27 Glendale Avenue, Burnage, Manchester, M19 1EH.

FLOOD RISK ASSESSMENT

A. Ul-Haq; I.Eng, MICE

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Contents:

1. Introduction 2
2. Site Location 2
3. Development Proposals 2
4. Flood zone Allocation 3
5. Vulnerability Classification 4
6. Sequential Test 5
7. Exception Test 5
8. Flood Zone Maps 6
9. Flood Defences and Flooding History 10
   9.1 Flood Defences 10
   9.2 Flooding History 10
10. Probability of Flooding 11
11. Conclusion 13
12. Flood Risk Management Measures 14
13. Flood Evacuation Plan 15

Appendices:

Appendix A: GMMC299111AB Table provided by the Environment Agency

1. Introduction:

This Flood Risk Assessment has been prepared in support of the planning application for a two storey rear extension at 27 Glendale Avenue, Burnage, Manchester, M19 1EH.

The Flood Risk Assessment has been prepared in accordance with Environment Agency's National Planning Policy Framework (NPPF).

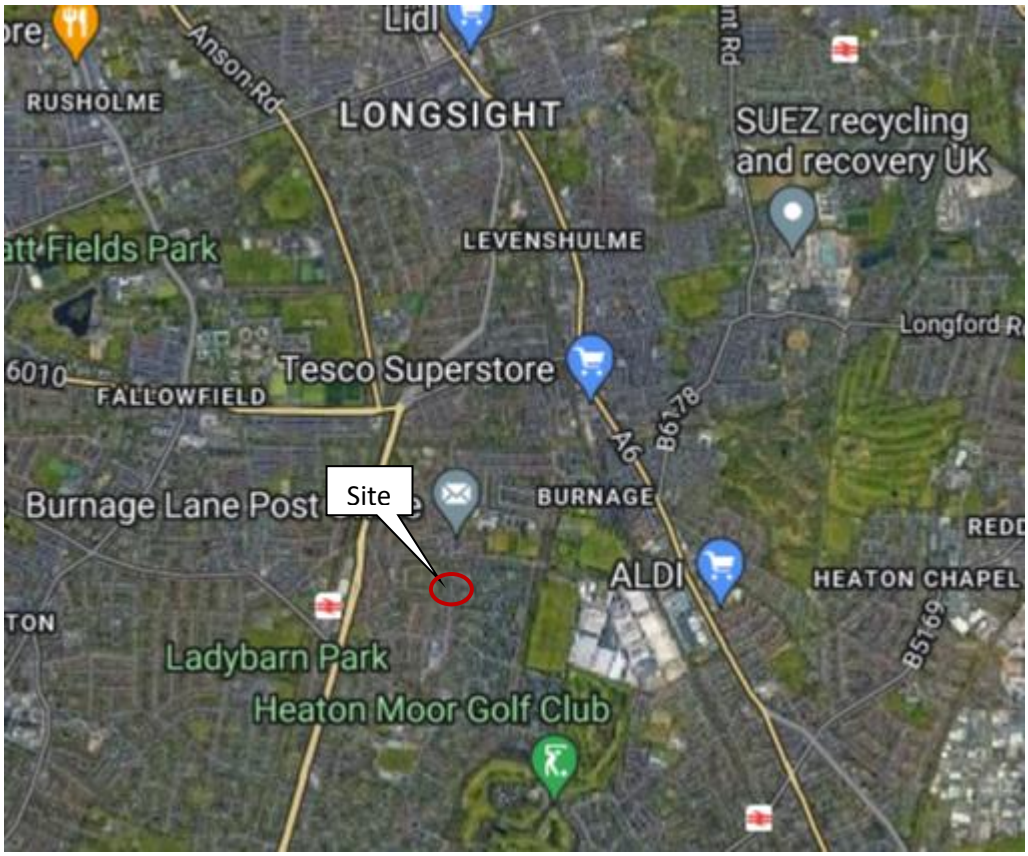
2. Site Location:

The site is semi-detached private dwelling house.

Grid Reference: SJ 86688 93042

Eastings/Northings: 386688/393042

Elevation: The existing threshold level of the property is 45.10m AOD.



