City of London Corporation
Local Flood Risk Management Strategy
2014 - 2020

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Contents
1 Introduction.................................................................................................................................4
2 Flood Risk Management Strategy requirements .................................................................6
3 Assessment of local flood risks .............................................................................................7
  3.1 Flood risk modelling .............................................................................................................7
  3.2 River and tidal flood risk .....................................................................................................7
  3.3 Surface water and sewer flood risk .....................................................................................8
  3.4 Ground water flood risk .......................................................................................................11
  3.5 Climate change and flood risk ............................................................................................12
  3.6 Strategic Flood Risk Assessment and Flood Risk Maps .......................................................13
4 Objectives for Managing Flood Risk in the City .................................................................14
  4.1 Objective 1: Flood Risk Information ....................................................................................15
  4.2 Objective 2: Reduced vulnerability and cost of flooding ................................................16
    4.2.1 Planning ..........................................................................................................................16
    4.2.2 Flood resistance and resilience ......................................................................................17
    4.2.3 Flood Insurance ............................................................................................................18
    4.2.4 SuDS approvals ..............................................................................................................19
    4.2.5 Asset register ................................................................................................................19
    4.2.6 Flood investigation .........................................................................................................20
    4.2.7 Warning and Informing .................................................................................................20
    4.2.8 Site Specific Flood Risk Management Plans ...............................................................21
  4.3 Objective 3: Emergency response to flooding .................................................................22
  4.4 Objective 4: Recovery from flooding ..................................................................................23
  4.5 Objective 5: Partnership working .......................................................................................24
    4.5.1 Drain London ................................................................................................................24
    4.5.2 Environment Agency ......................................................................................................24
    4.5.3 Port of London Authority ..............................................................................................25
    4.5.4 Neighbouring boroughs .................................................................................................25
    4.5.5 Regional Flood and Coastal Committee .........................................................................26
    4.5.6 Utility providers .............................................................................................................26
    4.5.7 Transport providers .......................................................................................................26
4.5.8 Technical bodies and Associations .......................................................... 27
4.5.9 Emergency Services ................................................................................. 27
5 Actions to reduce flood risk in the City ............................................................ 28
  5.1 Measures to achieve objectives ................................................................. 28
  5.2 Site Specific Flood Risk Management Plans ............................................. 28
  5.3 Funding & Resources ............................................................................... 29
  5.4 Flood Risk Action Plan ........................................................................... 30
6 Strategy review ............................................................................................... 38
  6.1 Public Consultation .................................................................................... 38
  6.2 Approval process ....................................................................................... 38
  6.3 Governance and monitoring ..................................................................... 38
  6.4 Review ...................................................................................................... 38
7 Wider sustainability objectives ....................................................................... 39
  7.1 Strategic Environmental Assessment ....................................................... 39
  7.2 Overall SEA conclusion .......................................................................... 41
Appendix 1 Legislative context ........................................................................... 42
Appendix 2 Flood Risk Powers and Responsibilities ......................................... 48
Glossary ............................................................................................................. 50
1 Introduction

The City is at relatively low risk of flooding with specific areas at some risk from river flooding and surface water/sewer flooding (Fig 1). However the consequences of flooding in these restricted parts of the City could be very high in terms of disruption to business, inconvenience to occupiers and reputational damage.

Figure 1: Flood Risk in the City of London

The City’s flood risks must be considered strategically since flood risks are associated with river catchments which extend well beyond the City’s boundaries. Changing weather patterns as a result of climate change will also influence the City’s future probability of flooding with more intense rainfall events creating conditions where flash flooding and overloading of the sewer network could become more frequent. Sea level rise will increase the risk of flooding from the tidal Thames in future decades. As a consequence past experience of flooding is not necessarily an accurate predictor of future flood risk.

The City is protected from River flooding by the Thames Barrier and by local flood defences along the riverside. The Thames Estuary 2100 Plan (TE2100 plan) identifies the wider actions which are needed to protect London from future flooding, some of which will need to be implemented within the City. Surface water/sewer flooding is a risk along Farringdon Street and the Thames riverside as a result of rainwater catchments as far afield as Hammersmith to the west and Hampstead to the north of the City. It is impossible to completely eliminate the possibility of flooding therefore an important element of flood preparedness is the implementation of measures to provide resistance, preventing flood waters entering...
properties and flood resilience enabling rapid recovery in the event of flooding. Emergency planning provides the assurance that in the event of flooding procedures are in place to respond effectively.

This strategy identifies the approach the City Corporation is taking to the flood risks that affect the City, the actions that are underway or planned to reduce these risks and the processes by which this strategy will be kept up to date.

The Flood and Water Management Act 2010 assigns various responsibilities to Lead Local Flood Authorities including the requirement to develop, maintain apply and monitor a strategy for local flood risk management in its area. The City Corporation, as unitary authority for the Square Mile is the Lead Local Flood Authority for the City.

This strategy covers flood risk affecting the City’s geographic area; it does not include flood risks on City owned or managed land beyond the City’s boundaries.
2 Flood Risk Management Strategy requirements

The Flood and Water Management Act 2010 specifies the Lead Local Flood Authority’s duties with regard to Local Flood Risk Management Strategies and outlines the elements that must be included in a Flood Risk Management Strategy. Table 1 shows these requirements and where each one is covered in the City of London Local Flood Risk Management Strategy.

Table 1: Flood and Water Management Act 2010 section 9 (4) Strategy Requirements

<table>
<thead>
<tr>
<th>The Flood and Water Management Act 2010 section 9 (4) requires that the strategy must specify:</th>
<th>Where it is covered in this strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) the risk management authorities in the authority’s area,</td>
<td>Appendix 2</td>
</tr>
<tr>
<td>(b) the flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area,</td>
<td>Appendix 2</td>
</tr>
<tr>
<td>(c) the objectives for managing local flood risk (including any objectives included in the authority’s flood risk management plan prepared in accordance with the Flood Risk Regulations 2009),</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>(d) the measures proposed to achieve those objectives,</td>
<td>Chapter 4 and Chapter 5</td>
</tr>
<tr>
<td>(e) how and when the measures are expected to be implemented,</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>(f) the costs and benefits of those measures, and how they are to be paid for,</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>(g) the assessment of local flood risk for the purpose of the strategy,</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>(h) how and when the strategy is to be reviewed, and</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>(i) how the strategy contributes to the achievement of wider environmental objectives.</td>
<td>Chapter 7</td>
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3 Assessment of local flood risks

Signpost to the Flood and Water Management Act 2010 Section 9 (4) requirements
This section deals with
(4)(g) the assessment of local flood risk for the purpose of the strategy

3.1 Flood risk modelling
Historically the City has not experienced significant flooding since 1928 when an area around Blackfriars was subject to flooding. The exact cause of this flooding is not known but it is likely to have been as a result of localised breach or overtopping of the flood defence wall or overloading of the sewer system following inundation elsewhere in London. Due to the City’s economic importance large scale flood defences have provided protection in the intervening years. However climate change is affecting weather patterns resulting in greater risk of flooding, and the paving over of areas which previously absorbed rainwater run-off has resulted in altered flood risk compared with previous decades. In order to predict the future risk of flooding computer modelling has been carried out by the Environment Agency with respect to river and tidal flooding and by Halcrow on behalf of the City Corporation for ground water, surface water and sewer flooding. The City of London Strategic Flood Risk Assessment provides details of this modelling and is the primary source of evidence of the future City flooding risks. It should be noted that modelling provides the best prediction of how flooding may affect the City but monitoring and investigation will improve the accuracy of this data.

3.2 River and tidal flood risk
The City of London 2012 Strategic Flood Risk Assessment (SFRA) shows that limited areas of the City are at risk from river flooding in the absence of any flood defences. The risk is confined to the riverside south of Thames Street and the Temples area (Fig 2). In reality the City is protected from river flooding by local flood defences along the riverside and by the Thames Barrier which protects the wider tidal Thames from flooding. Future flood risk from the Thames has been analysed through the Thames Estuary 2100 project which proposes various actions to reduce future risk, taking account of the impacts of climate change including sea level rise. Estuary wide actions promote the approach of making space for flood waters in flood plains along the estuary as opposed to flood defence raising. However in central London the opportunities for absorbing tidal flood waters into the landscape are limited therefore local actions in the City include the need to raise the flood defence walls by up to 0.5 metres by 2065 and a further 0.5m by 2100.

The Environment Agency has undertaken Breach Modelling (2012) which assesses the residual risk of a breach or overtopping of the flood defences at certain locations along the river. There is a breach location modelled in the City of Westminster close to the City boundary, which shows that the modelled breach extends into the Inner Temple area of the City of London. This breach modelling will be updated in 2014/15 to account for new TE 2100 modelled levels.
3.3 Surface water and sewer flood risk

The risk of flooding from surface water and sewer overflow is also confined to restricted areas of the City including the former Fleet Valley at Farringdon Street and the Thames Riverside (fig 3). This flooding is caused by overloading of the combined drainage and sewer network resulting in overflows from manholes in these areas. The use of Sustainable Drainage Systems in buildings and landscaping assists in reducing the rate at which surface water enters the sewer network thus reducing surface water flood risk.

