

Fish Island Section 19 Flood Investigation

08/08/2024



Revision History

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Report reviewed and approved by:

Ashraf Ali, Director Public Realm



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Acknowledgements

The London Borough of Tower Hamlets would like to acknowledge the following organisations and groups for providing information and input into this Section 19 Flood Investigation Report; local residents and businesses who were impacted by the flooding, Thames Water, the Environment Agency, Canal and River Trust, the London Fire Brigade, the Lead Local Flood Authority, and the Local Highways Authority

EXECUTIVE SUMMARY

This Section 19 flood investigation has been written as part of the London Borough of Tower Hamlets' (Tower Hamlets) duty as a Lead Local Flood Authority (LLFA), under Section 19 of the [Flood and Water Management Act \(2010\)](#), which states that:

“On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate-

- a) which risk management authorities have relevant flood risk management functions, and
- b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.”

Heavy rainfall occurred on the 4th January 2024 in Fish Island, an area in Tower Hamlets that lies adjacent to the River Lee Navigation and the Olympic Park in the northeast of the borough. Specific roads affected by the flooding include Dace Road, Smead Road, and Bream Street, where 61 reports of internal property flooding were received. It is understood that the London Fire Brigade attended the site and evacuated residents to ensure their safety. Floodwaters were noted to have subsided, and the area was largely clear of flooding by Friday 5th January.

This investigation has been carried out in response to the event, to establish the source of the flooding, the actions of the relevant Risk Management Authorities (RMAs) taken before, during, and after the flooding occurred, and to identify potential ways to mitigate future flooding in the area. The relevant RMAs include Tower Hamlets, the Environment Agency (EA), Thames Water Utilities Limited (TWUL) and the London Fire Brigade (LFB). Relevant stakeholders include the Canals and Rivers Trust (hereby referred to as “The Trust”).

This investigation has established that the site is at risk from surface water, groundwater, and fluvial flooding. However, based on eyewitness accounts, flooding reports (including footage of the event), and historic flood incidents at this site, it was determined that canal overtopping was the likely cause of the event, prompted by a failure to open the nearby lock gate in a timely manner, which caused the canal to breach. The lock sluices remained unopened throughout the duration of the heavy rainfall, which exacerbated the flooding; it was reported that once the sluices were opened the flood waters receded.

Tower Hamlets, the LFB, and The Trust carried out an emergency response to the flood event, with staff from both agencies attending the site and liaising with affected residents. Once the sluice gates were opened, flood waters were observed to have receded by 9am on the 5th January.

Following the flooding on the 4th January 2024, Tower Hamlets has taken several actions to mitigate the effects of future flood events. This includes commissioning this Section 19 flood investigation and liaising with affected residents to acquire funding for flood damages to the many properties that were severely flooded.

To reduce the risk of another flooding incident occurring in Fish Island, several short-, medium-, and long-term recommendations have been proposed. The key recommendations are:

- The Trust should improve communication channels between themselves and the London Fire Brigade to ensure that the London Fire Brigade are able to open the sluice gates themselves in emergency situations.
- Improved formal communication between the EA, Tower Hamlets, and the Trust, to ensure that all parties are aware of the procedures, responsibilities, and response timeframes for when the high high alarm goes off. Tower Hamlet's should have an involvement in any updates to the Trusts Water Control Manual - London East (2021), and the Trust's Emergency Response Standard (2022) should also be shared.
- The Trust to continue with project to refurbish the sluice system at Lea bridge and bring all 4 sluices back into automated mode. At present, the on-going issues with sluice malfunctions are causing a higher risk of flooding in the area; this should be addressed as a priority as repair / maintenance of these sluices is crucial to bring back the full capacity of the canal.

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1. Introduction

1.1 Background Policy and Information

Tower Hamlets is a Unitary Authority and thus is the Lead Local Flood Authority (LLFA) for the Borough. LLFAs are defined as a Risk Management Authority (RMA) under [Section 6 of the Flood and Water Management Act \(FWMA\) \(2010\)](#). Under [Section 19 of the FWMA \(2010\)](#), LLFAs are required to investigate flood incidents, and must, to the extent that they find necessary or appropriate, investigate:

- Which RMAs have relevant flood risk management functions, and
- Whether each of these RMAs have exercised, or are proposing to exercise, those functions in response to the flood incident.

Upon completion of the flood investigation, Tower Hamlets must publish the results and notify the relevant RMAs.

Tower Hamlets, in its role as the LLFA, has specific thresholds that determine which events trigger a Section 19 flood investigation. These thresholds are published in the [Local Flood Risk Management Strategy \(LFRMS\) \(2017\)](#), and state that flood incidents requiring investigation are defined as when:

- Highway flooding which requires a temporary road closure
- Property flooding which occurs more than once within a year

A web search was conducted and highlighted there had been previous flooding in the Fish Island area. However, no internal flood reports were received, and this was the first event to trigger a Section 19 investigation. This report will solely assess the 4th January 2024 flooding incident. This incident resulted in the internal flooding of 61 properties, and significant external flooding along Dace Road, Smeed Road, and Bream Street.

- This investigation will also cover:
- An identification of the cause(s) of the flooding
- An analysis of the actions taken by each relevant RMA before, during, and after the event.
- Recommendations for the short, medium, and longer-term for relevant RMAs to manage flood risk and alleviate the risk of flooding to properties in the vicinity of the site.

1.2 Methodology

The initial stage of this investigation was a data collection exercise, which involved requesting, receiving, and reviewing relevant datasets from RMAs. The datasets obtained for the purpose of this investigation is summarised in *Table 1-1*.

Table 1-1 Datasets and Sources

Datasets	Source
Assets significant to flood risk	Environment Agency / Tower Hamlets / Thames Water
Geological information	British Geological Survey
Groundwater information	Environment Agency
Blocked gully reports	Environment Agency / Tower Hamlets
Historic flood records	Environment Agency / Tower Hamlets
Light Detection and Ranging (LiDAR) topographical data	Environment Agency
Photos of the flooded sites	London Fire Brigade
Rainfall data	Environment Agency
Sewer network data	Thames Water / Tower Hamlets
Surface water, fluvial, and artificial flood maps	Environment Agency
Detailed River Network	Environment Agency
Actions taken before, during, and after the rainfall event	Environment Agency / Thames Water / Tower Hamlets / The Trust / London Fire Brigade
Canal Water Levels	Canal and Rivers Trust

On 31st January 2024, a site visit was conducted to make site observations and undertake resident engagement to obtain relevant information to aid the investigation. Local business owners shared information regarding water levels and property damage. The information collected on this site visit was then analysed and included within GIS mapping in a desktop study to investigate the flood mechanisms of the event. The available historical, topographical, drainage, geological, and land use data was assessed to establish the flood risk sources, hydrological catchments, and overland flow routes. The responsibilities of each RMA for the different flood risks posed to the site were identified, along with their actions taken before, during, and after the flooding incident.

Finally, the results were compiled and delivered in this report. Recommendations on flood risk mitigations and next steps are provided in *Section 5*.

2. Relevant Risk Management Authorities and Stakeholders

There are several different RMAs responsible for managing the risk of flooding, depending on its source. *Table 2-1* provides an overview of the different RMAs within the borough and their area of responsibility. *Table 2-2* provides an overview of relevant stakeholders within Tower Hamlets and their area of responsibility.

Table 2-1 Relevant Risk Management Authorities

RMAs	Borough-specific Authority	Risk Management Responsibilities
EA	Non-departmental public body	Main rivers, the sea, and reservoirs greater than 25,000m ³
LLFA	Tower Hamlets	Surface water, Ordinary Watercourses, and groundwater
Water and Sewerage Company	TWUL	Surface water, foul and combined sewer systems (sewer flooding)
Highway Authority	Tower Hamlets & Transport for London (TfL)	Public highway drainage

Table 2-2 Relevant Stakeholders

Stakeholder	Borough-specific Authority	Responsibilities
Canals and Rivers Trust	Canals and Rivers Trust	Canals and navigable waterways

2.1 Environment Agency

The EA is an RMA in flood risk management, with responsibilities for managing flood risk from Main Rivers, reservoirs, and the sea. They are also a [Category One responder](#), as defined by the Civil Contingencies Act (2004). As the national flood risk authority for the UK, they oversee and work with other RMAs on projects to manage fluvial flood risk. The EA also issues consent for works on or near Main Rivers (set out in the [“When to consult the Environment Agency”](#) document) and advises Local Planning Authorities (LPAs) on how development proposals may influence flood risk. This is informed by the [Flood Map for Planning](#). Fluvial flood risk is mapped in different Flood Zones, with the following definitions:

- Flood Zone 1: Land with less than 0.1% Annual Exceedance Probability (AEP) of fluvial flooding.
- Flood Zone 2: Land with between 1% to 0.1% AEP of fluvial flooding and between 0.5% to 0.1% AEP of tidal flooding.
- Flood Zone 3: Land with a greater than 1% AEP of fluvial flooding or greater than 0.5% AEP of tidal flooding.

