

Flood Investigation Report

Fouracres (Maghull), Sefton Lane (Maghull),
Hawksworth Drive (Formby), Water, Street (Thornton)
and Moss Lane (Lydiate)



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Executive Summary

Sefton Council has undertaken a flood investigation in respect of the events of September 24th 2012, when a number of properties within the borough were either affected or at risk of being affected by flooding. The areas that were affected are as follows

- Fouracres, Maghull;
- Sefton Meadows, Maghull;
- Hawksworth Drive, Formby;
- Water Street, Thornton;
- Moss Lane Lydiate.

Rainfall data for this event has concluded that a significant amount of rain, with a 1 in 3 return period, fell on to an already saturated area. Statistical data from the Natural Environmental Research Council has established 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 September 24th 2012 and the months immediately prior to that, were on any level, exceptional. Given the evidence collated for this investigation it is accepted that each Risk Management Authority did discharge its duties appropriately, although as with any major event of this nature, it is essential to review the response in order to learn lessons and improve how the relevant authorities react in future scenario.

This investigation has identified that the flooding mechanism varies between the sites but consistent issues are drainage systems being overwhelmed by the scale of the event and the land that flooded being low lying. The high level in the watercourses was also an issue at a number of locations where it either prevented discharge, flowed back into the drainage system or overflowed from the watercourse.

There are a number of recommendations suggested that would reduce the likelihood and impact of flooding in the future.

Recommendations relevant to the borough

Number	Recommendation	Lead Risk Management Authority
1	Investigate the merit of installing flap valves/non return systems on drainage outfalls to prevent 'backfilling' from watercourses into which they discharge, at high levels due to excessive rainfall.	United Utilities

2	Co-ordination of maintenance priorities and works between the Risk Management Authorities	Environment Agency
3	Work with landowners with riparian duties to reduce the impact of debris and blockages.	Environment Agency
4	The Council should work more closely with the Canal and River Trust to understand their role and potential contribution of their systems to flood risk	Sefton MBC
5	The Council should review their Operational Plan for flood events in order to improve response to future events	Sefton MBC
6	The Council, Environment Agency and United Utilities need to review how they share intelligence and co-ordinate responsibilities	Sefton MBC
7	The risk management authorities should review other locations where this mechanism for flooding might be an issue	United Utilities

Recommendations relevant to Fouracres, Maghull

Number	Recommendation	Lead Risk Management Authority
1	Investigate the merit of installing flap valves/non return systems on the outfalls into Whinny Brook and Dover's Brook.	United Utilities
2	Co-ordination of maintenance priorities and works between the Risk Management Authorities	Environment Agency

3	Work with landowners with riparian duties to reduce the impact of debris and blockages.	Environment Agency
4	The Council should work more closely with the Canal and River Trust in order to understand the role and potential contribution of their systems to flood risk	Sefton MBC
5	The Council, Environment Agency and United Utilities need to review how they share intelligence and co-ordinate responsibilities	Sefton MBC
7	The risk management authorities should review other locations where this mechanism for flooding might be an issue	United Utilities

Recommendations relevant to Sefton Meadows, Maghull

Number	Recommendation	Lead Risk Management Authority
1	Environment Agency should engage in further discussions with the riparian owner at Dover's Bridge about raising the embankment, to raise the low point in the defence.	Environment Agency
2	Council to discuss with the local farmer any more suitable measures to stop surface water flowing from the field into the highway.	Sefton MBC

3	Environment Agency to explore the feasibility of expanding the flood warning service for this area	Environment Agency

Recommendations relevant to Hawksworth Drive, Formby

Number	Recommendation	Lead Risk Management Authority
1	The level of the low spot in the embankment should be raised to the same level as the rest of the embankment.	Environment Agency
2	Investigate if there are flap valves/none return systems on the outfalls into Eight Acre Brook. And if not, consider the merit of installing them.	United Utilities

Recommendations relevant to Water Street, Thornton

Number	Recommendation	Lead Risk Management Authority
1	The Council will continue to work towards a solution that remedies defects and increases capacity for this area within financial constraints.	Sefton MBC

Recommendations relevant to Moss Lane, Lydiate

Number	Recommendation	Lead Risk Management Authority
1	Discuss the issues with the riparian land owners and seek to negotiate a solution	Sefton MBC

