

# Trafford Local Flood Risk Management Strategy



September 2014



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## Foreword

Flooding can have a serious impact on people and the environment, and this is likely to become more severe with climate change.

Whilst the Council has worked with its partners for many years to manage and mitigate flood risk, this is its first Local Flood Risk Management Strategy.

The Strategy deals with surface water, groundwater and watercourses in the Borough that are not main rivers, which includes canals. It includes a range of actions to address the issues identified.

Together we can all make Trafford a safer and more pleasant place in which to live, work, play, be educated and to visit.

**Councillor John Reilly**

**Executive Member for Environment and Operations**

# 1: Background

## The requirement to produce a Strategy

- 1.1 Trafford Council is a unitary authority located at the heart of the Greater Manchester City Region. In addition to sharing boundaries and broader policy objectives with neighbouring authorities, including Manchester and Salford, Trafford is hydrologically linked to these areas through a network of rivers, canals, sewers and drains.
- 1.2 Under Section 9 of the Flood and Water Management Act 2010, Trafford Council, as Lead Local Flood Authority (LLFA) for its area, is required to produce a strategy for managing Local Flood Risk, which means flooding from:
  - surface run-off;
  - groundwater;
  - ordinary watercourses (watercourses that are not main rivers, including canals).
- 1.3 The Local Flood Risk Management Strategy (LFRMS) must be consistent with the National Flood and Coastal Erosion Risk Management Strategy and the Lead Local Flood Authority must consult risk management authorities that may be affected by the strategy, and the public, as part of the preparation process. Section 11 of the Act sets out how all flood risk management authorities should use the LFRMSs.

## The National Flood and Coastal Erosion Risk Management Strategy for England

- 1.4 The National Flood and Coastal Erosion Risk Management Strategy for England, produced by the Environment Agency working jointly with the Department for Environment, Food and Rural Affairs (DEFRA), was first published in September 2011. The Flood and Water Management Act 2010 states that LFRMSs must be consistent with the National Strategy, the overall aim of which is to ensure that the risk of flooding and coastal erosion is properly managed using the full range of options in a co-ordinated way.
- 1.5 The National Strategy sets five **objectives** to support its delivery. These are:
  - understanding the risks of flooding and coastal erosion, working together to put in place long-term plans to manage these risks and making sure that other plans take account of them;
  - avoiding inappropriate development in areas of flood and coastal erosion risk and being careful to manage land elsewhere to avoid increasing risks;
  - building, maintaining and improving flood and coastal erosion management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, environment and society;

- increasing public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient;
- improving the detection, forecasting and issue of warnings of flooding, planning for and co-ordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

1.6 The National Strategy sets out six guiding principles to be followed:-

- *Community focus and partnership working*
- *A catchment based approach*
- *Sustainability*
- *Proportionate, risk-based approaches*
- *Multiple benefits*
- *Beneficiaries should be allowed and encouraged to invest in local risk management.*

### **The Greater Manchester context**

1.7 Greater Manchester represents the largest functional economic area outside London with a population of 2.6 million people, at the heart of a travel to work area of 7 million people, and generates economic output of £46 billion each year. Greater Manchester is a diverse conurbation with significant differences in productivity, connectivity and relative levels of wealth and deprivation.

1.8 The Association of Greater Manchester Authorities (AGMA) represents the ten local authorities in Greater Manchester and supports working together strategically, as there is often added value in doing things once as opposed to several times locally. Examples of such collaborative working include the Greater Manchester Strategic Flood Risk Assessment (2008) and Surface Water Management Plan (2012/2013). In order to support the Districts in meeting their duties, appropriate AGMA governance arrangements have been established through the North West Regional Flood and Coastal Committee (RFCC) and the Greater Manchester Flood and Water Management Board.

1.9 This Local Flood Risk Management Strategy (LFRMS) is one of a suite of ten covering the Greater Manchester area focusing on 'local flood risk', which is flooding caused by surface run-off, groundwater and ordinary watercourses. It is an important tool to help everyone understand and manage flood risk and is therefore of relevance to everyone who lives, works, plays or is educated in, or visits, the area.

## 2: Purpose

### 2.1 The Trafford Local Flood Risk Management Strategy:

- Identifies the flood risk management authorities in the Borough and the functions that may be exercised by those bodies;
- Provides an assessment of local flood risk;
- Identifies the objectives for managing local flood risk, the measures proposed to achieve those objectives, the costs and benefits of those measures and how they are expected to be implemented;
- Outlines how the Strategy contributes towards the achievement of wider environmental objectives;
- Outlines how and when the Strategy will be reviewed.

### 3: Risk Management Authorities and their functions

3.1 There are the following Risk Management Authorities (RMAs) in Trafford:-

- The Council, as Lead Local Flood Authority (LLFA)
- The Council, as Local Highway Authority (LHA)
- The Environment Agency
- United Utilities
- The Highways Agency

3.2 The responsibilities of these bodies are outlined in the following sections.

#### **The Council, as Lead Local Flood Authority**

3.3 The Flood and Water Management Act 2010 gives a wide range of new duties, responsibilities and powers to the Council as Lead Local Flood Authority (LLFA). The key ones are outlined as follows:-

#### *Local Flood Risk Management Strategy*

3.4 The Council is required to develop, maintain, apply and monitor a local strategy for flood risk management in its area. Local strategies will build on information such as national risk assessments and will use consistent risk based approaches across different local authority areas and catchments. The local strategy will not be secondary to the national strategy; rather it will have distinct objectives to manage local flood risks important to local communities.

#### *Investigating flooding incidents*

3.5 The Council has a duty to investigate and record details of significant flood events within its area. This duty includes identifying risk management authorities and their functions and how they intend to exercise those functions in response to a flood. The responding risk management authority must publish the results of its investigation and notify any other relevant risk management authorities.

#### *Flood Risk Asset Register and Record*

3.6 The Council has a duty to maintain a register and record of structures or features which are considered to have a significant effect on flood risk, including details of ownership and condition as a minimum. The record must be available for inspection and the Secretary of State will be able to make Regulations about the content of the register and record. Sustainable Drainage Systems (SuDS) will be required to be recorded on the register.



### *Works Powers*

- 3.7 The Act provides the Council with powers to do works to manage flood risk from surface runoff, groundwater and on ordinary watercourses, consistent with the local flood risk management strategy for the area.

### *Various*

- 3.8 Various changes are made to the Land Drainage Act 1991 and a number of responsibilities are transferred from the Environment Agency to the Council, including those relating to consenting of works adjacent to ordinary watercourses.
- 3.9 The Council is required to make a contribution towards Sustainable Development when exercising its flood and erosion risk management functions.

### *Designation Powers*

- 3.10 The Act provides the Council with powers to designate structures and features that affect flooding or coastal erosion. These powers are intended to overcome the risk of a person damaging or removing a structure or feature that is on private land and which is relied on for flood or coastal erosion risk management. Once a feature is designated, the owner must seek consent to alter, remove, or replace it.
- 3.11 Designating structures or features has the effect of limiting what alterations can be made without the designating authority's prior consent. This does not affect the day-to-day operation of the asset, nor does it mean that it cannot ever be modified, merely that consent will be required to ensure that any work done does not increase flood risk. Only structures/features which have an impact on flood risk can be designated.
- 3.12 Though there is scope for a very broad range of structures and features to be designated, those most likely to be designated in practice include walls (standalone or the side of a building), earth embankments and isolated pieces of naturally high ground.
- 3.13 DEFRA has published additional guidance on the Designation process for Risk Management Authorities. This guidance advises that designation should be risk based and targeted where it is most appropriate. In particular, if the owner is aware of the flood risk management function served by their structure/feature and has appropriate systems in place to manage the risks, designation may not be appropriate.
- 3.14 The key consideration is the effect of the feature or structure on flood risk. Ultimately it is a decision for each individual LLFA as to what it considers is appropriate in the context of local circumstances.

### *SuDS Approving Body*

- 3.15 The Act establishes each LLFA as a SuDS Approving Body (the ‘SAB’). The SAB will have responsibility for the approval of proposed drainage systems in new developments and redevelopments, subject to exemptions and thresholds. Approval must be given before the developer can commence construction. The SAB will also be responsible for adopting and maintaining SuDS, which serve more than one property, where they have been approved. Highways authorities will be responsible for maintaining SuDS in public roads to national standards.

### **The Council, as Local Highway Authority**

- 3.16 The Council, as Local Highway Authority, is responsible for drainage from adopted highways. This includes most of the road network within Trafford.

### **The Environment Agency**

- 3.17 The Environment Agency is a non-departmental public body of DEFRA and is the national lead on all matters relating to flooding. This includes building and maintaining flood defences, responsibility for main rivers, flood forecasting and warning, and generally improving awareness of flood risk.

- 3.18 The Flood and Water Management Act 2010 places new responsibilities on the Environment Agency for flood risk management. Under the Act, the Environment Agency must develop, maintain, apply and monitor a strategy for flood and coastal erosion risk management in England. The strategy must specify among other things:-

- The risk management authorities and the flood and coastal erosion risk management functions that may be exercised by those authorities
- The objectives for managing flood and coastal erosion risk and the measures proposed to achieve those objectives
- The costs and benefits of those measures, and how they are to be paid for
- How the strategy is to be reviewed.

- 3.19 The Environment Agency’s strategy is intended to be the overarching document for managing flood risk across England. Every other agency involved in flood and coastal erosion risk management functions – such as local authorities, internal drainage boards, water companies and highway authorities – must take account of this strategy. In working up the strategy, the Environment Agency must consult a number of stakeholders (including the public) and must publish a draft of the document and any accompanying guidance.

- 3.20 The Act requires the Environment Agency to co-operate with other risk management authorities and enables it to share information with them relating to this requirement. The Agency also has the power under the Act to request

information from persons in connection with the authority's flood and coastal erosion risk management functions.

- 3.21 The Act sets out that the Environment Agency may make grants in respect of expenditure incurred or expected to be incurred in connection with flood or coastal erosion risk management and may issue levies to the Lead Local Flood Authority for an area in respect of the Agency's flood and coastal erosion risk management functions in that area.
- 3.22 The Environment Agency is required under the Act to report to the Government on flood and coastal erosion risk management.
- 3.23 A further, key requirement of the Act is for the Environment Agency to establish, and consult, Regional Flood and Coastal Committees.
- 3.24 The Act amends the Reservoirs Act 1975, together with a range of other legislation, relating to a number of Environment Agency functions.

### **United Utilities**

- 3.25 United Utilities (UU) is the sewerage and water undertaker responsible for the development and maintenance of the water supply and public sewerage system in North West England, including Trafford. As such, it is responsible for dealing with water mains leakages and failures, together with sewer flooding when the amount of water entering the sewer system exceeds its design capacity or the system becomes blocked.
- 3.26 Under legislation governing the operation of the water industry, UU is required to maintain a register of sewer flooding known as the DG5 Register. This is a register of all internal and external properties that have been affected by flooding due to hydraulic capacity problems on the sewerage network.
- 3.27 United Utilities has invested significant amounts of money in the region, including Trafford, to reduce the risk of flooding to properties in addition to improving the quality of the water environment. As with other water companies, UU operates on a five-yearly cycle of investment known as Asset Management Plans (AMPs). Each AMP sets out a programme of investment and is submitted to the water industry regulator OFWAT (the Water Services Regulation Authority) for approval.