Location Plan

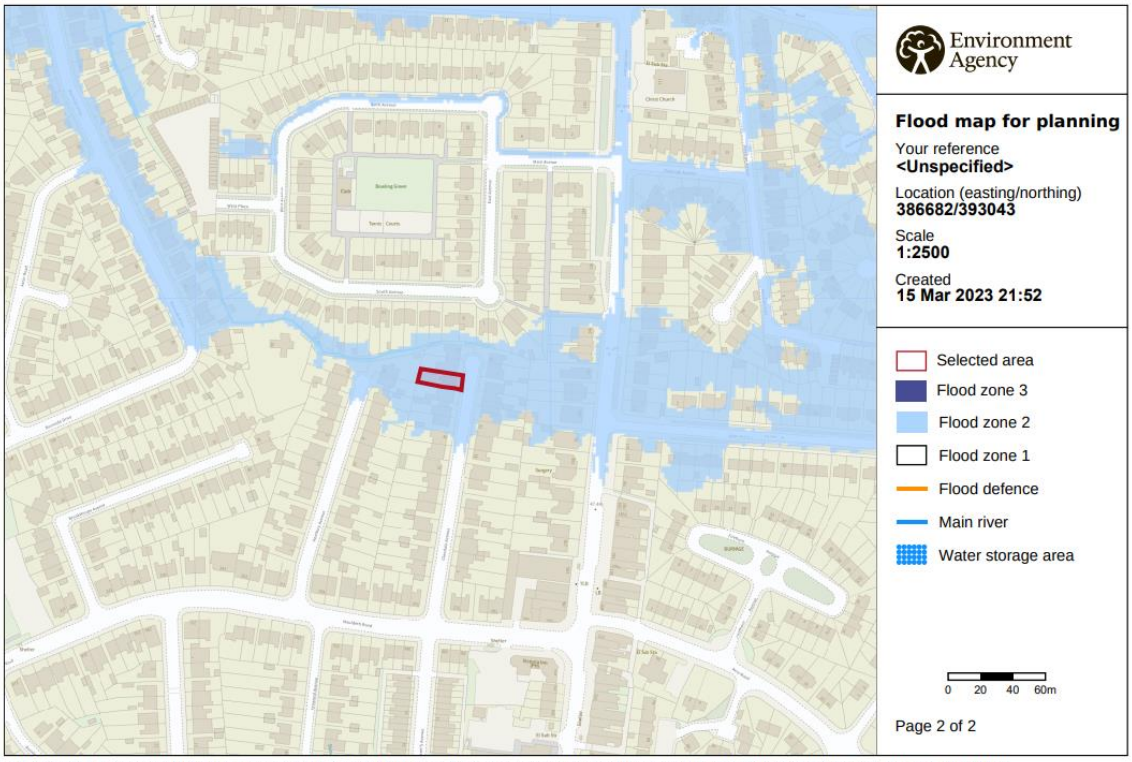
3. Development Proposals:

The development proposal is for a double storey, side and rear extension to a private dwelling house, to form additional living space. The proposed extension comprises of 50.00Sqm extension on the ground floor and 46.00Sq.m on the first floor.

4. Flood Zone Allocation:

Based on the latest Flood Zone Mapping from the Environment Agency, the site lies within flood zone 2 (rivers or the sea), meaning "Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.

Fig-1



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According to Environment Agency's guidelines, a flood risk assessment is required for developments in flood zone 2 or 3 including minor developments and change of use. The proposed development is classed as "minor extension". A minor development is defined by the Environment Agency's guidelines as "a minor extension (houshold extensions or non-domestic extensions less than 250 square metres) in flood zone 2 or 3." As stated in Section 3 above, the existing floor area of the proposed extension is 12.30 q.m .

Therefore, the proposed extension is considered to be a "minor extension", as such it is recommended to follow the Envronment Agency's standing advice.

5. Vulnerability Classification:

Table 2 of the Planning Practice guidance (PPG), reproduced below, states the Vulnerability Classification of various developments.
The Flood risk vulnerability classification classifies the site as "More vulnerable". The More vulnerable are described as "Buildings used for dwelling houses, student halls of residence, drinking establishments, night clubs and hotels". Therefore, the Environment Agency's standing advice should be followed.

Table 2: Flood risk vulnerability and flood zone "incompatibility"

Flood Zones: Flood Risk Vulnerability Classification

	Essentila infrastructure	**Highly vulnerable**	**More vulnerable**	**Less vulnerable**	**Water compatible**
Zone 1	√	√	√	√	√
Zone 2	√	Exception Test required	√	√	√
Zone 3a †	Exception Test required	X	Exception Test required	√	√
Zone 3b*	Exception Test required*	X	X	X	√*

Key:

√ Exception Test is not required

"†" In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

"*" In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

As can be seen from the Table 2 above, an Exception Test is not required.

6. Sequential Test:

Under the NPPF, all new planning applications should undergo a "Sequential Test". This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g., residential, hospitals, mobile homes etc.) outside of the floodplain.

The Sequential Test does not need to be applied for individual developments on sites which have; (i) been allocated in development plans the sequential test, nor for (II) **application for minor development**, such as this development, or alternatively (iii) a "change of use".

It should be noted that paragraph 164 of the NPPF (revised 2019) states: Applications for some minor developments and change of use should not be subject to the Sequential or Exception Tests but should still meet the requirement for site specific flood risk assessment.

7. Exception Test:

As stated in paragraph 5 above, an Exception Test is not required to be passed.

8. Flood Zone Maps:

As stated in paragraph 4 above, the site is located within Flood Zone 2 (medium risk of flooding) and is considered to be 'More vulnerable' according to NPPF guidelines. The figures below indicate the potential sources of flooding to the site.

