

# **LONDON** **FLOOD REVIEW**

**Non-Technical Summary - Stage 4 Report**

**July 2022**

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# 1 Introduction

On 12 July and 25 July 2021, many London boroughs experienced severe flooding, causing damage to property and infrastructure, and disrupting people's lives and livelihoods. To establish why this flooding happened, and how similar events may be better planned for and managed in the future, Thames Water (TW) commissioned an Independent Expert Group (IEG) to lead an independent review into the flooding.

The review consists of four key stages:

- *Stage 1: What?* – An objective review of the available data relating to the flooding on 12 and 25 July 2021
- *Stage 2: Why?* – An investigation into the flooding mechanisms and root causes that led to flooding on 12 and 25 July 2021
- *Stage 3: How?* – An assessment of how well Thames Water's assets, including flood alleviation schemes, critical pumping stations and the overall sewer network, performed on 12 and 25 July 2021
- *Stage 4: What next?* – Recommendations to improve current flood mitigation processes and improve resilience to future flooding events

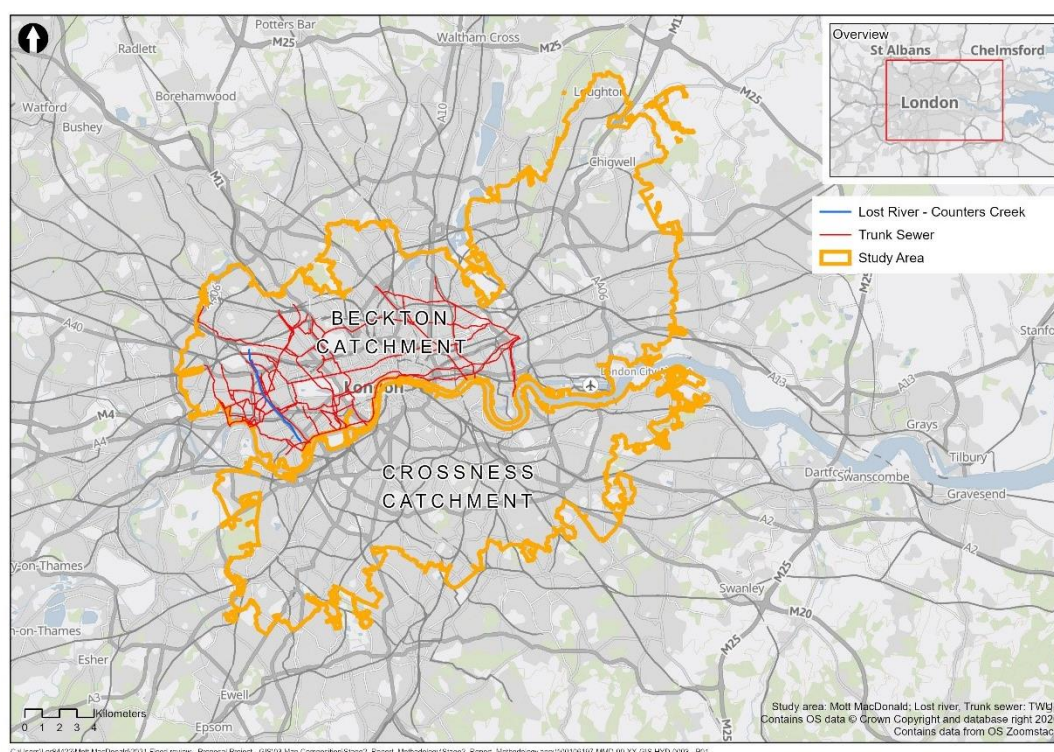
## 2 Conclusions and findings of the Review

### 2.1 Overview

The Stage 4 report is the final of four reports that make up the Independent Flood Review, investigating severe flooding which occurred across London in July 2021. This document is designed to give a non-technical summary of the full Stage 4 report so that everyone with an interest in the Review can understand and respond to it.

In Stage 4, we summarised the findings of the Review and put forward recommendations based on these findings so that the impacts of similar events may be reduced in the future. We have focused our study area on the Beckton and Crossness drainage catchments, which cover Central London where most flooding was reported (see Figure 2.1). However, many of the themes and recommendations of the report are applicable at a wider scale for most urban cityscapes.