### **The Highways Agency**

- 3.28 The Highways Agency operates, maintains and improves the strategic road network in England on behalf of the Secretary of State for Transport. This includes being responsible for drainage from highways for which it has responsibility.
- 3.29 In Trafford the Highways Agency has responsibility for the M60 and slip roads leading to the M56.

## 4: Assessment of local flood risk

- 4.1 There is a range of documents, produced by various bodies over a number of years, which deal with flood risk from various sources in Trafford. These documents are summarised as follows.

### **Greater Manchester Strategic Flood Risk Assessment (AGMA, 2008)**

- 4.2 In 2007 Scott Wilson consultancy was commissioned by the Association of Greater Manchester Authorities (AGMA) to undertake a sub-regional Strategic Flood Risk Assessment (SFRA). The Greater Manchester SFRA sought to assess flood risk arising from all sources and set out potential management and mitigation measures to assist in preparing local development documents, determining planning applications and emergency planning. The Greater Manchester SFRA was finalised in August 2008.
- 4.3 Whilst the Greater Manchester SFRA provided useful information on flooding from main rivers, including the likely impacts of climate change, and from groundwater there were a number of key areas where data were limited or unavailable. These included flood risk from the Manchester Ship Canal and Bridgewater Canal, sewers and surface water.
- 4.4 The Greater Manchester SFRA included a Sustainable Drainage Systems (SUDS) Map and User Guide, providing advice on the different types of system that would be appropriate in various parts of the conurbation having regard to local hydro-geology.

### **River Basin Management Plan: North West River Basin District (Environment Agency, 2009)**

- 4.5 This plan is about the pressures facing the water environment in the North West River Basin District, and the actions that will address them. It has been prepared under the European Union Water Framework Directive, and is the first in a series of six-year cycles of planning and action.

### **Irwell Catchment Flood Management Plan (Environment Agency, 2009)**

- 4.6 This document provides an overview of flood risk in the Irwell catchment and sets out the Environment Agency's preferred plan for sustainable flood risk management over the next 50 to 100 years.
- 4.7 Whilst the Catchment Flood Management Plan (CFMP) covers all types of inland flooding, particularly main rivers for which the Agency has direct responsibility, data on surface water and groundwater are limited.
- 4.8 The Manchester Ship Canal within Trafford is covered in the CFMP and Trafford Park is identified as being one of the areas adjacent to it. A proposed action is to undertake more detailed studies to identify current and future flood risk from the Manchester Ship Canal.

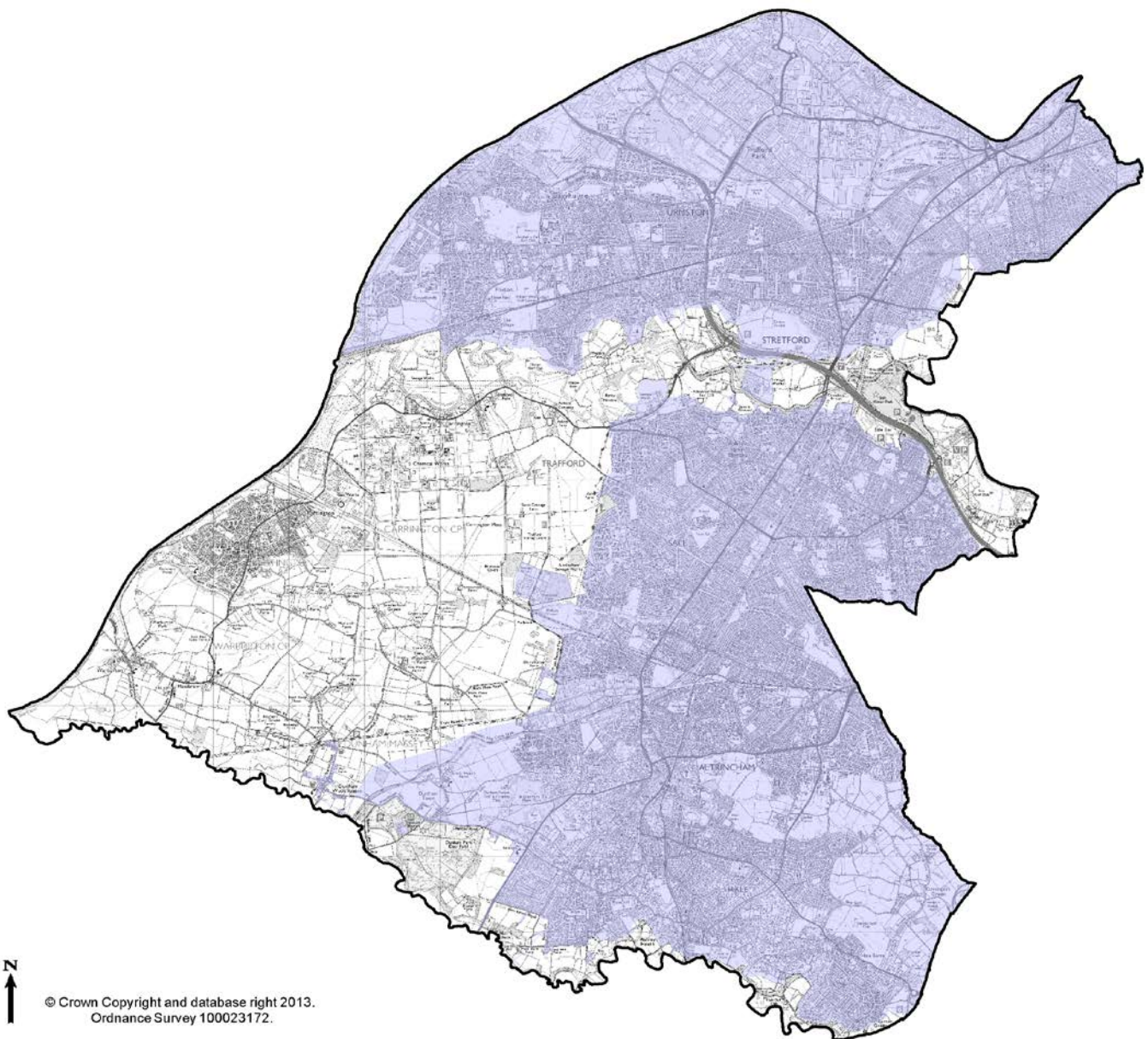
### **Upper Mersey Catchment Flood Management Plan (Environment Agency, 2009)**

- 4.9 This document provides an overview of flood risk in the Upper Mersey catchment and sets out the Environment Agency's preferred plan for sustainable flood risk management over the next 50 to 100 years.
- 4.10 Whilst the Catchment Flood Management Plan (CFMP) covers all types of inland flooding, particularly main rivers for which the Agency has direct responsibility, data on surface water and groundwater are limited.
- 4.11 The River Mersey, Bollin and Sinderland Brook within Trafford are covered in some detail in the CFMP. Sale and Altrincham are identified as having a history of flooding and as being at greatest risk in terms of the probability of flooding and numbers of properties/people likely to be affected.

### **Manchester, Salford and Trafford Level 2/Hybrid Strategic Flood Risk Assessment (Manchester City Council, Salford City Council, Trafford Council, 2010/2011)**

- 4.12 In June 2009 JBA consultancy was appointed by Manchester City Council, Salford City Council and Trafford Council to undertake a joint Level 2/Hybrid Strategic Flood Risk Assessment for their areas. This study was intended to fill in the data gaps in the Greater Manchester SFRA, as they relate to the three Districts, and examine in more detail flood risk arising from the principal sources particularly where major development is proposed.
- 4.13 The Manchester, Salford and Trafford Level 2/Hybrid Strategic Flood Risk Assessment was agreed in 2010 as a sound, independent analysis of the risk posed by flooding from all sources in the study area. A joint statement was issued by Manchester City Council, Salford City Council, Trafford Council and the Environment Agency and the final reports published. In 2011, an updated map base was used to revise the Level 2 Report and mapping volume. However, the fundamental conclusions of the study remained the same.
- 4.14 The JBA work provided a considerable amount of detailed information on flood risk in Trafford arising from the River Mersey, Sinderland Brook catchment, the Manchester Ship Canal, Bridgewater Canal, sewer network, surface water run-off and groundwater. A key element of the work was the identification of Critical Drainage Areas covering most of the Borough's built-up areas, and the provision of interim, technical advice on drainage standards in new developments as part of a dedicated User Guide. Figure 1 is a simplified plan showing the Critical Drainage Areas from the SFRA shaded on a map of Trafford.