As per the information available on the Environment Agency's website, the site is at a medium risk of flooding from the Surface Water, refer fig-2 below.

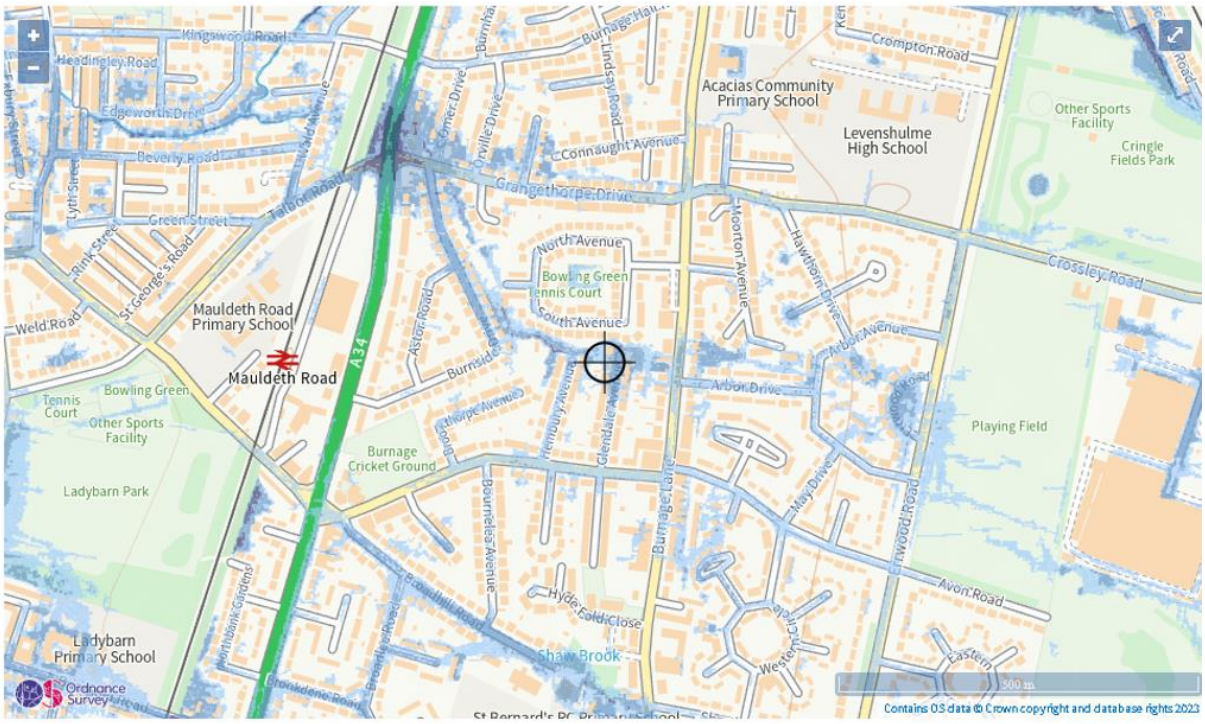
Fig-2

Extent of flooding from surface water

High Medium Low Very Low Location you selected

According to the Environment Agency's website, the depth of water due to surface water flooding, in a low risk scenario, is below 300mm, see fig-3 below.

Fig-3



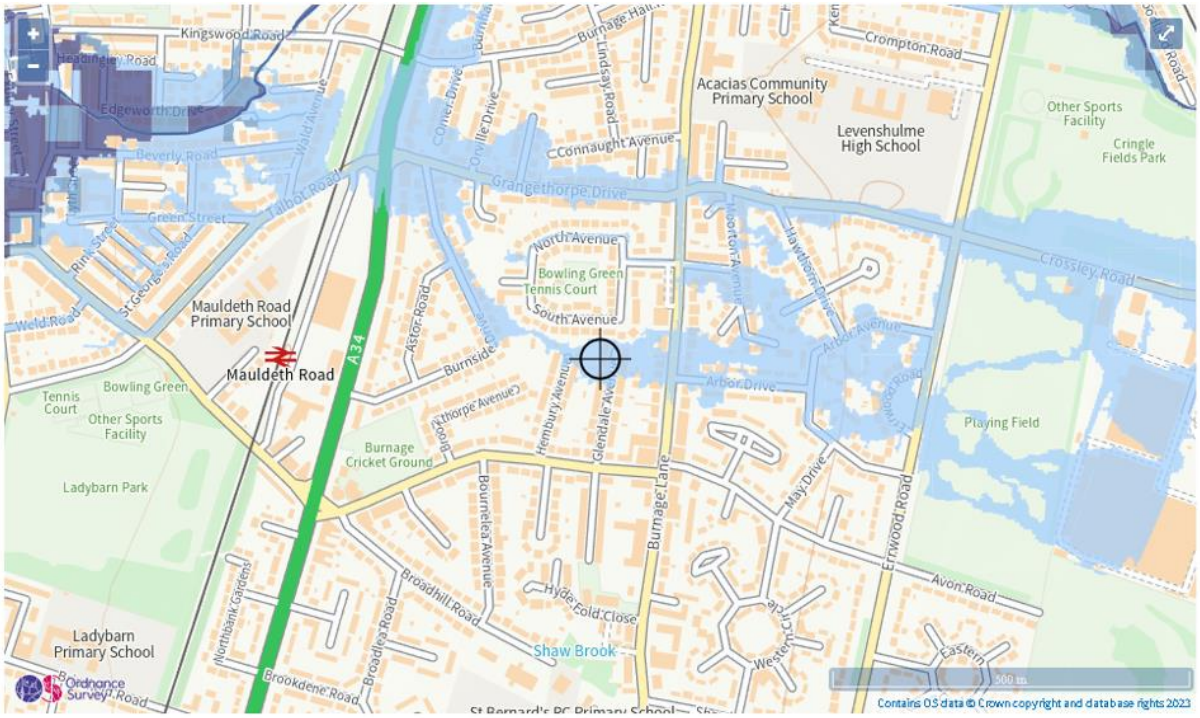
Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm Location you selected

