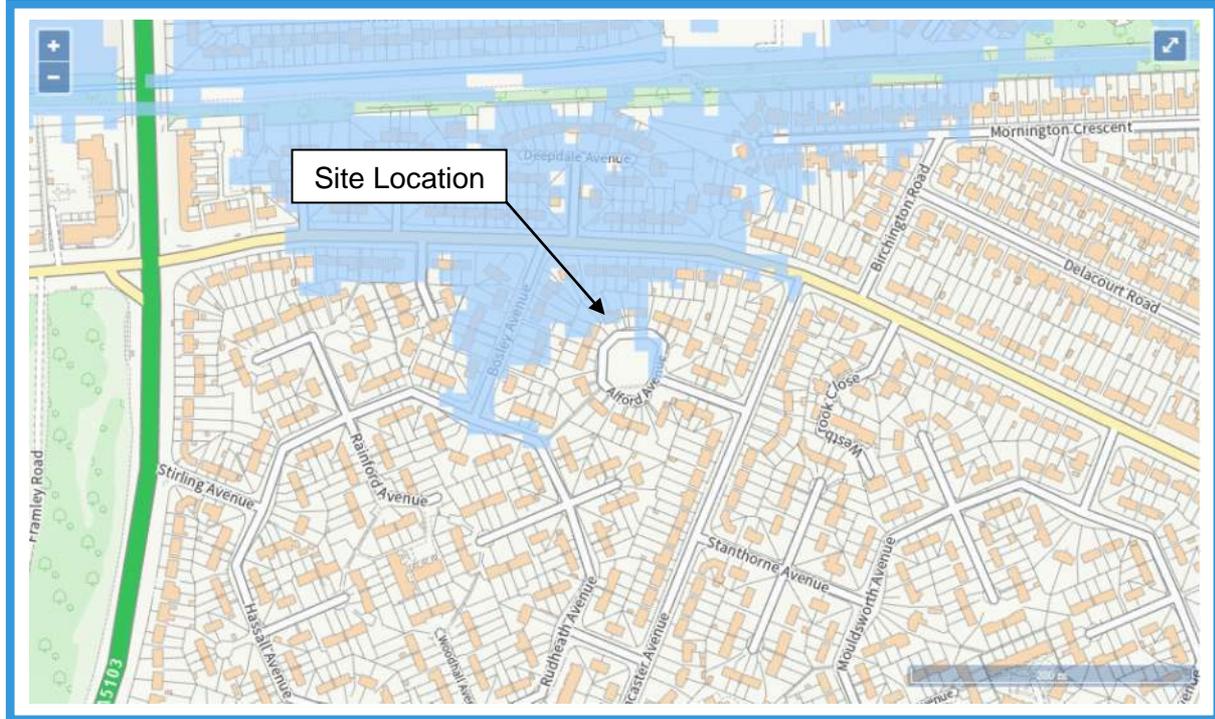
OK Cancel Export to CSV Print



Flood risk from reservoirs



Extent of flooding



Flood risk

Maximum extent of flooding

# Flood map for planning

Your reference  
<Unspecified>

Location (easting/northing)  
384211/393664

Created  
11 Jul 2021 11:23

**Your selected location is in flood zone 2, an area with a medium probability of flooding.**

## This means:

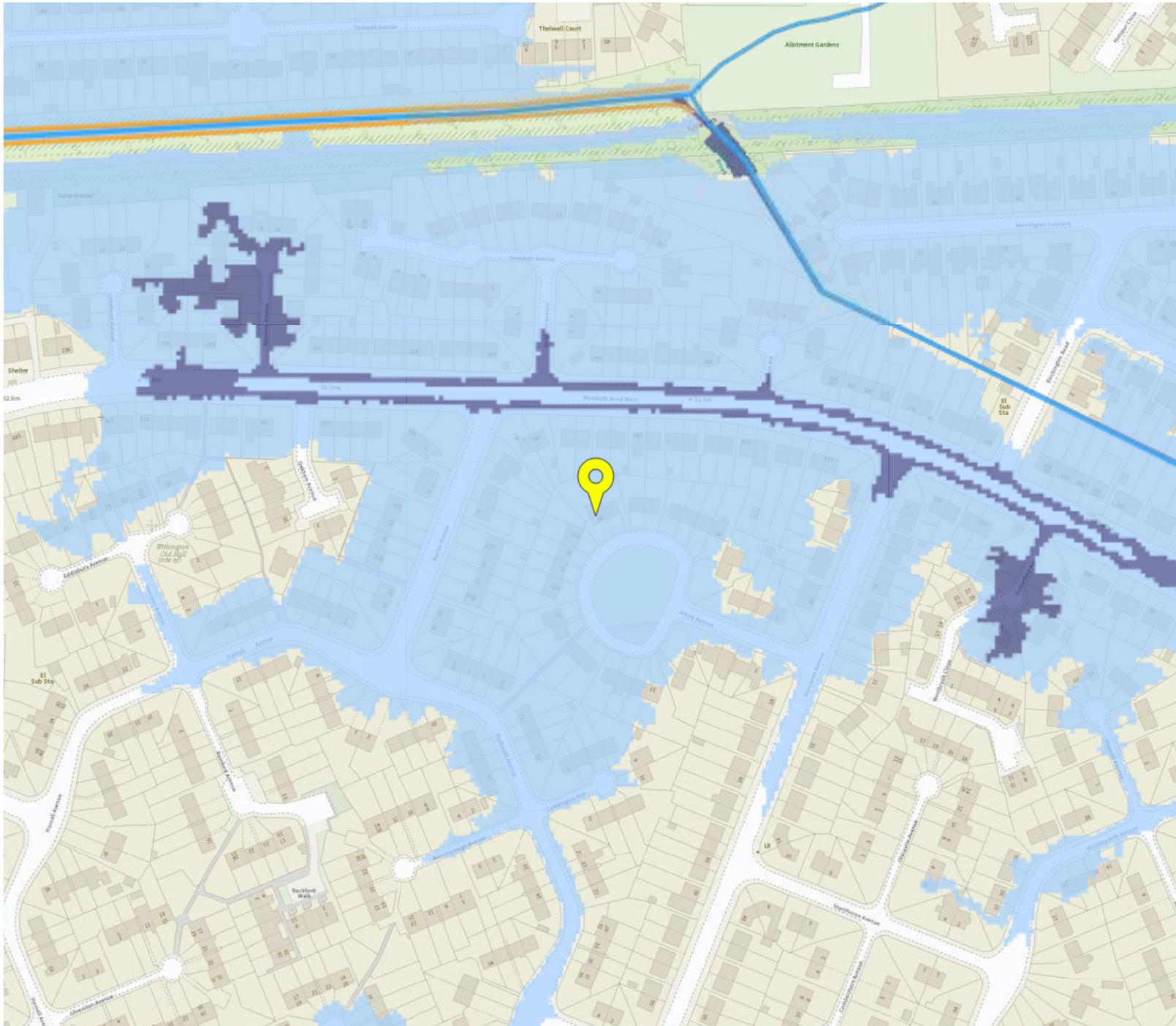
- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see [www.gov.uk/guidance/flood-risk-assessment-standing-advice](http://www.gov.uk/guidance/flood-risk-assessment-standing-advice))

## Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.  
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



<Unspecified>

384211/393664

1:2500

11 Jul 2021 11:23



Map Reference	Model Node Reference	Easting	Northing	Data	Undefended					Defended				
					10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	0.1 % AEP (1 in 1000 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	0.1 % AEP (1 in 1000 year)