**Figure 1: Critical Drainage Areas within Trafford**

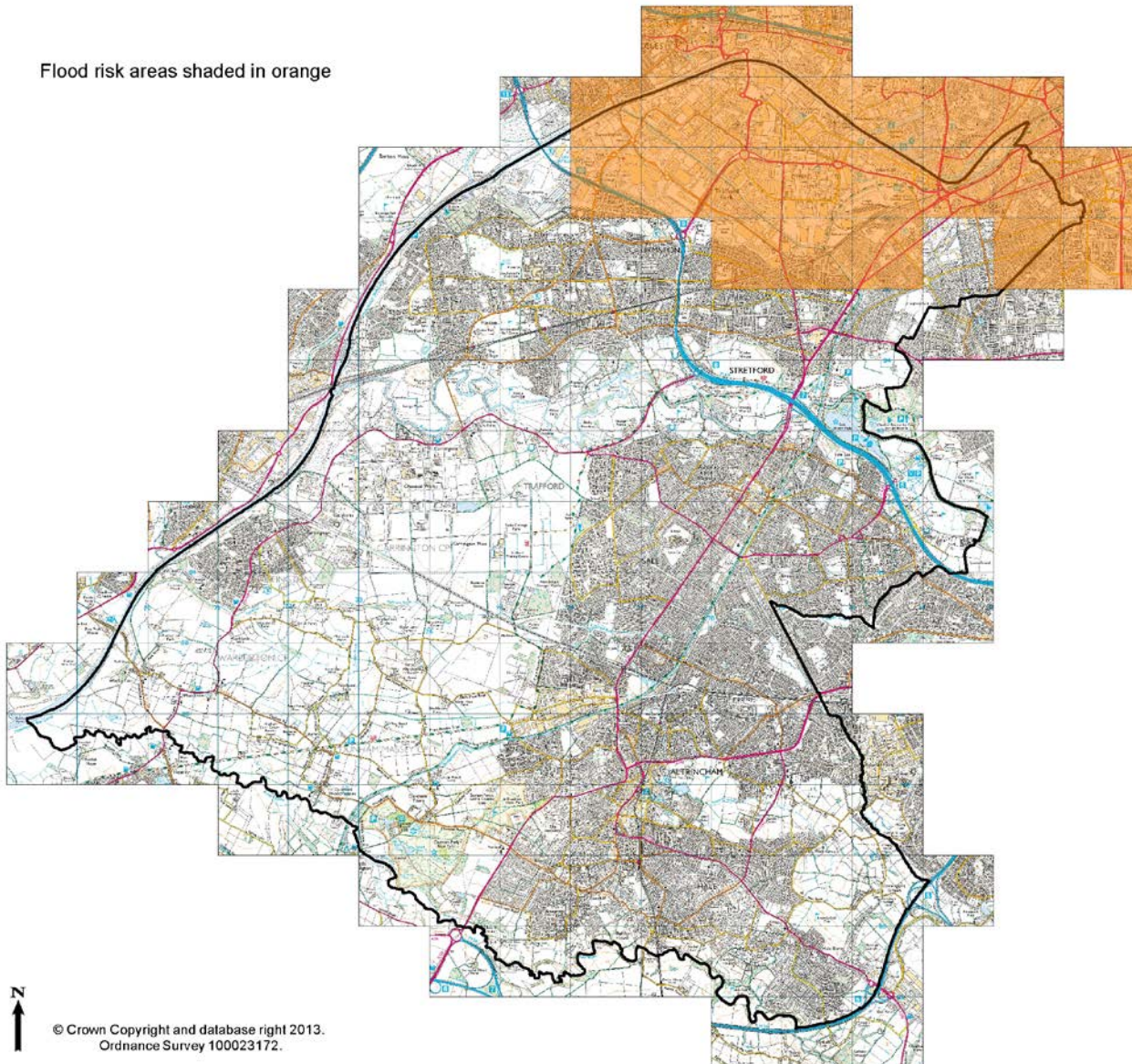


### **Preliminary Flood Risk Assessment (Trafford Council, 2011)**

- 4.15 As a 'Lead Local Flood Authority', under the Flood Risk Regulations 2009, the Council is required to prepare a 'preliminary assessment report' focusing on local flood risk from surface water, groundwater, ordinary watercourses and interactions between these sources together with other sources of flooding such as main rivers, the sea and reservoirs.
- 4.16 In Greater Manchester, AGMA Districts worked jointly to commission the preparation of individual Preliminary Flood Risk Assessments (PFRAs) using JBA consulting.

4.17 The Trafford PFRA was completed in May 2011, approved by the Council's Executive Member for Highways and Transportation in June 2011 and submitted for review to the Environment Agency (EA). The final document was published in December 2011.

**Figure 2: Trafford and the Greater Manchester Flood Risk Area**



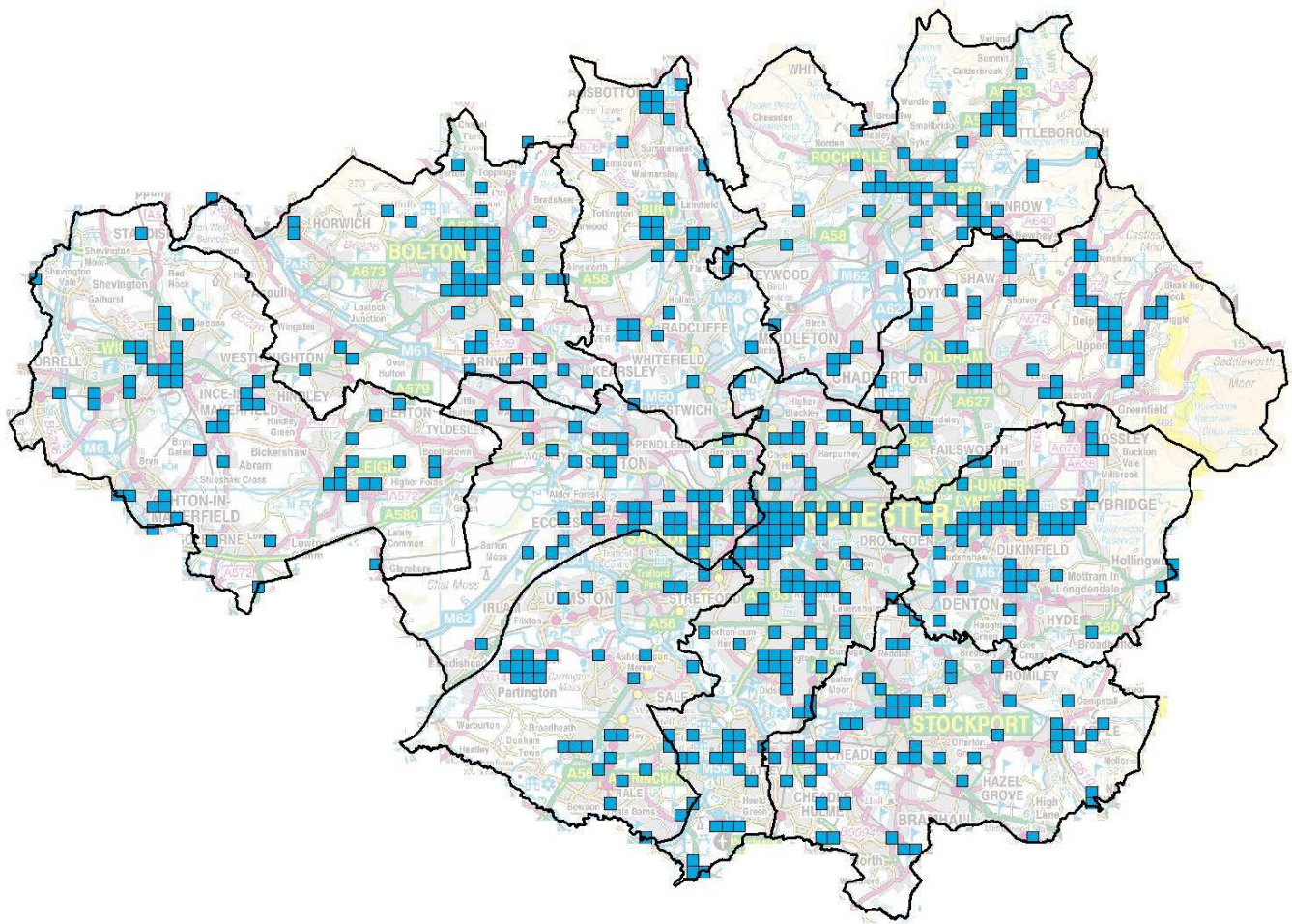
- 4.18 Figure 2 shows those locations in Trafford that the PFRA highlighted as forming part of the Greater Manchester Flood Risk Area. In order to ensure a consistent national approach to identifying indicative Flood Risk Areas, Government identified flood risk criteria and thresholds. The Environment Agency then used these with the national Flood Map for Surface Water (FMfSW) and the National Receptor Dataset (NRD) to identify areas at risk. Where clusters of these areas above the flood risk thresholds reached over 30,000 people they were identified as indicative Flood Risk Areas. Within the Greater Manchester Flood Risk Area a total of 86,500 people were identified as being at risk, of which 900 fall within Trafford.

### **Greater Manchester Surface Water Management Plan (AGMA, 2012/2013)**

- 4.19 The Greater Manchester Surface Water Management Plan is a study of surface water flood risk and provides evidence to support local authorities across Greater Manchester in prioritising and taking action to manage that risk.
- 4.20 The Surface Water Management Plan was developed in two stages. Stage 1 provided a strategic assessment of surface water flood risk, and was based on new sub-regional surface water hazard modelling (known as the Strategic Flood Map) which was then overlaid with the location of local critical and vulnerable receptors to identify surface water 'hotspots'. A total of 580 such 'hotspots' were identified across Greater Manchester. Stage 2 included 13 individual local projects, including one at Timperley in Trafford. The Timperley project involved a detailed investigation of the causes of surface water flooding in the area and made recommendations for further action.
- 4.21 Figure 3 provides an illustration of the overall distribution of surface water flood risk in Greater Manchester, based on work undertaken as part of the Greater Manchester Surface Water Management Plan.
- 4.22 Each grid square represents a 'hotspot' and has been derived by first mapping an extreme 1 in 200 year surface water flood event then identifying sensitive receptors (people, property, infrastructure and key services) potentially at risk. Where agreed thresholds were exceeded for any one receptor in the list below within a particular grid square then that square was flagged as a potential surface water hotspot:-
- 55 or more residential properties
  - 15 or more commercial properties
  - A score of 5 or more for critical flood risk infrastructure
  - More than 100 square metres of 'dangerous for some' and 'dangerous for all' flood hazards



**Figure 3: Surface water flooding hotspots in Greater Manchester**



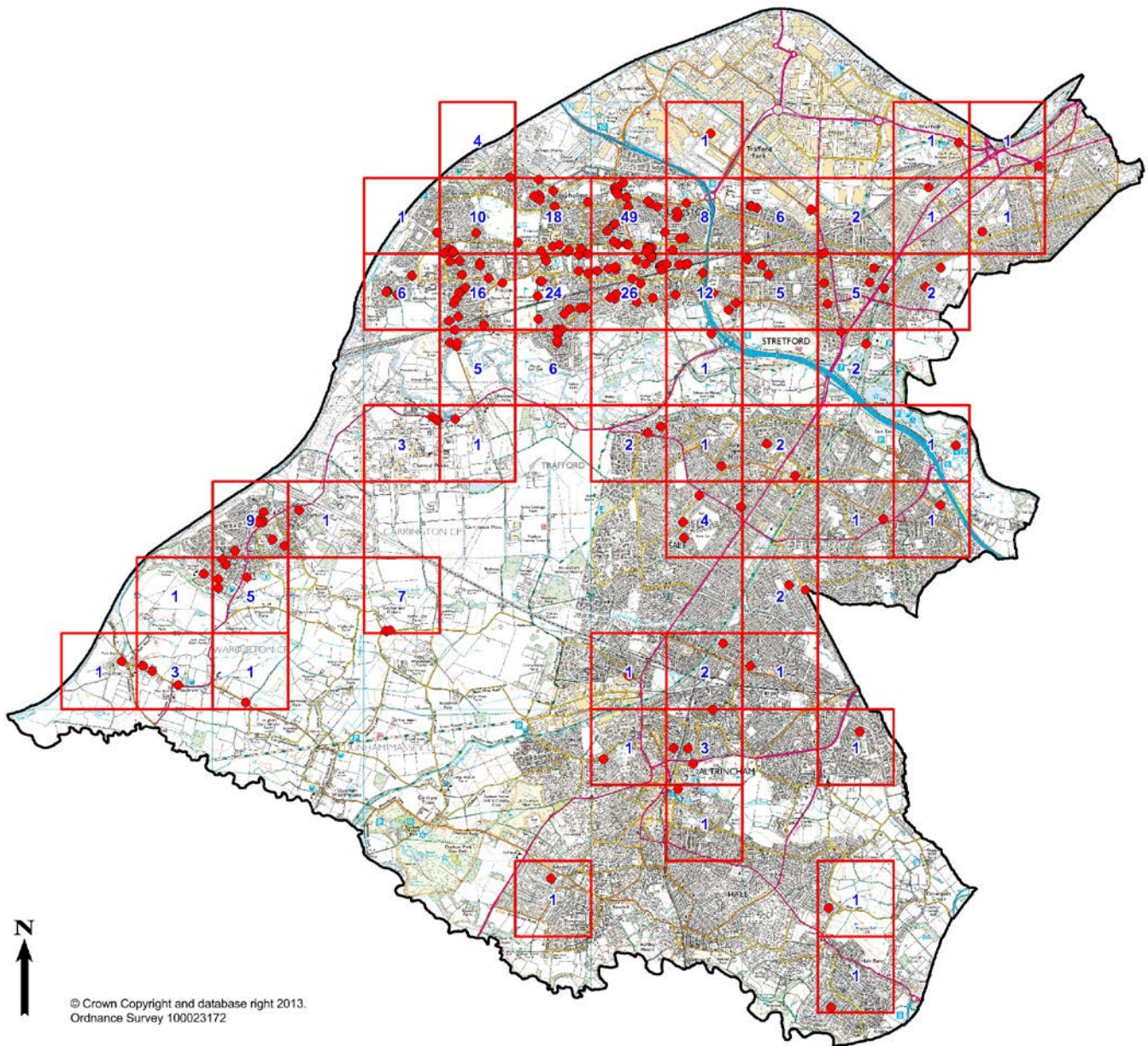
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Source: Greater Manchester Surface Water Management Plan

