

5822 - 2-4 Whitworth Street

Flood Risk Assessment

November 2024

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Contents

1 Introduction 3

2 The Site 4

2.1 Site Location 4
2.2 Site Description 4

3 Proposed Development 5

4 Requirements of National Planning Policy Framework (NPPF) 6

4.1 Summary 6

5 Strategic Flood Risk Assessments 7

5.1 Level 1 SFRA for Greater Manchester 7

6 Sources of Flooding 8

6.1 Sequential Test 8
6.2 Flooding from Rivers and Sea 8
6.3 Flooding from Sewers 9
6.4 Flooding from Groundwater 9
6.5 Flooding from Artificial Sources 9
6.6 Flooding from Surface Water 10
6.6.1 Safe Access 11

7 Conclusions 12

8 References 12

Appendices

1 Greater Manchester SFRA Maps
2 Topographical Survey

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1 Introduction

This Flood Risk Assessment (FRA) has been prepared by AKT II on behalf of the Clients, Glenbrook WWS Limited, Maizelands Limited and Arringford Limited, in support of the proposed redevelopment of 2-4 Whitworth Street West located within the Deansgate Ward of Manchester City Centre, M1 5WY.

This report identifies potential sources of flooding and their 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 comprises of brownfield land located within Manchester City Centre at 2-4 Whitworth Street West.

It is bound by Whitworth Street West to the north, with the listed railway viaduct and Deansgate Station platform immediately to the south and at first floor level to the existing buildings. Rowendale Street bisects the Site travelling under the railway viaduct providing vehicle and pedestrian links to Hewitt Street to the south. The Site is bound by Cameron Street to the east and Bugle Street to the west, which also provides vehicle and pedestrian access into the Knott Mill area, characterised by a mix of employment and residential buildings. Beyond Bugle Street is a live music venue (Rebellion) and Deansgate Station is beyond this. Whitworth Street West separates the Site from Deansgate Locks and the Deansgate Castlefield Metro Station located to the north and adjacent to the Rochdale Canal.

The nearest postcode is M1 5WY and the National Grid reference is SJ 83492 97528.

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 1,054 m². It is presently divided into two parcels, No. 2 and No. 4 Whitworth Street West, with a small public highway, Rowendale Street, separating the two plots.

2 Whitworth Street West is a four-storey, red-brick building. 4 Whitworth Street West is a three-storey, red-brick building. Both buildings are considered vacant.

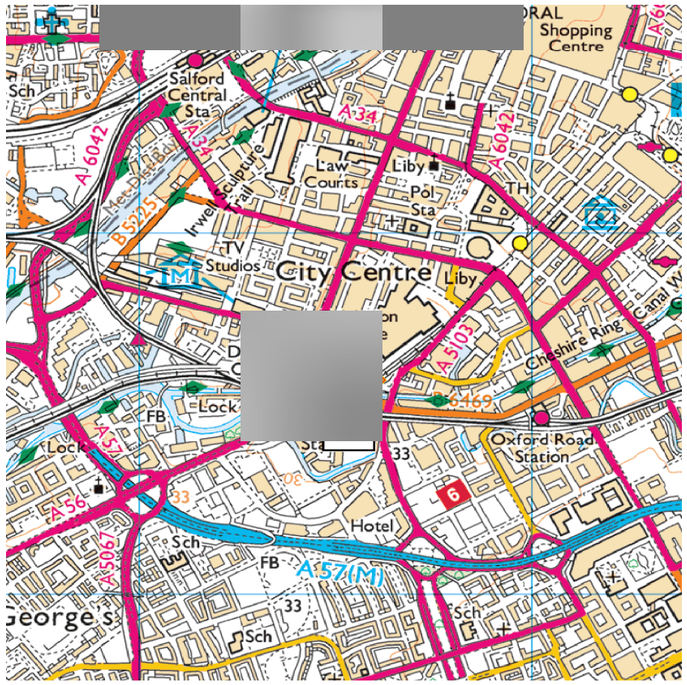


Figure 2.1 Site Location (StreetMap)

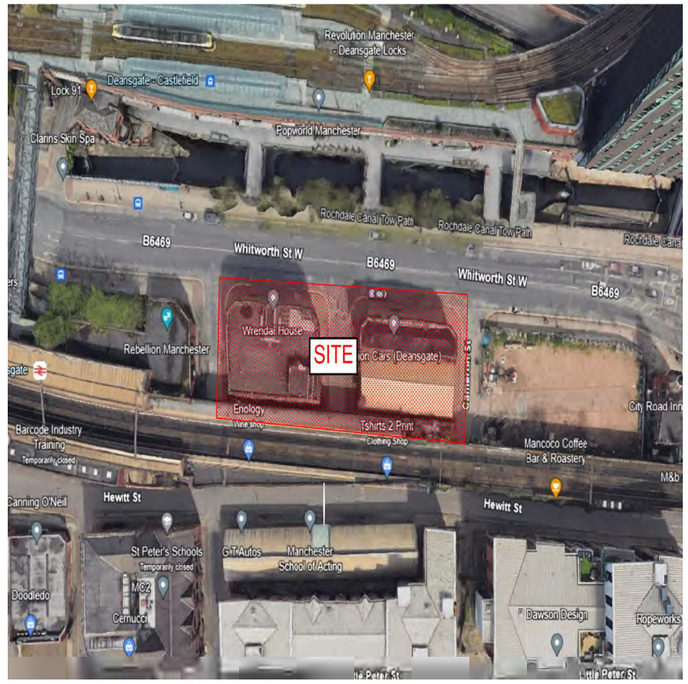


Figure 2.2 Site Location (Google Earth)

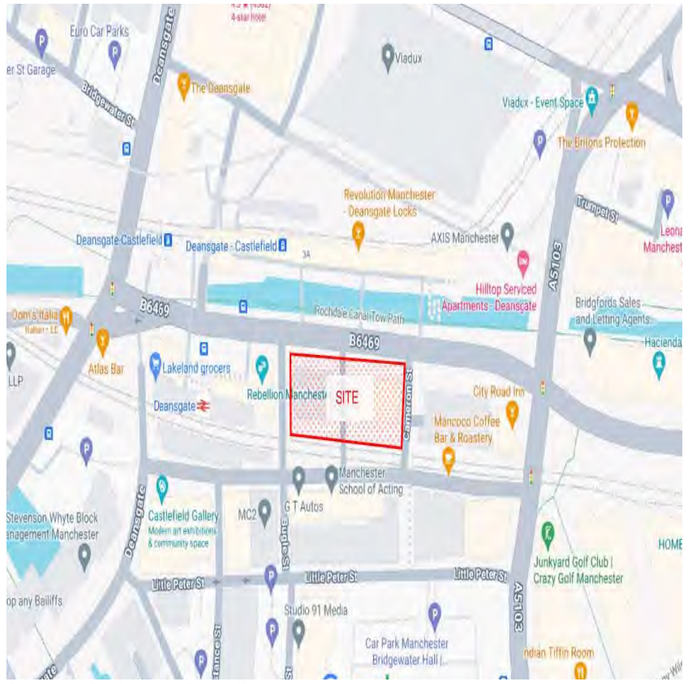


Figure 2.3 Site Location (Google Maps)

3 Proposed Development

The Proposed Development comprises of the demolition of 2 and 4 Whitworth Street West and development of a high-rise residential development, including ground floor amenities and back of house uses and public realm works. The proposal involves a new vertical Build to Rent (BtR) residential development that will regenerate the street currently composed of vacant buildings.

The development will involve the construction of a new 44 storey tower.

- The ground floor level wil consist of a reception area, bike storage, plant rooms, a kiosk, and a post room.
- The first floor will contain more plant space, a lounge area, a studio, and a gym.
- The second floor and above will house the residential units.

Figures 3.1 to 3.3 give an indication of the proposals.

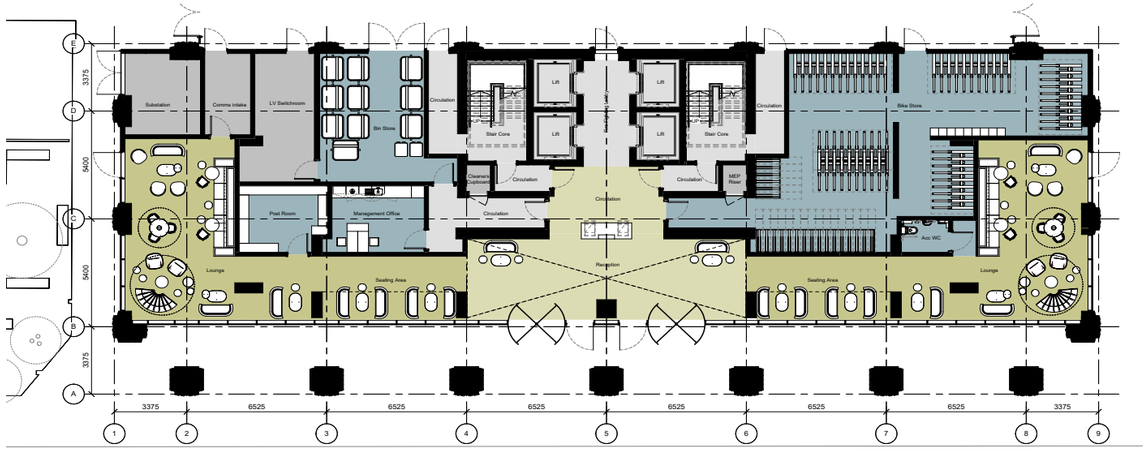


Figure 3.1 Proposed Ground Floor Layout

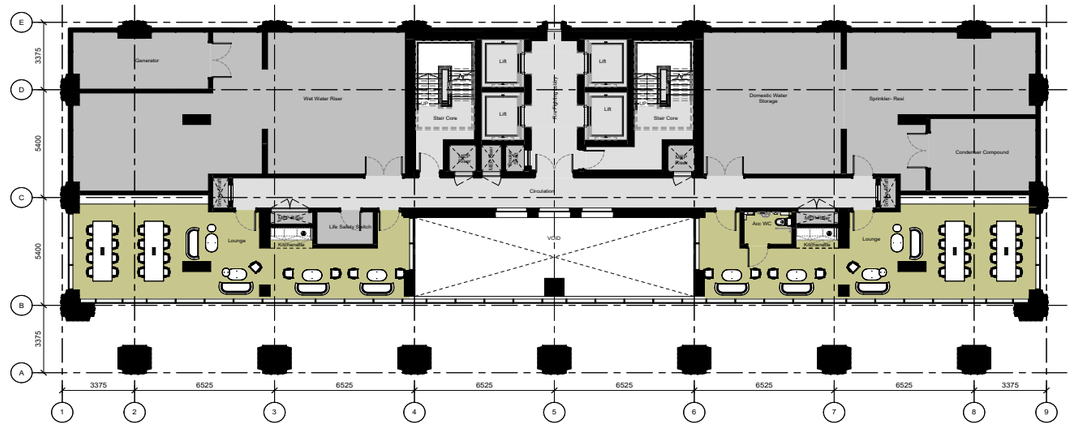


Figure 3.2 Proposed First Floor Layout

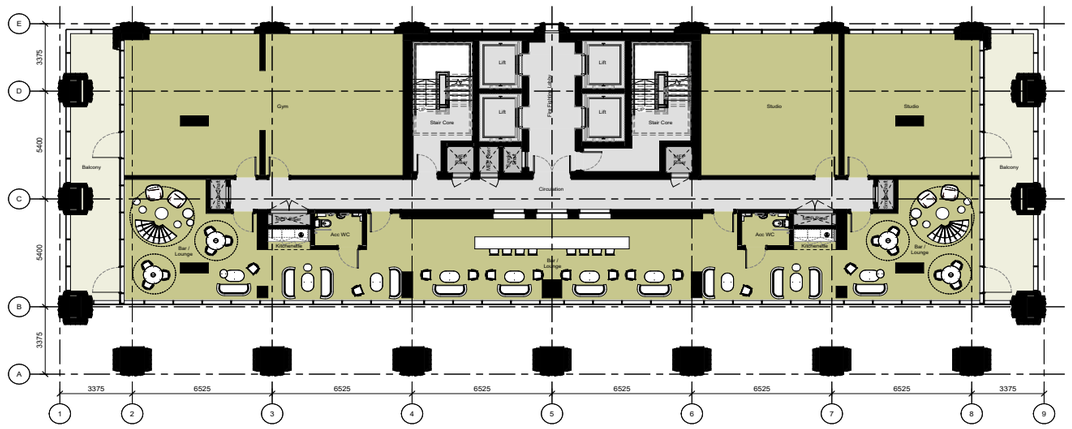


Figure 3.3 Proposed Typical Upper Floors Layout

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; and
- 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 developments in flood risk areas. The assessment of risk should take into account:

- The area liable to flooding;
- The probability of flooding 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 (an annual probability of 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 of one hectare or above, the vulnerability to flooding from other sources as well as from rivers and the sea, 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 (an 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 (an 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; 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 (refer to Figure 5.1) and the resulting report was issued in March 2019. The recommendations and mapping from this report form 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; and
- 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 from Places for Everyone Joint Development Plan Document (refer to Figure 5.2) must be considered by any new development:

- Policy JP-S4: 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 not to 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.