**Figure 2.1: Beckton and Crossness catchment areas**



### 2.2 What happened on 12 and 25 July?

The two storms in July 2021 caused major disruption to the road and railway networks and affected residents and livelihoods across London and the South East. Both events occurred at or around high tide and resulted in flooding reported at over 1500 properties.

On 12 July, a significant amount of rain fell over west London during a period of just over two hours. Severe flash-flooding occurred, which is typical of convective storms.

Due to the build up of rainfall, it is difficult to forecast exactly where will be affected, and how much rainfall will fall.

On 25 July, a similar event occurred, but this time the rain fell for nearly four hours over a larger part of London and Essex.

### **2.3 What caused the flooding?**

The overall findings from our modelling of the events confirm that the amount of rain that fell during the two storms was the main cause of flooding. The volume of rain that fell in each event was around twice the monthly average rainfall and greater than any existing sewer systems are designed for.

Managing sewer flood risk is TW's responsibility, while surface water flood risk is managed by the Lead Local Flood Authority (LLFA). The storms caused both sewer flooding and surface water flooding, which means the responsibility for managing flood preparation and responses for the July 2021 events was shared across several organisations.

As an example, in Kensington and Chelsea, the sewer system filled up because it was not designed to cope with the amount of rain that fell during the 12 July events. As a result, flood water exceeded the capacity of the sewer system and came out of manholes in the street resulting in surface water flooding, as well as directly flooding residents' basements.

In Waltham Forest, on the other hand, more rainwater fell than the gullies (the drains on the roads) could cope with meaning that water could not get into the sewer system. As a result, there was a lot of flooding on the surface, while the sewer network below ground still had capacity to accept more water in some locations.

The varied types of flooding – sewer flooding, surface flooding and combined surface and sewer flooding – and the extreme nature of the storms mean that it is not possible to identify a single solution that could have prevented the flooding or a single organisation that is responsible for managing the flooding. TW and the local authorities each have a role to play, and these roles are interconnected and interdependent.

During our investigation, we identified some other factors that played a part in slightly worsening the impacts of flooding in some locations. These included the rainfall coinciding with high tide, and operational performance on the day. We concluded that, even if these factors had not been present, there would still have been significant flooding of all types.

### **2.4 Under-reporting of flooding**

Gathering comprehensive, accurate and reliable data during the Review proved to be very difficult. As the Review had to be completed within six months, we imposed a cut-off date for receiving information. This was the end of January 2022. Any information received after that date was not included in our investigation. We studied London at a wider level, rather than focusing on a limited area, and are comfortable that the gaps in the information do not change our overall findings.

However, all of the information and flooding reports from residents received after January 2022 have been collated and will be used by TW, and other organisations,

when responding to the recommendations made by this Review. This could include developing and assessing any potential investments to help reduce flood impacts across Boroughs in the future. Therefore, any property not included in this review will not be at a disadvantage.

## 2.5 Communication and response to the flooding

As part of the Review, we looked at the communication between TW and its customers, as well as communication between all flood management organisations during the July 2021 floods. We also looked at TW's and other organisations' response to reports of flooding, both during and after the events.

Our findings suggest that, while TW has procedures in place to deal with severe weather events, these were not fully effective during either of the 12 and 25 July events. The predicted forecast made it difficult to tell where was likely to be affected, and how much rainfall would fall. This made it difficult for TW and the local authorities to prepare fully for the event and communicate adequately with their customers.

Our study also highlights the lack of effective communication between key flood management organisations across London before, during and after the events, and the lack of a cross-London plan to manage the impacts of flooding.

