Appendix 1 – draft policies on Climate Resilience and Flood Risk

This section aims to ensure that the City remains resilient in the face of changing climate patterns. The main focus is on flood risk and the risk of overheating of buildings and spaces which will become more frequent as a result of climate change.

Policy CS XX: Climate Resilience and Flood Risk

Buildings and the public realm must be designed to be adaptable to future climate conditions and resilient to more frequent extreme weather events.

- Development must minimise the risk of overheating and any adverse contribution to the urban heat island effect;
- Development must avoid placing people or essential infrastructure at increased risk from river, surface water, sewer or groundwater flooding;
- Flood defence structures must be safeguarded and enhanced to maintain protection from climate related sea level rise.

Reason for the policy

Today's new buildings will be in place for several decades, therefore they must be resilient to the weather patterns and climate conditions they will encounter during their lifetime. Designing climate resilience into buildings and the public realm will keep the City safe and comfortable as climate patterns change.

The UK Climate Projections (CP09) predict that London will experience a rise in mean temperatures of between 0.6^{o}c and 2.7^{o}c by 2050 [1]. This will increase the risk of overheating and the need for energy intensive air conditioning. In addition to this the City can experience temperatures up to 10^{0}c higher than the countryside around London, due to heat retention and waste heat expulsion from buildings resulting in an Urban Heat Island Effect.

Although the total annual rainfall will remain broadly similar to current levels, the patterns of rainfall is expected to change with more intense storms and periods of low rainfall. This will increase the risk of flooding, particularly from surface water and from sewer surcharge from London's combined drainage network. Conversely there will be a greater risk of water shortages and drought conditions as rainfall fluctuates.

The City lies within the tidal section of the Thames and is therefore vulnerable to sea level rise resulting from climate change. The Thames Estuary 2100 Plan identifies the need for the existing flood defences in central London to be raised by up to 1 metre between 2065 and 2100 to protect London from flooding.

How the policy works

The City Corporation will continue to monitor and model climate change impacts on the City to inform policy and decision making. UK Climate Projections will form the

[1] CP09 for the 30-year period 2020-2050, under medium emissions, the central estimate of increase in summer mean temperature is 1.6°C; it is very unlikely to be less than 0.6°C and is very unlikely to be more than 2.7°C

basis of future planning for climate resilience in the City. The City of London Strategic Flood Risk Assessment will be reviewed at least every five years or more frequently if circumstances require.

Developers will be expected to show that their proposals have taken account of predicted climate change and will minimise the impacts of changed climate patterns on future occupants and the City's communities.

Policy DM XX: Overheating and Urban Heat Island Effect

1. Developers will be required to demonstrate that their developments have been designed to reduce the risk of overheating through:

    - solar shading to prevent solar gain, particularly on glazed facades;
    - urban greening to improve evaporative cooling;
    - passive ventilation and heat recovery;
    - use of thermal mass to moderate temperature fluctuations;
    - minimal reliance on energy intensive cooling systems.

2. Building designs should minimise any contribution to the urban heat island effect.

Reason for the policy

Development presents an opportunity to renew or adapt existing building stock to provide buildings and public spaces which will cope better with changing climate patterns. Design measures should be employed to reduce energy demands from cooling infrastructure, making buildings more resilient in the face of higher temperatures. Measures such as urban greening can have a positive impact near the building, minimising the urban heat island effect.

Climate adaptation measures can contribute to wider benefits by pre-empting potential detrimental climate impacts. Careful selection of plants which are resilient to a range of weather conditions will assist wildlife to survive changed climate conditions. Urban greening and reduced reliance on air conditioning will have benefits for the City's air quality.

How the policy works

For all major development, the City Corporation will expect climate adaptation and resilience to be addressed at the design stage. Sustainability Statements should include details of the proposed adaptation and resilience measures. Energy statements should demonstrate reduced energy demand for cooling. BREEAM credits for adaptation to climate change should be targeted.

