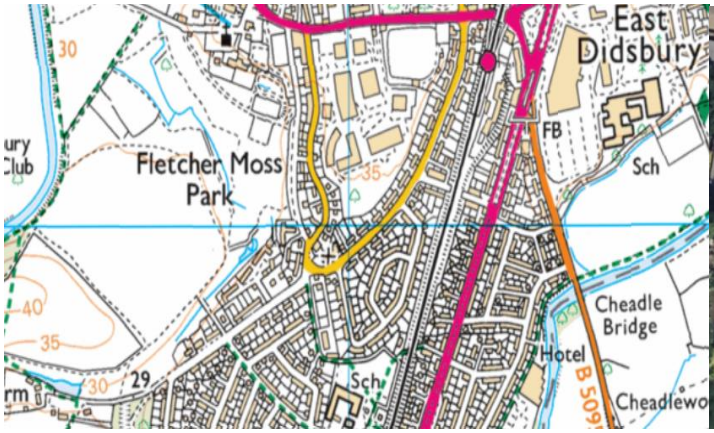
WtFR Ltd

Flood Risk Assessment

Development at

470 Parrs Wood Road, Manchester, M20 5QQ





On behalf of

David Dixey

Date: 12th July 2024

Reference: WTFR-FRA-2024/06/Q21

Issue sheet

Revision	Prepared by	Date	Checked by	Date
0	JS	12/07/24	JH	13/07/24

1. Introduction 1
2. Site Description 1
3. Flood Risk Assessment 3
3.1 National Planning Policy 3
3.2 Local Planning Policy 4
3.3 Flood Risk Zones, Vulnerability and Classification 4
4. Sources of flooding 8
4.1 Fluvial/Tidal 8
4.2 Historic Flooding 12
4.4 Reservoir 13
4.5 Groundwater 14
4.6 Geology 15
5. Proposed development 16
7. Hierarchy of disposing surface water 18
7.1 Infiltration 18
7.2 Surface Water Body 18
7.3 Surface Water or Combined Sewer 18
8. Use of SuDS 19
9. Management of flood risk 19
9.1 Fluvial 19
9.2 Surface Water 20
9.3 Flood Resistance and Resilience Measures 20
9.4 Flood plan 21
10. Conclusions 23

1. Introduction

WtFR Ltd has been commissioned to undertake a Flood Risk Assessment (FRA) in connection with the planning application for the proposed development at 470 Parrs Wood Road, Manchester, M20 5QQ.

This FRA has been produced to demonstrate how risks from all sources of flooding to the site and flood risk to others from the development will be managed, in order to satisfy the requirements, set out in the National Planning Policy Framework (NPPF).

A full assessment of the flood risk to the site and consideration of the surface water management as a result of the development has been considered as part of this analysis.

Data has been gathered from a number of other sources including: the Environment Agency (EA), the British Geological Society (BGS), National Soil Research Institute (NSRI), aerial photographs, Ordnance Survey (OS), commercially available historical mapping and relevant strategic documents developed by the Manchester City Council, in their capacity as the Local Planning Authority and Lead Local Flood Authority.

2. Site Description

Area Size: 400m^2 (total) 250m^2 (impermeable)

Grid reference: SJ 85072 90022

The proposals are for the erection of a single storey rear extension together with linked canopy to existing outbuilding, front porch extension and alterations to front elevation to the existing dwelling at 470 Parrs Wood Road, Manchester, M20 5QQ.

Figures 1 and 2 below show location details of the development site. Figure 3 shows an oblique aerial photograph of the development site.

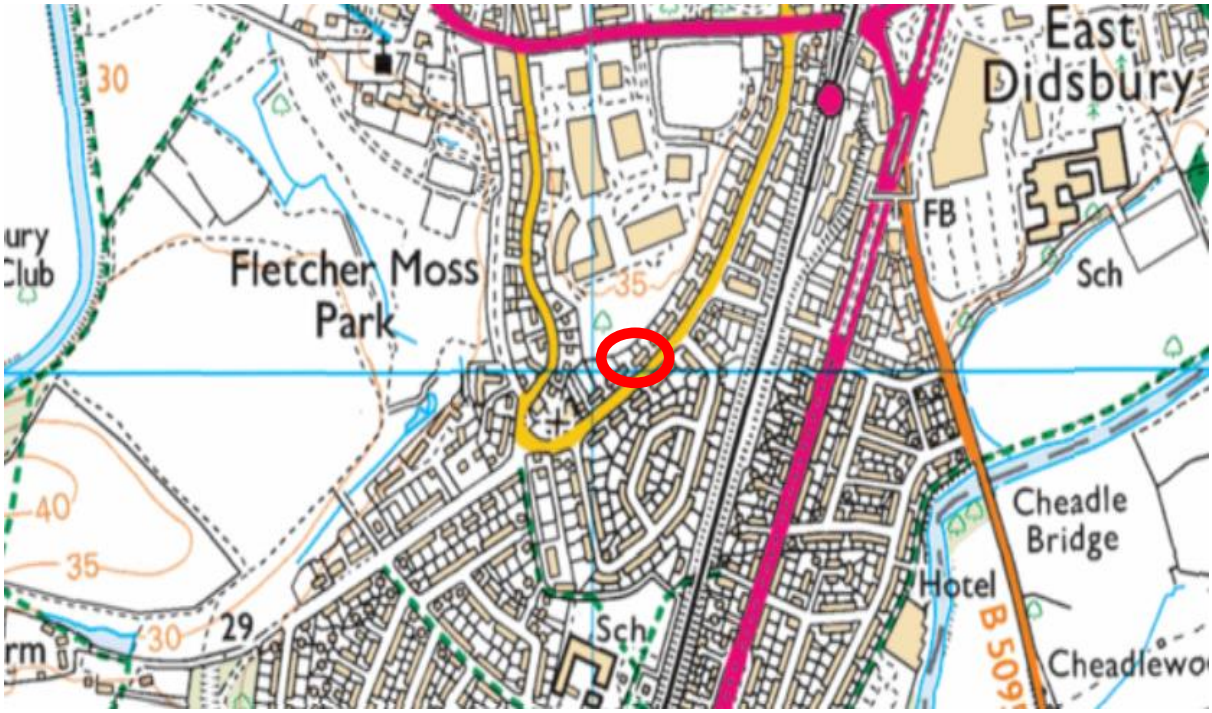


Figure 1 – Location of the site, highlighted.



Figure 2 –detailed location of the development site, highlighted.



Figure 3 – aerial photograph of the development site.

3. Flood Risk Assessment

3.1 National Planning Policy

Paragraph 173 of the NPPF states "When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment[59]. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan".

Footnote 59 states "A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use".

Furthermore paragraph 30 of the Planning Practice Guide on Flood Risk and Climate Change states "A site-specific flood risk assessment is carried out by (or on behalf of) a developer to assess the flood risk to and from a development site. Where necessary, the assessment should accompany a planning application submitted to the local planning authority. The assessment should demonstrate to the decision-maker 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 users.

The objectives of a site-specific flood risk assessment are to establish:

- whether a 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;
- evidence for the local planning authority to apply (necessary) the Sequential Test, and;
- whether the development will be safe and pass the Exception Test, if applicable".

