

Strategic Flood Response Framework

London Resilience Partnership Strategic Flood Response Framework

Version: 5.0

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Location / storage

This framework is stored on Resilience Direct. The public facing version can be found on [London Prepared](#). The framework is maintained by the London Resilience Partnership and updated on a three yearly review cycle. The framework may also be amended as required after a significant flood event that leads to recommendations for improvement.

Security Classification

This plan is marked as 'official' and may be shared with relevant partners.

Consultation

In producing this framework all members of the London Resilience Partnership have been consulted for comment directly or via their sector representative.

Version Control			
Version	Date	Owner	Changes
V3.1	November 2019	Hayley Deakin	Draft version following lessons learnt from Heavy rainfall summit. Amendments to include triggers focussed on forecast impact level rather than colouration, added in example SCG flood strategy, updated risk register flooding outcome descriptions, moved into new LRG template.
V3.2	January 2020	Hayley Deakin	Amendments made from comments received from consultation.
V4.0	May 2022	Callum Gegg	Draft version following review of framework after July 2021 surface water flood events. Amendments include addition of a matrix to the triggers, additional information on recovery, additional and improved mapping, and information on emergency alerts.
V5.0	June 2022	Callum Gegg	Final amendments prior to London Resilience Forum, including amendments to public communications, partnership teleconference arrangements, infrastructure mapping, and the role of RNLI (RNLI no longer offer a flood response service).

Contents

VERSION CONTROL 2

Part 1 – Strategic Flood Response Framework 4

1. DEFINITION..... 4

2. ACTION CHECKLIST 5

3. ACTIVATION PROCESS 5

4. LEVELS OF RESPONSE: TRIGGERS AND ACTIONS..... 6

5. STRUCTURE AND SUB-GROUPS 13

6. KEY CONSIDERATIONS..... 14

7. RESOURCES AND SUPPORT AVAILABLE..... 15

8. SCG OBJECTIVES - CONSIDERATIONS FOR STRATEGY 15

Part 2 – Capability Guidance 18

9. LINKS TO OTHER FRAMEWORKS AND PLANS 18

10. ROLES & RESPONSIBILITIES 20

APPENDIX A: Flood Risk in London..... 22

APPENDIX B: Flood Information and Warning Products 42

APPENDIX C: Properties Flooded Data..... 47

APPENDIX D: Acronyms 48

Part 1 – Strategic Flood Response Framework

This section offers a quick reference guide for strategic decision-makers responding to a flooding incident in London. It should be used alongside the London Strategic Coordination Protocol.

1. Definition

Introduction

This framework is aimed at members of the London Resilience Partnership and describes a coordinated strategic level planning for, and response to, a flooding incident in London.

The framework relates to the response to a flood event, causing or with the potential to cause significant and severe impacts. This includes flooding from rivers (fluvial), the sea (tidal), surface water, groundwater and reservoirs. This may be severe flooding in one or more locations or a greater number of less severe flooding events in multiple locations in London.

This plan excludes flooding from burst water mains, as this is perceived to have local impacts only and should be captured within Borough level Multi-Agency Flood Plans (MAFP).

Purpose

This framework aims to provide strategic direction to London responders, before, during and after a significant flooding incident in London.

The objectives of the London Strategic Flood Response Framework are to:

- Identify triggers and mechanisms for invoking a London-wide strategic response
- Provide responders with some context around the impacts of each type of flood risk
- Confirm the actions responders should take at each stage of a flooding incident
- Provide links to related plans and procedures.

Links to Other Plans

This Framework should be read alongside the [Strategic Coordination Protocol \(SCP\)](#), the [London Emergency Services Liaison Panel \(LESLP\) Major Incident Principles](#), and the London Resilience Communication Group (LRCG) Severe flooding incident communications plan.

Dependent on the impacts of a flooding incident, there may be a requirement to activate additional capability specific London Frameworks. The full suite of London Resilience Partnership Frameworks is available on Resilience Direct.

Depending on the context, this Framework should also be considered alongside localised plans e.g. Borough level Multi-Agency Flood Plans (MAFP) and site-specific reservoir emergency plans.

All organisations should consider the activation of internal major incident plans, procedures, and business continuity arrangements as appropriate.

Planning Assumptions

- All agencies maintain their own emergency and business continuity plans, which reflect the triggers and actions within this Framework.
- This Framework focuses on the initial response and coordination to a flooding incident. The response and coordination to the resultant impacts will be covered by other response arrangements (as detailed in the relevant frameworks and plans) and it is assumed that these arrangements will eventually supersede the initial response arrangements.

- Flooding events experienced by London may impact on neighbouring Local Resilience Forum (LRF) areas and vice versa.

2. Action Checklist

The following action list is for strategic leads to consider if there is a need to activate this Framework and to provide a checklist of the initial actions that should be undertaken.

Complete	Action	Section
	Activate the Framework	3 – Activation Process
	Determine the structure of the response and which sub-groups will be required.	5 – Structure and Sub-Groups
	Assess the immediate / short term implications	6 – Key Considerations
	Assess the medium term considerations	6 – Key Considerations
	Consider the longer term implications	6 – Key Considerations
	Determine the resources and support available	7 – Resources and Support Available
	Set strategy	8 – SCG Objectives – Considerations for Strategy
	Refer to the guidance document for further information	Part 2 – Capability Guidance

3. Activation Process

There are Levels 1 – 4 within this framework. These levels can aid decision making in the event of a flood. These are similar to those triggers identified in local borough Multi-Agency Flood Plans (MAFP).

Escalation through the levels may not always be sequential. More details on what considerations and actions should be taken at each level can be found in Section 4 - Triggers for Activation and Levels of Response.

Level 1 represents the routine operations such as long-term flood mitigation, adaptation work, horizon scanning, monitoring, and forecasting services. There is no trigger for Level 1 of this framework. London will continually operate at Level 1 as Business as Usual.

Level 2 represents the preparation and planning phase in the lead up to a potential flooding incident. It is activated on receipt of flood forecasting products from the Environment Agency, Met Office and Flood Forecasting Centre or reports from partner agencies of possible failing infrastructure that could cause flooding, for example a reservoir.

Level 3 represents the flood response phase. It is activated on receipt of flood warning products from the Environment Agency. Level 3 can also be activated by another partner agency that has received reports of failing infrastructure that is causing flooding.

Level 4 represents the strategic flood response to flooding which has either severe or wide-reaching impacts across London, and is activated through a tripartite discussion between the raising agency, London Resilience Group (LRG) and the Metropolitan Police Service (MPS).

4. Levels of Response: triggers and actions

LIKELIHOOD	High	Continue shared situational awareness	Send joint Met Office and EA impact email*	Call a partnership teleconference or TCG/ SCG*	Call a TCG / SCG*
	Medium		Consider joint Met Office and EA impact email*	Jointly review need to call a partnership teleconference*	Call a TCG / SCG*
	Low				Call a TCG / SCG*
	Very Low		Call a partnership teleconference*		
	Flood Guidance Statement	Minimal	Minor	Significant	Severe
	National Severe Weather Warning Service	Very Low	Low	Medium	High
IMPACT					

KEY

VERY LOW	LOW	MEDUIM	HIGH

- Where an email is sent to the London Resilience Partnership, London Fire Brigade (LFB) Communications should be alerted to consider the need to share information via the London Resilience Communication Group (LRCG) and/or to convene an LRCG teleconference.

Where a partnership teleconference, TCG or SCG is activated, the LRCG should be activated (convening teleconferences as required) to undertake public communications activity as set out in the LRCG Severe flooding incident communications plan.

LEVEL 1: Routine operations

Level 1 is a routine ongoing level which is business as usual, there is no trigger to activate Level 1. Risk Management Authorities will routinely work to mitigate flooding.

Flood Risk Mitigation (key areas listed)

- Regular maintenance work; removing debris from watercourses, clearing out drainage systems, maintaining flood defences etc.
- Implementing sustainable urban drainage techniques
- Improving flood modelling
- Designing flood alleviation schemes
- Consenting on building works in the flood zone

Emergency planning peacetime activities should include:

- Flood response planning, training and exercising
- Encouraging sign up to flood and weather warnings
- Community flood plan development
- Homeowners' preparedness, such as the implementation of property resilience measures
- Promotion of flood risk associated with London and advice to the public.

Horizon Scanning

Ongoing risk assessment and horizon scanning is integrated into category 1 and 2 responder's business as usual arrangements. This includes keeping a watching brief on forecasts, Met Office weather warnings, Environment Agency flood alerts and warnings, and the Flood Forecasting Centres Flood Guidance Statements.

It is important to be mindful of the potential for flooding in neighbouring counties to impact on London.

Climate change and adaption

Climate change is causing rising sea levels and more extreme weather events such as flooding, droughts and heatwaves to occur. Climate change alongside London's population growth means that flood risk will increase, unless that risk is carefully managed.

The [Thames Estuary 2100 \(TE2100\) Plan](#) provides strategic direction for the management of tidal flood risk in the Thames Estuary, from now until the end of the century. It is a plan that is adaptable to a changing climate and changing conditions along the estuary. The plan includes maintaining and raising current tidal flood defences, protecting land needed for future improvements to flood defences and monitoring how the estuary is changing.

The second [National Adaptation Programme 2018 to 2023](#) sets out a strategy for dealing with the effects of a changing climate.

The [Climate Change Act 2008](#) introduced the UK's first legally binding target for 2050 to reduce greenhouse gas emissions by at least 80% compared to 1990 levels. On 27 June 2019 the UK government [amended the Climate Change Act](#) and set a legally binding target to achieve net zero greenhouse gas emissions from across the UK economy by 2050.

Further information on climate change can be found on the GOV.UK pages here

<https://www.gov.uk/government/policies/adapting-to-climate-change>

LEVEL 2: Flood Preparation

TRIGGERS FOR FLOOD PREPARATION:

1. London is issued a minor, significant, or severe impact forecast via the Flood Guidance Statement.
2. London is issued a low, medium, or high impact forecast via the National Severe Weather Warning Service (NSWWS).
3. Environment Agency issues Flood Alerts for multiple locations in London
4. Problems have been identified with a reservoir that has not yet failed but has the potential to impact on London.
5. There are issues with utilities infrastructure which has a possible secondary consequence of flooding e.g. rupturing water main.

WHEN ONE OR MORE OF THE TRIGGERS HAVE BEEN MET SEE ACTIONS BELOW

ACTIONS FOR FLOOD PREPARATION:

Environment Agency, Met Office, London Resilience Group, London Resilience Communication Group (LRCG):

- Raise to the London Resilience Duty Manager if necessary (if escalation is expected or further action is anticipated).
- Depending on level of FGS / NSWWS impact forecast, carry out actions as per triggers table on page 6.
- Where a Partnership teleconference, TCG or SCG is convened because of a forecast event, this should be chaired by the most appropriate agency depending on the nature of the incident.
- Default Partnership teleconference chair: Local Authority for surface and ground water flooding. For fluvial and tidal flooding the decision on which agency will chair will be made in consultation between the MPS, LRG, Environment Agency and any other relevant agency through a tri-partite call. By default LRG will chair and facilitate Partnership teleconferences unless the lead response organisation is better suited and agrees to do so.
- Consider the need to share information via the LRCG (initially led by LFB for severe flooding incidents) to support multi-agency public communications activity.

Risk Management Authorities:

- Pre-emptively clear and remove any debris from watercourses or drainage systems to ensure water can flow freely
- Operate any flood defence assets as necessary

All organisations:

- Report any observations of properties or infrastructure flooding to the relevant London Borough and the Environment Agency (Appendix C includes guidance on reporting properties flooded)
- Assess the severity of primary and secondary impacts of flooding for their own organisation and decide whether response should be escalated to Level 3 or Level 4
- Refer to information available on known hotspots (maps showing surface water risk, basement density and fluvial & tidal flood risk can be found in the appendices)

- Manage staff to deal with a potential flooding incident, this may involve placing staff on standby or briefing key operatives internally
- Prepare to implement operational response plans including Borough Multi-Agency Flood Plans (MAFPs)
- Communicate any concerns or issues over critical infrastructure early so London Fire Brigade (LFB) or Environment Agency (EA) can assess whether they can help by deploying temporary barrier equipment
- Escalate or open organisational control centres
- Check business continuity plans to ensure organisations critical business activities can still be met in the event of a flood
- Prepare for potential media interest. Consider issuing proactive press releases providing advice to public on how to prepare for flooding.
- Keep a watching brief on the situation and stay up to date with the latest forecasts.