Example of local actions to reduce surface water flood risk

The City’s Open Spaces Department supports this corporate strategy by making sure paving in the City’s gardens drains to natural ground, for example by using soak-aways, rather than to the piped City drainage system. Trees and other planting, the use of green roofs and green walls are also assisting in flood risk reduction, where appropriate.

Given the density of the buildings and development in the City, building rainwater harvesting is encouraged through the planning process. An example is the harvesting of rainwater as part of the redevelopment of 10 Trinity Square to irrigate Seething Lane Garden.
Figure 3: Surface water and sewer flooding zones

The sewers that serve this area have wide catchments extending throughout Camden to the north (Fig 4) and as far as Hammersmith and Fulham to the west (Fig 5); therefore local engineering action within the City of London to reduce the risk is unlikely to be effective in isolation. The actions to alleviate flood risk in these areas extend across a wide area and include installation of Sustainable Drainage Systems (SuDS) across the drainage catchment and maintenance and improvement of the Thames Estuary wide flood defences. These actions form part of a wider strategy within the surface water catchment. Measures to alleviate flood risk will also have other benefits for water resource management through rainwater harvesting and reuse; and for water quality through reducing the level of rainwater entering the drainage network thus reducing the potential for sewer discharges.

Example of a wider action which reduces flood risk in the City.

The surface water catchment areas for the City’s flood risk hotspots extend to the edge of Hampstead Heath (Figs 4 & 5). The City Corporation is planning works to ensure that the pond dams on Hampstead Heath do not fail or cause flooding in the local area following a major rainfall event. Any such protection from flood risk in the Hampstead Heath area provides consequential benefits in reducing the risk of sewer overflows elsewhere in this catchment area, including the flood risk hotspots in the City.
Figure 4: Catchment area for flood risk in Farringdon Street

Figure 5: Catchment area for flood risk in the Paul's Walk area
3.4 Ground water flood risk
The City is protected from ground water flooding by the GARDIT programme which maintains groundwater levels in the deep chalk aquifer at between -30 and -50 m AOD. The City may also be vulnerable to groundwater flooding from the shallow aquifer which comprises sand and gravel with high porosity and permeability. The areas of the City which are most at risk from groundwater flooding from this shallow aquifer are shown in Fig 6: Areas with increased potential for elevated groundwater. Complex interactions between rainfall infiltration, basement barriers and the predominance of impermeable surfaces in the City, makes this type of flood risk difficult to predict, however flooding from this source is not thought to be likely in the short to medium term. Longer term impacts of climate change on ground water flood risk are less certain.

![Figure 6: Areas with increased potential for elevated groundwater](image-url)
3.5 Climate change and flood risk

Our climate is changing and is likely to continue to change for many decades to come. The City of London Climate Change Adaptation Strategy (2010) identifies the expected changes that London will face, which include an increasing magnitude and frequency of intense rainfall events.

Flooding is a natural process and the speed of inundation and duration varies greatly. With climate change, however, the frequency, velocity, depth, patterns and severity of flooding are forecast to increase causing flash flooding, and heavier average winter precipitation that will put us at greater risk of flooding.

The City of London Climate Change Adaptation Strategy (2010) is based on the UK Climate Projections 2009 (UKCP09). These scenarios are generated with probabilistic data. No climate model can give a single definite answer to what the future will look like, however, under the high emissions scenario peak rainfall is likely to increase significantly.

In the figure below, the black line shows the central estimate (50\textsuperscript{th} percentile) of the increase in precipitation on the wettest winter day for the high emissions scenario. The wide grey bars show the likely range of change (33\textsuperscript{rd} to 66\textsuperscript{th} percentiles). The error bars show the 10\textsuperscript{th} and 90\textsuperscript{th} percentile events (future increase in precipitation on the wettest winter day is very unlikely to be outside this range).

![Figure 7: Future rainfall as a result of climate change](Source: City of London Climate Change Adaptation Strategy)

It is clear that unless action is taken, flood risks in the City of London will increase. Climate change is increasing the magnitude and frequency of intense rainfall events that cause flash flooding. According to the London Local Climate Impacts Profile (LCLIP) published by the Greater London Authority (GLA) heavy rain and flash flooding were the most frequently occurring weather incidents reported in the media, with cases of river flooding also being reported. Existing problems have also been identified within the City. For example, the existing drainage system at the Guildhall Art Gallery cannot cope with intense rainfall at times, and this has led to some flooding of its basement, damage and associated cost.
3.6 Strategic Flood Risk Assessment and Flood Risk Maps

The City of London Strategic Flood Risk Assessment (SFRA) (2012) provides the results of the latest flood risk modeling and mapping for the City. Neighbouring boroughs’ SFRAs and Local Flood Risk Management Strategies provide further evidence of the risks elsewhere in London which may affect the City. The Environment Agency publish various flood maps for coastal and river flooding, flood maps for surface water and reservoir flood maps which give a wider perspective. However the SFRA modelling carried out for the City reflects the most accurate picture for the Square Mile and has been incorporated into the Environment Agency Maps.
4 Objectives for Managing Flood Risk in the City

Signpost to the Flood and Water Management Act 2010 Section 9 (4) requirements
This section deals with
(c) the objectives for managing local flood risk (including any objectives included in the authority’s flood risk management plan prepared in accordance with the Flood Risk Regulations 2009),

The following objectives for managing local flood risk aim to reduce the risk and impact of flooding on the City:

- To provide up to date information regarding the level of flood risk within the City taking account of emerging climate change impacts
- To reduce the vulnerability and cost to City businesses, residents and visitors of flood risk
- To respond effectively in the event of flooding providing emergency assistance to those in need
- To assist in recovery enabling the City residents and businesses to resume normal activities promptly
- To engage with other flood risk management authorities taking action to reduce flood risk through partnership working within and beyond the City’s boundaries
4.1 Objective 1: Flood Risk Information

To provide up to date information regarding the level of flood risk within the City taking account of emerging climate change impacts

City of London SFRA 2012

In 2007 the City Corporation published its first Strategic Flood Risk Assessment which was updated in 2012. The City of London Strategic Flood Risk Assessment (SFRA) 2012 provides information on the flood risks the City faces from fluvial and tidal, surface water, sewer overflows and groundwater. The SFRA 2012 brings together evidence from the City of London SFRA 2007, Drain London Surface Water Management Plan and Preliminary Flood Risk Assessment. New modelling has been undertaken, taking account of the drainage and sewer network thereby providing an up to date assessment of the potential risks from surface water and sewer overflows.

Flood Maps for Surface Water (FMfSW)

The Environment Agency (EA) has a duty to publish flood risk and flood hazard mapping for the whole of London which has been identified as a Flood Risk Area under the Flood Risk Regulations 2009. The City Corporation has commissioned more detailed modelling than the EA for the City and this data has been supplied for incorporation into the Flood Map for Surface Water (FMfSW) thus providing the most up to date information on flood risk for the City. The City Corporation will engage with the EA to ensure that future reviews of the FMfSW continue to include the most up to date mapping and modelling, including any future predicted impacts of climate change.

What we will do:

- We will review the City of London SFRA at least every 5 years or more frequently if evidence suggests that this is necessary. This frequency of review will enable the impacts of climate change to be taken into account as evidence emerges.
- We will keep under review the SFRAs and flood risk modelling that is carried out for neighbouring boroughs through the Central London North Flood Risk Partnership
- Where feasible, we will provide the most up to date mapping and modelling to the EA for incorporation in future reviews of the FMfSW
- We will continue to engage with other risk management authorities and other interested parties to improve data on flood risk for the City
4.2 Objective 2: Reduced vulnerability and cost of flooding

| To reduce the vulnerability and cost to City businesses, residents and visitors of flood risk |

4.2.1 Planning

New development provides an opportunity to review existing flood risk potential for each site and ensure that future use of the site reduces the vulnerability of occupants to flooding and provides flood protection for a wider area where possible. The National Planning Practice Guidance identifies which land uses are suitable for sites that are at risk of flooding. The City Corporation applies this guidance in order to avoid locating vulnerable uses, such as basement dwellings or essential infrastructure, in areas that are at risk of flooding. The City of London Local Plan defines the City Flood Risk Area as the area of the City which is susceptible to flooding from the River Thames, surface water or the sewer network. The National Planning Practice Guidance will be applied to development within this City Flood Risk Area.

The City Corporation encourages the use of green roofs and green walls as they reduce or delay the amount of water discharged into the drainage system (along with rainwater attenuation tanks and other methods). We encourage developers of new developments to install green roofs and green walls and to retrofit them in refurbishments. Case studies of properties with green roofs within the City are available on the City of London website to promote their use.

The City of London Climate Change Adaptation Strategy, which is available to the public on the City of London website, identifies the priority risks associated with climate change and proposes adaptation measures. These are designed to ensure the City’s infrastructure and services cope under a changing climate. The report identifies specific risks and opportunities associated with managing flood risk. The Thames Estuary 2100 plan recommends that flood defence raising will be required to take account of sea level rise by 2065. Development that is being planned now may still be in place beyond 2065 and should be designed to factor in these higher flood defences which otherwise could obscure views of the river.

