

NXQ

Lever Street, Manchester

Flood Risk Assessment

Revision 01: 27.03.2024



SOLLER



4891 - The NXQ Building, Lever Street
Flood Risk Assessment
February 2024

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1 Introduction

This Flood Risk Assessment (FRA) has been prepared by AKT II on behalf of the Client, Soller Nine, in support of the proposed redevelopment of The NXQ Building at the junctions of Lever Street, Houldsworth Street, Little Lever Street and Great Ancoats Street, Manchester, M1 1FJ.

This report identifies potential sources of flooding and risk to the proposed development. This study has been prepared in accordance with the guidance contained in the National Planning Policy Framework (NPPF) and the Greater Manchester Strategic Flood Risk Assessment (SFRA). A separate Drainage Strategy Report has been prepared by AKT II which should be read in conjunction with this FRA.

2 The Site

2.1 Site Location

The site is located in the Northern Quarter area of Manchester and comprises a number of properties forming a block bounded by Great Ancoats Street to the east, Little Lever Street to the south, Houldsworth Street to the west and Lever Street to the north. Little Ancoats Street runs through the centre of the site.

The nearest postcode is M1 1FJ and the National Grid reference is SJ 84725 98587.

The site is approximately flat with the eastern corner being at 49.3 m AOD and the western corner being at 48.9 m AOD.

The wider location can be seen in Figures 2.1 to 2.3 below.

2.2 Site Description

The site is square with an area of approximately 1,600 m² (40 m x 40 m). There a number of buildings on the Site as described below:

- **Bem Brasil** - a 3 storey traditional load bearing masonry construction
- **La Rosa** - a 3 storey traditional load bearing masonry construction
- **Golden Tandoori** - 3 storey traditional load bearing masonry construction
- **Houldsworth Street North Units** - typically 5 storey with load bearing masonry facades
- **Little Ancoats Street North Units** - a 4 storey traditional load bearing masonry building with a single storey basement
- **Little Ancoats Street Central units** - one and two storey infill buildings
- **Mob Burgers** - 3 storey traditional load bearing masonry construction with a partial basement below
- **Little Ancoats Street South Units** - a 2 storey traditional load bearing masonry construction



Figure 2.1 Site Location (StreetMap)



Figure 2.2 Site Location (Google Earth)

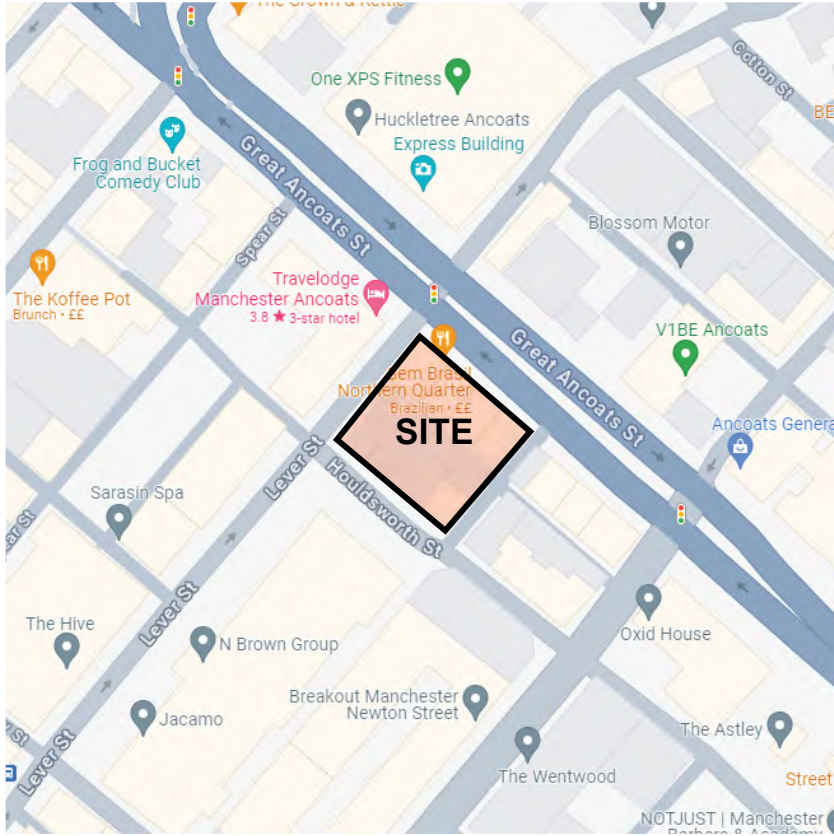


Figure 2.3 Site Location (Google Maps)

3 Proposed Development

The project involves the part-retention, conversion and extension of existing buildings; selective demolition; the erection of a ground floor + 17 storey building comprising new office space (Use Class E) with ground floor reception area and ancillary uses; supporting infrastructure and ancillary facilities, roof top plant, and landscaping.

- The basement levels will house plant, cycle storage and changing / shower facilities.
- Ground floor to Level 17 will comprise office space.
- Level 18 contains roof plant

Figures 3.1 to 3.5 give an indication of the proposals.

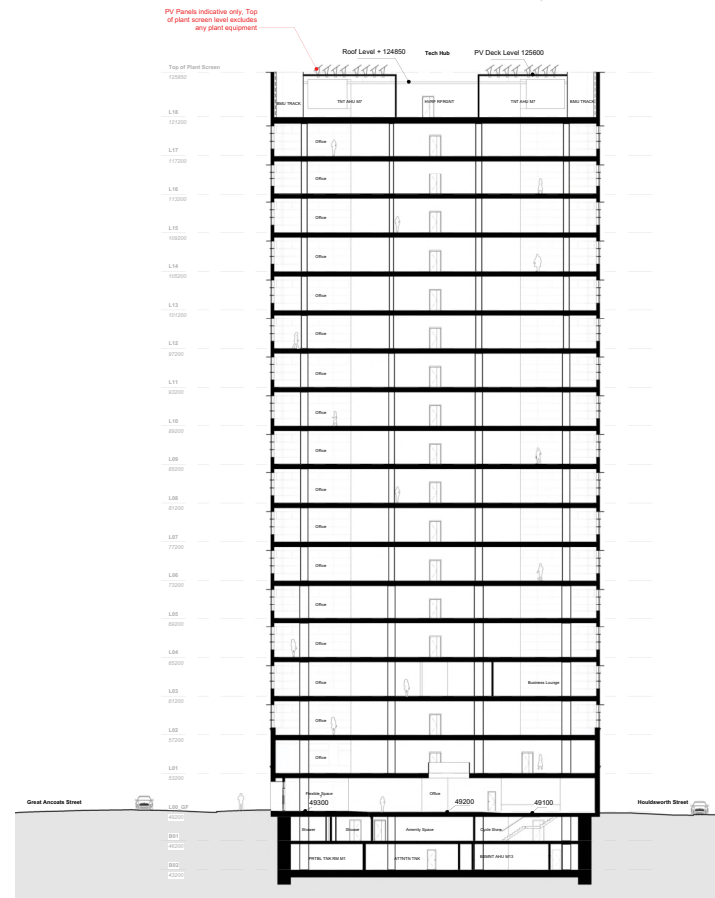


Figure 3.4 Proposed Section (North - South)

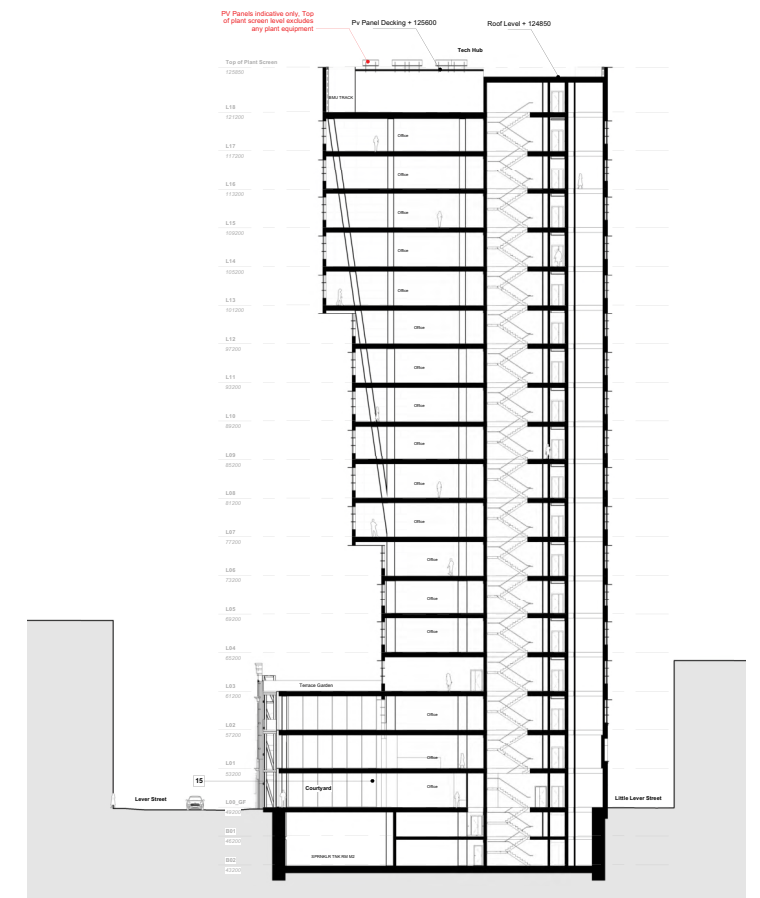


Figure 3.5 Proposed Section (East - West)

