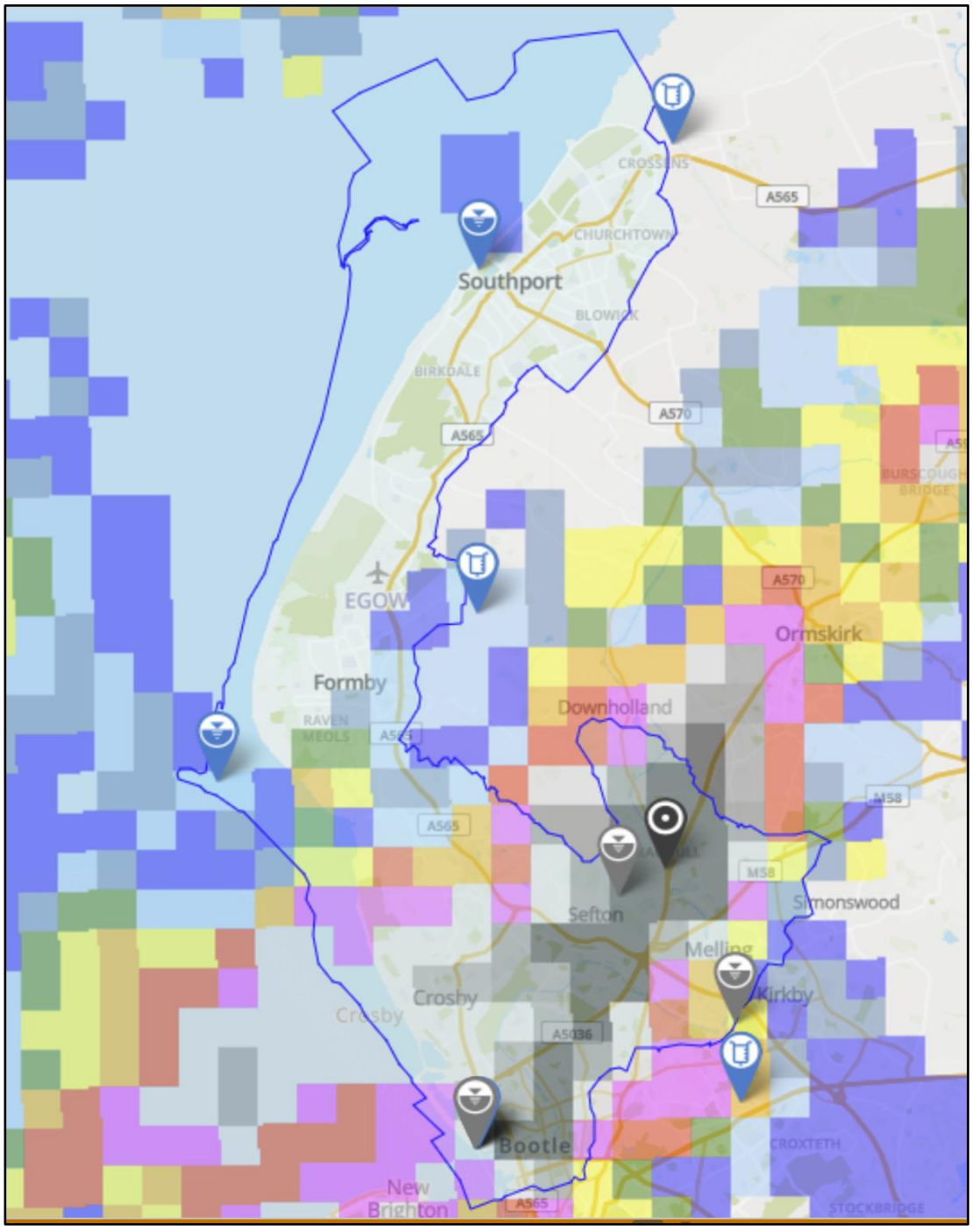
Section 19 Flood Investigation Liverpool Road North – Maghull 10/11th August 2020



Sefton Council

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Executive summary

On the night of the 10th August 2020, a fast-moving band of intense rainfall travelled over the Sefton area. The intensity of the rainfall caused flooding at several locations across the borough as the drainage systems were temporarily overloaded. One of these areas is Liverpool Road North, Maghull, which is the subject this report.

One of the roles of Sefton Council as the Lead Local Flood Authority (LLFA) is to carry out investigations into flooding incidents if they meet the set thresholds as outlined in the Councils Flood Investigation Policy.

The LLFA will:

- Identify and explain the probable 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.

History of flooding

Maghull has a long history of fluvial and surface water flooding. The investigation is looking at 2 locations within Maghull that flooded on the night of the 10th/11th August 2020, which are:

1 – 39 Liverpool Road North, Maghull

187 – 197 Liverpool Road North, Maghull

The council has no previous record of businesses and properties at these locations flooding prior to this event and the scale was sufficient to trigger a Section 19 investigation, as specified in the Council's Flood Investigation policy.

During the investigation, one business owner stated that there was flooding to number 17 Liverpool Road North in 2018 and on an occasion before that but these were not reported to the LLFA. On a subsequent rainfall event on the 18th August 2020, number 17 was close to internally flooding again.