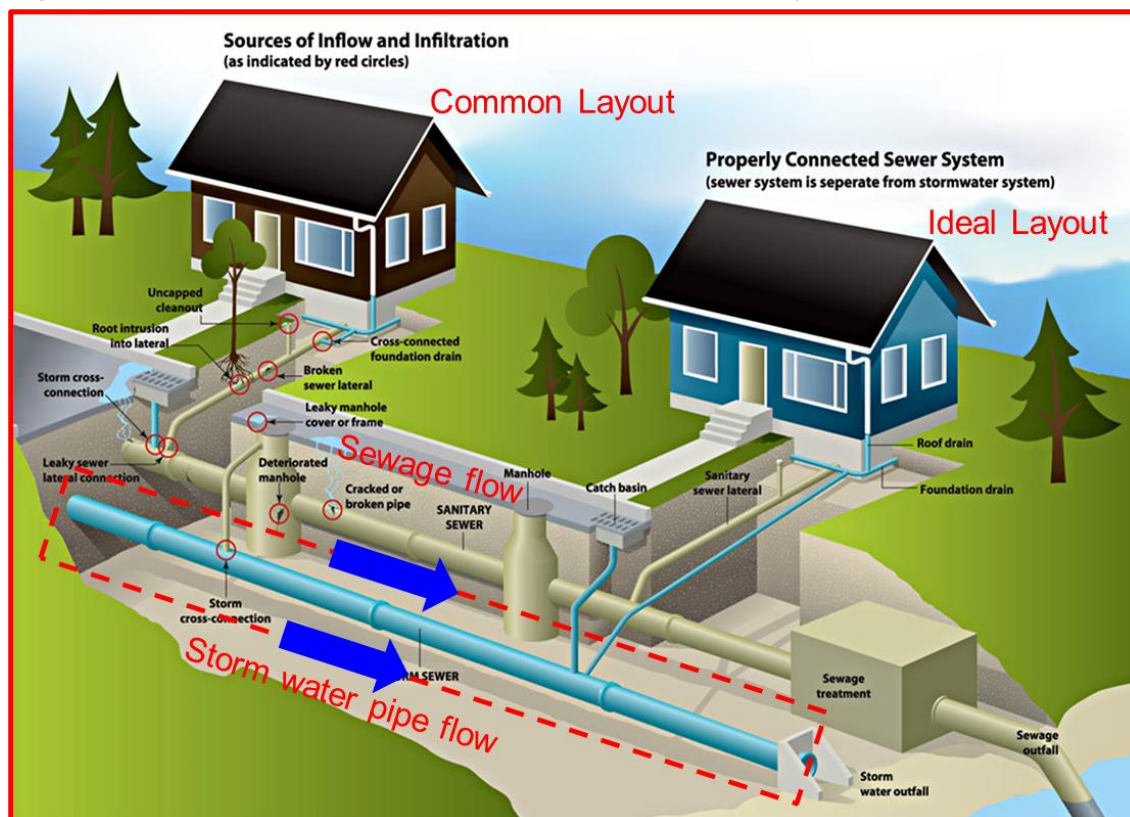
TW has put some new procedures in place since July 2021 which are expected to improve communication and responses, and these are outlined in the [Stage 4 report](#).

## 2.6 Discounted options

During this Review we have received many valuable bits of evidence, contributions and suggestions from people and organisations who were affected by, or have an interest in, the July 2021 flooding. Some of these included suggestions for possible changes that TW and other bodies could make. These included:

- Increasing the size of all the pipes in London
- Separating the systems (wastewater and stormwater) see Figure 2.2 below.

Figure 2.2: Example of a combined and separate sewer system



- Installing bigger pumps
- Large formal storage areas
- Sustainable Drainage Systems (SuDS) as the sole solution
- Urban deculverting (opening up river systems that are currently within pipes to form open channels)
- Using the Thames Barrier to reduce tide levels
- Regular and pre-emptive gully cleaning

We investigated all of these options but, after careful consideration, have rejected them as “the answer”, although some elements of some of the above will form part of future strategic solutions. The [Stage 4 report](#) outlines these discounted options, including reasons why they were discounted.



### 3 Recommendations

We identified a number of local solutions that can be implemented by Thames Water (TW) in the short-term within each London Borough, as well as several longer-term strategic recommendations which will involve all parties with wider flood management responsibilities.

The full list of recommendations, including the background, context and rationale for each recommendation, can be found in the full [Stage 4 report](#).