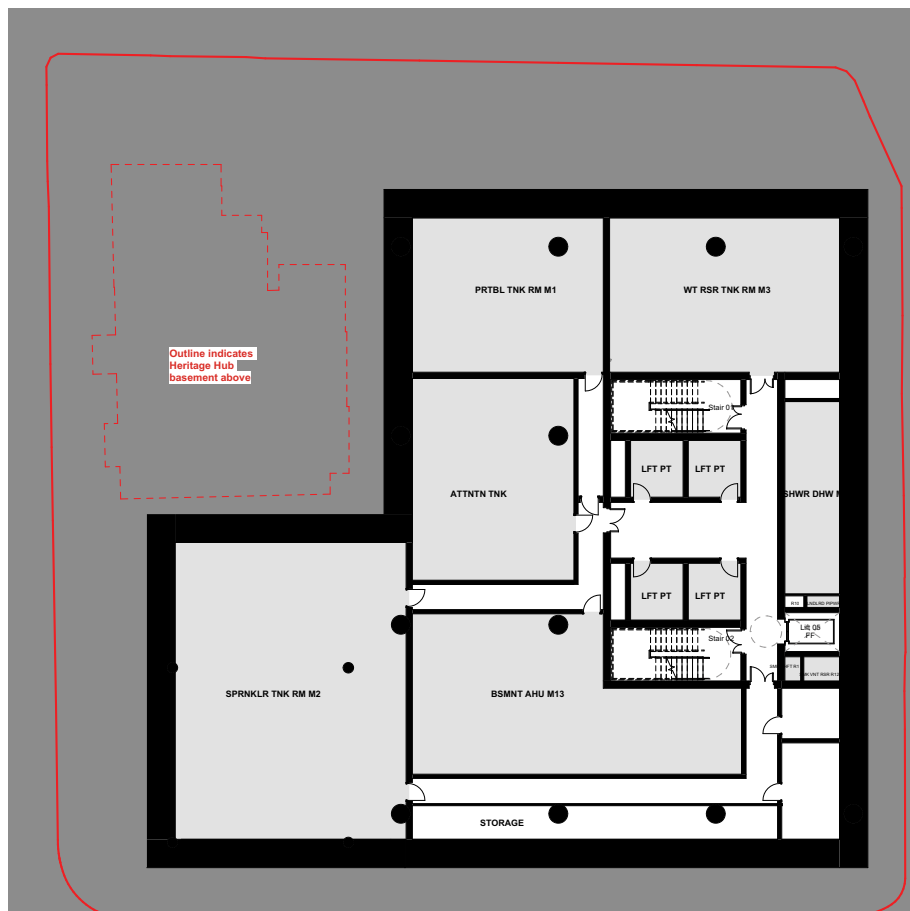


Figure 3.1 Proposed Basement Boz Level

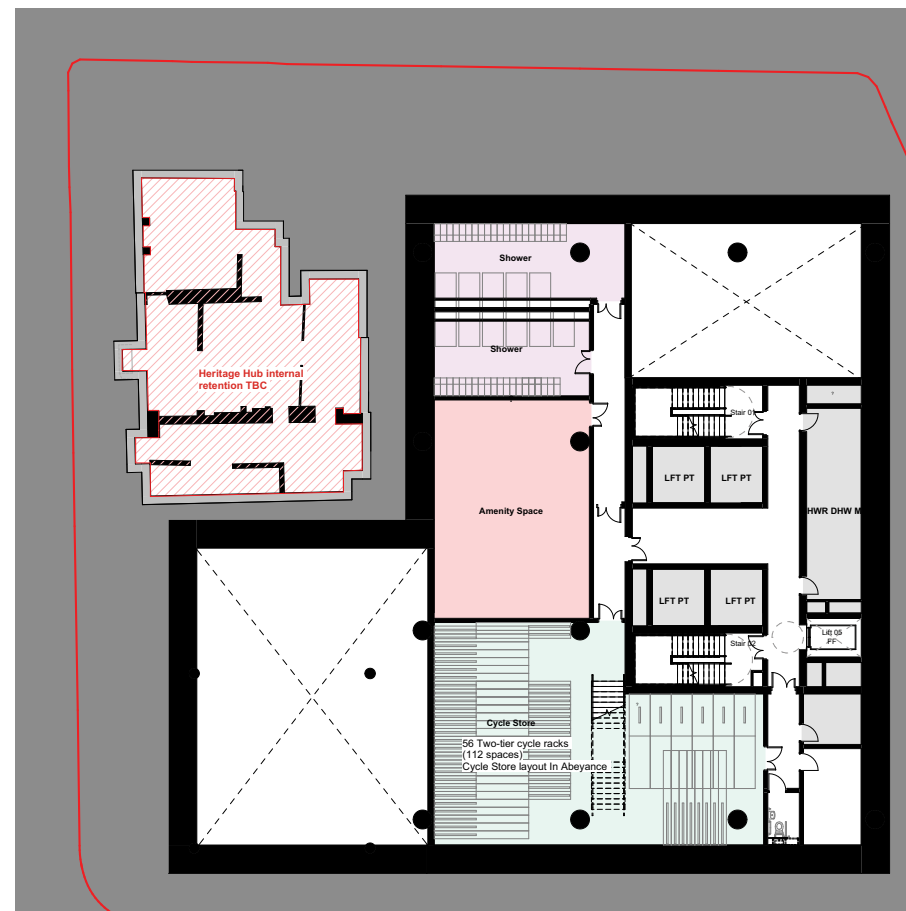


Figure 3.2 Proposed Basement Bo1 Level

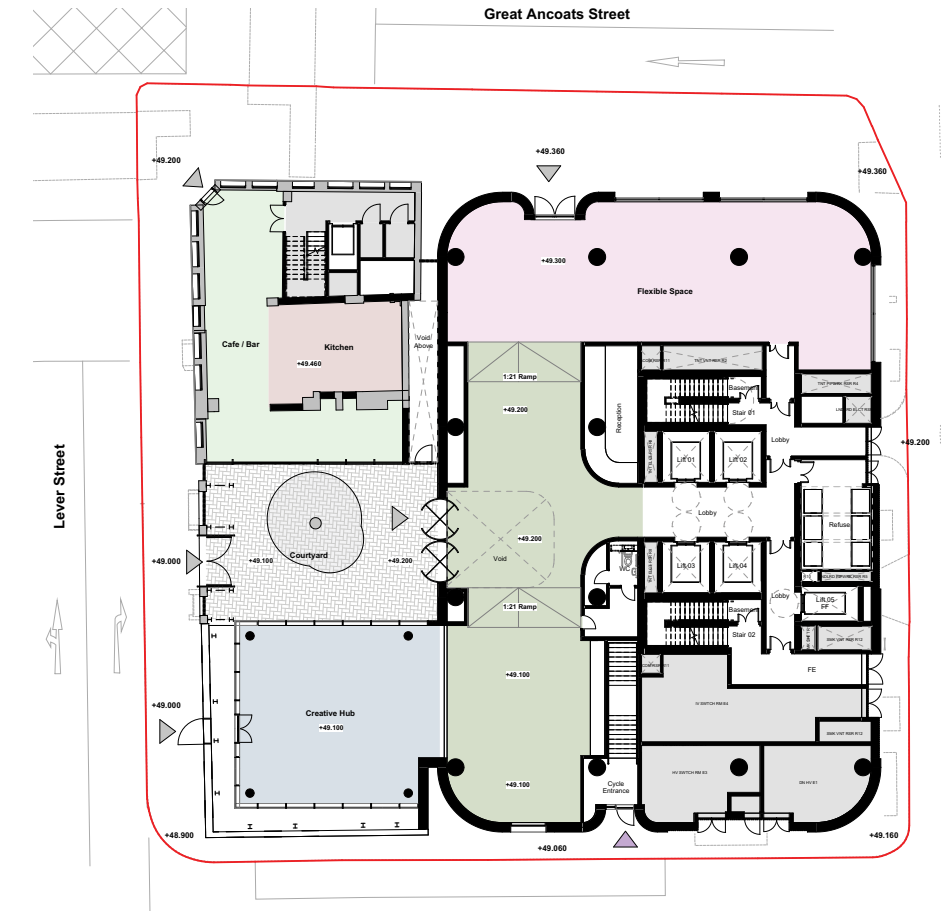


Figure 3.3 Proposed Ground Floor Layout

4 Requirements of National Planning Policy Framework (NPPF)

4.1 Summary

The National Planning Policy Framework (NPPF) has superseded Planning Policy Statement 25 “Development and Flood Risk” (PPS 25) although the requirements and goals remain essentially the same:

- The susceptibility of land to flooding is a material planning consideration;
- The Environment Agency has the lead role in providing advice on flood issues, at a strategic level and in relation to planning applications;
- Planning decisions should apply the precautionary principle to the issue of flood risk, using a risk-based search sequence to avoid inappropriate development on undeveloped and undefended flood plains etc. ;
- Developers should fund flood defences and warning measures required because of the development;
- Planning policies and decisions should recognise that the consideration of flood risk and its management needs to be applied on a whole-catchment basis and not only be restricted to flood plains.

With regard to the NPPF, those proposing particular developments are responsible for:

- Providing an assessment of whether any proposed development is likely to be affected by flooding and whether it will increase flood risk elsewhere and the measures proposed to deal with these effects and risks and;
- Satisfying the local planning authority that any flood risk to the development or additional risk arising from the proposal will be successfully managed with the minimum environmental effect thus ensuring the safe development and secure future occupancy of the site.

After this has been addressed, it is then the local planning authority’s responsibility (advised as necessary by the Environment Agency) to determine an application for planning permission after taking into account all material considerations, including the issue of flood risk and how it might be managed or mitigated. Local planning authorities are required to adopt a risk-based approach to proposals for development in flood risk areas. The assessment of risk should take into account:

- The area liable to flooding;
- The probability of it occurring, both now and over time;
- The extent and standard of existing flood defences and their effectiveness over time;
- The likely depth of flooding;
- The rates of flow likely to be involved; and
- The nature of the development proposed and the extent to which it is designed to deal with flood risk.

Local planning authorities in conjunction with the Environment Agency are responsible for determining that the threat of flooding should be managed. This is to ensure that the development is and remains safe throughout its lifetime (i.e. it has an appropriate degree of protection) and does not increase flood risk elsewhere.

Following flooding in December 2000 the Environment Agency (EA) provided indicative flood plain maps to all authorities and published them on the EA website. In addition to these indicative maps (following a national programme adopted by the Agency in 1996), detailed data and maps for priority areas at risk are available, to provide precise information for building developments.

The Government looks to local planning authorities under the NPPF to apply the risk-based approach to their decisions on development control through a sequential test. Under the test, sites are to be categorised under the following zones.

- 1** Areas with little or no potential risk of flooding (annual probability less than 0.1% for rivers, tidal & coastal). These areas would have no constraints on development other than the need to ensure that the development does not increase run-off from the site to greater than that from the site in its undeveloped or presently developed state. For development proposals on sites located within Flood Zone 1 comprising one hectare or above the vulnerability to flooding from other sources as well as from river and the sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in an FRA.
- 2** Areas with low potential risk of flooding (annual probability between 1.0% - 0.1% for rivers and between 0.5% - 0.1% for tidal & coastal). These areas would be suitable for most developments.
- 3a** Areas with high potential risk of flooding (annual probability greater than 1.0% for rivers and greater than 0.5% for tidal & coastal). These areas will generally be suitable for “Less Vulnerable” uses such as commercial, retail and industrial uses, provided there are adequate flood defences in place, that ensure buildings are designed to resist flooding, there are suitable warning and evacuation procedures in place and the new development does not add to flood risk downstream. “More Vulnerable” uses such as residential, health and education will require the Exception Test to be passed.
- 3b** Areas at highest risk from flooding (including those areas behind defences that offer a standard of defence less than 1% for rivers and less than 0.5% for tidal & coastal or where there is a significant risk that failure could lead to rapid inundation by fast flowing water). These areas may be suitable for recreation, sport and conservation use.

5 Strategic Flood Risk Assessments

Strategic Flood Risk Assessments are produced by Local Authorities in order to form the basis for preparing appropriate policies for flood risk management. The Environment Agency advise that Developers “should consult the Strategic Flood Risk Assessment prepared by your local planning authority” when preparing their design.

The site has been the subject of the Level 1 Strategic Flood Risk Assessment (SFRA) for Greater Manchester initially issued in August 2018 and subsequently updated in March 2019.

The key findings and recommendations from this report relating to the development site are summarised in the following section and have been used to inform the preparation of this site-specific flood risk assessment. For reference, a set of maps produced for the SFRA are contained within Appendix 1.

5.1 Level 1 SFRA for Greater Manchester

The Greater Manchester Combined Authority commissioned JBA Consulting to undertake an update of their Strategic Flood Risk Assessment and the resulting report was issued in March 2019. The recommendations and mapping from this report forms the basis of the series of Policy Recommendations to be followed by sites across the area and the main points impacting the development site are as follows:

- The site is not located in an area of considerable fluvial risk
- Surface water flood risk is an issue for all of Greater Manchester
- There are no Areas with Critical Drainage Problems (ACDPs) in Greater Manchester
- The site is not at risk from a breach of either the Rochdale Canal or Ashton Canal
- The Lead Local Flood Authority (LLFA) have not recorded any historic flood events on or close to the site

In addition, the following Policy Recommendation must be considered by any new development

- Policy GM-S 5: Flood Risk and the Water Environment
An integrated catchment based approach will be taken to protect the quantity and quality of water bodies and managing flood risk, by:
 - Working with natural processes and adopting a natural flood management approach to slow the speed of water drainage and intercept water pollutants;
 - Locating and designing development so as to minimise the impacts of current and future flood risk, including retrofitting or relocating existing developments, infrastructure and places to increase resilience to flooding;
- Expecting developments to manage surface water runoff through sustainable drainage systems and as close to source as possible (unless demonstrably inappropriate) so as to not exceed greenfield runoff rates or alternative rates specified in district local plans;
- Ensuring that sustainable drainage systems:
 - i. Are designed to provide multifunctional benefits wherever possible, including for water quality, nature conservation and recreation;
 - ii. Avoid adverse impacts on water quality and any possibility of discharging hazardous substances to ground;
 - iii. Are delivered in a holistic and integrated manner, including on larger sites split into different phases and
 - iv. Are managed and maintained appropriately to ensure their proper functioning over the lifetime of the development

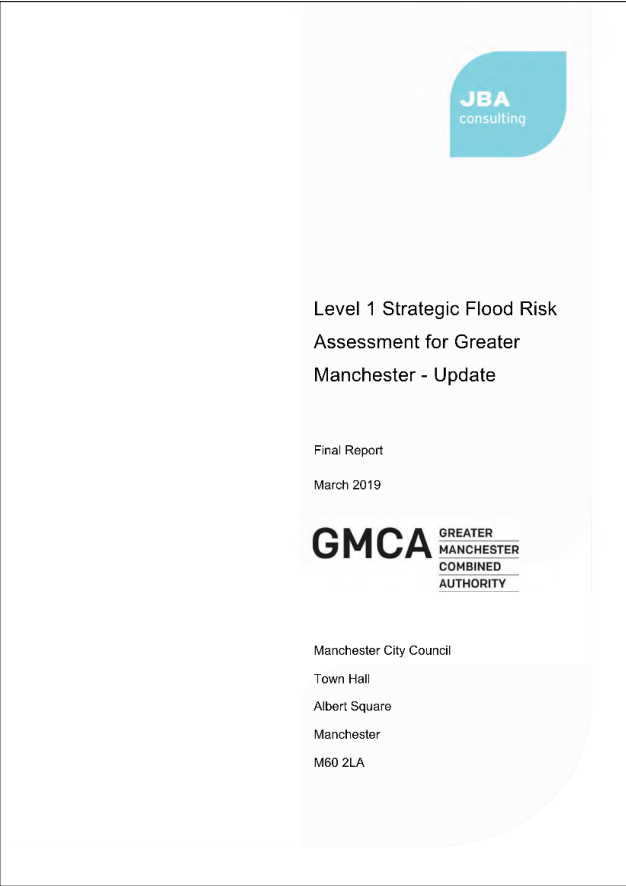


Figure 5.1 Greater Manchester Level 1 Strategic Flood Risk Assessment

6 Sources of Flooding

In accordance with the NPPF, it is a requirement to assess the flood risk to the site from all potential sources. For the purposes of this assessment this has been broken down into five potential sources:

- Flooding from rivers and sea
- Flooding from sewers
- Flooding from groundwater
- Flooding from artificial sources (e.g. reservoirs and canals)
- Flooding from surface water

These sources are discussed and assessed in more detail in Sections 6.2 to 6.6 below.

Essential infrastructure <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• Police stations, ambulance stations and fire stations and command centres and 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 <ul style="list-style-type: none">• 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, <i>subject to a specific warning and evacuation plan.</i>
Less vulnerable <ul style="list-style-type: none">• Police, ambulance and fire stations which are not required to be operational during flooding.• Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", 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 <ul style="list-style-type: none">• 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 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, <i>subject to a specific warning and evacuation plan.</i>

Figure 6.1 National Planning Policy Framework: Table 2 - Flood Risk Vulnerability Classification

6.1 Sequential Test

A risk-based Sequential test should be applied at all stages of the planning process. The aim is to steer developments to areas at the lowest probability of flooding (i.e. to Flood Zone 1).

Based on the Environment Agency's "Flood Map for Planning (Rivers and Sea)" (refer to Figure 6.3), the site is located entirely within Flood Zone 1- an area assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%). The Greater Manchester Combined Authority SFRA also states that the site is located within Flood Zone 1.

The development will accommodate office space at ground floor level and above with plant and back of house facilities in the basement. There will also be a food and beverage offering at ground floor. In accordance with NPPF Table 2 (refer to Figure 6.1), these uses are classified as 'less vulnerable'.

Referring to NPPF Table 3 (shown below in Figure 6.2) "less vulnerable" land uses are suitable in Flood Zones 1, 2 and 3a. As the whole site is classified as being within Flood Zone 1, the proposed land use is therefore acceptable on the site and the Sequential Test has been passed.

Legend

Flood Zone 3

Flood Zone 2

Flood Zone 1

Flood Defences

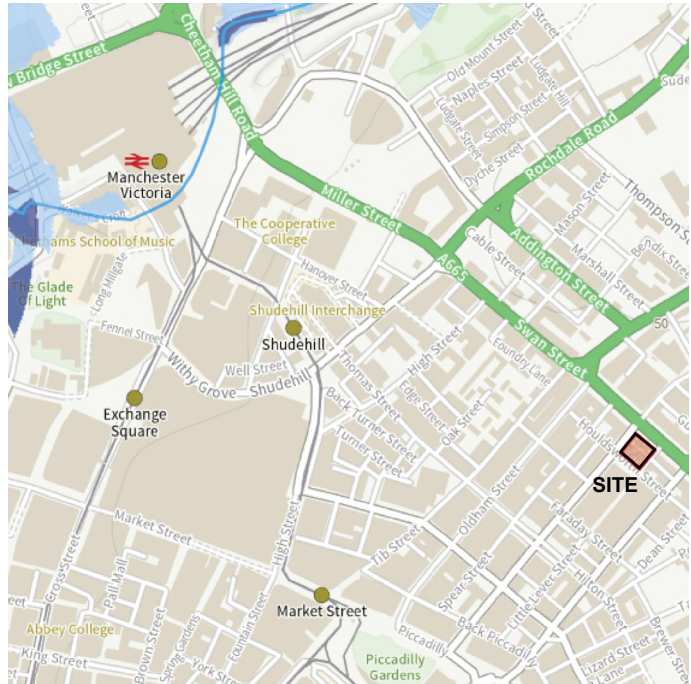


Figure 6.3 Environment Agency Flood Map for Planning

6.2 Flooding from Rivers and Sea

Fluvial flooding is caused by rivers, watercourses or ditches overflowing. Tidal flooding is caused by elevated sea levels or overtopping by wave action. In estuarine areas such as London, flooding might arise from either fluvial or tidal flooding, or a combination of the two.

Based on the Environment Agency's "Flood Map for Planning (Rivers and Sea)" (refer to Figure 6.4), the site is located entirely within Flood Zone 1- an area assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).

The Greater Manchester SFRA maps also confirm that the site is located in Zone 1 (refer to Appendix 1).

Using all the available evidence it is therefore considered that the site has a **very low** probability of flooding from fluvial and tidal sources.

Flood Risk vulnerability classification (see Table 2)		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

Figure 6.2 National Planning Policy Framework: Table 3 - Flood Risk Vulnerability and Flood Zone "Compatibility"

Very Low Risk

Low Risk

Medium Risk

High Risk



Figure 6.4 Environment Agency Flood Map for Rivers and Sea

6.3 Flooding from Sewers

Sewer and highway drainage flooding occurs when the capacity of systems are exceeded, or the function of the system is impeded (e.g. tide locking), which results in surcharging of the system and water being forced to the surface via gullies, manholes, foul water appliances such as toilets or other dedicated overflows.

The available United Utilities record plans (Figure 6.5) indicate that the closest combined public sewers to the site are:

- A 1550 mm dia. combined sewer running south east to north west and a 100 mm dia. combined sewer running north west to south east in Great Ancoats Street to the east of the site.
- A 600 mm dia. combined sewer running north east to south west in Lever Street to the north west of the site.
- A 600 mm dia. combined sewer running south east to north west in Houldsworth Street to the south west of the site.
- A 100 mm combined sewer running north east to south west in Little Lever Street to the south east of the site.
- A sewer of unspecified size running north west to south east under Little Ancoats Street within the site.

