



Flood Investigation Report

**Knowle, Dorridge, Bentley Heath,
Monkspath and Hockley Heath**

25th June 2021

As Lead Local Flood Authority, Solihull Metropolitan Borough Council carries out investigations into flooding incidents.

During such investigations, the LLFA will:

- **Identify and explain the likely cause(s) of flooding;**
- **Identify which authorities, communities and individuals have relevant flood risk management powers and responsibilities;**
- **Provide recommendations for each of those authorities, communities and individuals; and**
- **Outline whether those authorities, communities or individuals have or will exercise their powers or responsibilities in response to the flooding incident.**

The LLFA cannot:

- **Resolve the flooding issues or provide designed solutions; or**
- **Force Authorities to undertake any of the recommended actions.**

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1 Introduction

- 1.1. On 25 June 2021 parts of Knowle, Dorridge, Bentley Heath, Monkspath and Hockley Heath experienced a period of high intensity rainfall with 472 properties being affected by flooding.
- 1.2. As the Lead Local Flood Authority (LLFA) for Solihull, the Council's Flood Risk Management Team has investigated the events of 25 June 2021 and has produced this report in accordance with Section 19 of the Flood and Water Management Act 2010.

What is a Section 19 investigation?

In accordance with Section 19 of the Flood and Water Management Act 2010:

(1) 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.

(2) Where an authority carries out an investigation under subsection (1) it must—

(a) publish the results of its investigation, and

(b) notify any relevant risk management authorities.

- 1.3. Both Solihull Council's Preliminary Flood Risk Assessment (PFRA) and Local Flood Risk Management Strategy (LFRMS) define flood events considered to have 'Locally Significant Harmful Consequences' as:

- *Internal flooding to 5 or more residential properties, or;*
- *Flooding to 2 or more business properties, or;*
- *Flooding to 1 or more items of critical infrastructure, or a transport link impassable for in excess of 10 hours.*

2 What happened on 25 June 2021?

- 2.1. On Friday 25 June, parts of Knowle, Dorridge, Bentley Heath, Monkspath and Hockley Heath experienced a period of high intensity rainfall between approximately 2030hrs and 2130hrs. This led to a rapid increase and volume of surface water and associated watercourse flooding.
- 2.2. The rainfall developed 'in situ' locally during the evening, rather than following a normal tracked path. Rainfall Radar images that show the rainfall event are given in Appendix A.
- 2.3. Photos and videos shared at the time by those affected suggested that an extreme rainfall event had occurred. Common phrases such as "we've never seen anything like it" were heard by officers when knocking on doors to check on people's health and welfare after the event.
- 2.4. Residents of 209 properties mainly across Knowle, Dorridge, Bentley Heath, Monkspath and Hockley Heath reported internal property flooding. In the worst cases, water crossed the threshold to such a depth that residents were forced to evacuate their homes. As the flood waters rose some residents were left to live upstairs or seek alternative accommodation. A further 263 properties saw water entering either their garages or other external areas, requiring a clean-up.
- 2.5. Highways England closed the M42 motorway between Junction 5 and the M40 and the main A3400 Stratford Road through Hockley Heath was impassable, along with key routes in and out of Knowle, Dorridge and Bentley Heath. The railway line through Dorridge was flooded, with Network Rail closing the level crossing at Bentley Heath until August due to water damage.
- 2.6. In some areas, such was the flow and depth of water that on occasion it was unable to enter the surface water sewer network. When it could, the networks quickly flooded or were unable to discharge into already flooded watercourses. Extreme flow paths were seen moving across streets, entering the front door of a row of properties before passing through and continuing out of the back doors before repeating the process on the next row.

3 Our Investigation

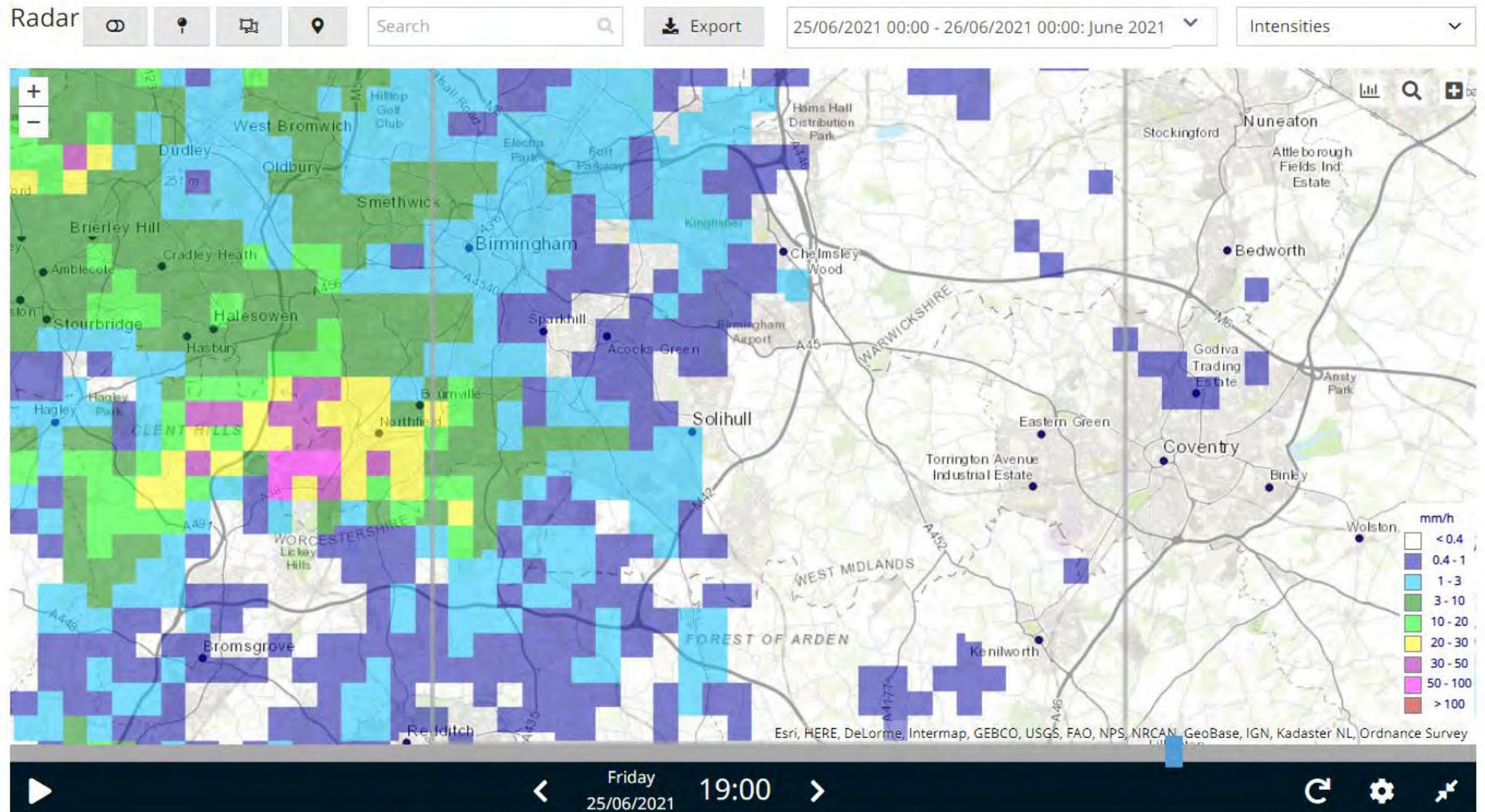
- 3.1. When flood events, such as on the afternoon of the 25 June occur, it is the responsibility of the Lead Local Flood Authority for the area to carry out an investigation where it considers it necessary or appropriate. Within Solihull, the Council's Flood Risk Management team carries out the function of the Lead Local Flood Authority, under the Flood and Water Management Act 2010.
- 3.2. The Lead Local Flood Authority must investigate which authorities have relevant flood risk management functions and whether each of those authorities has exercised, or is proposing to exercise, those functions in response to the flood. When such an investigation is carried out, the Lead Local Flood Authority must publish the results of its investigation and notify any relevant risk management authorities, such as the Environment Agency or Severn Trent Water as the water authority.
- 3.3. Following the flooding that occurred on 25 June, the Council's Flood Risk Management Team have carried out investigations with help from partners such as Severn Trent Water and Network Rail at nine locations across the Borough, as listed below. Reports for each location can be found in Appendices B – J.

- Appendix B – Longdon Road Area (area bounded by Warwick Road, Lodge Road, Station Road, Widney Road, Tilehouse Green Lane and Lady Byron Lane)
- Appendix C – Willowbank Road Area (area bounded by Browns Lane, Tilehouse Green Lane and Widney Road)
- Appendix D – Four Ashes Road Triangle (area bounded by Four Ashes Road, Mill Lane and Widney Road)
- Appendix E - Chadworth Avenue Area (area bounded by Four Ashes Road, Mill Lane, Rodborough Road and the railway line)
- Appendix F - Grange Road Area (area bounded by Rodborough Road, Earlswood Road, Grange Road and the railway line)
- Appendix G - Blue Lake Road Area (area bounded by Station Road, Grove Road, Knowle Wood Road, Blue Lake Road, Darley Green Road/Norton Green Lane and the railway line)
- Appendix H - Poplar Road Area (area bounded by Mill Lane, Widney Road, Station Road and the railway line)
- Appendix I - Stapenhall Road and Talton Close, Monkspath
- Appendix J - Stratford Road, Hockley Heath