Purpose of the report

The purpose of this report is to investigate the flood events that triggered a section 19 report in Maghull overnight on the 10th/11th August 2020. Two locations in Maghull triggered the need for a section 19 investigation: businesses 1-39 Liverpool Road North and properties 187-197 Liverpool Road North.

Event background

Flood incident / extent

The information in this section shows the extent and intensity of the storm from available data sources firstly for 1-39 Liverpool Road North and secondly 187 –197 Liverpool Road North. Whilst both areas are close geographically the data shows some differences, highlighting the local nature and varying intensity of the storm.

Location Characteristics

Both areas are urban catchments drained via a network of sewers. The properties in the area are served by a foul (waste) sewer system for bathroom and kitchen waste water and a surface (rain) water sewer system. The surface water drainage system works by taking the rain that falls on a property through channels, gutters and ground levels into grids. These grids then pass water into a private sewer (a drainage system solely for the property) which then enters into the public sewer.

Rain falling onto the highway is directed to gulleys via kerbs and road levels and the cambre of the road surface. Rain water then passes into the public sewer via a highway drain, also called a branch pipe.

1 – 39 Liverpool Road North

The surface water flood maps show that the area to the rear of the businesses (canal side) is at high risk and the highway is at medium risk with a few businesses at high and medium risk of flooding. The area that suffered from flooding is included on Figure 1. The surface water maps reflect the topography of the area as it is in a dip, as the opposite side of the road is higher and between Westway and the Red Lion Bridge all go down to the lowest point in front of the Number 15/17 .

The surface water public sewer drains an area between Westway and the Red Lion Bridge including Stafford Morton Way. Outside No.29 Liverpool Road North, the public sewer changes direction and flows towards the canal under the property. Behind No.25 the surface water sewer enters a combined sewer (foul and surface water) and there is a an overflow system and both systems go under the canal see Figure 2.

There are at least 22 highway gullies in this section draining the highway and the pavement slopes back towards the properties where there is a line of aco drain running along in front of the shops, taking the roof drainage and footpath surface water.

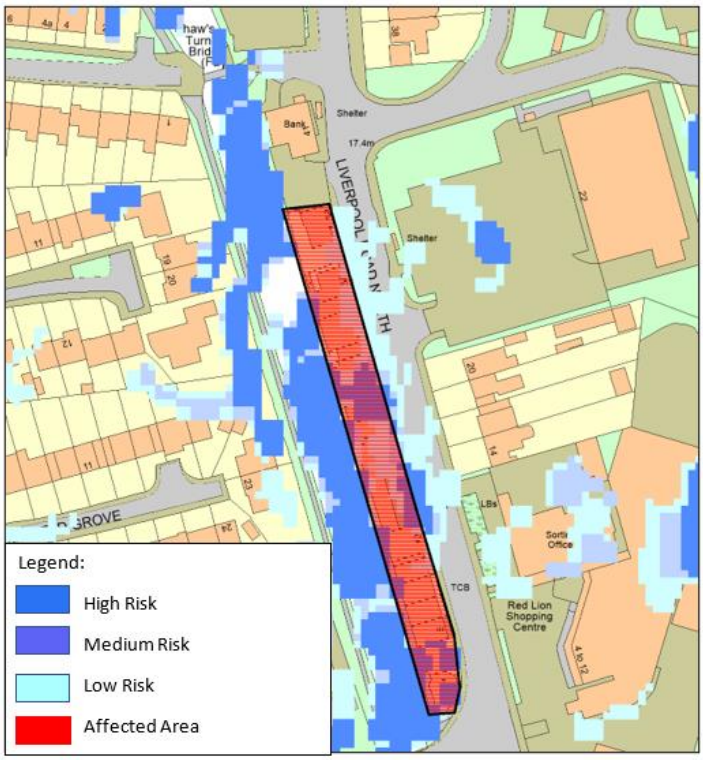

Figure 1 Surface water flood risk map for 1-39 Liverpool Road North

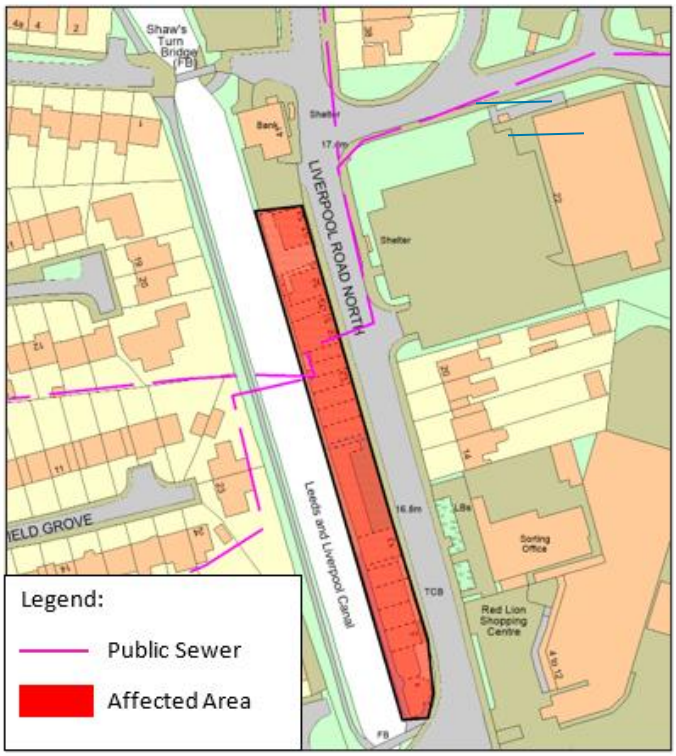

Figure 2 Drainage Network 1-39 Liverpool Road North.