As all the drainage infrastructure in the area is combined, the consequences of sewer flooding are high due to the limited inflow capacity of road drains in the event of an extreme storm. This may be worsened by blocked drains or gullies.

There is no recorded sewer flooding incidents on the site and there is no anecdotal evidence of sewer flooding to the site or it's immediate surrounds.

Using all the available evidence it is therefore considered that the site has a **low** probability of flooding from sewers and the local drainage network, as long as they continue to be adequately maintained.

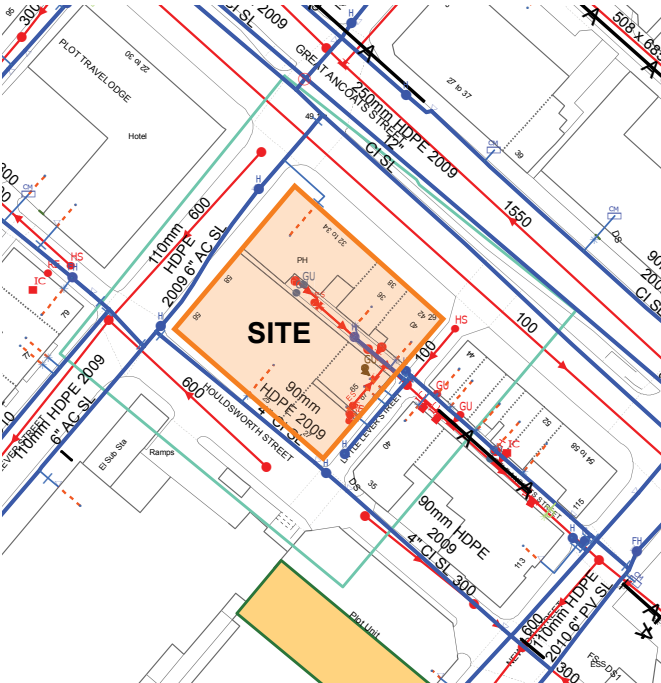


Figure 6.5 United Utilities Asset Record - Sewer and Water Main Map

6.4 Flooding from Groundwater

Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata and is often highly localised and complex. After a prolonged period of rainfall, a considerable rise in the water table can result in inundation for extended periods of time.

The BGS Groundwater Flood map (Fig. 6.6 below) indicates that the site is located within an area with limited potential for Groundwater flooding to occur. The Greater Manchester SFRA also shows the site is not located within an area at risk of groundwater flooding (Drawing No. GW_2.1 in Appendix 1). Also, site investigation works for adjacent sites did not record any groundwater strikes.

It is expected that the soil strata on the site is Made Ground overlying Glacial Till. As the Glacial Till contains firm or stiff clay, it is possible that perched ground water trapped above the clay may be encountered in the development of the new basement. Thus, protection should be offered via an appropriate waterproofing strategy which may include an external tanking membrane, or waterproofing concrete additives.

Based on this evidence, we consider that the site is at **low** risk of flooding from groundwater sources.

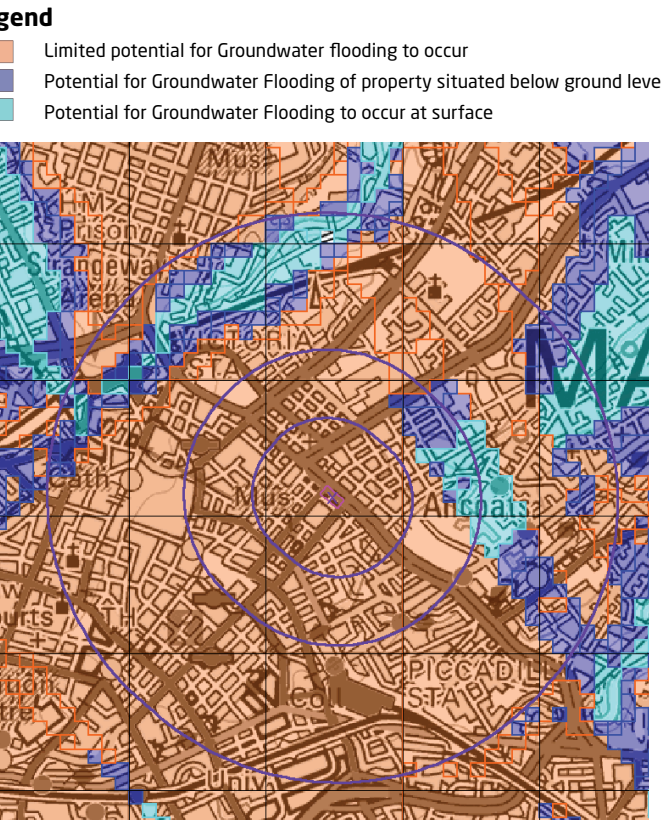


Figure 6.6 BGS Groundwater Susceptibility Map

6.5 Flooding from Artificial Sources

Where infrastructure exists that retains, transmits or controls the flow of water; flooding may result if there is a structural, hydraulic, geotechnical or mechanical failure of the infrastructure.

The United Utilities Asset Map (Figure 6.5) indicates that there are a number of water water mains beneath the roads surrounding the site including:

- Three water mains (4", 12" and 24") running in Great Ancoats Street to the east of the site.
- A 6" water main running in Lever Street to the north west of the site.
- A 4" water main running in Houldsworth Street to the south west of the site.
- A water main of unspecified size running in Little Lever Street to the south east of the site.
- A water main of unspecified size running in Little Ancoats Street within the site.

Although unlikely, a water main can burst at anytime which can result in the flooding of nearby properties. Ongoing upgrading of water mains across Manchester will reduce the probability of water mains bursting and therefore reduce the risk of flooding to the development.



Figure 6.7 Environment Agency Reservoir Flood Map

The topography of the surrounding roads suggests that any flood water from a burst main is likely to follow the road channels and flow north west along Great Ancoats Street and Houldsworth Street and south west along Lever Street and Little Lever Street.

To further reduce the flood risk from water mains, any initial sign of a burst water main should be reported to United Utilities as soon as possible and the local highway drainage system should be adequately maintained.

There are no artificial sources of flooding in the immediate vicinity of the site.

Figure 6.7 shows the Environment Agency's Flood Map for Reservoirs which indicates that the site is not at risk from flooding associated with reservoirs or artificial sources.

The Greater Manchester SFRA also shows the site is not located within an area at risk from reservoir flooding (Drawing No. MM_3.1 in Appendix 1) or from canal flooding (Drawing No. MM_3.2 in Appendix 1).

Based on this information it is therefore considered that the site is at **very low** risk of flooding from artificial sources.

6.6 Flooding from Surface Water

Surface water flooding can occur as a result of either overland flow or ponding. Overland flow occurs following heavy or prolonged rainfall, snow melt, or where intense rainfall is unable to soak into the ground or enter drainage systems due to blockages or capacity issues. Unless it is channelled elsewhere, the run-off travels overland, following the gradient of the land. Ponding occurs as the overland flow reaches low lying areas in the local topography. These flood events tend to have a short duration and depend on a number of factors such as geology, topography, rainfall, saturation, extent of urbanisation and vegetation.

As the surrounding area is highly developed it entirely comprises of impermeable hardstanding area, which, during high intensity storms, will generate large surface water runoff flows.

The Environment Agency's Risk of Flooding from Surface Water map shown in Figure 6.8 indicates that the site is located in an area identified as having a very low risk of surface water flooding. Little Lever Street to the south east has a low risk of flooding but the flooding does not enter the site. Also, the Susceptibility to Surface Water Flooding - Current Scenario and Future Scenario Maps in the Manchester City Council SFRA (Drawing Nos. SS_4.1 F and SS_4.2 F in Appendix 1) do not indicate any surface water flooding in Little Lever Street.

The Environment Agency provide further maps which illustrate the depth of flooding for various flood events with varying probabilities of occurring, ranging from a "high" probability event with a 1 in 30 (3.3%) or greater chance of occurring each year, a "Medium" probability event has between 1 in 30 (3.3%) and a 1 in 100 (1%) chance of occurring and a "Low" probability event has a 1 in 100 (1%) or less of occurring. These maps are shown in Figures 6.9 to 6.14.

Therefore, based on the above information the site is considered to be at **very low** risk of flooding from surface water.



Figure 6.8 Environment Agency's Risk of Flooding from Surface Water Map



Figure 6.9 Environment Agency's Risk of Flooding from Surface Water Map (High Probability - Depth)



Figure 6.11 Environment Agency's Risk of Flooding from Surface Water Map (Medium Probability - Depth)



Figure 6.13 Environment Agency's Risk of Flooding from Surface Water Map (Low Probability - Depth)



Figure 6.10 Environment Agency's Risk of Flooding from Surface Water Map (High Probability - Velocity)

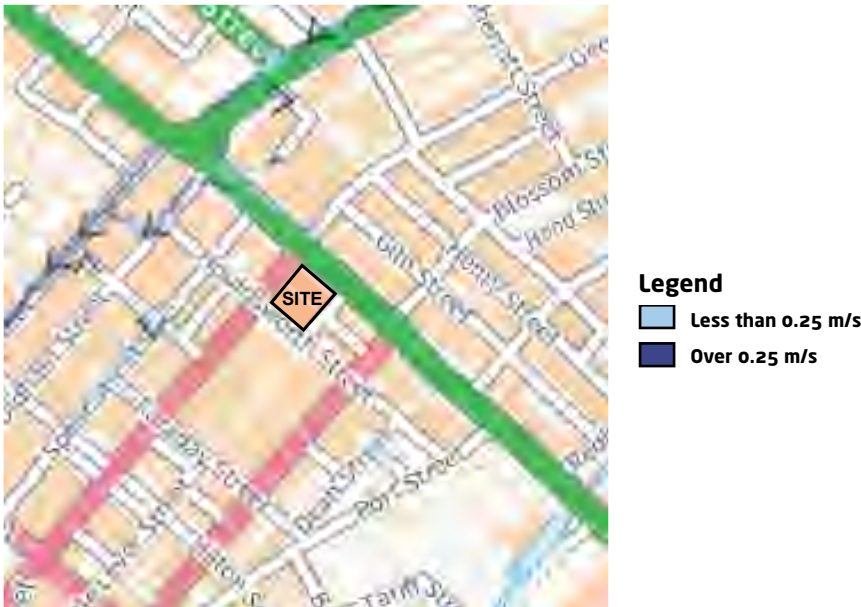


Figure 6.12 Environment Agency's Risk of Flooding from Surface Water Map (Medium Probability - Velocity)

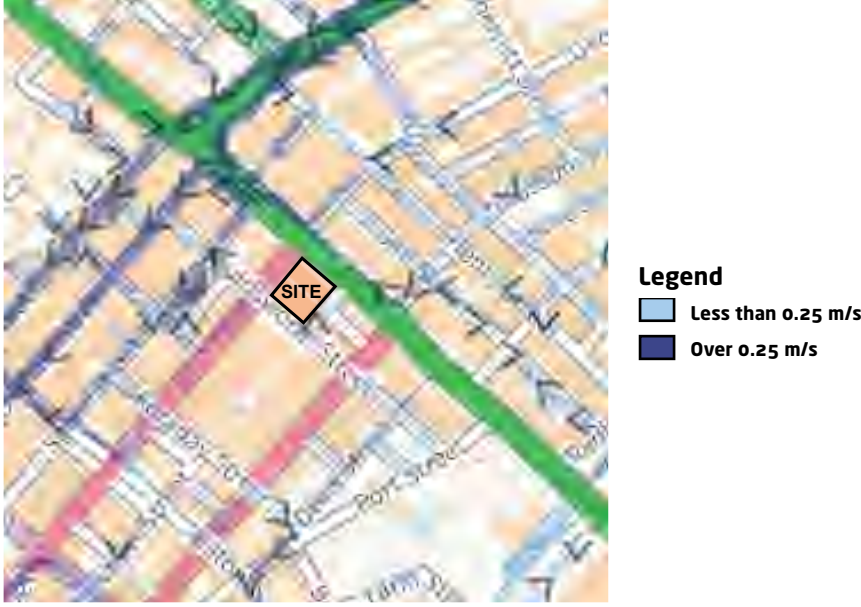


Figure 6.14 Environment Agency's Risk of Flooding from Surface Water Map (Low Probability - Velocity)

6.6.1 Safe Access

In the event that occupiers do wish to leave the site during flood events, the EA and Defra published FD2321/TR2 “Flood Risks to People” in March 2006. Guidance Note 2. Figure 6.15 provides details on combinations of flood depth and velocities that cause danger to people. This table shows that people can become endangered in shallow but fast moving water through to still but deep water.

The occupiers could safely remain in the buildings during any flood in the surrounding area without endangering themselves as there is no flooding within the building footprint.

Should they wish to leave the building, there is dry egress to the west onto Houldsworth Street, north onto Lever Street or east onto Great Ancoats Street (refer to Figure 6.16). Also, comparing the extent of flooding on the EA map to the topographical survey, the maximum depth of water on Little Lever Street would be less than 100 mm and with a velocity less than 0.25 litres/sec and therefore it would also be safe for occupants to leave the building to the south.

	Depth (m)										
	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	
Velocity (m/s)	0.00	0.13	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	1.25
	0.50	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
	1.00	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75
	1.50	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
	2.00	0.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25
	2.50	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
	3.00	0.88	1.75	2.63	3.50	4.38	5.25	6.13	7.00	7.88	8.75
	3.50	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
	4.00	1.13	2.25	3.38	4.50	5.63	6.75	7.88	9.00	10.13	11.25
	4.50	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50
	5.00	1.38	2.75	4.13	5.50	6.88	8.25	9.63	11.00	12.38	13.75

Flood Hazard Rating (HR)	Colour Code	Hazard to People Classification
< 0.75		Very low hazard - Caution
0.75 to 1.25		Danger for some - includes children, the elderly and the infirm
1.25 to 2.00		Danger for most - includes the general public
> 2.00		Danger for all - includes the emergency services

Figure 6.15 FD2321/TR2 “Flood Risk to People” Extract

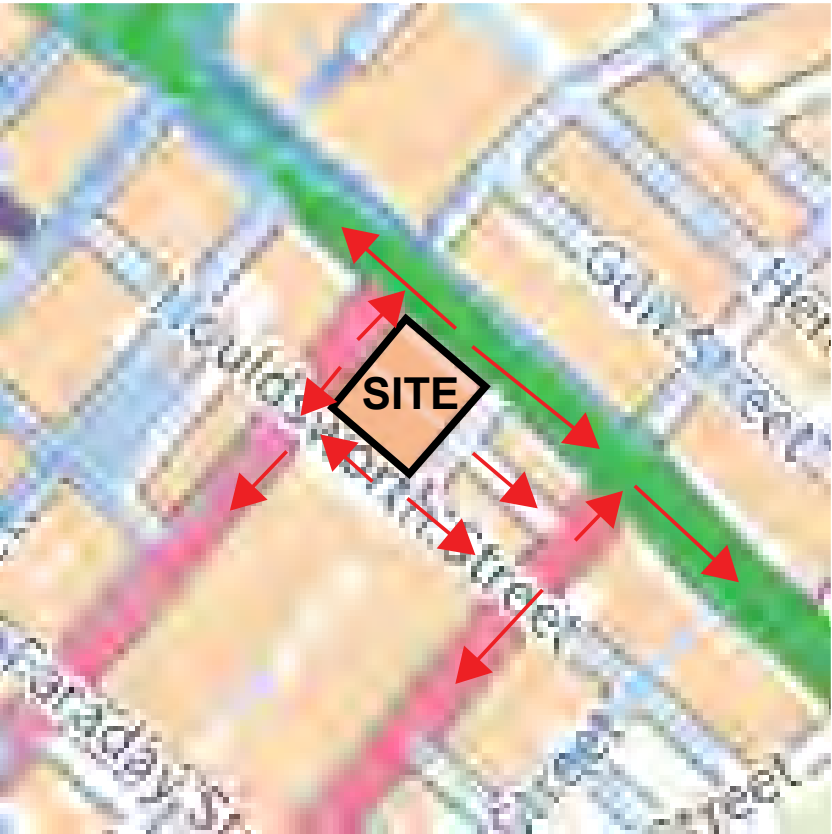


Figure 6.16 Potential Site Egresses During Flood Events

7 Conclusions

- In accordance with the National Planning Policy Framework, we would categorise the site as lying entirely within Flood Zone 1 - an area assessed as having a less than 1 in 1000 annual probability of river or sea and river flooding (<0.1%).
- In accordance with the NPPF, all proposed land uses are acceptable within Flood Zone 1 and therefore the site passes the Sequential Test.
- The site has been assessed as being at **very low risk** of flooding from rivers or tidal sources.
- The site has been assessed as being at **low risk** from surcharging sewers.
- The site has been assessed as being at **low risk** from groundwater sources.
- The site has been assessed as being at **very low risk** from artificial sources.
- The site has been assessed as being at **very low risk** from surface water flooding sources.
- The proposed redevelopment has an acceptable flood risk within the terms and requirements of the National Planning Policy Framework and the Greater Manchester Strategic Flood Risk Assessment.
- In order to reduce the risk from sewer flooding to the site and other properties downstream, and in order to comply with legislative requirements, the existing surface water discharge should be reduced using an appropriate SuDS Strategy.