The riverside walk in the City forms part of the Thames Path National Trail. This will need to be taken into consideration when any works are ongoing which could potentially affect its use. There are strict guidelines around diversions and any closure requires Secretary of State approval.

What we will do:

- Apply the National Planning Policy Framework (NPPF) and associated National Planning Practice Guidance on flood risk, developing and implementing flood risk policy in the Local Plan which accords with the Sequential and Exceptions Tests.

- Implement planning policy to avoid the development of vulnerable uses in City Flood Risk Areas as defined on the City of London Local Plan Policies Map.
4.2.2 Flood resistance and resilience

The City Corporation has established a corporate-wide officer Flood Risk Steering Group, enabling joint and integrated working across Departments. This integrated approach ensures that new developments within the City are flood resistant and resilient, and that existing properties including heritage assets improve their resilience to flooding without damage to their design or heritage value.

Flood resistance is the process of preventing flood waters from entering buildings and spaces. The City’s buildings and spaces differ from those in other parts of London because of the predominance of office buildings.

Flood resilience is the process of designing buildings and spaces so that if flooding occurs it creates minimal damage and enables rapid recovery.

The City Corporation have used Drain London funding to improve flood resistance and resilience working with City businesses, residents and different departments within the City of London Corporation to reduce the vulnerability and raise awareness of surface water flooding in the City. There are several stages to this flood resistance and resilience programme which have been completed:

- the development of evidence-based responses to reduce risk without increasing flood risk elsewhere;
- the development of online resources available on the City of London website;
- the creation of case studies and development of recovery/resilience advice; and
- the production of a Flood Risk Briefing for flood risk authorities, building owners and occupiers to attend with presentations from the EA, Met Office and a local business.

We will continue to:

- identify and co-operate with key stakeholders;
• educate and raise an awareness of flood risk in the City;
• develop a planning advice note on flood resistance and resilience to be factored into future planning permissions;
• identify secondary benefits for biodiversity and urban greening of flood resistance and resilience measures

All of these actions will improve the overall understanding of flooding in the City and assist in recovery enabling normal activities to be resumed promptly.

What we will do

- Promote flood resistance and resilience measures to property owners in the City Flood Risk Area ensuring that the heritage implications of mitigation measures are taken into account
- Work to ensure all City Corporation infrastructure is resistant and resilient to flood risk, such as the Waste Transfer Station at Walbrook Wharf
- Seek funding contributions from those who will benefit from any collective flood resistance and resilience measures

4.2.3 Flood Insurance

Property insurance claims for flood damage across the UK have increased significantly over recent years and are set to increase further due to the impacts of climate change. Since 2000 flood insurers have been providing cover under a “Statement of Principles” agreement with the government which ensures that flood insurance is available to householders and small and medium sized enterprises (SMEs). Large commercial properties are not covered by the Statement of Principles and therefore need to arrange for flood risk insurance at market rates. The Statement of Principles expired in June 2013.

The Government’s preferred option for ensuring that flood insurance is available to householders in the future is the proposed “Flood RE” scheme. Flood RE would provide a reinsurace fund, through a levy on the insurance industry, to provide insurance cover for residential properties which would otherwise be uneconomic to insure due to flood risk. Flood RE would provide fixed price flood insurance to be reviewed annually. Parliamentary approval through the Water Bill will put in place the legislation for this scheme to be implemented. Final implementation is likely to be in summer 2015. In the meantime the insurance industry has voluntarily agreed to continue providing cover under the Statement of Principles. The Flood RE scheme is intended to be a transitional scheme which would gradually evolve over the next 25 years at which time a free market for all flood risk insurance would take over.

There are very few residential properties in the City which are at risk of flooding; consequently the Flood RE scheme will have little impact in the City. Commercial premises will not be covered by Flood RE therefore if flood risk increases as a result of climate change, commercial properties within the City Flood Risk Area may be affected by market pressures for insurance cover. This could particularly affect SMEs.
The City Corporation regularly reviews its approach to issues which present a potential risk to the City. Flood risk is one of the issues on the City Corporation’s Strategic Risk Register and is reviewed in the light of emerging information such as climate change projections. Monitoring of the implementation of this LFRMS will inform the periodic reviews of risk.

What we will do

- Continue to monitor the progress of the Flood RE proposals and assess their impact on the City
- Continue to assess flood risk for the City Corporation’s strategic risk register in the light of emerging information.

4.2.4 SuDS approvals

The City of London Corporation as the Lead Local Flood Authority for the City of London has a duty to develop a Sustainable Drainage Approval Body (SAB) to approve all non-exempt building proposals. This approval will be required before construction can commence and will run in parallel with planning approval for any application placed before it. The approvals should be in accordance with the National Standards for Sustainable Drainage.

The SAB was scheduled to be operational from 1 April 2014 but has now been delayed as the Government is refining the proposed procedures and related National Standards and has yet to lay the required secondary legislation before Parliament.

What we will do

- Continue to develop the necessary SAB processes within the City Corporation to fulfil this obligation within the timeframe laid down by Government

4.2.5 Asset register

The Corporation has an obligation under the Flood and Water Management Act 2010 to establish and maintain a register of structures or features which, in the opinion of the authority, are likely to have a significant effect on a flood risk in its area. Given the nature and size of the City there are limited features that could be classified as such. Those identified are the highway gullies and the river defences including those buildings that act as a defence against river flooding.

What we will do

- The City Corporation has implemented a dynamic Highway Management System (HyMS). This will include information on assets which have an impact on flood risk. Public access to this register will be made available through the City of London website.
- Update the condition and state of repair of the flood risk assets on HyMS incorporating Environment Agency data on river flood defence walls annually.
4.2.6 Flood investigation
The City Corporation has an obligation under the Flood and Water Management Act to carry out investigation of reported flooding incidents. Flooding incidents are generally reported through the Contact Centre who will pass the report to the Drainage Section of the Highways & Cleansing Division. An officer will then investigate the incident and record the information. Where there are multiple properties affected by flooding from a single source the officer will record the information, investigate the cause and produce a report.

What we will do

- Continue to maintain the register of flooding incidents
- Produce flood investigation reports for instances of multiple property flooding from a single source

4.2.7 Warning and Informing
The City Corporation’s Security and Contingency Planning team is able to assist City businesses with the development and exercising of their business continuity and emergency plans. Further information about accessing this support can be found on the City Corporation’s website’s business continuity pages.

The City Corporation is a Category 1 responder under the Civil Contingencies Act and is responsible for warning and informing the public. Public information provision will be undertaken in accordance with the Emergency Preparedness and “Expectations and Indicators of Good Practice Set for Category 1 and 2 Responders”.

Live flood warning is available through the Environment Agency for river and groundwater flooding and research is currently progressing to enable rapid forecasting of urban flooding from manholes and other sewerage nodes. In the event of an emergency, the City Corporation will work together with other agencies including the emergency services and neighbouring Local Authorities to respond as set out within the Multi Agency Flood Plan and the City’s Emergency Management Plan.

Consideration of the needs of all the City’s communities has been taken into account in preparation of the Multi Agency Flood Plan and the City’s Emergency Management Plan. The City will adopt an inclusive approach to warning and informing paying particular attention to those who may be more vulnerable during flooding events.

What we will do

- Continue to support the City’s businesses and residents by warning and informing them of flood risks and supporting business continuity and emergency plans
- Work with the City Property Association and other business and resident associations, as appropriate, to raise awareness of flood risk amongst their members
Encourage businesses and communities that are at risk of flooding to use the Environment Agency’s flood warning service for river and groundwater flooding and any future flood warning system for surface water / sewer flooding.

4.2.8 Site Specific Flood Risk Management Plans

The Flood Risk Regulations 2009 (regulation 26) requires that LLFAS prepare a flood risk management plan in relation to each relevant flood risk area. Virtually the whole of London has been identified as a flood risk area under these regulations. For this cycle of plans Lead Local Flood Authorities (LLFAs) need to prepare Flood Risk Management Plans (FRMPs) that cover local sources of flooding (i.e. from surface water, groundwater and ordinary watercourses) for Flood Risk Areas. The Environment Agency needs to prepare FRMPs for main rivers, the sea and reservoirs in England. The Environment Agency and LLFAs can develop separate plans if they wish. However the City has opted to prepare a FRMP jointly with the Environment Agency and other LLFAs. To do this we will feed in the actions identified in this Local Flood Risk Management Strategy which include actions to manage flood risk in the areas identified as being at specific risk: Farringdon Street, Paul’s Walk and Victoria Embankment. The City Corporation will prepare specific flood risk management plans for these areas as a key action in the Environment Agency’s strategic Thames River Basin District Flood Risk Management Plan.

