CASE STUDY: FOURACRES, MAGHULL

OVERVIEW

On the 24th September 2012 a prolonged and heavy rainfall period caused flooding to Fouracres, a residential estate in Maghull, located in the East of Sefton.

The area is low lying and suffered from drainage systems becoming overwhelmed by the high level of rainfall over a short period and high levels in the main rivers, resulting in some homeowners having to leave their homes.

CATCHMENT

Fouracres is a small residential cul-de-sac, built circa 1964 with a residential population of approximately 120, situated at the confluence of Whinny Brook and Dover's Brook on the western side of Maghull. Whinny Brook is the main watercourse draining Maghull, cutting through the middle of the town and is an open ditch for much of its length with small sections of culverting under the railway line, canal and roads. Another watercourse called Dover's Brook starts on the western side of the A59.

The area is drained by normal surface water methods, within the property boundaries; drainpipes discharge to gullies which connect to the surface water sewer. Depending on the location within Fouracres, the water either discharges into Dover's Brook or Whinny Brook via an outfall within the drainage network. Similarly highway drainage is collected by gullies and discharges via the same mechanisms. The main foul sewer drain runs along the centre line of The Crescent and then under the back gardens of the even numbered houses on Fouracres.

The area is identified as being at flood risk on the Environment Agency's flood zone maps and Sefton Council's Surface Water Management Plan. However, there are no records of this area having been subject to flooding previously with residents stating that there has been relatively few incidences of ponding in gardens following severe rainfall events.

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CAUSE

The flood event was preceded by heavy persistent rain that continued during the flood event, this followed a particularly wet summer that had left the ground saturated.

Statistical data from the Natural Environment Research Council demonstrates that rainfall in the north west between April and October 2012 was 167% of the average for the period 1971-2000 and groundwater levels in the region were 'exceptionally high'.

Therefore, the weather events of 24th September 2012 and the months immediately prior to that, were on any level exceptional.

Based on the available data it would appear that the high water levels in Dover's and Whinny Brook not only stopped any outflow from the outfalls but also flowed up the pipework emerging from the gullies within residents gardens. As levels increased it emerged from manholes as well.

A contributory factor to the high levels in the Brooks could be a change in the maintenance regime leading to a build up of silt on the bed, reducing the Brooks' overall capacity to convey water. Another likely cause in some cases is rainwater pooling at the low point of some properties gardens.

IMPACTS

ENVIRONMENT

- Little impact. United Utilities cleaned the foul/contaminated water off the roads and residents cleaned it off their properties.

ECONOMY

- Cost to local authority (investigations/emergency response), local residents (insurance premiums etc.).

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PEOPLE

- Along Fouracres itself, around 40 properties were affected by the flood water.
- 24 properties suffered from internal damage.
- Foul water flooding affected at least 3 properties along The Crescent.
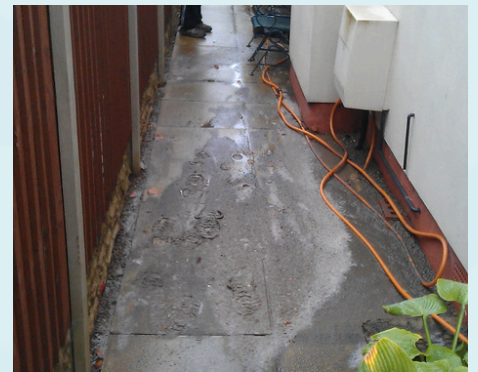- Powercut for 12 hours for safety reasons.
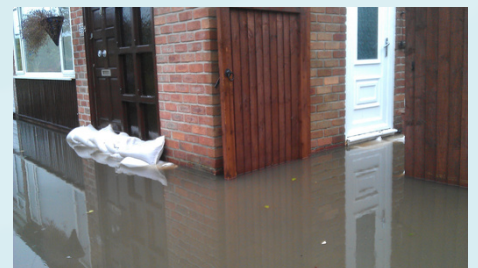

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RESPONSE

In response to the heavy rainfall, the Environment Agency deployed officers on 24th September 2012. Merseyside Fire and Rescue Service deployed pumps which reduced the level of the water to a limited extent and then the levels appeared to remain constant. They continued to pump until about 1pm on the 25th September.

Image provided by Sefton Council

In the same time period the council were on site in an emergency response role and were talking to residents to see if they had any welfare needs and supplied sandbags. United Utilities attended the site but could find no issues with their sewers and were told that the flooding was due to a breach in an embankment on the main river so left the site. However, subsequent inspection by the Environment Agency has found no evidence of a breach or overtopping on either Dover's or Whinny Brook. The levels in the Brook were high but did not reach full capacity.

Scottish Power were on site on the 25th September and following discussions with the category 1 responders, cut the power to the street for safety reasons at approximately 5am. This was re-established by 5pm.

The situation appeared to be stable following the withdrawal of the Fire Service pumps but in the afternoon water levels within the main river and within Fouracres started to increase. At 5pm on the 25th September the Environment Agency ordered two pumps which arrived on site at 7pm and were set up and operational by 9.30pm. At least one more property flooded during the evening with the water appearing to come up through the floor.

The pumps were left running overnight and while they did lower the water level they did not clear it. One of the pipes on the pump at the top of the road developed a defect at about 9.30am on the 26th September and it had to be turned off and repaired, Meanwhile, the water levels started to increase. With both pumps working at about 11am the level of water started to drop. Additional small pumps were brought in later to clear garden flooding around The Crescent and Fouracres.

To summarise, the pumping of the water back into Dover's Brook and Whinny Brook reduced the level within Fouracres to a limited extent. It wasn't until the levels in the Brooks significantly dropped that the flow of water backing up through the pipework ceased and the area started to drain out through the pipework helped by the pumps.

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FUTURE RISK MANAGEMENT

The flooding mechanism appears to be a back flow of water along the public sewer from the main rivers. As such there was realistically very little that any authority could do to alleviate the situation until the water levels in the rivers fell. The pumps were only reducing the flood levels slightly until the water levels in the rivers dropped. However, there are a number of recommendations put forward in order to reduce the likelihood and impact of flooding in the future.

United Utilities have carried out a number of investigations on both the foul sewer and the public sewer. The investigation on the foul sewer system concluded that there was no blockage in the system and flooding occurred due to surface water entering the foul system either via cross connections, directly through foul drains or flood water being discharged. United Utilities did not find a blockage on the surface water sewer system either. However, it was found that neither of the 2 outfalls which discharged into Dover's and Whinny Brook had a flap/non return valve on them. They have undertaken work to carry out further investigations on the system to better understand it and check for cross-connections.

Sefton Council organised a meeting for residents shortly after the flood event which both the Environment Agency and United Utilities attended as did the National Flood Forum. One of the concerns mentioned by a resident was the possibility of the local canal leaking and adding to the amount of water needing to be drained. The Council has undertaken discussions about this issue with the Canal and River Trust to better understand the role and potential contribution of their systems to the flood risk.

Another recommendation is for the Environment Agency to work with land owners who live near to water courses and are in charge of their own drainage systems to reduce the impact of debris and blockages, which should help prevent future flooding.

A report stated that the Council, the Environment Agency and United Utilities should review their communication with regards to sharing intelligence and co-ordinating responsibilities.

SOURCE
Sefton Council

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