

Section 19 Flood Investigation

Edinburgh Avenue - 26th August 2015 flood event

Slough Borough Council

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This document has 16 pages including the cover.

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Investigation details

Location of flood event:	Edinburgh Avenue and surrounding area
Date of flood event:	26 th August 2015
Date flood event was reported to Slough Borough Council:	26 th August 2015
Trigger for S19 investigation	Edinburgh Road Closed
Investigating officer (s):	Ian Sivyer
Date of investigation:	2 nd November 2015

Outcome of the investigation

Sources of flooding:	Heavy rainfall fell on August 26 th 2015. Surface Water flooding.
Cause and pathway of flood:	Heavy rainfall on 26 th August 2015 caused rapid inundation of Edinburgh Avenue and Farnburn Avenue where the speed and extent of flooding was exacerbated by: <ul style="list-style-type: none"> • A failed Thames Water pump station. • A collapsed storm overflow pipe caused by recent utility works. • Blocked highway drains / gullies. • And a high volume of surface water runoff from nearby buildings and carparks.
Key solutions:	Fix Thames Water pump station (this has been actioned). Reinstate 300mm storm overflow pipe (at the time of writing a Slough Borough Council has put a commission order in to fix the asset). Clear blocked highway drains (Slough Borough Council has cleared most drains / gullies). Educate nearby landowners about their responsibilities.
Risk Management Authorities (RMAs):	Slough Borough Council Environment Agency Thames Water
Number of proposed actions to be completed by RMAs:	8
Number of actions complete at the time of issue (November 2015)	3

1. Introduction

Bursts of heavy rainfall rapidly caused surface water flooding across Slough on August 26th 2015. At the time of writing no reports of internal property flooding had been received but Edinburgh Avenue was closed and external flooding is known to have occurred on Farnburn Avenue.

This report covers a Section 19 flood investigation for the flooding that occurred on Edinburgh Avenue and the surrounding roads due to surface water flooding on 26th August 2015 only.

1.1. Section 19 investigation requirement

Under the Flood and Water Management Act 2010 the Lead Local Flood Authority (LLFA) must, to the extent that it considers it necessary or appropriate, undertake an investigation upon becoming aware of a flood incident within its area.

A Lead Local Flood Authority is defined under Section 6(7) of the Flood and Water Management Act as being the unitary authority for that area, or if there is no unitary authority, the county council for the area. Section 19(1) requires that the lead local flood authority must 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.

Section 19(2) requires that the LLFA publishes the results of its investigation and notify the relevant risk management authorities accordingly. The risk management authorities are discussed in Chapter 3.

1.2. Trigger for the investigation

The approach taken by Slough Borough Council (SBC) is that it is necessary and appropriate to investigate a flood event under Section 19(2) if one of the following has occurred:

- Internal property flooding.
- Flooding of transport infrastructure sufficient to require closure or diversion of traffic.
- Flooding of a utility plant resulting in loss of service to customers.

This Section 19 investigation was triggered because Edinburgh Avenue was closed and required traffic to be diverted. At the time of writing no reports of internal property flooding were made, but external flooding is known to have occurred on Farnburn Avenue and large puddles formed on other surrounding roads.

1.3. Site location and catchment characteristics

The indicative location of the Section 19 report is shown in Figure 1-1 below. It predominantly covers the eastern edge of the SEGRO trading estate, but also includes Farnburn Avenue.

The investigation is outside of the fluvial floodplain (flood zone 2) however the updated Flood Map for Surface Water (uFMfSW) predicts that for a 1 in 30 year return period storm Edinburgh Avenue and Farnburn Avenue may experience surface water flooding.

Whilst the study area is outside of the fluvial flood zone, the Edinburgh Avenue surface water sewer discharges into the Salt Hill catchment via a decommissioned Thames Water oil interceptor (which has been renamed by Thames Water as a balancing pond).