187 – 197 Liverpool Road North

The surface water flood maps (Figure 3) show that the area at highest risk is to the properties on Hickson Avenue. The map shows that the surface water flood risk to the properties on Liverpool Road North starts at No. 189 and is mainly low to medium risk running down the road to the junction with Liverpool Road. Again this surface water flood risk reflects the topography of the location with the lowest areas at highest risk. The area that suffered from flooding is included on Figure 3.

The system that drains the area that flooded, between Green Lane and Southport Road, stretches from Westway to Nedens Lane with over 75 highway gullies. The surface water system starts as a highway drain flowing from Westway and becomes a public sewer where water from Granville Avenue enters it. At the junction of Southport Road, Liverpool Road North and Liverpool Road, the surface water sewers, draining the area, flow into a watercourse (Maghull Brook) and from there crosses under the canal. Figure 4

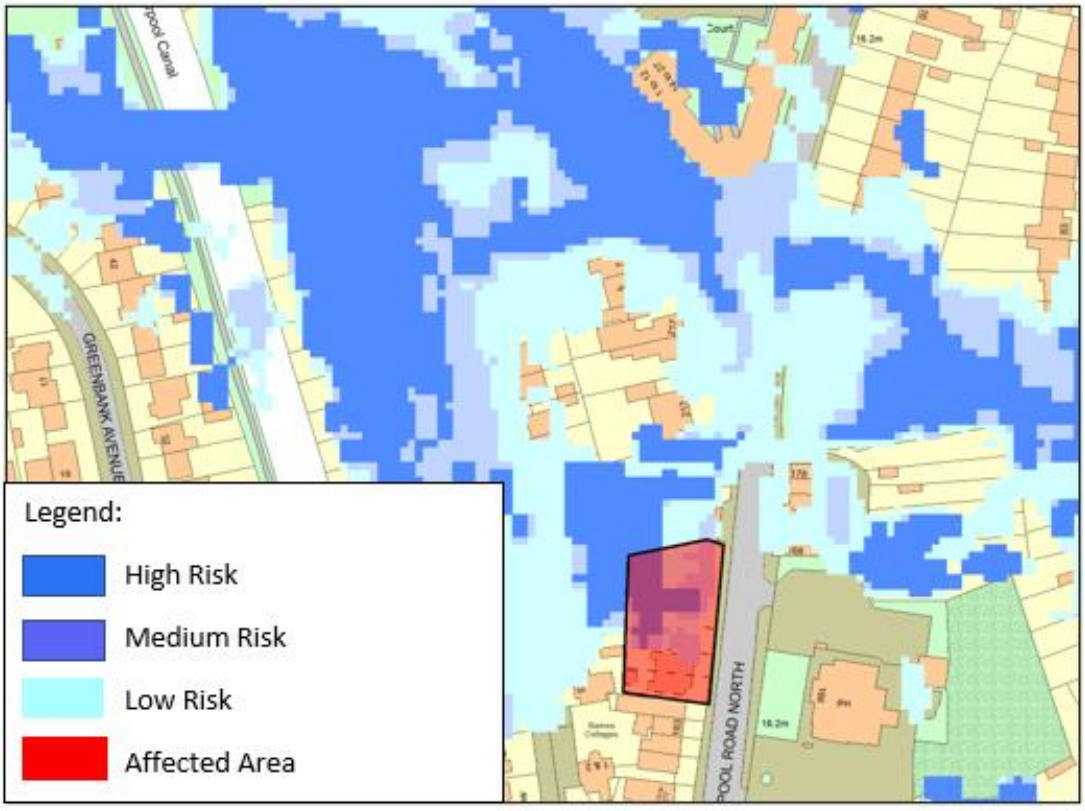

Figure 3 Surface water flood risk map 187-197 Liverpool Road North

Figure 4 Drainage network 187-197 Liverpool Road North

The properties that flooded are all below the level of the highway and pavement.

Current flood defences

There are no formal flood defences serving the areas that flooded.

Investigation

Responsibilities for maintenance of main rivers, ordinary watercourses, surface water systems and sewers

Maintenance for any watercourse, main river or non-main river, lies with the riparian owner, however, Lead Local Flood Authorities and the Environment Agency have powers to carry out maintenance activities on watercourses and main rivers, respectively.

The public sewerage system is maintained by the Water and Sewerage Company, which is United Utilities for Sefton. The property owner is responsible for (private) drainage up to the boundary of their property.

The Highway authority is responsible for drainage of the roads and pavements and associated assets ie gulleys and pipes flowing to the point of discharge ie public sewer or watercourse.