Escalating from LEVEL 2 Flood Preparation to LEVEL 3 Flood Response:

There may be a period of inactivity between the preparation phase and the response phase. This could range from hours to days depending on the detail and confidence of the weather/flood forecasts.

There will be occasions when the preparation phase (Level 2) is activated but response phase (Level 3) is not necessary. Activating the preparation phase ensures responders stay ahead of the incident, instead of trying to catch up during the response phase.

LEVEL 3: Flood Response - Triggers and Actions

TRIGGERS FOR FLOOD RESPONSE

1. There are Flood Warnings in force in London
2. Any organisation becomes aware of widespread disruption to transport or other infrastructure due to flooding from any source
3. Reports of properties flooding internally in multiple locations (Boroughs) across London
4. A reservoir which has the potential to impact on London is failing
5. A flood defence structure has been breached or has failed with significant impact for London
6. Cabinet Office Briefing Room (COBR) is opening due to flooding in London or flooding has the potential to affect London

WHEN ONE OR MORE OF THE TRIGGERS HAVE BEEN MET, SEE ACTIONS BELOW

ACTIONS TO CONSIDER FOR FLOOD RESPONSE:

London Resilience Group, Environment Agency, London Resilience Communication Group (LRCG), or other affected organisation:

- Depending on level of FGS / NSWWS impact forecast, carry out actions as per triggers table on page 6.
- Where a Partnership teleconference, TCG or SCG is convened this should be chaired by the most appropriate agency depending on the nature of the incident. In the event of there being a risk to life, initially the MPS will chair a TCG and/or SCG by default. This may change to the most appropriate agency as the incident progresses.
- Default chair where there is not considered to be a risk to life: Local Authority for surface and ground water flooding. For fluvial and tidal flooding the decision on which agency will chair will be made in consultation between the MPS, LRG, Environment Agency and any other relevant agency through a tri-partite call. By default LRG will chair and facilitate Partnership teleconferences unless the lead response organisation is better suited and agrees to do so.
- Activate the LRCG to undertake public communications activity as set out in the LRCG Severe flooding incident communications plan. LFB will by default act as the lead for LRCG for flooding incidents unless an SCG has been convened by MPS or another agency. In that case LFB and MPS or other lead agency should agree which agency will lead on public communications at that time.

All Organisations:

- Assess the severity for their own organisation and decide whether response should be escalated to Level 4 (strategic flood response)
- Activate emergency response plans and/or BCM plans where appropriate
- Communicate any concerns or issues over critical infrastructure early so London Fire Brigade (LFB) or Environment Agency (EA) can assess whether they can help by deploying temporary barrier equipment
- Scale up. Open control centres / incident rooms where appropriate to provide coordination for your organisation and a central point of contact
- Check the status of key sites and infrastructure that are known to be in flood risk areas.
- Media and public messages need to be agreed and circulated on a regular basis, coordinated via the London Resilience Communication Group (LRCG). A flooding situation can change rapidly.

- Report all details of any flooded properties or infrastructure and pass them to the Environment Agency and relevant London Borough or London Local Authority Coordination Centre (LLACC) (if open) on a regular basis.

LEVEL 4: London Strategic Flood Response - Triggers and Actions

TRIGGER FOR STRATEGIC RESPONSE:

1. A Severe Flood Warning is planned to be issued or has been issued by the Environment Agency.
2. Any partner agency decides they need to escalate the response to TCG and/or SCG level and calls a tripartite discussion between a raising agency (any agency), the Metropolitan Police Service (MPS) and London Resilience Group (LRG) to consider activating an SCG.
3. An Emergency Alert is planned to be issued or has been issued by the Cabinet Office ([Emergency Alerts](#) due to go live in 2022).

ACTIONS TO CONSIDER FOR FLOOD RESPONSE:

London Resilience Group:

- Inform all partners that a Strategic Coordinating Group for London is being held.

The full arrangements for activating strategic response in London are contained in the London Strategic Coordination Protocol. In the event of there being a risk to life, initially the MPS will chair a TCG and/or SCG by default. This may change to the most appropriate agency as the incident progresses.

Refer to Part 1: Strategic Summary, in particular:

- Action Checklist (section 2)
- Structure of the response and which sub-groups will be required (section 5)
- Strategic key considerations (section 6)
- SCG - Considerations for Strategy (section 8)

London Resilience Communication Group (LRCG):

- Undertake public communications activity as set out in the LRCG Emergency Plan and LRCG Severe flooding incident communications plan.
- LFB will by default act as the lead for LRCG for flooding incidents unless an SCG has been convened by MPS or another agency. In that case LFB and MPS or other lead agency should agree which agency will lead on public communications at that time.

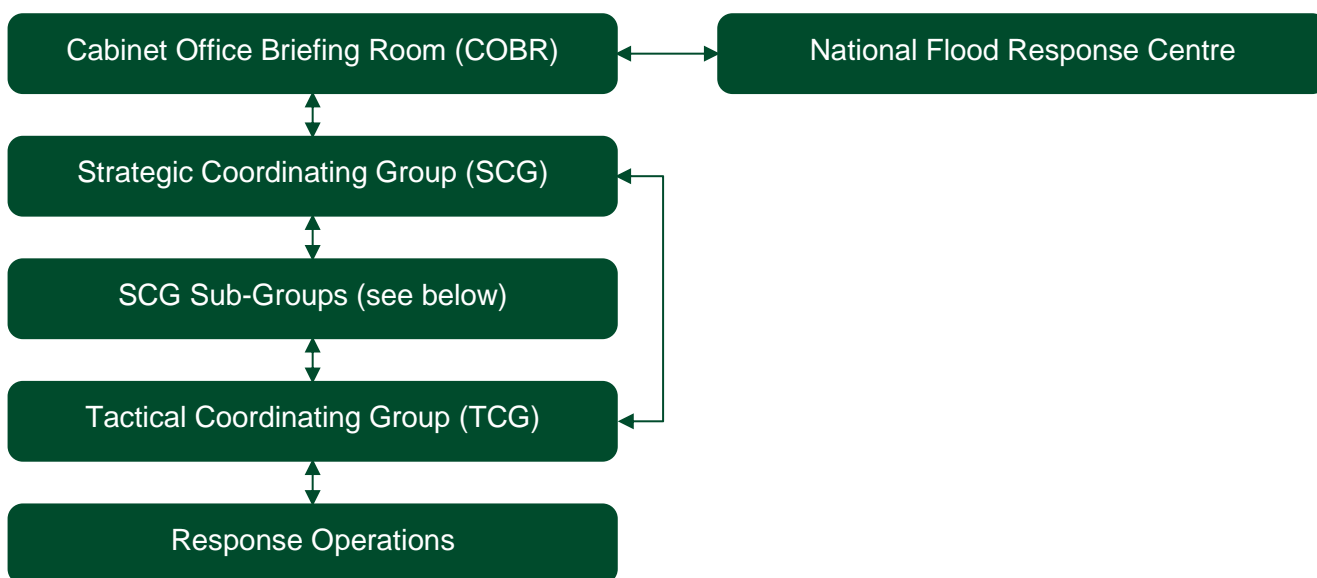
De-escalating from Level 4 Strategic Flood Response:

Following a Level 4 response, before returning back to level 1 there will be a period of recovery and de-escalation. It is possible that following a de-escalation from Level 4 to Level 2/3, there could be further escalations dependant on the forecast/conditions.

5. Structure and Sub-Groups

The below diagram represents the command structure of a fully escalated flooding incident.

The National Flood Response Centre is a specialist centre for Government Departments involved in responding to flooding to ensure they have joined up situational awareness to help advise COBR on the national situation. DEFRA as lead Government Department will decide in consultation with Civil Contingencies Secretariat when to open the National Flood Response Centre.



Sub-groups to be considered

An SCG will need to activate relevant sub-groups to support the response. Below is a list (not necessarily extensive) of the sub-groups an SCG might need to respond to a flooding incident.

Sub-Group	Purpose	Lead organisation
Tactical Coordinating Group (TCG)	Translate strategy into tactics and operations	Emergency Services
London Resilience Communications Group (LRCG)	Ensure appropriate and consistent communications	Metropolitan Police Service (MPS) as default lead for LRCG in general, or London Fire Brigade (LFB) as default lead for LRCG in flooding incidents
Humanitarian Assistance Steering Group (HASG)	Facilitate psychosocial support to those affected	Local Authorities
Mass Fatalities Coordinating Group (MFCG)	Coordinate the processes for managing fatalities	Metropolitan Police Service (MPS)
Evacuation and Shelter Coordinating Group (ESCG)	Coordinate the processes for managing evacuation and shelter	Metropolitan Police Service (MPS)
Scientific and Technical Advice Cell (STAC)	Provides relevant health or environmental impact expert advice	UK Health Security Agency (UKHSA)
Recovery Coordinating Group (RCG)	Plan for and influence wider longer-term outcomes	Local Authorities

6. Key Considerations

The below table is a list of key considerations for operational, tactical and strategic responders when responding to flooding. It is to be used as an early guide of possible key issues to put in place arrangements for. The table may not be extensive.

Operational Responders Initial operational response	Tactical Responders Tactical command, control, and coordination structures	Strategic Responders
Threat and hazard assessment Rescue and recovery Triage, treatment and transportation Environmental protection Evacuation and shelter Survivor Reception Centres, Rest Centres and Humanitarian Assistance (including access to services) Decontamination of buildings and the environment Contaminated waste disposal (used sandbags) Health and wellbeing (public and operational response staff)	Resource management Contamination risks Any impact on water supply and other utility services Warning and Informing Logistics (i.e. of evacuation and shelter) Impact on infrastructure Vulnerable areas (schools, hospitals, basement dwellings etc.) Casualty bureau Public Health impacts and advice Health and wellbeing (public and operational response staff)	Multi-Agency consequence management International/national media Communications and press strategy National reporting Political sensitivities Impact on infrastructure Vulnerable areas (schools, hospitals, basement dwellings etc.) Critical National Infrastructure Threats to strategically significant locations and events Recovery planning (e.g. needs of communities) Economic and financial implications Legislation and policies Public health impacts and advice Loss of River Thames navigation due to consecutive barrier closures (e.g. impacts to construction projects) VIP visits

7. Resources and Support Available

Resources and support can be requested from across the London Resilience Partnership through the strategic coordination structures.

Resource / Support	Provider(s)¹
Temporary barriers / demountable ²	EA / LFB
Pumping equipment ²	EA / LFB / Contractors
Military aid ²	Military
Mutual aid (equipment or people) ²	Any agency providing mutual aid
Sandbags/Gelbags ³	LAs / LFB / EA
Boats	LFB / LSR
Flood Rescue Team assets	HM Coastguard

¹ EA resources may be deployed under blue light services as an escort.

² National resources may not be available at the time of flooding incident.

³ Sandbags/Gelbags may be prioritised for internal organisational use. Please note resource and distribution will vary depending on Local Authority.

8. SCG objectives - Considerations for Strategy

An indicative set SCG Strategy is contained within the Strategic Coordination Protocol. The following are additional flood specific strategic objectives for consideration by the SCG:

- Be proactive and act early

When flooding hasn't happened yet but is forecast to potentially have catastrophic impacts SCG attendees will need to make decisions based on very little information i.e. a weather forecast alone. This might be before any rain has started to fall, and before we know which areas in London are likely to be the worst impacted. Strategic actions to consider are proactive evacuation of vulnerable locations and agreeing appropriate warning messages early etc.