### **Incident data (Trafford Council, 2012/2013)**

- 4.23 The Council has a mechanism in place to enable flooding incidents to be logged and investigated, in line with the adopted AGMA Investigations Policy (Appendix 2). This mechanism includes a database and mapping system, and covers all sources of flooding.
- 4.24 Figure 4 provides a geographical overview of recorded incidents in Trafford, drawing mainly on those that occurred in the summer of 2012. The numbers in grid squares indicate the total number of incidents within the area covered by those grid squares, whilst the dots identify the locations. Whilst based on limited data, it can be noted that there is a particular concentration of events within the Borough's main built-up areas particularly those in Davyhulme, Urmston and Flixton.

**Figure 4: Recorded flooding incidents in Trafford**



4.25 In due course the incident data will be interrogated alongside a range of datasets on flood risk to assist in identifying priority areas for Council intervention.

### **Multi-Agency and Local Authority Flood Plans**

4.26 The Greater Manchester Multi Agency Flood Plan sets out the response arrangements to a major flooding incident that require multi agency co-operation.

4.27 Sitting beneath this plan are the ten District plans, including the Trafford document, which provide information on the response and management

arrangements for a flood incident within their areas. They also reflect the known risks of flooding in their respective localities.

### **The impacts of Climate Change**

- 4.28 The majority of studies of the likely impact of climate change in the United Kingdom predict more frequent and intense storms, with wetter winters, increasing the likelihood of flooding.
- 4.29 Environment Agency guidance to support the National Planning Policy Framework sets out recommended allowances for climate change when calculating peak rainfall intensities and peak river flows as part of assessing flood risk. These allowances are used in preparing Strategic Flood Risk Assessments and site-specific Flood Risk Assessments and in other studies. The assumptions in the Environment Agency guidance have been followed in this Local Flood Risk Management Strategy.

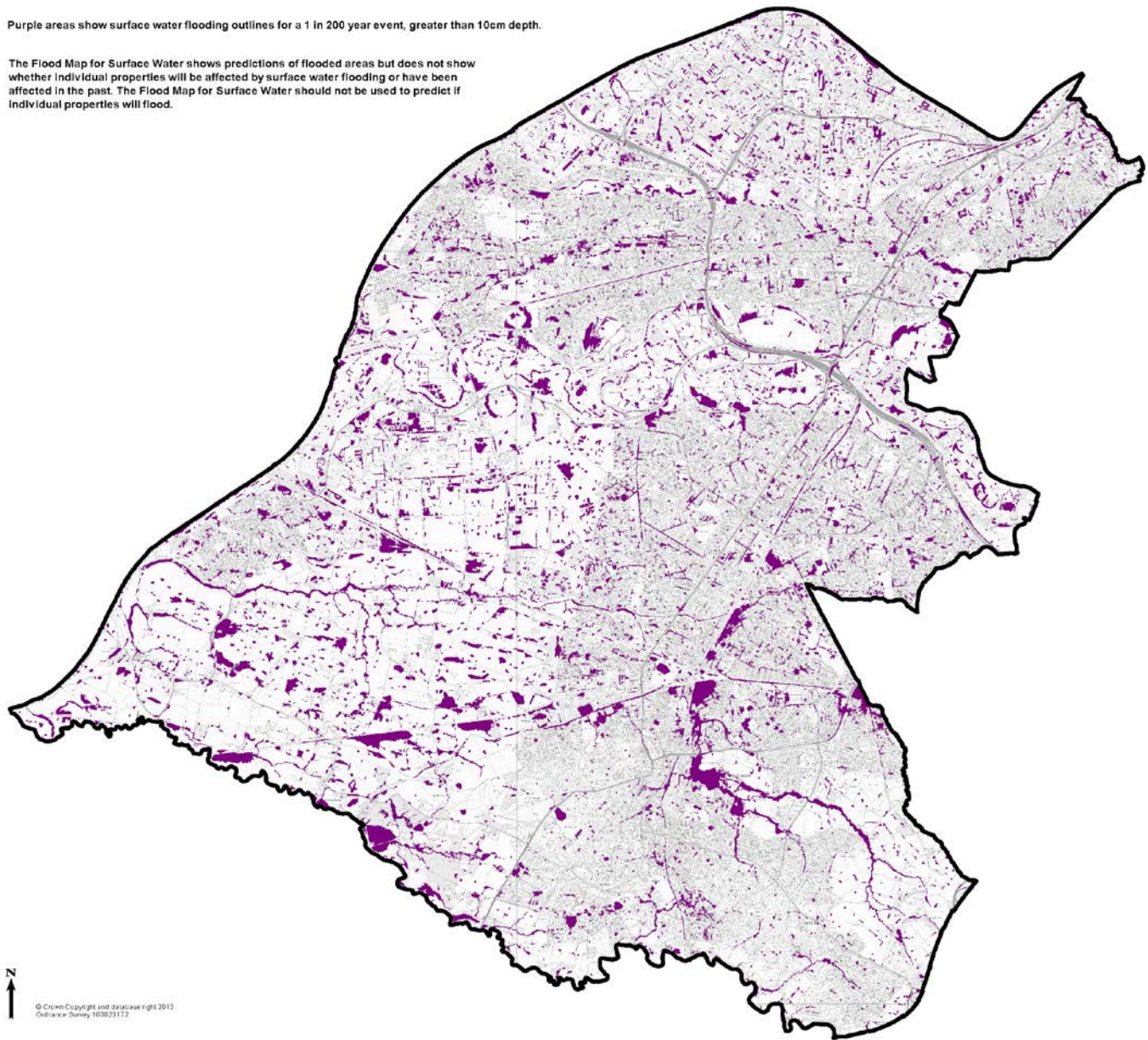
### **Surface Water**

- 4.30 Figure 5 shows the strategic flood map for surface water for Trafford, based on work undertaken as part of the Greater Manchester Surface Water Management Plan. This identifies areas at risk of surface water flooding during a 1 in 200 year storm event, where the depth of water is greater than 0.1 metre (10 centimetres).
- 4.31 The map identifies locations across the whole Borough at risk from surface water flooding. These locations fall within the main urban areas as well as Trafford's countryside. Some of the locations correspond to watercourses, natural floodplains and existing surface water features. Others will have been identified due to variations in local topography, for example low-lying areas where water is expected to pond in a storm event.

**Figure 5: Strategic flood map for surface water in Trafford**

Purple areas show surface water flooding outlines for a 1 in 200 year event, greater than 10cm depth.

The Flood Map for Surface Water shows predictions of flooded areas but does not show whether individual properties will be affected by surface water flooding or have been affected in the past. The Flood Map for Surface Water should not be used to predict if individual properties will flood.



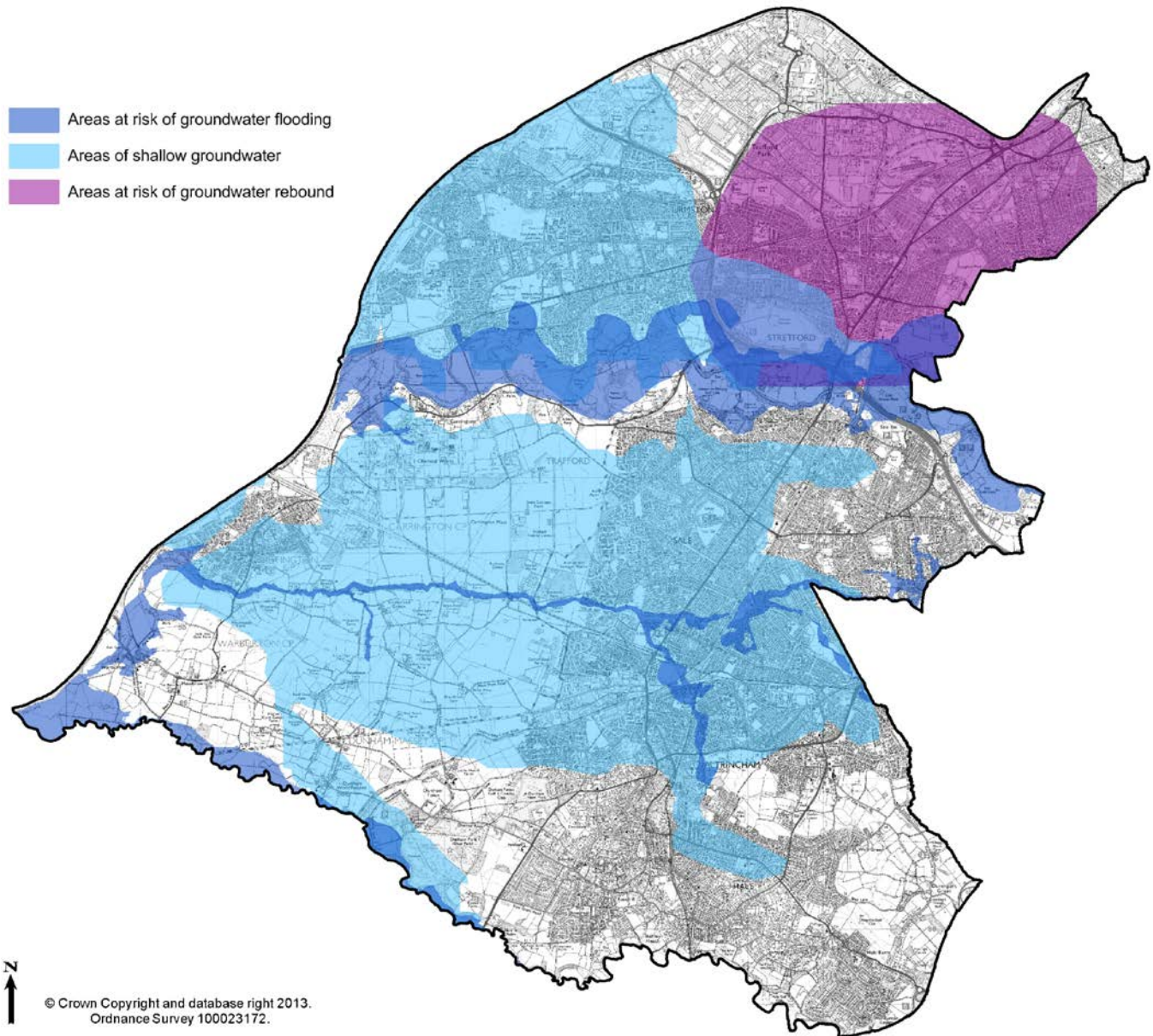
## Groundwater

- 4.32 Much of Trafford lies above water-bearing rocks (aquifers) and in a number of areas the decline of industry, and consequent reduction in water abstraction, has led to a rebound in groundwater levels that has been known to cause flooding in some properties. Particular problems can occur in properties with cellars/basements where the water table is particularly high or on land where

the water table is already high and prolonged heavy rainfall leads to over-saturation and consequent surface water flow.