According to Environment Agency's website, the site lies within flood zone 2 (rivers or the sea). An area with low probability of flooding from rivers or the sea, see fig-4 below.

Fig-4



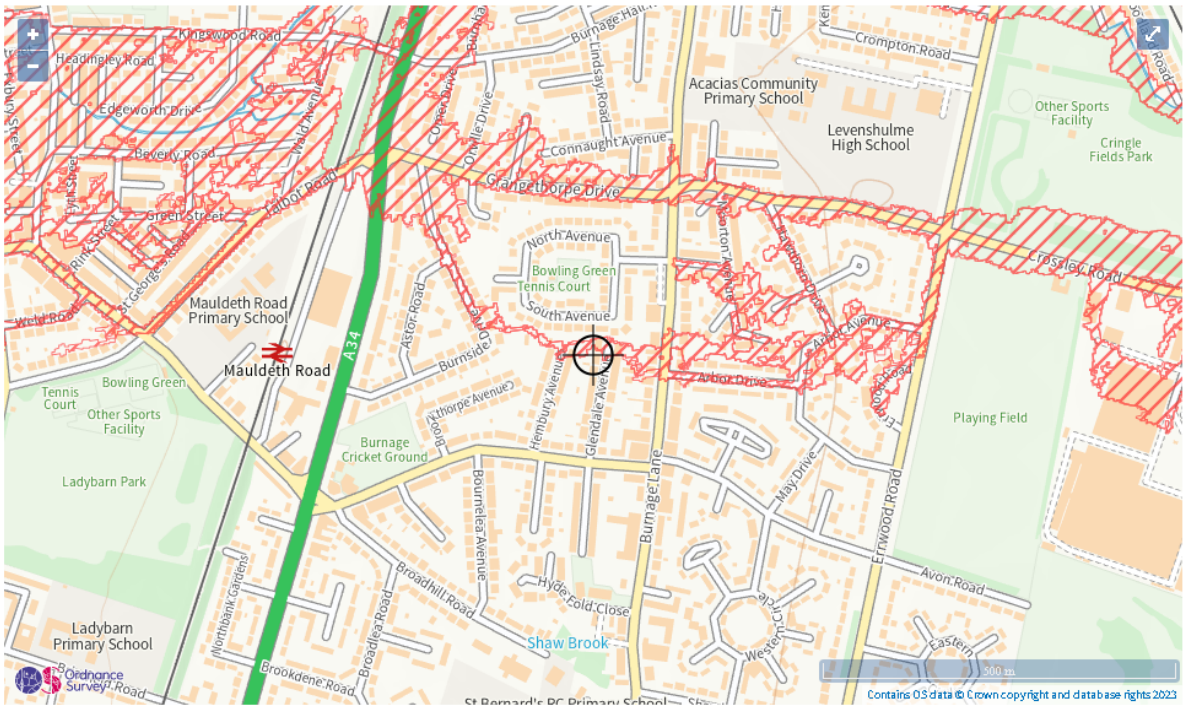
The main river "Cringle Brook" is located approximately 600m to the North of the site and flows from East to West.

A watercourse "Willow Brook" runs approximately 20m to the North of the site, it also flows from East to West.

The local topography indicates general fall from East to West.

As per the information available on the Environment Agency's website, the site may be impacted by flooding from reservoirs when there is also flooding from the rivers. However, there is no risk of flooding from the reservoirs when the river levels are normal, refer to fig-5 below.