- Protect and mitigate flooding to critical infrastructure

Flooding in London could happen quickly. Proactive deployment of equipment to help defend critical infrastructure or key assets should be assessed and the establishment of an appropriate sub-group should be considered. Details of critical infrastructure and vulnerable areas should be identified within Borough Multi-Agency Flood Plans (MAFP).

- Collaborative Flood Warning messaging

The Environment Agency's flood alerts and warnings are explained in Appendix B3. These are issued to potentially thousands of Londoners directly if they live in a flood zone.

The highest level of flood warning is a Severe Flood Warning which means danger to life. If time allows the Environment Agency will liaise with an SCG before issuing Severe Flood Warnings. The SCG can adapt the messaging and timing of these messages if they feel the need to.

The timing might need to be adapted to allow for extra resources in control rooms to answer a likely surge of 999 calls following danger to life messaging that has been issued (some flood warning areas will have thousands of properties registered).

Partners can add in additional messages in regards to where rest centres are or safe evacuation routes etc. There is however a word limit so all messages should be kept brief or act as signposts

to further information. The SCG may want to use the communications sub-group (the London Resilience Communication Group) to advise or lead on carrying out on these actions.

- Develop a coordinated media strategy prior to impacts being observed
- Provide information on the likely level of disruption to travel and other services
- Identify mutual aid to help with rest centres, evacuation, erecting temporary defences, managing traffic disruption, dealing with injuries and rescue etc

See section 6 for further SCG considerations.

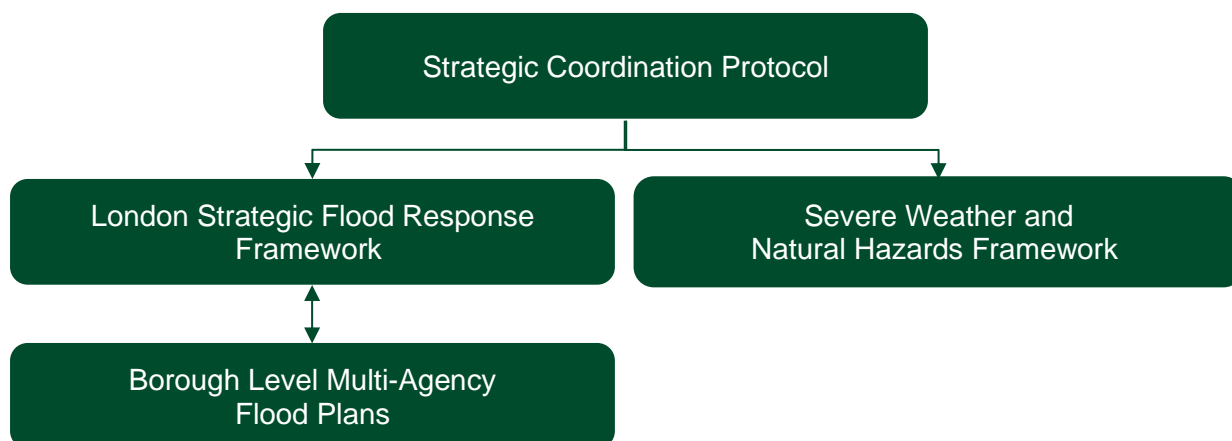
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Part 2 – Capability Guidance

This section offers guidance relating to a Strategic Flood Response incident. It is intended to complement the preceding Strategic Summary of the response.

9. Links to other frameworks and plans

This framework should also be used alongside Borough level Multi-Agency Flood Plans (MAFP). A London Borough may want to activate their Borough MAFP locally if a Strategic local Partnership group has been activated to prepare for or respond to flooding.



This guidance should be considered alongside the following resources as appropriate. Each regional framework listed has a capability lead in the partnership and can be used to assist any sub-group in its formation.

National Documentation	<ul style="list-style-type: none"> National Flood Emergency Framework¹
Multi-LRF Framework ²	<ul style="list-style-type: none"> The River Thames Scheme Maidenhead to Teddington emergency response plan³ Neighbouring LRF Framework/Plans
Regional Frameworks	<ul style="list-style-type: none"> London Strategic Coordination Protocol LESLP Major Incident Principles Manual Offsite reservoir Plans Recovery Coordination Protocol Mass Evacuation Framework Mass Shelter Framework

¹ The London Strategic Flood Response Framework sits below the National Flood Emergency Framework for England written by DEFRA.

² Flooding will usually stretch across administrative boundaries. Therefore, it is important the LRF shares plans and maintains good relationships with its other neighbouring areas – Essex, Hertfordshire, Thames Valley, Surrey, and Kent.

³ This plan outlines the arrangements for Thames Valley, Surrey, and relevant London Boroughs (Richmond and Kingston) to respond to flooding together for one of the largest, most developed, undefended flood plains in England.

	<ul style="list-style-type: none"> • London Resilience Communication Group (LRCG) Emergency Plan, and LRCG Severe flooding incident communications plan • Identification of the Vulnerable • Severe Weather and Natural Hazards Framework • Humanitarian Assistance Framework • Mass Casualty Framework • London Power Supply Disruption Framework • Scientific and Technical Advice Cell Arrangements • Strategic Framework for Responding to Telecommunications Disruption • Water Supply Disruption Framework
Local or Organisational Plans	<ul style="list-style-type: none"> • London Borough Multi-Agency Flood Plans • Reservoir specific emergency plans • Environment Agency's What to do before, during and after a flood guidance for the public • Flooding health guidance and advice from UK Health Security Agency • Frequently asked flooding health questions from UK Health Security Agency • Individual organisational and community flood plans

10. Roles & Responsibilities

[London Emergency Services Liaison Panel \(LESLP\)](#) describes the generic roles and responsibilities of its members within London. The [National Flood Emergency Framework for England](#) describes the specific roles of lead government departments, the Environment Agency, Flood Forecasting Centre and other national organisations in the response to flooding.

Recovery and recovery funding

The London Resilience Partnership Recovery Coordination Framework can be used for strategic officers involved in recovery co-ordination and provides additional guidance.

The Cabinet Office [Emergency Response and Recovery](#) guidance describes specific responsibilities across the full range of Category 1 and 2 responders and other response organisations.

It will be for ministers to determine when this support is made available and the eligibility criteria. Weather incidents with localised impacts will not usually trigger a recovery support package, however this may be considered in exceptional circumstances.

In a severe weather event with significant wide area impacts, local authorities may need central support to help their communities and businesses return to normal. Guidance and information is available on the [flood recovery framework](#) for local authorities in England.

Both community recovery grants, in the region of £500 (indicative) per eligible household, and business recovery grants, in the region of £2,500 (indicative) per eligible business, exist to help support recovery. Two schemes also exist to provide recovery assistance, the council tax discount scheme and the business rate relief scheme, [information](#) is available which breaks down the eligibility criteria. Lead agency throughout a flood event

The lead agency during a flood depends upon the level of the flood event, impacts, flood type and response actions.

During a smaller scale flood event (Level 3) the Local Authority or Police may lead dependant on the impacts and which organisation has the primary response actions to manage the impacts.

The response phase of a widespread pan-London flood event (Level 4) would be the Police. Recovery stage is led by the Local Authority.

Flood Risk Management - Who is responsible?

The Environment Agency has a strategic overview of all types of flood risk and works closely with Lead Local Flood Authorities and other Risk Management Authorities in order to manage the risk.

The below table shows which organisations leads on the management of the flood risk day to day, this is not to be confused with which organisation might lead during the response and recovery phases. Flooding is a complex hazard and so it is worth bearing in mind that different sources of flooding often happen together and impact one another with many different Risk Management Authorities.

Organisation	Flood Risk Type									
	Main rivers (large rivers)	Ordinary watercourses (small rivers)	Tidal flooding	Surface water	Ground water	Sewer flooding	Road drainage	Offsite reservoir	Onsite reservoir	Canals and artificial waterways
Environment Agency	X		X							
London Boroughs (Lead Local Flood Authorities and Highways Authorities)		X		X	X		X Non-Motorway and non-TLRN (Transport for London Route Network) roads	X		
National Highways							X Motorway Roads			
Transport for London (TfL)							X Red route roads TLRN			
Water Utility						X				
Canal and Rivers Trust										X
Reservoir owner									X	

APPENDIX A: Flood Risk in London

This section provides a summary of the types of flooding, risk and possible impacts in London.

A 1. Surface Water Flooding

Hazard description

Surface water flooding occurs where rainfall exceeds natural and highway drainage capacity and therefore lies or flows over the ground instead. Surface water flooding can occur very quickly with little or no warning.

This will often result from intense downpours over small localised areas and also from more prolonged rainfall over a wide area where the ground becomes saturated.

Road networks are affected most frequently from seemingly small amounts of rainfall and properties are affected in the more severe events.

London's built-up land surface does not allow rainwater to soak away into the ground. Therefore there is an increased risk that severe rain will lead rapidly to flooding. A major surface water flood would cause great property damage, with a high chance of loss of life, especially in basement dwellings.

There are more properties and infrastructure at high risk of surface water flooding in London than from any other source of flooding with over 68,000 properties at high risk. The below maps show the high, medium, and low likelihood of surface water flooding, indicating numbers of postcodes at risk. It highlights Westminster, Hammersmith and Fulham and Kensington and Chelsea as being the most at risk London boroughs.

Recent [analysis by Zurich UK](#) indicates that nearly half (14,780) of London's 33,200 basements in commercial use are at risk of flooding from heavy rain. This comes after Zurich's data scientists pinpointed every commercial or mixed-use property in the city and mapped them against areas of flooding from heavy rain. Of these, 5,692 basements face a "high" or "extreme" flood risk, with the greatest number of buildings in Westminster.

London Risk Register Reasonable Worst Case Scenario Outcome Description

- Severe impact but low likelihood thunderstorm forecast is in place across the South East in the Summertime. The certainty is low and specific locations are unknown. There is very little lead time, less than 1 day.
- High intensity rainfall in London begins to fall recording exceptional levels of rainfall over a very short duration.
- Flooding of up to 87,000 properties and 21,000 businesses (108,000 properties in total).
- Just over 40 fatalities and thousands of casualties.
- Evacuation of up to 314,000 people (25,000 of which may require additional assistance).
- Short to medium term shelter requirements for 117,000 residents.
- Infrastructure is impacted including roads, railway lines, gas, electricity and water. Closure of schools in affected area for over 1 month.

Warning lead times

In very intense storms, typical in summer months, localised flooding can occur within minutes of the rain starting. More widespread flooding could happen within a few hours. In general, to implement any operational response to reduce impacts (for example erecting temporary barriers)

would need to be carried out on the basis of a forecast. Multi Agency Flood Plans should have identified critical or vulnerable areas that would merit protection.

It is important to note that a heavy rainfall weather forecast is unlikely to be able to pinpoint specific areas in London that might be worst affected. Often forecasts of this nature cover all of London.