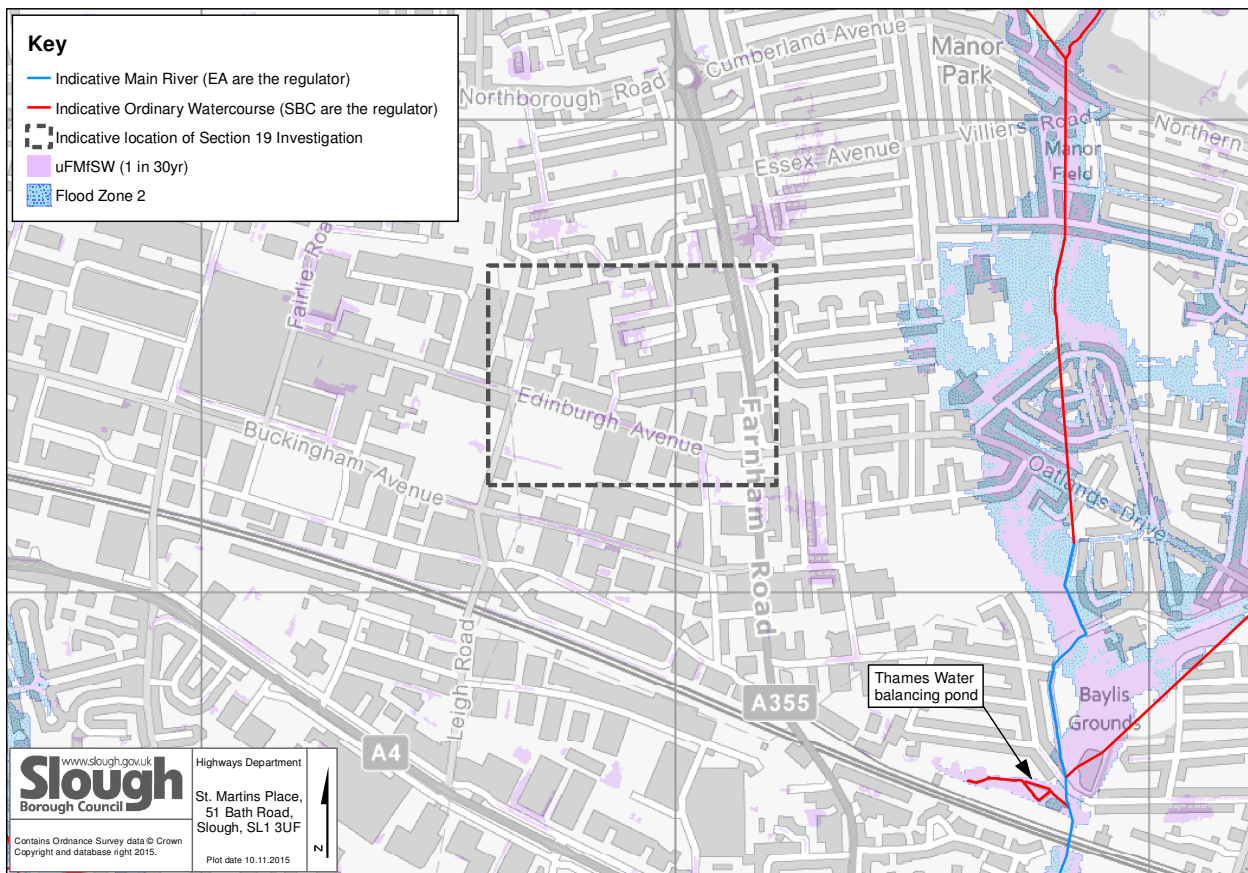


Figure 1-1 Indicative location of Section 19 report

1.4. History of flooding

Detailed flood records are not available for Edinburgh Avenue, however, this stretch of road is known to have flooded in the past.

1.5. Terminology

In this document surface water flooding refers to flooding that “happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead” (Environment Agency, n.d.).

2. Analysis of the 26th August 2015 flood event

2.1. Severity of the rainfall event

On August 26th 2015 heavy rainfall fell across Berkshire. The storm was characterised by short, sharp intense bursts of rainfall which caused flash flooding across Slough. At the time of writing limited data was available to predict the return period of the event. However, unconfirmed reports indicate a total of 48mm of rainfall was recorded over 24 hours at a gauge in Heathrow (ukweatherworld, n.d.). And 20mm was recorded in Wooburn over a similar duration¹. Whilst the return period of the event has not been established, this data indicates that the intensity of rainfall varied across the catchment.

2.2. What happened?

Heavy rainfall on 26th August 2015 caused rapid inundation of Edinburgh Avenue and Farnburn Avenue where the speed and extent of flooding was exacerbated by:

- A failed Thames Water pump station.
- A collapsed Thames Water storm overflow pipe caused by recent utility works.
- Blocked highway drains / gullies.
- And a high volume of surface water runoff from nearby buildings and car parks.

Surface water flood risk modelling would need to be undertaken to understand if flooding would have occurred without these issues.