Fig-5



Maximum extent of flooding from reservoirs:

when river levels are normal | when there is also flooding from rivers | Location you selected

Source of Flooding:

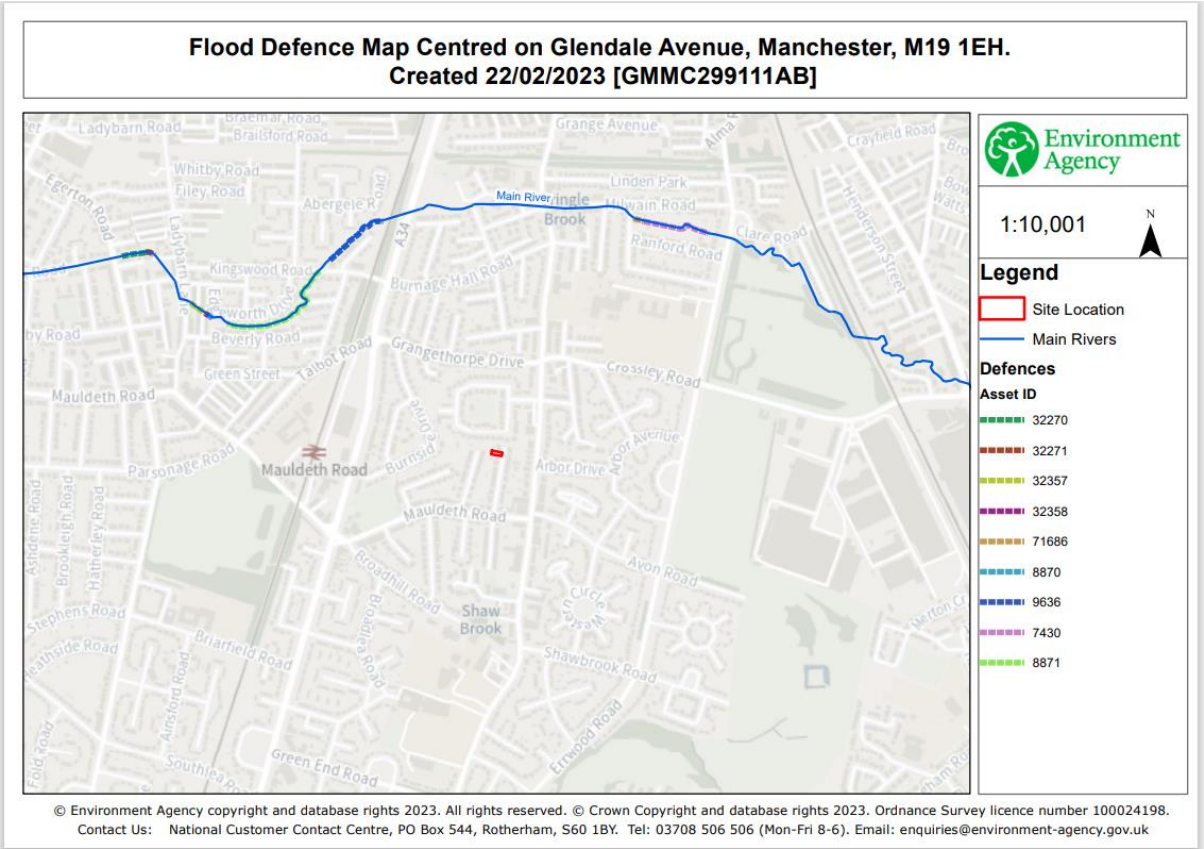
Source	**Flood Risk**
Surface water	Medium (see Fig-2, page 6)
Fluvial	Low (see Fig-4, page 8)
Reservoirs	Only when there is also flooding from rivers.
Ground Water	Not known
Sewer	Not known

9. Flood Defences and Flooding History:

9.1 Flood Defences:

The main river "Cringle Brook" is located approximately 600m to the North.
The figure 6 below, provided by the Environment Agency, shows the flood defences along Cringle Brook.

Fig-6



A minor watercourse "Willow Brook" is located approximately 60metres to the North of the site. The brook flows from East to West. The environment Agency has not provided any information regarding the Willow brook.

9.2 Flooding History:

The Environment Agency has not provided any historic flooding records. Therefore, it is assumed that the site has not been subject to flooding from Cringle Brook in the past.