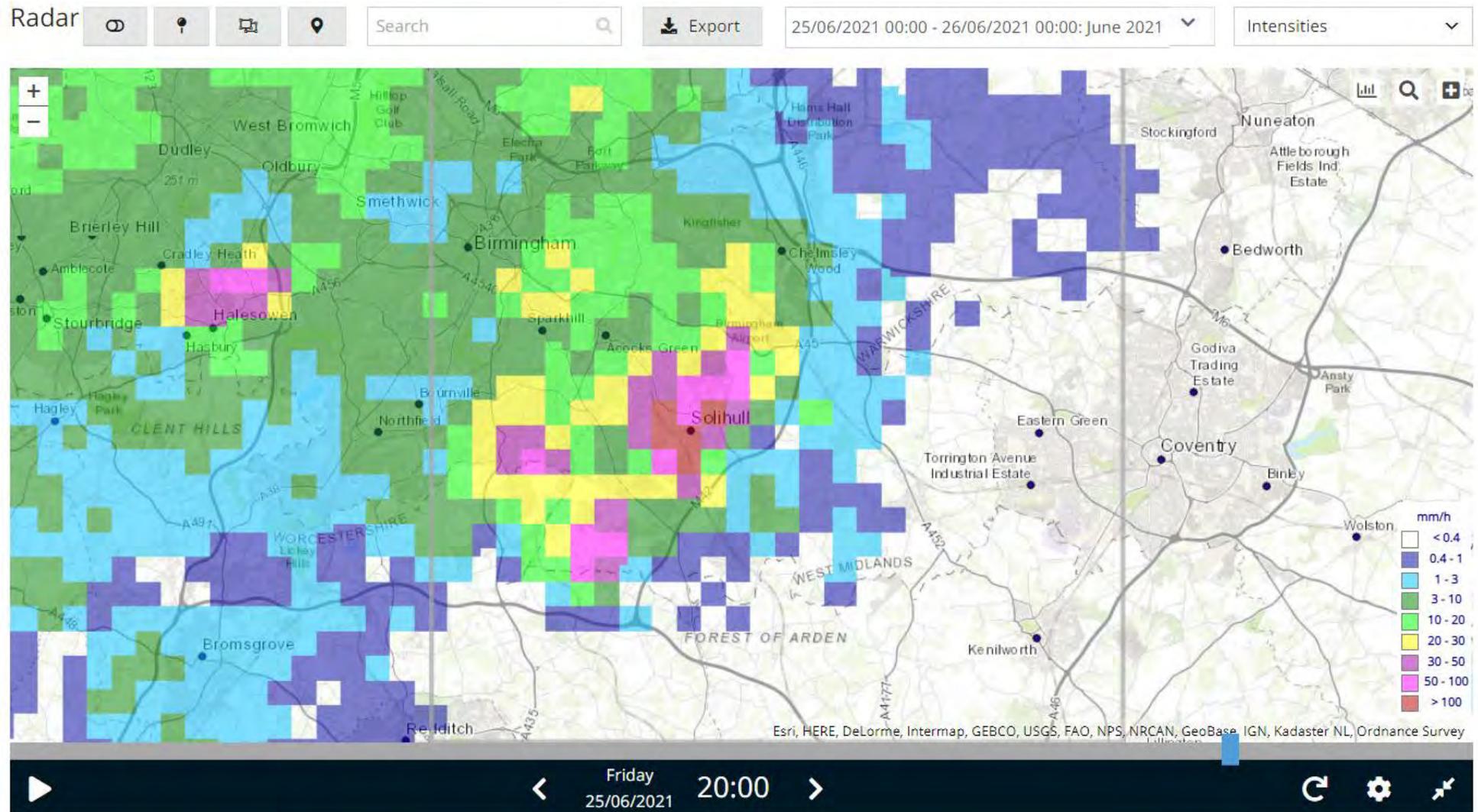
4 Summary & Conclusions

- 4.1 As the LLFA, the Council's Flood Risk Management Team has investigated the events of 25 June 2021 and has produced this report in accordance with Section 19 of the Flood and Water Management Act 2010.
- 4.2 This investigation has determined that on 25 June 2021 a period of high intensity rainfall was experienced. At its peak, nearly a month's rain fell in one hour.
- 4.3 209 reports of internal property flooding were received mainly across Knowle, Dorridge, Bentley Heath, Monkspath and Hockley Heath, with some residents being forced to leave their homes and live in alternative accommodation.
- 4.4 The vast majority of the properties that were affected on 25 June are shown to be at risk from flooding on mapping produced by the Environment Agency.
- 4.5 Nine locations have been investigated in more detail to identify the causes and mechanisms of the flooding. Work has included condition surveys of watercourses, culverts, attenuation features, surface water sewer and highway drainage systems, with follow up work being arranged on the occasions where it has been found necessary.
- 4.6 Following the investigation work that has been undertaken at the nine locations, an action plan has been produced, which is included in Appendix K.