Continuing paragraph 31 of the Planning Practice Guidance quotes "The information provided in the flood risk assessment should be credible and fit for purpose. Site-specific flood risk assessments should always be proportionate to the degree of flood risk and make optimum use of information already available, including information in a Strategic Flood Risk Assessment for the area, and the interactive flood risk maps available on the Environment Agency's web site.

A flood risk assessment should also be appropriate to the scale, nature and location of the development. For example, where the development is an extension to an existing house (for which planning permission is required) which would not significantly increase the number of people present in an area at risk of flooding, the local planning authority would generally need a less detailed assessment to be able to reach an informed decision on the planning application. For a new development comprising a greater number of houses in a similar location, or one where the flood risk is greater, the local planning authority would need a more detailed assessment".

3.2 Local Planning Policy

Local Authorities consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF. Relevant local policy, as outlined by Manchester City Council, is contained within the;

i) Strategic Flood Risk Assessment
ii) Local Flood Risk Management Strategy

The Strategic Flood Risk Assessment (SFRA) and the Local Flood Risk Management Strategy (LFRMS) are key sources of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF.

3.3 Flood Risk Zones, Vulnerability and Classification

These 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 available on the Environment Agency's web site, as indicated in the table below.

Table 1 – Flood Zones

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 2 – Flood Risk Vulnerability Classification

Essential Infrastructure
• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable
• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').
More Vulnerable
• Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill* and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable
• Police, ambulance and fire stations which are **not** required to be operational during flooding. • Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.

Water Compatible Development
• Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

* Landfill as defined in Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2010.

Table 3 - Flood risk vulnerability and flood zone 'compatibility'

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*	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;

- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† 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 to be there and 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.

Minor development in context of Planning Practice Guidance

Section 17 of the Planning Practice Guidance for Flood Risk and Coastal Change states:

Minor development means:

- minor non-residential extensions: industrial/commercial/leisure etc. extensions with a footprint less than 250 square metres.
- alterations: development that does not increase the size of buildings e.g. alterations to external appearance.
- householder development: For example; sheds, garages, games rooms etc. within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling e.g. subdivision of houses into flats.

Furthermore section 18 of the Planning Practice Guidance for Flood Risk and Coastal Change looks at whether minor developments likely to raise flood risk issues? It states:

Minor developments are unlikely to raise significant flood risk issues unless:

- they would have an adverse effect on a watercourse, floodplain or its flood defences;
- they would impede access to flood defence and management facilities, or;
- where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.

The Environment Agency's advice on flood risk assessment is helpful for ensuring extensions or alterations are designed and constructed to conform to any flood protection already incorporated in the property and include flood resilience measures in the design.

The Environment Agency's advice for minor developments – household extensions is to ensure floor levels are either no lower than existing floor levels or 300 millimetres (mm) above the estimated flood level. If floor levels are not going to be 300mm above existing flood levels, the local planning authority may require flood resistance and resilience measures to be included within the proposals.

4. Sources of flooding

4.1 Fluvial/Tidal

The Environment Agency's Flood Map for Planning (Rivers and Sea) identifies fluvial and tidal flood zones, and provides an indication of whether or not these zones are protected, due to the presence of flood defences (also highlighted). Figure 4, below, presents the Flood Map for the surrounding area.

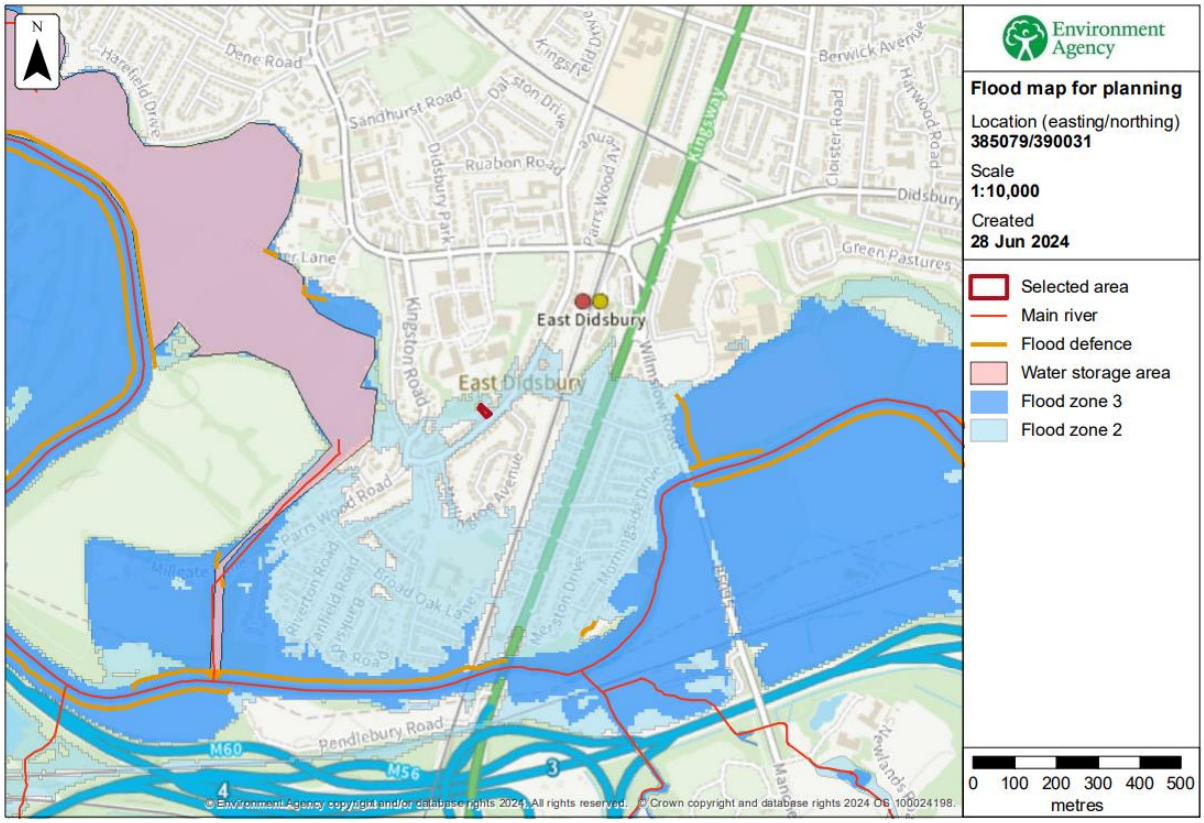


Figure 4 – Fluvial flood risk – EA Flood Map.

The EA Flood Map identifies the development site to lie within Flood Zone 2, where the chance of flooding in any given year is between 1 in 1000 (0.1%) and 1 in 100 (1%).

Figures 5 and 6 shows the defended modelled flood extents at the development site, this shows that the development is at risk in the 0.1% AEP and the 1%+70%CC AEP.