What we will do

- Prepare and implement site specific flood risk management plans for Farringdon Street, Paul’s Walk and Victoria Embankment seeking contributions from beneficiaries of any area-wide flood alleviation measures.
4.3 Objective 3: Emergency response to flooding

To respond effectively in the event of flooding providing emergency assistance to those in need

The City Corporation has Emergency Response plans in place. These plans include the Multi Agency Flood Plan, the Emergency Management Manual and Rest Centre Plans for those evacuated from their homes.

- The Multi Agency Flood Plan (MAFP) An agreed framework between category 1 and 2 responders which sets out a co-ordinated response and recovery phase to severe flooding in the City of London.

- The Emergency Management Manual is a plan used by the City Corporation to respond to major incidents within the City.

- The City Corporation also has a Rest Centre Plan which details how the Local Authority could care for those evacuated from their homes due to an incident. The City Corporation has plans for Rest Centres in more than one location within the City.

Local Authorities can be contacted 24/7 to initiate a response capability.

The contact numbers for the City Corporation (daytime hours) are 020 7332 3417/1969/3584 and 3914.

Out of hours the City Corporation can be reached on 020 7606 3030.

What we will do:

- Ensure that emergency arrangements and plans are in place to respond to major incidents
- Embed the current MAFP by training and exercising it with appropriate partners.
- Review and update the MAFP every five years or more frequently if circumstances require.
4.4 Objective 4: Recovery from flooding

To assist in recovery enabling the City residents and businesses to resume normal activities promptly

The City Corporation intends to reduce the impact of flooding in the City and to create a model of best practice for dealing with flood risks for owners of commercial property and critical infrastructure.

The City Corporation has local plans and London has regional plans in place to assist businesses and residents with the return to normality.

During the latter stages of a major flooding incident (the recovery period and return to normality) the City Corporation may be able to provide services and staff to assist with the following resources drawn from day to day operations such as:

- Technical and Engineering Advice
- Building control
- Highways services
- Public health and environmental issues
- Provision of reception centres
- Re-housing and accommodation needs
- Transport
- Psychosocial support
- Help lines
- Welfare and financial needs

Depending on the severity of the flooding, the City Corporation may decide to establish a Community Assistance Centre to undertake a detailed Community Impact Assessment, to provide advice and support to affected people and to support the recovery of the community in a local setting.

The City Corporation may also decide to establish a Business Information Centre (BIC), to undertake a Business Impact Assessment, to provide advice and support to affected businesses and to support the recovery of the City’s business community. Specialist advice may need to be sought to address damage to historic structures.

Where multiple properties are affected by a single source of flooding, the City Corporation will investigate the causes and impact of flooding and prepare a report outlining any actions to reduce the risk of reoccurrence.

What we will do:

- Ensure that recovery arrangements and plans are in place to deal with flood recovery.
4.5 Objective 5: Partnership working

To engage with other flood risk management authorities taking action to reduce flood risk through partnership working within and beyond the City’s boundaries.

Flooding does not respect local authority boundaries therefore it is essential that Lead Local Flood Authorities work in partnership across local authority boundaries and with a range of agencies to build up a comprehensive picture of the flood risks and actions to reduce that risk. Local actions will form part of a wider strategy for reducing flood risk in the Thames River Basin, integrating cross boundary actions for effective flood risk management.

The Flood and Water Management Act (2010) gives local authorities the lead in managing local flood risk and has designated the City Corporation as the Lead Local Flood Authority (LLFA) for the City of London. This role requires partnership with all relevant bodies to help manage flood risk in the area.

The ‘duty to cooperate’ is a statutory requirement in the Localism Act 2011, which amends the Planning and Compulsory Purchase Act 2004. It places a legal duty on local planning authorities, county councils in England and public bodies to engage constructively, actively and on an on-going basis to maximise the effectiveness of Local and Marine Plan preparation relating to strategic cross boundary matters.

4.5.1 Drain London

In order to fulfil these roles the City Corporation works in partnership with a wide range of other organisations including the Environment Agency, Thames Water, the emergency services, Transport for London (TfL) and multiple utility infrastructure providers, such as UK Power Networks and BT. Partnership working with other London boroughs and the GLA has been established through membership of the Drain London Forum. This partnership group was established by the Greater London Authority (GLA) to bring together the GLA, the London boroughs and the City of London, the Environment Agency, Thames Water, Transport for London and London Councils to address surface water flooding issues. The Drain London Forum assists boroughs with their responsibilities for managing flood risk by sharing good practice, knowledge and expertise.

4.5.2 Environment Agency

Partnership working with the Environment Agency (EA) covers a number of different aspects including assistance in fulfilling the requirements of the Flood Risk Regulations 2009. Through this partnership the City Corporation completed and published a Preliminary Flood Risk Assessment, funded through Drain London in December 2011. In December 2013 the Environment Agency published comprehensive flood mapping covering all sources of flooding. The City Corporation provided additional modelling for the Environment Agency’s published maps to ensure that the most accurate and consistent picture of flood risk is presented. Future collaboration with the EA will include preparation of the Thames River Basin District - Flood Risk Management Plan which will cover London’s identified Flood Risk Area. This plan will be subject to public consultation and will be published by December 2015.
The Environment Agency is also the lead organisation co-ordinating the Thames Estuary 2100 Project. The Thames Estuary 2100 plan (TE 2100 plan) identifies mitigation that will reduce the City’s vulnerability to river flood risk from the River Thames and its tidal influences. The City Corporation has a role in ensuring the delivery of local TE2100 actions which include flood defence maintenance and the raising the flood defences along the riverside by up to 0.5 metres by 2065 and a further 0.5 metres by 2100. Further protection will result from wider actions such as allowing sacrificial water storage in flood plain areas elsewhere in the Thames Estuary during periods of heavy rainfall.

The Environment Agency (EA) co-ordinates the funding of flood mitigation projects through the Flood and Coastal Erosion Risk Management Grant-in-Aid (FCRM GiA). The costs of each scheme are balanced against the value of the benefits that the scheme would bring in order to allocate funding in the most cost effective manner. Assessment of a series of possible actions to alleviate flood risk in Farringdon Street and Paul’s Walk on the Thames Riverside found that major engineering projects would be very expensive and difficult to deliver, would not offer cost effective solutions and concluded that flood resistance and resilience measures in the immediate area provides the most cost effective option for protecting businesses from flooding. Co-operation will continue to explore possible EA funding to reduce flood risk in the City.

4.5.3 Port of London Authority

The Port of London Authority works to ensure navigational safety along the tidal Thames, promote use of the river and safeguard its unique marine environment. It works in partnership with people looking to use the river whether for trade, travel, recreation or pleasure. The City Corporation will work in partnership with the Port of London Authority to ensure that flood risk is taken into account in consideration of development associated with the River Thames.

4.5.4 Neighbouring boroughs

More detailed flood risk planning is carried out with the members of the Central London North Partnership Group which comprises the boroughs that form the catchment areas that affects the City’s flood risk: Islington, Camden, Westminster, Kensington & Chelsea and Hammersmith & Fulham. Liaison with Tower Hamlets and Newham, which are the receiving LLFAs for the City’s surface water drainage and sewers, is also essential. The Central London North Partnership Group also includes representatives from other Risk Management Authorities such as the Environment Agency, Thames Water, and Transport for London.

The City Corporation commissioned research into possible mitigation measures which could reduce the risk of surface water and sewer flooding. Initial assessments carried out according to the partnership funding process set out by Defra, identified that local mitigation projects would be ineffective in preventing flooding. Projects would need to cover the wider catchment which encompasses much of Camden to the north and extends into Westminster, Kensington and Chelsea and Hammersmith and Fulham to the west. Alleviation of flooding in the City’s flood risk hotspots would require extensive retrofitting of Sustainable Drainage Systems (SuDS) in these areas. The schemes as they stand did not achieve a high enough partnership funding score to attract Defra funding, therefore although schemes may
be effective in reducing flood risk substantial local funding would be required from the beneficiaries of the flood alleviation projects.

The City will continue to pursue the incorporation of SuDS into new and existing buildings within the City and in these wider catchment areas. Neighbouring boroughs, the GLA, Thames Water and the Environment Agency will be key partners in progressing this action. Section 13 of the Flood and Water Management Act 2010 imposes a duty on risk management authorities to co-operate with other relevant authorities in the exercise of their flood risk management functions.

In relation to individual developments in a neighbouring borough, where the relevant SuDS approval body believes a road in the City will be affected it will have a duty consult the City, in the City’s role as highways authority.

4.5.5 Regional Flood and Coastal Committee

The Regional Flood and Coastal Committee (RFCC) is a committee established by the Environment Agency under the Flood and Water Management Act 2010 that brings together members appointed by Lead Local Flood Authorities (LLFAs) and independent members with relevant experience, to discuss flood and coastal risk management work in their region. The City’s RFCC Member also represents the neighbouring boroughs of the Central North London Partnership Group.