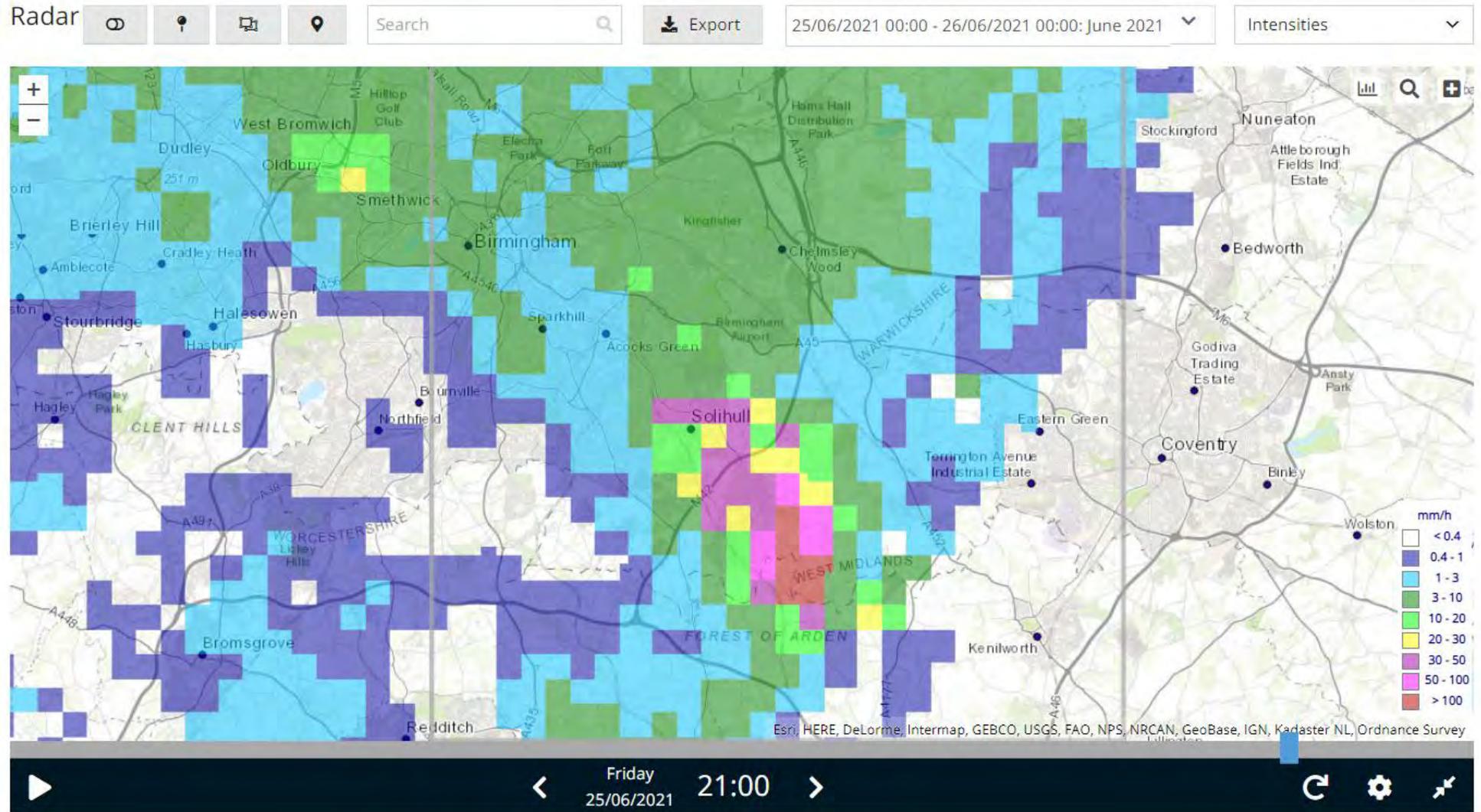
Appendix A – Rainfall Radar Images



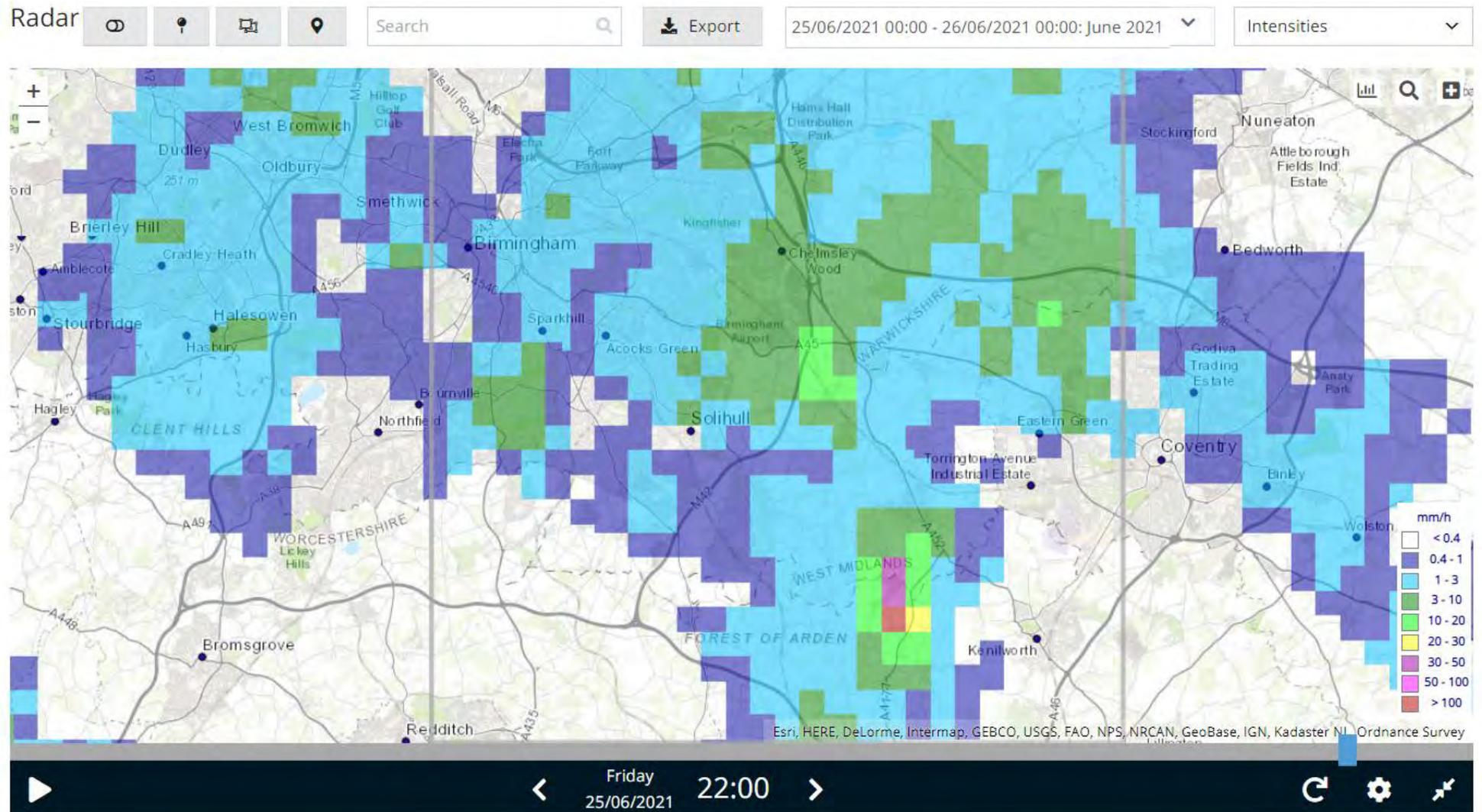
Appendix A – Rainfall Radar Images



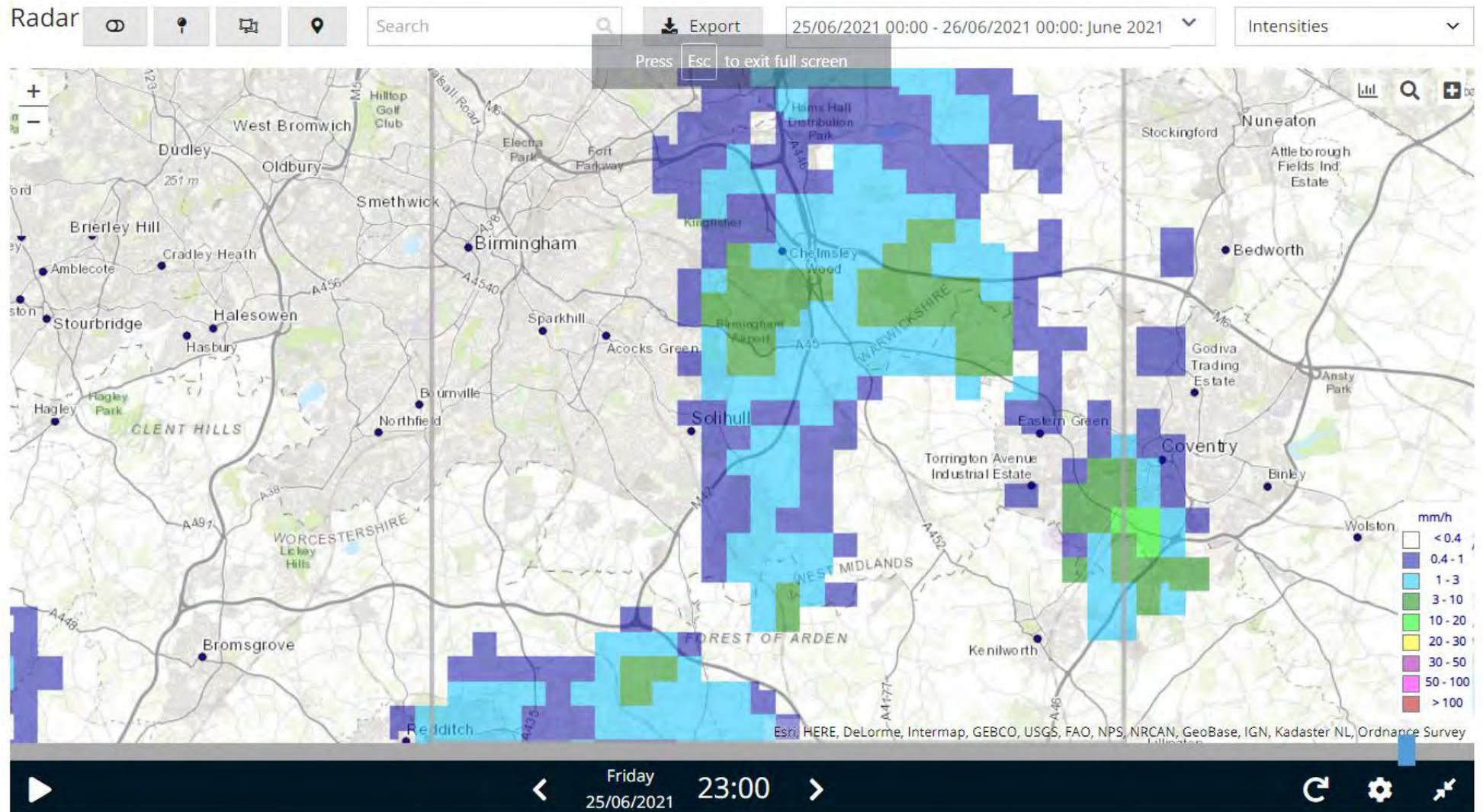
Appendix A – Rainfall Radar Images



Appendix A – Rainfall Radar Images



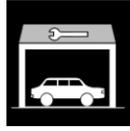
Appendix A – Rainfall Radar Images



Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Longdon Road Area

Who or what was affected?

		
16 properties internally flooded	28 properties externally flooded	5 garages flooded

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✓	✓	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water and foul water networks became overloaded.	Main Rivers were unable to cope with the amount of water flowing into them	Watercourses were unable to cope with the amount of water flowing into them	No other source was identified.

Location Plan



Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

How does the existing system work, what does existing mapping show us and what happened on 25th June?

A network of Severn Trent Water surface water sewers exist to drain properties and the local highway network on the Hallcroft Way, Landor Road and Purnells Way estates. The network discharges at various point along Purnell's Brook, which runs in a north easterly direction through Lodge Park before passing through a culvert under Longdon Road. A separate surface water system serving Lodge Road, Dell Farm Close and parts of Longdon Road converges with this system at the culvert on Longdon Road, as does a surface water network serving Tilehouse Green Lane and the western length of Longdon Road.

Foul (used) water from properties is kept separate and taken away by a foul water sewer system.

<u>Description of area shown to be at risk</u>	<u>What happened on 25th June?</u>
1. Flood risk on Tilehouse Green Lane	Reports were received of internal flooding to multiple properties and garages along the Tilehouse Green Lane and of the highway being impassable either as a result of surface water being unable to enter the sewer network or the sewer network flooding.
2. Surface water flowpaths across the Hallcroft Way, Landor Road and Purnells Way estates	Properties located within the surface water flow paths experienced internal flooding. In addition, sewer outfalls in Purnell's Brook were submerged due to rising water levels which caused water to back up throughout the system and flood the highway network.
3. Flood risk associated with the watercourse near Longdon Road and Newton Road.	Properties near to the culvert reported internal flooding, primarily due to surface water flooding from the highway due to water being unable to enter Purnell's Brook.

Location: Longdon Road Area

Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
Condition of the ordinary watercourse section of Purnell's Brook between Landor Road and Longdon Road.	The ordinary watercourse has been inspected following the flooding and minor quantities of debris removed.	Solihull Council	Complete
Condition of the main river section of Purnell's Brook between Longdon Road and Warwick Road	The Environment Agency have been asked to inspect this length of watercourse as it falls under their responsibility for consenting and enforcement. Where necessary, the Environment Agency will write to relevant landowners to remind them of their riparian roles and responsibilities.	Environment Agency	Ongoing
Condition of culverts adjacent to Earlswood Road	Site inspections have been carried out and maintenance work identified to assist with the free flow of water. The watercourses connecting into these culverts have also been dug out and cleared of debris.	Lead Local Flood Authority/ Local Highway Authority	Complete
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
That the grass on the open space area next to Hillmorton Road is left too long and that when it is cut it is blown into the road causing the gullies to block.	The Streetcare team have confirmed that the grass is cut every 12 working days and the road is swept every 6 weeks.	Solihull Council	Complete