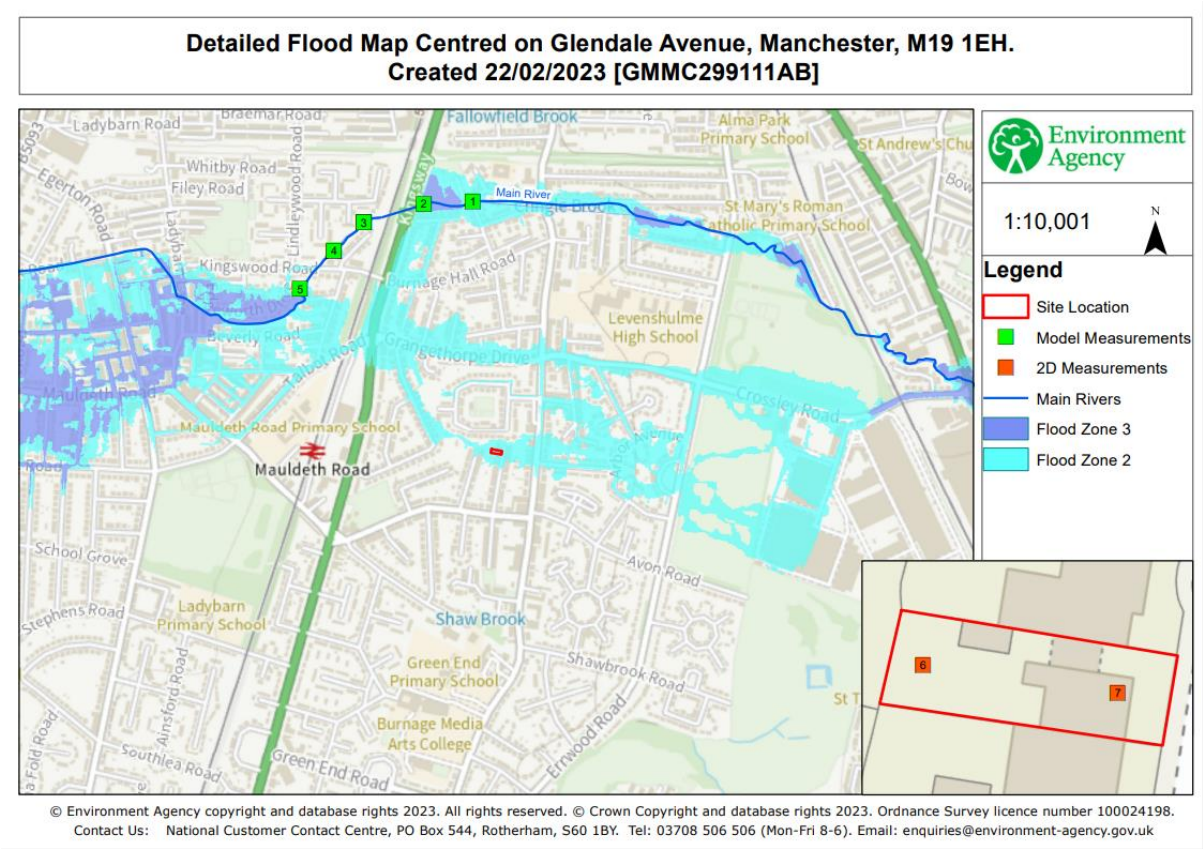
Whilst there is no historic flooding information available for the Willow brook. The owner/occupiers of No.31 Glendale Avenue (which abuts the Willow Brook) recall one incident of localised flooding in 2009. This was caused by a blockage of the Willow Brook at that location. The flood water mainly impacted the garage of the property which is closer to the brook.

10. Probability of Flooding:

The figure 7 below, provided by the Environment Agency, shows the nodes for the flood data within the site. The flood data provided is shown in the table attached in Appendix A. The flood data is centred on Glendale Avenue.

The Environment Agency guidance states the definition of Flood Zone 2, Medium probability as, “Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.

Fig-7



The information provided by the Environment Agency (and attached in Appendix A), shows the flood data centred on Glendale Avenue. The data is shown for three nodes (6 and 7) within the site.
It indicates the risk of flooding from rivers with flood defences and where flood defences have been removed, including estimated impact of climate change. The flood levels in both scenarios are the same.

The analysis of the data shows that in the 1.0% (1 in 100 years) Annual Exceedance Probability (AEP) plus 70% for Climate change, the flood level at node 6 would be 45.28m AOD and for Node 7 it would be 45.81m AOD. There is no date for 1.0% (1 in 100 years) Annual Exceedance Probability (AEP) plus 30% for Climate change. The property threshold

level is 45.10m AOD, however the afore-mentioned data exceeds the guideline of the Environment Agency for such situations.

For 0.1% (1 in 1000 years) Annual Exceedance Probability, node 6 and 7 indicates a flood levels of 45.48 and 46.00m AOD respectively. This will impact the property by a depth of 380 to 900mm.

11. Conclusion:

- The area of the new extension is 50.00Sq.m, half of which will be built over the existing impermeable area, as such there will be very little (negligible) increase in the surface water run-off.

- The proposed extension is considered a minor development of residential dwelling. As it is an extension to an existing dwelling house, the floor level of the extension can't be set higher than existing building. Therefore it is recommended that finished floor level of the proposed extension is set no lower than that of existing dwelling.

- As demonstrated by Figure-4 on page 8, the site is at low risk of flooding from fluvial flooding.

- The Environment Agency has not provided any historic flooding records. Therefore, it is assumed that the site has not been subject to flooding from Cringle Brook in the past.