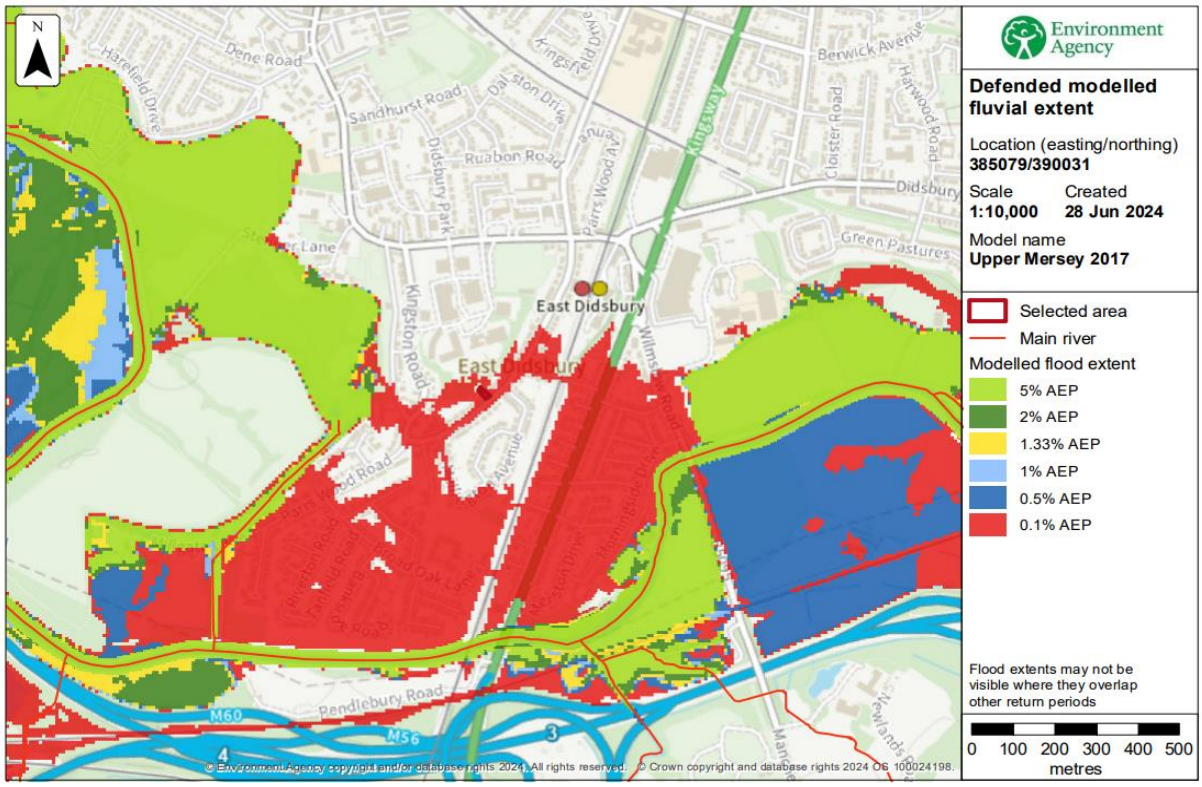


Figure 5 – Defended modelled flood extents.

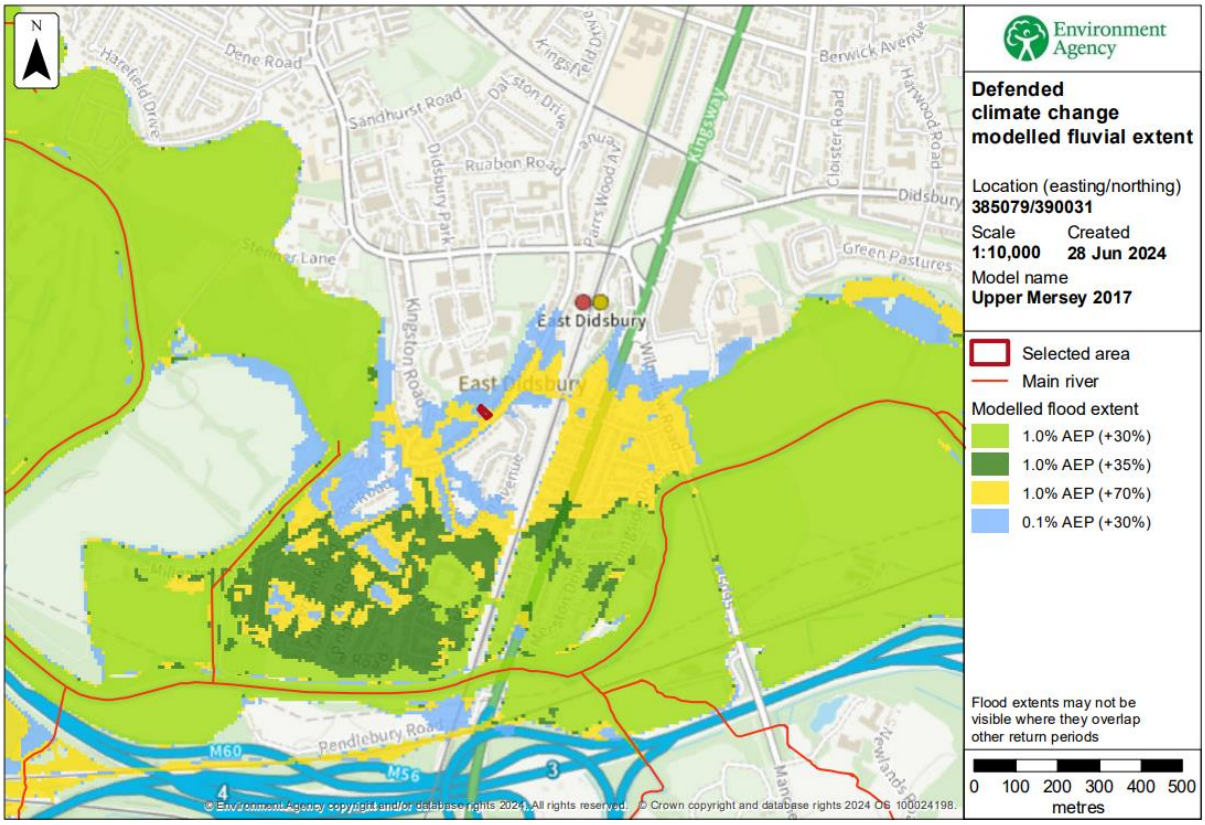


Figure 6 – Defended climate change modelled flood extents.

Modelled flood information is also available from the Upper Mersey Study, which was completed in 2017. Using a 2D ISIS - TUFLOW model the floodplain has been represented as a grid. The flood water levels have been calculated for each grid cell.

Figure 7, below, provides a map with the model node location points shown, with corresponding modelled flood levels for a range of Annual Exceedance Probability events provided in Table 4.