For minor development, the Design and Access Statement should include details of climate resilience measures.

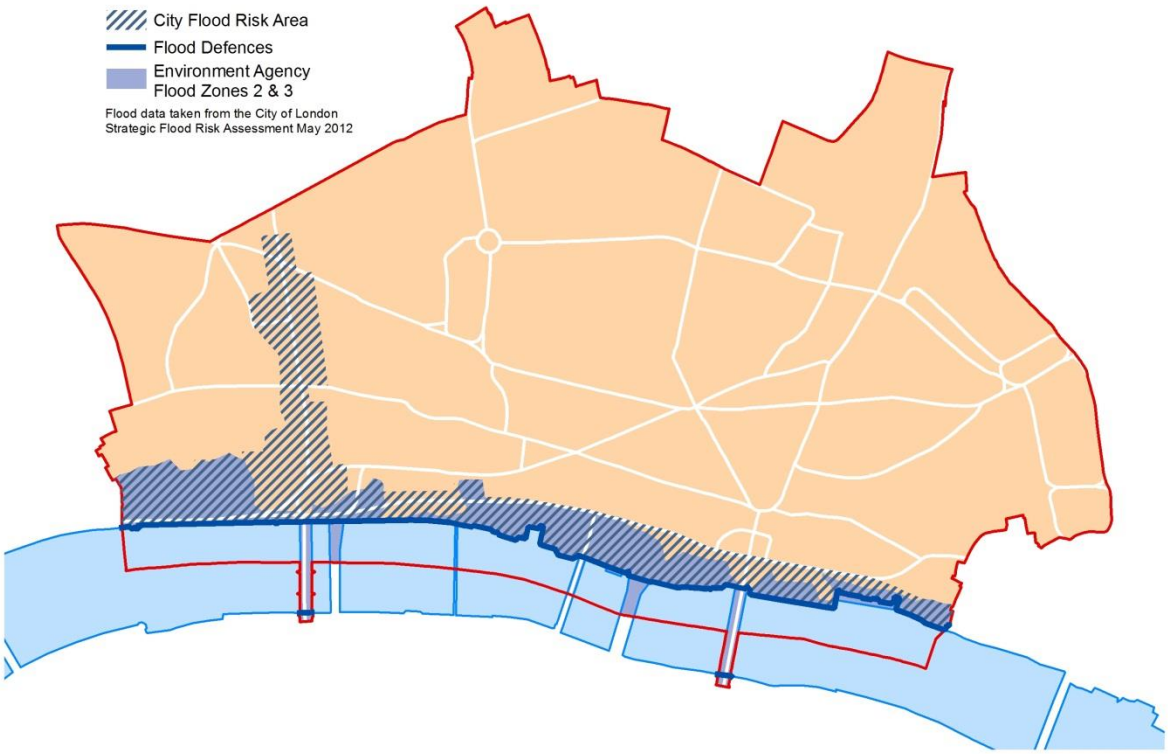
Policy DM XX: Flood Risk

Development proposals, including change of use, within the City Flood Risk Area and major development elsewhere, must be accompanied by a site-specific flood risk assessment demonstrating that:

- the site is suitable for the intended use, in accordance with the sequential and exceptions tests (see table XX) and with Environment Agency and Lead Local Flood Authority advice;
- the development will be safe for occupants and visitors and will not compromise the safety of other premises or increase the risk of flooding elsewhere;
- safe access and egress routes are identified;
- flood resistance and resilience have been designed into the proposal.

Reason for the policy

While the City is generally at low risk of flooding due to its topography, some parts of the City are at risk of flooding from the River Thames and from surface water/sewer overflow in the former Fleet valley. Fig XX identifies the areas at risk from these sources as the City Flood Risk Area which is also shown on the Local Plan Policies Map. This policy will ensure that vulnerable uses are not located in areas that are at risk of flooding and that suitable flood resilience and evacuation measures are incorporated into the design.