For more detailed information about Rights and Responsibilities please refer to Section 8.

Rainfall event in terms of depth, duration and return period

The graphs below show the amount of rain that fell in the Maghull area on the 10th August 2020, this has been derived from radar imagery.

Figures 5 and 6 show the radar image of the amount of rainfall at the 2 locations of flooding at 23:15 and 23:20 respectively:

- 1 – 39 Liverpool Road North Purple dot, and
- 187 – 197 Liverpool Road North blue dot

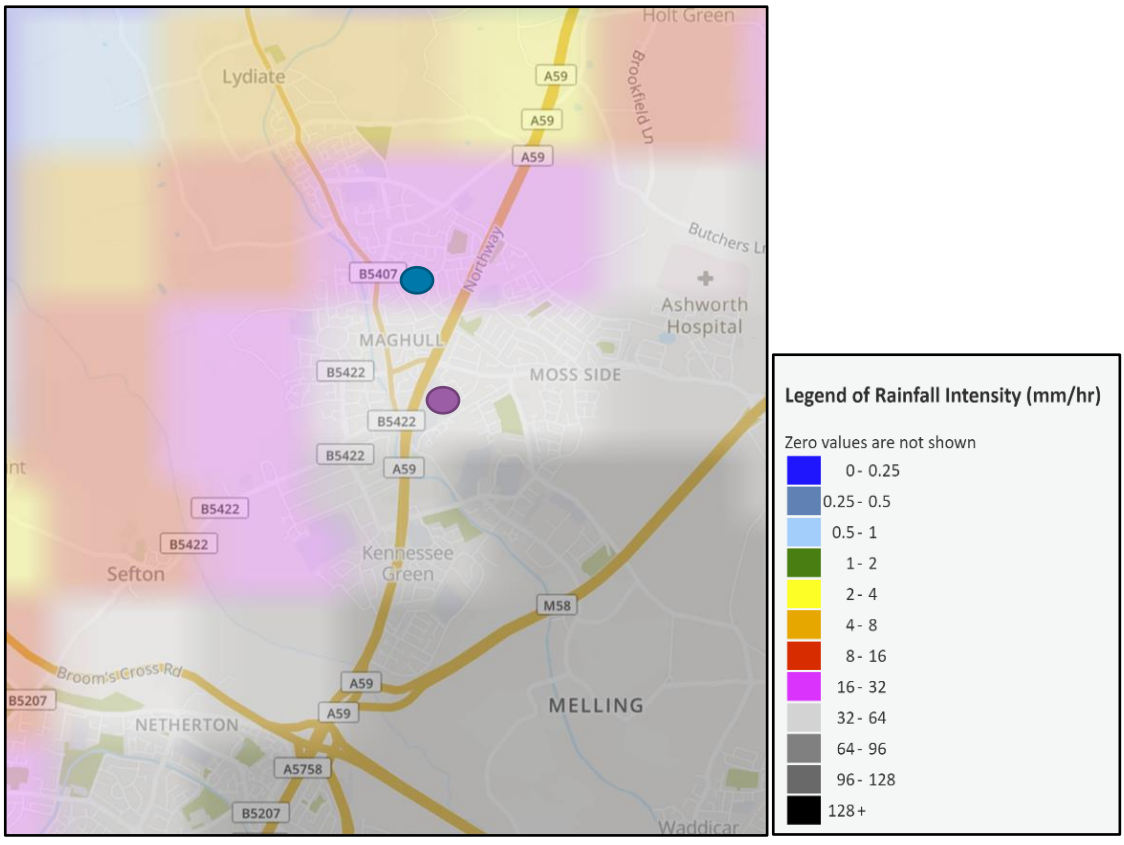

Figure 5 Rainfall radar (Source: Meniscus MapRain software) at 23:15 hrs. with legend

The storm was moving fast over the area in a northerly direction, affecting the southern site 1 -39 Liverpool Road first with light rainfall (2 – 4mm/hr) starting at approximately 23.00, but increasing intensity within 10 mins to between 32 – 64 mm/hr, seen in figure 5.