1	ea013_Model_CHOP01_00001	384282	393823	Modelled Water Level (m aodN)	31.41	31.64	31.84	31.88	32.14	31.41	31.65	31.84	31.88	32.20
				Modelled Flow (cumecs)	2.95	3.72	3.70	3.69	3.66	2.95	3.75	3.73	3.73	3.70
2	ea013_Model_CHOP01_00003	384247	393852	Modelled Water Level (m aodN)	31.39	31.61	31.81	31.84	32.13	31.39	31.61	31.81	31.85	32.20
				Modelled Flow (cumecs)	10.14	13.52	16.85	17.59	24.07	10.14	13.55	16.87	17.63	24.19
3	ea013_Model_CHOP01_00007	384027	393840	Modelled Water Level (m aodN)	31.06	31.29	31.48	31.52	31.84	31.06	31.29	31.49	31.53	31.92
				Modelled Flow (cumecs)	10.25	13.64	17.00	17.72	23.83	10.25	13.67	17.03	17.76	24.61
4	ea013_Model_CHOP01_00010	383865	393832	Modelled Water Level (m aodN)	30.74	30.93	31.10	31.13	31.46	30.74	30.94	31.10	31.13	31.51
				Modelled Flow (cumecs)	10.25	13.64	17.00	17.71	23.19	10.25	13.67	17.03	17.75	24.14
5	ea013_Model_CHOP01_00013	383664	393820	Modelled Water Level (m aodN)	29.46	29.63	29.78	29.82	31.00	29.46	29.63	29.79	29.82	31.07
				Modelled Flow (cumecs)	10.25	13.64	17.00	17.71	23.09	10.25	13.67	17.03	17.75	24.72