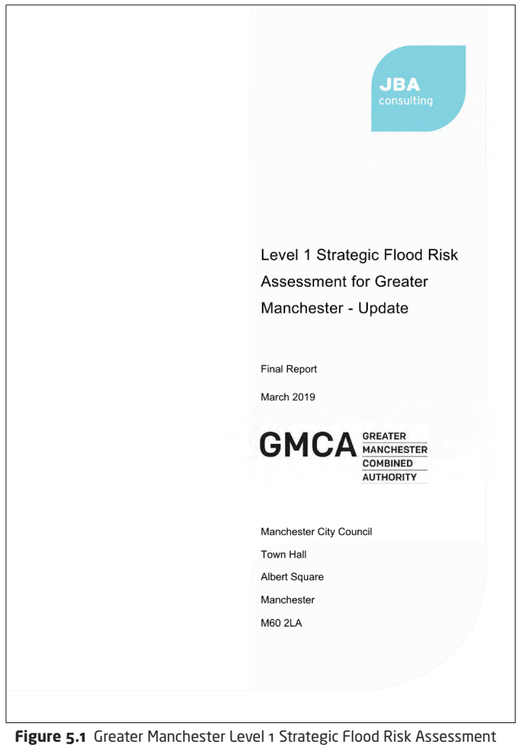


Figure 5.1 Greater Manchester Level 1 Strategic Flood Risk Assessment

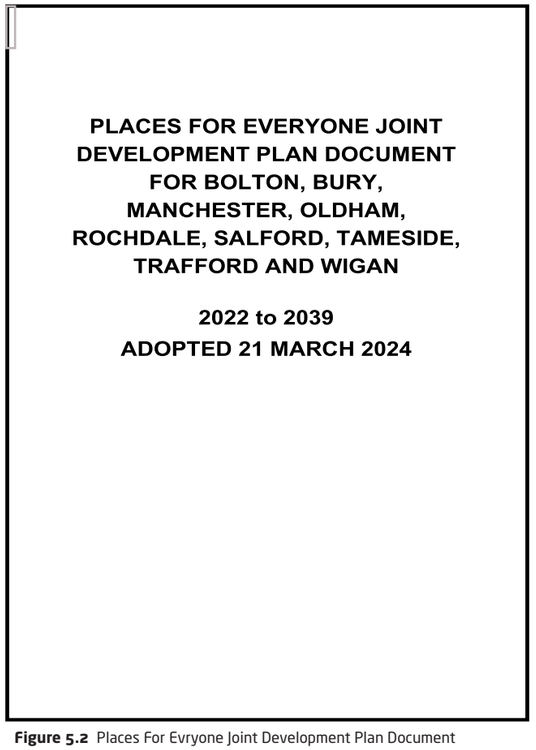


Figure 5.2 Places For Evryone Joint Development Plan Document

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 the 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
- 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 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
- 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 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
- 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, *subject to a specific warning and evacuation plan.*

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 with the lowest probability of flooding (i.e. to Flood Zone 1).

Based on the Environment Agency's "Flood Map for Planning" (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 proposed scheme will accommodate a new Build to Rent (BtR) residential development involving a tall apartment tower. In accordance with NPPF Table 2 (refer to Figure 6.1), this use is classified as 'More vulnerable'.-

Referring to NPPF Table 3 (shown below in Figure 6.2) "More 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.

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"



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.

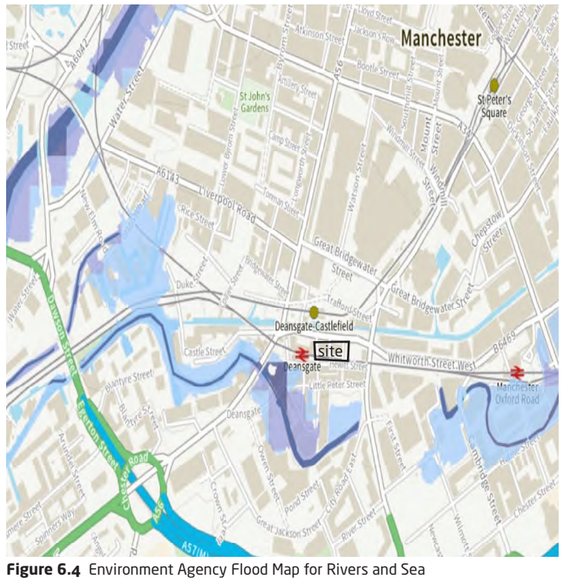


Figure 6.4 Environment Agency Flood Map for Rivers and Sea

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 the 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 375 mm dia. combined sewer running in Whitworth West Street to the north of the site.
- A 225 mm dia. combined sewer running in Bugle Street to the west of the site.
- A 375 mm dia. combined sewer running in Cameron Street to the east of the site.
- A 300 mm combined sewer running in the middle of the site in Rowendale Street.
- A 500 x 600 mm combined sewer running in Hewitt Street to the south of 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 are no recorded sewer flooding incidents on the site and there is no anecdotal evidence of sewer flooding to the site or its immediate surrounds.

In addition, no basement is proposed, and therefore it is unlikely that the development is vulnerable to sewer flooding.

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.

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 (Figure 6.6 below) indicates that the site is located within an area with limited potential for Groundwater flooding to occur. However, The Greater Manchester SFRA shows that part of the site is located within an area at risk of groundwater flooding (Drawing No. GW_2.1 in Appendix 1), but since the proposed development dosen't include a basement, this will not affect the risk of groundwater flooding.

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

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.

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).

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

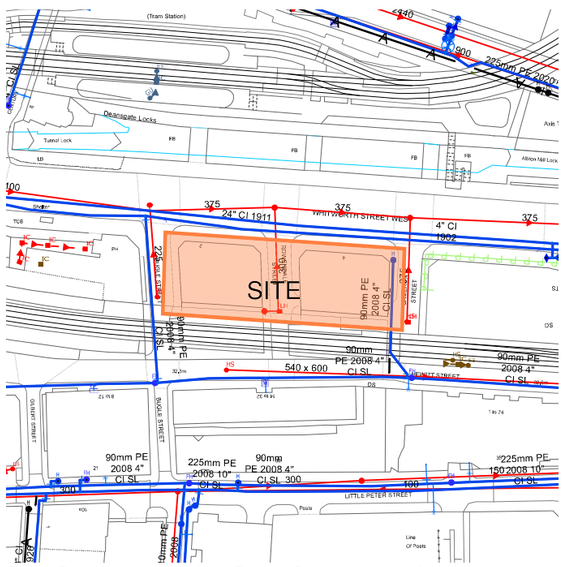


Figure 6.5 United Utilities Asset Record - Sewer and Water Main Map

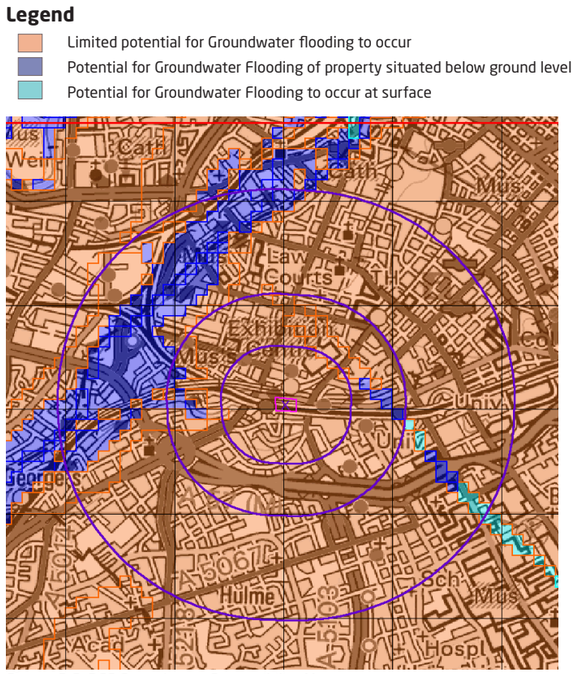


Figure 6.6 BGS Groundwater Susceptibility Map



Figure 6.7 Environment Agency Reservoir Flood Map

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.

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 low risk of surface water flooding.

The Environment Agency provides further maps which illustrate the depth of flooding for various flood events with varying probabilities of occurrence, 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 each year, and a "Low" probability event has a 1 in 100 (1%) or less of occurring each year. These maps are shown in Figures 6.9 to 6.14.

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

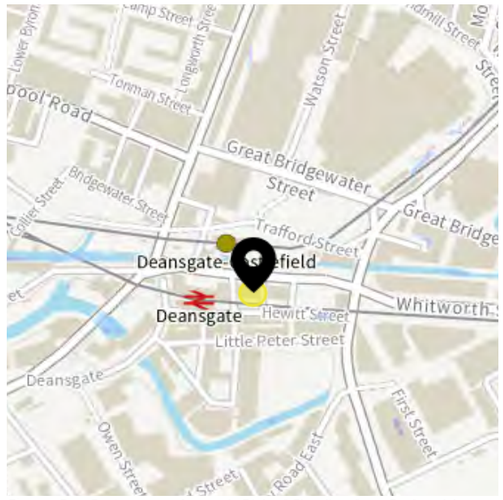


Figure 6.9 Environment Agency's Risk of Flooding from Surface Water Map (High Probability - Depth)

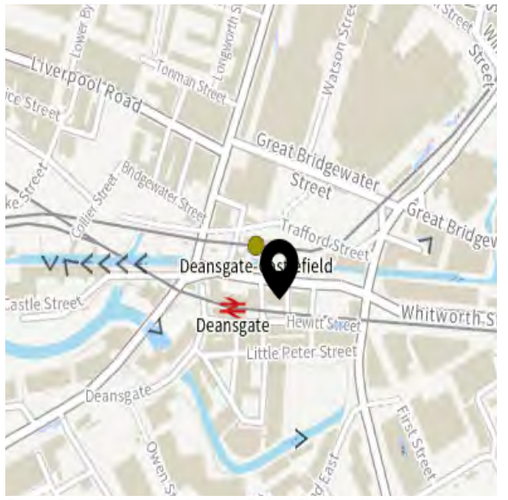


Figure 6.10 Environment Agency's Risk of Flooding from Surface Water Map (High Probability - Velocity)



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



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

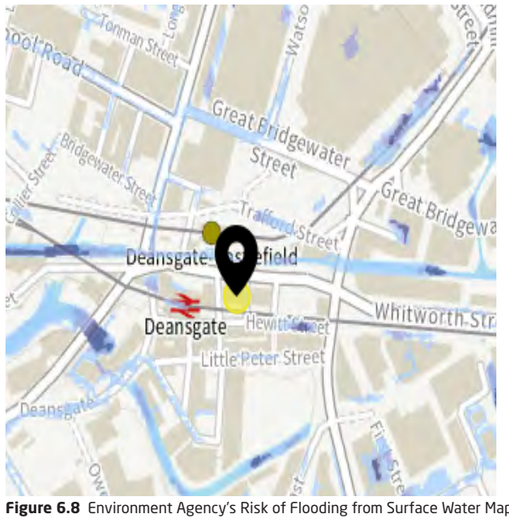


Figure 6.8 Environment Agency's Risk of Flooding from Surface Water Map

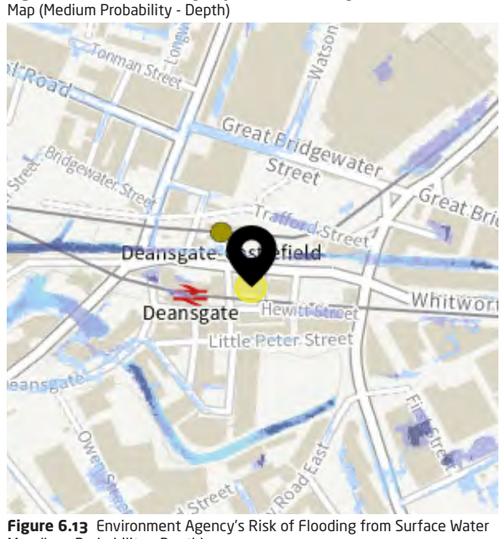


Figure 6.13 Environment Agency's Risk of Flooding from Surface Water Map (Low Probability - Depth)