8 References

Site Specific Documents:

- United Utilities Asset Maps
- Environment Agency Flood Risk Maps

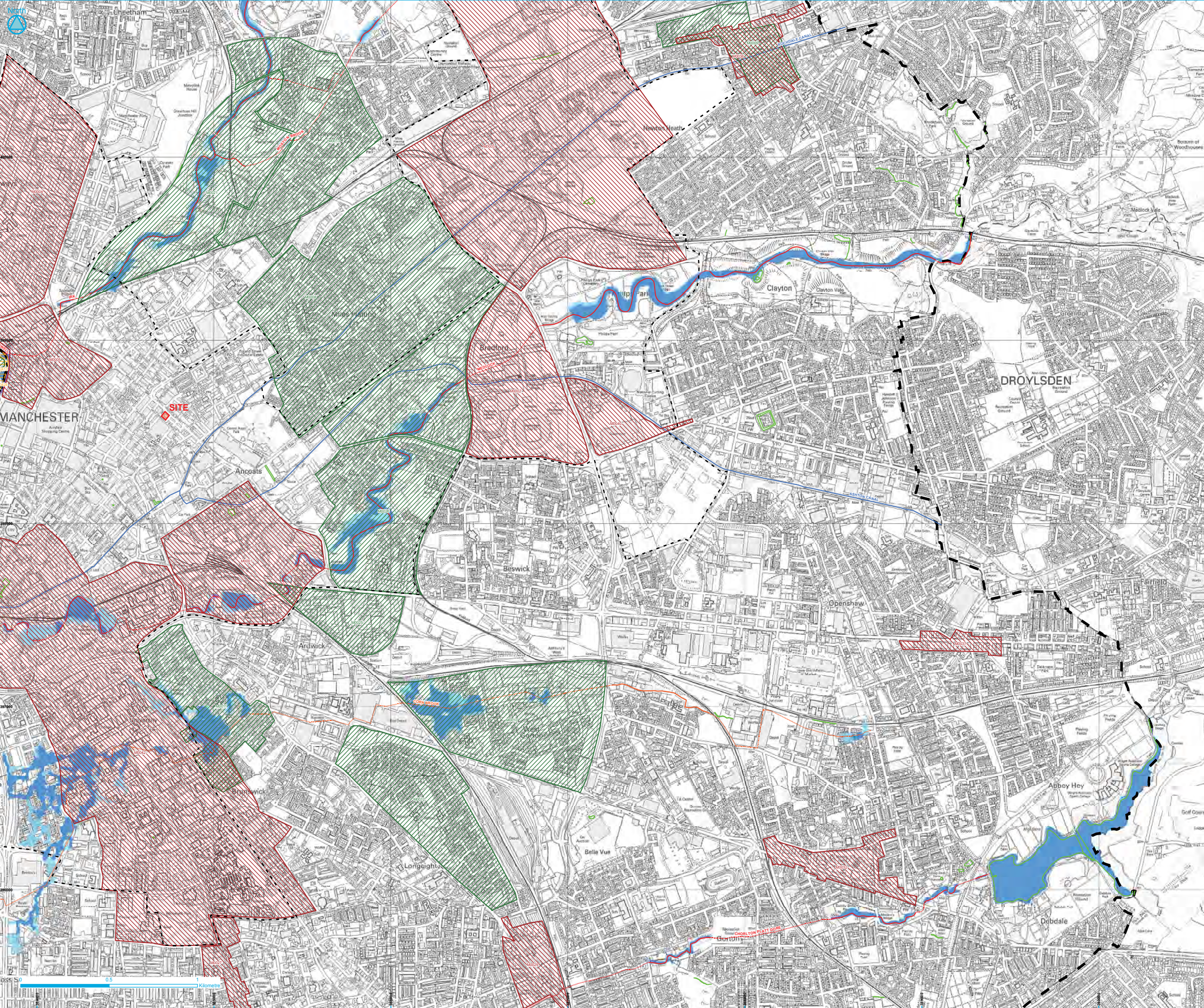
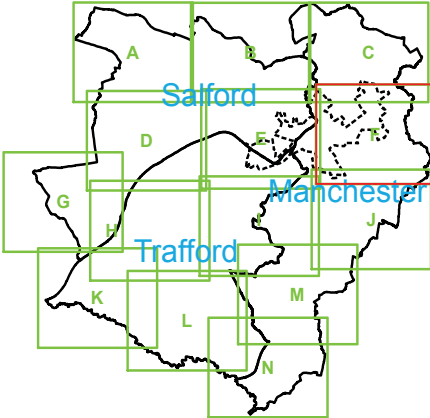
Technical Guidance and Planning Policy Documents:

- Greater Manchester SFRA dated November 2017
- BS 8533:2011, Assessing and managing flood risk in development: Code of Practice, October 2011
- CIRIA Report C624, Development and flood risk: guidance for the construction industry, 2004
- DEFRA / Environment Agency Flood and Coastal Defence R&D Programme, Phase 2 FD2321/TR1 The Flood Risks to People Methodology, March 2006

Appendix 1

Greater Manchester SFRA Maps





Council Boundary

Fluvial Flood Extent

- 1 in 100 Year
- 1 in 100 Year With Climate Change

Potential Development Sites / Locations

- Employment
- Housing
- Mixed Use
- Other

Regional Centre Boundary

Main Rivers (V8.0)

- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Inwell
- Other Waterbodies

Digitised River Lines

- Culverted
- Open

This map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide.

The map shows estimated flood extents using the modelling outputs produced for this SFRA on the River Inwell, Grey Inwell, Irk, Medlock, Corn Brook, Mersey at Carrington and the Manchester Ship Canal. Beyond the modelled reaches, recent EA modelling or the Flood Zones have been used. Where climate change outlines do not exist, Flood Zone 2 was used as a proxy to represent how flood risk might increase in the future. The SFRA modelled reaches are shown on Figure 1.1 of the Maps Index.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

These maps should be used as an indication of areas in which fluvial flooding may increase in the future. These maps should be used to apply the Sequential Test and are also useful when reviewing which sites may require the Exception Test by Spatial Planners, Development Management and developers in assessing possible future fluvial risks. Emergency planners may also find them useful while designating access and egress routes.

The map should be used to apply the Sequential Test and Exception Test.

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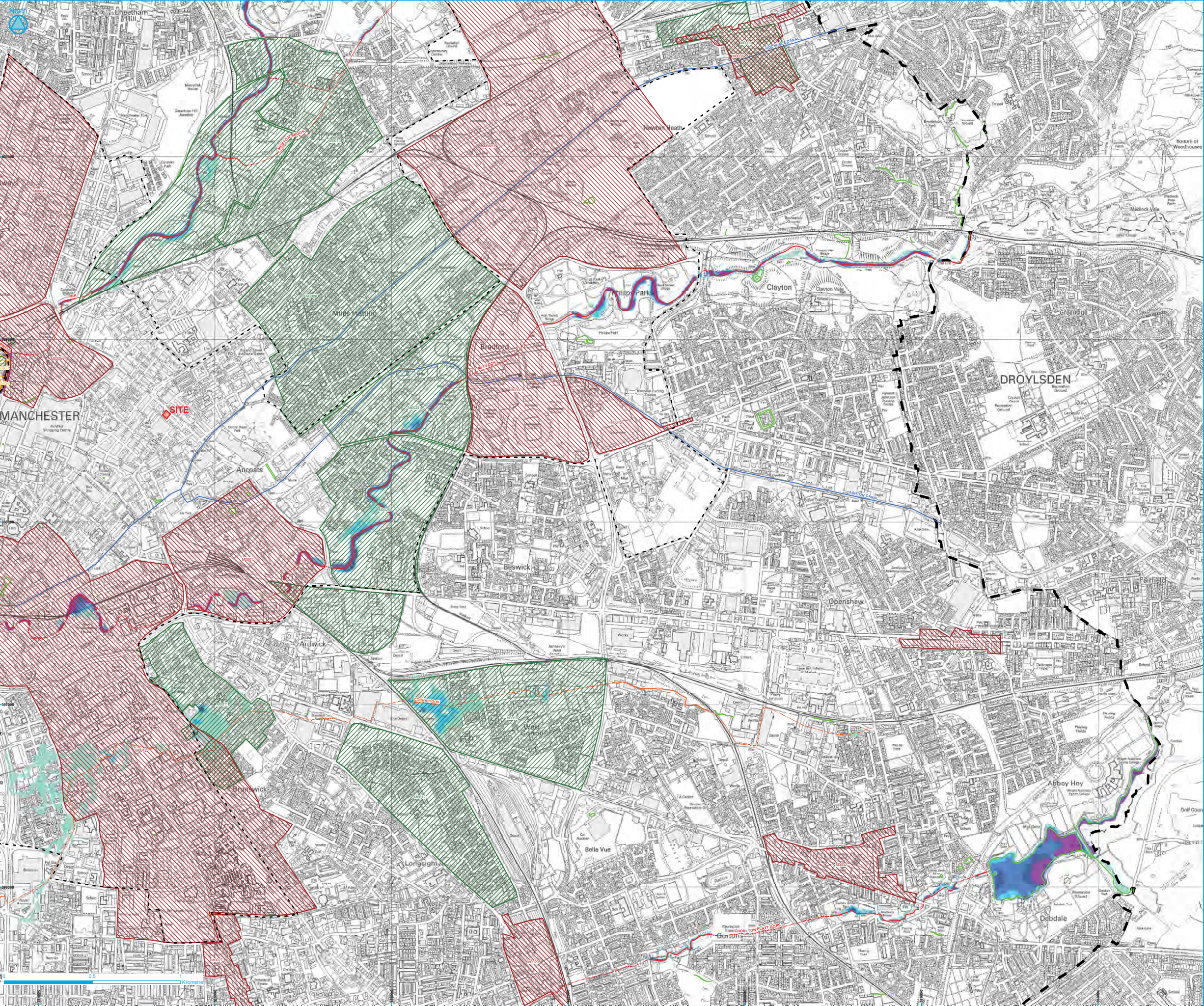
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for

Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

1 in 100 Year and 1 in 100 Year With Climate Change Flood Extents

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Approved by: H O'Callaghan	Date: 22/11/2010	
File Name: _ArcViewMapping\Level2MST_Fluvial_Q100_extent_V1.2.mxd	Status: FINAL	Scale: 1:10,000
Drawing Number: FL_1.3F		Original @ A1



Legend

- Council Boundary**
- Maximum Flood Depth (m)**
 - <0.5
 - 0.5 - 1
 - 1 - 1.5
 - 1.5 - 2
 - >2
- Potential Development Sites / Locations**
 - Employment
 - Housing
 - Mixed Use
 - Other
 - Regional Centre Boundary
- Ashton, Bridgewater and Rochdale Canals**
- Manchester Ship Canal / Grey Irwell**
- Other Waterbodies**
- Main Rivers (V8.0)**
 - Culverted
 - Open
- Digitised River Lines**
 - Culverted
 - Open

This map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide.

The map identifies the estimated flood depths using the modelling outputs produced for this SFRA where this has been undertaken. Outside the modelled reaches this map uses a strategic indication of flood depths within Flood Zone 3. For the Sinderland Brook recently modelled extents are used. This broadscale method has been applied as discussed within the SFRA. The SFRA modelled reaches are shown on Figure 1.1 of the Maps Index.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

The map should be used to apply the Sequential Test and Exception Test.

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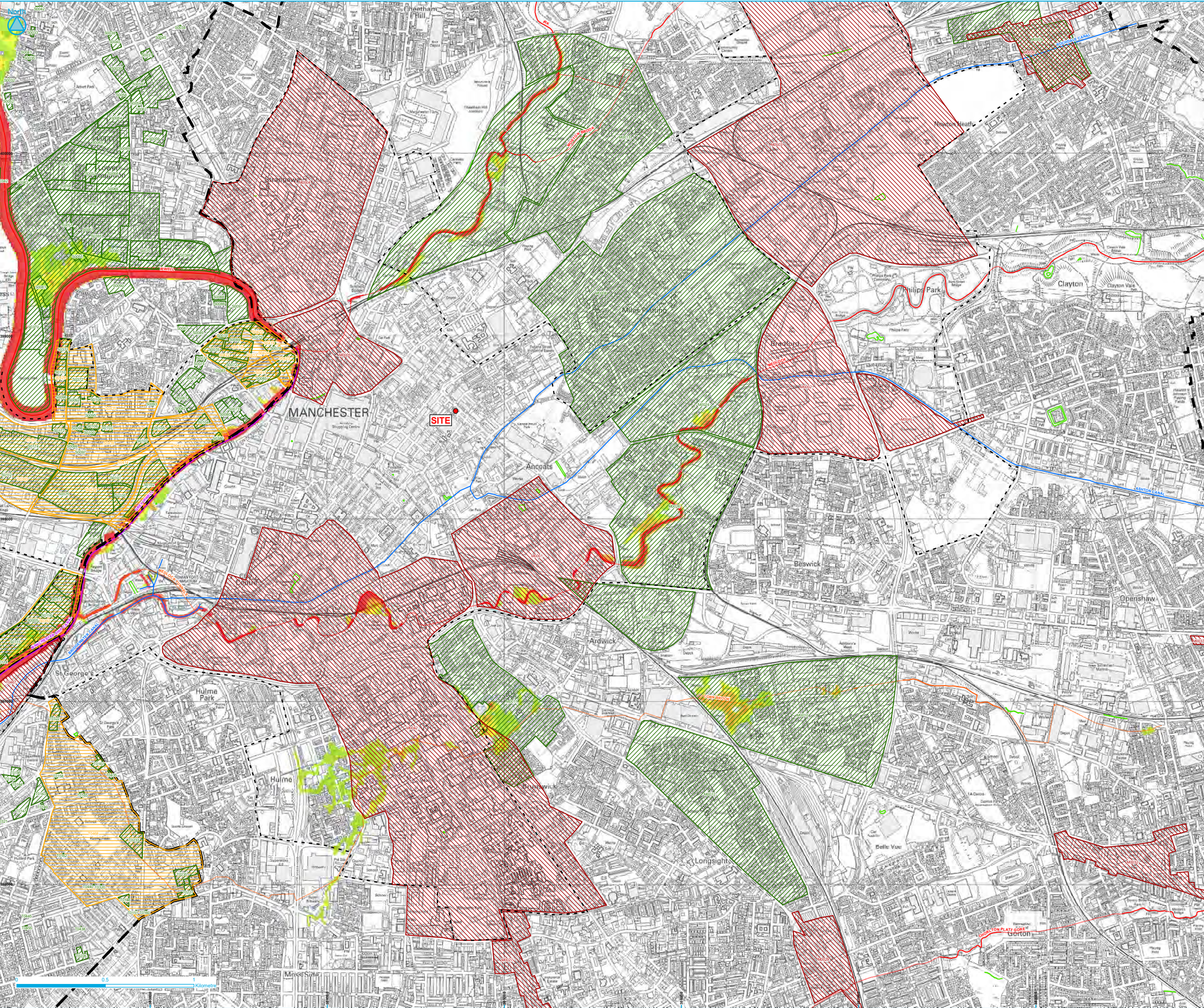
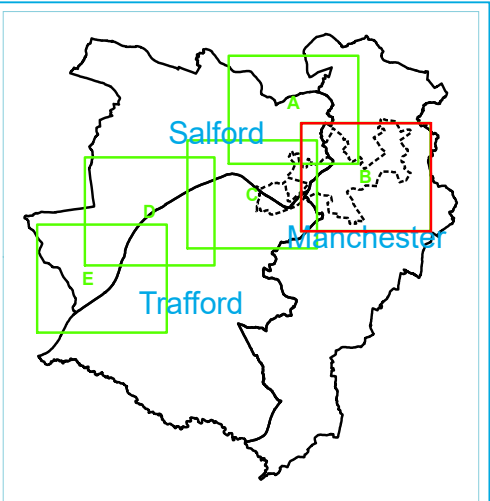
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Fluvial 1 in 100 Year Depths