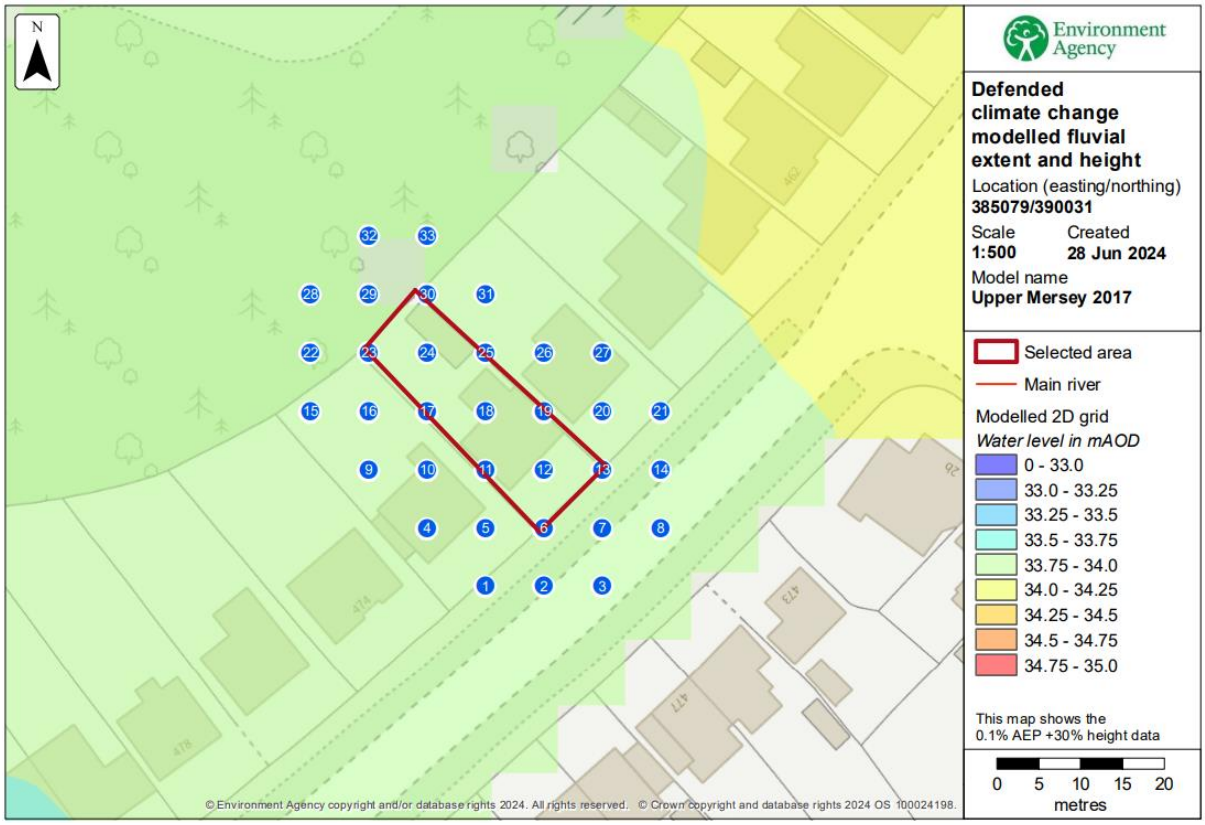


Figure 7 – Map showing model node location points.

Label	Easting	Northing	1% AEP (+30%)		1% AEP (+35%)		1% AEP (+70%)		0.1% AEP (+30%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	385079	390010	NoData	NoData	NoData	NoData	0.10	33.57	0.43	33.90
2	385086	390010	NoData	NoData	NoData	NoData	0.28	33.59	0.62	33.93
3	385093	390010	NoData	NoData	NoData	NoData	0.29	33.60	0.64	33.94
4	385072	390017	NoData	NoData	NoData	NoData	0.03	33.55	0.36	33.88
5	385079	390017	NoData	NoData	NoData	NoData	0.09	33.57	0.41	33.90
6	385086	390017	NoData	NoData	NoData	NoData	0.10	33.59	0.44	33.93
7	385093	390017	NoData	NoData	NoData	NoData	0.28	33.60	0.64	33.95
8	385100	390017	NoData	NoData	NoData	NoData	0.33	33.60	0.68	33.96
9	385065	390024	NoData	NoData	NoData	NoData	NoData	NoData	0.34	33.84
10	385072	390024	NoData	NoData	NoData	NoData	0.01	33.57	0.31	33.87
11	385079	390024	NoData	NoData	NoData	NoData	0.02	33.59	0.33	33.90
12	385086	390024	NoData	NoData	NoData	NoData	0.06	33.60	0.39	33.93
13	385093	390024	NoData	NoData	NoData	NoData	0.09	33.60	0.44	33.95
14	385100	390024	NoData	NoData	NoData	NoData	0.25	33.61	0.61	33.97
15	385058	390031	NoData	NoData	NoData	NoData	NoData	NoData	0.39	33.83
16	385065	390031	NoData	NoData	NoData	NoData	NoData	NoData	0.33	33.84

Table 4 – Modelled flood levels.

Node 11 is the closest point to the development site that indicates flooding, with a flood level of 33.59mAOD for the 1%(+70%CC) event and 33.90mAOD for the 1%(+30%CC) event, and it is proposed that these figures are used to determine the recommended ground floor level for the development.

However, it is normal to consider the latest climate change guidance, when assessing long term flood risk. Table 5 below provides an extract from the latest guidance, giving a range of percentage increases to flood levels over varying timescales.

Upper Mersey Management Catchment peak river flow allowances

	Central	Higher	Upper
2020s	13%	17%	27%
2050s	22%	31%	51%
2080s	41%	53%	85%

Table 5 – Climate change allowances.

For more vulnerable developments in Flood Zone 2 the 'central' (41%) climate change allowance is the EA minimum benchmark for flood risk mitigation.

It is considered that the predicted flood level of 33.90mAOD, equating to 1 in 100+70%, is appropriate in this instance. It is proposed that the floor level is set as high as possible but no lower than existing, as in line with EA guidance.

4.2 Historic Flooding

The EA does not have records of historic flood events from rivers affecting the area local to this property. Further analysis of strategic flood risk documents developed by the Manchester City Council does not indicate flooding from other sources.

4.3 Surface Water Flooding

The Environment Agency's updated Flood Map for Surface Water (uFMfSW) identifies pluvial flood risk. Figure 8, below, presents the uFMfSW for the development site and the surrounding area.

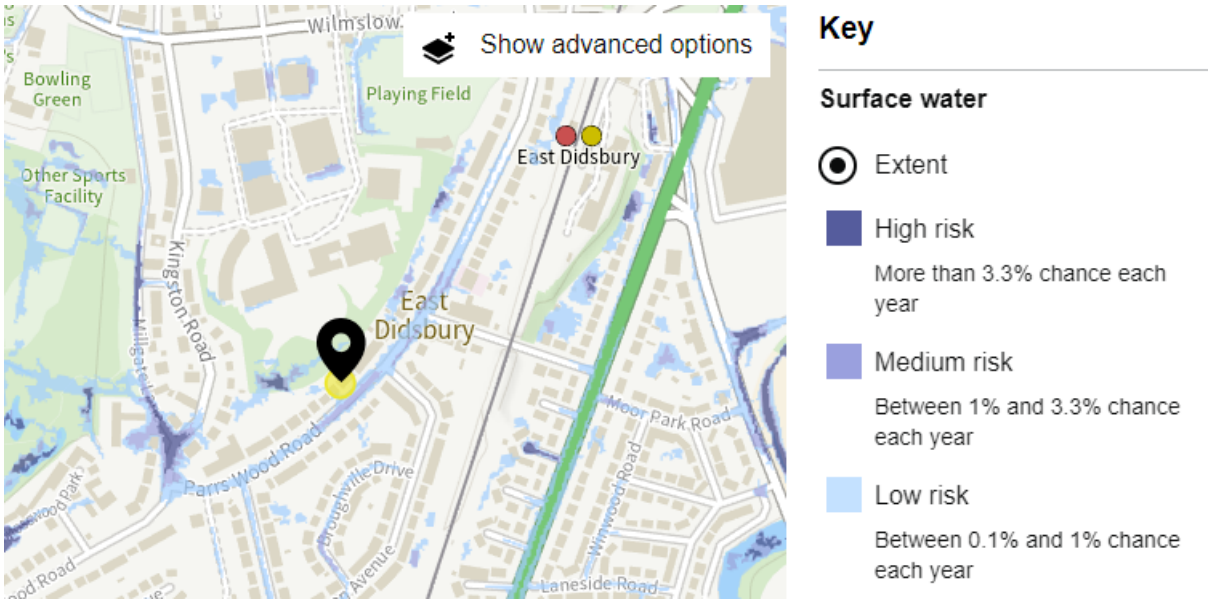


Figure 8 – Flooding from surface water sources, uFMfSW, site highlighted.