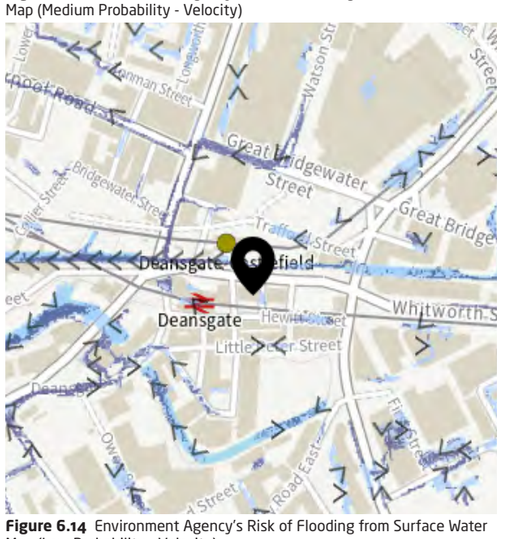


Figure 6.14 Environment Agency's Risk of Flooding from Surface Water Map (Low Probability - Velocity)

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 Bugle Street, south onto Hewutt Street or east onto Cameron Street (refer to Figure 6.16

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 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** of flooding from surcharging sewers.
- The site has been assessed as being at **low risk** of flooding from groundwater sources.
- The site has been assessed as being at **low risk** of flooding from artificial sources.
- The site has been assessed as being at **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, but since the proposed development is within a critical drainage area, a Drainage Strategy which assesses suitable forms of surface water drainage for the site will be prepared in support of the planning application.
- 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:

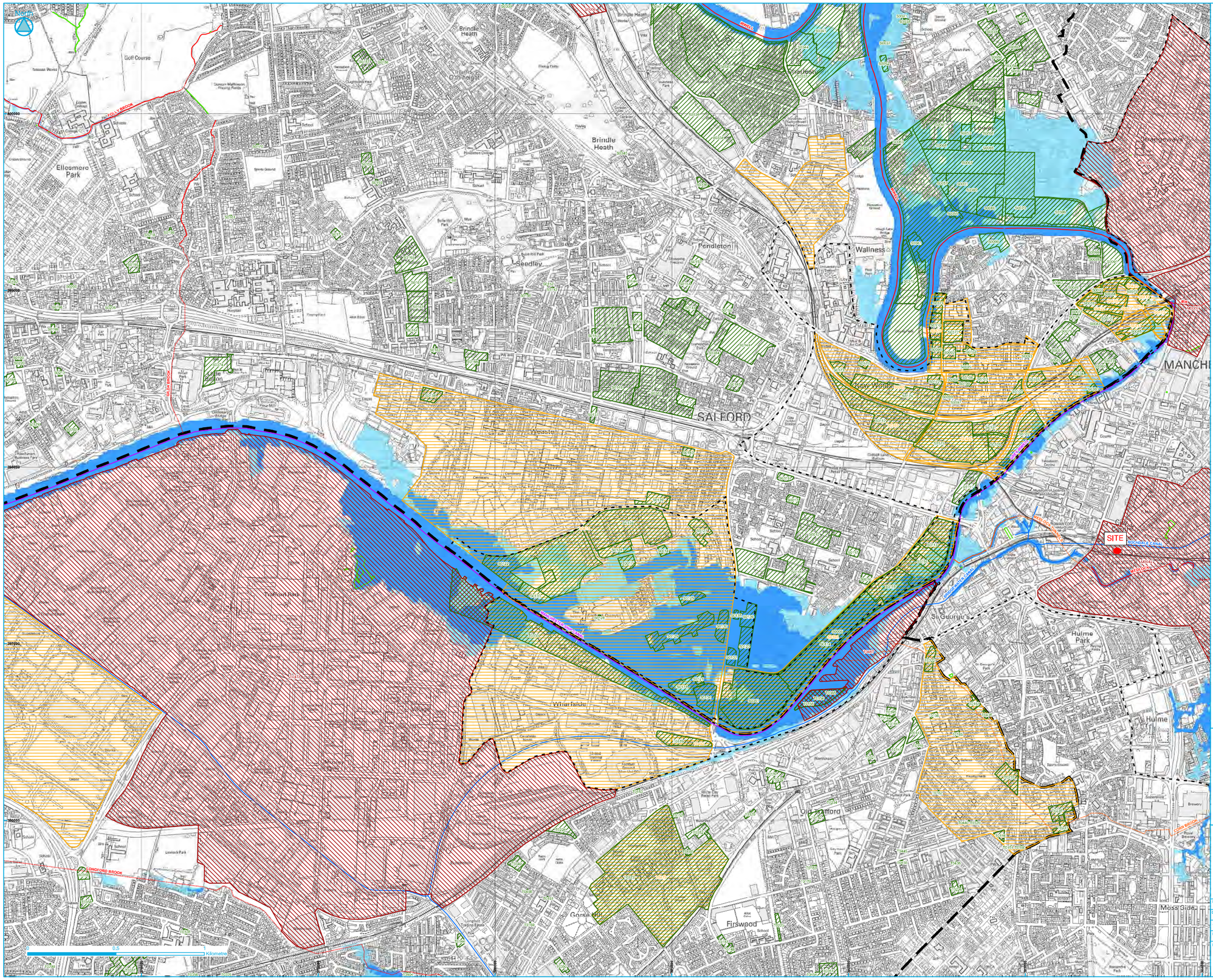
- United Utilities Asset Maps
- Environment Agency Flood Risk Maps

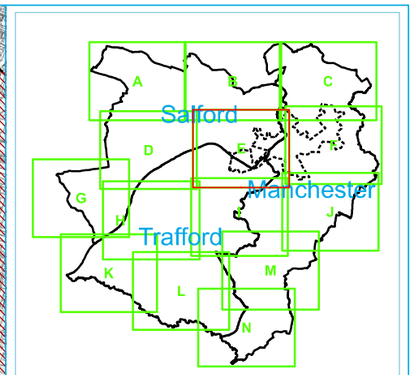
Technical Guidance and Planning Policy Documents:

- 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

- 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 shows estimated flood extents using the modelling outputs produced for this SFRA on the River Irwell, Grey Irwell, 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 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.

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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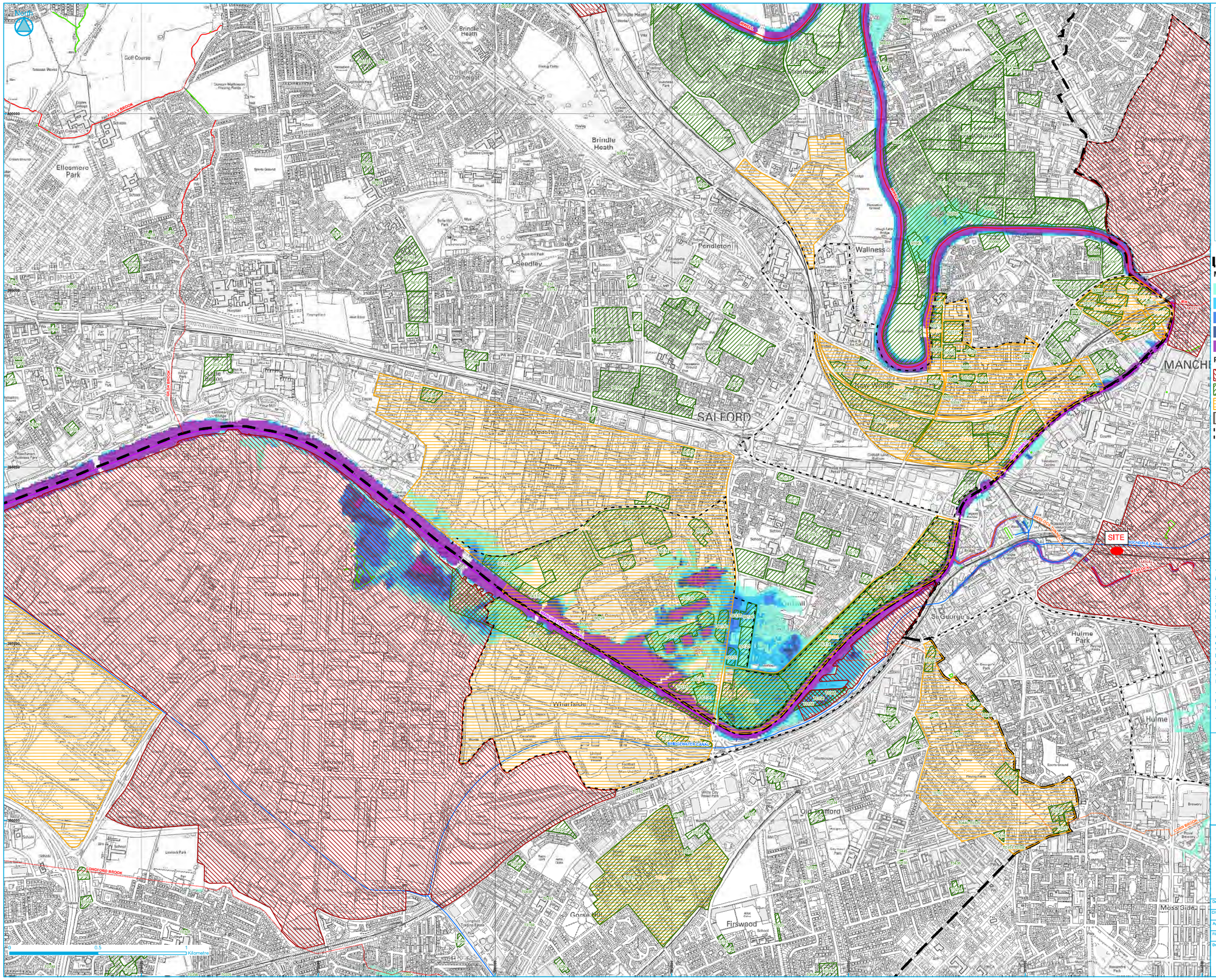
for

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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Checked by:	J Dimelow	Date: 22/11/2010	
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Drawing Number:	FL_1.3E	Status: FINAL	Scale: 1:10,000