4.5.6 Utility providers

Thames Water is an important partner in the implementation of flood mitigation and resistance measures. Thames Water has a remit through the utilities regulator OFWAT to reduce the number of properties affected by sewer flooding. OFWAT impose strict criteria and will only fund projects where there is a history of internal sewer flooding of premises during 1 in 10 year rainfall events. Although not strictly a flood risk mitigation project the proposed Thames Tideway Tunnel Project will intercept combined sewer outflow pipes and prevent them from discharging sewage into the Thames during heavy rain storms. In parallel with this Thames Water is promoting the use of Sustainable Drainage (SuDS) to reduce the rate and quantity of surface water run-off into London’s combined sewerage network.

Other utility providers will need to be kept up to date with the flood risks affecting their networks. Flood risk strategies provide an opportunity for engagement with these organisations.

4.5.7 Transport providers

Transport providers have their own flood risk plans covering emergency response to flooding incidents and asset resilience in the face of climate change. Transport for London is carrying out a comprehensive Flood Risk Review Assessment for London Underground, and Thameslink is carrying out a review of the vulnerability of existing assets on their network.

The City could be affected by disruption to transport networks across a wide geographical area since around 90% of journeys to work in the City are made by public transport.
The City Corporation will continue to engage with transport providers to gain a better understanding of the risks associated with flooding on the transport network and measures to mitigate the impact of flooding.

4.5.8 Technical bodies and Associations

London Drainage Engineering Group (LoDEG), Association of Thames Drainage Agencies (ATDA) and Construction Industry Research and Information Association (CIRIA) provide technical support and training related to flood risk and SuDS.

The City Property Association, which represents the interests of commercial property owners and major occupiers in the City will work with the City to raise awareness of flood risks including the likely disruption and insurance implications of widespread flooding across London.

4.5.9 Emergency Services

In the event of an emergency, the City will work together with other agencies including the emergency services and neighbouring Local Authorities to respond as set out within the Multi Agency Flood Plan and the City’s Emergency Management Plan.

What we will do:

- Work through Drain London to contribute to a coherent London wide approach to flood risk
- Work with the Central London North Flood Risk Partnership Group to ensure that appropriate policies are included in our partner’s Flood Risk Strategies and Local Plans
- Work with the Environment Agency to implement the City’s actions from the TE 2100 Plan and the requirements of the Flood Risk Regulations
- Continue to discuss possible funding of local projects with the Environment Agency
- Engage with and make representations to Thames Water and OFWAT to progress widespread retrofitting of SuDS into existing properties through the Thames Water draft five year plan consultation process
- Work with utility providers to build resistance and resilience to flood risk ensuring prompt recovery following a flood incident
- Work with transport providers to ensure implementation of flood resilience for transport networks
- Work with technical bodies to provide technical guidance and training to increase awareness of flood risk and mitigation.
- Work with emergency services to provide effective response to flooding incidents.
5 Actions to reduce flood risk in the City

This section deals with
(d) the measures proposed to achieve the objectives,
(e) how and when the measures are expected to be implemented,
(f) the costs and benefits of those measures, and how they are to be paid for,

5.1 Measures to achieve objectives

The measures to be implemented to achieve the objectives will consist of a combination of local actions through the spatial planning and development management functions, SuDS approvals, flood investigation and promotion of business and continuity awareness, complemented by wider actions in partnership with other flood risk management bodies.

5.2 Site Specific Flood Risk Management Plans

The Flood Risk Regulations 2009 require that Lead Local Flood Authorities prepare Flood Risk Management Plans (FRMP) for identified Flood Risk Areas by December 2015. These Flood Risk Areas are defined at a wide scale such that virtually the whole of London is defined as a Flood Risk Area. The City has opted to prepare a FRMP jointly with the Environment Agency and other LLFAs covering the Thames River Basin District which includes the whole of London’s Flood Risk Area. This wider catchment FRMP will incorporate the actions identified in this strategy to manage flood risk in the City’s surface water flooding hotspots.

The City Corporation intends to prepare Flood Risk Management Plans for these three areas by December 2015.

Farringdon Street & New Bridge Street
Paul’s Walk
Victoria Embankment
5.3 Funding & Resources

Funding and resources to implement this strategy will come from a number of different sources.

- As LLFA the City Corporation is responsible for co-ordination and co-operation with other risk management authorities to address flood risk in the City and in this role will use existing resources to fulfil many of the actions identified in the action plan.
- In addition to this, grant funding may be available from sources such as the Drain London fund which is managed by the GLA and the flood and coastal erosion risk management Grant in Aid (FCRM GiA) which is administered by the Environment Agency on behalf of Defra.
- Thames Water is responsible for the upgrading of sewerage infrastructure to prevent sewer flooding and to take account of future climate predictions.
- Utility companies and property owners are responsible for site specific flood risk alleviation, resistance and resilience of their premises. Where premises will benefit from wider flood alleviation schemes property
owners will be encouraged to provide a contribution towards such schemes.
- City developers are responsible for ensuring that flood risks are addressed in building design and associated landscaping.

Resourcing considerations will need to include direct project funding, staff resources, expert consultancy requirements and training needs to implement the Flood Risk Action Plan.

5.4 Flood Risk Action Plan

Objective 1: Up to date information on flood risk

<table>
<thead>
<tr>
<th>Action</th>
<th>Who</th>
<th>When</th>
<th>Resources</th>
<th>Funding</th>
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</thead>
<tbody>
<tr>
<td>We will review the City of London SFRA at least every 5 years or more frequently if evidence suggests that this is necessary. This frequency of review will enable the impacts of climate change to be taken into account as evidence emerges.</td>
<td>Built Environment-Planning</td>
<td>2017</td>
<td>City Corporation Consultancy expertise</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td>We will keep under review the SFRAs and flood risk modelling that is carried out for neighbouring boroughs through the Central London North Flood Risk Partnership Group</td>
<td>Built Environment Planning Drainage</td>
<td>Annually</td>
<td>City Corporation Neighbouring LLFAs</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td>We will provide the most up to date mapping and modelling to the EA for incorporation in future reviews of the FMfSW</td>
<td>Built Environment Planning</td>
<td>2013 to be reviewed by 2019</td>
<td>City Corporation Consultancy expertise</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td>City Corporation as LLFA will continue to engage with other risk management authorities and other interested parties to</td>
<td>Built Environment Other risk management authorities</td>
<td>Ongoing</td>
<td>City Corporation Other interested</td>
<td>City fund revenue budget</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other parties</td>
<td></td>
</tr>
</tbody>
</table>
improve data on flood risk for the City and interested parties

<table>
<thead>
<tr>
<th>Objective 2: To reduce vulnerability and cost of flood risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>Apply the National Planning Policy Framework (NPPF) and National Planning Practice Guidance on flood risk, developing and implementing flood risk policy in the Local Plan which accords with the Sequential and Exceptions Tests.</td>
</tr>
<tr>
<td>Implement planning policy to avoid the development of vulnerable uses in the City Flood Risk Area as defined on the City of London Local Plan Policies Map</td>
</tr>
<tr>
<td>Require the use of green roofs and green walls and other urban drainage techniques in new development and encourage in existing buildings to improve flood resilience subject to impacts on heritage value</td>
</tr>
<tr>
<td>Highlight the need for future raising of flood</td>
</tr>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>defences along the riverside to developers of property in this area encouraging a strategic approach to local flood defences.</td>
</tr>
<tr>
<td>Use pre-application meetings to promote flood resistance and resilience measures to property owners considering refurbishment or redevelopment in the City Flood Risk Area.</td>
</tr>
<tr>
<td>Promote flood resistance and resilience measures to property owners in the City Flood Risk Area ensuring that the heritage implications of mitigation measures are taken into account.</td>
</tr>
<tr>
<td>Work to ensure all City Corporation infrastructure is resistant and resilient to flood risk, such as the Waste Transfer Station at Walbrook Wharf</td>
</tr>
<tr>
<td>Seek funding contributions from those who will benefit from any collective flood resistance and resilience measures</td>
</tr>
<tr>
<td>Continue to monitor the progress of the Flood RE proposals and assess their</td>
</tr>
<tr>
<td>Action</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
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<tr>
<td>impact on the City</td>
</tr>
<tr>
<td>Continue to assess flood risk for the City’s risk register in the light of emerging information.</td>
</tr>
<tr>
<td>Continue to develop the necessary SAB processes within the City Corporation to fulfil this obligation within the timeframe laid down by Government</td>
</tr>
<tr>
<td>The City Corporation has implemented a dynamic Highway Management System (HyMS). This will include information on assets which have an impact on flood risk. Public access to this register will be made available through the City of London website</td>
</tr>
<tr>
<td>Update the condition and state of repair of the flood risk assets on HyMS incorporating Environment Agency data on river flood defence walls annually.</td>
</tr>
<tr>
<td>Continue to maintain the register of flooding incidents</td>
</tr>
<tr>
<td>Produce flood investigation reports for instances of multiple property</td>
</tr>
<tr>
<td>Action</td>
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<tr>
<td>-----------------------------------------------------------------------</td>
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<tr>
<td>flooding from a single source</td>
</tr>
<tr>
<td>Continue to support the City’s businesses and residents by warning and informing them of flood risks and supporting business continuity and emergency plans</td>
</tr>
<tr>
<td>Work with the City Property Association and other business and resident associations, as appropriate, to raise awareness of flood risk amongst their members</td>
</tr>
<tr>
<td>Encourage businesses and communities that are at risk of flooding to use the Environment Agency’s flood warning service for river and groundwater flooding and any future flood warning system for surface water / sewer flooding.</td>
</tr>
<tr>
<td>Prepare and implement site specific flood risk management plans for Farringdon Street, Paul’s Walk and Victoria Embankment seeking contributions from beneficiaries of any area-wide flood alleviation measures</td>
</tr>
</tbody>
</table>
### Objective 3: Emergency response to flooding