2.2 London Borough of Tower Hamlets

Tower Hamlets has multiple RMA roles and responsibilities, including as an LLFA, Highway Authority, LPA, landowner, and Category One responder.

As a Highway Authority, Tower Hamlets is responsible for maintaining all highway assets that are not part of the Strategic Road Network, which is managed by TfL. Highway assets include drains, kerbs, road gullies, and pipes, all of which must be regularly inspected and maintained to ensure runoff is well managed. Tower Hamlets' authority extends to the point where the pipe network connects to the public sewer, which lies under TWUL's responsibility.

As an LLFA, Tower Hamlets is responsible for managing the flood risk from surface water, groundwater, and Ordinary Watercourses. Under the FWMA (2010) and [Flood Risk Regulations \(2009\)](#), their duties include:

- Developing, implementing, and maintaining a LFRMS.
- Maintaining a register of assets and features that have a significant effect on the flood risk within the borough.
- Undertaking Section 19 flood risk investigations as per the FWMA (2010).
- Acting as a statutory consultee in reviewing and consulting on surface water drainage proposals for major developments, providing comments to the LPA.
- Regulating works within the proximity of Ordinary Watercourses (consenting and enforcement).

2.3 Thames Water Utilities Limited

TWUL is the regional water and sewerage company for Tower Hamlets and is the RMA responsible for managing the risk of flooding from public sewers, including surface water, foul, and combined sewer systems. They have a duty under Section 94 of the [Water Industry Act \(1991\)](#) to ensure that the area they serve is effectively drained and will continue to be effectively drained in the future. They have responsibilities to inspect, maintain, and repair their sewerage and water supply systems ensuring they are resilient to flooding.

TWUL data has been used in this report to analyse local drainage networks.

2.4 Landowners

Landowners have the primary responsibility of safeguarding their own land and property, including private roads, against flooding. Under Common Law, it is required that landowners do not take any action within their property that increases the flood risk of a neighbouring property. It also allows landowners to take any reasonable measures to protect their property from flooding, providing this does not cause harm to others.

Riparian landowners are responsible for ensuring that any structure on their land or within a neighbouring watercourse is kept clear of debris so that the watercourse can flow naturally. Riparian landowners are also responsible for maintaining the banks and bed of an Ordinary Watercourse or Main River if it passes through or lies adjacent to their land.

2.5 Category One Responders

Schedule 1 of the Civil Contingencies Act (2004) categorises all blue light emergency services as Category One Responders. For flood incidents within the borough, the most relevant emergency services are the London Fire Brigade (LFB) and the Metropolitan Police Service (MPS). The MPS coordinates emergency services and can assist with evacuations, whilst the LFB is responsible for saving lives and can also assist with the pumping of floodwaters.

2.6 Canals and Rivers Trust (The Trust)

The Trust is a charity that is a custodian for a 2,000-mile network of canals and navigable rivers and are responsible for the maintenance and management of this network. The Trust are not a Category One responder, so is not an RMA. The Trust was established in 2012 to replace the public corporation British Waterways. They are responsible for 8,500 different structures within canals and waterways including the Old Ford Lock 19 which is laid out in the [Asset Management Strategy \(2017\)](#).

3. Flood Incident Details

3.1 Location

Fish Island is located in the northeast of Tower Hamlets. The areas that flooded on 4th January 2024 are all located west of the River Lee Navigation and are topographically lower than the canal. The layout of the roads and the location of the canal are shown in *Figure 3-1*. The affected areas are located within a Creative Enterprise Zone. This is an initiative funded by the Mayor of London to designate areas where artists and creative businesses can find permanent affordable space to work and grow their businesses. The area is made up of multiple newly built apartment blocks and work-live studios.

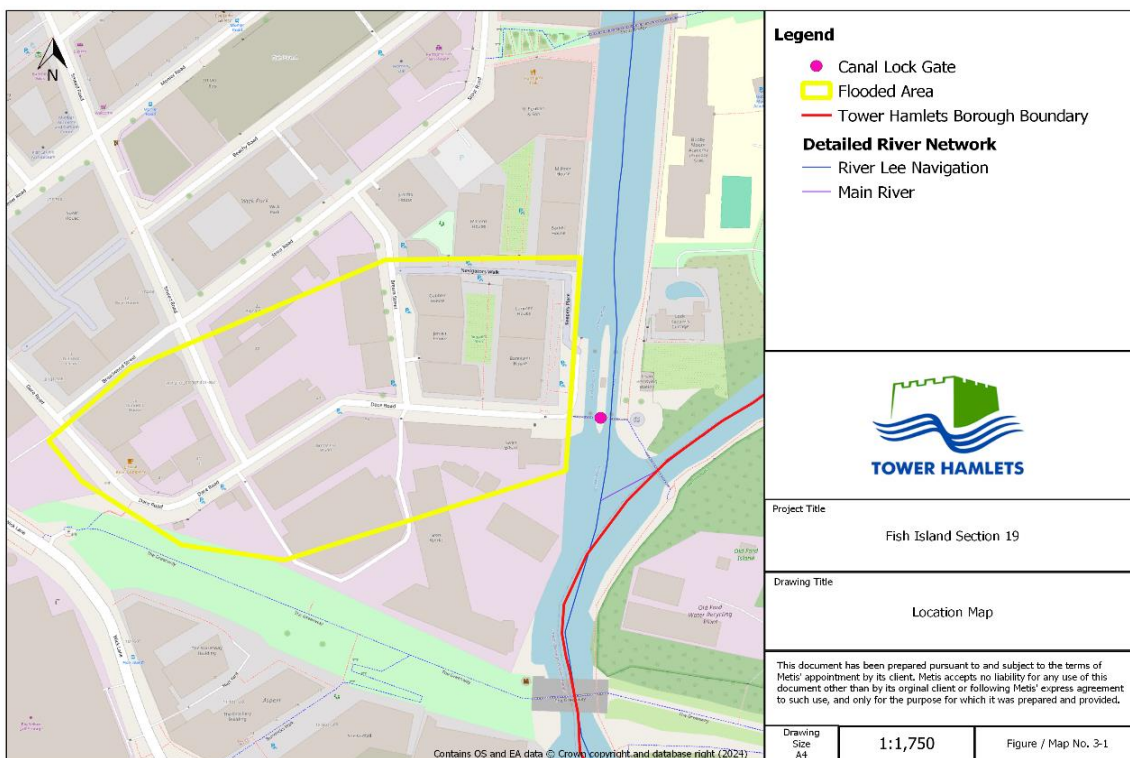


Figure 3-1 Locations of reported flooding at Fish Island on 4th January 2024

The River Lee Navigation is fed by the River Lea from above Hertford Lock, and by numerous other feeder streams. Water levels between locks can vary depending on weather conditions, the river base flows, and the nature of the various other feeder streams. The River Lee Navigation receives additional inflows from the Pymmes Brook, Flood Relief Channel, and Copper Mill Stream, as illustrated in *Figure 3-2*.

Water discharges from the River Lee Navigation into the Waterworks River at the automated Lea Bridge Sluices. These sluices maintain the navigational level in the River Lee Navigation upstream of the Old Ford Lock and convey flood water towards the tidal Bow Creek.

Old Ford Lock is a publicly operated, automated lock, operated via an electric panel located to the side of the lock with the SCADA (Supervisory Control And Data Acquisition) system providing diagnostic information to aid customer Services.

Although there is a by-pass weir at the lock 5.686m AOD), it is not the control structure; the Lea Bridge automatic sluices are set to maintain the level in the canal (5.800m AOD).