Original @ A1



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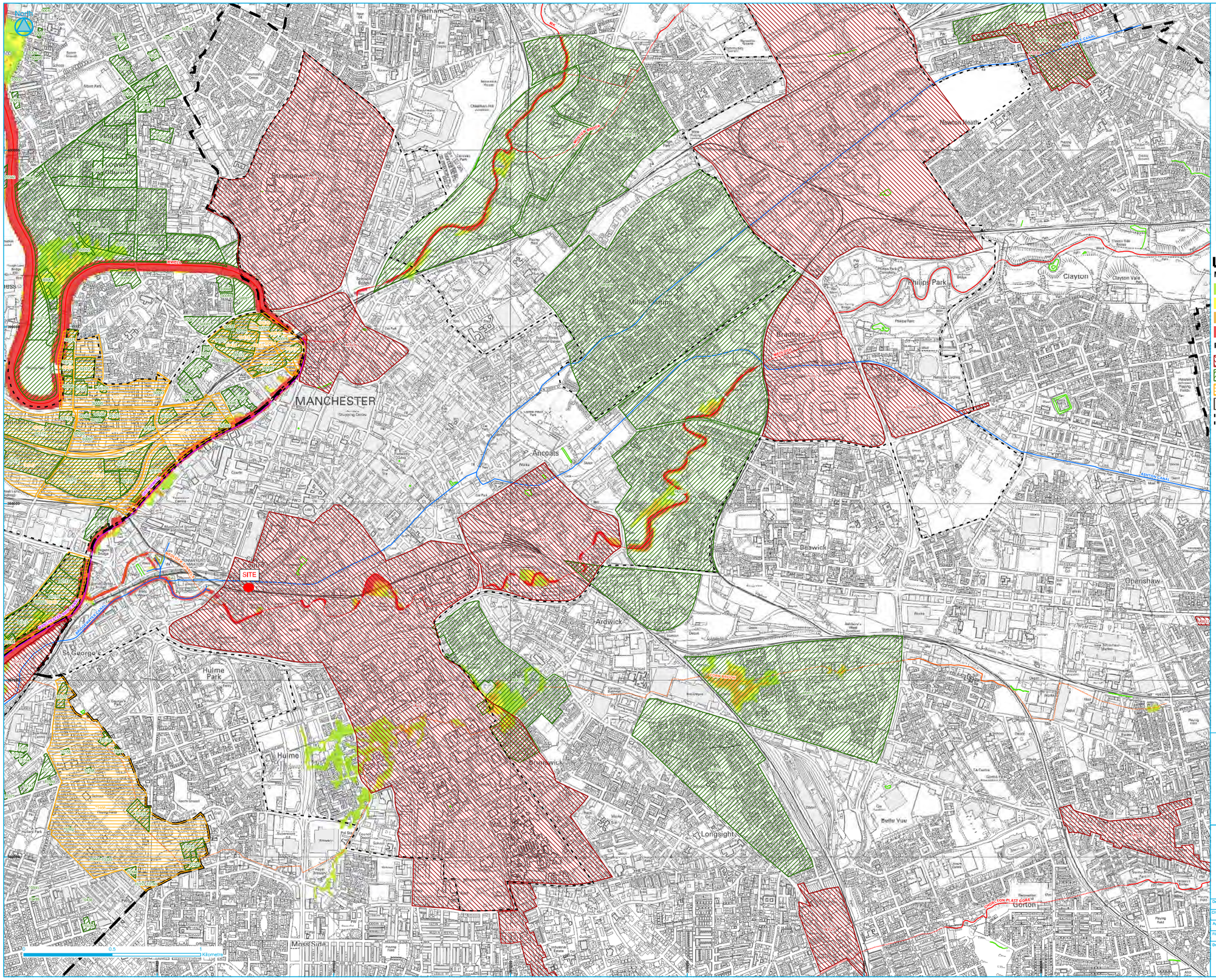
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Fluvial 1 in 100 Year Depths

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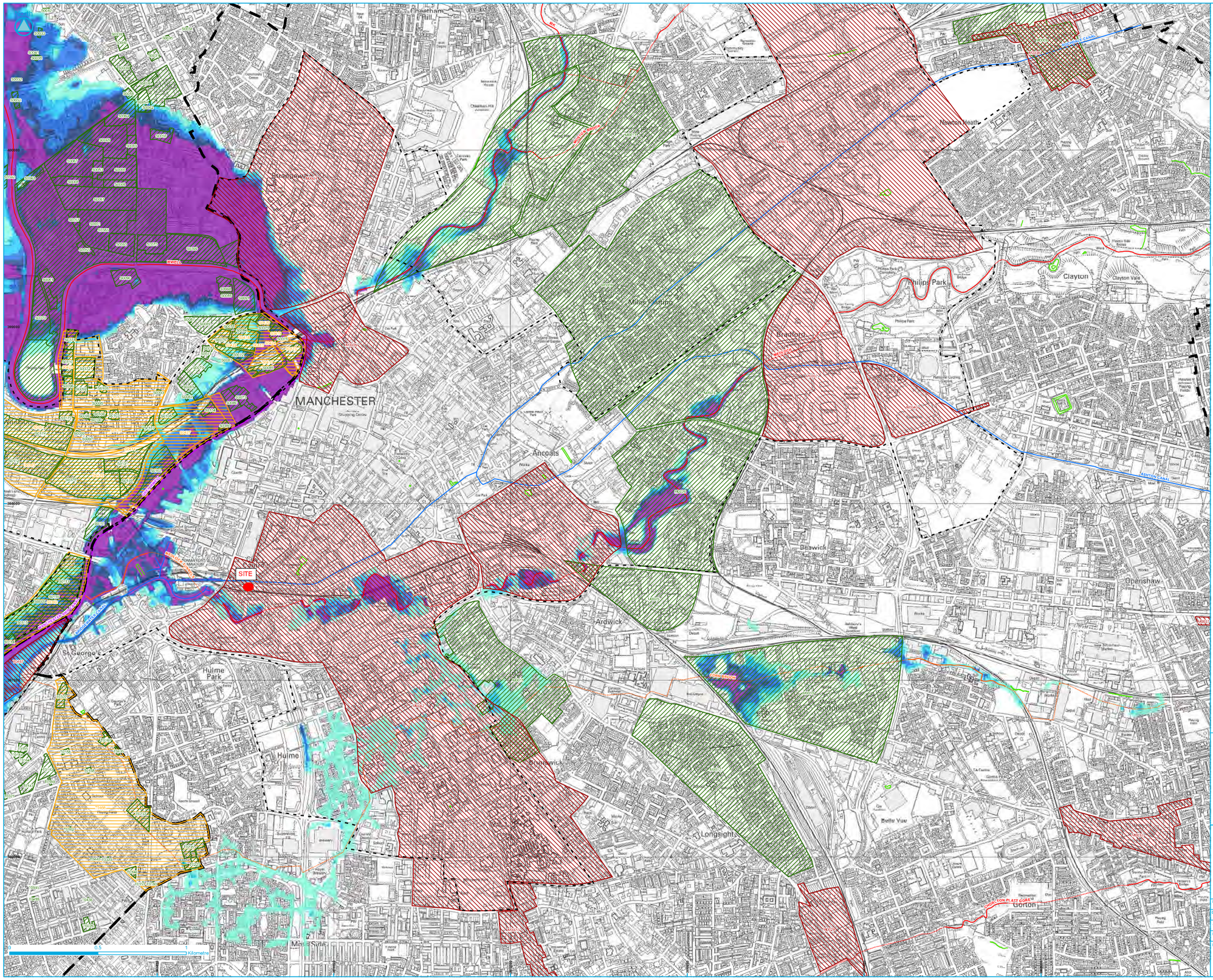
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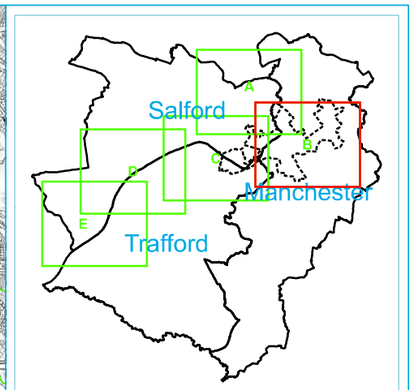
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Fluvial 1 in 100 Year Flood Hazard

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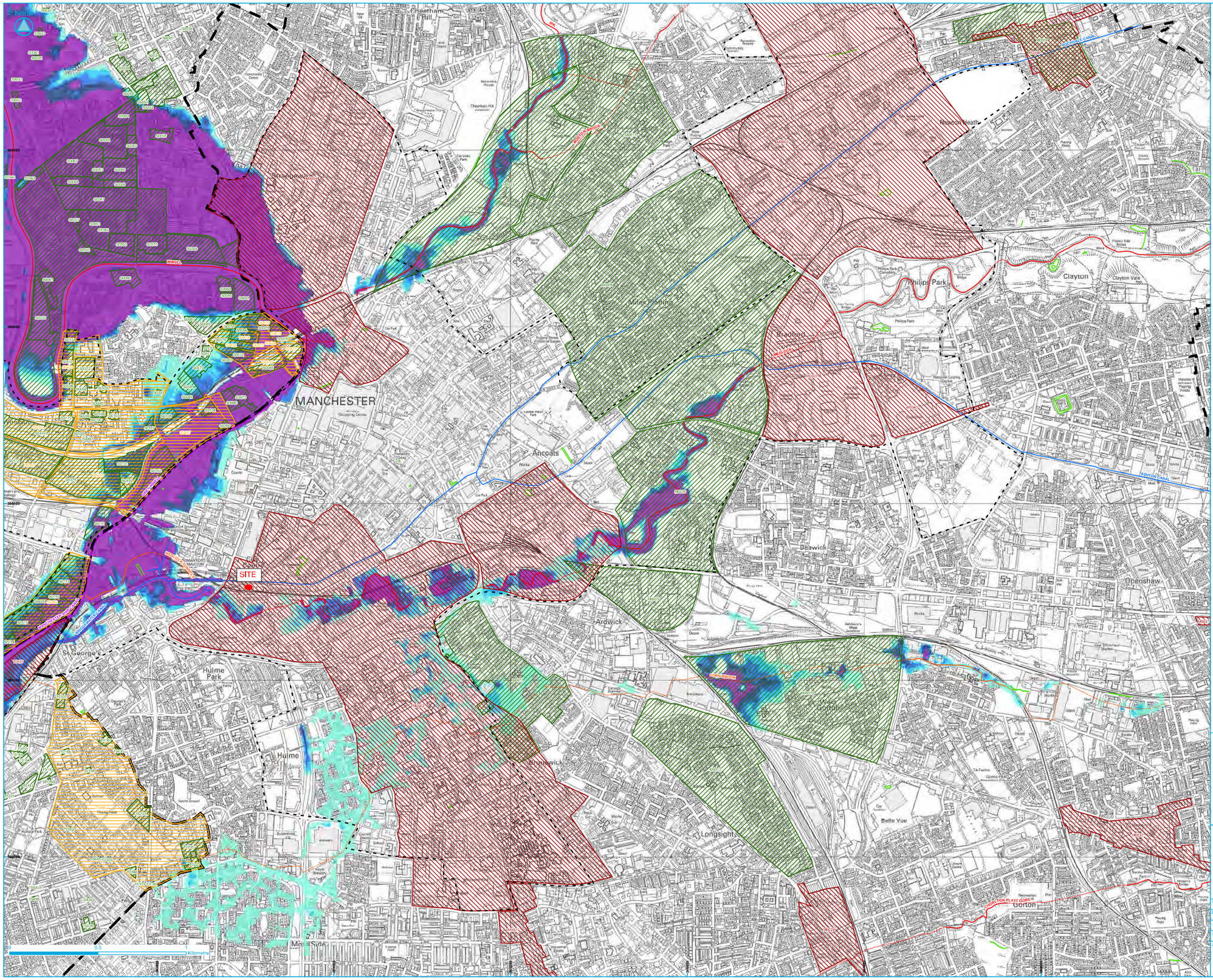
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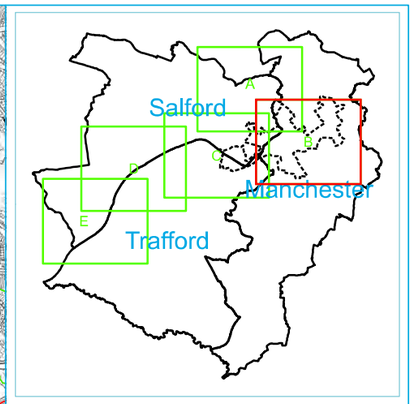
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Fluvial 1 in 1000 Year Flood Depth