The uFMfSW shows that area in the vicinity of the development site is at low risk of surface water flooding. Low risk means that the probability of flooding in any given year is between 1 in 100 (1%) and 1 in 1000 (0.1%).

There is a medium risk of surface water directly outside the property, but this is exclusively within the highway.

4.4 Reservoir

The Environment Agency's Risk of Reservoir Flooding Map identifies the maximum extent of flooding that may be expected in the unlikely event that a reservoir dam failed. Figure 9 below, presents the risk map for development site and the surrounding area. The development is at risk of flooding.

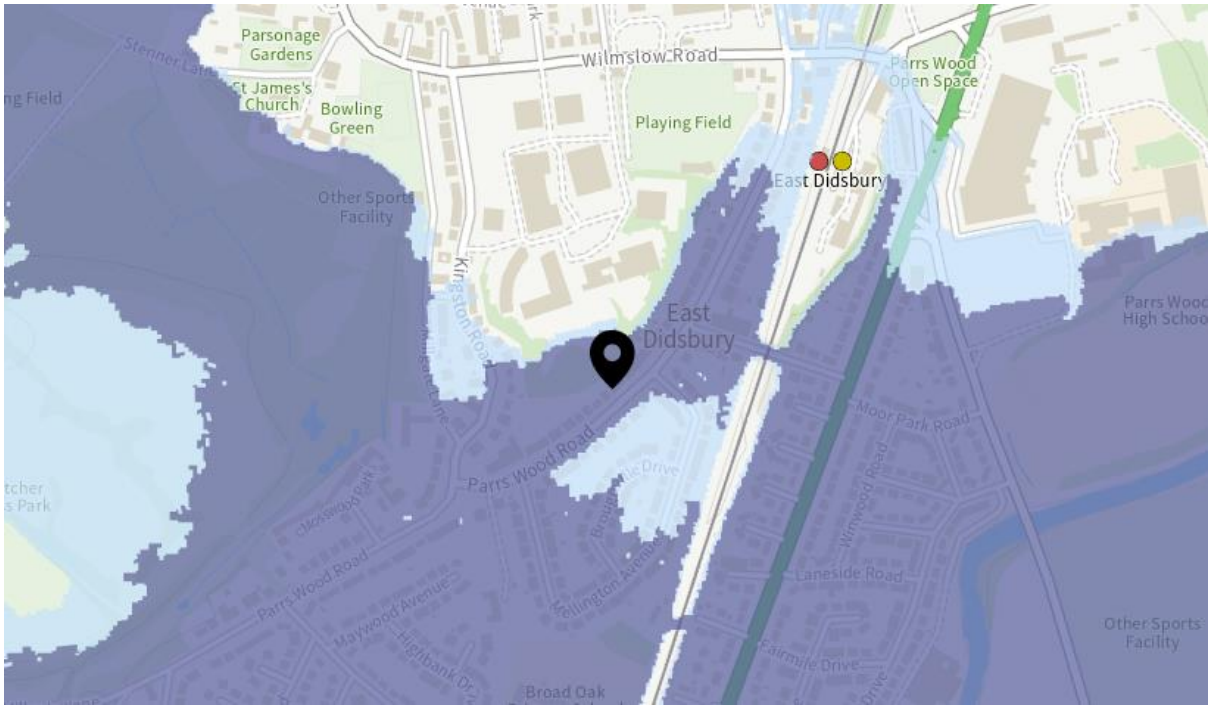


Figure 9 – Reservoir flood map.

The development is at risk of flooding from reservoir flooding. Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensures that reservoirs are inspected regularly, and essential safety work is carried out.

4.5 Groundwater

The Environment Agency's Groundwater Vulnerability Map indicates that the development site is situated over a medium risk groundwater vulnerability area, as shown in Figure 10. Further analysis shows that the development site is not situated over a Groundwater Source Protection Zone as shown in Figure 11.

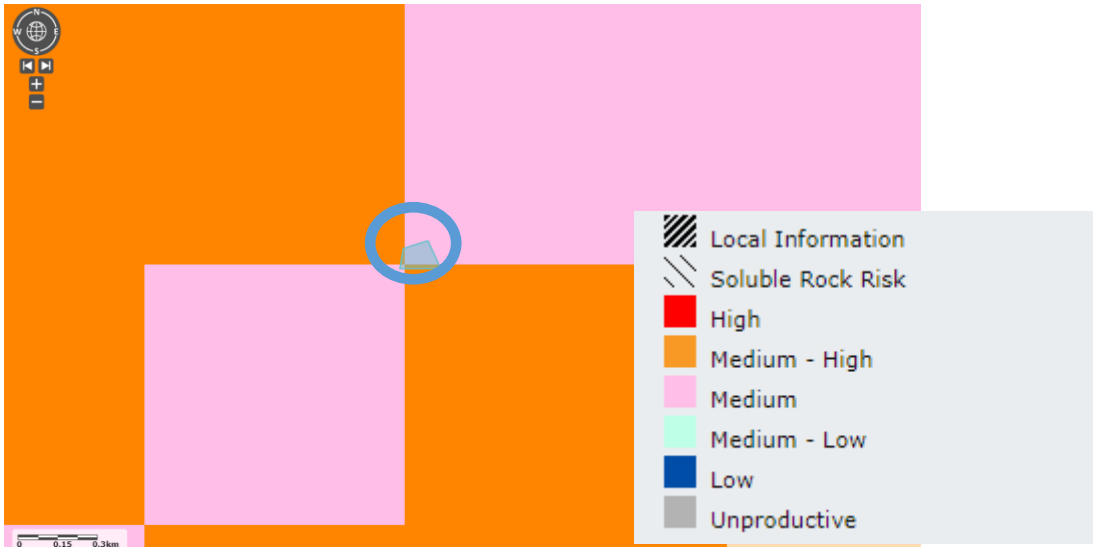


Figure 10 – Groundwater vulnerability map, site highlighted.