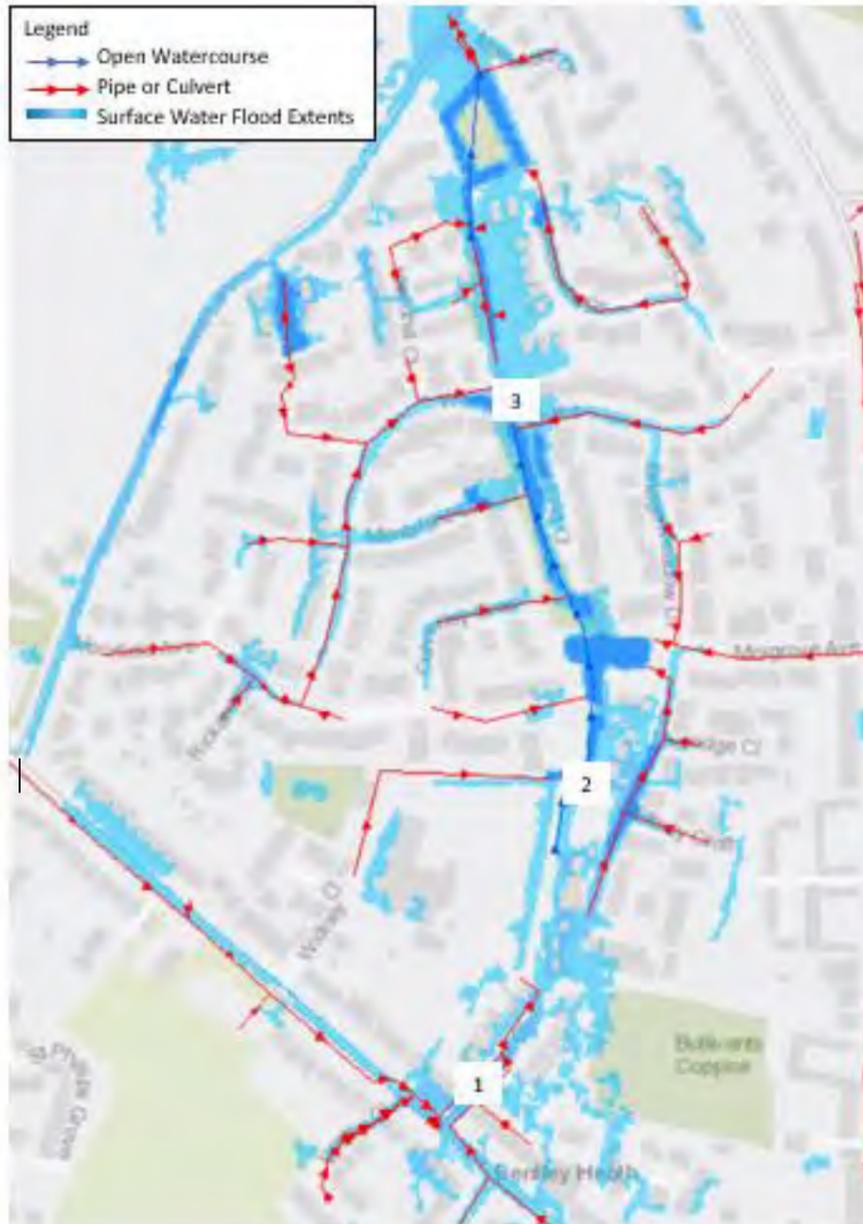
Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Willowbank Road Area

Who or what was affected?

		
10 properties internally flooded	27 properties externally flooded	8 garages flooded

Location Plan



Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✗	✓	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water and foul water networks became overloaded.	There are no main rivers in the area.	Watercourses were unable to cope with the amount of water flowing into them.	No other source was identified.

How does the existing system work, what does existing mapping show us and what happened on 25th June?

Severn Trent Water surface water sewers exist beneath Bullivents Close, Widney Road, Willowbank Road, Bridge Meadow Drive, Tilehouse Green Lane and adjoining streets to take away surface water from properties and the local highway network. The surface water sewer system then connects into the watercourse that runs in a northerly direction alongside Bridge Meadow Drive and under Willowbank Road towards Browns Lane.

Foul (used) water from properties is taken away by a separate foul water sewer system.

<u>Description of area shown to be at risk</u>	<u>What happened on 25th June?</u>
1. Surface water flood risk on Widney Road at the junction with Bullivents Close and Bretby Close.	Reports were received of internal and external flooding to multiple properties at a low spot on the highway at the junction of Widney Road with Bullivents Close and Bretby Close, due to the surface water sewer network becoming overwhelmed. It is understood that surface water entered into the foul water network causing further flooding.
2. Surface water flood risk on Bridge Meadow Drive.	Reports were received of internal flooding to multiple properties and garages along the road as a result of surface water being unable to enter the sewer network.
3. Flood risk associated with the watercourse that runs north from the rear of Bridge Meadow Drive towards Browns Lane.	The watercourse flooded the highway on Pool End Close and Willowbank Road. There were also reports of external flooding in Willowbank Road, Pool End Close and Hawkshead Drive due to flooding of the watercourse.

Location: Willowbank Road Area

Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
Inadequate capacity of sewers within the area	It is unrealistic to upsize all of the drainage network in the area in order to deal with extreme events.	Severn Trent Water	Complete
Condition of the open watercourse that flows alongside Bridge Meadow Drive	The watercourse has been inspected and a number of maintenance actions passed to the responsible party. Maintenance on the watercourse has previously been carried out in October and December 2020 near Bridge Meadow Drive, Willowbank Road and Pool End Close.	Lead Local Flood Authority	Complete
Concerns that such flood events are now happening on a more regular basis.	The Environment Agency has previously warned that intense bouts of flooding are set to become more frequent. "This follows a pattern of severe flooding over the past 10 years linked to an increase in extreme weather events as the country's climate changes. Met Office records show that since 1910 there have been 17 record breaking rainfall months or seasons – with 9 of them since 2000. As intense storms are becoming more frequent, sea levels are also rising because of climate change" (EA, 2018)		

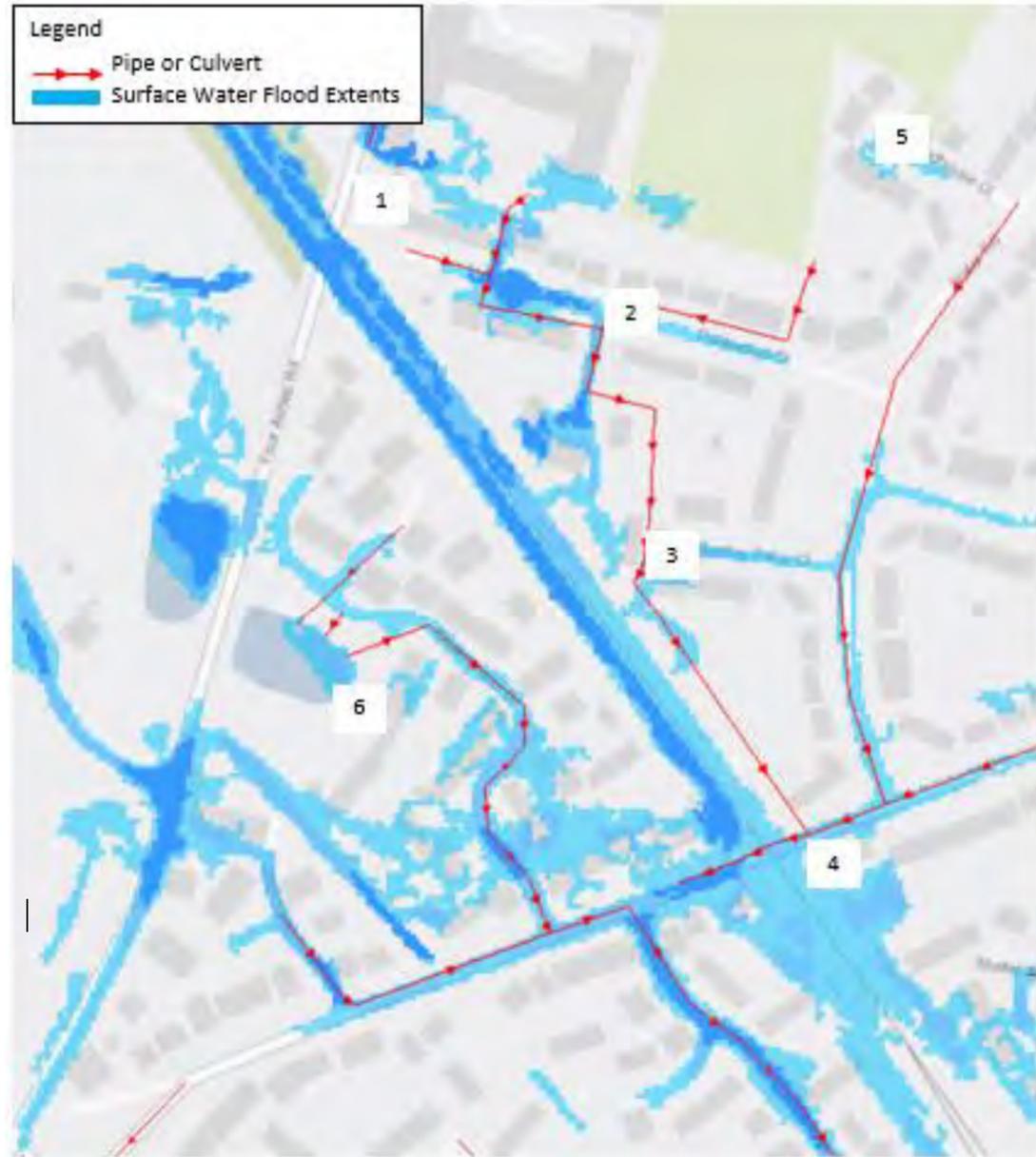
Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Four Ashes Road Triangle Area

Who or what was affected?

		
34 properties internally flooded	13 properties externally flooded	3 garages flooded

Location Plan



Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✗	✗	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water and foul water networks became overloaded.	There are no main rivers in the area.	No ordinary watercourses contributed to the flooding.	No other source was identified.

How does the existing system work, what does existing mapping show us and what happened on 25th June?

There are Severn Trent Water surface water sewers beneath Slater Road, Mill Lane, Four Ashes Road and adjoining streets which have been provided to take away surface water from properties and the highway network.

The surface water sewer system along Four Ashes Road is identified to connect into the Network Rail drainage system just north of the rail bridge. The surface water system then heads in a south easterly direction along the rail line to the Severn Trent Water system at Mill Lane, where it is also joined by a surface water sewer system that conveys flows from Packwood Close, Oak Tree Close, Bentley Farm Close and Slater Road. The systems then continue south and outfall into the ordinary watercourse near to Michael Blanning Gardens.

Foul (used) water from properties is taken away by a separate foul water sewer system.