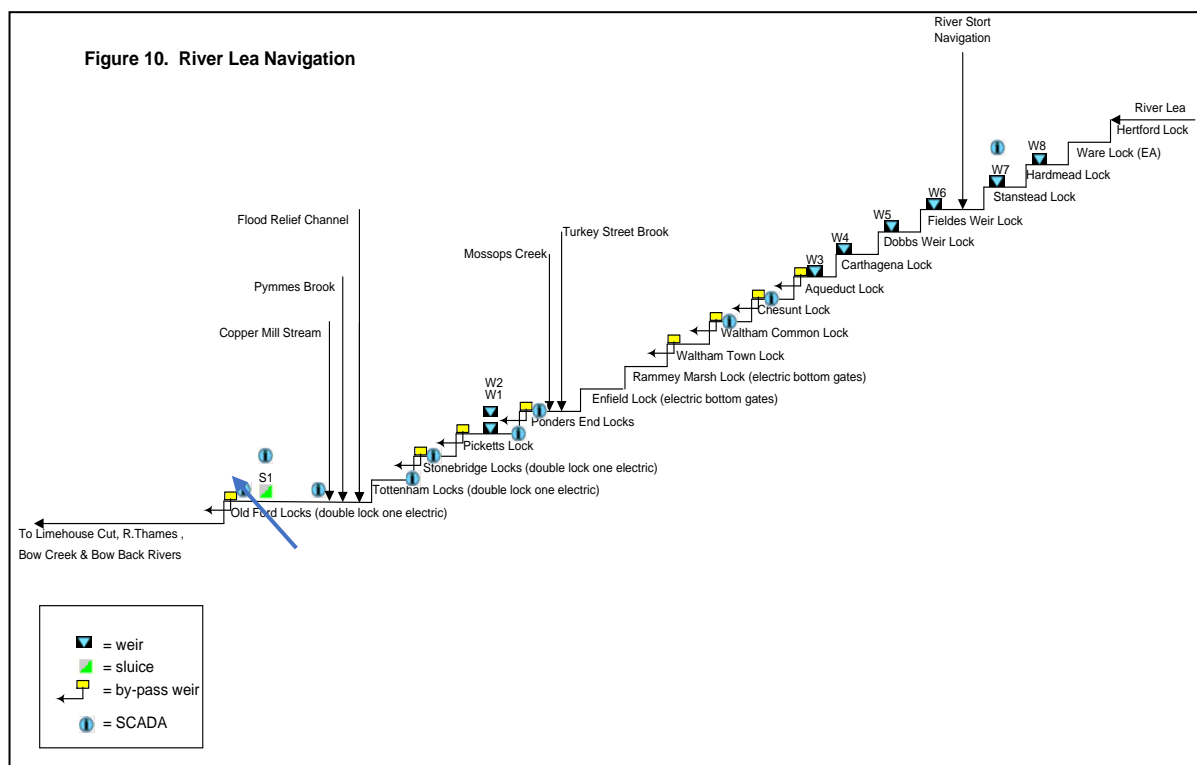


Figure 3-2 Location of Old Ford Lock within the River Lee Navigation
(Source: Canals and Rivers Trust)

3.2 Rainfall Event

On 4th January 2024, Storm Henk brought damaging winds and heavy rain to southern and central parts of England and Wales. Storm Henk was the eighth storm of the 2023-24 storm season, which in the UK runs from September to August of the next year. This caused canal levels to increase in both levels and flow rates along the whole length of the River Lee Navigation and Lea Navigation. Rain gauge data shows heavy periods of rain in the lead-up to the event beginning in the morning of the 2nd January, with the most significant event being the evening of the 4th January. A yellow rain warning (Very Low Likelihood of Medium Impacts) was issued for London from 12:00 4th January until 03:00 on 5th January 2024. It was predicted that 10-20mm of rain would fall, and that some areas could experience up to 30-40mm. Tower Hamlets received approximately between 15-25mm. The Met Office also reported that between the 3rd – 9th January daily mean river flow was categorised as “above normal” for the River Lea.

This heavy rainfall caused levels in the canal to rise, indirectly leading to overtopping, which caused significant flooding to Fish Island, namely Dace Road, Bream Street, and Smeed Road. A total of 61 reports of internal property flooding in the area were received. *Figure 3-3* shows the general location of flooding for the 4th of January flood event.

Local businesses and residents reported significant losses, for example, of equipment from camera studios, furniture, and stock, due to the 4th January flooding incident. As Hackney Wick is a designated Creative Enterprise Zone, with multiple affordable warehouses and live-work spaces for artists, many residents store equipment in the studios so the loss of this equipment and days of work resulted in a significant financial burden. Dampness and mould have been reported since the incident, which has caused a potential health hazard to impacted residents and business owners. Most internal flooding reports were received from the Peanut Factory, a live-work unit located on Dace Road. The flood waters reached a level of approximately 1 m in this area and is shown within the red area of *Figure 3-3*.

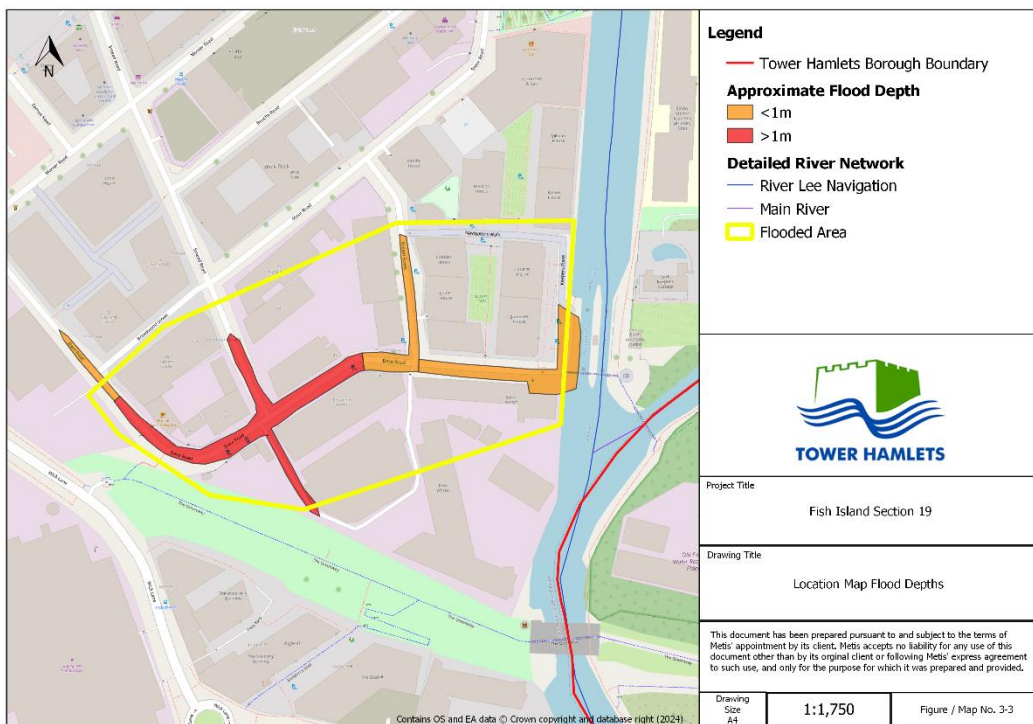


Figure 3-3 Locations of flooding with approximated depths

3.3 Rain Gauge Data

The EA provided rainfall data, recorded by two rain gauges, for the period before, during, and after, 4th January 2024 flood event. *Figure 3-4* shows the location of the rain gauges in proximity to the site.

As is evident from *Figure 3-4*, there are no rain gauges in close proximity to Fish Island. *Table 3-1* summarises the peak rainfall period during this storm event, and *Figure 3-5* shows the rain gauge data provided, indicating a similar scale of event.

However, the distance of these rain gauges from the site does introduce some uncertainty. *Figure 3-6* and *Figure 3-7* evidence the canal overtopping and height of flooding respectively.

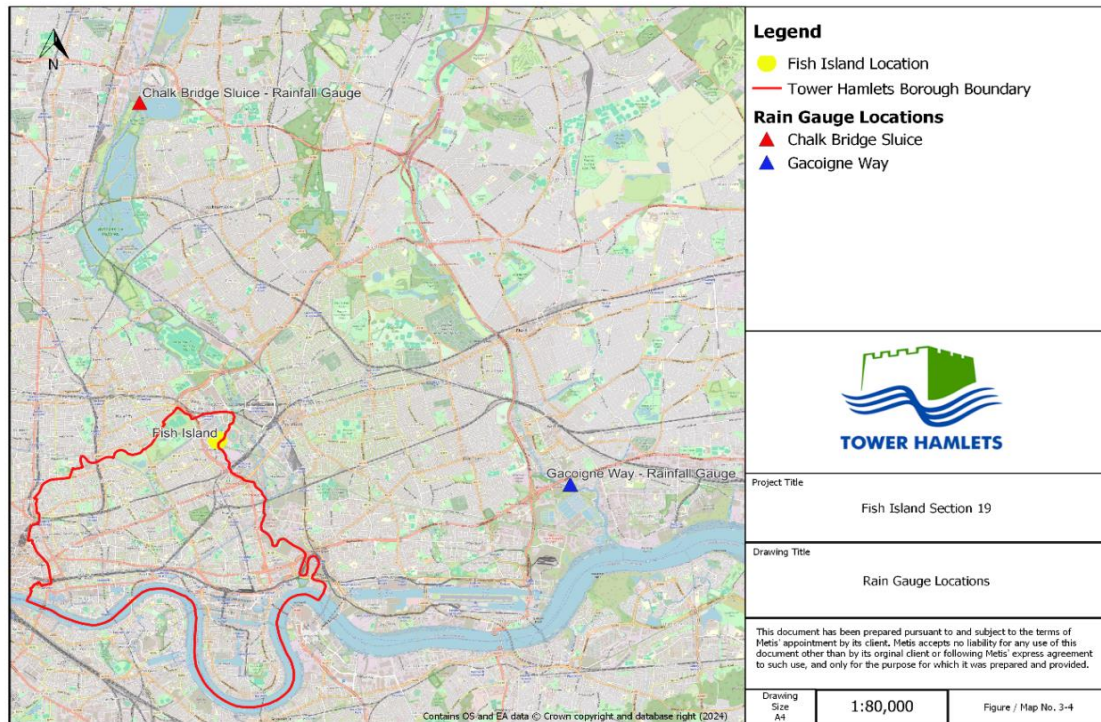


Figure 3-4 Locations of EA Rain Gauges

Table 3-1 Summary of rainfall event. (Source: EA)