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Original @ A1



- Council Boundary
- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Inwell
- Other Waterbodies
- Maximum Flood Hazard**
 - Very Low Hazard
 - Dangerous For Some
 - Dangerous For Most
 - Dangerous For All
- Potential Development Sites / Locations**
 - Employment
 - Housing
 - Mixed Use
 - Other
- Regional Centre Boundary
- Main Rivers (V8.0)**
 - Culverted
 - Open
- Digitised River Lines**
 - Culverted
 - Open

This map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide.

The map identifies the estimated flood hazard using the modelling outputs produced for this SFRA. The SFRA modelled reaches are shown on Figure 1.1 of the Maps Index.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

The map should be used to apply the Sequential Test and Exception Test.

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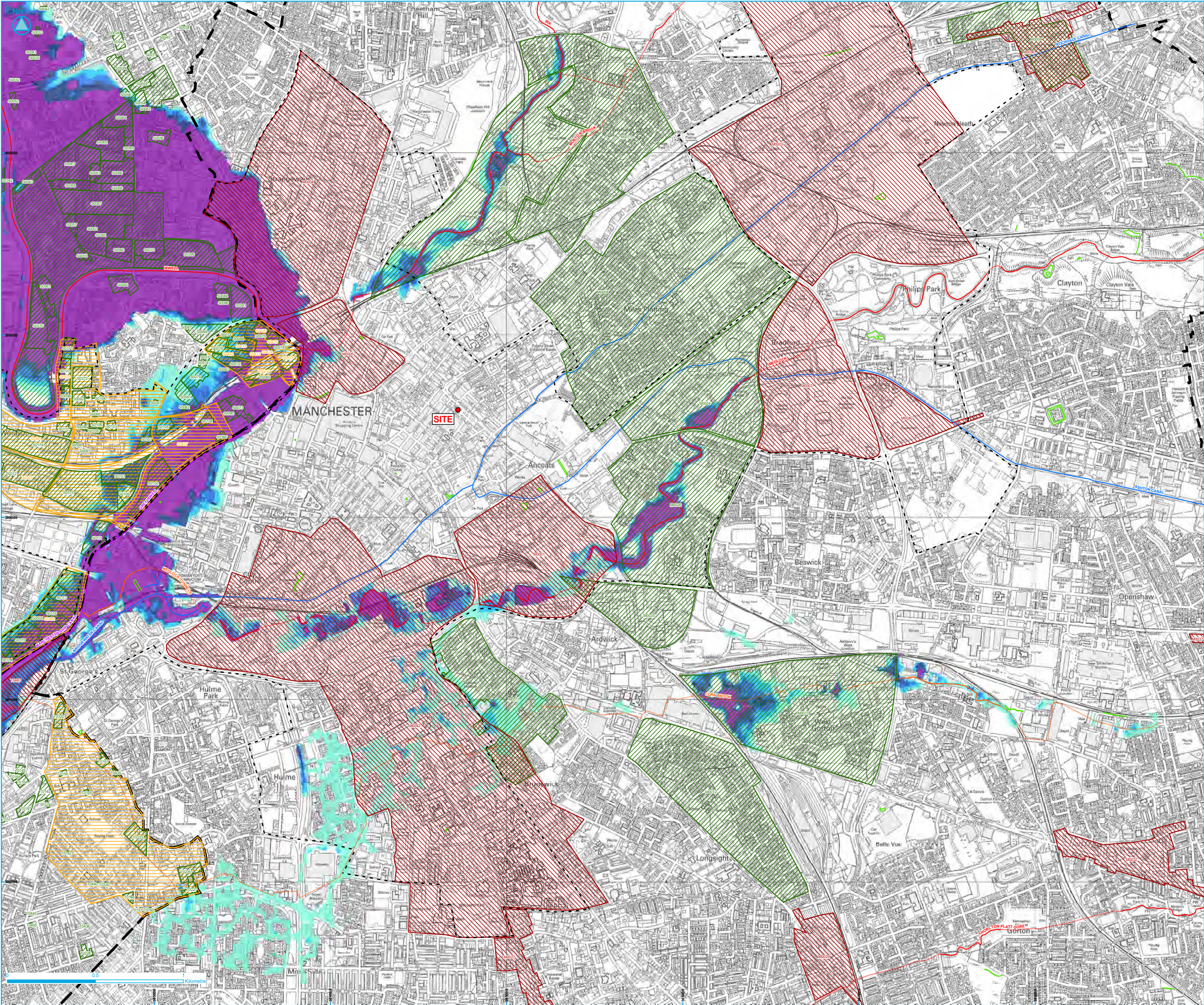
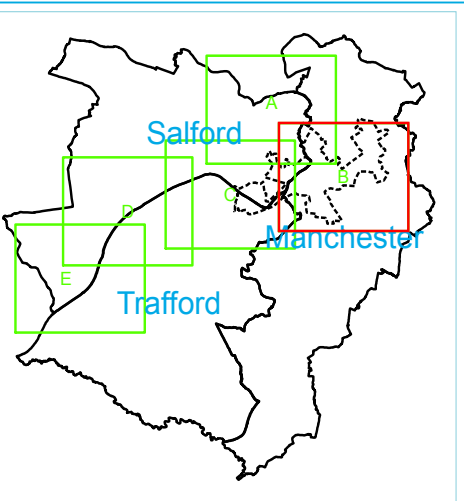
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Fluvial 1 in 100 Year Flood Hazard

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Approved by:	J Cooper	Date:	13/01/2011		
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Original @ A1



- Council Boundary**
- Maximum Flood Depth (m)**
- <0.5
 - 0.5 - 1
 - 1 - 1.5
 - 1.5 - 2
 - >2
- Potential Development Sites / Locations**
- Employment
 - Housing
 - Mixed Use
 - Other
 - Regional Centre Boundary
- Ashton, Bridgewater and Rochdale Canals**
- Manchester Ship Canal / Grey Inwell
 - Other Waterbodies
- Main Rivers (V8.0)**
- Culverted
 - Open
- Digitised River Lines**
- Culverted
 - Open

This map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide.

The map identifies the estimated flood depths using the modelling outputs produced for this SFRA. The SFRA modelled reaches are shown on Figure 1.1 of the Maps Index. The map shows a worst case example and is useful in understanding residual risk to life for an extreme event, considering climate change.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

The map should be used to apply the Sequential Test and Exception Test.

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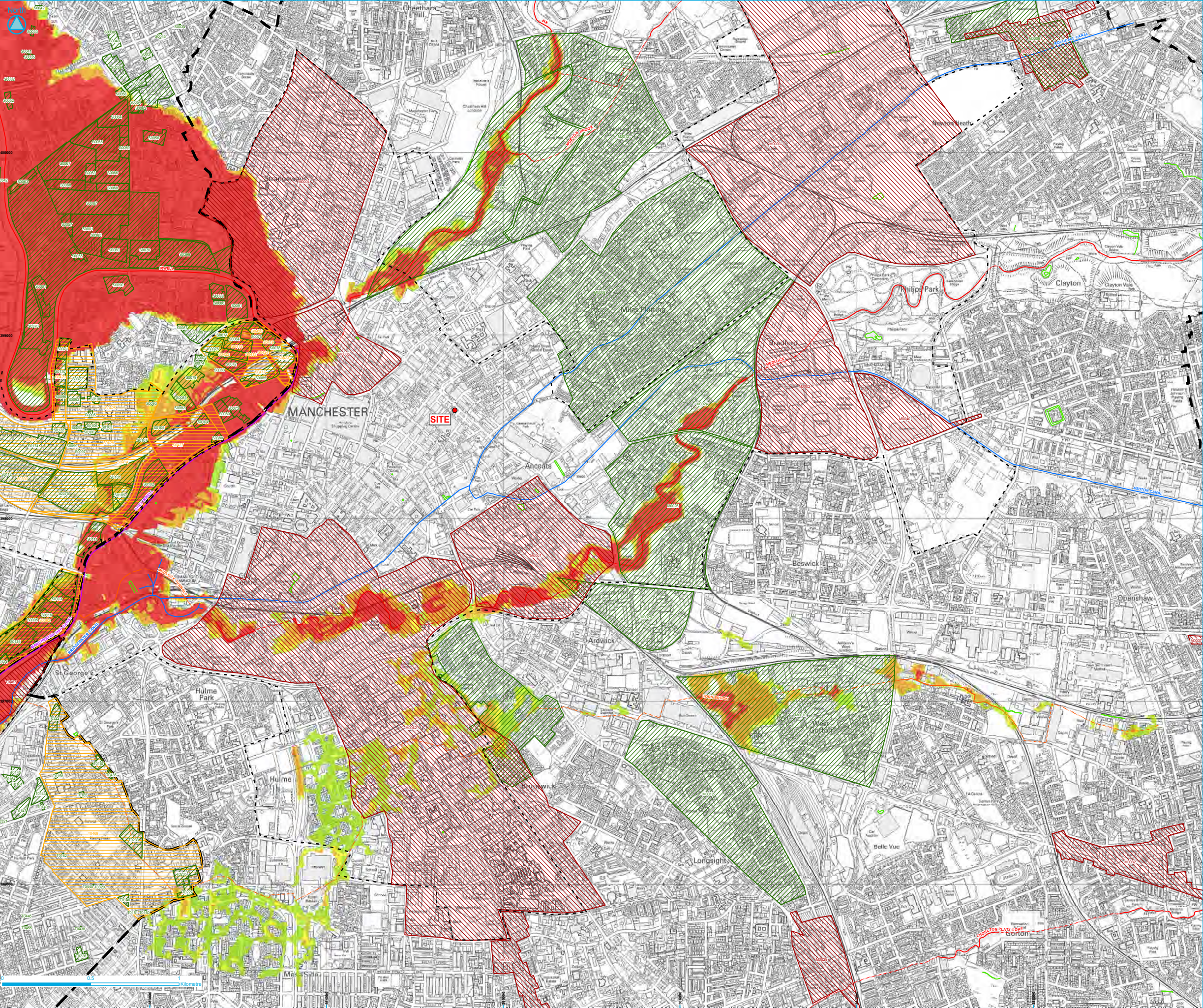
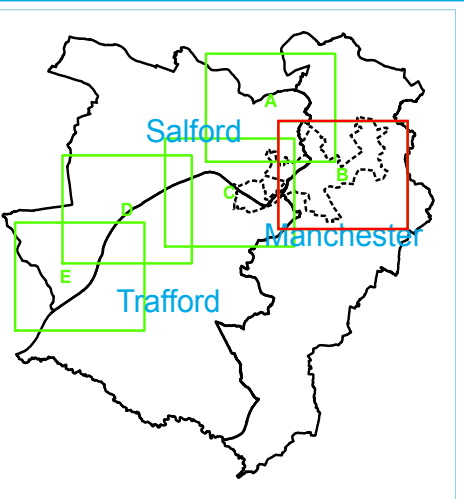
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Fluvial 1 in 1000 Year With Climate Change Flood Depth

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Original @ A1



- Council Boundary**
- Maximum Flood Hazard**
 - Very Low Hazard
 - Dangerous For Some
 - Dangerous For Most
 - Dangerous For All
- Potential Development Sites / Locations**
 - Employment
 - Housing
 - Mixed Use
 - Other
- Regional Centre Boundary**
- Waterbodies**
 - Ashton, Bridgewater and Rochdale Canals
 - Manchester Ship Canal / Grey Inwell
 - Other Waterbodies
- Waterbodies**
 - Culverted
 - Open
- Digitised River Lines**
 - Culverted
 - Open

This map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide.

The map identifies the estimated flood hazards using the modelling outputs produced for this SFRA. The SFRA modelled reaches are shown on Figure 1.1 of the Maps Index. The map shows a worst case example and is useful in understanding residual risk to life for an extreme event, considering climate change.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

The map should be used to apply the Sequential Test and Exception Test.