4.33 Figure 6, reproduced from the Manchester, Salford and Trafford Level 2/Hybrid Strategic Flood Risk Assessment (SFRA), shows areas at risk of groundwater flooding in Trafford.

**Figure 6: Areas at risk from groundwater flooding in Trafford**



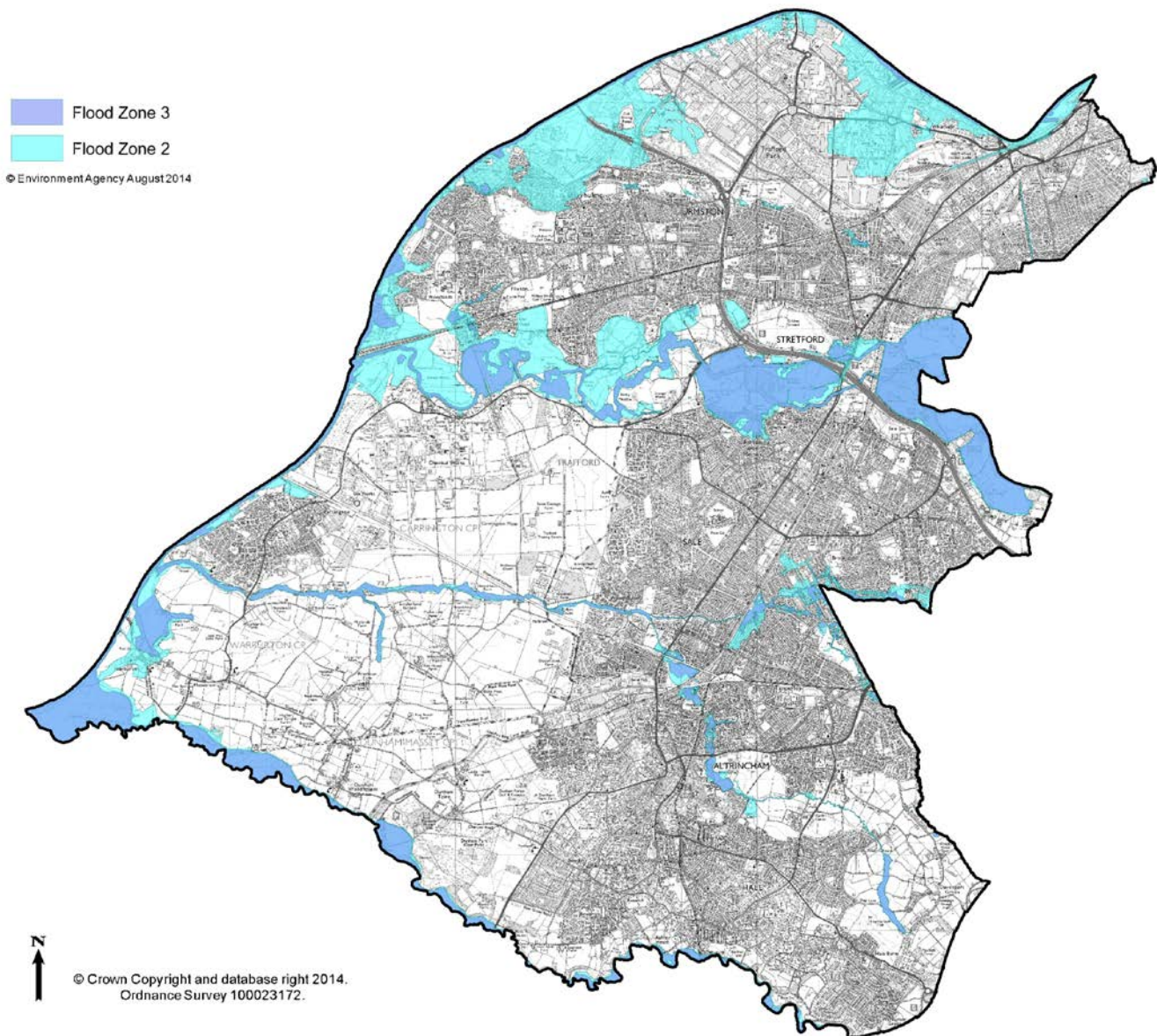
## Ordinary Watercourses

### *The Manchester Ship Canal*

- 4.34 Opened in 1894, the Manchester Ship Canal (MSC) is a 58 km long canalised river, flowing from Manchester City Centre to the Mersey Estuary. It takes flows from the Rivers Irwell, Irk and Medlock upstream of Salford before flowing westwards towards Irlam where the River Mersey joins it. The Rivers Glaze and Bollin join just upstream of Warrington and at this point the River Mersey splits off from the canal to flow through Warrington town centre and out to the estuary. At Runcorn, the River Weaver passes through the canal and the sluices here pass the main fluvial flow back into the Mersey Estuary. The canal ends at Eastham Lock, between Bromborough and Ellesmere Port.
- 4.35 Though currently classified as an ordinary watercourse, thereby making the Council the relevant Risk Management Authority within Trafford, the Ship Canal has been modelled by the Environment Agency as a main river and is privately owned and operated by the Manchester Ship Canal Company (MSCC)/Peel. A detailed water level control protocol has been developed by the MSCC/Peel, following discussions with the Environment Agency, and this sets out a clear framework within which water levels on the Ship Canal will be managed.
- 4.36 Navigation on the canal is controlled by five sets of lock gates. These are:
- Mode Wheel Locks at the Quays
  - Barton Locks
  - Irlam Locks
  - Latchford Locks in Warrington
  - Eastham Locks at the downstream limit of the canal
- 4.37 At each lock structure there is a set of sluice gates which control water levels and pass flows downstream. The upper and lower limits of the water level are fixed for navigation purposes to ensure that there is sufficient draught within the canal at all times. The larger channel size and straighter path also mean that the Manchester Ship Canal is capable of passing larger flows more quickly.
- 4.38 There are four sluices at Mode Wheel and Barton Locks, five at Irlam and three at Latchford. The sluices which control the water level at Eastham are located at Runcorn where eight sluices allow fluvial flows into the Mersey Estuary. Of these, Mode Wheel Locks, Barton Locks and Irlam Locks are of most relevance to Trafford.
- 4.39 The channel of the Manchester Ship Canal is typically 60 metres wide and 9 metres deep. This is a much greater cross-sectional area than the rivers it replaced meaning that it is more capable of passing floods easily. At low flows, however, the lower velocities encourage sediment to settle in the canal. Regular dredging of the canal is required to maintain the navigable depth.

4.40 The most up to date Environment Agency hydraulic modelling of the Manchester Ship Canal has shown that, where the sluice gates are operated to allow flows to pass downstream, in a 1 in a 100 year event (equating to Flood Zone 3) water is largely contained within channel. During a 1 in a 1000 year event (equating to Flood Zone 2) a number of areas of land adjacent to the canal are at risk of flooding. Figure 7 reproduces the current (August 2014) Environment Agency Flood Map for Planning (Rivers and Sea) showing these areas.

**Figure 7: Extract from the Environment Agency Flood Map for Planning (Rivers and Sea) showing flood risk and the Manchester Ship Canal**



4.41 A separate study commissioned by Peel to examine the operational reliability of the sluices on the Manchester Ship Canal, including the co-occurrence of such a failure with a storm event, concludes that the risk of failure is very low.

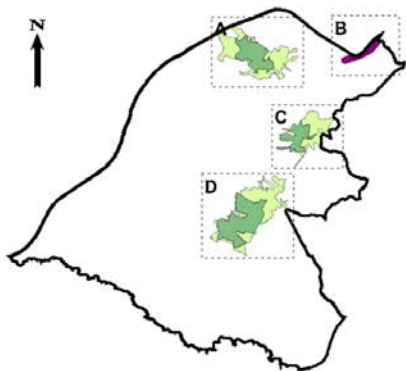
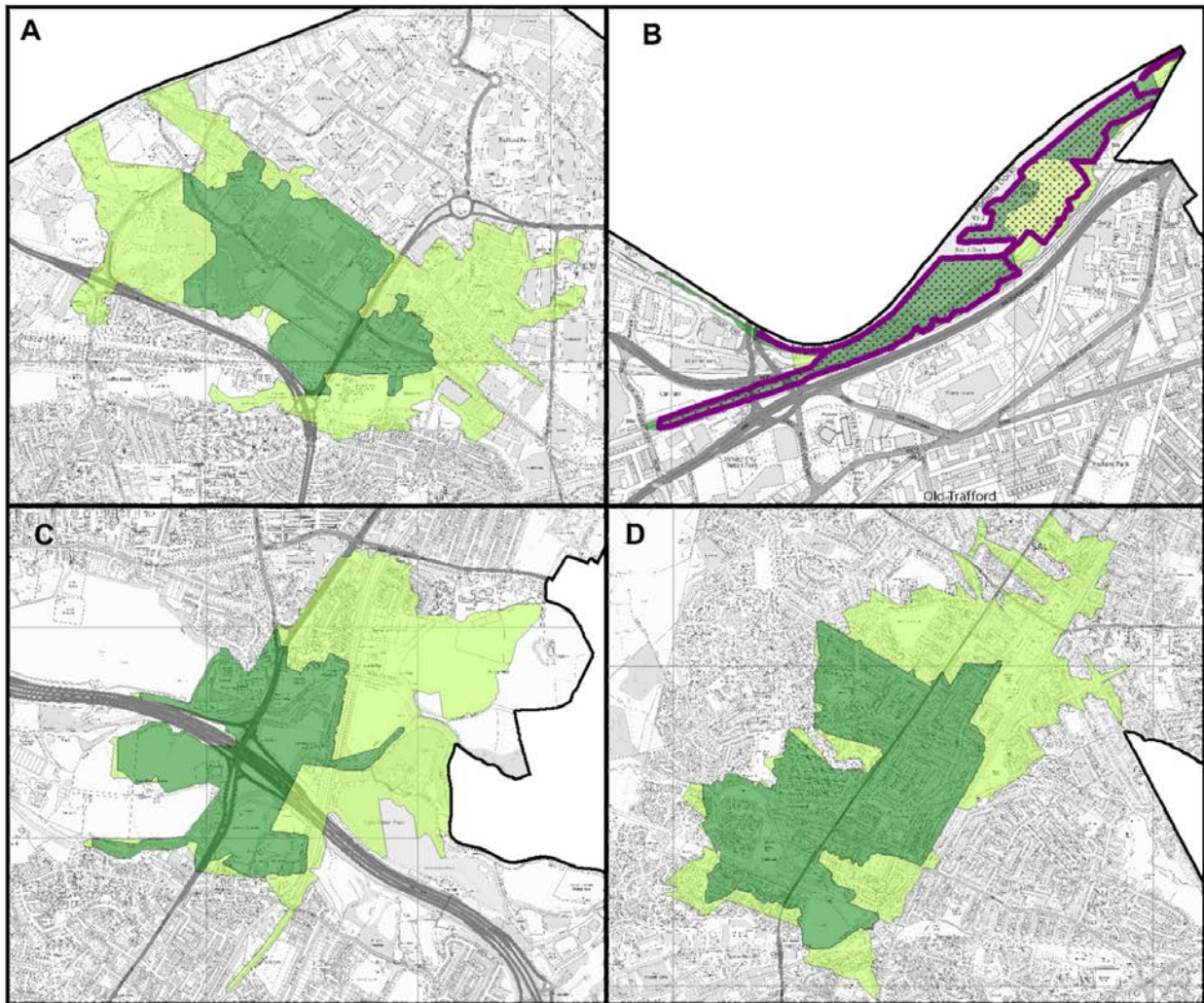
- 4.42 The Manchester Ship Canal Company Water Level Control Operational Protocol for the canal sets out the operating procedures for the canal sluices, including at high flows. It also details the maintenance regime and the reliability of the sluices.