Rainfall Period	Peak Time	Rainfall Peak (mm/15 min)	Cumulative Rainfall Over Rainfall Period (mm)
04/01/2024 15:45:00 - 05/01/2024 02:45:00	04/01/2024 18:45	2.175	20.39

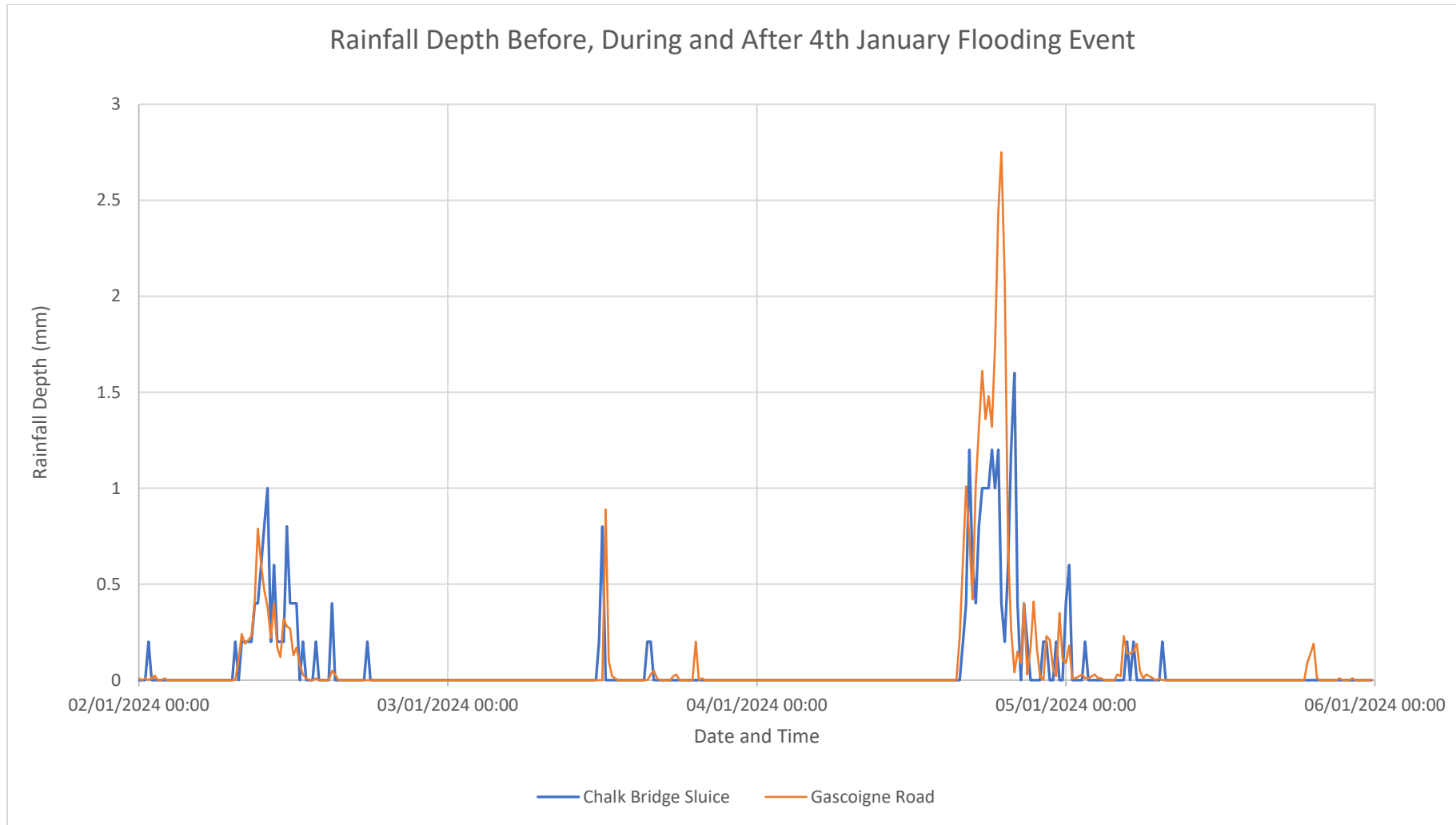
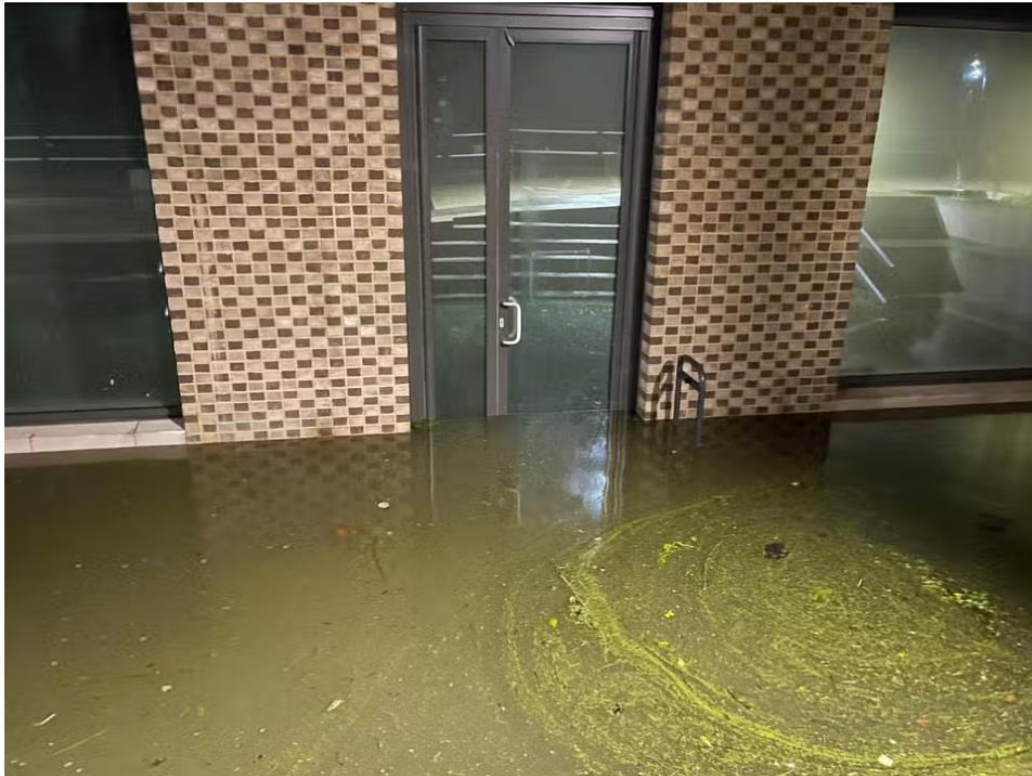
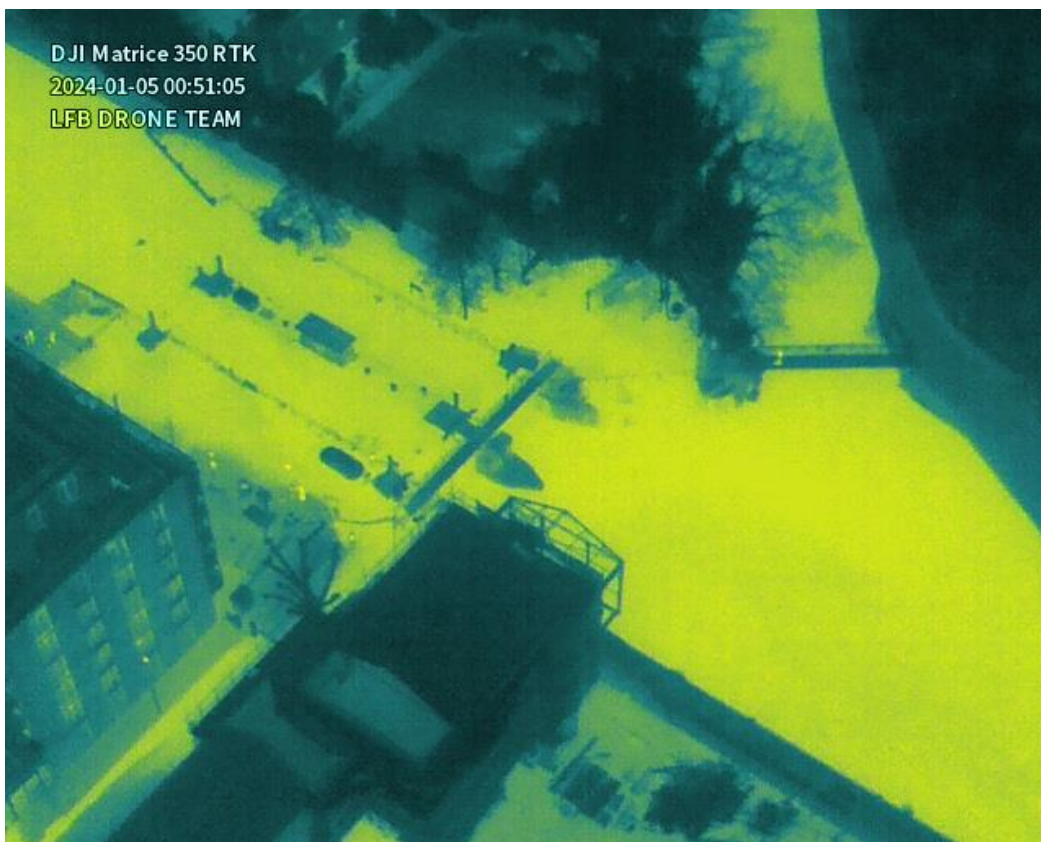