Warning methods

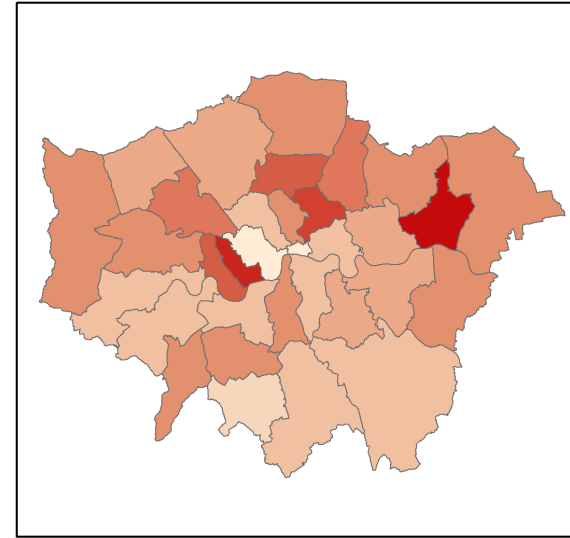
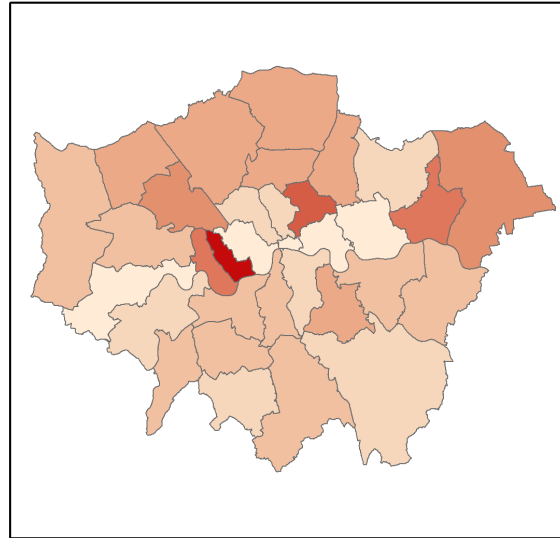
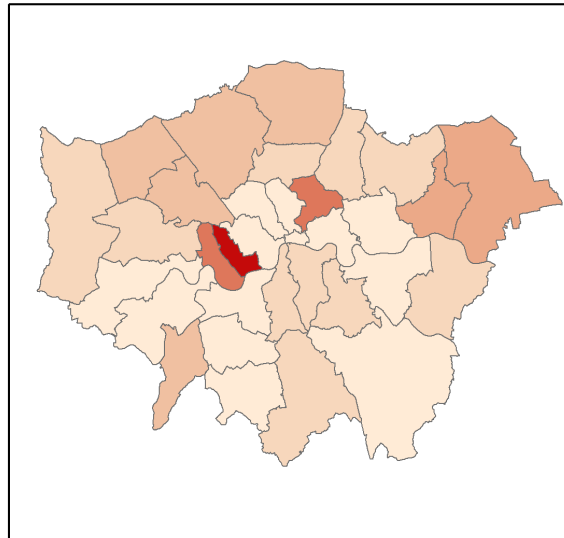
Warning for surface water flooding will be via Flood Guidance Statements and Met Office severe weather warnings. There may be low confidence of precise impacts and locations especially for thunderstorm events.

Surface water flooding risk (as percentage of total area) by London Borough

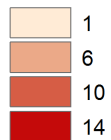
1 in 30 (3.3%)

1 in 100 (1%)

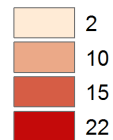
1 in 1000 (0.1%)



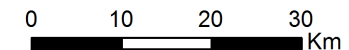
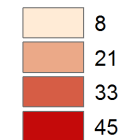
Percentage of total area



Percentage of total area



Percentage of total area



For information: These maps have been produced using the best available data that we have. Please note these maps are to provide pan London information and there may be differences in the modelling across different London Boroughs, which has been reflected in the maps. Therefore, the maps may not be a true representation of surface water risk across London. Data included came from the latest surface water flooding extent polygons from the [Defra Data Services Platform](#).

Standard, Large and Mega Basements in London

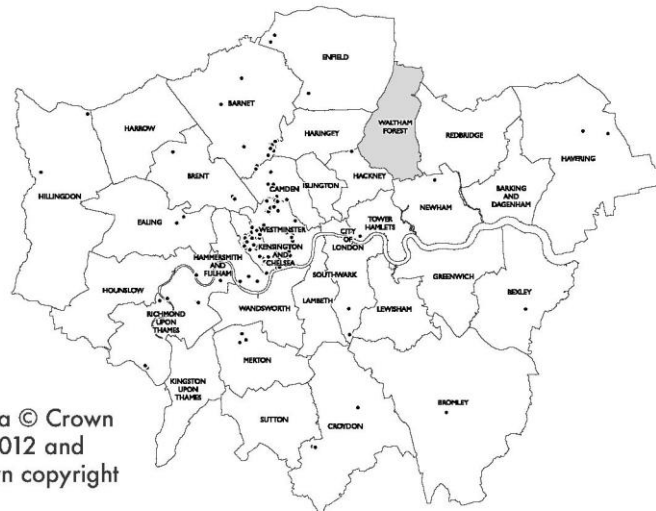
STANDARD BASEMENTS



LARGE BASEMENTS



MEGA BASEMENTS

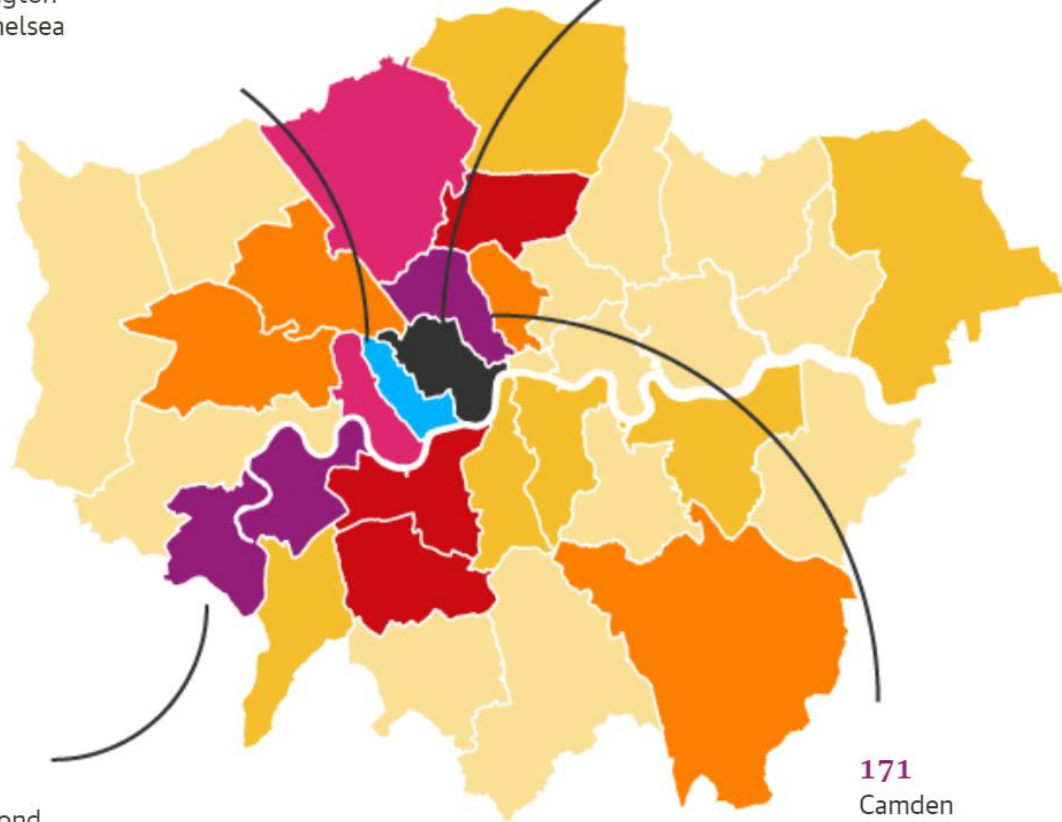


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Large and mega basements by London Borough

421
Kensington
and Chelsea

266
Westminster



150
Richmond
upon Thames

171
Camden

Large and mega basements by borough

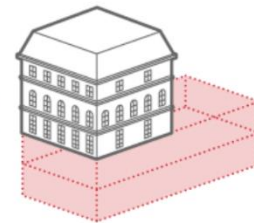
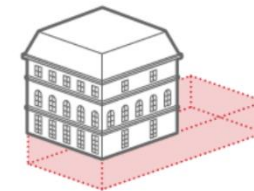
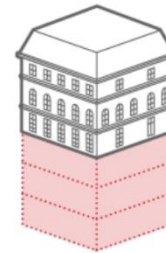
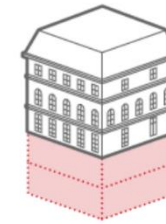
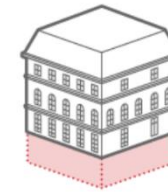


Basement size categories

Standard

Large

Mega



<https://doi.org/10.1080/02723638.2021.1934628>

A 2. Groundwater Flooding

Hazard description

Flooding from groundwater can happen when the level of water within the rock or soil that makes up the land surface (known as the water table) rises and reaches ground level. The level of the water table changes with the seasons due to variations in long term rainfall and water abstraction.

There are some key features of flooding from groundwater:

- Flooding will usually occur days or even weeks after heavy or prolonged rainfall.
- Flooding may occur for a long time, often lasting several weeks.
- The water doesn't always appear where you would expect it to (i.e. valley bottoms). It may also emerge on hillsides.
- Water may rise up through floors rather than coming in through doors.
- Flooding from groundwater is most common in areas where the underlying bed rock is chalk (see London geology diagram on following pages).
- Groundwater flooding causes an increased risk to sewer flooding.

London Risk Register Reasonable Worst Case Scenario Outcome Description

- Extended amounts of above average rainfall has led to exceptionally high groundwater levels. The main areas of concern are in the South East of London where the geology is predominately chalk (see below map).
- With the rising water table, basements start to flood and water comes up through floor boards. Water from the ground emerges in low lying areas resulting in flooding of up to 1000 domestic and commercial properties for up to 3 months.
- Infrastructure is also impacted including roads, railway lines, gas, electricity and water.
- Groundwater fed rivers that are usually dry have re-emerged are high and out of banks flooding the surrounding areas. In some areas fluvial flooding and groundwater flooding combine.
- Impacted communities will need assistance with sheltering for up to 1 year.

Warning lead times

There is generally a long lead time for the conditions where groundwater flooding can occur - several days or longer. It is however, difficult to predict precisely where the location of flooding will happen.

Warning methods

Groundwater flooding warnings will be issues via flood guidance statements, water situation reports (Environment Agency) and flood alerts and warnings.

There will be a high confidence of impacts however it may be difficult to predict precisely where the location of groundwater flooding will happen.

Geology underlying London Borough

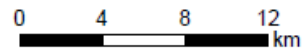
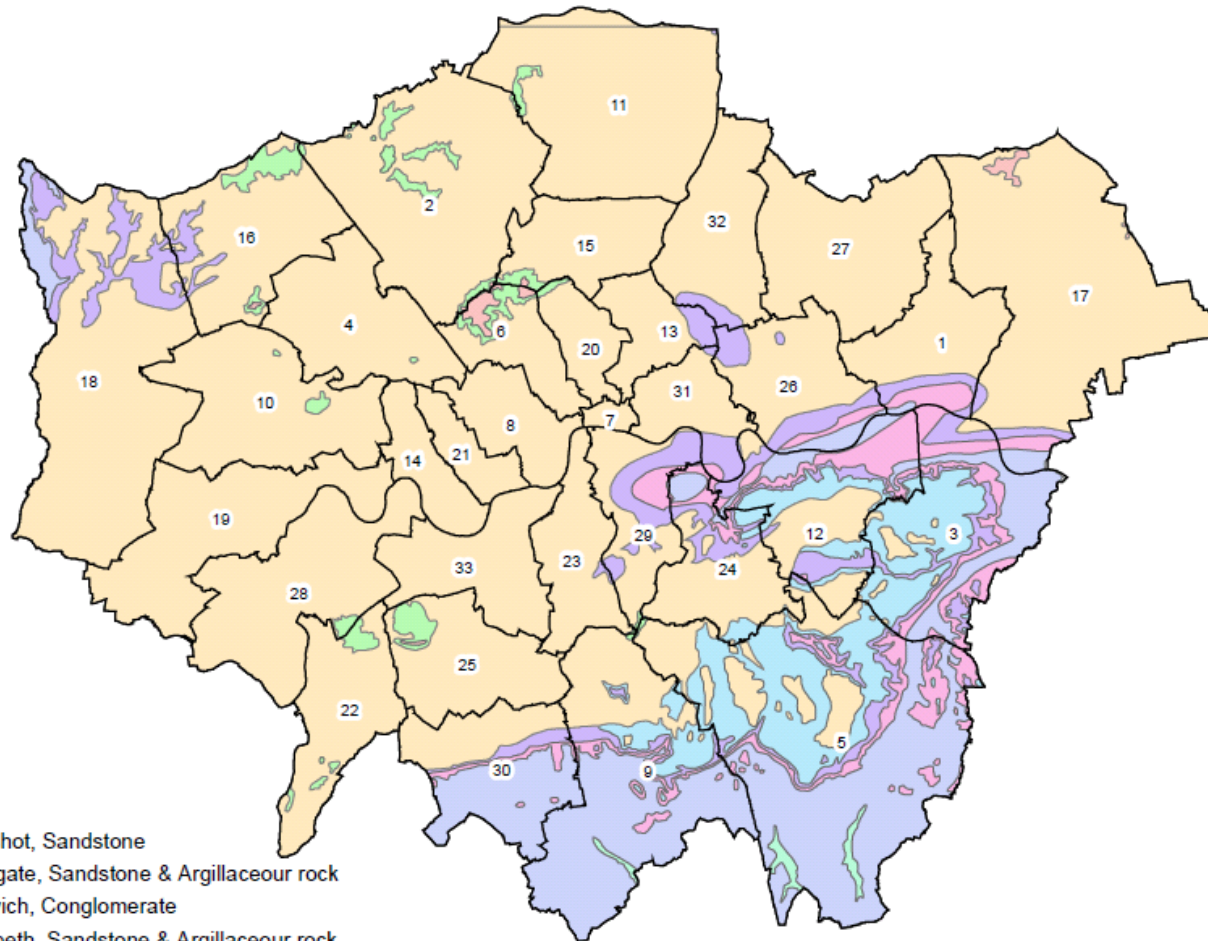