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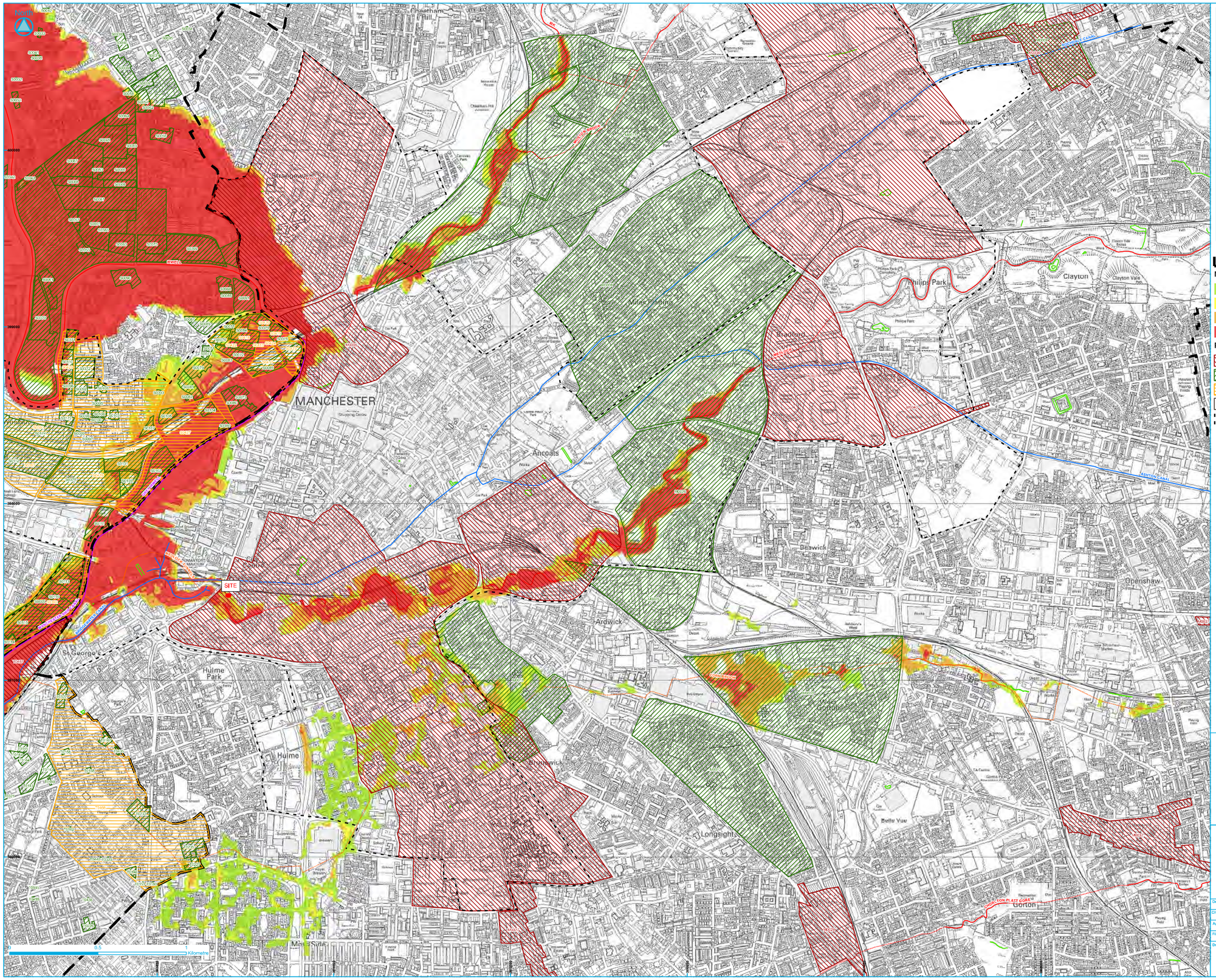
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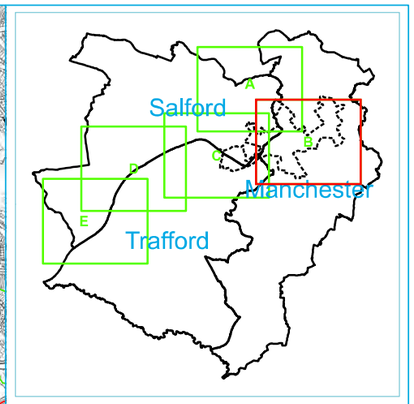
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Fluvial 1 in 1000 Year With Climate Change Flood Depth

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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

- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Irwell
- 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 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 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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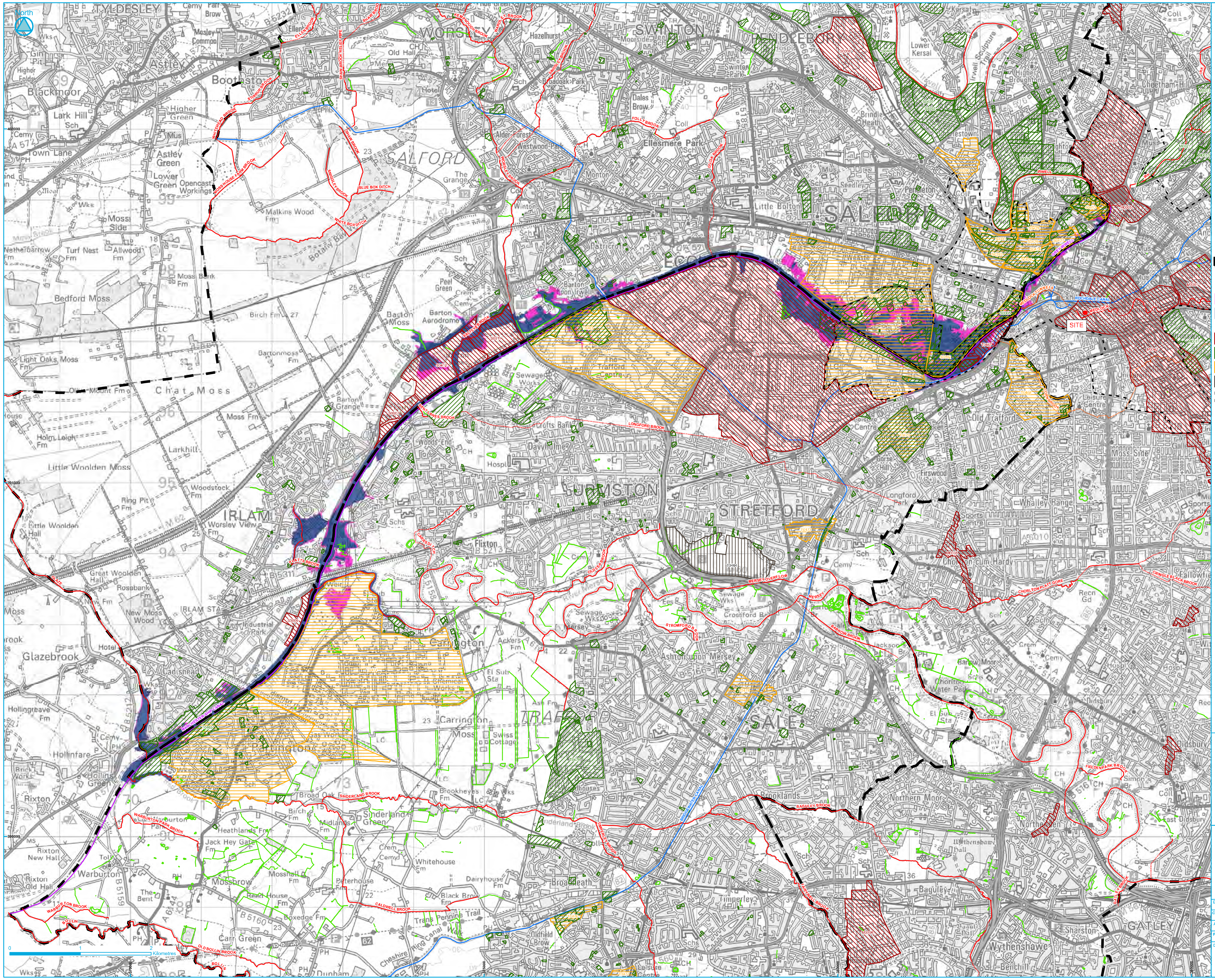
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Fluvial 1 in 1000 Year With Climate Change Flood Hazard

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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 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.

Areas at risk from the Manchester Ship Canal and Grey Irwell 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 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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Urban Design Zoning for the Manchester Ship Canal and Grey Irwell

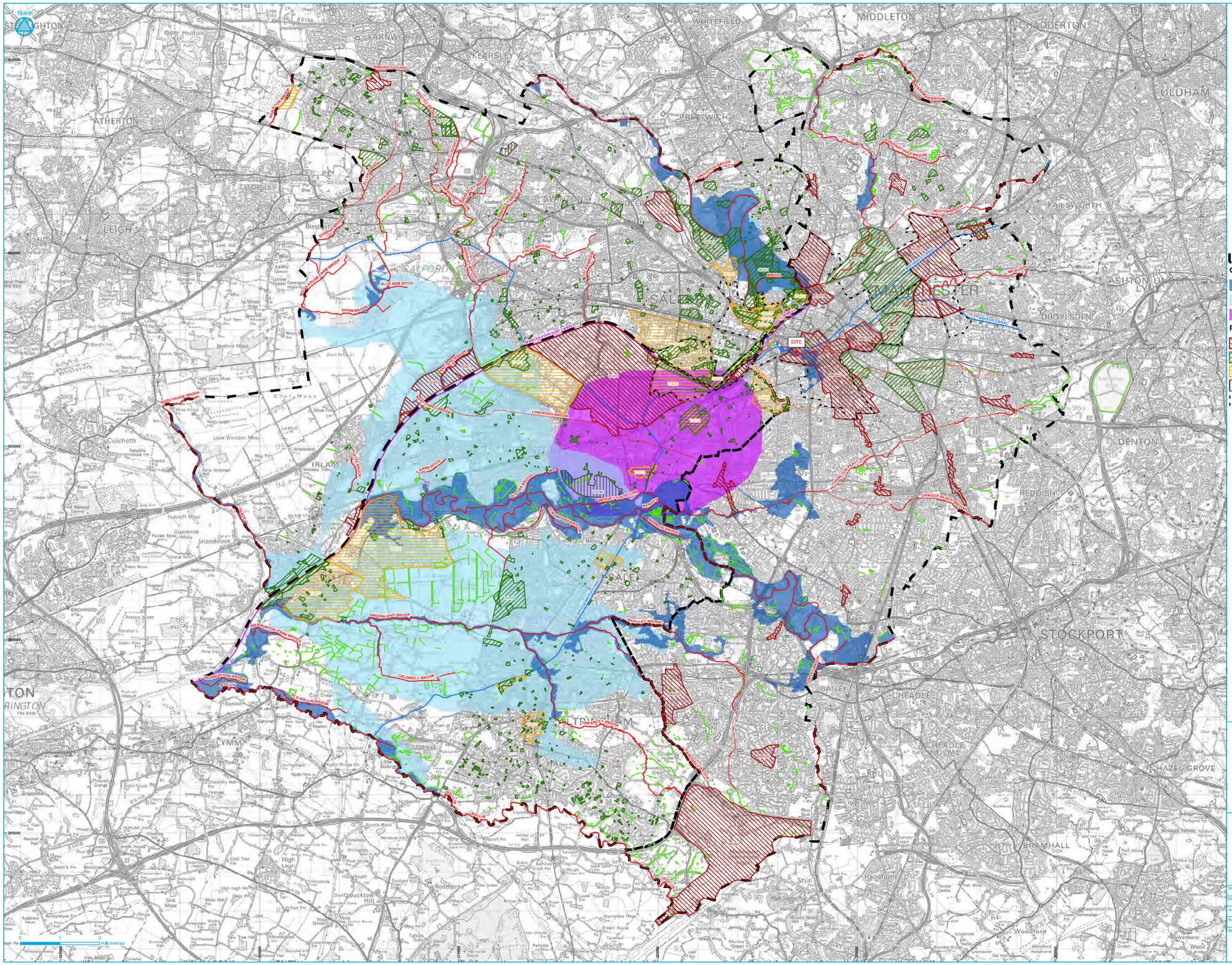
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Council Boundary