Figure 3-5 Rainfall depth before, during, and after the 4th of January 2024 flooding event (Source: EA)



*Figure 3-6 Water level on Dace Road 4th January 2024
(Source: [The Evening Standard](#))*



*Figure 3-7 Drone imaging of flooding on the 5th January 2024 00:51
(Source: London Fire Brigade)*

3.4 Canal Levels

The usual range of the River Lea at Lea Bridge is between 5.78mAOD and 6.10mAOD. It has been between these levels for 90% of the time since monitoring began, according to information available at the time of writing. *Figure 3-8* illustrates the 4th January flooding event caused levels far higher than this (~6.33m) and also demonstrates that the water level rising occurred far earlier than the lock gate was opened (01:00). Significantly, The Trust assets in this area have been in below optimum condition since 2021 when sluice D was rendered inoperable due to a twisted frame and then in late 2021, sluice C started to demonstrate the same failures and was locked off but could still be used in manual mode if necessary. According to EA data, with all Lea Bridge Sluice gates operational, they were designed to convey 70 m³/s. EA telemetry data from Lea Bridge Road gauging station (TQ3517787240, approx. 800m upstream) shows that flows did not exceed 50 m³/s on 4th /5th January 2024.

It should also be noted that in the morning of 4th January “Sluice B” failed and had to be opened manually, it was subsequently opened 5%, then by the early evening (19:43) the “High High” alarm (second of a two tier warning system of canal water level) sounded from both sluices. This should result in water controllers attending the automatic sluices, however, no action occurred on site until 23.00. The Water Control Manual (London Waterways East) states that specifically for “Old Ford Lock” or “Lea Bridge Sluices” SCADA sites any water level alarm must always be followed up by the water control staff as both sites monitor levels in the same pound and abnormal water levels are likely to be caused by a failure of the automatic sluice. An empty pound will cause many boats to be grounded and a high pound could potentially overtop, threatening adjacent properties. It is therefore clear that ongoing technical issues with the sluices at Lea Bridge are causing an increased risk of canal flooding to the area, which would have contributed to the flooding experienced on 4th January 2024.

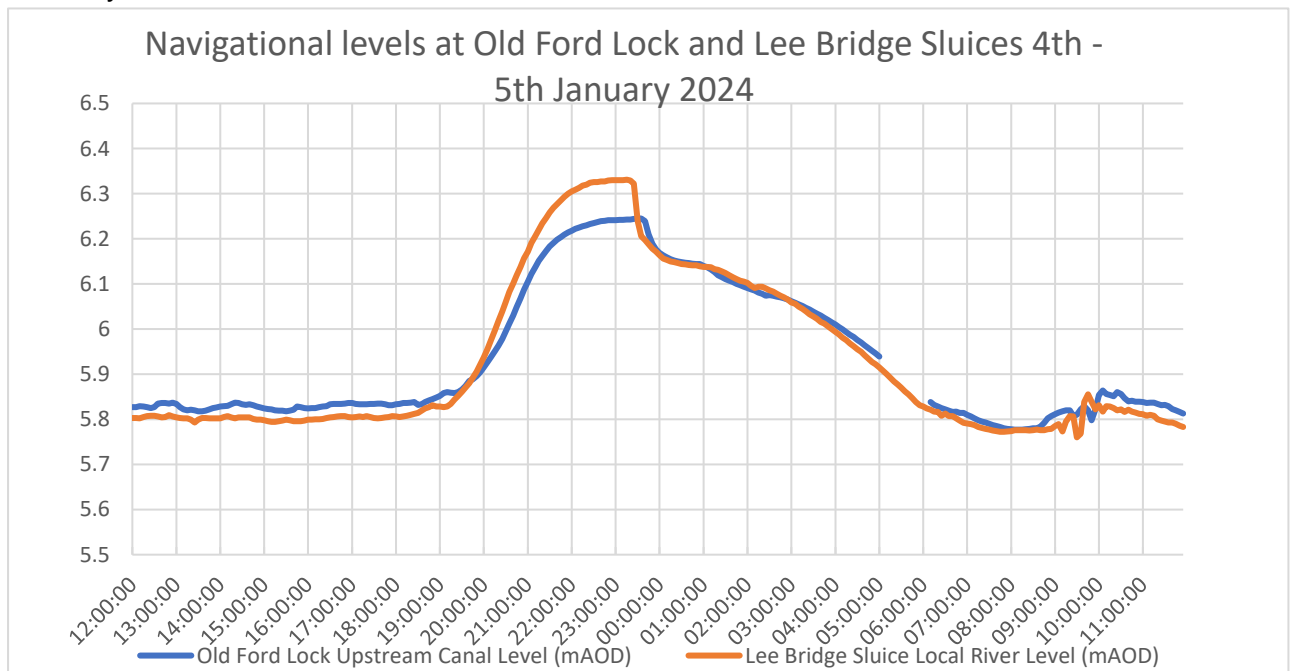


Figure 3-8 Canal levels data before, during, and after the 4th January 2024 flooding event (Source: Canals and Rivers Trust)

4. Flood Mechanisms

4.1 Local Drainage Network

Figure 4-1 shows the TWUL sewer network within the local area. All the sewers within the vicinity of the flooded area are classed as combined.

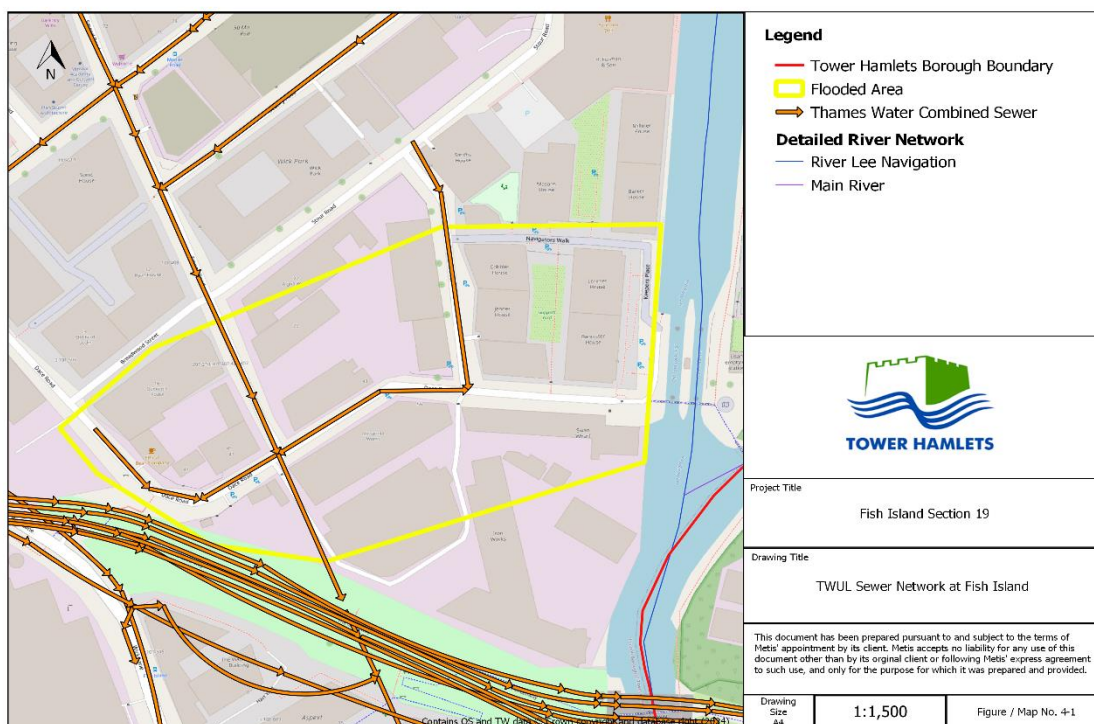


Figure 4-1 Thames Water sewer network

4.2 Local Flood Risk

Several flooding mechanisms could have contributed to the flooding event on 4th January 2024. To gain a clearer understanding of the cause of the flooding, it is necessary to analyse the local flood risks from surface water, ordinary watercourses, main rivers (fluvial flooding), groundwater, and sewers.