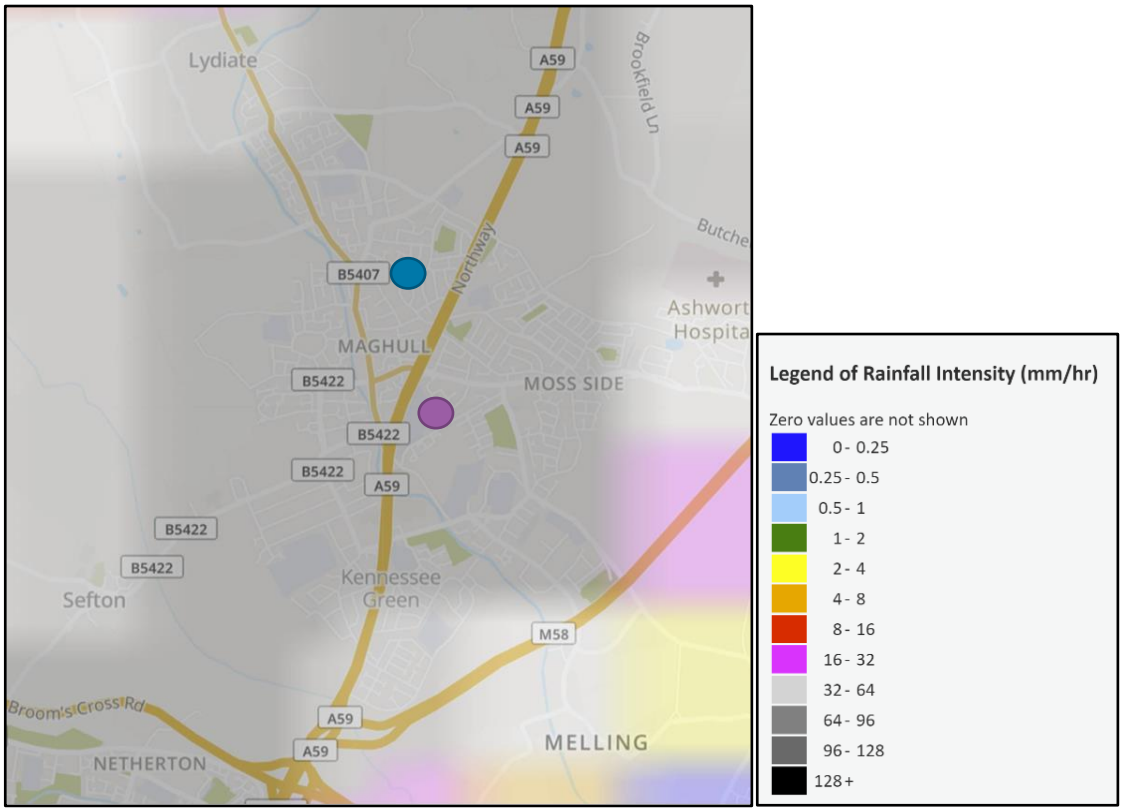

Figure 6 Rainfall radar (Source: Meniscus MapRain software) at 23:20 hrs. with legend

The radar picture (figure 6) at 23:20 shows the rainfall affecting the area to be between 64 - 96mm/hr. Again, this intense rainfall moves over the area fast and within 5 mins the rain fall intensity eases to 16-32 mm/hr, but this is still a significant amount of rainfall. The rainfall carried on affecting the area, at different intensities until 03.05hrs on the 11th August.

As can be seen in the Figures 7 and 8, based on radar derived rainfall levels, the intense rain only lasted 15 minutes, but in that time over 20mm (2cm) of rain fell.

To put the rainfall into context the average rainfall for Liverpool in August is 69mm and during this event a third of this amount fell in a 15-minute period.

Rainfall Characteristics for 1-39 Liverpool Road North

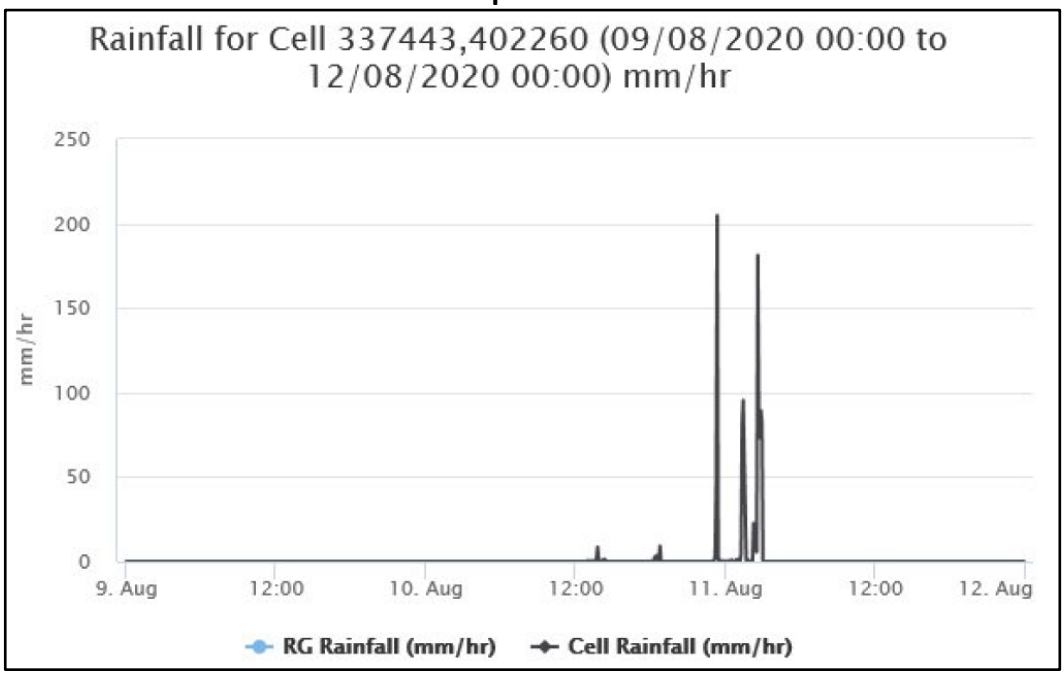

Figure 7 Rainfall amounts mm/hr. for 1 – 39 Liverpool Road North

To put the rainfall into context Tables 1 and 2 show the calculated return period of the storm, based on a 15 minute peak rainfall between 23:15 and 23:30.