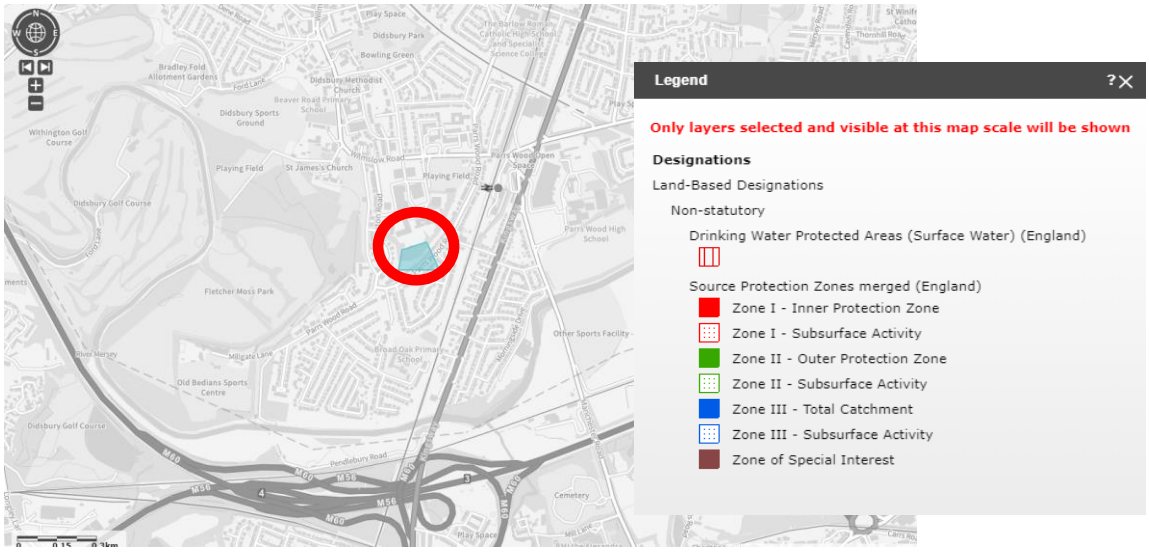


Figure 11 – Groundwater source protection zones, site highlighted.

Due to the minimal groundworks (for the construction of shallow foundations) the impact on groundwater is considered to be negligible.

However, it is recommended that a groundwater mitigation plan is developed that may be implemented if groundwater is encountered during construction.

4.6 Geology

Figures 12 and 13 present information from the British Geological Survey.

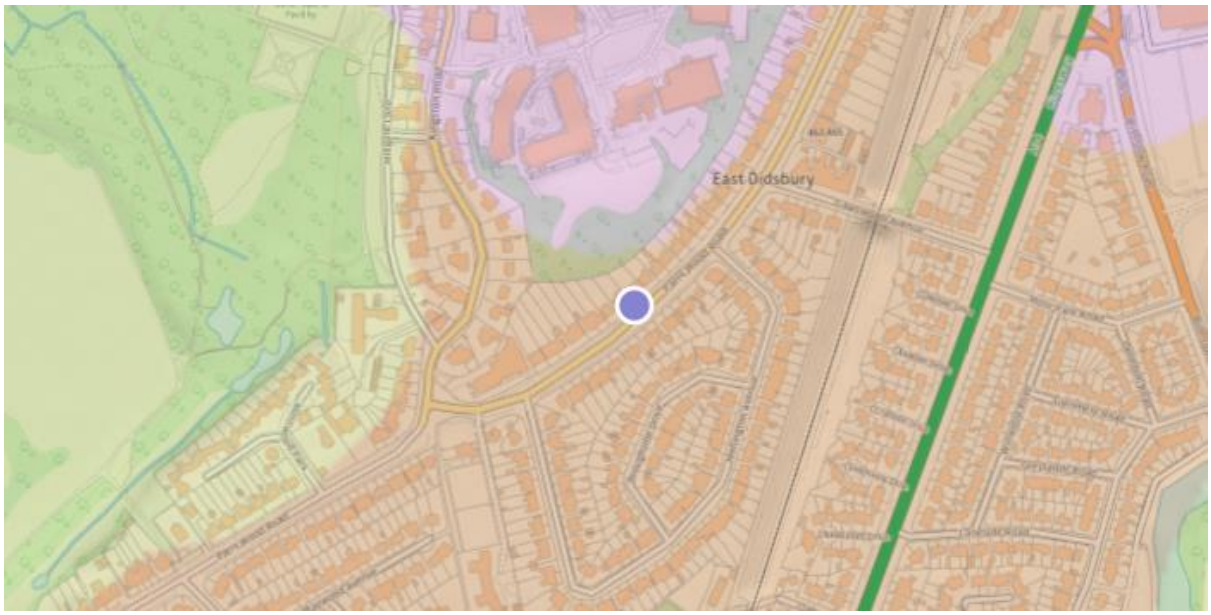


Figure 12 – Superficial Geology of the development.

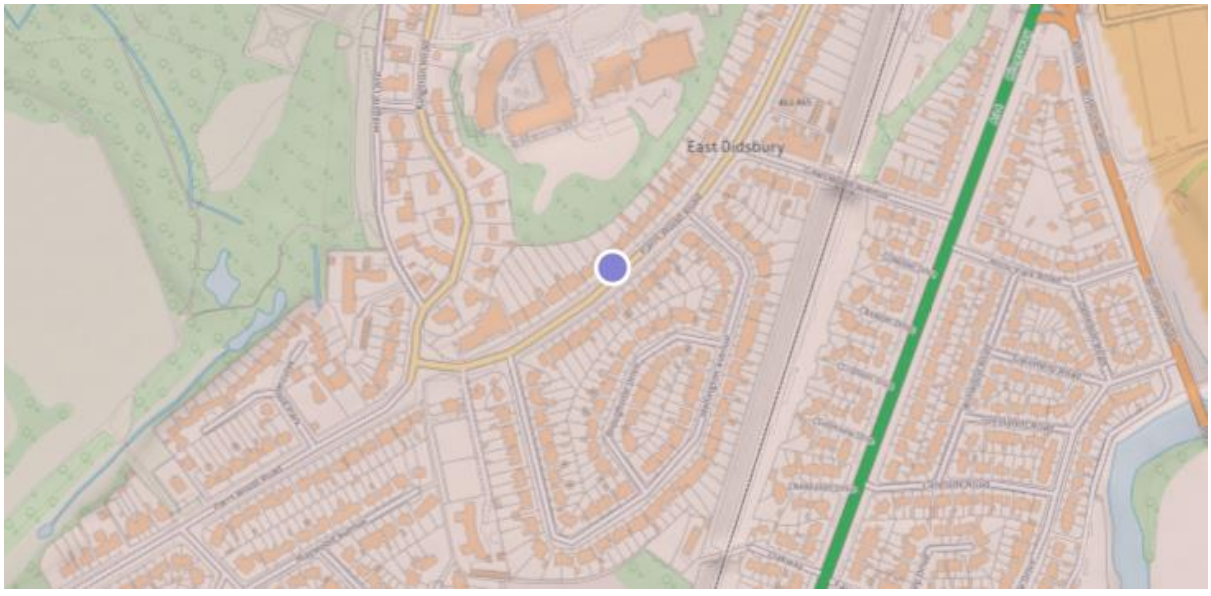


Figure 13 – Bedrock geology of the development.

The superficial deposit records at the development site are described as River Terrace Deposits - Sand and gravel. Sedimentary superficial deposit formed between 2.588 million years ago and the present during the Quaternary period.

With regards to the bedrock, the site is underlain by the Wilmslow Sandstone Formation - Sandstone. Sedimentary bedrock formed between 252.2 and 247.1 million years ago during the Triassic period.

5. Proposed development

This FRA is prepared to support a planning application for the erection of a single storey rear extension together with linked canopy to existing outbuilding, front porch extension and alterations to front elevation to the existing dwelling at 470 Parrs Wood Road, Manchester, M20 5QQ.

Buildings used for residential dwellings are classified as being **More Vulnerable** development within Table 2 of the Planning Practice Guidance. More Vulnerable minor developments within Flood Zone 2 are acceptable.