<table>
<thead>
<tr>
<th>Action</th>
<th>Who</th>
<th>When</th>
<th>Resources</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that emergency arrangements and plans are in place to respond to major incidents</td>
<td>Security and Contingency Planning</td>
<td>On-going</td>
<td>City Corporation, Emergency Services, Environment Agency, City businesses and residents</td>
<td>City Fund revenue budget Other organisations’ funds</td>
</tr>
<tr>
<td>Embed the current MAFP by training and exercising it with appropriate partners.</td>
<td>Security and Contingency Planning</td>
<td>On-going</td>
<td>City Corporation, Emergency Services, Environment Agency, City businesses and residents</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td>Review and update the MAFP every five years or more frequently if circumstances require this.</td>
<td>Security and Contingency Planning</td>
<td>2017</td>
<td>City Corporation, Emergency Services, Environment Agency, City businesses and residents</td>
<td>City Fund revenue budget</td>
</tr>
</tbody>
</table>

### Objective 4: Recovery following flooding

<table>
<thead>
<tr>
<th>Action</th>
<th>Who</th>
<th>When</th>
<th>Resources</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that recovery arrangements and plans are in place to deal with flood recovery.</td>
<td>Security and Contingency Planning</td>
<td>On-going</td>
<td>City Corporation, Emergency Services, Environment Agency, building owners</td>
<td>City Fund revenue budget Other organisations’ funds</td>
</tr>
</tbody>
</table>

### Objective 5: Engagement with other flood risk management authorities
<table>
<thead>
<tr>
<th>Action</th>
<th>Who</th>
<th>When</th>
<th>Resources</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work through Drain London to contribute to a coherent London wide approach to flood risk</td>
<td>Built Environment Planning &amp; Drainage</td>
<td>On-going</td>
<td>City Corporation, GLA</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td></td>
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<td>Other organisations’ funds</td>
</tr>
<tr>
<td>Work with the Central London North Flood Risk Partnership Group to ensure that appropriate policies are included in our partner’s Flood Risk Strategies and Local Plans</td>
<td>Built Environment Planning &amp; Drainage</td>
<td>On-going</td>
<td>City Corporation</td>
<td>City Fund revenue budget</td>
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<tr>
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<td></td>
<td>North London Central Partnership Group</td>
<td>Other organisations’ funds</td>
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<td>Other Risk Management Authorities</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>RFCC Member</td>
<td></td>
</tr>
<tr>
<td>Work with the Environment Agency to implement the City’s actions from the TE 2100 Plan and the requirements of the Flood Risk Regulations</td>
<td>Town Clerks</td>
<td>Short term 2010 to 2035</td>
<td>City Corporation</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium term 2035 to 2050</td>
<td>Environment Agency</td>
<td>Other organisations’ funds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long term 2050 to 2100</td>
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</tr>
<tr>
<td>Continue to discuss possible funding of local projects with the Environment Agency</td>
<td>Built Environment</td>
<td>Short term 2010 to 2015</td>
<td>City Corporation</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Environment Agency</td>
<td>Environmental Agency funds</td>
</tr>
<tr>
<td>Engage with Thames Water and OFWAT to progress widespread retrofitting of SuDS into existing properties through the Thames Water draft twenty five year plan consultation process</td>
<td>Built Environment</td>
<td>Consultation on plan for 2015 to 2040</td>
<td>City Corporation</td>
<td>City Fund revenue budget</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Thames Water</td>
<td>Thames Water funding</td>
</tr>
<tr>
<td>Action</td>
<td>Who</td>
<td>When</td>
<td>Resources</td>
<td>Funding</td>
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<tr>
<td>-----------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Work with utility providers to build resistance and resilience to flood risk ensuring prompt recovery following a flood incident</td>
<td>Town Clerks Built Environment</td>
<td>On-going</td>
<td>City Corporation, Utility Providers, Building owners</td>
<td>City Fund revenue budget Utility providers funding</td>
</tr>
<tr>
<td>Work with transport providers to ensure implementation of flood resilience for transport networks</td>
<td>Town Clerks Built Environment Transport for London</td>
<td>On-going</td>
<td>City Corporation Transport providers</td>
<td>City Fund revenue budget Transport provider funding</td>
</tr>
<tr>
<td>Work with technical bodies to provide technical guidance and training to increase awareness of flood risk and mitigation.</td>
<td>Town Clerks Built Environment</td>
<td>On-going</td>
<td>City Corporation Technical bodies</td>
<td>City fund revenue budget</td>
</tr>
<tr>
<td>Work with emergency services to provide effective response to flooding incidents</td>
<td>Security and Contingency Planning</td>
<td>On-going</td>
<td>City Corporation Emergency services</td>
<td>City fund revenue budget</td>
</tr>
</tbody>
</table>
6 Strategy review

Signpost to the Flood and Water Management Act 2010 Section 9 (4) requirements

This section deals with:

(h) how and when the strategy is to be reviewed.

6.1 Public Consultation
The draft Local Flood Risk Management Strategy was subject to public consultation in April 2014 in line with the requirements of the City Corporation’s Statement of Community Involvement.

6.2 Approval process
The Local Flood Risk Management Strategy was adopted by the Planning and Transportation Committee on 23rd Sept 2014.

6.3 Governance and monitoring
Implementation of the Strategy will be overseen by the officer led Flood Risk Steering Group. The Flood Risk Steering Group is chaired by the City Corporation’s Director of the Built Environment and includes representatives from Built Environment, City Surveyors, Contingency Planning, and Town Clerks.

6.4 Review
The Strategy will be reviewed by the Planning & Transportation Committee every five years alongside the City of London’s Strategic Flood Risk Assessment.
7 Wider sustainability objectives

Signpost to the Flood and Water Management Act 2010 Section 9 (4) requirements

This section deals with

(i) how the strategy contributes to the achievement of wider environmental objectives

7.1 Strategic Environmental Assessment

The City of London draft Local Flood Risk Management Strategy has been subject to Strategic Environmental Assessment (SEA) which evaluates the impact that the strategy will have on wider sustainability objectives. Strategic Environmental Assessment (SEA) is the process by which strategic plans and programmes are assessed to ensure that they take account of social, environmental and economic objectives for the area, fulfilling the requirements of the Strategic Environmental Assessment (2001/EC/42) (SEA Directive). SEA was used during the preparation of the strategy to evaluate options for achieving the flood risk objectives against a series of wider sustainability objectives.

The sustainability objectives relevant to the Flood Risk Management Strategy were determined at the SEA scoping stage which included consultation with the Environment Agency, English Heritage, Natural England, GLA and flood risk partnership group members.

The sustainability objectives relevant to the Local Flood Risk Management Strategy are as follows:

1. To protect the health, wellbeing and safety of workers, residents and visitors
2. To protect property and essential infrastructure
3. To protect the historic environment, archaeological heritage and landscape
4. To protect and enhance biodiversity
5. To protect water quality and resources
6. To adapt to the impacts of climate change
7. To minimise adverse impacts on the economy

The impact of the flood risk strategy options was assessed against these wider sustainability objectives taking account of the positive, negative and neutral impacts, and the geographic scale and timescale of the impact (short, medium or long term). Comments are included to highlight the significant effects of the preferred options in terms of direct or indirect effects, whether effects are permanent or temporary and whether there are likely to be cumulative effects.

The conclusions of the SEA are reported in the Strategic Environmental Assessment Report and are summarised below:
SEA Objective 1: To protect the health, wellbeing and safety of workers, residents and visitors.

Assessment of options against each of the Flood Risk Strategy objectives indicates that a positive proactive approach will bring benefits in relation to the protection of the health, wellbeing and safety of workers, residents and visitors. The greatest danger to health is from sewer flooding which is influenced by actions in a wide catchment area beyond the City. Therefore partnership working particularly on SuDS implementation in neighbouring boroughs is a key activity to protect the health wellbeing and safety of workers, residents and visitors.

SEA Objective 2: To protect property and essential infrastructure

A proactive approach, making sure that flood risk information is up to date and local measures are implemented to enhance resistance and resilience to flooding, will provide the best opportunities for protection of property and essential infrastructure. The SEA identifies that the adoption of a co-ordinated approach to flood investigation, flood risk asset management and emergency planning are important elements for property protection.

SEA Objective 3: To protect the historic environment and archaeological heritage

The SEA assessment identifies that the most effective actions to protect historic assets against flood risk include promotion of resistance and resilience measures warning and informing and the preparation of co-ordinated management plans and emergency and contingency plans for areas that are at risk of flooding. A lack of partnership working beyond the city’s boundaries could present greater risks to historic assets by increasing the risk of surface water flooding exacerbated by actions in neighbouring boroughs.