Thames Water pump station and assets

A low level surface water sewer runs from Birch Avenue, past Farnburn Avenue and connects to a high level sewer at the junction of Perth Avenue and Edinburgh Avenue. The low level sewer collects water from a number of sub-catchments, with the furthest manhole about 1.5 km away in Farnham.

Thames Water own and operate the dry weather flow pump station that lifts water up from the low level sewer to the high level sewer. When the pump is operational the low level sewer acts as a tank sewer. If the pump is not operation the low level sewer fills with water and storage capacity is lost. The area is known to be at risk of flooding so additional capacity was added to the low level sewer by building an extension which runs underneath Edinburgh Avenue. Appendix A provides the indicative location of all key assets.

On September 8th 2015 Slough Borough Council visited Edinburgh Avenue to undertake a detailed inspection and found that the Thames Water pump station was not working. See photographs overleaf. If the Thames Water pump station had been operational the speed of inundation at Edinburgh Avenue would have been slower and the extent of flooding would have been less. It later transpired that Thames Water were not aware that the pump had failed² indicating that the alarm warning of pump failure does not work.

The pump is a critical asset and must be operational. Thames Water have since fixed the pump but the alarm must also be fixed to ensure that the pump remains operational.

¹ 20mm of rainfall was recorded at a Slough Borough Council home weather station.

² Thames Water operations team stated that the pump was operational at the time of the flood (call centre reference number 5110 694 5978).



Figure 2-1 SBC visiting the Thames Water pump station



Figure 2-2 Pump station chamber full of water



Figure 2-3 Rod dipped into the chamber to demonstrate depth

In addition to the flooding on Edinburgh Avenue, water was reported to be flowing out of the low level sewer via a chamber adjacent to Farnburn Avenue. This combined with surface water runoff from the north east corner of the SEGRO estate and flowed into a low spot on Farnburn Avenue. If the Thames Water pump station had been operational the volume of water flowing onto Farnburn Avenue would have been less.

Collapsed storm overflow

After the event it was found that a 300mm storm overflow pipe connected to the high level sewer had collapsed. The obstruction was probably caused by utility works that took place over the top of the pipe. Prior to the utility works taking place the 300mm storm over flow pipe was known to be clear and flowing freely.



Figure 2-4 SBC inspecting storm overflow on September 7th



Figure 2-5 Blocked 300mm storm over flow pipe



Figure 2-6 Location of blockage, indicated by the white cross (which follows the line of recent utility works)

If the 300mm storm overflow pipe had not been blocked storm flows would have been conveyed into the Salthill catchment quicker and the extent of flooding would have been reduced.

Slough Borough Council has commissioned emergency works to return the storm overflow pipe to its original condition, the cost of which will be recharged to the company that caused the damage.

Highway drains / gullies

Following the flood event Slough Borough Council sent the gully crew to investigate the highway gullies on Edinburgh Avenue and on Farnburn Avenue. The crew checked 20 gullies on Edinburgh Avenue and found that 7 were blocked, 1 was not working, and 1 was filled with Tarmac. The blockages were exacerbated by loose bark chippings which washed down from planted areas traversing Edinburgh Avenue. Landowners should be encouraged to swap the loose bark chippings for other less buoyant material. Slough Borough Council has since cleared all of the blockages, however civil works will need to be undertaken to remove the Tarmac. It is unknown why tarmac is in the gully pot.

Highway gullies on Farnburn Avenue drain to soakaways. Soakaways are located to the east and new soakaways were installed to the west. The new soakaways were installed to alleviate the known surface water flooding issues.

The most westerly gully was connected to the Thames Water low level sewer, however this connection has since been closed to reduce the risk of flood water surcharging from the sewer onto Farnburn Road. All of the gullies along Farnburn Avenue should therefore be connected to soakaways only. However anecdotal evidence from a resident living on the western side indicates that during the event water poured up and out from a highway drain. For this to have occurred the drain would need to have been connected to the Thames Water low level sewer. Slough Borough Council will check the connections on Farnburn Avenue to ensure all highway gullies are connected to soakaways. Anecdotal evidence from a resident living on the eastern side of Farnburn Road indicates that despite taking some time to drain the soakaways did work.

Surface water runoff from adjacent estate

Surface water runoff was observed flowing from buildings and car parks adjacent to Edinburgh Avenue by Slough Borough Council staff at the time of the event. Runoff should be reduced to greenfield runoff rates before flowing onto the highway. Further calculations could be undertaken to ensure runoff is being correctly managed on the estate.