- As noted in paragraph 10, the analysis of the data provided by the Environment Agency shows the property may be impacted from 0.1% (1 in 1000 year) Annual Exceedance Probability event, where the modelled water inundation would be likely to be between 380 and 900mm above the property threshold level.

- Whilst there is no historic flooding information available for the willow brook, The owner/occupiers of No.31 Glendale Avenue recall one incident of localised flooding in 2009, about 60metres to the North of the site. This was caused by a blockage of the Willow brook at that location. The flooding water mainly impacted the garage which is closer to the brook.

12. Flood Risk Management Measures:

The property is located in Flood Zone 2, therefore, it should be noted that the risk of flooding to the property is generally considered to be low to moderate. However, the following mitigation measures are recommended to be incorporated into the proposed development;

i. The Environment Agency guidelines states that finished floor level should be a minimum of whichever is higher of 300mm above the:
   - Average ground level of the site
   - Adjacent road level to the building
   - Estimated river or sea flood level

As it is an extension to an existing dwelling house, the floor level of the extension can't be set higher than existing building. Therefore it is recommended that finished floor level of the proposed extension is set no lower than that of existing dwelling.

ii. The external doors to the property to be fitted with Nautilus 400 or similar approved flood barrier system to a height of 1.0m from finished floor level.

iii. All windows within 900mm of finished floor level, should have water-tight seals at the joints with the walls.

iv. The ground floor of the proposed extension should be constructed of concrete to facilitate cleaning & drying.

v. Any new airbricks should be anti-flood airbricks

vi. A layer of DPM to be installed to the inner side of all external walls of extension, to a height of 1.0m.

vii. Sealant should be applied around all pipe/cable/Services entry points.

viii. Any new sockets in the new extension to be located a minimum of 1.0m above the finished floor level.

The above measure will provide protection to the property against the probability of flooding from rivers at 0.1% AEP (1 in 1000 year event) and will also protect in the event of 1.0% AEP (1 in 100 year event) plus 30% for climate change.

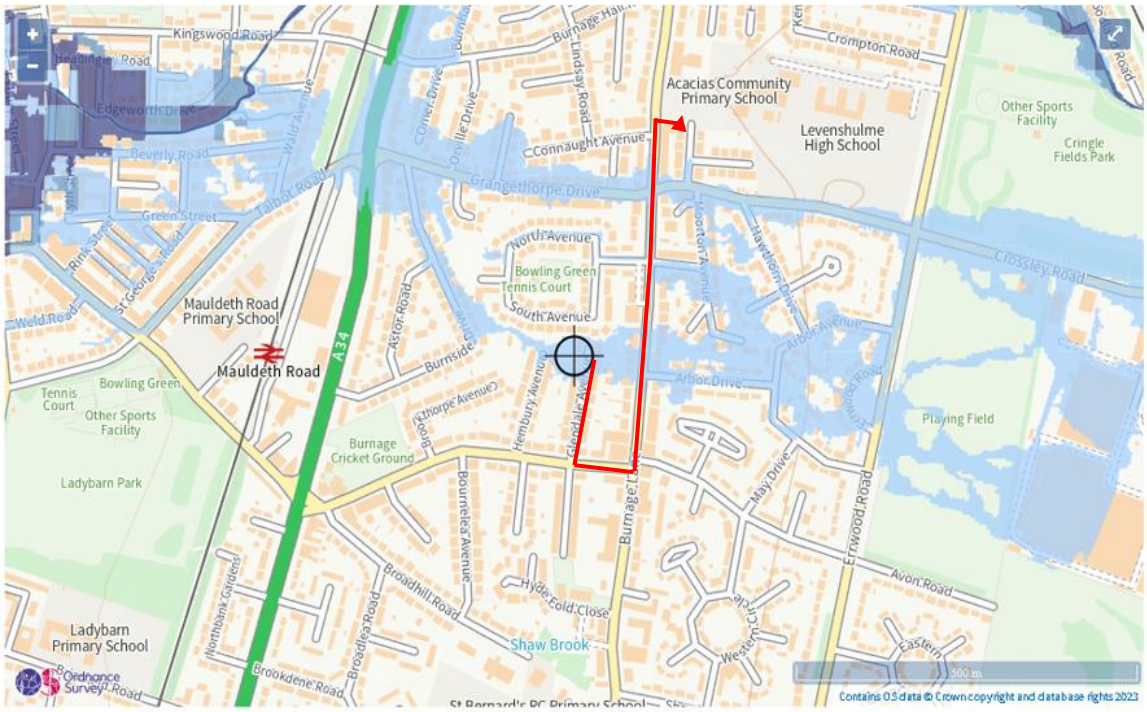
13. Flood Evacuation Plan:

13.1Acacia Community Primary School is in walking distance of the proposed site and is in Flood Zone 1, see figure 8 below.