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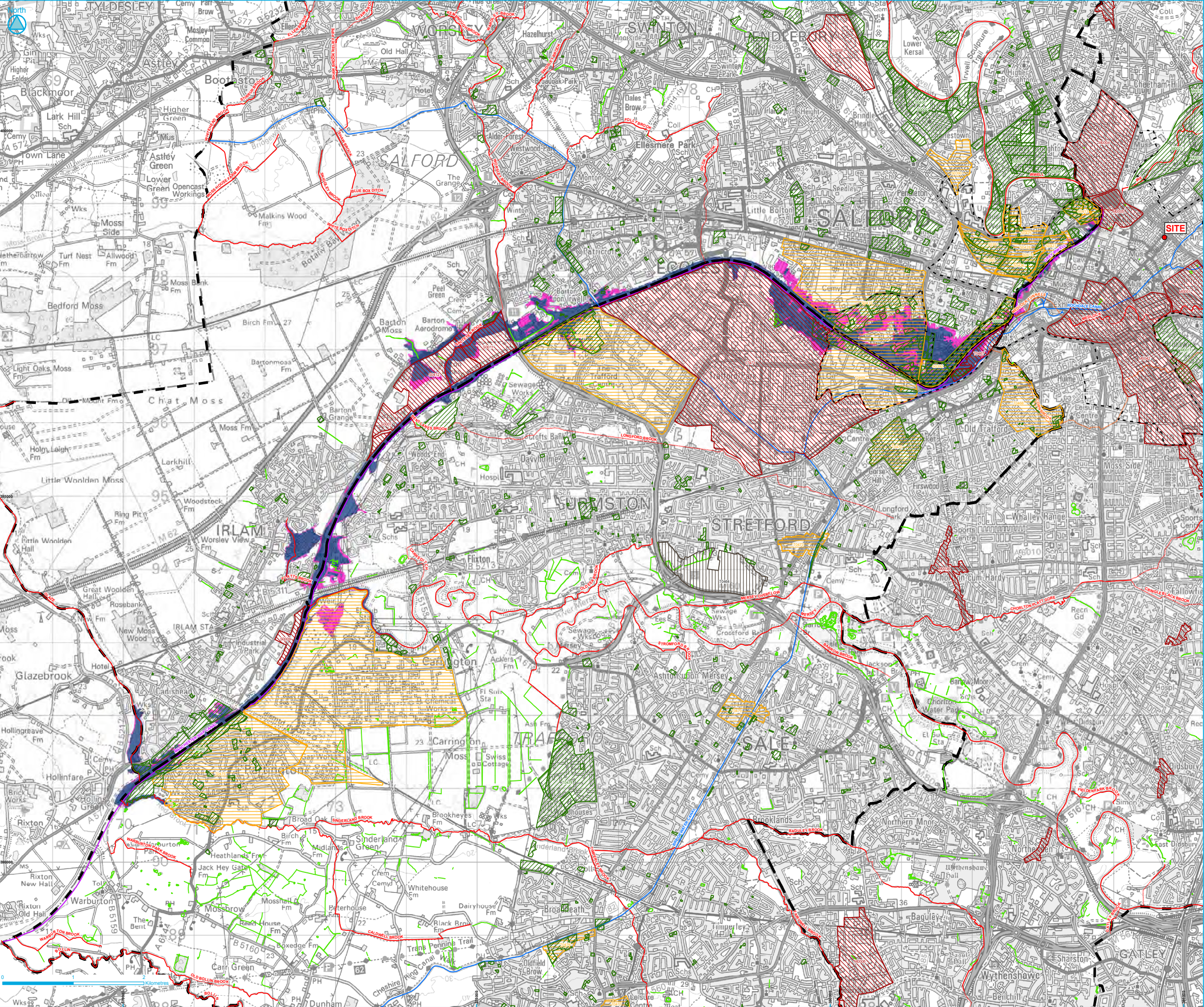
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Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Fluvial 1 in 1000 Year With Climate Change Flood Hazard

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Drawing Number: FL_1.10B	Status: FINAL	Scale: 1:10,000
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- Council Boundary
- Urban Design Thresholds For Resistance & Resilience
 - <0.6 m
 - >0.6 m
- Potential Development Sites / Locations
 - Employment
 - Housing
 - Mixed Use
 - Other
- Regional Centre Boundary
- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Inwell
- Other Waterbodies
- Main Rivers (V8.0)
 - Culverted
 - Open
- Digitised River Lines
 - Culverted
 - Open

This map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide.

Areas at risk from the Manchester Ship Canal and Grey Inwell are currently subject to a wide variation in model results resulting from model uncertainties. Hence urban design response needs to adopt a mix of non-structural resilience measures and/or floor level raising to account for the high degree of uncertainty associated with a residual risk.

The Main River information shown in the SFRA is provided by the Environment Agency, the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

This map shows typical urban design approaches that would be applicable to areas of residual flood risk. The design thresholds used to identify where resistance and resilience are potentially applicable are based on flood depths expected in a 1 in 100 yr event with an allowance for climate change and the adopted flood risk scenario for operation of the Manchester Ship Canal. This map should be used in conjunction with the advice given in Chapter 9 of the Level 2 SFRA.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

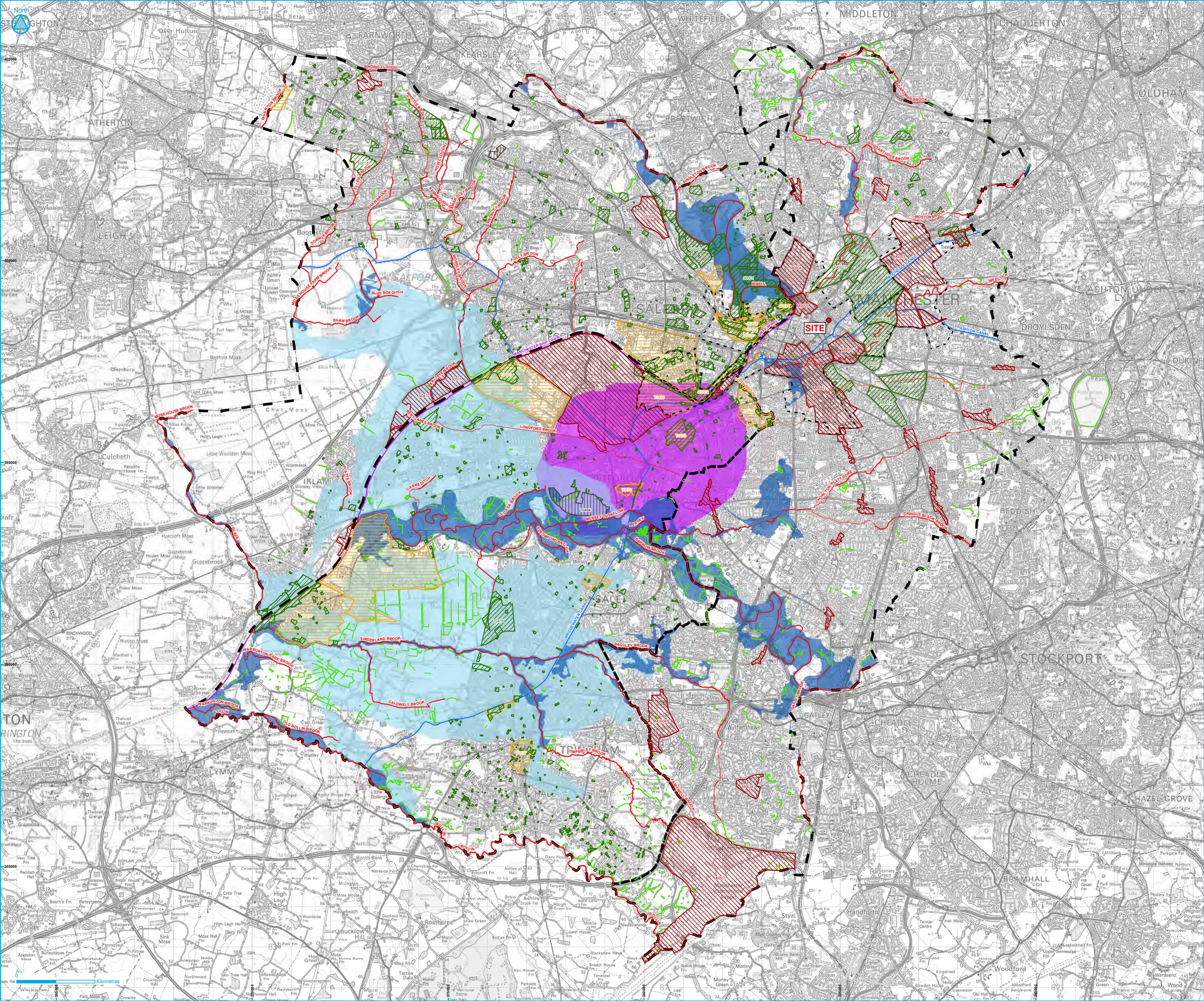
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Urban Design Zoning for the Manchester Ship Canal and Grey Inwell

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File Name: ArcView\Mapping\level2\MST_MSC_UrbanDesignZoning_V1.3.mxd		
Drawing Number: FL_1.15	Status: FINAL	Scale: 1:25,000
Original @ A1		



- Council Boundary**
- Groundwater Issue**
 - Areas at risk of GW Flooding
 - Areas of shallow GW
 - Areas at risk of GW rebound
- Potential Development Sites / Locations**
 - Employment
 - Housing
 - Mixed Use
 - Other
- Regional Centre Boundary**
- Ashton, Bridgewater and Rochdale Canals**
- Manchester Ship Canal / Grey Inwell**
- Other Waterbodies**
- Main Rivers (V8.0)**
 - Culverted
 - Open
- Digitised River Lines**
 - Culverted
 - Open

The map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide. This map shows areas that are potentially at risk from groundwater flooding and should be used to scope suitable mitigation measures in a site specific Flood Risk Assessment.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The information on the map is based on Environment Agency potential groundwater rebound areas, data from the Coal Authority, BGS drift geology mapping and Defra Groundwater Emergence Maps.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.



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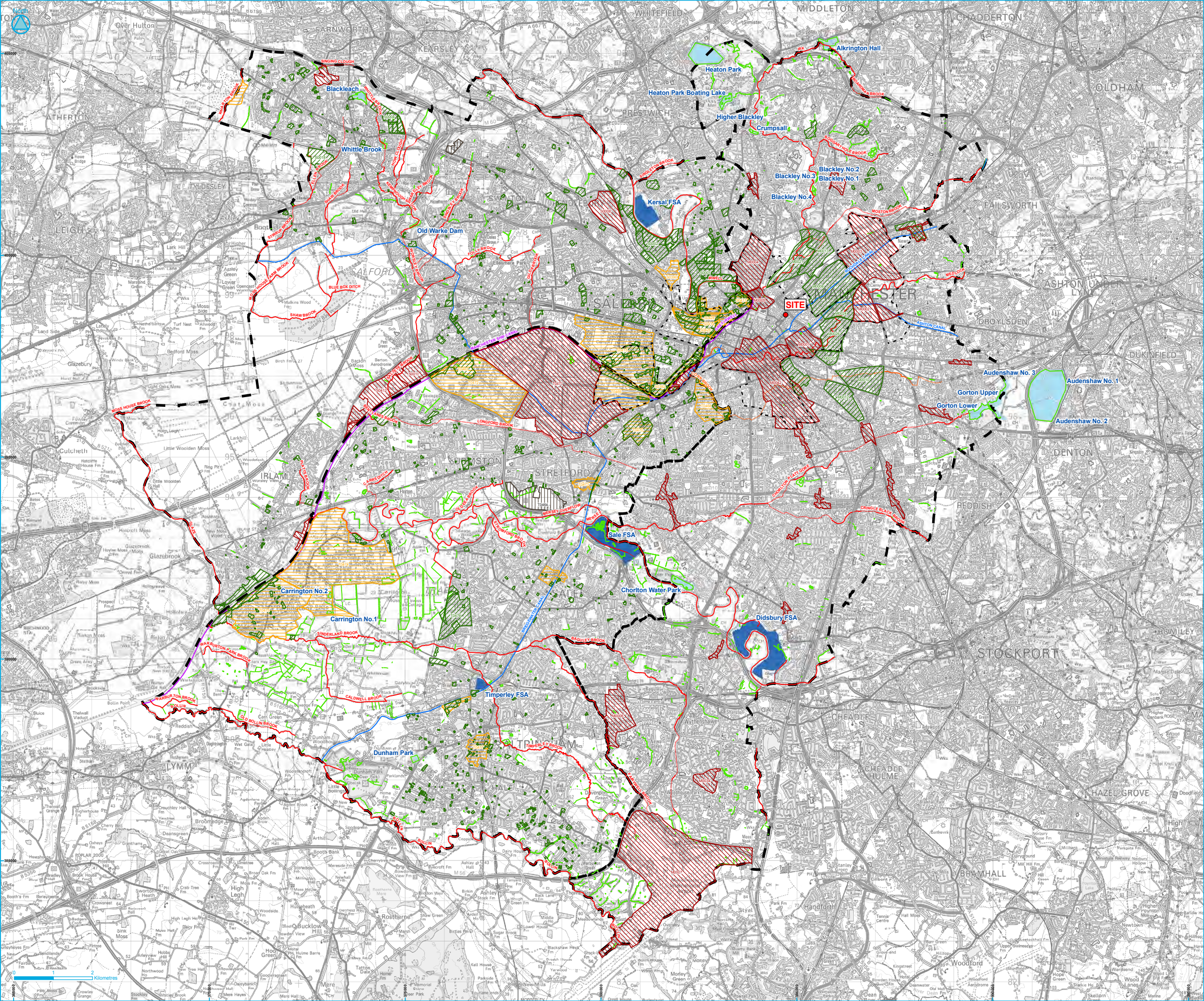


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Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Groundwater Flooding

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		Original @ A1



Salford

Manchester

Trafford

Legend

Council Boundary

- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Inwell
- Other Waterbodies

Reservoirs

- Flood Storage Area
- Reservoir

Potential Development Sites / Locations

- Employment
- Housing
- Mixed Use
- Other

Main Rivers (V8.0)

- Culverted
- Open

Digitised River Lines

- Culverted
- Open

Regional Centre Boundary

This map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide. The reservoirs within and near to proposed development sites have been mapped to show their location only. The information is based on OS MasterMap and data gathered in the AGMA Sub-regional Level 1 SFRA.

The Main River information shown in the SFRA is provided by the Environment Agency, the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

This map should not influence the spatial placement of development during the Sequential Test, however, it should inform the need for emergency planning to take account of the risk within community plans.

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Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