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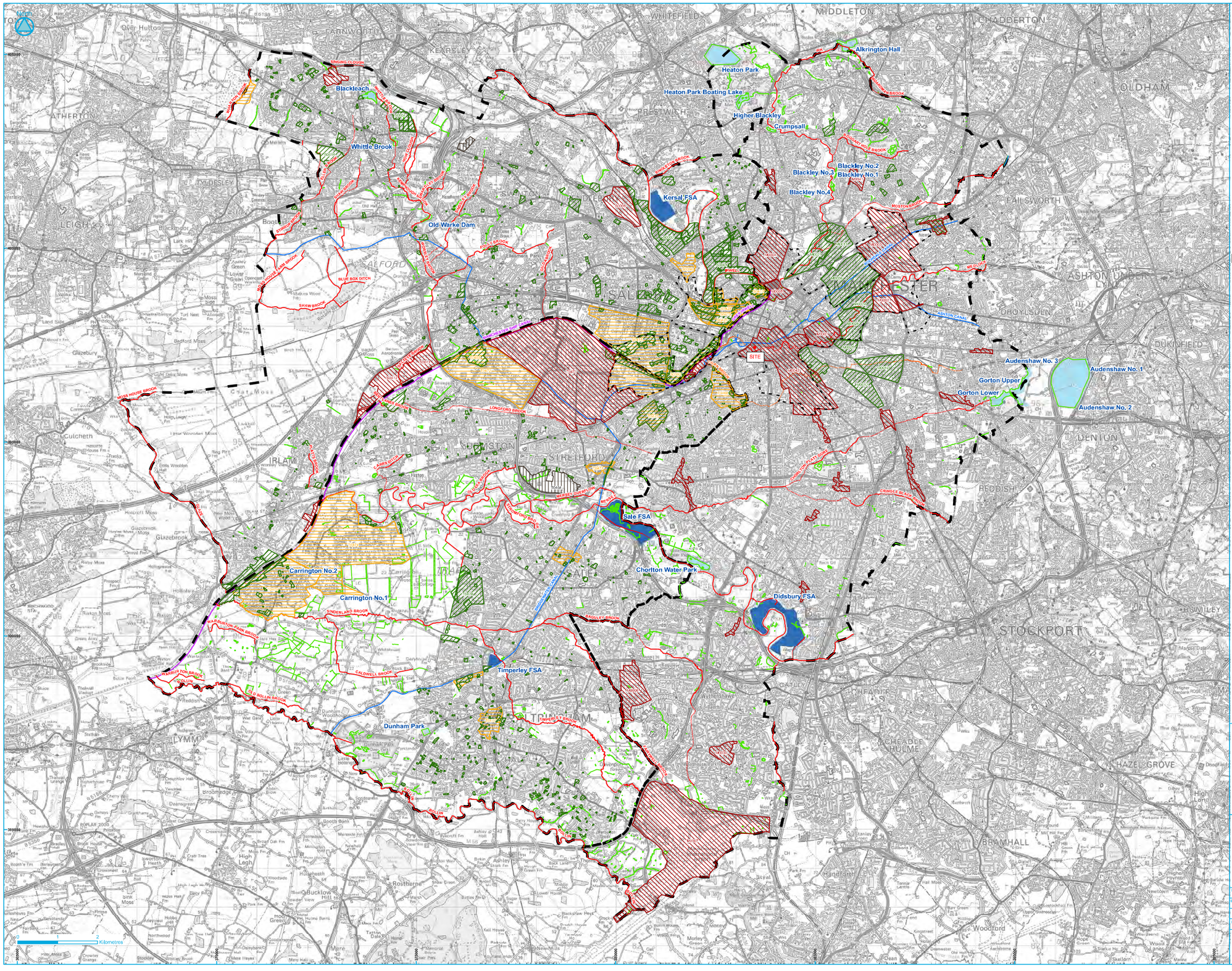
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Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Groundwater Flooding

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Original @ A1





Council Boundary

Reservoirs

- Flood Storage Area
- Reservoir

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 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 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 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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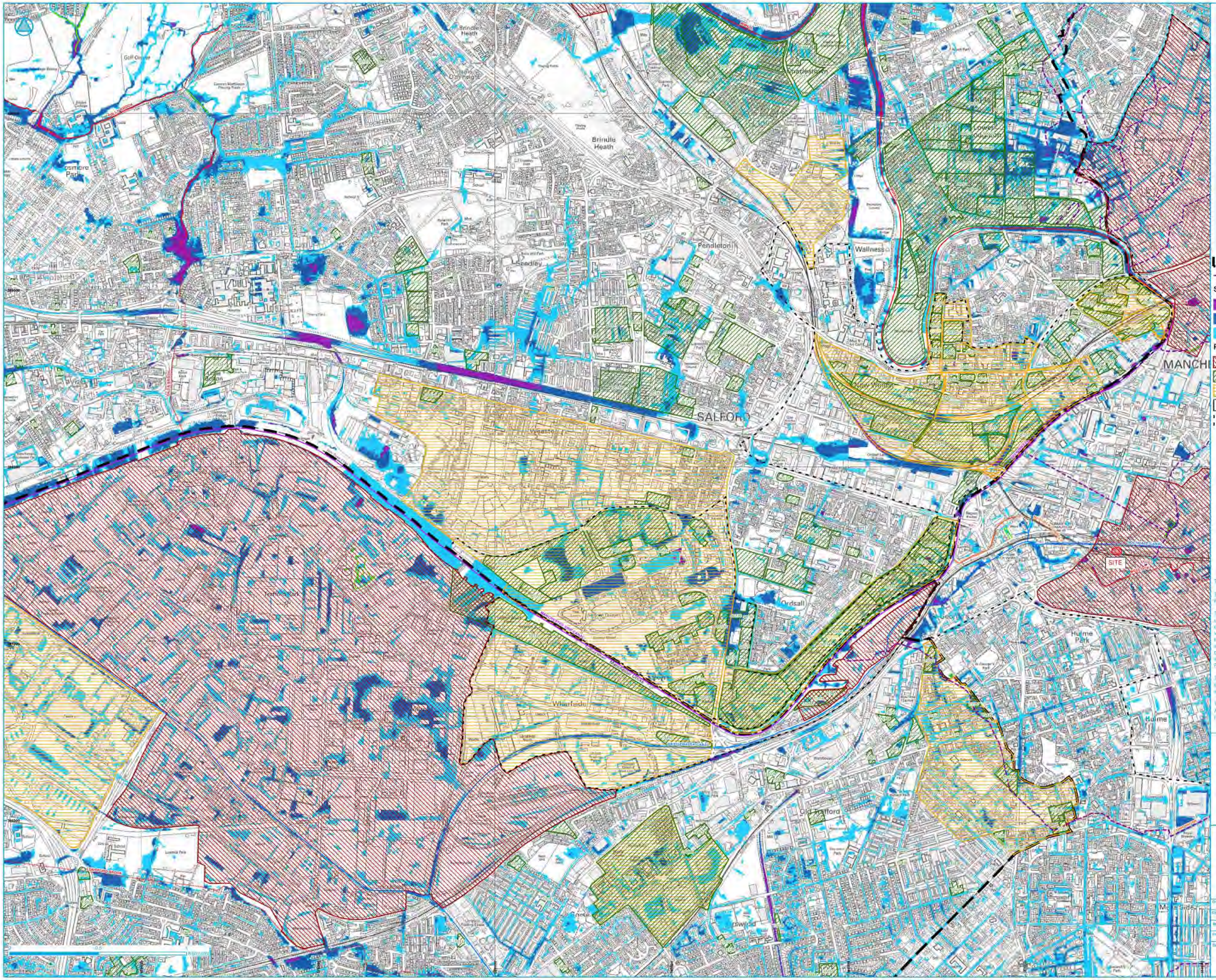
for

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

Reservoir Screening

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Checked by: J Dimelow	Date: 01/02/2011		
Approved by: J Cooper	Date: 01/02/2011		
File Name: ...ArcView\MappingLevel1\MST_ReservoirScreening_V1_2.mxd			
Drawing Number: MM_3.1	Status: FINAL	Scale: 1:45,000	

Original @ A1



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

This map utilises 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 scales 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.

01925 570818
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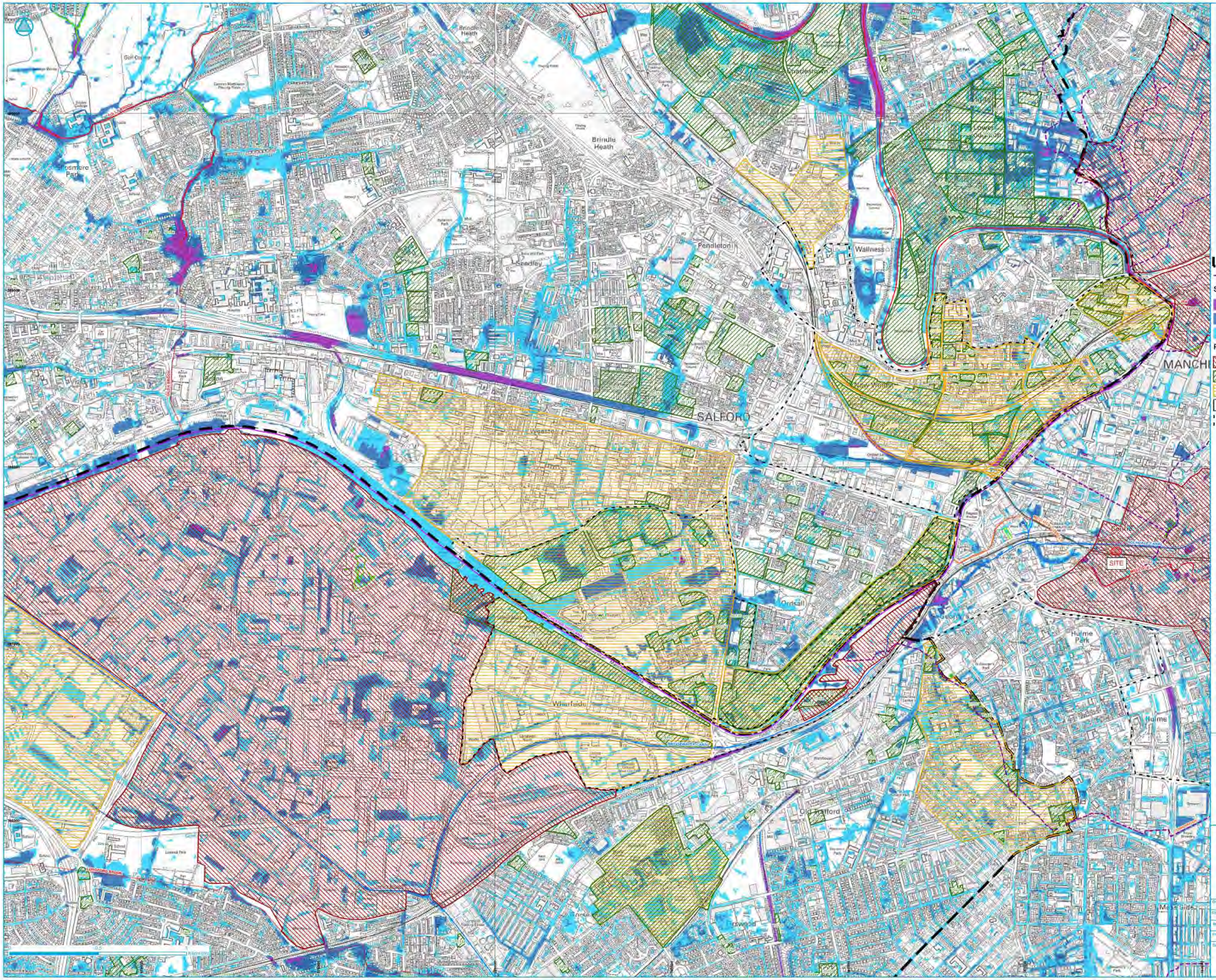
for

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

Susceptibility to Surface Water Flooding - Current Scenario

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Checked by: Glenn	Date: 01/02/2011		
Approved by: Chester	Date: 01/02/2011		
File Name: ...ects\w Mapping\Level2\MST_SurfaceWaterFlooding_Current_V1.1.mxd			
Technical Number: SS_4.1 E	Status: FINAL	Scale: 1:10,000	