How the policy works

Site-specific flood risk assessments must address the risk of flooding from all sources and take account of the City of London Strategic Flood Risk Assessment and the City of London Local Flood Risk Management Strategy. Necessary

mitigation measures must be designed into and integrated with the development and where feasible and viable may be required to provide protection from flooding for properties beyond the site boundaries.

Within the City Flood Risk Area different uses will be acceptable in different zones. Table X shows the vulnerability classifications and table Y shows which level of vulnerability classification is suitable in which part of the City Flood Risk Area. Full details of the Environment Agency's flood zones are shown on the policies map.

If the intended use of a site falls into one of the categories whereby an Exceptions Test is required as set out in Table Y, the developer will need to investigate whether there is a reasonably available site outside the City Flood Risk Area which would be more suitable for the intended use. If no alternative site is available, the developer must demonstrate through the Exceptions Test that the benefits of the development outweigh any risk from flooding, and that the development will be safe without increasing the risk of flooding elsewhere.

Table X Flood risk vulnerability classifications relevant to the City

Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations
Highly Vulnerable	• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Installations requiring hazardous substances consent.
More Vulnerable	• Hospitals • Residential institutions such as care homes and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Sites used for waste management facilities for hazardous waste.
Less Vulnerable	• Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in 'more vulnerable' and assembly and leisure. • Police, ambulance and fire stations which are not required to be operational during flooding. • Waste treatment (except hazardous waste facilities).
Water-compatible development	• Flood control infrastructure. • Docks, marinas and wharves. • Navigation facilities.

	• Water-based recreation (excluding sleeping accommodation). • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

Source: Relevant uses from Planning Practice Guidance – Flood Risk and Coastal Change

Table Y Suitability of different uses in flood zones

Flood Risk Vulnerability classification	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
EA Zone 1	✓	✓	✓	✓	✓
EA Zone 2	✓	Exceptions Test required	✓	✓	✓
EA Zone 3a	Exceptions Test required	×	Exceptions Test required	✓	✓
EA Zone 3b	Exceptions Test required	×	×	×	✓
SFRA Surface water/sewer flood risk hotspots	Exceptions Test required	×	Exceptions Test required	✓	✓

Source: amended from Planning Practice Guidance – Flood Risk and Coastal Change

The City of London Strategic Flood Risk Assessment (SFRA) provides guidance on suitable flood resistance measures, to prevent water entering the building, and flood resilience measures, which enable speedy recovery in the event of flooding. These should be specified for all development within the City Flood Risk Area (as shown on the Policies Map). Passive design measures such as suitable threshold levels and the use of flood resilient materials will be favoured over active measures such as removable flood barriers.

Design measures can help to reduce flooding, thus protecting the local area beyond the development site through:

- sustainable drainage systems;
- green/blue roofs; and
- rainwater reuse, recycling and attenuation

Resistance to flooding can be achieved through design measures such as:

- raised kerbs and altered topography which contains water at a distance from the building;
- avoiding opening windows or vents at ground floor or basement levels;
- using low permeability materials to limit water penetration of external walls, and flood resistant doors to prevent water ingress; and
- fitting non-return valves on plumbing to prevent sewer surcharge within the building.

Flood resilience measures make clean up after a flood more efficient, and include:

- avoiding locating sensitive equipment such as computer servers at lower levels of buildings in flood prone areas;
- locating all fittings, fixtures and services at a suitable height to minimise damage by flood waters;
- using impermeable surfaces and structures; and
- providing sumps and soak-aways that gradually release water to the sewer network.

In order to demonstrate that the development will be safe for occupants, flood warning and evacuation plans should be provided for all 'more' or 'highly' vulnerable development within the City Flood Risk Area. Details of the type of measures which should be included in an evacuation plan are set out in the City's SFRA.

For minor development outside the City Flood Risk Area, an appropriate flood risk statement should be included in the Design and Access Statement.