<u>Description of area shown to be at risk</u>	<u>What happened on 25th June?</u>
1. Properties adjacent to the rail line on Four Ashes Road are situated lower than carriageway level creating a flow path through the properties towards Packwood Close.	Reports were received of internal flooding to both properties and the highway as a result of surface water being unable to enter the sewer network or the sewer network flooding
2. Properties along Packwood Close and Oak Tree Close identified at risk from surface water pooling within turning circle near filling effective low spot in local topography before overtopping along Oak Tree Close.	Observations confirmed surface water flows through the section of garages and the land off Four Ashes Road passed through properties and pooled in the turning circle to a significant depth, causing internal flooding to a number of the properties fronting this on Packwood Close as a result of surface water being unable to enter the sewer network or the sewer network flooding. No property flooding reported for Oak Tree Close.
3. Properties on Bentley Farm Close situated between the rail line and garage area are shown to lie within a clear flow route for surface water from area 2 noted above.	The watercourse flooded the highway on Pool End Close and Willowbank Road. There were also reports of external -flooding in Willowbank Road, Pool End Close and Hawkshead Drive due to flooding of the watercourse.
4. Terraced properties on south side of Mill Lane adjacent to railway level crossing. Each of these properties includes a cellar.	Severn Trent surface water manholes within Mill Lane adjacent t the level crossing were observed to be overflowing and causing internal property flooding with cellars becoming inundated. The level crossing was also flooded and had to be closed to traffic due to damage caused to the track and safety barriers.
5. An isolated low spot within the turning circle of Redhouse Close where levels fall towards one or two of the existing properties on the southern side.	Surface water unable to enter the sewer network overtopped the kerbing within the turning circle and caused external flooding to several of the adjoining properties.
6. Highway and external areas including SuDS Pond along Buckminster Drive.	The SuDS pond became overwhelmed and overtopped, causing external flooding to two adjoining properties and the associated highway.

Location: Four Ashes Road Triangle Area

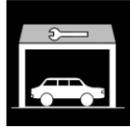
Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
Inadequate capacity of sewers within the area	It is unrealistic to upsize all of the drainage network in the area in order to deal with extreme events.	Severn Trent Water	Complete
Drainage next to garages on Bentley Farm Close not working.	Site inspections have been undertaken which identified a clear flow route from the garage area to the properties on Bentley Farm Close. Solihull Community Housing have completed works to introduce kerbs and alterations to levels to provide additional resilience within the garage area.	Solihull Community Housing	Complete
The pond outlet on Buckminster Drive is not routinely maintained.	We have visited this location as part of our investigations and at the time of inspection the outlet did not appear blocked. These outlets are adopted by Severn Trent Water and they have subsequently visited and cleaned this outlet to allow a free flow of water from the pond to the network and the asset has been added to a regular monitoring schedule.	Severn Trent Water	Complete
What support will be given to the householders whose houses were flooded?	We are working with the Environment Agency to try and secure funding to help better protect those properties that experienced internal flooding and that qualify for assistance.	Lead Local Flood Authority	Ongoing

Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Chadworth Avenue Area

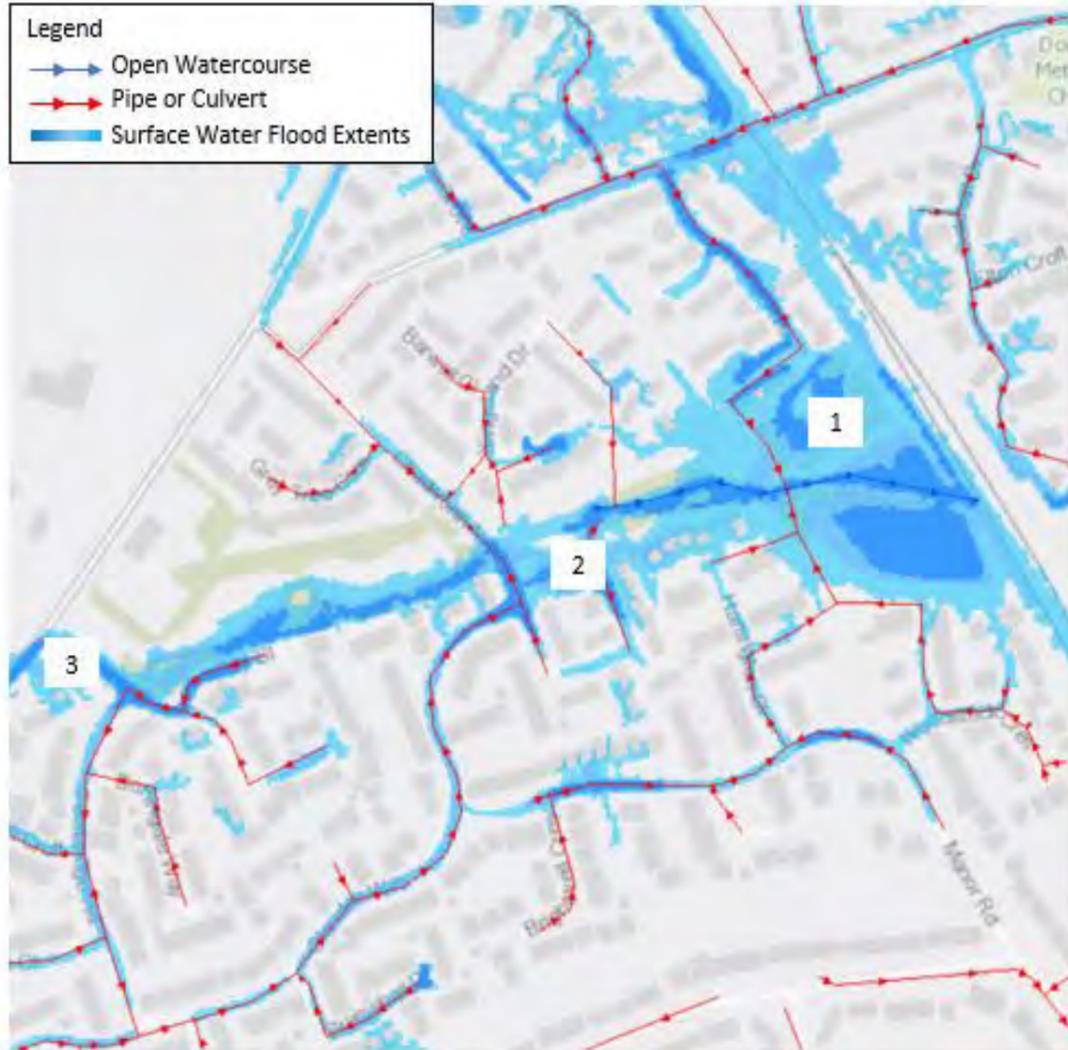
Who or what was affected?

		
22 properties internally flooded	13 properties externally flooded	1 garage flooded

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✗	✓	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water and foul water networks became overloaded.	There are no main rivers in the area.	Watercourses were unable to cope with the amount of water flowing into them	No other source was identified.

Location Plan



How does the existing system work, what does existing mapping show us and what happened on 25th June?

A Severn Trent Water surface water sewer network serves the residential area between Mill Lane and the public open space that runs through Chadworth Avenue. The system collects surface water from Chadworth Avenue, Kingsland Drive and Winsters Avenue, before heading in a southerly direction and outfalling at multiple locations into the watercourse that runs in an easterly direction from Four Ashes Road, under Conker Lane, to the railway line. The system then passes through a culvert underneath the railway line before entering the surface water sewer system in Beckford Croft.

An additional surface water sewer network serves the residential area to the south of the public open space that runs through Chadworth Avenue. This system collects surface water from the Glendon Way and Pembridge Road area before discharging at various locations into the watercourse that runs in an easterly direction from Four Ashes Road to the railway line.

Foul (used) water from properties is kept separate and taken away by a foul water sewer system.

Description of area shown to be at risk	What happened on 25th June?
1. Properties on Michael Blanning Gardens are at risk from flooding.	Surface water flowed along Winsters Avenue and towards the properties on Michael Blanning Gardens. Several properties were internally and externally flooded as a result of surface water being unable to enter the sewer network or the sewer network flooding. There was also internal flooding from foul water which was as a result of surface water entering the foul water system.
2. Properties at the bottom of the cul-de-sac on Hartington Close are located within a surface water flow path	Several properties were internally and externally flooded as a result of surface water being unable to enter the sewer network or the sewer network flooding.
3. Properties on Four Ashes Road lie within a surface water flow path	The surface water drainage system was overwhelmed with the volume of rainfall which caused flooding to properties.

Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

Location: Chadworth Avenue Area

Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
Foul water flooding and inadequate capacity of sewers	Severn Trent have undertaken various visits to the area to cleanse their assets where necessary. They have confirmed from their investigations that the system suffered a suspected hydraulic overload due to extreme weather. Foul water flooding occurred as a result of surface water entering the foul water system through manhole covers.	Severn Trent Water	Complete
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
Inadequate capacity of sewers within the area, particularly on Four Ashes Road near to Althorpe Drive	It is unrealistic to upsize all of the drainage network in the area in order to deal with extreme events.	Severn Trent Water	Complete
A blocked surface water drainage system outside Four Ashes Nursery causing flooding to the road.	Further investigation works are being carried out to identify the problem. If necessary, a job will be raised for our partner contractors to undertake repair work.	Local Highway Authority	Ongoing
Surface water runoff from Morville Close to properties on Four Ashes Road	Further investigation works are being carried out to determine what may be possible at this location to help better protect the affected properties.	Local Highway Authority	Ongoing

Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Grange Road Area

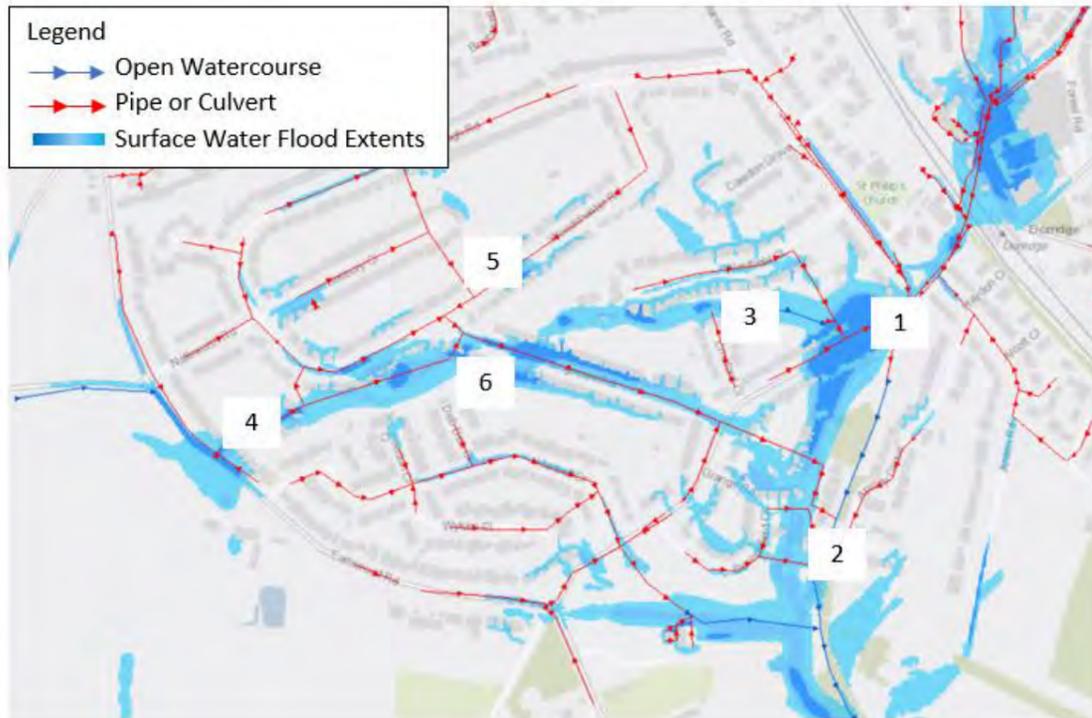
Who or what was affected?

		
32 properties internally flooded	41 properties externally flooded	9 garages flooded

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✗	✓	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water and foul water networks became overloaded.	There are no main rivers in the area.	Watercourses were unable to cope with the amount of water flowing into them	No other source was identified.

Location Plan



Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

How does the existing system work, what does existing mapping show us and what happened on 25th June?

Severn Trent Water surface water sewers convey flows eastwards along Grange Road to a localised low spot outside No. 41, converging with a wider network of surface water sewers from Manor Road, Station Road and Arden Road. The system then continues in a southerly direction between properties on Grange Road and Apsley Grove before outfalling into an ordinary watercourse that runs along the eastern side of Beaconsfield Close. Severn Trent Water surface water sewers also run in an easterly direction along Ettington Road from Earlswood Road, before continuing along the back of the properties located on Woodchester Road to connect into the surface water system in Kingscote Road, where a Severn Trent Water attenuation tank is located. The surface water system then continues southerly along Kingscote Road, crossing Grange Road between Nos. 83 and 85 before connecting into the system on Beaconsfield Close and outfalling into the ordinary watercourse at a point behind Nos. 10 and 12. It should be noted that the watercourse located behind Beaconsfield Close receives all of the water from the above areas.

Foul (used) water from properties is kept separate and taken away by a foul water sewer system.

Description of area shown to be at risk	What happened on 25th June?
1. Surface water flood risk on Grange Road, near to Manor Road and Arden Road.	Properties were internally and externally flooded as a result of surface water being unable to enter the sewer network or the sewer network flooding. Observations were also made of water flowing down Poplar Road, Station Road, and Grange Road towards the low point in the road. Foul water flooding was also observed.
2. Surface water flow path on Beaconsfield Close.	Reports were received of internal flooding to properties to the west of the watercourse with water entering the front and back of their properties. Residents that suffered external flooding further up the road observed water coming through their gardens heading downhill. It was also noted that watercourse behind the properties became overwhelmed and overtopped its banks.
3. Surface water flow path on Westfield Close.	Residents observed highway flooding as a result of surface water being unable to enter the sewer network or the sewer network flooding. They also noted a low point in the road where properties were internally flooded. Most back gardens flooded along the route of the Severn Trent surface water sewer system.
4. Surface water flow path on Ettington Close.	Reports were received of internal flooding to properties at the lowest point of the cul-de-sac. The highway flooded as a result of surface water being unable to enter the sewer network or the sewer network flooding. Surface water from Earlswood Road and the adjacent field also contributed at this location.
5. Surface water flow path on Woodchester Road.	Observations confirmed surface water flows coming off the highway to the front of the properties but also flooding back gardens.
6. Surface water flow path on Kingscote Road.	Internal flooding to the properties located at the western end of Kingscote Road occurred, with properties further down experiencing external flooding. Residents observed highway flooding as a result of surface water being unable to enter the sewer network or the sewer network flooding.

Location: Grange Road Area

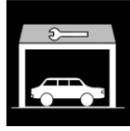
Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
Foul water flooding and inadequate capacity of sewers	Severn Trent have undertaken various visits to the area to cleanse their assets where necessary. They have confirmed from their investigations that the system suffered a suspected hydraulic overload due to extreme weather.	Severn Trent Water	Complete
Condition of the ordinary watercourse behind Beconsfield Close	The ordinary watercourse has been inspected following the flooding. Where necessary, contact has been made with relevant riparian landowners to remind them of their roles and responsibilities.	Riparian Landowners	Ongoing
Maintenance of ordinary watercourses west of Ettington Close and Earlswood Road	Landowners have been reminded of their roles and responsibilities and requested to clear watercourses appropriately.	Riparian Landowners	Ongoing
Condition of culverts adjacent to Earlswood Road	Site inspections have been carried out and maintenance work identified to assist with the free flow of water. The watercourses connecting into these culverts have also been dug out and cleared of debris.	Lead Local Flood Authority/ Local Highway Authority	Complete
Attenuation Tank in Kingscote Road	Severn Trent Water have checked the condition of the attenuation tank at this location.	Severn Trent Water	Complete
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
What support will be given to the householders whose houses were flooded?	We are working with the Environment Agency to try and secure funding to help better protect those properties that experienced internal flooding and that qualify for assistance.	Lead Local Flood Authority	Ongoing

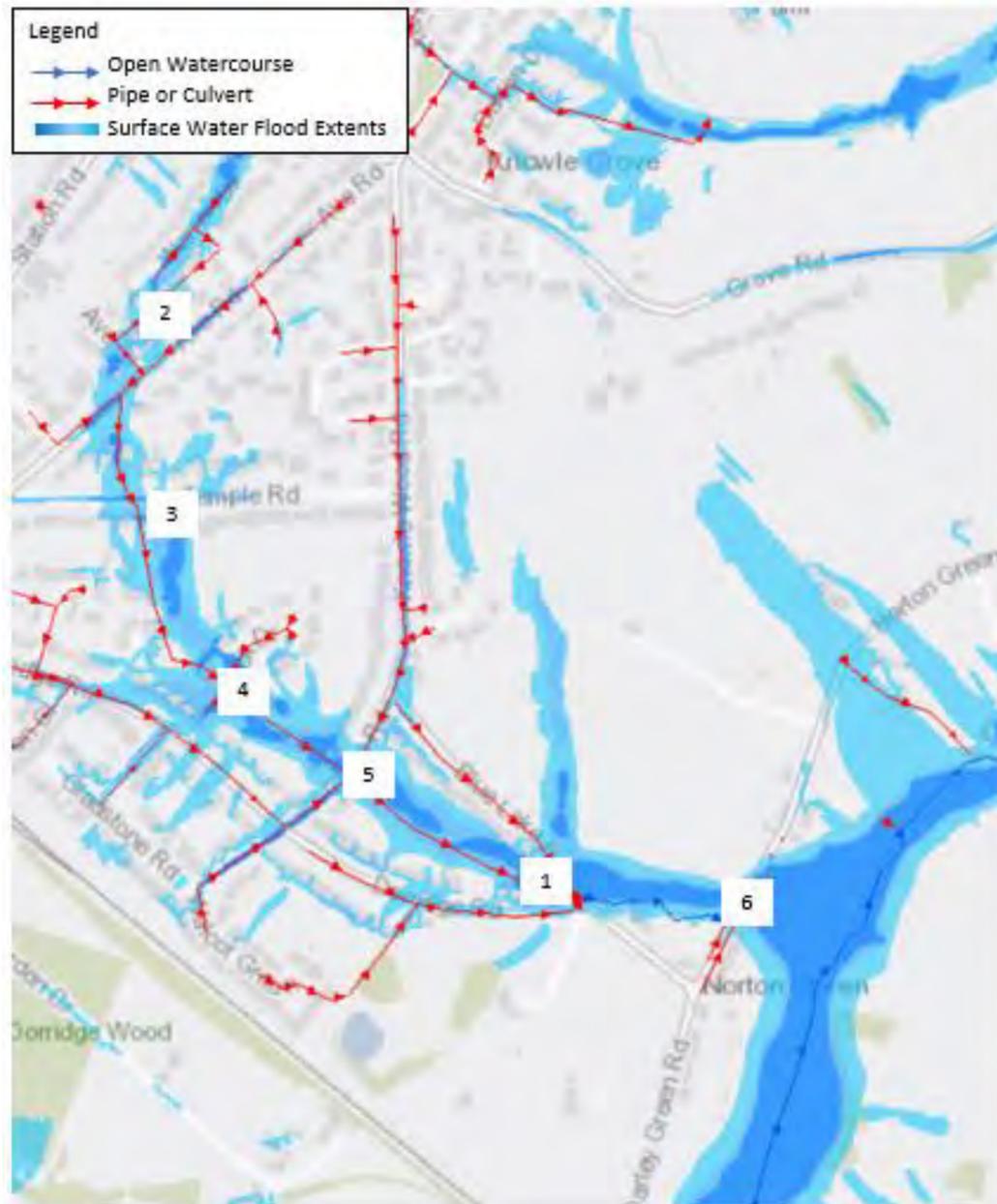
Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Blue Lake Road Area

Who or what was affected?