Original @ A1



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

This map shows 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 Rivers 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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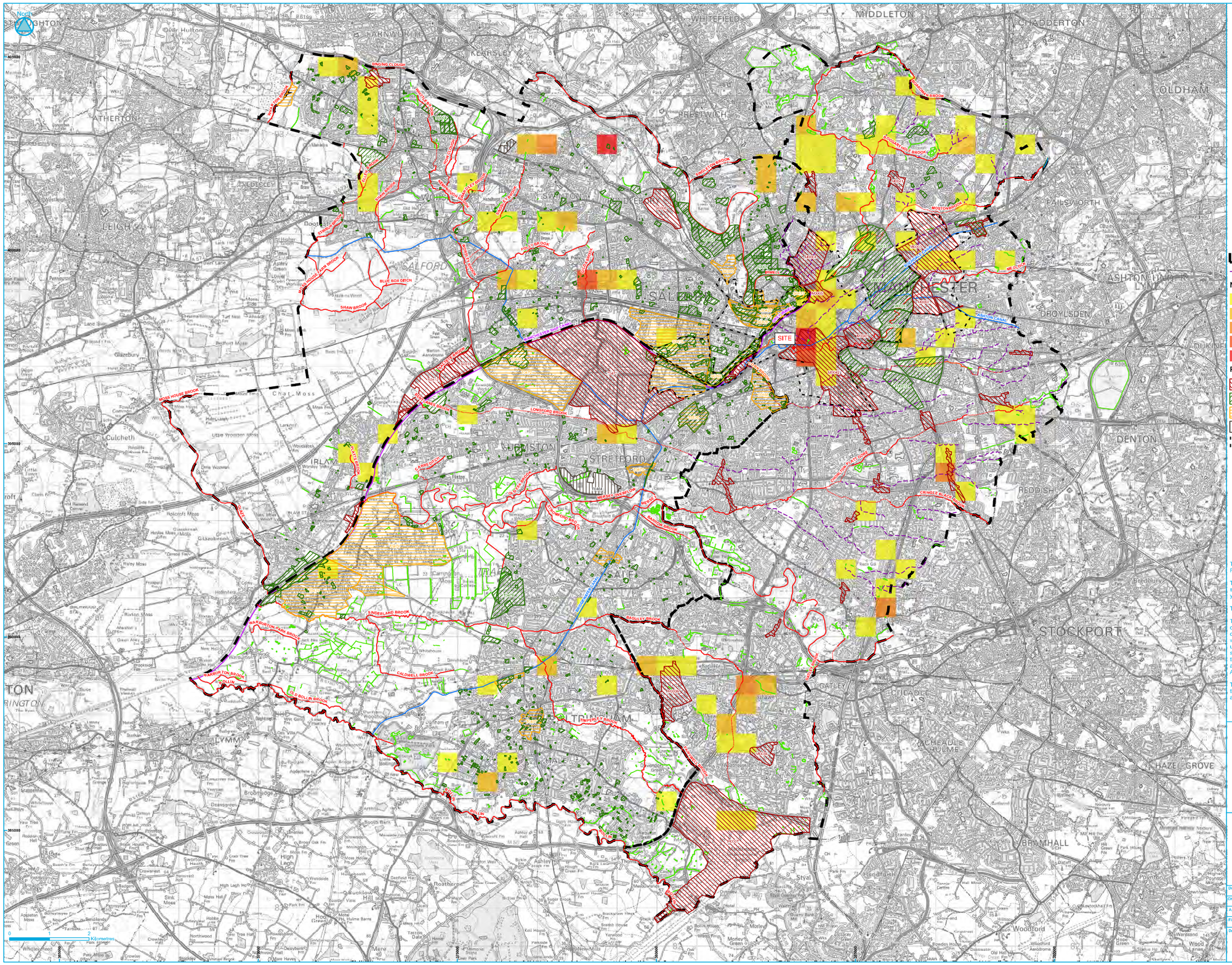
for

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

Susceptibility to Surface Water Flooding - Future Scenario

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Approved by: Chris Lee	Date: 01/02/2011		
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Technical Note no.: SS_4.2 E	Status: FINAL	Scale: 1:10,000	

Original @ A1





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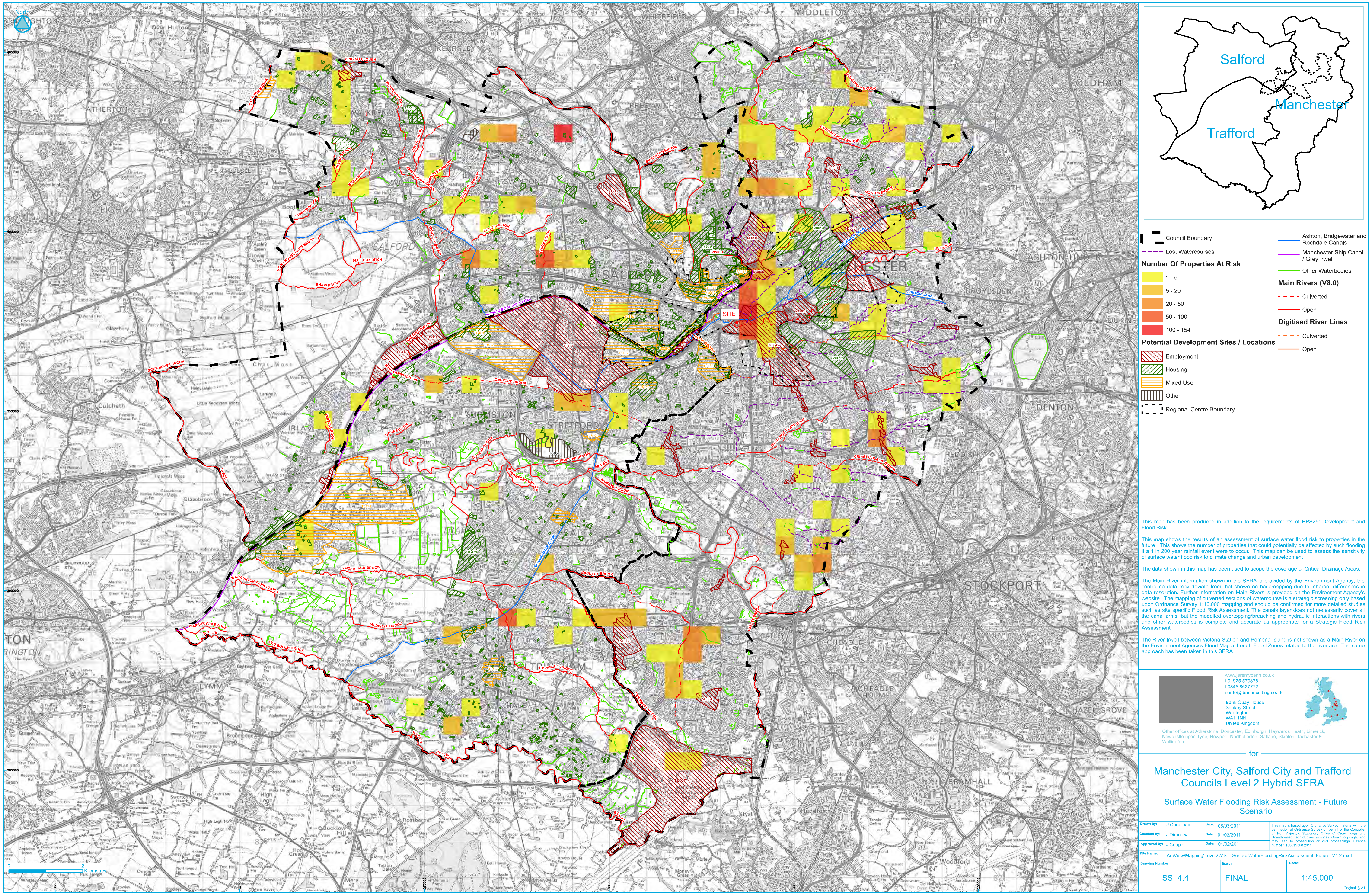
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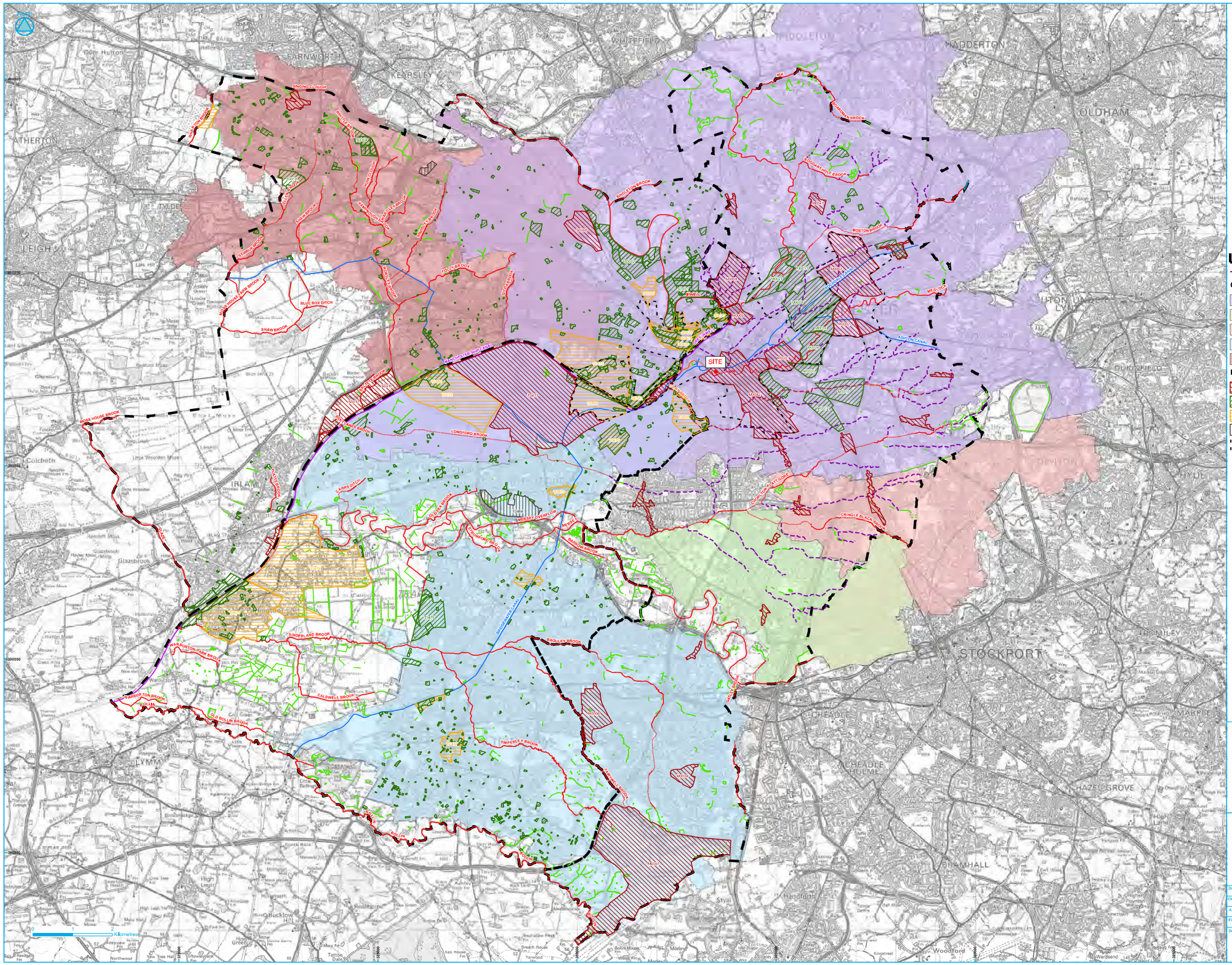
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Surface Water Flooding Risk Assessment - Current Scenario

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Approved by:	J Cooper	Date:	01/02/2011	
File Name:	Arc\View\Mapping\Level2\MST_SurfaceWaterFloodingRiskAssessment_Current_V1.2.mxd			
Drawing Number:	SS_4.3	Status:	FINAL	Scale: 1:45,000

Original @ A1


North
SITE
Salford
Manchester
Trafford
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 Irwell
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 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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for
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA
Surface Water Flooding Risk Assessment - Future Scenario
Drawn by: J Cheetham
Date: 08/03/2011
Checked by: J Dimelow
Date: 01/02/2011
Approved by: J Cooper
Date: 01/02/2011
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Drawing Number: SS_4.4
Status: FINAL
Scale: 1:45,000
Original @ A1
0 1 2 Kilometres