4.2.1 Surface Water Flood Risk

Surface water flooding occurs during heavy or prolonged periods of rainfall, when the volume of water exceeds the capacity of the drainage network, and the water cannot drain away at a sufficient rate via infiltration resulting in ponding and overland flows.

A review of the EAs Risk of Flooding from Surface Water (RoFSW) data shows that there is risk from a 3.3% AEP event within Dace Road and the surrounding properties. The internal flood reports were also mainly located within the 3.3% AEP, or 1% AEP extent as shown in Figure 4-2. It should be noted that Fish Island is not located within a Critical Drainage Area (CDA) and has a relatively low surface water flooding risk in relation to the rest of the borough.

Surface water flooding can be eliminated as the cause of this flooding event, as it was noted that following the opening of the sluice gates, flood waters receded rapidly, indicating sufficient performance of the local drainage network. This is also supported by accounts that water flowed down Dace Road from the canal, rather than surcharging from blocked gullies. Gullies in the area are cleaned regularly, with gullies on Dace Road (23 no.) being cleaned twice a year and Bream Road (6 no.), Smeed Road (8 no.), Beachy Road (10 no.) and Stour Road (8 no.) all cleaned annually, normally in autumn after leaf fall. As the gullies were cleaned recently, water drained away quickly clearly indicating that the drainage network, and therefore surface water flooding, was not the cause of the flooding on 4th January.

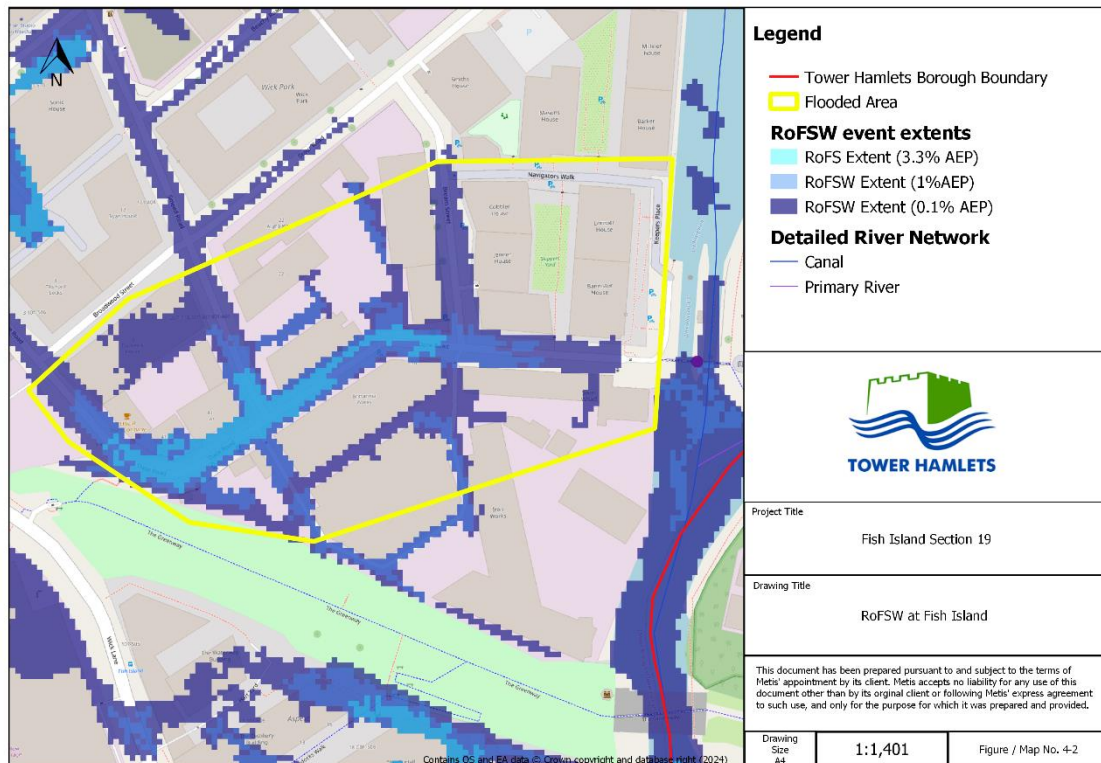


Figure 4-2 RoFSW within Fish Island

4.2.2 Ordinary Watercourse Flood Risk

An Ordinary Watercourse is a river, stream, or ditch that is not designated as a Main River by the EA. Significant rainfall events can lead to an Ordinary Watercourse exceeding its hydraulic capacity and rising above their banks or retaining structures, causing surface water flooding on the surrounding land.

The EA's RoFSW extents include the risk of flooding from Ordinary Watercourses. A review of the EA's Detailed River Network confirms that the River Lee Navigation is classified as a "Main River". The Hertford Union Canal to the North of the site is not classified as a main river therefore could potentially pose a risk. However, during 4th January 2024, flooding was not reported near the Hertford Canal, so it is considered that this was not the cause of the flooding.

4.2.3 Fluvial Flood Risk

Fluvial flooding occurs when watercourses designated as Main Rivers by the EA exceed their hydraulic capacity as a result of heavy or prolonged rainfall. A Main River is usually a larger river or stream, which is shown on the EA's [Main River Map](#). A principal criterion for defining a watercourse as a Main River, as per [EA guidance](#), is if there are a significant number of people and/or properties liable to flooding consequences from the watercourse.

The River Lee Navigation, which runs through Fish Island to the east of the site, is designated as a Main River by the EA. Tower Hamlet's [Strategic Flood Risk Assessment \(SFRA\)](#) states that of the four canals in the Borough, the River Lee Navigation is the most vulnerable in terms of overtopping during times of high flows in the lower Lea catchment, and that some overtopping of the embankment was observed in 2000. However, the SFRA also states that all navigational assets (locks, docks, and basins) are all the responsibility of British Waterways, now known as The Canals and Rivers Trust.

The EA's fluvial flood zone mapping shows that the majority of Fish Island is located within Flood Zone 3, including the properties that reported flooding in 4th January event, as shown in *Figure 4-3*. Considering the evidence provided of the high likelihood of the canal overtopping, the area of Fish Island being within Flood Zone 3, the severity of the rainfall event, eyewitness accounts and photographs from the night it is evident that fluvial flooding was the cause of the flooding incident.