The return period calculated for 1-39 Liverpool Road North is 24.20, which translates into a 4% chance of this type of rainfall occurring in any one year. Whilst the return period for 187-197 Liverpool Road North is calculated at 30.57 or just over a 3% chance of this type of rainfall occurring in any one year.

Start of peak rainfall	10/08/2020	23:15 hrs
End of peak rainfall	10/08/2020	23:30 hrs
Duration (mins)		15
Rainfall depth (mm)		20.95
*FEH **return period		24.20

Table 1 Table showing Summary of event 1 in 24-year rainfall event

*FEH (Flood Estimation Handbook) is the software Sefton MBC use to calculate return periods.

**A return period is the probability of a storm of similar characteristics ie rainfall insensity, affecting an area. A storm with a return period of 1 in 100 year event can also be expressed as having a 1% chance of occurring in any one year. It does not mean that it only happens once a century.

Rainfall Characteristics for 187-197 Liverpool Road North

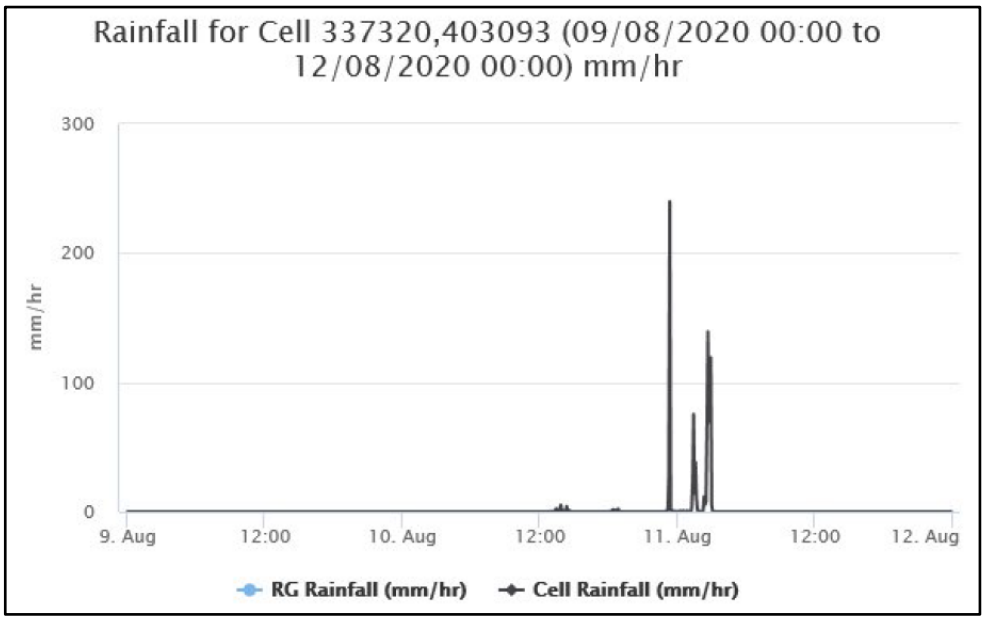

Figure 8 Rainfall amounts mm/hr. for 187 - 197 Liverpool Road North

Start	10/08/2020	23:15 hrs
End	10/08/2020	23:30 hrs
Duration (mins)		15
Rainfall depth (mm)		22.33
FEH return period		30.57

- Table 2 Table showing Summary of event 1 in 30-year rainfall event

River gauge levels and flows

The flooding was not related to watercourses, however, it is interesting to note that the rainfall event was significant enough to raise the river levels in both the River Alt by 37cm (Figure 10) and Dovers Brook by 80cm (Figure 11).