### ***The Bridgewater Canal***

- 4.43 The Bridgewater Canal was built originally from Worsley in Salford to the centre of Manchester in the late 18<sup>th</sup> Century. It was extended to Runcorn where a flight of locks lowered the Canal to the Mersey estuary. However, these locks have now been abandoned. At Barton the Bridgewater Canal crosses the Manchester Ship Canal on a swing aqueduct.
- 4.44 The Bridgewater Canal is on a single level throughout Trafford and there are no locks apart from connections to other canals, including the connection to the Ship Canal at Pomona. There are sluices from the Bridgewater Canal to the River Irwell/Manchester Ship Canal that can be opened manually during a flood or upon receiving a warning. These include sluices at Pomona and Barton.
- 4.45 The Bridgewater Canal is owned and operated by the Peel Group.
- 4.46 The Bridgewater Canal is a controlled water body, receiving flows from the River Medlock in Manchester. Flood risk from the canal is associated with lower probability events such as overtopping and/or the breaching of embankments. The Manchester, Salford and Trafford Level 2/Hybrid Strategic Flood Risk Assessment (SFRA) identified a number of extensive canal hazard zones alongside the Bridgewater Canal where there is a risk of flooding from such breaching or overtopping. Some of these canal hazard zones fall within the Borough's most densely populated urban areas.
- 4.47 Figure 8 shows the canal hazard zones as identified in the SFRA. The area shaded purple is an area at risk of canal overtopping. The areas of dark green - 'Zone A' – are where land is likely to be affected by a breach given the height and width of the Bridgewater Canal embankments. Areas of light green - 'Zone B' – are where land is less likely to be affected by a breach given the same considerations. It should be noted that the Bridgewater Canal hazard zones in the SFRA were identified using broad scale modelling and the limited information that was available at the time of the SFRA's production. For a more detailed and up to date assessment of the risk within Zone A it is always recommended that a site-specific Flood Risk Assessment is undertaken.



**Figure 8: Bridgewater Canal - Canal Hazard Zones**



-  Canal Overtop Hazard Zone
-  Canal Breach Hazard Zone A
-  Canal Breach Hazard Zone B

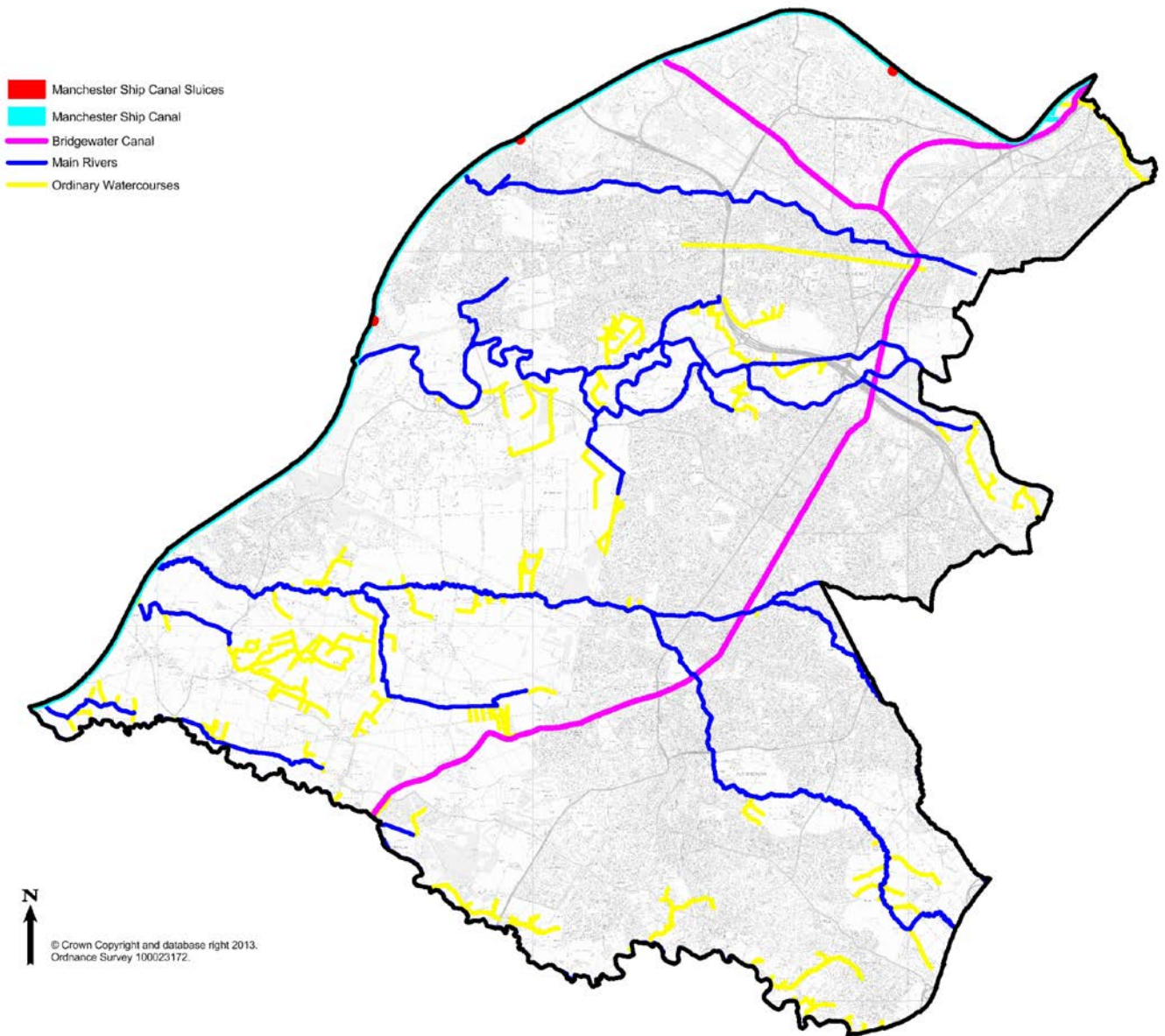
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Ordnance Survey 100023172.

- 4.48 Though the SFRA was produced using the best information available to JBA consultants at the time of its production, a more comprehensive study of the Bridgewater Canal using detailed survey information and modelling was subsequently undertaken by HR Wallingford on behalf of the Manchester Ship Canal Company/Peel.
- 4.49 The Council is currently working with the Manchester Ship Canal Company/Peel, together with Manchester City Council and Salford City Council, to reach a final, agreed view on the status of the HR Wallingford study for planning and local flood risk management purposes. The conclusions of this work will be publicised and reflected in a future review of this Strategy.

#### ***Other Ordinary Watercourses***

- 4.50 Trafford has a number of other ordinary watercourses (watercourses that are not main rivers) within its area. These include both open and culverted channels, and range from land drains in the Borough's agricultural areas through to watercourses in residential gardens and important culverts within densely-populated urban areas.
- 4.51 Figure 9 illustrates the broad location of these other ordinary watercourses in Trafford.
- 4.52 Whilst the Council possesses basic data on other ordinary watercourses, including location and length, it does not have detailed information on channel capacity or flood risk apart from where ground survey and modelling has been undertaken as part of specific development proposals or works requiring land drainage consent. For this reason the Council intends to improve its understanding via a dedicated study and this is identified as a priority project in Appendix 1 of this Strategy.
- 4.53 The commissioned study on other ordinary watercourses in Trafford will involve the production of indicative flood hazard maps for the Borough's non-main rivers, under free flow conditions and culvert blockage conditions where applicable. The study will cover a range of return periods and have regard to the likely impacts of climate change.
- 4.54 The study will assist the Council in identifying assets at significant risk of flooding, targeting new capital investment and improving maintenance regimes.

**Figure 9: Ordinary watercourses in Trafford**



## 5: Objectives for managing local flood risk

5.1 The Objectives for managing local flood risk in Trafford are:-

### **Economic**

- To reduce local flood risk to existing businesses and other economic infrastructure
- To support the sustainable economic growth of the Borough, as part of the City Region, by ensuring that local flood risk is managed when planning new development and investment

### **Social**

- To reduce local flood risk to existing homes and social infrastructure, particularly in areas of multiple deprivation
- To work with local communities in improving their resilience to flooding

### **Environmental**

- To reduce local flood risk to existing environmental assets
- To enhance the landscape, townscape, biodiversity, geodiversity and cultural heritage of the Borough

## 6: Contribution to wider environmental objectives

- 6.1 The Strategic Environmental Assessment Directive (2001/42/EC) requires that certain plans and programmes undergo an environmental assessment, due to the likelihood that they will have significant environmental effects once implemented. The Environmental Assessment of Plans and Programmes Regulations 2004 transpose the Directive into UK law. SEA is required for local flood risk management strategies therefore alongside this Strategy an Environmental Report has been produced. The Environmental Report identifies, describes and evaluates the likely significant effects on the environment of implementing the Strategy, together with any reasonable alternatives.
- 6.2 It is also necessary, under the Conservation of Habitats and Species Regulations 2010, to carry out an Appropriate Assessment in respect of any plan or project which either alone or in combination with other plans or projects would be likely to have a significant effect on a European Site, and is not directly connected with the management of the site for nature conservation. European sites include Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites. There are no European designations within Trafford but a screening of potential impacts on areas close to the Trafford boundary has been undertaken by the Greater Manchester Ecology Unit and the findings made available in a separate document.
- 6.3 The Water Framework Directive (WFD) 2000/60/EC, and the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 make it a requirement to ensure that the Strategy will not lead to actions which result in a deterioration in the status of any water body (including the channel, the flow, and the flora and fauna), will not prevent future restoration/improvement, and includes opportunities for improvement in the status of water bodies to help meet WFD objectives. This requirement has been incorporated into the SEA framework.
- 6.4 A number of measures proposed in the Strategy will contribute towards wider environmental objectives. For example, the development of green infrastructure may involve the creation of new woodland, wildlife habitats and open space, which will improve the local environment and may offer enhanced recreational opportunities for local communities. Enhanced surface water management on Council land, and within its properties, should ensure more efficient use of water resources.