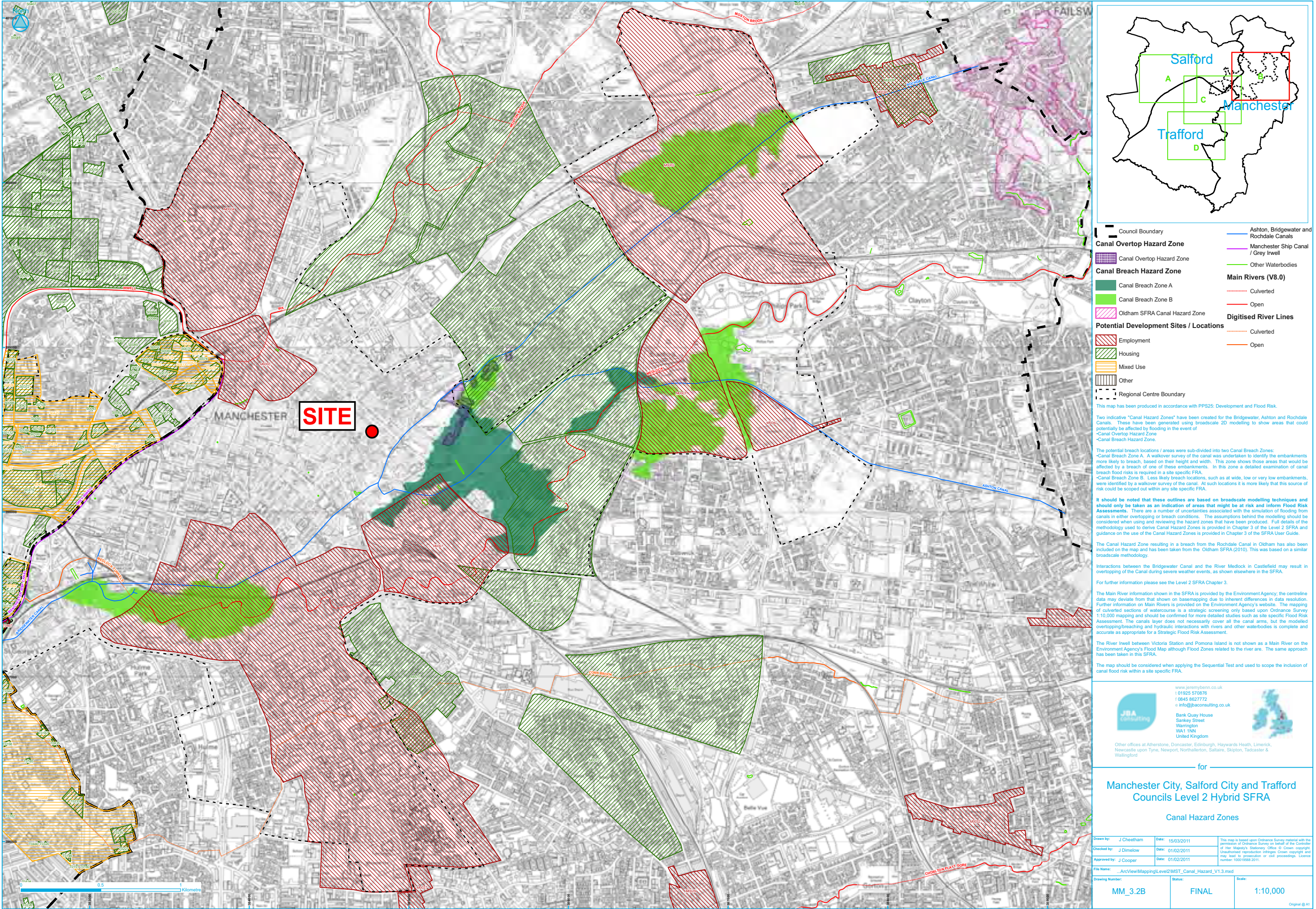
Reservoir Screening

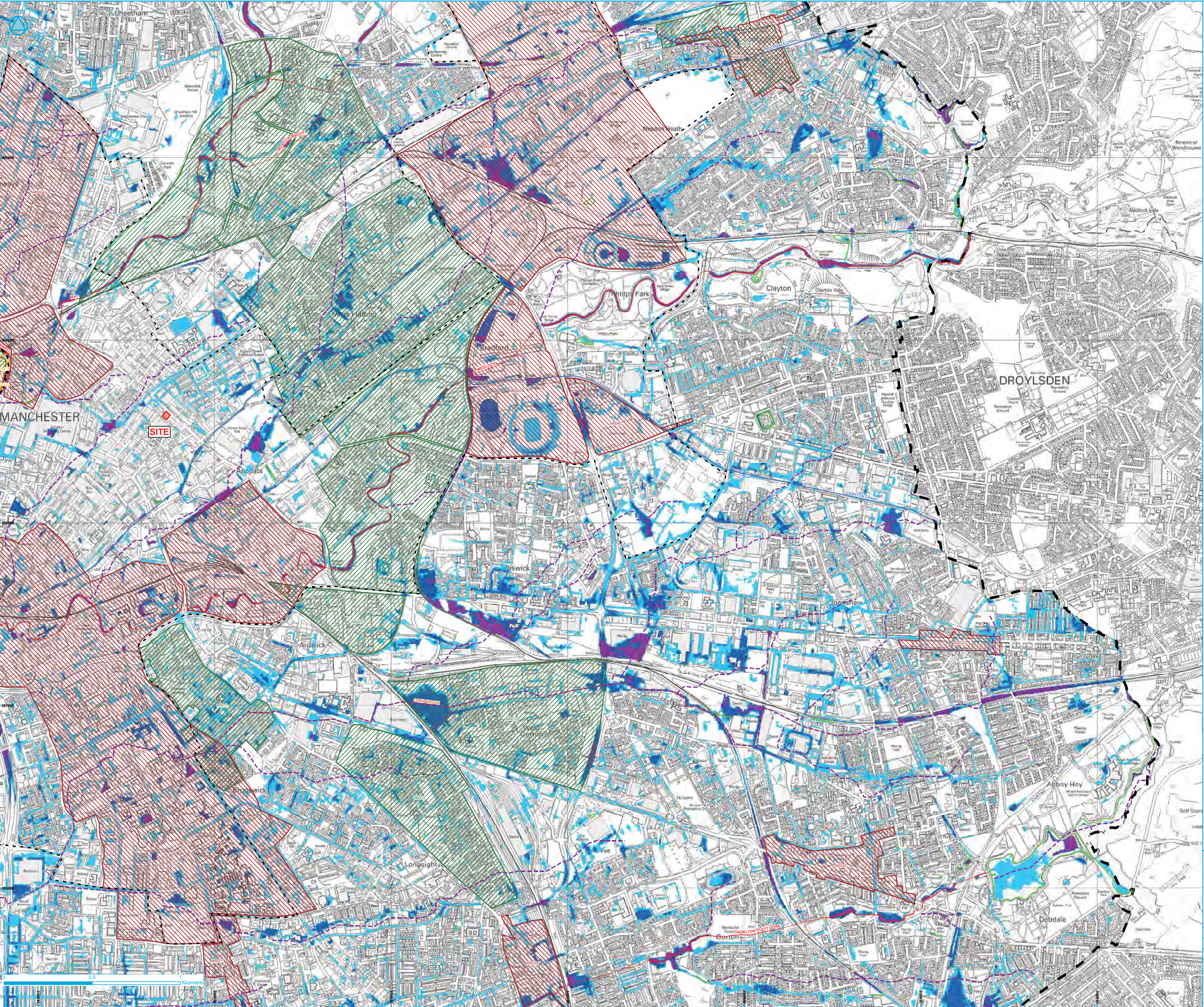
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File Name: ...ArcViewMappingLevel1MST_ReservoirScreening_V1.2.mxd

Drawing Number: MM_3.1	Status: FINAL	Scale: 1:45,000
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Original @ A1





Legend

- Council Boundary
- Lost Watercourses
- Susceptibility to Surface Water Flooding**
- High Susceptibility
- Intermediate Susceptibility
- Low Susceptibility
- Potential Development Sites / Locations**
- Employment
- Housing
- Mixed Use
- Other
- Regional Centre Boundary
- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Irwell
- Other Waterbodies
- Main Rivers (V8.0)**
- Culverted
- Open
- Digitised River Lines**
- Culverted
- Open

This map has been produced in accordance with PPS25: Development and Flood Risk.

The map refines the Environment Agency's map of 'Areas Susceptible to Surface Water Flooding' based on more detailed modelling outputs produced for this SFRA.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

This map should be used to apply the Exception Test and to scope what the Flood Risk Assessment should consider in its placement of surface development and the management of runoff.

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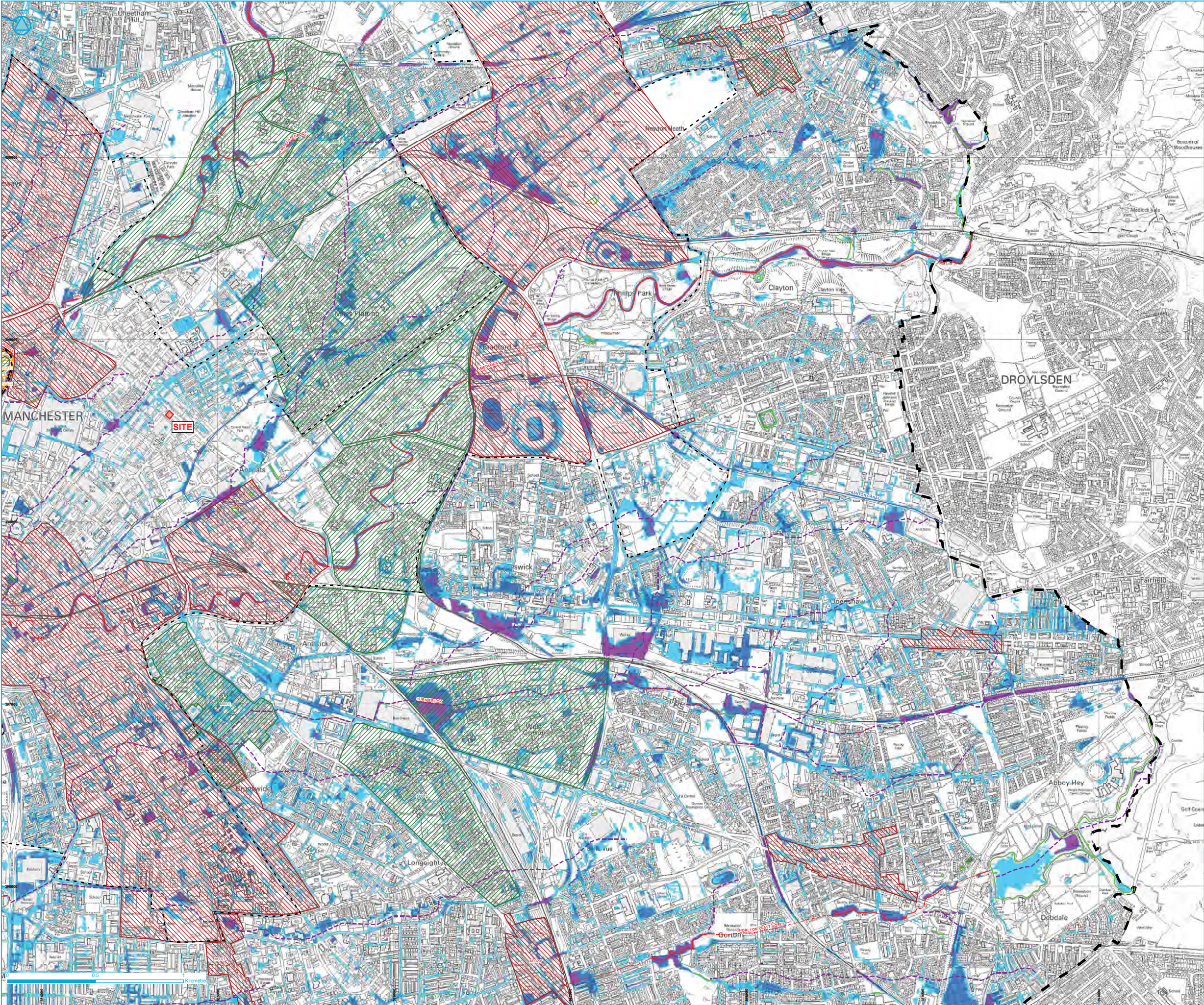
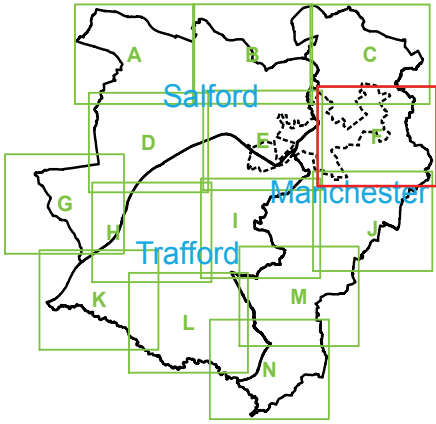
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Susceptibility to Surface Water Flooding - Current Scenario

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Checked by: J Dimelow	Date: 01/02/2011	
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File Name: ...ArcView/Mapping/Level2/MST_SurfaceWaterFlooding_Current_V1.1.mxd		
Drawing Number: SS_4.1 F	Status: FINAL	Scale: 1:10,000

Original @ A1



- Council Boundary
- Lost Watercourses
- Susceptibility to Surface Water Flooding
 - High Susceptibility
 - Intermediate Susceptibility
 - Low Susceptibility
- Potential Development Sites / Locations
 - Employment
 - Housing
 - Mixed Use
 - Other
- Regional Centre Boundary
- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Inwell
- Other Waterbodies
- Main Rivers (V8.0)
 - Culverted
 - Open
- Digitised River Lines
 - Culverted
 - Open

This map has been produced in accordance with PPS25: Development and Flood Risk.

The map refines the Environment Agency's map of 'Areas Susceptible to Surface Water Flooding' based on more detailed modelling outputs produced for this SFRA. This map can be used to assess the sensitivity of surface water flooding to climate change and urban development.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

This map should be used to apply the Exception Test and to scope what the Flood Risk Assessment should consider in its placement of surface development and the management of runoff.



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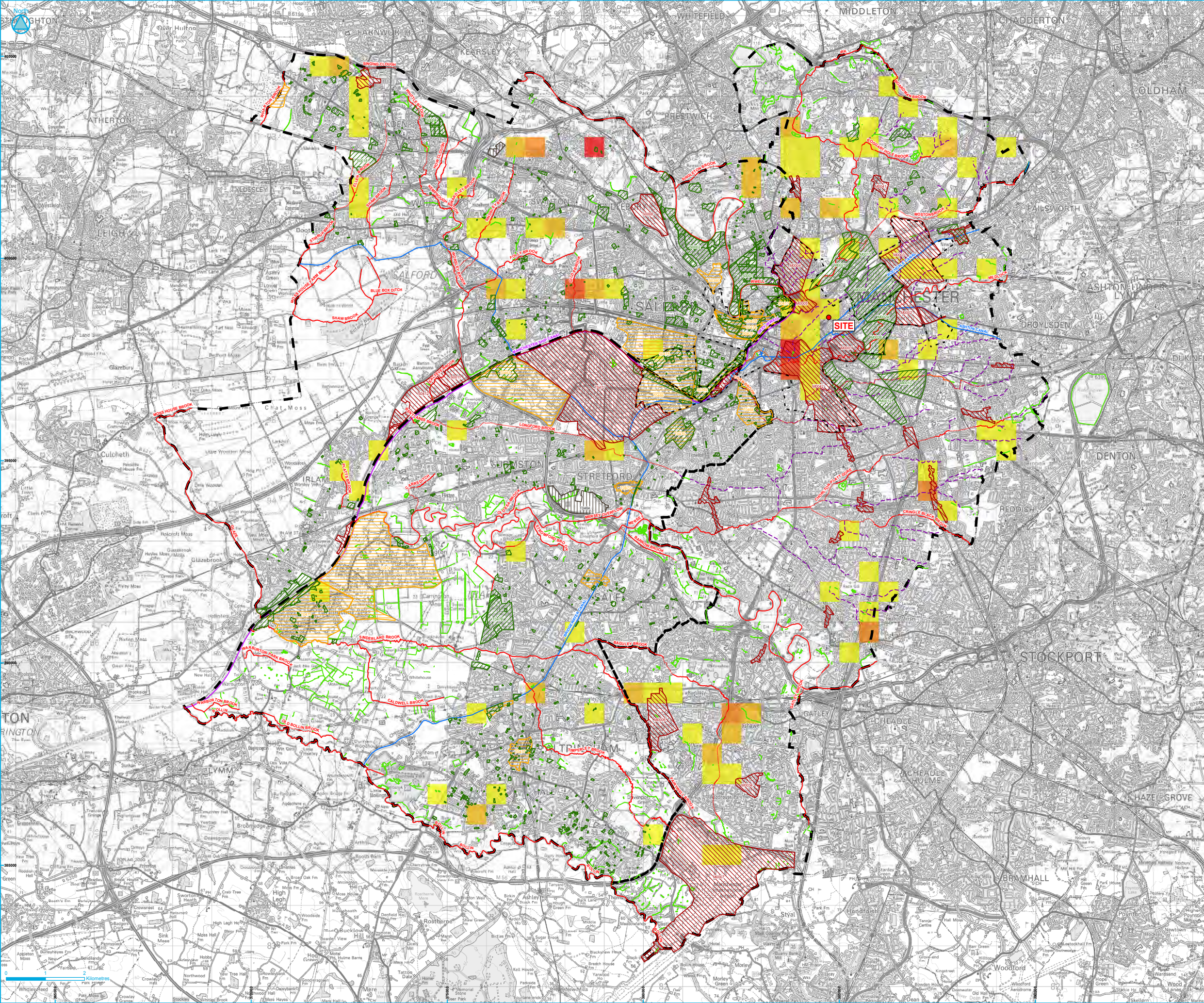
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Susceptibility to Surface Water Flooding - Future Scenario

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Drawing Number: SS_4.2 F	Status: FINAL	Scale: 1:10,000
Original @ A1		



- Council Boundary**
- Lost Watercourses**
- Number Of Properties At Risk**
- Potential Development Sites / Locations**
- Main Rivers (V8.0)**
- Digitised River Lines**

This map has been produced in addition to the requirements of PPS25: Development and Flood Risk.