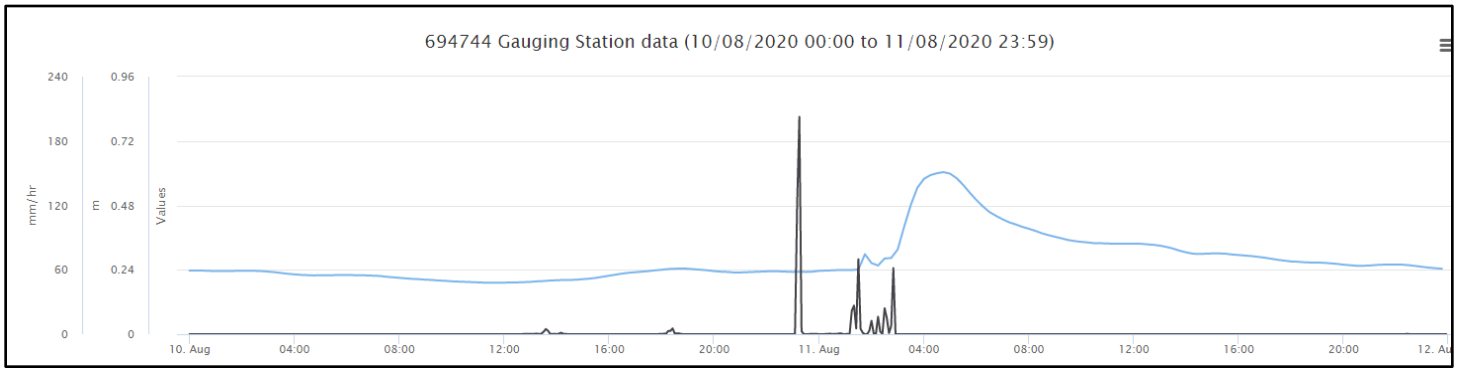

Figure 9 Rainfall and river gauge levels for the River Alt

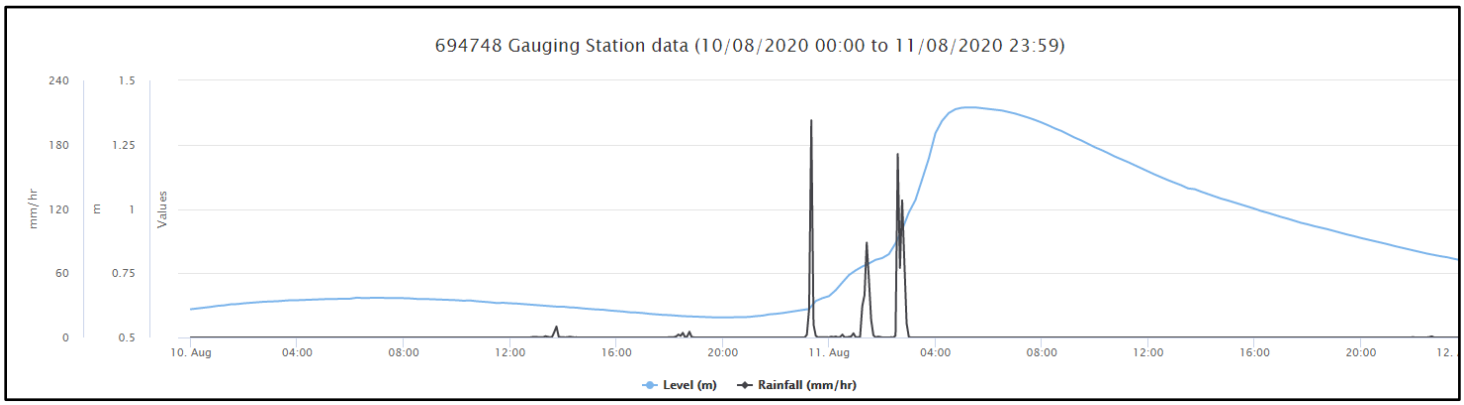

Figure 10 Rainfall and river gauge levels for the Dover's Brook

Causes of flooding

The cause of flooding is due to the amount of rainfall that came down in such a short period of time, the water was falling faster than it could get into the drainage networks leading to water ponding on low spots on the highway and properties and eventually leading to flooding.

1 – 39 Liverpool Road North

The flooding here was exacerbated by a number of the gullies being blocked/not operating at full capacity and the topography of the area as the properties that flooded being lower than the rest of the area. This meant water flowed down the roads ponding in front of the number 15/17 .

The other factor that contributed to the flooding is the aco drain at the rear of the pavement. The owernship and condition of this asset are not known. Additionally, where there are drop kerbs, for example at the pedestrian crossing, water that was flowing down the highway would have been able to run towards the aco drain channel and would then be constrained as the pavement is higher than the door levels of the properties.

187 – 197 Liverpool Road North

The properties affected at 187 to 201 Liverpool Road North were lower than the road level meaning that once the water was high enough to flow over the pavement, at the drop kerbs, the water flowed into the

front of the properties and was unable to drain away fast enough. There may even have been water flowing along the pavement beforehand that was able to run down the driveways.

The additionally, flow down the highway was increased as a number of the gullies were either blocked/not operating at full capacity.

a) Failure of drainage systems and the mechanisms of failure (operation and asset performance)

There were siltation issues with several gullies in the vicinity of the flooding and the ACO drain was not operating efficiently due to a build-up of debris.

b) Flood incident response

The event happened during the night and an officer attended site the following morning when people went back into their businesses and homeowners begun to report flooding. The officer distributed sandbags and discussed the flooding with the property owners. The officer noted that between 15 and 17 Liverpool Road North there is an alleyway leading to the canal (and a rear entrance) and there is a step between the properties which is stopping flood water flowing into the canal.

c) Timeline

23:15 short sharp thunderstorm with heavy rain fell in the catchment.

Summary of impacts and findings

The event was rapid onset flooding which caused internal damage to businesses and residential properties. As well as financial loss to the businesses, residents were concerned about damage to their property and belongings.

Conclusion

The surface water drainage systems were overwhelmed by the volume of water from a short but intense storm lasting 15 minutes. Whilst there were blockages to several gullies it is likely flooding would have still occurred, possibly not to the levels experienced, but with such intensity the rainwater would not have been able to enter the drains fast enough. The flooding has highlighted a particular issue at 1 – 39 Liverpool Road North, where the roofs drain onto the pavement adjacent to the property entrances.