## 7: Measures proposed to manage local flood risk

7.1 Appendix 1 outlines a range of measures proposed by the Council to manage local flood risk in Trafford. Indicative costs and benefits for each of the measures are identified, where possible. Broadly, these measures involve:-

- Enhancing our understanding of flood risk from ordinary watercourses, including the Bridgewater Canal
- Improving awareness of flood risk amongst local communities, and improving their resilience to flooding
- Implementation of 'soft' flood management measures, such as green infrastructure improvements
- Development of closer links between local flood risk management and the planning process
- Better recording and investigation of flooding incidents
- Better management of the Council's own assets.

7.2 Detailed action plans, and funding bids, will be worked up for these areas where necessary.

## 8: Implementation and funding

### **Partnership working**

- 8.1 The Council, as Lead Local Flood Authority, will work with other Risk Management Authorities and key stakeholders within the Borough to manage flood risk effectively. This is important given the hydrological linkages between different sources of flood risk for which different bodies may be responsible, for example main rivers (the Environment Agency) and canals (the Manchester Ship Canal Company/Peel/the Council) or sewers (United Utilities) and surface water (the Council). It is also vital in terms of developing and delivering practical schemes at the local level, which may involve a diverse range of partners such as the Red Rose Forest, landowners, voluntary and community groups.
- 8.2 The Council, as Lead Local Flood Authority, will also work with neighbouring authorities – including those within AGMA – on issues of common interest. This includes further studies and schemes with cross-boundary implications.

### **Funding**

- 8.3 The Council will use this Strategy to assist in its bids for funding for local flood risk management schemes, including applications for national government Grant in Aid (GiA) and European Regional Development Fund assistance where possible.

## 9: Monitoring and review

- 9.1 The Council will monitor the implementation of measures identified for managing local flood risk in Trafford (Appendix 1) and bring forward reviews as necessary.
- 9.2 The Council will also monitor a range of indicators, as outlined in the Strategic Environmental Assessment (SEA) Scoping Report produced in relation to this Strategy. In doing so it will use a variety of mechanisms, including its Local Plan Annual Monitoring Report and existing links with key partners such as the Environment Agency. Existing survey information will be utilised wherever possible in order to avoid duplication of effort.
- 9.3 Monitoring and review will be led by the Council's internal Flood and Water Management Steering Group and progress reports will be prepared, and published, as necessary.



## APPENDIX 1

# PROPOSED LOCAL FLOOD RISK MANAGEMENT MEASURES

PROJECT NAME	DETAILS	TIMESCALE	INDICATIVE COSTS	INDICATIVE BENEFITS
Risk assessment of Trafford's other ordinary watercourses	Engagement of specialist consultants to provide a risk assessment of Trafford's open and culverted ordinary watercourses, apart from the Manchester Ship Canal and Bridgewater Canal. A range of return periods (e.g. 5, 30, 100, 200, 1000 year) will be considered. Outputs to include a written report and mapping showing flood extent, depth, velocity and hazards.	April 2014- March 2015	£20 000 - £50 000	Sound evidence base for: <ul style="list-style-type: none"> <li>• Land drainage consenting;</li> <li>• Improved inspection and maintenance;</li> <li>• Informing future planning and investment.</li> </ul>

PROJECT NAME	DETAILS	TIMESCALE	INDICATIVE COSTS	INDICATIVE BENEFITS
Bridgewater Canal study	Engagement of external advisers to provide a technical appraisal of the HR Wallingford study of the Bridgewater Canal, to inform Manchester City Council, Salford City Council and Trafford Council on their final view of this evidence base document.	April 2014 – March 2015	To be agreed.	<ul style="list-style-type: none"> <li>• Updated evidence base, superseding relevant information in the SFRA.</li> <li>• Consistent basis for decision-making on planning and investment by the local authorities and key stakeholders.</li> </ul>

PROJECT NAME	DETAILS	TIMESCALE	INDICATIVE COSTS	INDICATIVE BENEFITS
Warning and informing local communities	Trafford Council will work with AGMA on warning and informing local communities on flood risk and improving their resilience to flooding. This will include establishing a dedicated Warning and Informing Steering Group, either within Trafford or across the ten AGMA authorities, and establishing relevant targets and priorities.	Early 2014 onwards	To be delivered within existing resources.	<ul style="list-style-type: none"> <li>• Better awareness of flood risk amongst local communities.</li> <li>• Improved ability of local people to help themselves when faced with flooding incidents.</li> </ul>

PROJECT NAME	DETAILS	TIMESCALE	INDICATIVE COSTS	INDICATIVE BENEFITS
Green Infrastructure Opportunity Areas	Trafford Council/Red Rose Forest project to develop a package of green infrastructure schemes within the Borough. Site development plans will be developed for a number of areas where opportunities are clustered, and will include a range of measures such as woodland planting, creation of flood storage areas, new wildlife habitats and open space.	To be determined.	To be determined.	<ul style="list-style-type: none"> <li>• Improved management of flood risk from various sources, including surface water and ordinary watercourses, and improvement of water quality.</li> <li>• Creation of green infrastructure assets of benefit to local communities and wildlife.</li> </ul>

PROJECT NAME	DETAILS	TIMESCALE	INDICATIVE COSTS	INDICATIVE BENEFITS
Embedding relevant local flood risk management measures in the Trafford Local Plan	Ensure relevant measures, including the protection and improvement of watercourse corridors, are referred to in the emerging Land Allocations Plan, and shown on the Policies Map, where detailed boundaries are known.	April 2014 – March 2015	To be delivered within existing resources.	<p>Sound evidence base for:</p> <ul style="list-style-type: none"> <li>• Informing future planning and investment;</li> <li>• Improved maintenance;</li> <li>• Land drainage consenting.</li> </ul>

PROJECT NAME	DETAILS	TIMESCALE	INDICATIVE COSTS	INDICATIVE BENEFITS
Implementation of AGMA Investigations Policy	To be determined.	March 2013 onwards	To be determined.	<ul style="list-style-type: none"> <li>• Better recording and investigation of flooding incidents.</li> </ul>
Audit of surface water management in the Council's estate, as part of the Council's Energy and Water Management Plan	Review current surface water management arrangements for Council buildings, car parks, highways, greenspaces and other assets, and assess the scope for introducing more sustainable and efficient forms of drainage.	April 2014 onwards	To be delivered within existing resources.	<ul style="list-style-type: none"> <li>• Reduction in surface water flows to main sewers.</li> <li>• Potential reduction in utility charges to the Council.</li> </ul>

## APPENDIX 2

( AGMA INVESTIGATIONS POLICY)



# AGMA Policy for Investigating Flood Incidents

## THE LEGISLATION

Section 19 of the Flood and Water Management Act 2010 states that:

- (1) On becoming aware of a flood in its area, a lead local flood authority (LLFA) must, to the extent that it considers necessary or appropriate, investigate:
  - (a) Which risk management authorities have relevant flood risk management functions, and
  - (b) Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood
- (2) Where an authority carried out an investigation under subsection (1) it must –
  - (a) Publish the results of its investigation, and
  - (b) Notify any relevant risk management authorities

*NB. The term 'flood' includes any case where land not normally covered by water becomes covered by water (from natural sources). It does not include flooding from a burst water main or any part of the sewage network (unless caused by the volume of rainwater entering the system).*

## 1.0 RATIONALE

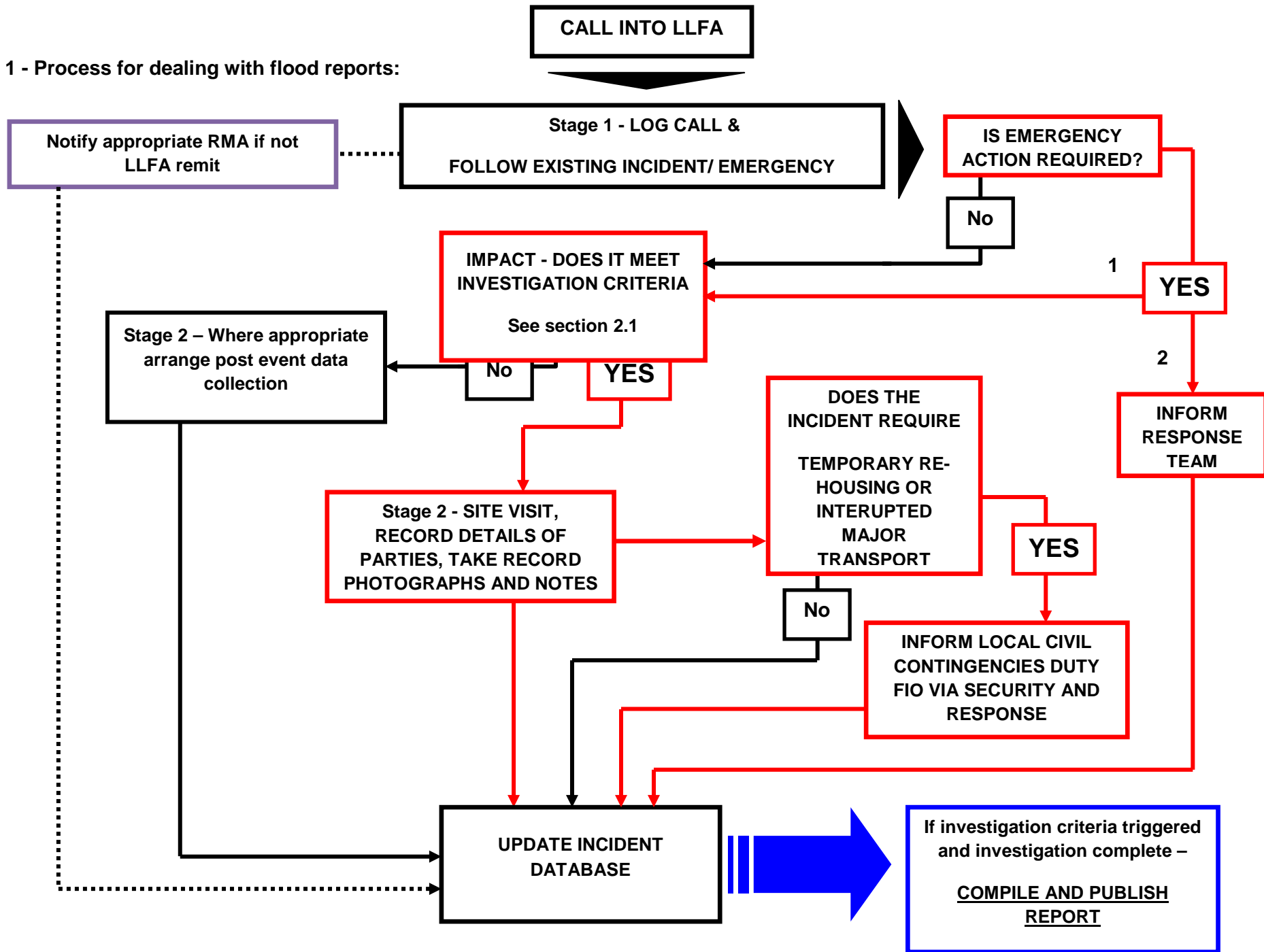
There has been no guidance provided on how to discharge this duty and many elements remain highly subjective. As a result, and to avoid inconsistency across the conurbation; this policy has been drafted for local implementation to improve the understanding of flood risk and flood risk management uniformly.