- No. Borough
- 1 Barking & Dagenham
 - 2 Barnet
 - 3 Bexley
 - 4 Brent
 - 5 Bromley
 - 6 Camden
 - 7 City of London
 - 8 Westminster
 - 9 Croydon
 - 10 Ealing
 - 11 Enfield
 - 12 Greenwich
 - 13 Hackney
 - 14 Hammersmith & Fulham
 - 15 Haringey
 - 16 Harrow
 - 17 Havering
 - 18 Hillingdon
 - 19 Hounslow
 - 20 Islington
 - 21 Kensington & Chelsea
 - 22 Kingston upon Thames
 - 23 Lambeth
 - 24 Lewisham
 - 25 Merton
 - 26 Newham
 - 27 Redbridge
 - 28 Richmond upon Thames
 - 29 Southwark
 - 30 Sutton
 - 31 Tower Hamlets
 - 32 Waltham
 - 33 Wandsworth

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Geology

- Bagshot, Sandstone
- Claygate, Sandstone & Argillaceous rock
- Harwich, Conglomerate
- Lambeth, Sandstone & Argillaceous rock
- London Clay, Argillaceous rock
- Middle Chalk
- Thanet Sand, Sandstone
- Upper Chalk



Produced by Evidence Delivery

A 3. Fluvial (river) Flooding

Hazard description

Fluvial flooding happens when a river cannot cope with the amount of water draining into it from the surrounding land. The result is often water overtopping or breaching of a riverbank or defence. River flooding can also occur from a blockage in the channel.

Rivers respond to rainfall at different rates according to several factors such as land use, catchment size and topography. In some areas of London, fluvial flooding can occur within 30 minutes following the onset of rain. Some other larger rivers can take several days to reach their highest level following a rainfall event. A map of London Rivers can be found on the following page.

London Risk Register Reasonable Worst Case Scenario Outcome Description

- Successive bands of rainfall saturate river catchments (soil moisture deficit⁴ is at zero) and fill river channels to full capacity. Further high intensity heavy rainfall causes fluvial rivers in London (tributaries to the Thames) to exceed channel capacity.
- Flooding happens quickly with little warning and time for evacuations.
- Flood defences, gates and alleviation channels may be overtopped or fail. Blockages occur in the river channel from debris causing further flooding.
- Rivers are out of banks and flooding up to 25,000 domestic and commercial properties. Up to 30 fatalities and up to 1000 casualties. Infrastructure such as roads, railway, underground, water treatment works, electricity, water supply etc could be disrupted.
- There is a build-up of surface water on roads where flooded rivers have backed up and overwhelmed local drainage systems causing a combined flood event.

Warning lead times

The Environment Agency aims to provide a two-hour warning of property flooding (flood warning). However, there are some rivers in London that can react very quickly to heavy rainfall, particularly smaller tributaries.

As flooding can happen incredibly quickly in some London catchments the Environment Agency will issue pre-emptive flood alerts to some areas in London before any rain has fallen. These areas are:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Brent Brooks including Silk Stream, Deans, Edgware, Dollis, Mutton & Wealdstone Brooks 2. Lower Lee Tributaries inc. Ching, Cobbins, Nazeing, Pymmes, Rags, Salmons, & Turkey Brooks, Small River Lee and Trinity Marsh Ditch 3. Yeading Brooks 4. River Pinn and Wood Ridings Stream 5. Rivers Beam and Rom | <ol style="list-style-type: none"> 6. Beverley Brook area in Merton, Sutton, Kingston upon Thames, Richmond upon Thames and Wandsworth 7. River Wandle area in the London Boroughs of Wandsworth, Merton, Lambeth, Croydon and Sutton 8. Ravensbourne area in the London Boroughs of Lewisham, Bromley, Greenwich and Croydon 9. River Hogsmill area from Ewell to Kingston upon Thames 10. Shuttle and Cray |
|---|---|

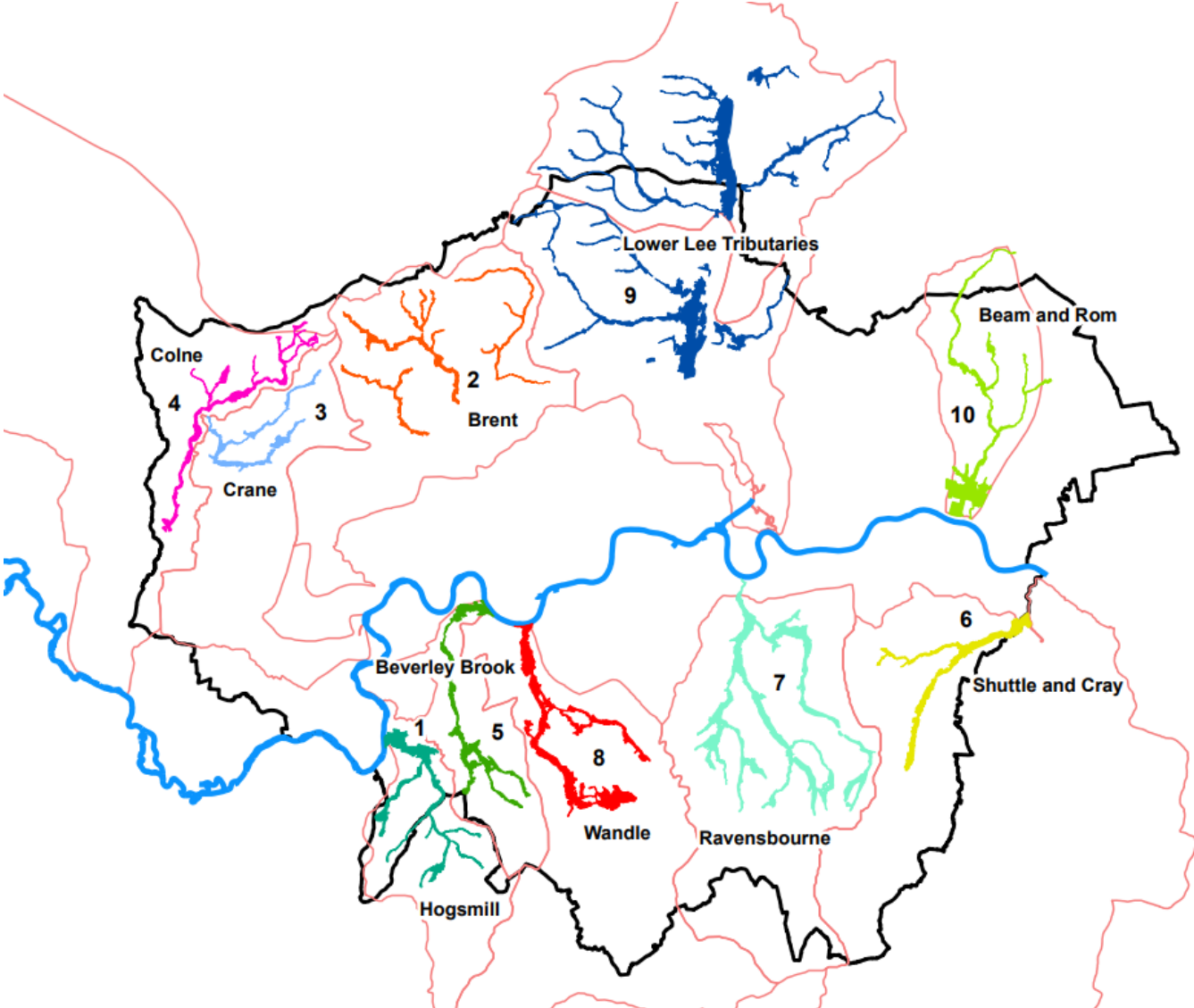
⁴ Soil moisture deficit is the amount of rain needed to bring the soil moisture content back to field capacity

Warning methods

Fluvial flood alerts and warnings will be issued via Flood Warning Service (Environment Agency), Flood Guidance Statements, and Met Office Severe Weather Warnings.

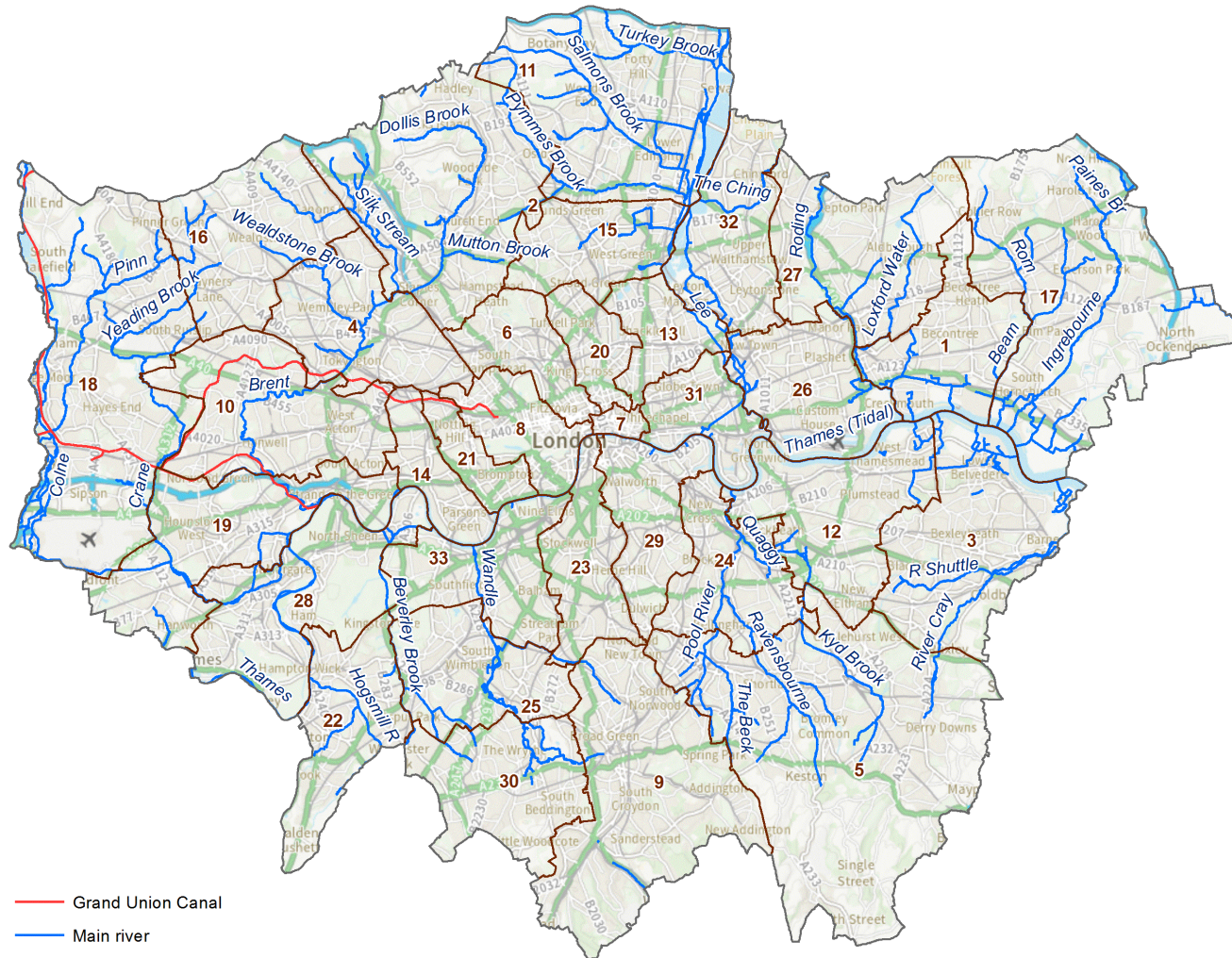
There is likely to be a low certainty on any forecast of fluvial flooding five days before an event and a higher certainty of fluvial flooding 1 to 2 days before an event. There will be less confidence for rainfall from thunderstorms.