13.2 The address is: Acacia Community Primary School, Alexandra Drive, Manchester M19 2WW

13.3 It is recommended that you exit the property and walk south on Glendale Avenue and turn left onto Mauldeth Road. Then turn left onto Burnage Lane and walk for about 960.0 metres, then turn right onto Alexandra drive and walk approximately 50.0 metres to enter into the grounds of Acacia Community Primary School. A total distance of about 1,320metres.

Fig-8



Appendix A: GMMC29111AB Table provided by the Environment Agency

					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) + 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)	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) + 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)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
1	ea013_0238_CRN01_2672d	386924	393862	Modelled Water Level (m aodN)	43.05	43.17	43.44	43.64	43.69	43.94	44.09	44.18	44.59	44.65	44.87	44.92	45.00	45.13	43.05	43.17	43.44	43.64	43.69	43.94	44.09	44.18	44.59	44.65	44.87	44.92	45.00	45.13
				Modelled Flow (cumecs)	1.87	2.41	3.03	3.41	3.49	3.91	4.18	4.28	4.81	4.85	5.03	5.08	5.12	5.18	1.87	2.41	3.01	3.41	3.49	3.91	4.18	4.24	4.81	4.85	5.03	5.08	5.12	5.18
2	ea013_0238_CRN01_2546i	386502	393656	Modelled Water Level (m aodN)	42.53	42.78	43.29	43.56	43.63	43.92	44.06	44.18	44.59	44.64	44.86	44.41	44.98	45.10	42.53	42.78	43.29	43.56	43.63	43.92	44.08	44.18	44.59	44.64	44.86	44.41	44.98	45.10
				Modelled Flow (cumecs)	2.01	2.56	3.17	3.20	3.20	3.22	3.22	3.10	3.80	3.90	4.73	3.74	5.06	6.55	2.01	2.56	3.17	3.20	3.20	3.22	3.20	3.10	3.66	3.95	4.73	3.74	5.55	6.55
3	ea013_0238_CRN01_2387	386354	393611	Modelled Water Level (m aodN)	41.47	41.57	41.68	41.73	41.74	41.79	41.81	41.82	41.87	41.87	41.90	41.85	41.91	41.92	41.47	41.57	41.68	41.73	41.74	41.79	41.81	41.82	41.87	41.87	41.90	41.85	41.91	41.92
				Modelled Flow (cumecs)	2.15	2.72	3.47	3.80	3.86	4.12	4.30	4.37	4.73	4.79	5.06	4.57	5.54	5.79	2.15	2.72	3.47	3.80	3.86	4.12	4.30	4.37	4.73	4.79	5.06	4.57	5.54	5.79
4	ea013_0238_CRN01_2284i	386281	393540	Modelled Water Level (m aodN)	40.73	40.82	40.92	40.97	40.98	41.03	41.08	41.07	41.14	41.14	41.15	41.21	41.11	41.20	40.73	40.82	40.92	40.97	40.98	41.03	41.08	41.07	41.14	41.14	41.15	41.21	41.11	41.20
				Modelled Flow (cumecs)	2.01	2.56	3.23	3.55	3.62	3.91	4.07	4.16	4.53	4.58	4.77	4.37	4.87	4.99	2.01	2.56	3.23	3.55	3.62	3.91	4.07	4.16	4.53	4.58	4.77	4.37	4.87	4.99
5	ea013_0238_CRN01_2106	386197	393448	Modelled Water Level (m aodN)	40.21	40.34	40.49	40.55	40.57	40.60	40.62	40.62	40.67	40.68	40.70	40.65	40.73	40.74	40.21	40.34	40.49	40.55	40.57	40.60	40.62	40.63	40.67	40.68	40.70	40.66	40.75	40.74
				Modelled Flow (cumecs)	2.15	2.72	3.47	3.80	3.86	4.12	4.30	4.37	4.73	4.79	5.06	4.57	5.54	5.79	2.15	2.72	3.47	3.80	3.86	4.12	4.30	4.37	4.73	4.79	5.06	4.57	5.54	5.79
6	2D Levels	386671	393045	Modelled Water Level (m aodN)											45.28		45.38	45.41											45.28		45.38	45.41
7		386690	393042	Modelled Water Level (m aodN)											45.91		46.00	46.04											45.81		46.00	46.04

Model data taken from Cringle Brook 2017

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

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.

Flood Defences

Start Date	Asset Type	Asset ID	Standard of Protection	Upstream Actual Crest Level (m aod)	Downstream Actual Crest Level (m aod)
01/01/2004	Wall	32070	100	39.28	39.21
01/01/2004	Wall	32071	100	39.73	39.40
01/01/2004	Wall	32057	100	40.97	40.67
01/01/2004	Wall	32058	100	40.71	40.72
01/01/2004	Engineered High Ground	71686	100	48.71	47.89
01/01/2004	Wall	8870	100	39.83	38.84
01/01/2004	Engineered High Ground	9636	100	41.26	43.63
01/01/2004	Natural High Ground	7430	100	47.83	50.40
01/01/2004	Natural High Ground	8871	100	41.17	39.56