SEA Objective 4: To protect and enhance biodiversity

The register of flood risk assets where maintenance and state of repair are recorded in one place presents opportunities for the protection and enhancement of biodiversity particularly associated with the river defence flood walls which provide important habitats along the river Thames area of metropolitan importance for nature conservation. Partnership working is identified as important in protection and enhancement of biodiversity since it will enable input from organisations with varied expertise, for example the Environment Agency and the Port of London Authority, in ensuring that flood risk management plans take account of biodiversity.

SEA Objective 5: To protect water quality and resources

The development of an effective SuDS approvals process will be important in protecting water quality and resources through the impact of SuDS in reducing rainwater run-off and preventing sewer overflows and also in conserving water by collecting it for landscape watering etc. The preparation of co-ordinated plans for flood risk areas and flood recovery will also assist in avoiding water pollution and making the best use of water resources.

SEA Objective 6: Climate Change Adaptation

The uncertainties related to climate change make it essential that review of the City of London Strategic Flood Risk Assessment is carried out at regular intervals in order
to identify where climate change is having an impact on flood risks. Similarly partnership working is important to gain knowledge of how climate change is affecting the sewer flooding catchment areas and how sea level rise is affecting the flood risk from the Thames.

**SEA Objective 7: Minimise impacts on the economy**

The provision of accurate flood risk information and the preparation of co-ordinated flood risk management and recovery plans will be the most useful aspects in minimising impacts on the economy. Warning and informing will also form a crucial activity in making sure that businesses in the flood risk areas are aware of the risks and make appropriate contingency plans.

7.2 **Overall SEA conclusion**

The SEA has considered a “Do Nothing” approach against a series of proposed actions related to flood risk. The “Do Nothing” option results in poorer outcomes against each of the SEA objectives. Therefore a positive approach to flood risk management is recommended.
Appendix 1 Legislative context

Pitt Review

Flood risk planning has assumed a high profile due to the extreme flooding events of summer 2007 and the subsequent Pitt Review ‘Learning Lessons from the 2007 Floods’ which was published in Dec 2008. The recommendations of this report, along with legislative changes, require that local authorities assume a new role in co-ordination of measures to minimise flood risk in their areas. More recent national flooding has placed greater emphasis on flood risk planning as the frequency of extreme weather events increases.

The Flood Risk Regulations 2009 came into force on 10th Dec 2009. These regulations transpose EC Directive 2007/60/EC assessment and management of flood risks and impose new duties on the Environment Agency and local authorities, including the City as a lead local flood authority to:

- Prepare a preliminary flood risk assessment by June 2011, for publication by the Environment Agency in December 2011, showing the probability of flooding and consequences for human health, the environment, cultural heritage and economic activity
- Prepare flood risk maps and flood hazard maps by June 2013, for publication by the Environment Agency in December 2013
- Prepare a flood risk management plan for areas which are at significant risk of flooding by June 2015, for publication by the Environment Agency in December 2015

Flood and Water Management Act 2010 – received Royal Assent on 8th April 2010. It gives local authorities new responsibilities as lead local flood authorities (LLFA):

Part 1 of the act requires all lead local flood authorities in England to:

- Develop, maintain, apply, and monitor the application of, a strategy for local flood risk from surface run off, groundwater and ordinary watercourses, in their area. The strategy must at least set out who the risk management authorities are in the area and their relevant functions, the authority’s objectives for managing flood risk, as well as proposed measures to deliver the objectives, and timescales for implementation of the measures; how those measures are to be paid for as well as their costs and benefits, how and when the strategy will be reviewed, and how the strategy contributes to the achievement of wider environmental objectives. The lead local flood authority must consult affected risk management authorities and the public about its strategy and provide guidance on the application of the strategy.
- Investigate flooding incidents in its area and report on its findings.
- Establish and maintain a register of structures or features which may significantly affect flood risk in their area including information regarding ownership and state of repair.
- Contribute to sustainable development in the discharge of its flood risk duties.
- Assume the power to designate features with respect to flood risk and subsequently to act as responsible authority for such features.

**Part 2** of the act gives local authorities new duties as “approving bodies” with regard to drainage including:

- Approving rainwater drainage systems before commencement of any construction works which have drainage implications
- Adopting and maintaining approved systems which affect more than one property
- Approval of surface water drainage systems prior to connection to public sewers. (Automatic right of connection to public sewers is removed by this Act).

**Part 3** of the act provides legislative powers for:

- Consolidation of legislation relating to flood risk including Water Industry Act 1991, the Water Resources Act 1991, the Land Drainage Act 1991, the Reservoirs Act 1975, the Highways Act 1980 (so far as relevant to water), the Environment Act 1995 (so far as relevant to water), the Public Health Act 1936 (so far as relevant to water) and the Coast Protection Act 1949.
- Provision of funding by Parliament to pay for expenditure under the Act

As Lead Local Flood Authority, the City Corporation is responsible for preparing and implementing a Flood Risk Management Strategy for the City. The Requirements of the Flood and Water Management Act with respect to this Flood Risk Management Strategy are set out in fig 9

**Fig 9: Requirements of the Flood and Water Management Act 2010 Section 9 Local flood risk management strategies: England**

(1) A lead local flood authority for an area in England must develop, maintain, apply and monitor a strategy for local flood risk management in its area (a “local flood risk management strategy”).

(2) In subsection (1) “local flood risk” means flood risk from—
   - (a) surface runoff,
   - (b) groundwater, and
   - (c) ordinary watercourses.

(3) In subsection (2)(c) the reference to an ordinary watercourse includes a reference to a lake, pond or other area of water which flows into an ordinary watercourse.

(4) The strategy must specify—
   - (a) the risk management authorities in the authority’s area,
   - (b) the flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area,
   - (c) the objectives for managing local flood risk (including any objectives included in the authority’s flood risk management plan prepared in accordance with the Flood Risk Regulations 2009),
(d) the measures proposed to achieve those objectives,
(e) how and when the measures are expected to be implemented,
(f) the costs and benefits of those measures, and how they are to be paid for,
(g) the assessment of local flood risk for the purpose of the strategy,
(h) how and when the strategy is to be reviewed, and
(i) how the strategy contributes to the achievement of wider environmental objectives.

(5) The strategy must be consistent with the national flood and coastal erosion risk management strategy for England under section 7.

(6) A lead local flood authority must consult the following about its local flood risk management strategy—
(a) risk management authorities that may be affected by the strategy (including risk management authorities in Wales), and
(b) the public.

(7) A lead local flood authority must publish a summary of its local flood risk management strategy (including guidance about the availability of relevant information).

(8) A lead local flood authority may issue guidance about the application of the local flood risk management strategy in its area.

(9) A lead local flood authority must have regard to any guidance issued by the Secretary of State about—
(a) the local flood risk management strategy, and
(b) guidance under subsection (8).

This strategy will be subject to Strategic Environmental Assessment (SEA) as required by the SEA Directive and will be reviewed by other stakeholders during a period of public consultation prior to adoption.

**Civil Contingencies Act 2004**

Local Authorities have 7 duties under the Civil Contingencies Act 2004

- To operate with other local responders to enhance coordination and efficiency;
- Ensure information is shared with local responders to enhance coordination:
- Carry out risk assessments
- Have emergency plans in place
- Have business continuity management arrangements in place
- Have arrangements in place to warn and inform the public in the event of an Emergency
- Provide advice and assistance to businesses and voluntary organisations regarding business continuity management
Planning Guidance

The National Planning Policy Framework (NPPF) was introduced in 2012 and provides Government guidance on Planning. The Core Planning principles include the following requirements:

- support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy)

- promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions (such as for wildlife, recreation, flood risk mitigation, carbon storage, or food production)

Section 10 of the NPPF states that “Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.

National Planning Policy Framework requirements for development

Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:

- applying the Sequential Test;

- if necessary, applying the Exception Test;

- safeguarding land from development that is required for current and future flood management;

- using opportunities offered by new development to reduce the causes and impacts of flooding; and

- where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations.

The NPPF is supported by National Planning Practice Guidance which provides details of how the flood risk elements of the NPPF should be applied.
Other City of London strategies and plans

The City Corporation has adopted a number of plans and strategies which are relevant to this Flood Risk Management Strategy and these have been taken into account in its preparation:

- **Sustainable Community Strategy**

  The City Together is a non-executive partnership that brings together the key public, private and voluntary sector providers in the City with representatives from the City’s resident, business, worker and faith communities.

  The City Together’s role is to generate and pursue a collectively agreed long term vision with strategic objectives for the City, designed to promote the economic, social and environmental wellbeing of the City of London. The City Together also aims to promote and encourage more effective partnership working and is responsible for developing the City’s Sustainable Community Strategy called ‘The City Together Strategy: The Heart of a World Class City’. Through The City Together, our diverse communities and partners can work together to support the continued success of the City in a way that meets the needs of our residents, businesses, workers and visitors.