3. Responsible authorities and landowners

3.1. Identification of relevant RMAs

The following Risk Management Authorities (RMAs) had risk management functions:

- Lead Local Flood Authority (Slough Borough Council)
- The highways authority (Slough Borough Council)
- Thames Water

Lead Local Flood Authority

Lead Local Flood Authorities (LLFAs) are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas. As part of this, the LLFA liaises regularly with the Environment Agency as well as the other RMAs to ensure that all sources of flooding in their area are being properly managed, and filling in any gaps in responsibility where the relevant RMA is unclear. They need to produce reports when there is a reported flood, and they have to keep a register of their flood management assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses.

Highways authority

Slough Borough Council is the acting highways authority and is responsible for managing flooding on the highways.

Thames Water

Thames Water manages surface water and foul water sewers. In the study area Thames Water is also responsible for managing a dry weather flow pumping station.

3.2. Landowners

In addition to RMAs landowners are also responsible for managing risk. In particular residents have a responsibility to take measures to protect themselves and their property from flooding.

3.3. Flood risk management functions

Each RMA must perform the relevant risk management functions.

With regard to flood risk Slough Borough Council must:

1. Coordinate emergency support with their own functions
2. Deal with emergencies on 'non main rivers'
3. Coordinate emergency support from the voluntary sector
4. Manage public health issues
5. Provide advice and management of public health
6. Provide support and advice to individuals

Thames Water must:

1. Attend emergencies relating to their services.
2. Assess and manage risk of service failure.
3. Assist with recovery process, that is, water utilities manage public health considerations.

3.4. Flood risk management proposed actions

The proposed actions to be exercised by the relevant RMAs are listed in the table below.

Table 3-1 Flood risk management proposed actions

Risk management authority	Activity date	Proposed action	Action exercised? (Yes / No)
Slough Borough Council	September 7 th & 8 th 2015	Investigate drainage assets on Edinburgh Avenue and Farnburn Avenue Drainage assets investigated. Discovered multiple failed assets.	Yes
Slough Borough Council	September 2015	Clear blocked gullies on Edinburgh Avenue and Farnburn Road	Yes
Slough Borough Council	Winter 2015/16	Clear or decommission tarmac filled gully pot	No
Slough Borough Council	Winter 2015/16	Re-commission 300mm storm overflow pipe	No (but commission order has been issued to undertake works)
Slough Borough Council	Winter 2015/16	Check gullies on Farnburn Avenue are not connected to the Thames Water low level sewer	No
Slough Borough Council	Winter 2015/16	Encourage landowners adjacent to Edinburgh Avenue to not use chipped bark in planted areas Material that does not float during a flood event should be used	No
Thames Water	September 2015	Fix dry weather flow pump station on the corner of Perth Avenue and Edinburgh Avenue	Yes
Thames Water	As soon as possible	Investigate dry weather flow pump alarm system	No

4. Investigation outcome

The outcomes of the investigation are summarised in Table 4-1 below and are repeated on the front page of this document.

Table 4-1 Investigation outcome

Sources of flooding:	Heavy rainfall fell on August 26 th 2015. Surface Water flooding.
Cause and pathway of flood:	Heavy rainfall on 26 th August 2015 caused rapid inundation of Edinburgh Avenue and Farnburn Avenue where the speed and extent of flooding was exacerbated by: <ul style="list-style-type: none"> • A failed Thames Water pump station. • A collapsed storm overflow pipe caused by recent utility works. • Blocked highway drains / gullies. • And a high volume of surface water runoff from nearby buildings and carparks.
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Risk Management Authorities (RMAs):	Slough Borough Council Environment Agency Thames Water
Number of proposed actions to be completed by RMAs:	8
Number of actions complete at the time of issue (November 2015)	3

5. References

(n.d.). Retrieved from Environment Agency: <http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2>

(n.d.). Retrieved from ukweatherworld:
<http://www.ukweatherworld.co.uk/forum/index.php?/topic/109151-26th-august-2015-loftus-samos-221c-heathrow-478mm/>

Appendix A. Figures

Key

- Indicative location of dry weather pump station
- Indicative location of low level sewer extension
- Indicative location of low level sewer
- Indicative location of high level sewer
- Indicative location of 300mm storm overflow pipe

Runoff from estate

Water overflowed from low level sewer chamber onto Farnburn Avenue

Gullies on Farnburn Avenue should only be connected to soakaways

Anecdotal evidence indicates that the soakaways worked on the eastern side of Farnburn Avenue

Failed thames water pump station prevented the low level sewer acting as a tank sewer

300mm storm overflow pipe sheared off due to utility works