This map shows the results of an assessment of surface water flood risk to properties. This shows the number of properties that could potentially be affected by such flooding if a 1 in 200 year rainfall event were to occur.

The data shown in this map has been used to scope the coverage of Critical Drainage Areas.

The Main River information shown in the SFRA is provided by the Environment Agency, the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

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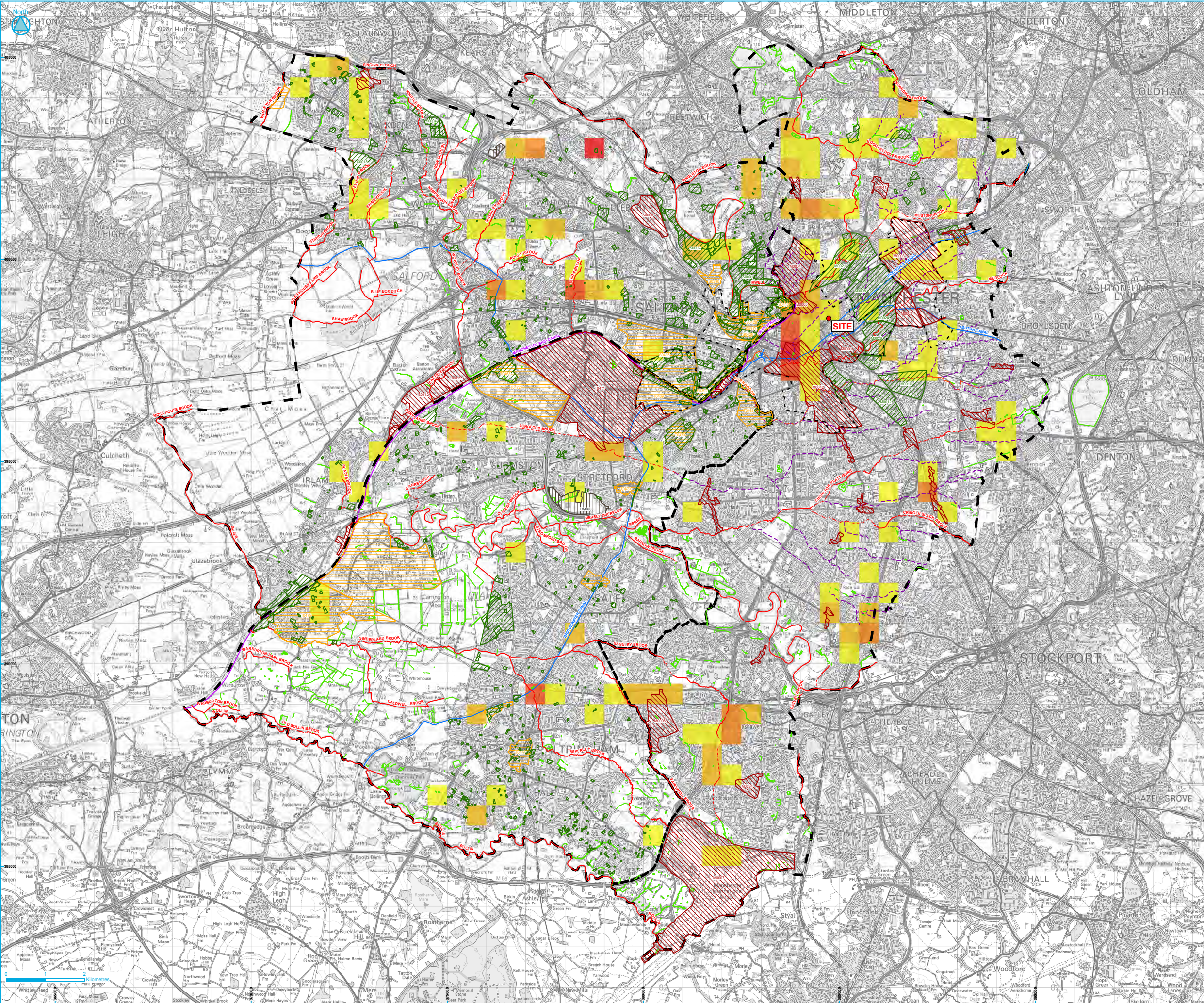
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Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Surface Water Flooding Risk Assessment - Current Scenario

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File Name: ...ArcViewMappingLevel2MST_SurfaceWaterFloodingRiskAssessment_Current_V1.2.mxd		
Drawing Number: SS_4.3	Status: FINAL	Scale: 1:45,000

Original @ A1



Legend

- Council Boundary
- Lost Watercourses
- Number Of Properties At Risk
 - 1 - 5
 - 5 - 20
 - 20 - 50
 - 50 - 100
 - 100 - 154
- Potential Development Sites / Locations
 - Employment
 - Housing
 - Mixed Use
 - Other
 - Regional Centre Boundary
- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Inwell
- Other Waterbodies
- Main Rivers (V8.0)
 - Culverted
 - Open
- Digitised River Lines
 - Culverted
 - Open

This map has been produced in addition to the requirements of PPS25: Development and Flood Risk.

This map shows the results of an assessment of surface water flood risk to properties in the future. This shows the number of properties that could potentially be affected by such flooding if a 1 in 200 year rainfall event were to occur. This map can be used to assess the sensitivity of surface water flood risk to climate change and urban development.

The data shown in this map has been used to scope the coverage of Critical Drainage Areas.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Inwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

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for

Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

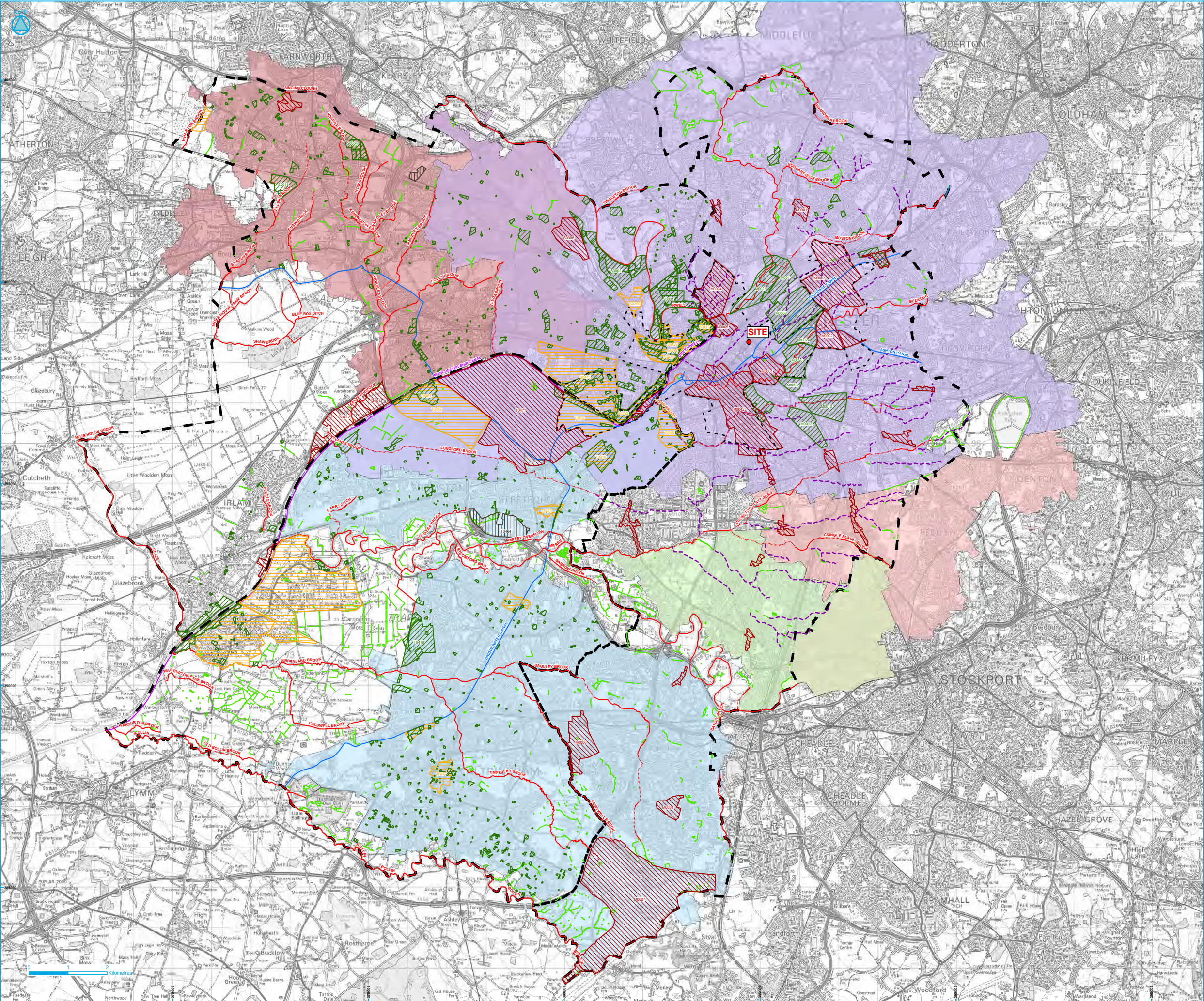
Surface Water Flooding Risk Assessment - Future Scenario

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File Name: ...ArcViewMappingLevel2MST_SurfaceWaterFloodingRiskAssessment_Future_V1.2.mxd

Drawing Number:	Status:	Scale:
SS_4.4	FINAL	1:45,000

Original @ A1



- Council Boundary**
- Lost Watercourses**
- Critical Drainage Areas**
- Potential Development Sites / Locations**
- Main Rivers (V8.0)**
- Digitised River Lines**

This map has been produced in accordance with PPS25: Development and Flood Risk.

Certain locations are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. There are generally known local flooding problems associated with these areas. These areas have been defined as Critical Drainage Areas in the SFRA. Specific drainage requirements are required in these areas to help reduce local flood risk.

Chapter 5 of the Level 2 SFRA covers the flooding from surface water and sewers and how Critical Drainage Areas have been defined.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only, based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

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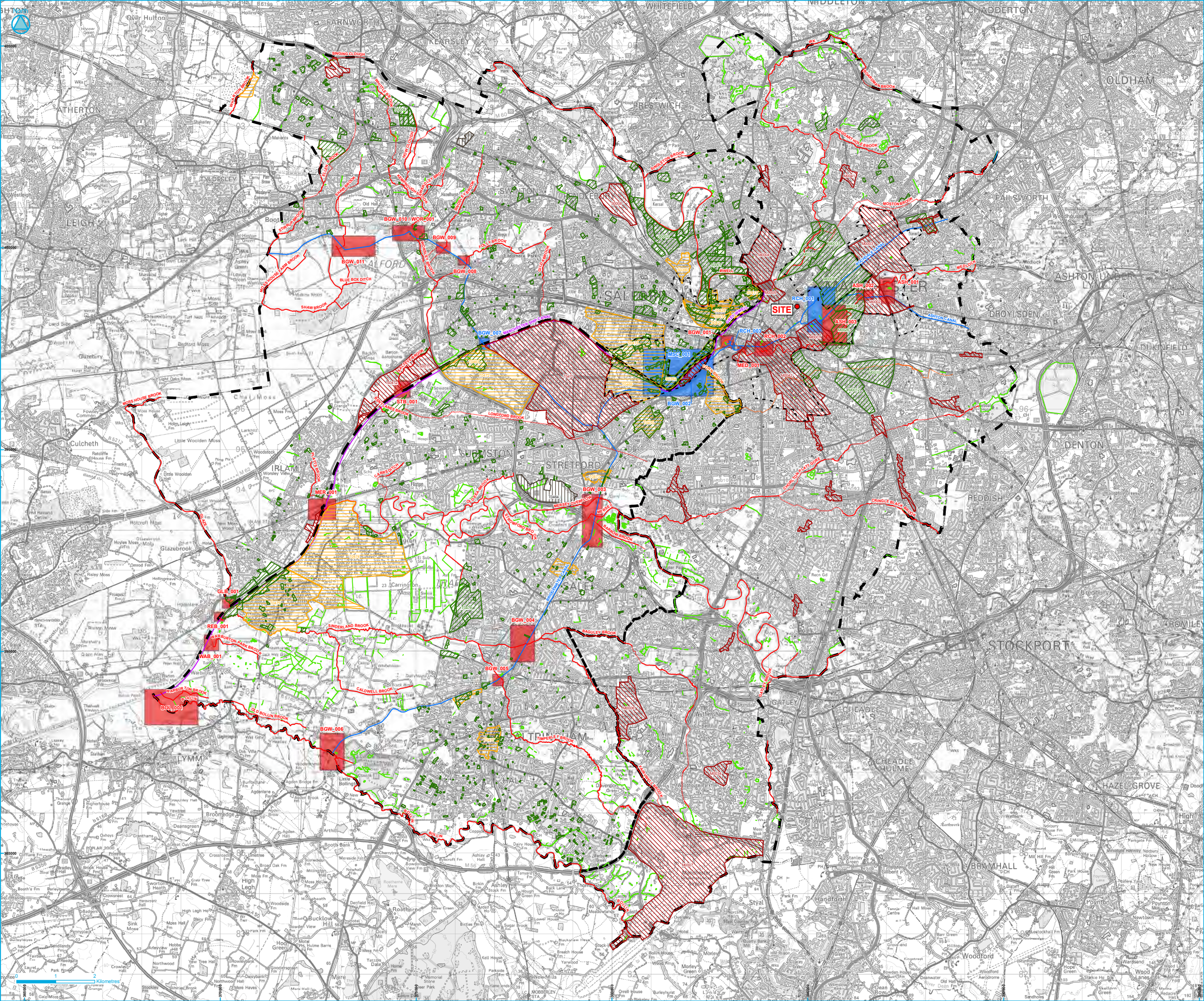
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Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Critical Drainage Areas

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Drawing Number: SS_4.5	Status: FINAL	Scale: 1:45,000

Original @ A1



- Council Boundary**
- Hydraulic Interactions**
- Potential Development Sites / Locations**
- Main Rivers (V8.0)**
- Digitised River Lines**

This map has been produced in accordance with PPS25: Development and Flood Risk.

The map shows the interactions between different sources of flooding. This identifies where further consideration of hydraulic interactions is required in site specific FRAs.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overlapping breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment. The River Irwell downstream from Victoria Station and the Manchester Ship Canal function as a single (hydraulically linked) watercourse. The rectangles represented on this map show an indicative area over which hydraulic interactions are considered possible.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

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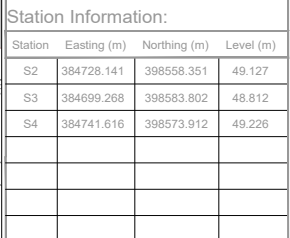
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Hydraulic Interactions			
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File Name: ArcView\Mapping\level2MST_Hydraulic_Interactions_V1.1.mxd			
Drawing Number: HI_5.1		Status: FINAL	Scale: 1:45,000
Original @ A1			

Appendix 2

Topographical Survey





OS Buildings Surveyed Buildings

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSG836 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSG836 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

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CLIENT
**Glenn Howells
Architects**

PROJECT
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Manchester
M4 5AB**

TITLE	Topographical Survey
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SCALE A1@ 1: 200	DATE June 2020
DRAWN PG/DH	QUALITY REF GH7615

Level datum	See note
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Grid orientation	See note
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Job number	36876
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Drawing No.	Rev.
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All dimensions should be checked on site prior to design and construction

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Notes:

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