The topography of the areas put these businesses and properties at higher risk of surface water flooding because during intense rainfall events runoff is likely to bypass/flow over the gullies and run to the lowest point ponding in the highway to a level that affects the properties.

Rights and responsibilities (authorities and landowners)

Lead Local Flood Authority – Sefton Council

The LLFA has an overarching strategic coordinating role in managing local flood risk from surface water (pluvial), ordinary watercourses (fluvial) and groundwater sources.

The Council's key responsibilities as a LLFA are to:

- Develop a Local Flood Risk Management Strategy (Section 9 FWMA).
- Investigate flooding (Section 19 FWMA) to a locally derived threshold as detailed in our flood investigations policy for Sefton.
- Maintain a register of assets (Section 21 FWMA) affecting flood risk management.

The FWMA also amended the following sections of the Land Drainage Act 1991 (LDA) resulting in new roles and responsibilities for the Council:

- Section 14a – The addition of this subsection introduced the role of the LLFA and provides general permissive powers to undertake works to mitigate flood risk from ordinary watercourses, surface water and groundwater.
- Section 23 – As of 6th April 2012, the responsibility for issuing Land Drainage Consents for works in or near to ordinary watercourses passed from the EA (Environment Agency) to the LLFA.
- Section 25 – The LLFA have permissive powers to require works to maintain the free passage of flow on ordinary watercourses.

Duties remaining under the LDA.

- As a Land Drainage authority, we retain general powers under Section 14 of the LDA to enter private landownership and undertake works to alleviate flood risk.
- Undertake maintenance on watercourses to which the council is the landowner

Highways Authority - Sefton Council

The Highways Authority has a duty under the Highways Act (1980) to drain the local Highway network (not Trunk Roads) of surface water where it creates a nuisance. Where drainage infrastructure is provided to assist in this duty then the Highways Authority must maintain it to be fit for purpose.

Maintenance of roadside drainage ditches may be the direct responsibility of the Highways Authority or the adjacent landowner. For more information relating to the Highways Authority please refer to the Highways Statutory Duties and Vested Powers Guidance Notes.

Environment Agency

The Environment Agency has the strategic oversight for all flood and coastal erosion risk management in England and Wales. The EA is responsible for managing coastal flooding and fluvial flooding from Main Rivers as well as the risk of flooding from reservoirs. For more information, please visit the Environment Agency website.

Highways England

Highways England has sole responsibility and powers for managing Highway surface water runoff from the trunk road network (i.e., M1, M6, A50, A38 etc).

United Utilities

Sefton is serviced by United Utilities who manage the surface water, foul water and combined public sewer network throughout Sefton and neighbouring authorities. United Utilities have a duty to ensure the reliable operation and maintenance of the public sewer network.

Property owners

Residents are encouraged to understand the flood risk in their local area, or may encounter during their daily routine i.e., routes to work etc, and have a flood plan to steer their response in times of flooding to reduce the consequences of flooding. It is recommended that residents sign up to appropriate warnings for their area and when and where possible alert neighbours to the risks.

When flooding does occur, residents are encouraged to document as much information as possible to aid the investigations of all operating authorities and to provide information to their loss adjusters and insurers. It should be noted that landowners/householders have a responsibility to prevent surface water runoff flowing onto neighbouring land.

Property owners are responsible for protecting their own property.

Recommended actions

1 – 39 Liverpool Road North

- Highways to inspect gullies and drains in the vicinity to check for blockages from Westway to Red Lion Bridge and Stafford Morton Way and assess adequacy of the highway drainage system.

- Establish ownership of ACO drains and asset owners to clear the ACO-drains outside of shops.
- UU to check systems in affected areas are working as they should be.
- Highways to investigate feasibility of mitigation measures on the highway including raising the dropped kerbs and installation of additional road gullies,
- Residents and businesses to ensure they buy their own supply of flood sacks to protect their properties in case of future events.
- Risk Management Authorities to investigate PLP funding schemes to assist.
- Look at putting a pipe through the step between No.15 and 17 Liverpool Road North to allow flood water to discharge into the canal

187 – 197 Liverpool Road North

- UU to check systems in affected areas are working as they should be.
- Highways to inspect gullies and highway drains in the vicinity, from Westway down to Southport Road, to ensure they are operational.
- Highways to investigate feasibility of mitigation measures on the highway including raising the dropped kerbs and installation of additional road gullies,
- If there are frequent access issues preventing gulley maintenance, Highways to consider moving gullies to sections of the highway that have parking restrictions i.e. on the zig zag lines at the pedestrian crossing.
- Property owners to install Property Level Protection (PLP) to their properties to prevent water getting into their property or to consider resilience measures so they can recover more quickly after a flood such as installing tiled flooring that can easily be cleaned, raising the level of electric sockets, flood doors, automatic airbricks etc.
- Risk Management Authorities to investigate PLP funding schemes to assist.
- Residents and businesses to ensure they buy their own supply of flood sacks to protect their properties in case of future events.

Next steps

The recommendations will be added to the Making Space for Water action and issues log for the appropriate Risk Management Authority to update on progress.

Sefton Council