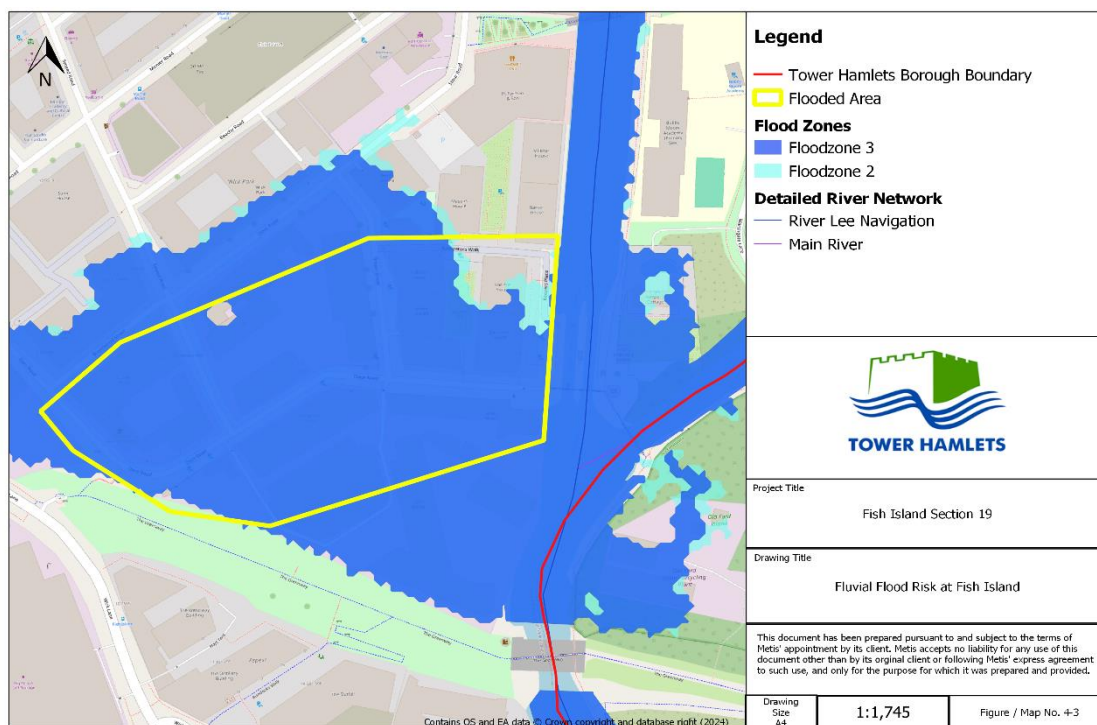


Figure 4-3 Fluvial flood risk zones of the Fish Island area

4.2.4 Groundwater Flood Risk

Groundwater flooding occurs when prolonged rainfall causes the water table to rise. If the water table is too high, surface water is no longer able to infiltrate into the ground, causing flooding. In extreme circumstances, flooding can be caused by groundwater emerging directly from the ground. An area’s risk of groundwater flooding is closely tied to the ground composition and presence of aquifers. Based on the EA’s Areas Susceptible to Groundwater Flooding data, Fish Island lies within the ‘greater than or equal to 50% and less than 75%’ and the “less than 25%” risk classifications as seen in *Figure 4-4*. This classification is comparatively low within the borough. With no reports of groundwater flooding and the risk being low, groundwater flooding can be ruled out as a cause of this flooding event.

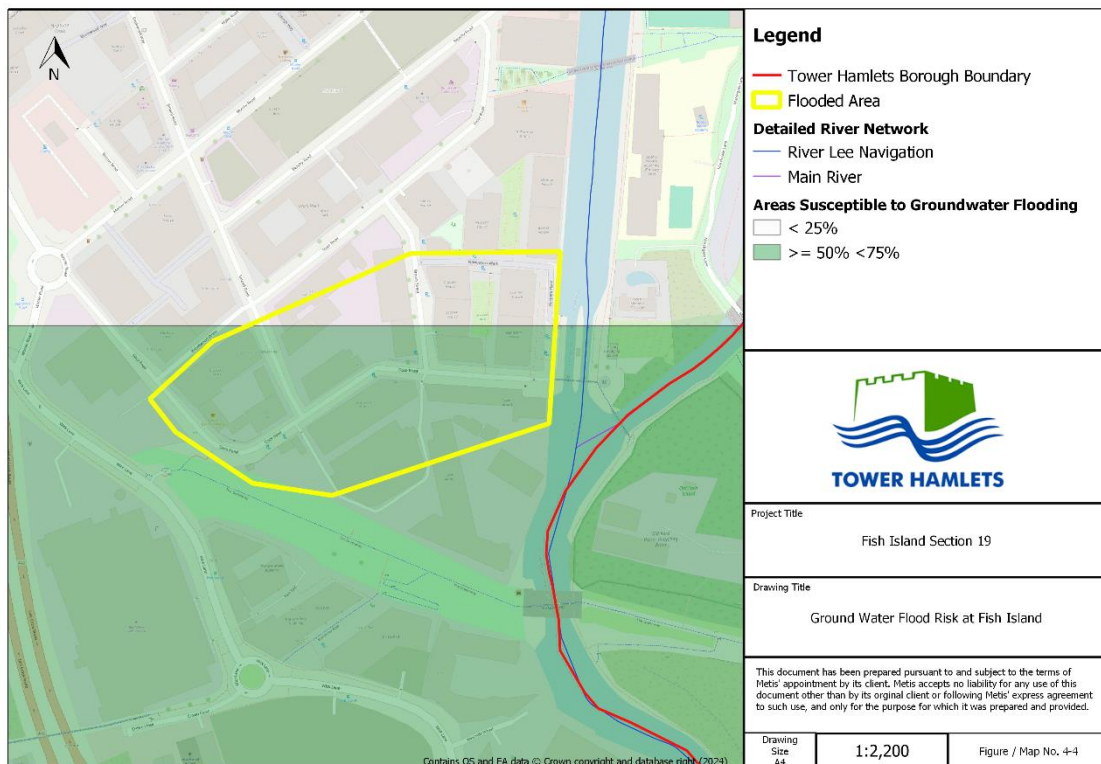


Figure 4-4 Groundwater flood risk zones at Fish Island

4.2.5 Sewer Flood Risk

Sewer flooding can occur when the volume of rainfall exceeds the capacity of the sewer system, resulting in the system surcharging and flooding. A blockage in the sewer system downstream can also cause water to back up within the network, causing flooding. On 4th January, once the sluice gates were opened and the water stopped overtopping the canal the water drained away quickly (it was reported by Tower Hamlets the water had receded by 9am the next morning) which indicates that there were no sewer blockage or capacity issues.

4.2.6 Flooding From Other Sources

There is a potential risk of flooding from reservoirs that could affect this area. Potential reservoirs that could cause flooding include King George V, William Girling, Banbury, Walthamstow No.4, Walthamstow No.5, Warwick East Reservoir, High Maynard, West Warwick, Lockwood, Stoke Newington (West), Stoke Newington (East). However, no reservoir flooding incidents occurred at the time of 4th January flood event. It is therefore considered that this flood event was not caused by reservoir flooding sources.

4.3 Summary of Flooding Sources

Through analysis of the different flood mechanisms and the available evidence and data (including the severity of the rainfall event, flow rates of the River Lee Navigation, and photographs of the event), it can be concluded that the main source of flooding on 4th January 2024 was from fluvial sources. The River Lee Navigation exceeded its hydraulic capacity due to high rainfall caused by Storm Henk and overtopped its banks, flooding the roads to the west of the canal and properties along these roads.

The flooding was caused by the canal overtopping and the sluice gates not being opened in sufficient time to allow the water to flow downstream. EA data suggests if Lea Bridge Sluice gates were operational, they were designed to convey 70 m³/s, however, flows did not exceed 50 m³/s on 4th /5th January 2024. Despite this, the hydraulic capacity of the canal was overwhelmed, which led to the scale of the flooding which occurred in Dace Road, Smead Road and Bream Street. Once the sluice gates were opened, water levels were reported to recede. Multiple eyewitness accounts clearly state the canal was the cause of this flooding and following the sluice gates opening water drained away efficiently, which was evidenced by photographs received from local residents and footage from the London Fire Brigade.

4.4 Actions Taken by Relevant RMAs (and Other Stakeholders)

The actions taken by relevant RMAs before, during, and after the flooding event on 4th January are summarised in *Table 4-1*.

Table 4-1 RMA and stakeholder actions before, during, and after the 4th January 2024 flood event

Authority	Authority Contributing Action to Flooding Incident
Tower Hamlets	<p><u>Before:</u> 04/01/2024 – Tower Hamlets received a yellow rain warning.</p>
	<p><u>During:</u> 05/01/2024 09:00 – The Lead Local Flood Authority (LLFA) and Highways Authority were informed of the flooding. By this point, the water had completely receded.</p>
	<p>05/01/2024 13:00 - The LLFA and Highways Authority team lead attended the site and undertook an initial investigation, however</p>

	<p>at this time the water had receded. (Please see Appendix A for site photos). No gully drainage issues were noted during this site investigation.</p> <p><u>After:</u> Immediately following the flooding Tower Hamlets commissioned this Section 19 report to investigate the cause of the flooding and provide future recommendations to address flood risk in the area.</p> <p>Multiple businesses were affected by the flooding and Tower Hamlets have been in correspondence to aid residents and businesses with the process of applying for funding. (such as the Government payments for communities affected by flooding fund)</p> <p>Tower Hamlets have also provided £67,000 in both community and business recovery grants combined and a total of £5,744 of council tax discounts have been awarded.</p>
EA	<p><u>Before:</u> 02/01/2024 16:08 – In response to forecast rain and impacts from Storm Henk, a Flood Alert was issued for several areas including Lower River Lea from Hoddesdon to Canning Town (62WAF53LowerLee).</p> <p>05/01/2024 03:00 – Flood Alert Removed</p> <p>The debris screen camera network was actively monitored throughout the week and field operatives attended to clear the screens and any potential blockages throughout this period.</p> <p><u>During:</u> 04/01/2024 21:09 – A call was received from a member of the public regarding high river levels north of Hackney Wick and reports of debris on a weir. The Flood Incident Duty Officer passed this information to the customer and Operations Manager at the Canal and Rivers Trust.</p> <p>04/01/2024 21:36 – The EA received the first reports of flooding to property in the Hackney Wick area.</p> <p>04/01/2024 22:09 – The Flood Incident Duty Officer (FIDO) contacted the emergency contact at The Trust. FIDO checked if The Trust were aware of this situation and asked what was being done at Lea Bridge Sluices to maximise flow. The call handler confirmed The Trust were aware of the situation, that people were attending the site, and that it was the sheer volume of water that was causing the problems. The handler said that when there is such a large volume of water and rainfall, there is nothing else that can be done.</p>