		
44 properties internally flooded	13 properties externally flooded	21 garages flooded

Location Plan



Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✗	✓	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water and foul water networks became overloaded.	There are no main rivers in the area.	Ordinary watercourses were unable to cope with the amount of water flowing into them.	No other source was identified.

How does the existing system work, what does existing mapping show us and what happened on 25th June?

Severn Trent Water surface water sewers exist beneath Blue Lake Road, Dorridge Road, Avenue Road, Knowle Wood Road and adjoining streets to take away surface water from properties and the local highway network.

The surface water network in this area begins at Avenue Road and continues into Temple Road and Temple Gardens, after which it crosses low points in Paddock Drive and Clyde Road, whilst picking up connections from adjoining roads. The system then runs through the back gardens of properties on Dorridge Road and Blue Lake Road before outfalling into the watercourse near the junction of Dorridge Road and Blue Lake Road.

Separately, a part of Knowle Wood Road drains into a ditch near the junction of Blue Lake Road and Knowle Wood Road. The ditch continues down Blue Lake Road and meets the sewer from Dorridge Road and Blue Lake Road. Foul water from properties is kept separate and taken away by a foul water sewer system. A pumping station exists on Blue Lake Road near the junction with Dorridge Road which serves a small number of properties. Reports of foul water flooding were received, which was as a result of surface water entering the foul water system through manhole covers.

<u>Description of area shown to be at risk</u>	<u>What happened on 25th June?</u>
1. Flood risk on Dorridge Road and Blue Lake Road.	Internal and external flooding was experienced on Gladstone Road and Granville Road. Flows moved in a north easterly direction towards Dorridge Road and then followed the natural gradient of the highway towards the junction of Dorridge Road and Blue Lake Road. Surface water flows that were unable to enter the sewer network passed through the back gardens of Blue Lake Road and Dorridge Road and internally flooded properties at the junction of the two roads, where the highway was impassable. Flows entered the ordinary watercourse to the north of the junction of Blue Lake Road and Dorridge Road, which was flooded due to runoff from surrounding land.
2. Flood risk on Avenue Road and Avenue Close.	Surface water flows moved along Avenue Close in a southerly direction and towards the low spot on Avenue Road, where properties were internally and externally flooded.
3. Flood risk on Temple Road and Temple Gardens.	Surface water flows from Avenue Road and Avenue Close led to flooding of gardens and garages on Temple Road and Temple Gardens.
4. Flood risk on Paddock Drive.	Surface water flows entered Paddock Drive from the west and led to internal and external flooding of properties.
5. Flood risk on Clyde Road.	Surface water flows moved in a south easterly direction across Clyde Road internally flooding properties, before flooding gardens of properties on Dorridge Road and Blue Lake Road.
6. Flood risk associated with the ordinary watercourse at Norton Green Lane and Darley Green Road.	The watercourse flooded surrounding land and gardens, as well as causing internal flooding to a number of properties in the area.

Location: Blue Lake Road Area

Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
Condition, maintenance and capacity of the pumping station.	Severn Trent Water own and maintain the foul pumping station on Blue Lake Road. Severn Trent Water have checked the operation of the pumping station and whilst some minor repairs have been identified, the system was considered to be in working order.	Severn Trent Water	Complete
Inadequate capacity of sewers within the area	It is unrealistic to upsize all of the drainage network in the area in order to deal with extreme events.	Severn Trent Water	Complete
Future development within the area will increase flood risk. How is the Council going to modify its plans for housing since any more development will only make the potential flooding problem worse.	New development is located away from land that are considered to be at high risk of flooding and to ensure that it does not cause additional risk to those living downstream. The Council's Local Plan contains a specific policy relating to water management, which developers are required to follow. This includes limiting discharge rates and providing on site storage. New development can offer an opportunity to achieve some betterment, be it through the provision of greater storage areas for flood waters, or the potential funding of flood risk management schemes through contributions to the Community Infrastructure Levy.	Lead Local Flood Authority/ Local Planning Authority	Ongoing
What support will be given to the householders whose houses were flooded?	We are working with the Environment Agency to try and secure funding to help better protect those properties that experienced internal flooding and that qualify for assistance.	Lead Local Flood Authority	Ongoing
How is runoff controlled in exceedance events? What measures have been taken to reduce flood risk in new developments?	Exceedance occurs when the rate of surface water runoff is greater than the capacity of the surrounding sewer or drainage network. Where exceedance events are not controlled, indiscriminate flooding of properties can occur. New developments are required to consider extreme rainfall in their designs.		
Concerns that such flood events are now happening on a more regular basis.	The Environment Agency has previously warned that intense bouts of flooding are set to become more frequent. "This follows a pattern of severe flooding over the past 10 years linked to an increase in extreme weather events as the country's climate changes. Met Office records show that since 1910 there have been 17 record breaking rainfall months or seasons – with 9 of them since 2000. As intense storms are becoming more frequent, sea levels are also rising because of climate change" (EA, 2018)		

Investigation under Section 19 of the Flood and Water Management Act 2010 Location: Poplar Road Area

Who or what was affected?

		
39 properties internally flooded	11 properties externally flooded	3 garage flooded

What flooding mechanisms have been identified?

Surface Water/Overland Flow	Sewers	Main Rivers	Ordinary Watercourses	Other
✓	✓	✗	✗	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water and foul water networks became overloaded.	There are no main rivers in the area.	No ordinary watercourses contributed to the flooding.	No other source was identified.



How does the existing system work, what does existing mapping show us and what happened on 25th June?

Water from approximately 33 hectares on the western side of the railway runs through a culvert under the track that ultimately enters the Severn Trent Water surface water network at Beckford Croft, before converging with the sewer system on Poplar Road.

A further system serves approximately 9.5ha of residential area to the north of Poplar Road. This surface water sewer flows down Poplar Road from Mill Lane, before diverting and running under back gardens between Poplar Road and Edstone Close. The sewer crosses under Hanbury Road where it is joined by sewers carrying surface water from Hanbury Road and the section of Poplar Road between Beckford Croft and Fennis Close. The sewer then continues into Copstone Drive and runs in the back gardens between Copstone Drive and Poplar Road and out to Station Road.

The lower end of Poplar Road drains via a separate surface water sewer that also runs to Station Road. All the surface water sewers in Station Road run under the railway bridge and discharge to a watercourse between Grange Road and Apsley Grove.

Foul (used) water from properties is kept separate and taken away by a foul water sewer system.

Description of area shown to be at risk	What happened on 25 th June?
1. Flood risk associated with a flow route from the railway culvert.	Properties were flooded by water coming into the back gardens from the railway culvert and a build up of water coming from the highway at the front. Surface water sewers in the road were filled to capacity which meant that the watercourse could not flow into the system.
2. Surface water flow path along Poplar Road.	The properties flooded from water in the highway flowing through garages and internally into the back gardens. The Severn Trent sewer system surcharged outside No. 94 causing the manhole cover to be lost into the chamber.
3. Surface water flow path across Edstone Close.	Water flooded down the road but did not flood properties as it passed from front to back gardens.
4. Surface water flow path from Poplar Road to Hanbury Road.	Water flowed from the back garden and past properties. There was some internal flooding caused as water levels rose.
5. Surface water flow paths from Hanbury Road to Copstone Drive and then onto Poplar Road.	Water built up in Copstone Drive, flooding properties. This was joined by water flowing out of Hanbury Park which inundated back gardens and properties as it joined the main flow running from Copstone Drive to the rear of Poplar Road.
6. Poplar Road	Water flowing along Poplar Road flooded through houses to get to lower ground in the back gardens. The flooding here does not match the predicted flooding. This is likely due to inaccurate topography in the model used to make the flood maps.

Location: Poplar Road Area

Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
Inadequate capacity of sewers within the area, particularly at Hanbury Road and Fennis Close.	It is unrealistic to upsize all of the drainage network in the area in order to deal with extreme events.	Severn Trent Water	Complete
Did the surface water sewer systems fail?	The surface water sewers are owned by Severn Trent Water. They have been checked to make sure they are able to flow. The amount of rain that fell was far beyond the capacity of sewers to contain.	Severn Trent Water	Complete
Why was so much water flowing from Hanbury Park into the rear gardens at Copstone Drive?	Hanbury Park is substantially permeable meaning that under normal circumstances water is absorbed into the ground. However in high intensity storms there can still be substantial run-off as the water doesn't have time to soak away.		
Can anything be done to stop residents paving over their front gardens with impermeable surfaces?	All new driveways should be surfaced with a permeable material or drained into a soakaway. If not they should require planning permission. Unfortunately this planning law is difficult to enforce.		

Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Stapenhall Road and Talton Close, Monkspath

Who or what was affected?

		
3 properties internally flooded	4 properties externally flooded	2 Garage flooded

Location Plan



Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✗	✗	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water networks became overloaded.	There are no main rivers in the area.	Flooding did not occur due to ordinary watercourses.	No other source was identified.

How does the existing system work, what does existing mapping show us and what happened on 25th June?

A Severn Trent Water surface water sewer collects water from roads to the northeast and flows down Stapenhall Road to Stanbrook Road. There it joins another sewer coming from the northwest and flows down Talton Close before discharging to a watercourse just west of the M42.

Foul (used) water from properties is kept separate and taken away by a foul water sewer system.

<u>Description of area shown to be at risk</u>	<u>What happened on 25th June?</u>
1. A build up of surface water is shown on Stapenhall Road between Stanbrook Road and Kerswell Drive	There was one report of internal flooding due to the build up of water breaching into the property. Other properties reported external flooding as the water tipped round the corner into Stanbrook Road.
2. Properties on Talton Close are shown to be at risk of surface water flooding.	Water surcharged from the Severn Trent sewers through manholes and the highway gullies. Additional surface water flowing from Stanbrook Road contributed to the flooding. The water built up in the close and internally flooded one property and flooded the outbuilding and garage of another. The other properties in the close suffered external flooding and the highway was inaccessible.