Model data taken from Chorlton Platt Gore 2012

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

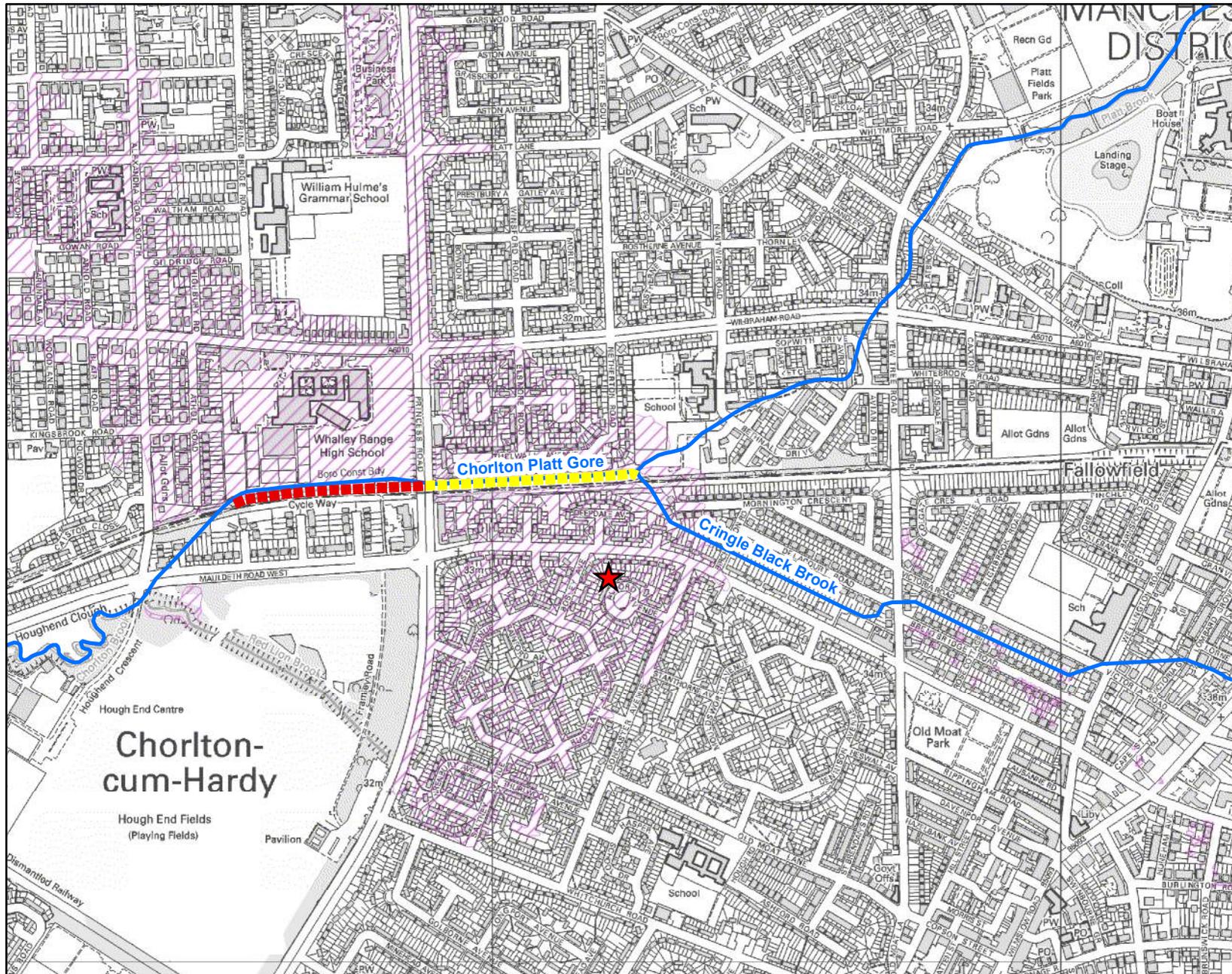
cumecs - cubic metres per second

Notes: Climate Change Scenario - We do not hold climate change measurements at this location. For further guidance on climate change within the GMMC area please see the attachment 'Flood risk assessments: Climate change allowances'. Particularly section 3, table B which shows the Local precautionary allowances for potential climate change impacts.