Figure 14 shows the exiting floor layouts and Figure 15 shows the proposed floor layouts.

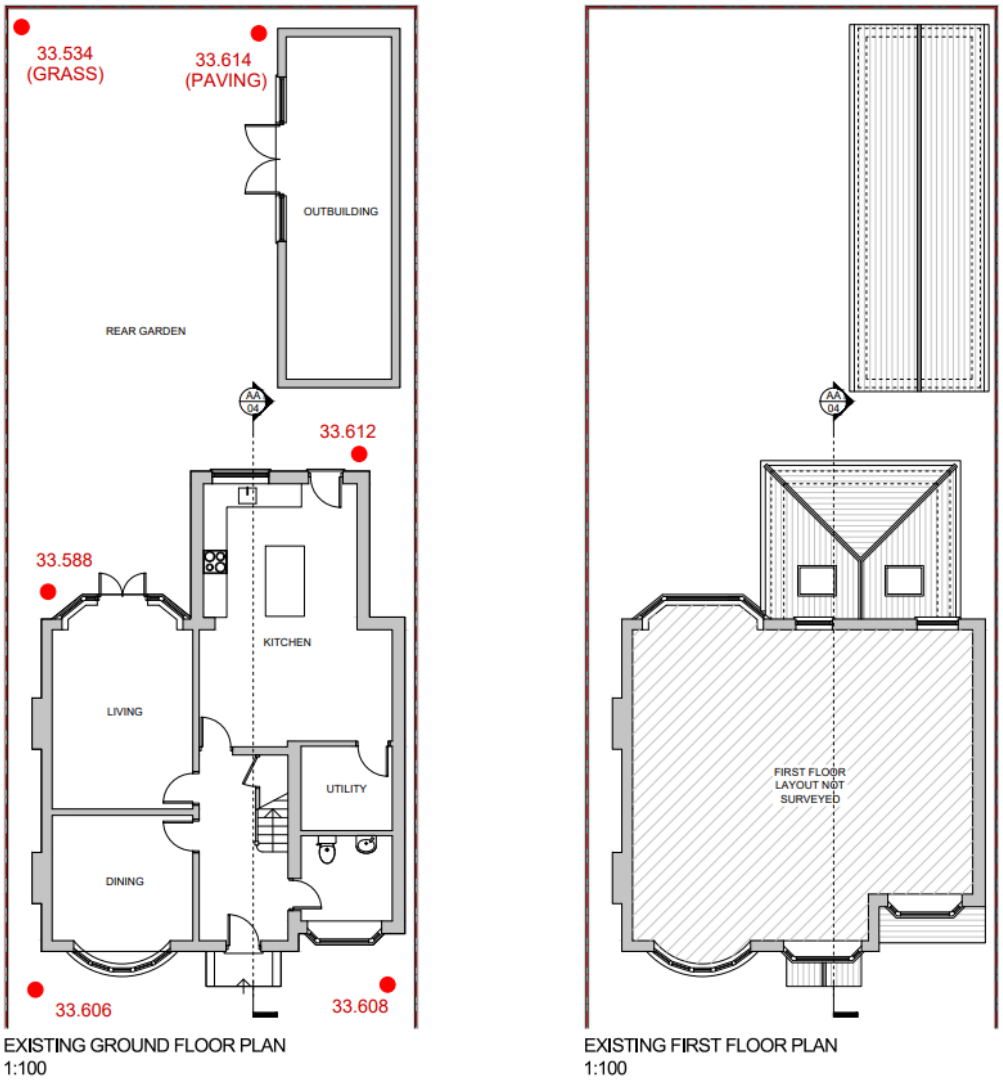
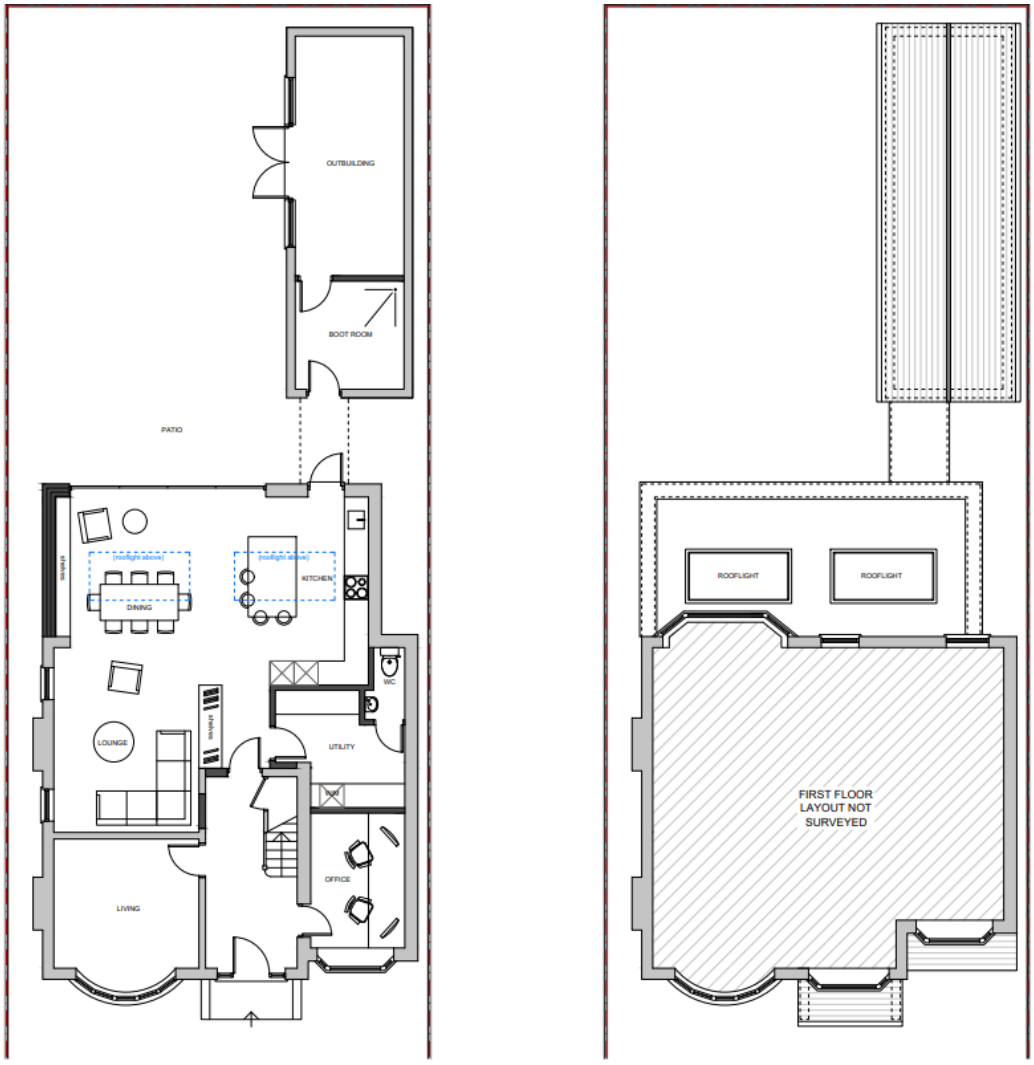


Figure 14 – Existing floor layouts.