Location: Stapenhall Road and Talton Close, Monkspath

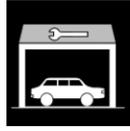
Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
Capacity of the Severn Trent Water sewers / is there a blockage	Severn Trent Water have checked the surface water system but have found no blockage or defect.	Severn Trent Water	Complete
The flow of water from Stanbrook Road into Talton Close.	We are investigating the highway drainage network to see if the water can be captured better. If water is held on Stanbrook Road there is a risk that the build-up of water causes flooding to properties as the flow route is diverted.	Local Highway Authority	Ongoing

Investigation under Section 19 of the Flood and Water Management Act 2010

Location: Stratford Road, Hockley Heath

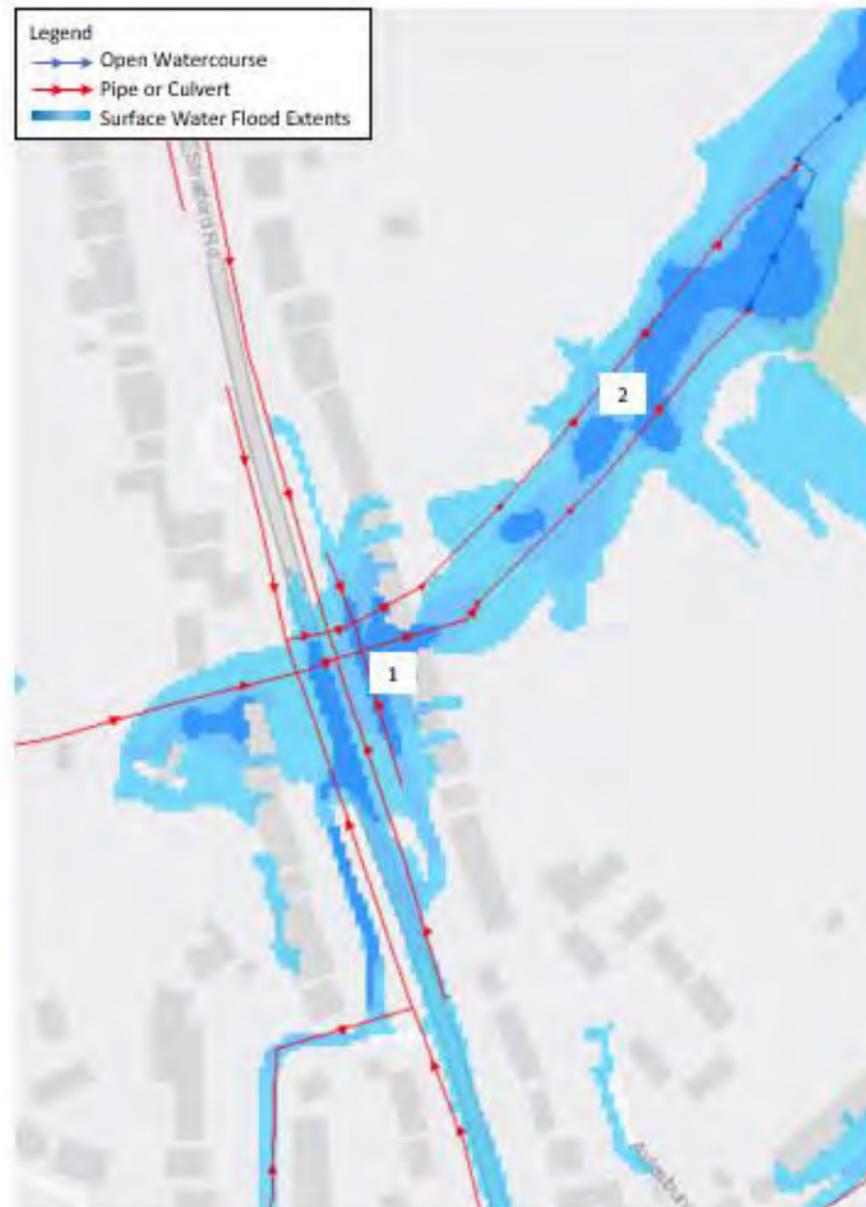
Who or what was affected?

		
5 properties internally flooded	9 properties externally flooded	0 garage flooded

What flooding mechanisms have been identified?

<u>Surface Water/Overland Flow</u>	<u>Sewers</u>	<u>Main Rivers</u>	<u>Ordinary Watercourses</u>	<u>Other</u>
✓	✓	✗	✗	✗
Water flowed across the ground and was unable to enter watercourses or sewers.	The local surface water networks became overloaded.	There are no main rivers in the area.	Flooding did not occur due to ordinary watercourses.	No other source was identified.

Location Plan



How does the existing system work, what does existing mapping show us and what happened on 25th June?

There is a Severn Trent Water surface water sewer network beneath the roads in Hockley Heath that is provided to take away surface water (rainwater) from properties with water from the highway draining via this same network. Foul (used) water from properties is kept separate and taken away by a foul water sewer system.

With the exception of the south west corner of Hockley Heath and from the part of the Stratford Road that is north of The Barn Public House, the surface water sewer network for the whole of the village heads to the vicinity of the Stratford Road service road. Flows are conveyed through surface water sewers and overland flows to this location where a number of surface water sewer networks joint together and subsequently outfall into a watercourse that runs through land to the rear (east) of the properties on the service road before continuing downstream to join the River Blythe.

Description of area shown to be at risk	What happened on 25th June?
1. Stratford Road from the junction of Orchard Road in a northerly direction to its northern most junction of the Service Road.	Reports were received of internal flooding to multiple properties and garages along the service road and of the highway being impassable either as a result of surface water being unable to enter the sewer network or the sewer network flooding.
2. Flood risk associated with the watercourse that runs in a north easterly direction from the rear of the Service Road.	No reports were received of flooding of the watercourse, although it is suspected that it would have been out of bank.

Mapping produced by the Environment Agency showing existing areas of risk of flooding from watercourses and also from surface water in the area. The mapping is based on computer models to assess long term risk and does not take into account factors such as blocked drains or burst pipes.

Location: Stratford Road, Hockley Heath

Your concerns and our actions

Concerns have been raised about	What has been done in response	Who is responsible	Status
That the flooding was caused by drains that weren't clean.	Solihull Council cleans highway gullies (drains) once a year as standard practice. Since the flooding, the Council has cleaned the system again and has undertaken CCTV surveys of assets where necessary.	Local Highway Authority	Complete
Inadequate capacity of sewers within the area	Given the history of flooding at this location, we are aware that further works are being reviewed by Severn Trent to understand what options exist.	Severn Trent Water	Ongoing
What support will be given to the householders whose houses were flooded?	We are working with the Environment Agency to try and secure funding to help better protect those properties that experienced internal flooding and that qualify for assistance.	Lead Local Flood Authority	Ongoing

Action Plan

Appendix K

June 2021 Flood Event

LLFA – Lead Local Flood Authority
LHA – Local Highway Authority
CSW – Emergency Planning

STW – Severn Trent Water
WMFS – West Midlands Fire Service
WMP – West Midlands Police

SCH – Solihull Community Housing
EA – Environment Agency

<u>Action No</u>	<u>Highlighted Issues</u>	<u>Recommendation</u>	<u>Status</u>	<u>Notes</u>	<u>Owner</u>
Knowing when and where it will flood					
1	Accuracy of forecasting	The nature and intensity of the event could not be predicted. Consideration could be given to putting a 'Thunderstorm Plan' in place.	In Progress	The Environment Agency is looking at whether a plan could be adopted for the West Midlands.	EA
2	Communities at Risk	Consideration should be given to raising flood risk awareness across other communities that are at risk and the use of Parish Councils and community groups in providing this message.	In Progress		LLFA/CSW
Being rescued and cared for during an emergency					
3	Communication and information sharing between partners on the ground at the time of the event could be improved.	Revision of the West Midlands Local Resilience Forum internal procedures.	In Progress		LRF
Reducing the risk of flooding and its impact					
4	Condition of Ordinary Watercourses in areas that experienced flooding.	Inspections of Ordinary Watercourses to be undertaken.	Complete	Officers have carried out inspections of ordinary watercourses and has written to those landowners where any consenting or enforcement work has been identified.	LLFA

5	Condition of Main Rivers in areas that experienced flooding.	Inspections of Main Rivers to be undertaken.	Complete	The Environment Agency has inspected the length of Purnells Brook, Knowle, which has Main River status.	Environment Agency
6	Condition of highway drainage assets.	Inspections and cleansing of highway drainage assets across affected areas to be undertaken.	Complete	Tanker Services have undertaken an additional 1,657 gully cleanses across affected areas. Officers have also inspected associated pipework and have raised works orders for defect repairs where necessary.	LHA
7	Funding needs to be obtained to install measures that can reduce the risk of future flooding at locations that were affected in June 2021.	Officers to submit proposals for project funding to DEFRA, through the Environment Agency.	In Progress	Officers have submitted preliminary proposals for funding for eight areas.	LLFA
Better advice and helping people to protect their families and homes					
8	Properties were affected by vehicles driving through roads causing bow waves.	Consideration should be given to how communities can safely help themselves, e.g. through the provision of road closure signage and equipment.	In Progress		LHA/CSW
9	Review of Council information regarding flood risk	Officers to review existing information provided via the Council's website to help people protect their own properties.	In Progress		LLFA/CSW
Recovery					
10	Need to provide on-going support to those affected by the flooding over a longer period of time. For example, residents were unaware of the questions that they would have in the future.	Clear signposting to the various forms of support and advice that can be obtained after an event.	In Progress	Officers have supported those communities who were affected by the flooding in June, supported by partner agencies where appropriate, through Stay Connected communications.	LLFA/CSW/ EA/STW

11	Assistance with future insurance renewals	Clear signposting to third sector knowledge and experience to assist property owners obtain insurance following flooding	In Progress		SMBC
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