- **Climate change adaptation strategy**

  The City of London’s Climate Change Adaptation Strategy (2010 update) uses the latest UK Climate Projections, UKCP09 and builds on the impacts previously identified in the London Climate Change Partnership’s publication, ‘London’s Warming’.

  The climate change risks for the City are summarised below:

  - Hotter, drier summers,
  - Milder, wetter winters,
  - More frequent extreme high temperatures,
  - More frequent heavy downpours of rain,
  - Significant decreases in soil moisture content in summer,
  - Sea level rise and increases in storm surge height,
  - Possible higher wind speeds.
  - Longer periods when weather systems are locked into the same pattern.

  The City of London’s Climate Change Adaptation Strategy, aims to identify the priority risks associated with climate change and proposes adaptation measures which are designed to ensure that the City’s infrastructure and services cope under a changing climate. The City Corporation will continue to review emerging experience of climate change affecting south east England for its impacts on the City.

- **Core Strategy/Local Plan**

  The City’s adopted Core Strategy sets out the future vision and key polices for planning the City of London. This will be replaced in 2015 by a new planning strategy for the City of London called the Local Plan. The Plan sets out the vision for
shaping the Square Mile in the future and contains the policies by which planning decisions will be made.

The Core Strategy and emerging Local plan set out the City’s approach to flood risk associated with new development requiring flood risk assessments for any development sites located in the City Flood Risk Area.

The Local Plan is accompanied by a Policies Map (in two parts) that shows where its policies operate.

- **Multi Agency Flood Plan**

The Multi Agency Flood Plan outlines the various responsibilities of different organisation with regard to emergency and contingency planning for flood risk.
Appendix 2 Flood Risk Powers and Responsibilities

<table>
<thead>
<tr>
<th>Authority</th>
<th>Function</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Corporation</td>
<td>Lead Local Flood Authority</td>
<td>Strategic role in overseeing the management of local flood risk i.e. flood risk from surface water runoff, groundwater and ordinary watercourses. This includes responsibility for:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Preparing a Local Flood Risk Management Strategy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Investigation of flooding incidents and preparation of flood incident reports</td>
</tr>
</tbody>
</table>

Signpost to the Flood and Water Management Act 2010 Section 9 (4) requirements

a) The risk management authorities in the authority’s area and
b) The flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area.

Risk Management Authorities and other interested parties

The Flood and Water Management Act 2010 recognises the following authorities as risk management authorities:

- Lead Local Flood Authorities (LLFA)
- The Environment Agency
- Water companies
- Highways authorities
- Internal Drainage Boards (not relevant to the City)
- District and borough councils

These risk management authorities have a duty to co-operate with each other in the exercise of their duties and the power to take on flood risk functions from other authorities by mutual agreement.

The relevant risk management authorities for the City are the City Corporation as LLFA for the square mile, the Environment Agency which exercises a national and regional role in co-ordinating flood risk management, Thames Water as the water company and sewerage undertaker for the City, and Transport for London as the Highways Agency for parts of the City.

A number of other authorities, although not defined as risk management authorities, have a role to play in the management of flood risk in the City. These include the Greater London Authority (GLA) which manages the Drain London project, improving information on flood risk for London; Network Rail which manages mainline stations feeding the City; the Emergency Services and first responders in tackling flooding incidents; the Marine Management Organisation and the Port of London Authority; and neighbouring boroughs as LLFAs for their areas since they also influence the City’s flood risk management.

Risk management functions in the City
<table>
<thead>
<tr>
<th>Authority</th>
<th>Function</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Maintaining register of assets that impact on flood risk and registering appropriate assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Implementing SuDS Approval Body (SAB)</td>
</tr>
<tr>
<td>City Corporation</td>
<td>Planning Authority</td>
<td>Ensuring that development does not increase vulnerability to flood risk for new and existing properties</td>
</tr>
<tr>
<td>City Corporation</td>
<td>Category 1 responder under the Civil Contingencies Act</td>
<td>Ensuring that systems and processes are in place to provide emergency response to flooding</td>
</tr>
<tr>
<td>City Corporation</td>
<td>Highway Authority</td>
<td>Duty to maintain the highway including responsibility for drain and gully maintenance on non-strategic roads in the City</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>Strategic Role</td>
<td>Taking a strategic overview of the management of all sources of flooding and coastal erosion. This includes setting the direction for managing the risks through strategic plans; providing evidence and advice to inform government policy and support others; working collaboratively to support the development of risk management skills and capacity and providing a framework to support local delivery.</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>Operational role</td>
<td>Operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea, as well as being coastal erosion risk management authority. Responsible for inspection of flood defences and maintenance of the Thames Barrier. Advisory and statutory consultee role in the assessment of flood risk associated with planning policy and development. Advisory role in assessment of Multi Agency Flood Plans.</td>
</tr>
<tr>
<td>Thames Water</td>
<td>Sewerage undertaker</td>
<td>Responsible for provision and maintenance of the sewer network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upgrade of sewer network to facilitate increased drainage capacity requirements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Responsible for implementation of Thames Tideway Tunnel to reduce sewer outflows into the City</td>
</tr>
<tr>
<td><strong>Authority</strong></td>
<td><strong>Function</strong></td>
<td><strong>Responsibilities</strong></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Thames</td>
<td></td>
<td><strong>Transport for London</strong> Transport infrastructure provider <strong>Responsible for provision and maintenance of strategic road network and London Underground and bus networks ensuring their resilience to flood risk</strong></td>
</tr>
<tr>
<td>Network Rail</td>
<td>Transport infrastructure provider</td>
<td><strong>Network Rail</strong> Transport infrastructure provider <strong>Responsible for provision and maintenance of railway network serving mainline stations in the City and their resilience to flood risk</strong></td>
</tr>
<tr>
<td>Greater London Authority</td>
<td>Drain London</td>
<td><strong>Greater London Authority</strong> Facilitation of co-ordinated working on flood risk across London including provision of guidance and information</td>
</tr>
<tr>
<td>Neighbouring boroughs</td>
<td>LLFAs for their areas</td>
<td><strong>Neighbouring boroughs</strong> LLFAs for their areas Strategic role in overseeing the management of local flood risk in their areas and liaison with other LLFAs affected.</td>
</tr>
<tr>
<td>Businesses and Residents</td>
<td>Property owners</td>
<td><strong>Businesses and Residents</strong> Property owners Responsible for flood resistance and resilience and emergency and contingency planning associated with properties Riparian owners are responsible for the maintenance of flood defences</td>
</tr>
<tr>
<td>Utility companies</td>
<td>Utility providers</td>
<td><strong>Utility companies</strong> Utility providers <strong>Responsible for provision and maintenance of utility infrastructure – electricity, gas telecommunications etc. and ensuring its resilience to flood risk</strong></td>
</tr>
</tbody>
</table>

**Glossary**

**City Flood Risk Areas** – Areas of the City that are at risk of river or surface water flooding as defined in the City of London Local Plan

**Drain London** – Multi agency partnership co-ordinated by the Greater London Authority to provide pan London information and advice on flood risk

**Flood Zones** – Environment Agency defined zones with varying probabilities of river flooding

- Flood Zone 1 - Low probability of flooding - less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)
- Flood Zone 2 – Medium probability of flooding - between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%)
- Flood Zone 3 - High probability of flooding - a 1 in 100 or greater annual probability of river flooding (>1%)

**FMfSW** – **Flood Map for Surface Water** – National scale maps published by the Environment Agency showing surface water flood risk.
LLFA - Lead Local Flood Authority – The local authority with the statutory responsibility for flood risk management in its local area. The City Corporation is the LLFA for the City of London geographic area.

LFRMS – Local Flood Risk Management Strategy – Strategy for managing flood risk at a local level as required by the Flood and Water Management Act 2010

Multi Agency Flood Plan – Emergency Plan for responding to flooding

NPPF – National Planning Policy Framework – The government’s statement of planning guidance to local planning authorities, issued by the Department of Communities and Local Government in March 2012. The City Corporation must take account of it in preparing and implementing its planning policies.

Preliminary Flood Risk Assessment – preliminary assessment of the risk of flooding as required by the Flood Risk Regulations 2009

Risk Management Authorities – authorities defined in the Flood and Water Management Act as having flood risk responsibilities

Sequential Test and Exceptions Test – Tests to be applied to proposals for new development in order to avoid allowing vulnerable uses in areas that are prone to flooding. Details of these tests can be found in the National Planning Practice Guidance to the National Planning Policy Framework

SEA – Strategic Environmental Assessment – assessment of the likely environmental, social and economic assessment of the implementation of plans and programmes as required by the EU Strategic Environmental Assessment Directive

SFRA – Strategic Flood Risk Assessment – comprehensive assessment of the risks of flooding from all sources

Surface Water Management Plan – plan for the management of surface water to reduce risk of flooding from this source.

TE2100 – Thames Estuary 2100 Plan – Environment Agency’s plan for addressing flood management in the Thames Estuary up to 2100

Contact: Janet Laban Tel: 020 7332 1148
janet.laban@cityoflondon.gov.uk