Our recommendations include:

- Establishing a body with a strategic view and governance with all parties contributing so that surface water and sewer systems can be assessed in combination, and investments designed to optimise outcomes across different organisational boundaries
- Sharing data across multiple organisations, particularly around flood risk management assets (such as pumping stations and storage tanks), high-risk areas and vulnerable customers, including across Boroughs where flood risk may originate from other areas.
- Improving forecasting and monitoring of the development of extreme events
- Improving preparedness for emergencies and enabling cross-organisational collaboration at short notice, including establishing roles and responsibilities in advance so this is clear ahead of any emergency. Existing actions taken under the London Resilience Framework may be drawn on to achieve this.
- Using data and digital tools to more rapidly assess sewer network performance and prioritise responses in extreme events
- Protecting those at highest risk of flooding by installing anti-flood devices such as non-return valves, [FLIPs](#) or flood gates depending on the flood mechanisms
- Supporting homeowners and tenants to understand how they can protect their homes from flooding, including opportunities to build in resilience
- Influencing planning policy and working with developers to reduce flood risk to others from new developments and basement renovations
- Encouraging asset owners to fully understand, develop and maintain their assets so they perform at their optimum level during high intensity events
- Understanding how the combined above and below ground systems operates when flow capacity of the sewers is exceeded, who will be affected and how the landscape can be altered to allow safe passage of flood waters to areas away from properties
- Adopting a suite of flood risk measures, including a combination of green (i.e. Sustainable Drainage Systems (SuDS) Figure 3.1 and 3.2 below) and [grey engineering](#) (i.e. traditional) solutions which can be installed in alignment with the planning policy to provide an agreed level of service across all organisations



**Figure 3.1: SuDS features installed as part of CCFAS**



Source: Mott MacDonald

**Figure 3.2: Example of a rain garden**



Source: Montgomery County Department of Environmental Protection

- Understanding risk at the hydrological catchment level, rather than being constrained by the boundaries of LLFAs, including the modelling and assessment of flood risk

We recognise that there are limitations as to what may be achieved with the funding and resources available. Any new schemes will be assessed and prioritised on the benefits they provide to customers and on the costs required to build and operate them in the normal way. Partnership working can bring different funding streams, so we recommend that flood risk organisations actively seek these in the future.

An important finding of the Review is that, even if all of our recommendations were taken up by the relevant organisations, we would still predict significant flooding when this type of extreme storm events occur, and due to climate change these events are predicted to become more frequent. As a result, the various organisations that have responsibility for managing flood risk will need to plan, work and invest together to reduce the impacts of flooding in the future.

## 4 Next steps

### 4.1 Dissemination

This Review is just a first step in identifying possible actions to improve our resilience to extreme weather events in the future. The IEG will be focussing, over the next few months, on engaging with wider stakeholders and the general public regarding the findings of the report. We will prepare and distribute briefing packs to inform discussion around the key recommendations. We encourage debate and engagement amongst practitioners and the general public as to how these recommendations may be achieved.

We have received much communication from the wider public as part of the Review process. This indicates that there is a lot of interest in our findings. Members of the IEG are willing to attend town hall discussions to share the findings and recommendations of the report, however this may be limited due to timescales and availability. We encourage council members and MPs to reach out to the IEG via the website.

### 4.2 Implementation

The recently formed Strategic Surface Water Management Group is likely to be the best group to formulate or at least monitor the implementation plan, where there are strategic recommendations which need collaboration across multiple organisations. Individual organisations should reflect on what they could implement and develop their own action plans. For transparency, we recommend that each member of the SSP shows what steps they will take and which recommendations they will take forward. We recognise that the recommendations are quite strategic and will likely be turned into implementation plans. These will cover the steps required to achieve the recommendation, identify responsibilities and drive SMART actions to encourage those progressing these recommendations to be accountable.

It is likely that some recommendations will not be achievable in the short term due to the need for funding or legislative changes. Bold changes should be considered such as forming a single organisation responsible for surface water flooding management, as is the case in other cities such as Copenhagen. For these recommendations, a roadmap should be identified to outline the steps that must be taken to ensure progress is made towards these longer-term goals. By identifying the desired approach, structure, and funding mechanisms, it will be possible to influence new and changing legislation, taking a more proactive approach in future.

In addition to the recommendations outlined in this Review there will also be progress by TW and the LLFAs to develop further flood schemes to address the areas thought to be at greatest risk, which can only be achieved by working together collaboratively. TW are currently developing a plan for implementing further FLIPs and consideration of local schemes in a response to this Review. The next steps to this progress will include an update to the information on actual flooding during the July events, allowing for information missing from this Review to be incorporated prior to any decision being made on where new schemes are to be prioritised.