	<p><u>After:</u> The Area Director contacted The Trust director to check if any support was required, and was informed that no support was required from the EA.</p> <p>10/01/2024 – EA staff were sent to Walthamstow - Springfield Marina, Coppermill Lane E5 9BL, due to reports of the River Lea bursting its banks at the location on 4th January 2024. There was no evidence of flooded properties, just some residual water in marshes adjacent to the Lee Navigation.</p> <p>The EA have invited Tower Hamlets to collaborate on EA and Hackney council's engagement in Hackney Wick and we have also offered engagement support through the Lee Partnership Group.</p>
TWUL	<p><u>Before</u> No actions taken no sewer issues</p> <p><u>During</u> No actions taken no sewer issues</p> <p><u>After</u> No actions taken no sewer issues</p>
Canals and Rivers Trust	<p><u>Before</u> 2021 – Lea Bridge Sluice D rendered inoperable due to twisted frame. Sluice C starting to demonstrate failures and was locked off (could still be used in manual mode).</p> <p>December 2021 – Produced the Water Control Manual for London Waterways East - River Lea, River Stort, and Bow Back River Navigations.</p> <p>August 2022 – Produced the Emergency Response Management Document which laid out the actions required to ensure The Trust had planned its response to emergency situations.</p> <p><u>During</u> 04/01/2024 10:35 – Lea Bridge Sluices – Sluice B Failure alarm activated. <i>(The Lea Bridge automatic sluices are set to maintain the level in the pound (5.800m AOD)).</i></p> <p>04/01/2024 10:37 – Lea Bridge Sluices – Sluice B Failure alarm acknowledged, Mechanical & Electrical (M&E) supervisor attended site, left sluice B at 5% open in manual operation.</p> <p>04/01/2024 12:40 – AMCO (security alarm monitoring company) called, call out arranged for the morning of 05/01.</p> <p>04/01/2024 19:28 – Lea Bridge Sluices – High alarm activated. The High (Hi) alarm is set to alert The Trust staff that conditions are changing, and that the level is rising above our navigational</p>

	<p>limits. Whilst no physical action is normally taken locally at this stage (this is covered by the automated SCADA system), additional remote monitoring will start: staff can attend site if concerns are raised.</p> <p>04/01/2024 19:29 – Lea Bridge Sluices – High alarm acknowledged.</p> <p>04/01/2024 19:43 – Lea Bridge Sluices – High High alarm activated. The High High alarm alerts the team that conditions are continuing to deteriorate, and to check that the automated system is working. Teams will start visiting site to check for debris and blockages.</p> <p>04/01/2024 19:44 – Lea Bridge Sluices – High High alarm acknowledged.</p> <p>04/01/2024 21:25 – Reports of overtopping at Old Ford Lock.</p> <p>04/01/2024 21:30 – Duty Supervisor makes decision to attend Lea Bridge Sluices / Old Ford lock.</p> <p>04/01/2024 23:10 – Duty Supervisor arrives at Lea Bridge Sluices and opens sluice C manually.</p> <p>05/01/2024 00:30 – Duty Supervisor arrives at Old Ford Lock. 05/01/2024 01:00 – Duty Supervisor is escorted (due to high water levels) to Old Ford Lock by London Fire Brigade (LFB) and opens the downstream lock gate.</p> <p><u>After</u> Canal levels (Old Ford Lock Upstream Canal Level, Lea Bridge Sluice Local River level) and actions taken were submitted to Tower Hamlets as evidence for Section 19 investigation.</p> <p>Staff were present at the lock gate for community engagement purposes in the days following the event.</p> <p>The Trust confirms they are in early planning stages of project to refurbish the sluice system at Lea Bridge and bring all 4 sluices back into automated mode.</p>
London Fire Brigade	<p><u>Before</u> No known actions taken</p>
	<p><u>During</u> 04/01/2024 22:16 – Call made to LFB.</p> <p>04/01/2024 22:24 – LFB arrive to site.</p>

	05/01/2024 01:50 – Incident categorised as under control.
	05/01/2024 11:11 – Incident closed.
	<u>After</u> Report submitted for inclusion in Section 19 with photographs of flooding event and brief report on key timings.

5. Conclusion and Recommendations

5.1 Conclusion

This Section 19 investigation was triggered by Tower Hamlets for Fish Island following a flood event on 4th January 2024, which resulted in internal and external flooding of multiple properties surrounding the River Lee Navigation. Rainfall began in the evening of 4th January during Storm Henk. This investigation has assessed the source of flooding and provided a summary of the actions taken by the relevant RMAs before, during and, and after the flood event.

The data collection and investigation has established that the site is at risk from groundwater, surface water, fluvial, and artificial sources of flooding. Based on the flooding reports, historic flooding incidents, photographs taken at the site, and eyewitness accounts, it was established that this flood event was likely caused by fluvial flooding. The River Lee Navigation exceeded its hydraulic capacity and overtopped its banks. If the sluices, which were not opened until 2 hours after initial flooding reports were made, were opened sooner the impact of flooding could have been significantly reduced or avoided. This is evidenced from EA data that if all Lea Bridge Sluice gates were operational, they were designed to convey 70 m³/s. According to EA telemetry data from Lea Bridge Road gauging station, flows did not exceed 50 m³/s on 4th /5th January 2024.

In order to reduce the risk of another flood incident occurring in Fish Island, several short-, medium-, and long-term recommendations have been proposed, which are outlined in *Section 5.2*.

5.2 Recommendations

Short term recommendations are as follows:

- The Trust to continue with project to refurbish the sluice system at Lea bridge and bring all 4 sluices back into automated mode. At present, the on-going issues with sluice malfunctions are causing a higher risk of flooding in the area; this should be addressed as a priority as repair / maintenance of these sluices is crucial to bring back the full capacity of the canal.
- Tower Hamlets to increase monitoring of potential flood sites, particularly during times of weather alerts.
- The Trust to ensure that provision is in place during times of weather warnings to ensure that canal sluice gates can be opened in a suitable timeframe. There was a 2-hour time difference between receiving flooding reports at the canal and the sluice gates being opened during this event; a quicker response would have led to water draining away sooner, potentially avoiding, or lessening the impact of this flood event.
- The Trust should improve communication channels between themselves and the London Fire Brigade to ensure that the London Fire Brigade are able to open the sluice gates themselves in emergency situations.
- The EA should continue publicising the new flood warning system covering the area and encourage residents to sign up for this service.

- Increased public awareness of flooding should be promoted between Tower Hamlets, the EA, and local residents. Residents should be aware of who to contact in the event of a flood, as well as the resources available and measures they can take themselves to mitigate flood risk. This information can be contained within Tower Hamlets webpages.
- The EA and The Trust should ensure clarity on the agreement on operation and management of the River Lee Navigation and its assets and better collaborate in emergency situations.

Medium term recommendations are as follows:

- Improved formal communication between the EA, Tower Hamlets, and the Trust, to ensure that all parties are aware of the procedures, responsibilities, and response timeframes for when the high high alarm goes off. Tower Hamlet's should have an involvement in any updates to the Trusts Water Control Manual - London East (2021), and the Trust's Emergency Response Standard (2022) should also be shared.
- The Trust to undertake a detailed hydrological model of the canals in this area so that more comprehensive management of flows could be undertaken.
- Tower Hamlets and the EA should continue to work together and identify the potential for and invest in flood alleviation schemes within the Fish Island and Hackney Wick area. For example, implementing highway SuDS or increasing property flood resilience could be explored as opportunities to reduce local flood risk.
- Tower Hamlets should consider the implementation of SuDS features throughout the catchment, to provide resilience and decrease the pressure on the watercourse in flood events. SuDS would not have prevented the flooding during this event due to the high volumes of overtopping water over a short period. However, implementing highway SuDS across the catchment will increase resilience in the area to future surface water flooding events.
- Tower Hamlets should update strategic documents. These include:
 - Surface Water Management Plan (SWMP) – 2011
 - Local Flood Risk Management Strategy (LFRMS) – 2022
 - Strategic Flood Risk Assessment (SFRA) Level 1 – 2017
 - Strategic Flood Risk Assessment (SFRA) Level 2 – 2012

Long term recommendations are as follows

- Tower Hamlets should investigate planning proposals in the area, as development has the potential to exacerbate flooding if not designed and delivered in line with local and national planning policy.
 - Consideration could be given to the location of the Creative Enterprise Zone, to lessen the impacts of flooding on local businesses.
 - Developments should follow relevant guidance on Finished Floor Levels (FFLs), as provided by the [Environment Agency](#).
 - Tower Hamlets should review the suitability of basements in this area, and consider the implementation of relevant planning policy to manage this.

Appendix A – Photos received from Tower Hamlets following site visit