Map showing those London catchments where pre-emptive flood alerts can be issued



Please note this map only shows the extent of the river catchment covered by the pre-emptive flood alert, not the full river in all cases.

Main rivers by London Borough



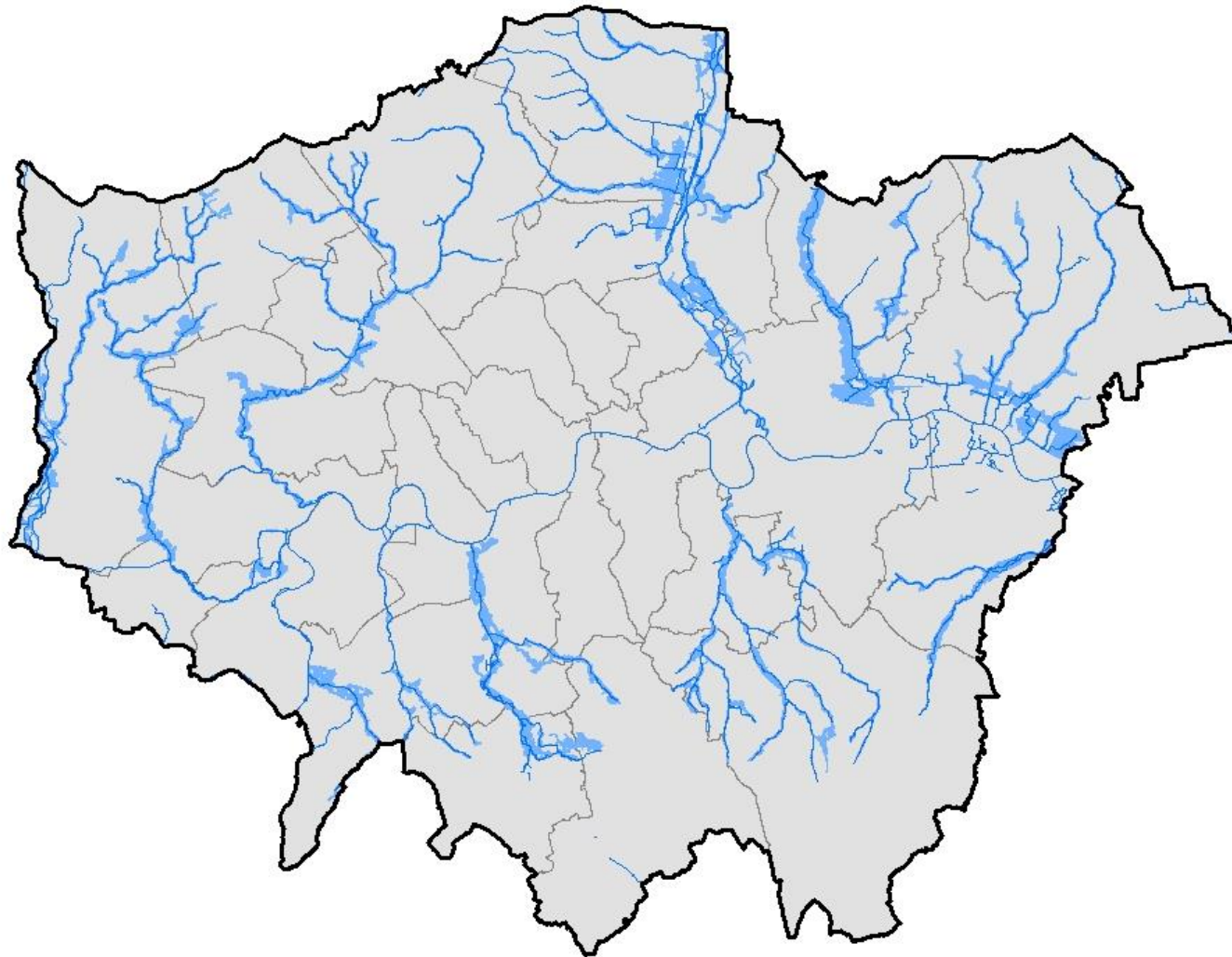
No.	London Borough
1	Barking and Dagenham
2	Barnet
3	Bexley
4	Brent
5	Bromley
6	Camden
7	City of London
8	Westminster
9	Croydon
10	Ealing
11	Enfield
12	Greenwich
13	Hackney
14	Hammersmith and Fulham
15	Haringey
16	Harrow
17	Havering
18	Hillingdon
19	Hounslow
20	Islington
21	Kensington and Chelsea
22	Kingston upon Thames
23	Lambeth
24	Lewisham
25	Merton
26	Newham
27	Redbridge
28	Richmond upon Thames
29	Southwark
30	Sutton
31	Tower Hamlets
32	Waltham Forest
33	Wandsworth

— Grand Union Canal
 — Main river

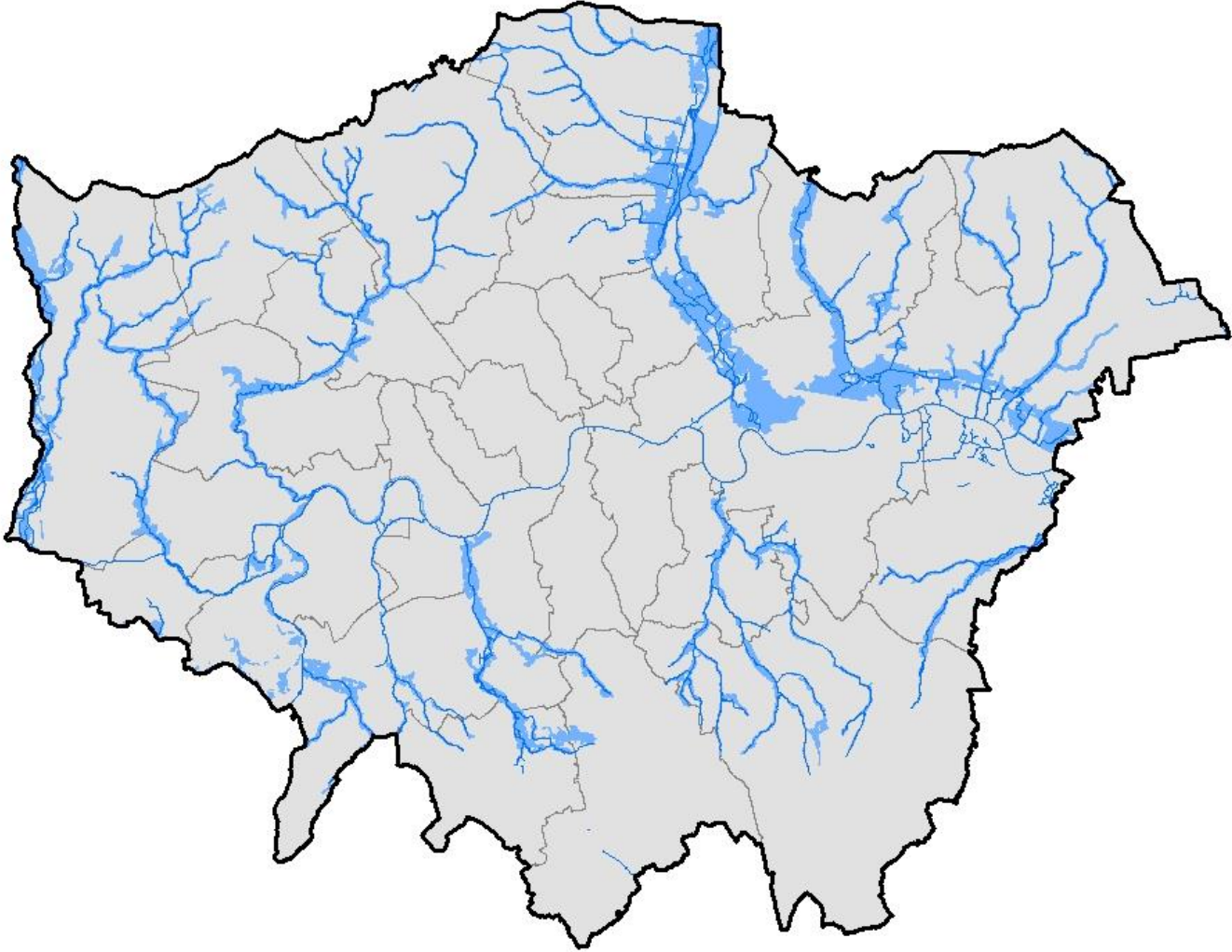
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Modelled Fluvial Defended Map for London



Modelled Fluvial Undefended Map for London



A 4. Tidal Flooding

Hazard description

Tidal flooding results from an incoming tide coming from the sea, raising river levels above the level of defences or from a breach in defences. The river Thames in London is tidal.

Tidal Defence System including walls, embankments, tidal gates, and the Thames Barrier

The Thames Barrier and its associated gates are operated and maintained by the Environment Agency. It is used to protect London from large incoming tides. It is one of the largest movable flood barriers in the world, spanning 520 metres across the Thames near Woolwich and protecting 125 square km of central London.

The Thames Barrier and its downstream defences have a 0.1% annual exceedance probability (AEP). This is equivalent to providing protection against a 1 in 1000-year surge event or smaller. The upstream walls and embankments are lower to allow greater use and enjoyment of the river. Thames Barrier is closed when surge conditions threaten to overtop these defences, increasing central London's level of protection to that of the downstream defences.

The Thames Barrier may also be closed during periods of high flow over Teddington Weir to reduce the risk of river flooding in some areas of South West London including Richmond and Twickenham.

The barrier has no individual trigger level for closure. The closing process is partly guided by a mathematical matrix that considers these 3 major factors:

- the height of the tide (usually a spring tide) measured at the Thames Estuary
- the height of the tidal surge, which naturally accompanies each tide
- the river flow entering the tidal Thames, measured as it passes over Teddington Weir

When required, the Thames Barrier is closed on an incoming tide to hold back any surge activity. The nearer to low tide the Thames Barrier is closed, the lower the upstream river levels remain and the greater capacity there is to cope with high fluvial flows. The Thames Barrier will remain closed over high water until the water level downstream of the barrier has reduced to the upstream level. The Thames Barrier is then opened, allowing the water upstream to flow out to sea with the outward-bound tide.

The Environment Agency has closed the Thames Barrier 206 times since it became operational in 1982. Of these closures, 103 were to protect against tidal flooding and 103 were to alleviate river flooding (correct as of April 2022). The frequency of closures is expected to increase over future decades.