PROPOSED GROUND FLOOR PLAN
1:100

PROPOSED FIRST FLOOR PLAN
1:100

Figure 15 – Proposed floor layouts.

6. Surface Water Drainage

The existing runoff rate from the site can be calculated using the Modified Rational Rainfall Method. Where Q = 2.78 * Cv * Cr * Ri * A

Cv = **0.75** – Fully impermeable areas i.e. existing roads and hardstanding

Cr = **1.3** – Routing Coefficient (CIRIA C697 recommends a value of 1.3)

Ri = **120**mm Rainfall intensity

A = **0.025**ha current impermeable area

Q = 2.78 * 0.75 * 1.3 * 120 * 0.025

Q = 8.13l/s

It is assumed that the existing arrangement for the discharge of surface water from the development is into the surface water or combined sewerage system. The impermeable area of the site will be slightly increased as the minor extension will be built over permeable ground, however the method of surface water disposal will be as existing.

On this basis, the proposed discharge of surface water from the development will not see any surface water flooding on site in the 1 in 30 year and 1 in 100 year plus climate change events. Therefore, it will not increase the risk of surface water / sewer flooding elsewhere.

7. Hierarchy of disposing surface water

The Planning Practice Guidance and part H of the Building Regulations state that "generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer".

7.1 Infiltration

Due to the limited amount of permeable ground and underlying geology, infiltration is not considered a viable option.

7.2 Surface Water Body

There are no watercourses within the immediate vicinity of the development site.

7.3 Surface Water or Combined Sewer

It is assumed that a public surface water or combined sewer serves the existing property. As such, it is recommended that surface water is discharged to the public sewerage system.

8. Use of SuDS

The NPPF, Planning Practice Guide and the Ministerial Statement all look at the use of SuDS as a priority to aid the disposal of surface water from new developments.

Due to the minor nature of the development proposal there is limited capacity to include SuDS measures although permeable paving will be used and the use of water butts may be considered for use, where appropriate, to minimise surface water runoff from the site.

9. Management of flood risk

9.1 Fluvial

The analysis of flooding from fluvial and tidal sources shows that the building is in Flood Zone 2 and hence is at a risk of flooding from events between the 1 in 1000 (0.1%) and 1 in 100 (1%) year events.

Table 2 of this report details that residential developments are classified as More Vulnerable; Table 3 of the report shows that More Vulnerable minor developments in Flood Zone 2 are acceptable.

The results from the Upper Mersey Study indicate that the long term flood level in the vicinity of the development site is 33.90mAOD, equating to 1 in 100+70%CC. It is proposed that the floor level is set as high as possible but no lower than existing, as in line with EA guidance.

To mitigate against extreme events it is recommended that flood resistance and resilience measures are incorporated in the development. Suitable measures are specified in section 9.3 of this report.

It is also recommended that the residents of the property register for the EA Flood Warning Service, which is available in the area and develop a flood plan that may be implemented in the event of extreme flooding. Details of a flood plan are set out in section 9.4 of this report.

9.2 Surface Water

The uFMfSW shows that area in the vicinity of the development site is at low risk of surface water flooding. Low risk means that the probability of flooding in any given year is between 1 in 100 (1%) and 1 in 1000 (0.1%).

Appropriate SuDS features and measures will be incorporated within the development to minimise surface water discharges.

Due to the small scale of the development, on-site attenuation is not necessary.

It is assumed that a public surface water or combined sewer serves the existing property. As such, it is recommended that surface water is discharged to the public sewerage system and due to the small scale of the development, on-site attenuation is not necessary.

As such, the proposed development will not increase the risk of flooding elsewhere from surface water sources.

9.3 Flood Resistance and Resilience Measures

It is recommended that the proposed works incorporate flood resilience and resistance measures where appropriate. This would ensure that flooding in exceedance events could be mitigated against. Such measures could include:

- External ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Ground level electrical main ring run from higher level; and on separately switched circuit from first floor;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-siphon fitted to all toilets;
- Kitchen units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level.

9.4 Flood plan

As the development is situated in Flood Zone 2 it would be prudent for a flood warning and evacuation plan to be set up and implemented post development. This plan would include residents signing up to the Environment Agency flood warning service.

The flood warning service has three types of warning that will help you to 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.

Recommended Flood Plan:

Before a flood

- Find out if you are at risk of flooding;
- Find out if you can receive flood warnings;
- Prepare and keep a list of all your contacts to hand or save them on your mobile phone/tablet;
- Think about what items you can move now and what you would want to move to safety during a flood such as pets, cars, furniture and electrical equipment;
- Know how to turn off gas, electricity and water supplies;
- 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.

On receipt of a flood warning

- Tune into your local radio station on a battery or wind-up radio;
- Fill jugs and saucepans with water;

- Grab your already prepared flood kit;
- Collect blankets, torch, first aid kit, medication and food;
- Move important documents, personal items, valuables and lightweight belongings upstairs or to high shelves;
- Raise large items of furniture, or put him in large bags if you have them;
- Move people, outdoor belongings, cars and pets to higher ground;
- Switch off water, gas and electricity at mains when water is about to enter your home. Do not touch sources of electricity when in standing water;
- Fit flood protection products, if you have them, for example flood boards, airbrick covers and sandbags;
- If you do not have non-return valves fitted, plug water inlet pipes with towels or cloths; Know your means of escape;
- Listen to the advice of the emergency service and evacuate if told to do so;
- Avoid walking or driving through flood water. 300mm of fast flowing water can knock over an adult and two feet of water can move a car.

<u>After a flood</u>

- 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 outwear, including gloves, wellington boots and a face mask;
- Have your electrics, central heating and water checked by qualified engineers before switching them back on.

10. Conclusions

The analysis of flooding from fluvial and tidal sources shows that the building is in Flood Zone 2 and hence is at a risk of flooding from events between the 1 in 1000 (0.1%) and 1 in 100 (1%) year events.

Table 2 of this report details that residential developments are classified as More Vulnerable; Table 3 of the report shows that More Vulnerable minor developments in Flood Zone 2 are acceptable.

The results from the Upper Mersey Study indicate that the long term flood level in the vicinity of the development site is 33.90mAOD, equating to 1 in 100+70%CC. It is proposed that the floor level is set as high as possible but no lower than existing, as in line with EA guidance.

To mitigate against extreme events it is recommended that flood resistance and resilience measures are incorporated in the development.

Appropriate SuDS features and measures will be incorporated within the development to minimise surface water discharges.

It is assumed that a public surface water or combined sewer serves the existing property. As such, it is recommended that surface water is discharged to the public sewerage system and due to the small scale of the development, on-site attenuation is not necessary.

As such, the proposed development will not increase the risk of flooding elsewhere from surface water sources.

Due to the minimal groundworks the impact on groundwater is considered to be negligible.

However, it is recommended that a groundwater mitigation plan is developed that may be implemented if groundwater is encountered during construction.

There is no evidence of historic flooding of the development site.

The development is at risk from reservoir failure.

Based on the likely flooding risk, it is considered that the proposed development can be operated safely in flood risk terms, without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF.

Disclaimer

WtFR Ltd expressly disclaims responsibility for any error in, or omission from, this assessment arising from or in connection with any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on circumstances encountered and information evaluated at the time of preparation and WtFR expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with those opinions, conclusions and any recommendations.

WtFR does not accept any liability for the use of this report or its contents by any third party.