Policy DM XX: Sustainable drainage systems (SuDS)

1. All development, transportation and public realm proposals must incorporate SuDS principles and be designed to minimise the volume and discharge rate of rainwater run-off into the combined drainage network in the City, ensuring that rainwater is managed as close as possible to the development.

2. The design of the surface water drainage system should be integrated into the design of proposed buildings and landscaping, unless there are exceptional circumstances which make this impractical. Proposals should demonstrate that run-off rates are as close as possible to greenfield rates and the number of discharge points has been minimised.

3. SuDS designs must take account of the City's archaeological heritage, complex underground utilities, transport infrastructure and other underground structures, incorporating suitable SuDS elements for the City's high density urban situation.

4. SuDS should be designed, where possible, to maximise contributions to water resource efficiency, water quality, biodiversity enhancement and the provision of multifunctional open spaces.

5. An operation and maintenance plan will be required to ensure that the SuDS elements will remain viable for the lifetime of the building.

Reason for the policy

The drainage system in Central London comprises a combined network where foul sewage from internal plumbing combines with rainwater drainage in the same underground pipework. Consequently, heavy rain can result in overloading of the drainage network with discharges of diluted sewage from manholes within the City Flood Risk Area and combined sewer outflow pipes into the Thames at Walbrook Wharf and Blackfriars.

More frequent extreme rainfall events are predicted because of climate change; therefore the risk of sewer overflow flooding is increasing. To combat this, it is necessary to reduce the total amount of rainwater entering the drains and/or slow down the rate at which it enters the drains. Sustainable Drainage Systems (SuDS) provide a range of techniques for achieving this.

How the policy works

All development presents opportunities to reduce rainwater run-off. The cumulative impact of minor development, transport and public realm proposals are as important as major development in reducing the risk of sewer overflow flooding. Therefore, all development, transport and public realm proposals must contribute to a reduction in rainwater run-off to the drainage network.

For major development, pre-application discussion with the City Corporation as Planning Authority and Lead Local Flood Authority and consultation with the Environment Agency, Thames Water and other interested parties is encouraged to ensure that SuDS designs are suitable for the proposed site. SuDS designs must comply with the London Plan Drainage Hierarchy and local requirements set out in the City Corporation's forthcoming SuDS guidance.

Although planning permission may not be required for all transport and public realm schemes a SuDS and drainage plan should be an integral part of designing these schemes in order to protect the City from flooding.

For all major development, a separate SuDS and Drainage Plan must be submitted at application stage. For minor development the Design & Access Statement should include details of how rainwater run-off has been minimised. Designs should focus on reducing flows as close as possible to greenfield runoff rates, minimising the number of discharge points from the site.

Proposals should demonstrate an integrated approach to water management, for example intercepting the first 5mm of each rainfall event through greening and incorporating rainwater storage for reuse or irrigation. Major developments should specifically maximise the other benefits of SuDS such as biodiversity, amenity and water quality.

Arrangements for maintenance must be considered in the designs. Planning conditions may be used to secure a suitable operations and maintenance plan.

Policy DM XX: Flood protection and flood defences

1. Development must protect the integrity and effectiveness of structures intended to minimise flood risk and, where appropriate, enhance their effectiveness.

2. Wherever practicable, development should contribute to an overall reduction in flood risk within and beyond the site boundaries, incorporating flood alleviation measures for the public realm.

The City of London is protected from flooding by the Thames Barrier, and more locally by flood defence walls along the River Thames. Development adjacent to these flood defences must maintain their integrity and effectiveness for the benefit of the whole City. The Thames Estuary 2100 project recognises the need for the raising of flood defences by up to 0.5m by 2065 and 1m by 2100. Development on the riverside should be designed to enable this future defence raising without adverse impacts on river views and pedestrian movement along the riverside walk. Discussions with the Environment Agency will be required to establish the most effective designs for improved flood defences.

A strategic approach to flood defence raising will enable riparian developers to design buildings and the riverside environment to accommodate higher flood walls. Riparian owners are responsible for maintenance and enhancement of flood defences.