London Risk Register Reasonable Worst Case Scenario

The Thames Barrier is designed with numerous back-up systems and undergoes a rigorous maintenance programme. However, London's tidal flood risk cannot be completely removed and, although very unlikely, inundation could still occur as a result of extremely high surge activity, a breach in the walls and embankments or barrier and gate failure.

The reasonable worst case scenario for tidal flooding in London is based upon a no notice breach of a wall or embankment.

- Localised tidal flooding resulting from sudden breach of a section of the Thames tidal wall or embankment caused by a vehicle collision or construction incident or a failure of a tidal flood gate coinciding with high tides on the river Thames.

- Water would rapidly pour through the breach site flooding surrounding properties and impacting infrastructure such as roads, railway, electricity, gas and water.
- No notice rapid flooding of up to 10,000 domestic and commercial properties with little time to evacuate or mitigate the impacts.
- Up to 10 fatalities and 500 casualties.
- Water may pool and stay behind breach site for some days prolonging recovery time.

Warning lead times

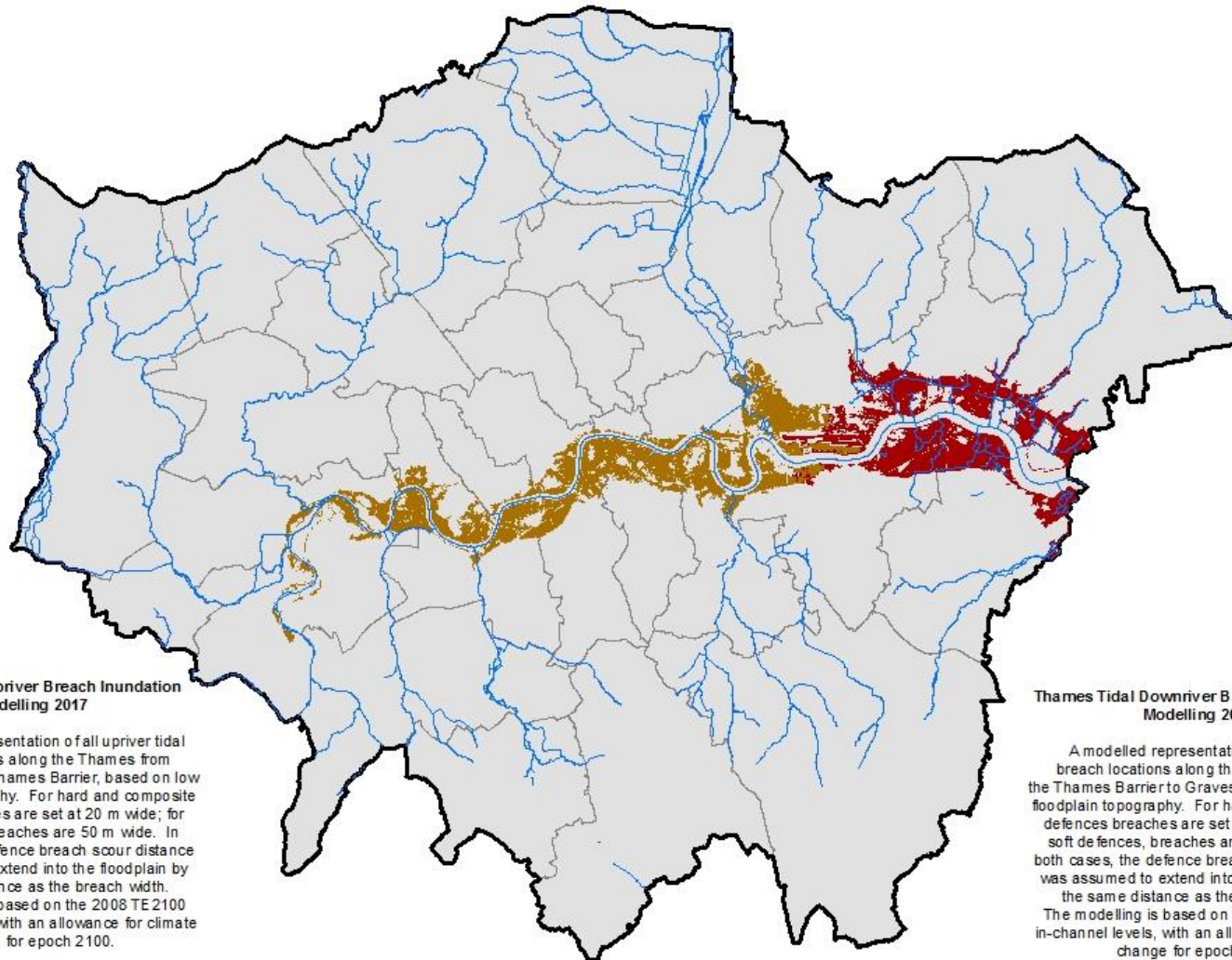
There is generally a few days warning of tidal flooding. The scale of any impacts will be refined closer to the actual event. London is protected from tidal flooding by the Thames Barrier but on tides that are high (but not high enough to trigger a closure of the Barrier) some riverside locations in West London are vulnerable to local flooding. In these circumstances timely Flood Alerts are issued to the places impacted.

For tidal breaches there may be little or no warning.

Further information

Impacts, risks, warning mechanisms and confidence of forecasting are outlined in the following tables and mapping.

Modelled Breach Inundation Map for London



Thames Tidal Upriver Breach Inundation Modelling 2017

A modelled representation of all upriver tidal breach locations along the Thames from Teddington to the Thames Barrier, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width. The modelling is based on the 2008 TE 2100 in-channel levels, with an allowance for climate change for epoch 2100.

Thames Tidal Downriver Breach Inundation Modelling 2018

A modelled representation of all tidal breach locations along the Thames from the Thames Barrier to Gravesend, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width. The modelling is based on the 2008 TE 2100 in-channel levels, with an allowance for climate change for epoch 2115.

A 5. Reservoir Flooding

Reservoir flooding may occur from a catastrophic failure, this could be due to a plane crash, structural instability, or a calculated threat. This type of reservoir flooding could be potentially life threatening.

Reservoir flooding could also occur in a slower manner due to structural damage, causing a small trickle or steady flow of water into the surrounding areas.

The Reservoirs Act 1975

A large raised reservoir is defined as: capable of holding more than 25,000 cubic metres of water above the natural level of any part of the land adjoining the reservoir. Some reservoirs that fall under the Reservoirs Act might be dry flood storage areas.

The Act ensures all reservoirs that fall under its jurisdiction are maintained and structurally safe. Undertakers (reservoir owners) employ a supervising and inspecting engineer. The undertaker will then carry out any safety works recommended by the last inspecting engineer within the report.

Roles and Responsibilities

The reservoir undertaker (owner) has a responsibility to write on-site reservoir plans, appoint inspecting and supervising engineers and to ensure the reservoir is in a good working order. They have a responsibility to manage their own assets and structures accordingly ensuring their activities do not to increase the risk of flooding.

The Environment Agency is the enforcement body for the Reservoirs Act and regulates reservoir safety.

London Boroughs have the responsibility to write emergency [off-site plans](#) for reservoirs. National Guidance states that MAFP are not required to include flood risks from reservoir dam failure, however reference can be made to generic / specific reservoir plans that may be used alongside / in conjunction with the MAFP.

London Risk Register Reasonable Worst Case Scenario Outcome Description

- Collapse without warning resulting in almost instantaneous flooding. Significant movement of debris (including vehicles) and sediment.
- Complete destruction of some residential and commercial properties and serious damage of up to 500 properties. Several thousand other properties could be flooded.
- Up to 200 fatalities, up to 1000 casualties. Up to 50 missing persons and people stranded.
- Hazardous recovery amongst collapsed infrastructure and debris. Water supply to homes and businesses is lost.
- Up to 200 people need temporary accommodation for 2 – 18 months.

Reservoir Flood Maps

Detailed reservoir inundation mapping (ready to go PDF maps and shape files) are shared on Resilience Direct by the Environment Agency. Each individual reservoir has speed, depth, extent, velocity and hazard mapping available. It is advised all responders use this detailed mapping for their own planning purposes. It is important to note that the maps show the worst case scenario.

Simplified reservoir mapping is also available publicly on GOV.UK [flood risk information maps](#).

London specific overview reservoir inundation maps are saved on Resilience Direct.

Offsite Reservoir Plans

King George V reservoir, located in London Borough Enfield, is the reservoir which has the highest level of potential impact of those located in London. If it were to breach the consequences could be catastrophic and it's for this reason that the reservoir has an offsite reservoir plan in place.

If a local authority deems their reservoir risk as substantial, then they can also write an offsite plan for their reservoir or collective of reservoirs.

Warning Lead Time

There is no official forecasting or warning mechanism for reservoir failure. However, the Environment Agency may be able to issue flood warnings to the affected area if the reservoir impact enters main river. The limitations in doing this is that flood warning areas are not drawn to reservoir inundation outlines, so some communities or properties may be missed off. It also relies on the EA being notified quickly of reservoir breach.

If a problem has been identified with the reservoir potentially leading to failure the undertaker should contact the Environment Agency, Local Authority and Police.

Cross boundary working

It is important to note that reservoirs located outside of London boundaries may also have a significant impact into London. It is important that the London Resilience Partnership is aware of this risk.

A 6. Infrastructure Flooding

High-level infrastructure flood maps are available in the [London Regional Flood Risk Appraisal \(2018\)](#).

The Regional Flood Risk Appraisal contains the following infrastructure risk maps set against Environment Agency mapping of Flooding from Multiple Sources in Greater London 2017.

These maps are based on the data available at the time of production of the London Regional Flood Risk Appraisal.

Map 1	Environment Agency Flooding from Multiple Sources in Greater London 2017 plus Table for individual London borough data
Map 2	Opportunity Areas and Flood Risk 2017 plus Table for individual Opportunity Area data
Map 3	Town Centres and Flood Risk plus Table for individual Town Centre data
Map 4	Mainline Rail Network and Flood Risk 2017
Map 5	Underground and DLR Networks and Flood Risk 2017
Map 6	TfL Road Network and Flood Risk 2017
Map 7	Hospitals and Flood Risk 2017
Map 8	Emergency Services and Flood Risk 2017
Map 9	Schools and Flood Risk 2017
Map 10	Utilities Infrastructure and Flood Risk 2017
Map 11	Waste or Treatment Sites and Flood Risk 2017
Map 12	Increased Potential for Elevated Groundwater
Map 13	Reservoir Flood Map – London extract

APPENDIX B: Flood Information and Warning Products

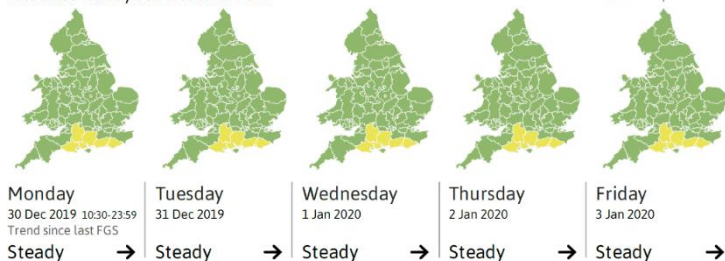
There are a number of methods to warn, inform and advise the public, professional partners, media and businesses of flood risk. The flood risk products listed below are designed to be used during the preparation and response phase of a flooding incident as well as beforehand to gain local knowledge of potential flood risk. Below is a description of the products available from the EA, Met Office and Flood Forecasting Centre, designed to aid responders with incident response decisions.