The focus of this policy is not solely around the identification of the necessity to instigate an investigation but to ensure that a process is in place to gather supporting evidence. Initially from the information received relating to a flood incident it may be deemed a full investigation is not appropriate but by having a process in place as outlined in this document the supporting evidence is in situ if the incident escalates to one of much greater significance once the impact of the flooding is known.

## 1.1 REPORTING PROCEDURES

Depending on the circumstances, flooding may be reported to the LLFA through a number of different sources, including: The Contact Centre; Highways and Engineering Service; Emergency Planning Service; Housing Management Services and the Emergency Services, any of which may take the initial notification of the incident. It is therefore vital to ensure that one nominated contact (the Lead Local Flood Officer or the relevant team) is identified, and that training and awareness sessions are put in place to ensure reports and details of the incident are all correctly directed and are not missed. A secondary contact should also be nominated to ensure cover during absences, and a system should also be put in place to cover flood incidents which occur outside of normal office hours.

Fig 1 - Process for dealing with flood reports:



## 2.0 CRITERIA FOR UNDERTAKING INVESTIGATION

Not all flood incidents will justify a full investigation. Despite this, it is necessary to collect focal information from all incidents, even where the impact of the incident is minimal. All data gathered can be used to inform and predict the consequences of more serious incidents, not doing this may hinder a comprehensive understanding of risk across an LLFA area.

Where the incident has impacted on resources it may be decided that data is gathered post event when resources allow. Information such as photographs, flow paths and sources should be recorded where possible and even if they are not required as part of an investigation will become useful evidence especially to support and quantify the identified risk areas.

If it is found that flooding occurs on a frequent basis to a property/area it may be frequency rather than the scale of the incident that triggers an investigation in the future.

### 2.1 IMPACT/CONSEQUENCE

It is recommended that an incident be defined as 'significant' based on any of the following factors and would potentially trigger a full investigation (see assessment matrix section 5.0):

Trigger	Consequence.
Risk to life	Death, accident/ injury.
Weight of public, media, political and planning interest	Reputation.
Impact on critical services	Critical services include schools, hospitals, nursing homes and emergency services.
Internal residential property flooding - $\geq$ 5/6	'Internal' flooding includes flooding inside the main property and any outbuildings which provide living accommodation. Any flooding of other outbuildings and garages etc should be classed as 'external', except where they are integral to the main property and accessible via an internal door. – It is important to collect accurate records of internal property flooding, to support any decisions on flood defence funding. This information may be requested in regards to future property purchases, any inaccurate data could potentially prejudice a sale resulting in legal action.
Economic disruption	Consider the relative impacts of flooding of <b>commercial property</b> . In some cases, flooding of a single commercial property could no more warrant investigation than flooding of a single residential property; but in other cases, the serious flooding of a large, single property could be extremely disruptive to the economic functioning of a community or have significant impact on a local or regional economy, and would therefore certainly trigger an investigation. Other causes of economic disruption should be covered by consideration of impacts upon infrastructure.
Impact on critical infrastructure and installations	Critical infrastructure includes motorways, 'A' roads, rail links, port facilities, utility installations, bridges, flood defences etc.
Frequency of flooding	Also consider depth of flooding, were residents displaced and the duration of such.

- Effective deployment of defensive measures should also be recorded.
- Consideration should also be given to any locally significant flood incidents which the LLFA may choose to investigate regardless of the criteria above.

### 3.0 SCOPE OF EVIDENCE GATHERING

Regardless as to whether a flood incident will result in a full and formal published investigation gathering information relating to the cause and impact of the flooding is necessary at all stages of the event.

Whilst the amount of data required to provide an insight into the cause of the flooding should remain **proportionate** to the size of the event it is imperative that all LLFA's ensure a process is embedded to support this. It is each districts responsibility to nominate a Lead Flood Officer and provide training and incident response procedures which align with this policy.

If there are issues around the nominated Flood Officer having the capacity or correct training to attend, this should be overcome through training and awareness sessions between all involved directorates and a strong Flood Risk Management Working Group.

Part of the process should also identify the means of capturing this data and in what format it should be recorded and stored to ensure the information can be viewed and shared for use by any relevant parties. This will not only ensure relevant data is captured in a timely manner but evidence is available to support future bids within the GM investment programme.

#### 3.1 STAGE 1 – Incident Recording

The following information should be gathered at the time the incident is reported:

Information type	Information required
<b><u>Caller details:</u></b>	<ul style="list-style-type: none"> <li>• Name</li> <li>• Address</li> <li>• Telephone number</li> <li>• e-mail</li> </ul>
<b><u>By what route was the call received:</u></b>	<ul style="list-style-type: none"> <li>• Direct from the caller</li> <li>• 3<sup>rd</sup> party <ul style="list-style-type: none"> <li>○ family or friends of the person affected</li> <li>○ other RMA's</li> <li>○ Emergency services</li> <li>○ Councillor on behalf of their constituency</li> <li>○ Other – please state</li> </ul> </li> </ul>
<b><u>Incident details:</u></b>	<ul style="list-style-type: none"> <li>• Reference no:</li> <li>• Address/ location:</li> <li>• Date and Time of incident:</li> </ul>
<b><u>What is/has flooded:</u></b>	<ul style="list-style-type: none"> <li>• Property – internal – If Yes, ask whether basement or Ground floor</li> <li>• Property – external</li> <li>• Level of flooding (if already occurred) – approximate depth</li> <li>• Highway</li> <li>• Open space (define)</li> <li>• Other (define)</li> </ul>

<b><u>Where is/was the water coming from:</u></b>	<ul style="list-style-type: none"> <li>• Overflowing Manhole/Drain</li> <li>• Overflow from a river or stream</li> <li>• Water running off the highway</li> <li>• Water running off a field</li> <li>• Other (define)</li> <li>• Don't Know</li> </ul>
<b><u>Additional risk information:</u></b>	<ul style="list-style-type: none"> <li>• Is/was there a danger to life? (if yes advise caller to contact the emergency services immediately)</li> <li>• Is/was there a foul smell?</li> <li>• Is/was there evidence of sewage in the water?</li> <li>• Is the water still rising? If so, how deep is it?</li> <li>• Is there a watercourse nearby? If so, what is it called?</li> <li>• Is there ongoing traffic disruption?</li> <li>• Other factors (define)</li> </ul>

### 3.2 STAGE 2 - Site Information Data Gathering

This information whilst again being proportionate to the size of the event is necessary to validate initial reports received from the public or 3<sup>rd</sup> parties including the media and would be included in the final report if a full investigation is required. Each LLFA should aim to gather the following information:

<b>Information type</b>	<b>Information required</b>
<b><u>Incident details:</u></b>	<ul style="list-style-type: none"> <li>• Reference no:</li> <li>• Location:</li> <li>• Date and time of incident:</li> <li>• Date and time of site visit</li> </ul>
<b><u>What is/has flooded:</u></b>	<ul style="list-style-type: none"> <li>• number and type of receptors affected;</li> <li>• extent, depth and velocity of flooding</li> <li>• extent of damage to critical infrastructure</li> </ul>
<b><u>Where is/was the water coming from:</u></b>	<ul style="list-style-type: none"> <li>• source and cause of flooding and any interactions with other sources of flooding;</li> </ul>
<b><u>Additional risk information:</u></b>	<ul style="list-style-type: none"> <li>• duration of event;</li> <li>• topographic / land use / drainage infrastructure information associated with the affected site;</li> <li>• any immediate resolution, and any links to longer term mitigation / management measures;</li> <li>• previous similar and historic incidents</li> <li>• any measures taken during the event to limit damage and their apparent effectiveness</li> <li>• photographic evidence of flooding</li> </ul>

### 4.0 PUBLISHING

If a Formal Investigation has been undertaken, the LLFA has a legal Duty to publish a report of its findings. Local procedures for approval and publishing of public documents should apply.

*Special consideration should be made for cross-boundary incidents, and the format of reporting and sharing of information should be agreed between neighbouring LLFAs.*

## 5.0 ASSESSMENT MATRIX

The following table provides guidance as to determine whether a full investigation is required:

NUMBER	FLOODING IMPACT	IF 'YES' GO TO:	IF 'NO' GO TO:
1	Has a flood incident occurred? <ul style="list-style-type: none"> <li>• Internal property flooding - residential/commercial</li> <li>• Economic disruption</li> <li>• Risk to life or public health</li> <li>• Affecting critical services, infrastructure and or installations</li> <li>• Deployment of defensive measures</li> </ul>	4	2
2	Has a flood incident occurred to; <ul style="list-style-type: none"> <li>• Non-priority highways?</li> <li>• Parks, gardens or open space (posing no threat to life or public health)?</li> </ul>	3	---
3	Is there a local/ political desire to investigate the incident?	4	12
4	Have you identified the relevant risk management authority?  If necessary, arrange a meeting of the local flood risk management partnership (A meeting may only be necessary for major events – minor events may only need information circulated by phone or email between LLFA, the Environment Agency and United Utilities)	8	5
5	Notify the relevant flood risk management authority	6	---
6	Is the risk management authority exercising their functions in relation to this incident?	7	4
7	Log the correspondence in the incident file and request copies of the outcome if/ when appropriate.	---	---
8	Is there a history of flooding in the area?	9	13
9	Has this been investigated before?	10	13
10	Is the cause and extent the same as previous incidents?	11	13
11	Log incident details; promote self-help and community resilience.	12	---
12	<b>REVIEW SITE VISIT &amp; DATA COLLECTION</b>  Is a full investigation required based on information available?	13	11
13	<b>FULL INVESTIGATION – AND PUBLISH</b>  <i>Consider scope for Flood Defence Grant in Aid application for property-protection scheme.</i>	---	---

# GLOSSARY

AGMA	Association of Greater Manchester Authorities
AMP	Asset Management Plan
CFMP	Catchment Flood Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
FMfSW	Flood Map for Surface Water
GiA	Grant in Aid
LFRMS	Local Flood Risk Management Strategy
LHA	Local Highway Authority
LLFA	Lead Local Flood Authority
MSC	Manchester Ship Canal
MSCC	Manchester Ship Canal Company
NRD	National Receptor Dataset
OFWAT	The Water Services Regulation Authority
PFRA	Preliminary Flood Risk Assessment
RFCC	Regional Flood and Coastal Committee
RMA	Risk Management Authority
SAB	SuDS Approving Body
SAC	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Areas
SuDS	Sustainable Drainage System
UU	United Utilities
WFD	Water Framework Directive

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