**Flood Defences**

Start Date	Asset Type	Asset ID	Standard of Protection	Upstream Actual Crest Level (m aod)	Downstream Actual Crest Level (m aod)
01/01/1996	Embankment	60038	100	32.25	31.39
01/01/1996	Embankment	32515	100	31.52	30.29

Flood Defence Map centred on Alford Avenue, Withington, Manchester, M20 1AQ. Created on 26/04/2021.  
[GMMC213023CC]



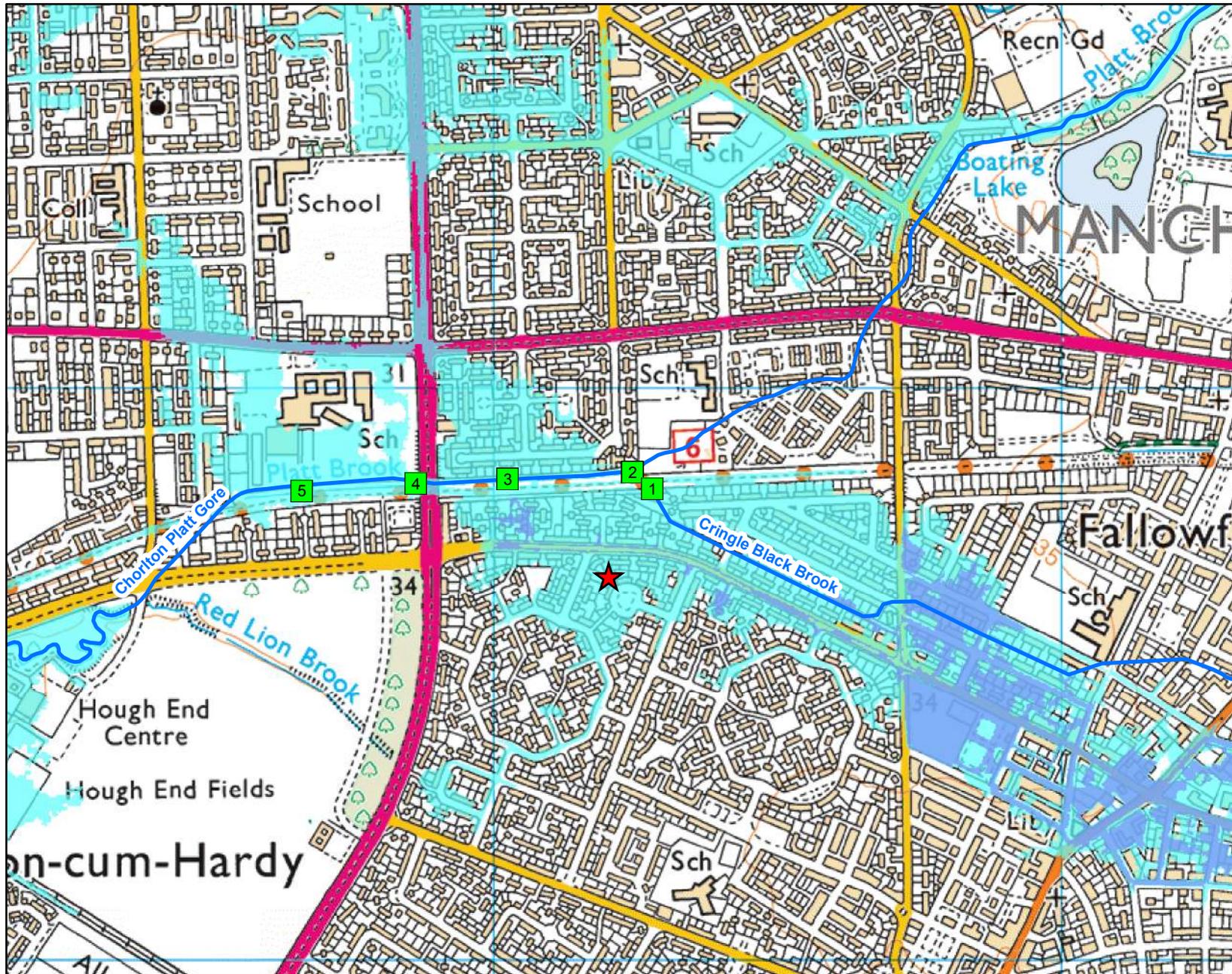
1:10,001



**Legend**

-  Site Location
- Defences (EA maintained)**
- Asset ID**
-  32515
-  60038
-  Main River
-  Areas Benefiting

Detailed Flood Map centred on Alford Avenue, Withington, Manchester, M20 1AQ. Created on 26/04/2021.  
[GMMC213023CC]



1:10,001



### Legend

- ★ Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2