B 1. Flood Guidance Statements (FGS)

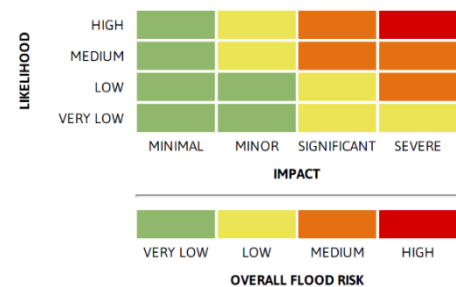
The Flood Forecasting Centre (FFC – a joint Met Office and EA centre) is responsible for providing guidance on the likelihood of flooding across England and Wales over the next five days.

Purpose	Further Details:
To provide professional partners with a 5-day overview of flood risk – daily risk assessment at a county level for England and Wales.	All types of natural flood risk is assessed – river, coastal, groundwater and surface water. This is generally the only warning partners will receive regarding potential surface water flooding. Each flooding type is given a green, yellow, amber or red risk rating (see flood risk matrix below)
Delivery Method	Information the FGS displays:
Email or Met Office Hazard Manager. Category 1 and 2 responders need to register with the Flood Forecasting Centre to receive FGS.	<ul style="list-style-type: none"> • General summary of flood risk • Overview of each type of flood risk (river, coastal, groundwater and surface water) • Specific areas of concern (county scale) • Warnings/alerts currently in place • Contact details for further information or clarification
Lead Agency	FGS is issued everyday around 10:30am; it will also be issued at other times of the day if the situation warrants and/or the flood risk changes. Category 1 and 2 responders can amend the service, so flood guidance statements are only sent when their county/counties of interest are issued yellow or above.
Flood Forecasting Centre (joint EA and Met Office service)	The assessment is based on weather forecasts, flood forecasts and catchment conditions.
Time Scale	
Up to 5-days notice	

Flood Guidance Statement
10:30hrs Monday 30 December 2019



Flood risk matrix



The following is reviewed for each FGS:

- The likelihood of an adverse flood event where likelihood bands are described as very low <20%, low 20-40%, medium 40-60%, high 60% or greater.
- Recent weather conditions – is the event shortly after an earlier period of prolonged rain or other high impact weather?
- Area and duration – is it expected to be short and localised or will it affect a large geographical area over several hours?
- Knowledge about the condition of the catchments within the counties – how saturated are the catchments, how high are the rivers and what are the underlying conditions?
- Detailed flood forecast models for the coast, showing surges and large waves, and flood flows for rivers are evaluated.
- Seasonal factors, for example snow cover or leaf fall.
- The combined effect of river flow and high tides – if a river flood is being assessed, does this coincide with high tides, which could cause problems?




B 2. Met Office Hazard Manager

Met Office Hazard Manager, a website available specifically for the emergency response community, provides a wide variety of information that could be of use before or during a flooding incident, including the Flood Forecasting Centre services. The features listed below are available on the Met Office Hazard Manager:

- The rainfall radar function provides the ability to see the intensity and coverage of rainfall over the last 24 hours and where it is forecast to fall over the next 7 days. This is available 24 hours a day, with actual data being updated every 5 minutes.
- The ability to see current and forecast information for other types of weather hazards including any warnings that have been issued for rain, wind, snow, ice, fog, thunderstorm, lightning, and extreme heat. Through the Met Office it is possible to [sign up](#) to receive warnings directly via Email, Fax or SMS.
- The Flood Forecasting Centre's Flood Guidance Statement can be found as a Product Layer.

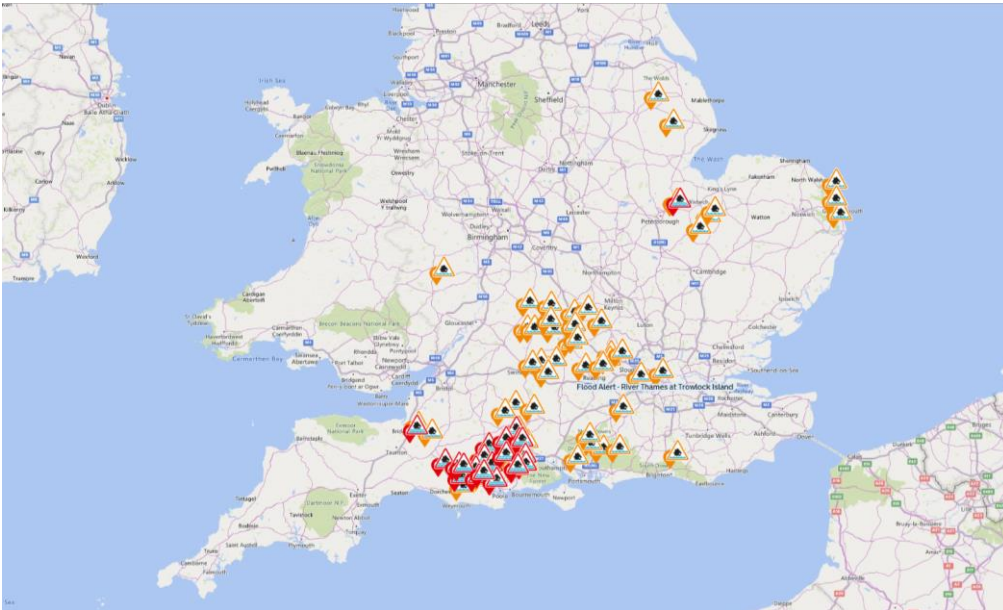
B 3. Flood Warning Service

The EA is responsible for issuing warnings to the general public, businesses, emergency responders and media relating to tidal, fluvial and groundwater flooding. The warning codes are issued using the Flood Warning Service system which can send bulk messages to a mass audience via several formats. The formats are automated phone calls, email and SMS text message. The flood warning service is an opt out service whereby everyone with a telephone registered to an address within flood zone is automatically registered. Messages issued also update flooding information on the Environment Agency website and the Floodline (0345 988 1188) service.

Warning Code	Meaning
 <p>FLOOD ALERT FLOODING IS POSSIBLE. BE PREPARED.</p> <p>PREPARE</p>	<p>Flooding is possible. Be prepared</p> <p>The impact on the ground will be flooding to roads, gardens, fields, recreation grounds, etc. Detail included with each Flood Alert will indicate the likelihood of escalating to Flood Warning.</p>
 <p>FLOOD WARNING FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.</p> <p>ACT</p>	<p>Flooding is Expected. Immediate action required</p> <p>Impacts on the ground will be flooding to homes and businesses, infrastructure (roads / underground stations / utilities etc) which will have a major impact. Expect significant transport disruption and a high level of local media interest.</p>
 <p>SEVERE FLOOD WARNING</p> <p>SURVIVE</p>	<p>Severe Flooding. Danger to life</p> <p>Impacts on the ground include deep and fast flowing water, potential collapse of structures, critical resources disabled, large towns/communities isolated, and large volumes of evacuees. Expect significant transport disruption and a high level of local and national media interest.</p> <p>These are only issued in exceptional circumstances and are likely to only be issued once a certain level of flooding has already occurred.</p>
<p>Flood Alert / Flood Warning / Severe Flood Warning, no longer in force</p> <p>(No icon)</p>	<p>The flood alert / warning / severe flood warning is no longer in force for this area.</p> <p>Used to inform that the situation is improving.</p> <p>Even when a Flood Warning or a Severe Flood Warning is removed it may still mean that there are flooded properties, damaged infrastructure and standing water where flooding has occurred.</p>

B 4. Live Flood Warning Map

The live flood warning map is available on the Environment Agency website [link here](#). The map shows locations of flood alerts, warnings and severe flood warnings that are in force as well as looking at live river level at gauging stations.



B 5. Water Situation Reports

The Environment Agency writes monthly water situation reports. These reports can be used if organisations want to keep an eye on rainfall data, soil moisture deficits, river flow, groundwater levels and reservoir stocks.

Organisations can sign up to receive these via email or they also located online: [link here](#)

B 6. Emergency Alerts

Purpose	<p>Further Details:</p> <p>The Cabinet Office, working with Department for Culture, Media and Sport (DCMS), has built a UK-wide emergency alerting capability based on Cell Broadcasting technology (mobile phone towers).</p> <p>In the UK there is a national protocol, owned by the Civil Contingencies Secretariat (CCS). This states that Emergency Alerts should only be used for emergencies where:</p> <ol style="list-style-type: none"> 1. Lives are at risk in an emergency 2. The risk covers a defined geographical area 3. Those receiving the message need to take action 4. There is some urgency to taking action - there may be some warning, or it needs to be immediate, but this isn't for long term or general risk, must be specific <p>The Environment Agency, as part of a multi-agency response, will use Emergency Alerts for severe flood situations (from rivers and the sea) where there is a significant risk to life and immediate action is required. They will be used to support severe flood warning messages and reach more of those at risk so they can take immediate action.</p>
To deliver risk to life warnings to more of those at risk from severe flooding and that need to take immediate action.	
Delivery Method	
Broadcast to mobile devices that are 4 and 5G enabled to a flood warning area. Broadcast remains in force for 22.5 hours but can be stopped sooner.	
Lead Agency	
Environment Agency (for flooding)	
Time Scale	
When immediate action is required or up to 2 hours before life threatening flood conditions are forecast	

APPENDIX C: Properties Flooded Data

During a widespread flood event the need for real time properties flooded data is key for reporting, obtaining shared situational awareness, allocating resources, evacuating communities, mobilising flood rescue efforts and planning recovery to name a few.

Although collating properties flooded data is an operational and tactical responsibility, it features within this plan for two reasons. To ensure that across London we have a consistent way to define and record property flooding. And to put in place a mechanism for sharing this information and reporting it centrally during a pan London flood event.

It is the responsibility of the local authority to produce a Section 19 report (Flood and Water Management Act, 2010) as part of the Lead Local Flood Authority duties, collating significant flooded information during an event for their London Borough. London Boroughs, the Environment Agency, Emergency Services other Risk Management Authorities and infrastructure organisations need to work together to share this information with one another during the response and recovery phases.

When recording properties flooded it is important to capture:

1. **The address or location**
2. **Flooding type:** fluvial (river), surface water, groundwater, tidal, reservoir, sewers, canals, highways drainage etc.
3. **Flooding extent:** internal, basement, garage (attached or not attached onto main building), occupied caravans, park homes, gardens, driveways, outhouses and sheds

These can then be separated out into the following categories:

Internal property flooding: water has entered the property. This includes basements and below ground level floors. Garages are included if attached onto the main building. Occupied caravan and park homes are also included.

External property flooding: where water has entered gardens, driveways, outhouses, garages (that are separate from the main building) and sheds.

(National Flood Emergency Framework, DEFRA, 2015)

It is important to capture as much information as possible when recording and reporting properties flooded data.

APPENDIX D: Acronyms

AEP	Annual Exceedance Probability
BCM	Business Continuity Management
CCS	Civil Contingencies Secretariat
COBR	Cabinet Office Briefing Room
DCMS	Department for Culture, Media and Sport
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
ESCG	Evacuation and Shelter Coordinating Group
FFC	Flood Forecasting Centre
FGS	Flood Guidance Statements
HASG	Humanitarian Assistance Steering Group
LESLP	London Emergency Services Liaison Panel
LFB	London Fire Brigade
LLACC	London Local Authority Coordination Centre
LRCG	London Resilience Communication Group
LRF	Local Resilience Forum or London Resilience Forum
LRG	London Resilience Group
LSR	London Search & Rescue
MAFP	Multi-Agency Flood Plans
MFCG	Mass Fatalities Coordinating Group
MPS	Metropolitan Police Service
NHS	National Health Service
NSWWS	National Severe Weather Warning Service
RCG	Recovery Coordinating Group
RNLI	Royal National Lifeboat Institution
SCG	Strategic Coordinating Group
STAC	Scientific and Technical Advice Cell
TCG	Tactical Coordinating Group
TfL	Transport for London
TLRN	Transport for London Route Network
UKHSA	UK Health Security Agency

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LONDON RESILIENCE GROUP

The London Resilience Group is jointly funded and governed by the Greater London Authority, London Local Authorities, and the London Fire Commissioner. We are hosted by the London Fire Brigade. Our work, and that of the London Resilience Partnership, is overseen by the London Resilience Forum.