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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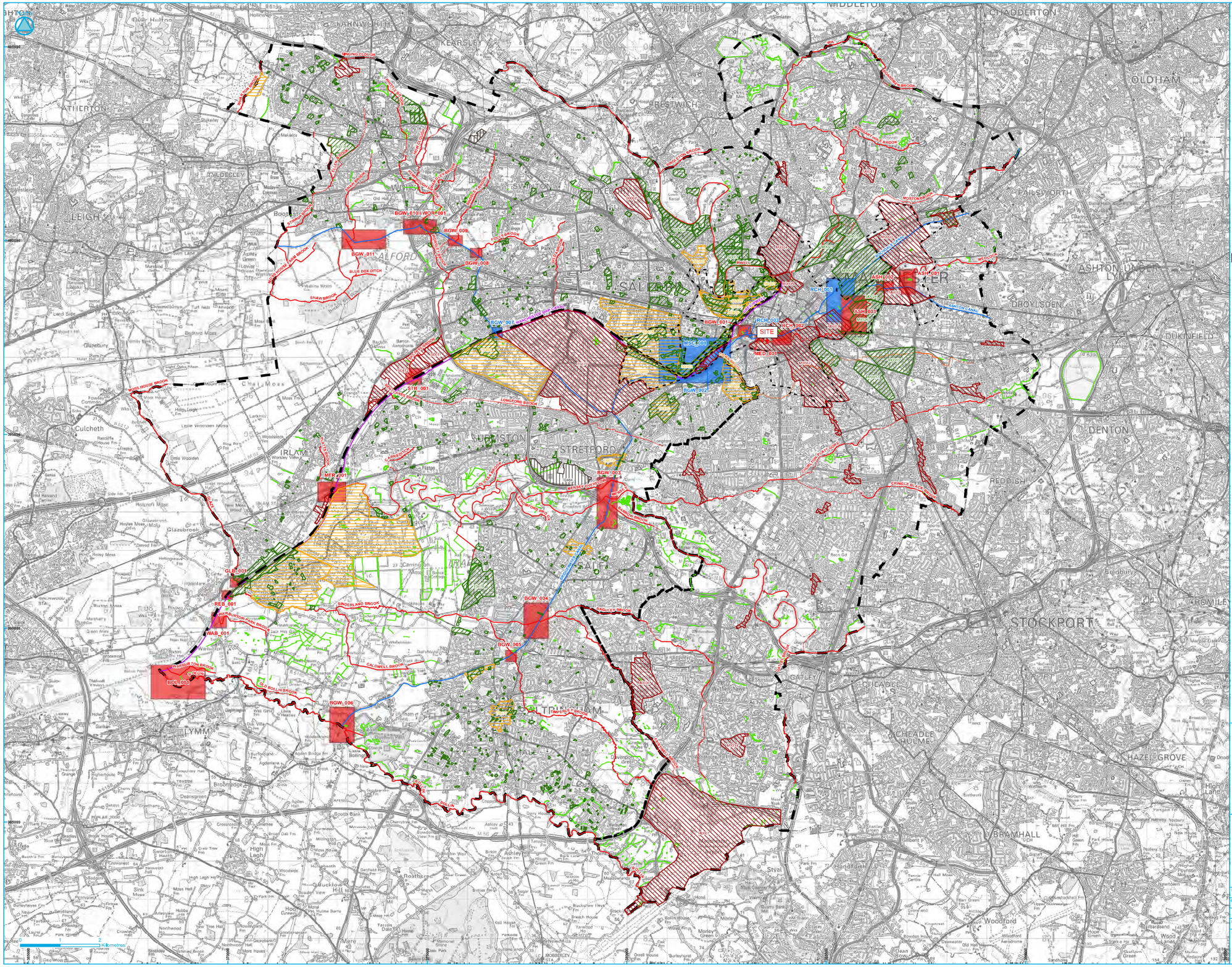
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Critical Drainage Areas

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

Original @ A1



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 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 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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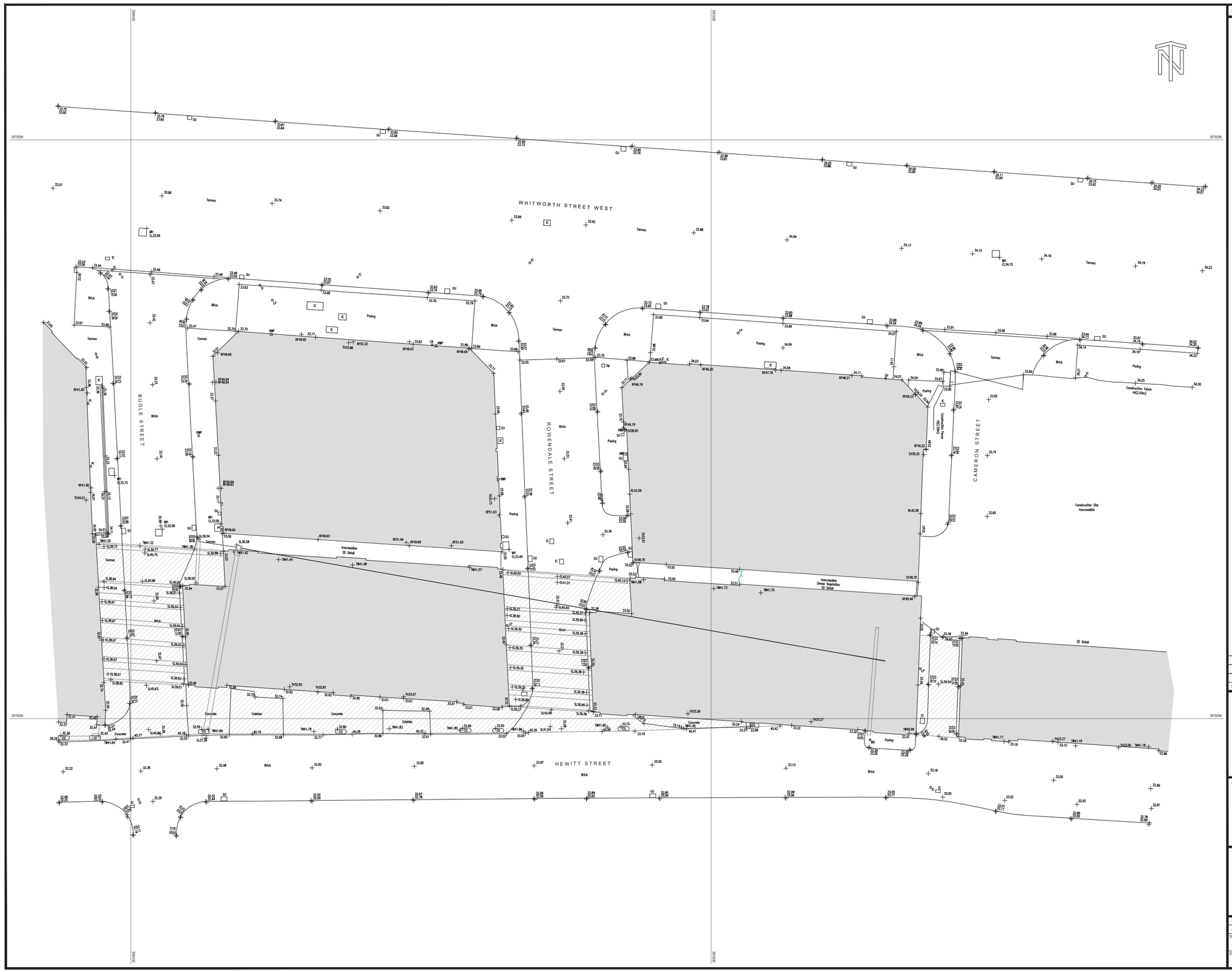
Hydraulic Interactions

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Approved by: J Cooper	Date: 01/02/2011		
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Drawing Number: HI_5.1	Status: FINAL	Scale: 1:45,000	

Orginal @ A1

Appendix 2

Topographical Survey



NOTES

KEY

Grid & Datum - Local Plane Grid related to OS National Grid & Datum By GNSS RTK Observations

STANDARD ABBREVIATIONS

STREET FURNITURE

A/C - AIR CONDITIONING
AE - AERIAL
AL - ALARM
AV - AIR VALVE
BA - BUOYANCY AID
BB - BELISHA BEACON
BD - BUILDING DIVIDE
BH - BOREHOLE
BI - BOLLARD ILLUMINATED
BL - BASEMENT LIGHT
BO - BOLLARD
BOS - BOLLARD POST
BR - BOUNDARY
BS - BUS STOP
BU - BUSH
CA - CABLE
CB - CONTROL BOX
CC - CLOSE CIRCUIT TV
CW - CIGARETTE BIN
DI - DRAIN
CT - CLOSE CIRCUIT TV POLE
DP - DOWN PIPE
DR - DRAIN
Dr.Ch - DRAINAGE CHANNEL
DU - DUCT
EL - ELECTRIC
EP - ELECTRICITY POLE
ER - EARTH ROD
FA - FENDOR ANCHOR
FB - FLOWER BED
FH - FIRE HYDRANT
FL - FLOODLIGHT
FS - FLAG STAFF
GA - GATE
GM - GAS METER
G - GIRTH
GP - GATE POST
GU - GULLY
GV - GAS VALVE
Hyd - HYDRANT
IC - INSPECTION COVER
IT - TRAFFIC COVER
JB - JUNCTION BOX
KO - KERB OFFLET
LA - LADDER
LB - LITTER BIN
LC - LIGHTING COLUMN
LI - LIGHT
LP - LAMP POST
MBO - MOORING BOLLARD
MA - MAST
MH - MANHOLE
MO - MONUMENT
MP - MILE POST
MR - MOORING RING
MW - MONITORING WELL
NP - NAME PLATE
OH - OVERHEAD
OSBM - ORDNANCE SURVEY BENCH MARK
PA - PLAY APPARATUS
PB - PILLAR BOX
PH - PUBLIC HOUSE
PI - PIPE
PL - PLANT
PM - PARKING METER
PN - PAINTER
PO - POST
PP - PETROL PUMP
RH - RIDGE HEIGHT
RS - ROAD SIGN
RI - ROAD SIGN ILLUMINATED
RTW - RETAINING WALL
SA - SATELLITE DISH
SA - STANCHION
SC - SPEED CAMERA
SD - SATELLITTE DISH
SF - SAFETY FENCE
SG - SIGNAL
SI - SIGN
SIL - SIGN ILLUMINATED
SMP - SERVICE MARKER POST
SS - SECURITY SENSOR
ST - STOP TAP
SU - STUMP
SV - STOP VALVE
SW - SWITCHGEAR
TA - TANK
TA - TAP
TBM - TEMPORARY BENCH MARK
TCB - TELEPHONE CALL BOX
TE - TELEPHONE
TM - TICKET MACHINE
TS - TRAFFIC SIGNAL
TP - TELEGRAPH POLE
UTL - UNABLE TO LIFT
VDP - VEHICLE DETECTOR PAD
VP - VENT PIPE
WB - WATER BLOW
WM - WATER METER
WO - WASH OUT
WP - WASTE PIPE

FENCE TYPES

B/W - BARBED WIRE
C/B - CLOSE BOARDED
CI - CORRUGATED IRON
C/P - CONCRETE PANEL
H/R - HANDRAIL
I/R - IRON RAILING
PAL - PALISADE
P/C - POST & CHAIN
P/P - POST & PANEL
P/R - POST & RAIL
PSB - PEDESTRIAN SAFETY BARRIER
P/W - POST & WIRE
W/M - WIRE MESH

LEVELS

EL43.45 - BED LEVEL
EV43.45 - EAVE LEVEL
IL43.45 - INVERT LEVEL
43.45 - SPOT LEVEL
RF43.45 - ROOF LEVEL
RL43.45 - RIDGE LEVEL
SB43.45 - SOFT BED LEVEL
SI43.45 - SOFFIT LEVEL
TH43.45 - THRESHOLD LEVEL
WL43.45 - WATER LEVEL

SYMBOLS

HEDGE
GATE
BUILDING
TREE CANOPY
CONTROL STATION
EMBANKMENT
TREE
BUSH

Rev	Date	Drawn	Description	Chk'd	App'd
A	31.10.23	TB	Client Details Changed	AM	NDO

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UNION
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MANCHESTER
M2 6LW

Title

2 - 4 WHITEWORTH STREET
MANCHESTER

TOPOGRAPHICAL SURVEY
SHEET 1 OF 1

Surveyed	TB	Drawn	TB	Drawn Date: 20/10/2023
Checked	AM	Approved	NDO	

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Project: 12624
CAD File: P:\12624\DRAWINGS\12624_001.DWG
Status: REV
Drawing No: 12624 / 001A / 1
Rev: A