United Utilities Response to the Recommendations

Recommendation	What Action will be taken	When	Outcome/Next Step
United Utilities is reviewing other locations where low outfalls and high river levels might create a flooding issue	Investigations are ongoing, especially in the area around Fouracres.	Ongoing	Where appropriate locations / mitigation measures will be considered for future capital programme of work.
United Utilities have Investigated the merit of installing flap valves/non return systems on the outfalls into Whinny Brook and Dover's Brook and will install suitable non return systems when conditions allow (i.e. when outfall is clear and water levels permit access for installation).	United Utilities have investigated the area and will fit appropriate measures, e.g. non return valves when the outfall have been cleared and water levels permit access.	Will be implemented at the earliest opportunity, i.e. when conditions permit access.	Enhanced protection against back flow from Dover's and Whinney Brook.
Investigate if there are flap valves/none return systems on the outfalls into Eight Acre Brook. And if not, consider the merit of installing them.	This will be considered when conditions allow inspection of the outfall arrangement.	Will be inspected when conditions allow and mitigation measures if appropriate will be considered.	Outfall arrangement will be inspected and mitigation measures will be assessed and prioritised.

Environment Agency Response to the Recommendations

Recommendation	What Action will be taken	When	Outcome/Next Step
Co-ordination of maintenance priorities and works between the Risk Management Authorities	EA will share their maintenance programme with other RMAs. Other RMAs to share their maintenance/works programmes	April 2013	
Work with landowners with riparian duties to reduce the impact of debris and blockages.	Raise awareness with riparian landowners and remind them of the importance of keeping channels clear.	Ongoing	
Environment Agency should engage in further discussions with the riparian owner at Dover's Bridge about raising the embankment, to raise the low point in the defence.	Previous discussions on the subject have been unsuccessful. We will re-open discussions with the landowner, in light of the recent flooding.	June 2013	
The level of the low spot in the embankment should be raised to the same level as the rest of the embankment.	Undertake crest level survey for 8 Acre watercourse. Programme works to raise low spot near A565 culvert.	December 2012 13/14	
Environment Agency to explore the feasibility of expanding the flood warning service for this area	New gauging station planned for Dover's Brook. Assess feasibility of new FWA using this gauge	April 2013 June 2013	

Recommendations relevant to Sefton MBC

Recommendation	What Action will be taken	When	Outcome/Next Step
The Council should review their Operational Plan for flood events in order to improve response to future events	The Operational plan will be reviewed in light of flood incident to improve co-ordination and operational response	April 2013	Improved co-ordination and operational response.
The Council, Environment Agency and United Utilities need to review how they share intelligence and co-ordinate responsibilities	Will review purpose and scope of "Making Space for Water" meetings (regularly occurring meeting between SMBC, EA and UU).	February 2013	Improved co-ordination and operational response.
The Council should work more closely with the Canal and River Trust in order to understand the role and potential contribution of their systems to flood risk	Canal and River Trust to be invited to Making Space for Water meetings	February 2013	Understanding of the Canal network on flood risk.
Council to discuss with the local farmer any more suitable measures to stop surface water flowing from the field into the highway.	Capita to contact farmer.	March 2013	Reduce flood water on highway
The Council will continue to work towards a solution that remedies defects and increases capacity for this area within financial constraints.	Monies have been secured to make some improvements to the piped watercourse, but awaiting land owners permission and require further investigations	March 2013	Reduce flood risk in Water Street, Thornton
Discuss the issues with the riparian land owners and seek to negotiate a solution	Site meetings held	December 2012	Riparian owners have cleared the watercourse allowing water to divert along its old course.

1. Introduction

1.1 Lead Local Flood Authority Duty to Investigate

Under the Flood and Water Management Act 2010 (FWMA), Sefton Metropolitan Borough Council is designated as the Lead Local Flood Authority (LLFA) for Sefton.

The Council has a duty, where it deems necessary, to record and report flood incidents within its administrative area under Section 19 of the FWMA. In order to assist in the preparation of the report Section 14 of the same Act confers the power to request information from parties that it considers relevant to the investigation.

The Council has chosen to exercise this duty in relation to the floods that occurred in September 2012 at multiple locations. The reason it has chosen to investigate these events is because of the number of properties affected.

This report will:

- describe the locations that flooded and how we would expect their drainage systems to operate under normal conditions,
- describe any history of flooding
- describe the weather event that led to the flooding (set out in full in appendix 1),
- describe the flood event including setting out what the relevant flood risk authorities have done and propose to do
- set out what we believe to be the mechanism by which the flooding occurred,
- conclude if all relevant flood risk authorities undertook their roles and responsibilities appropriately (set out in full in the appendix)
- set out recommendations based on lessons learnt from this event

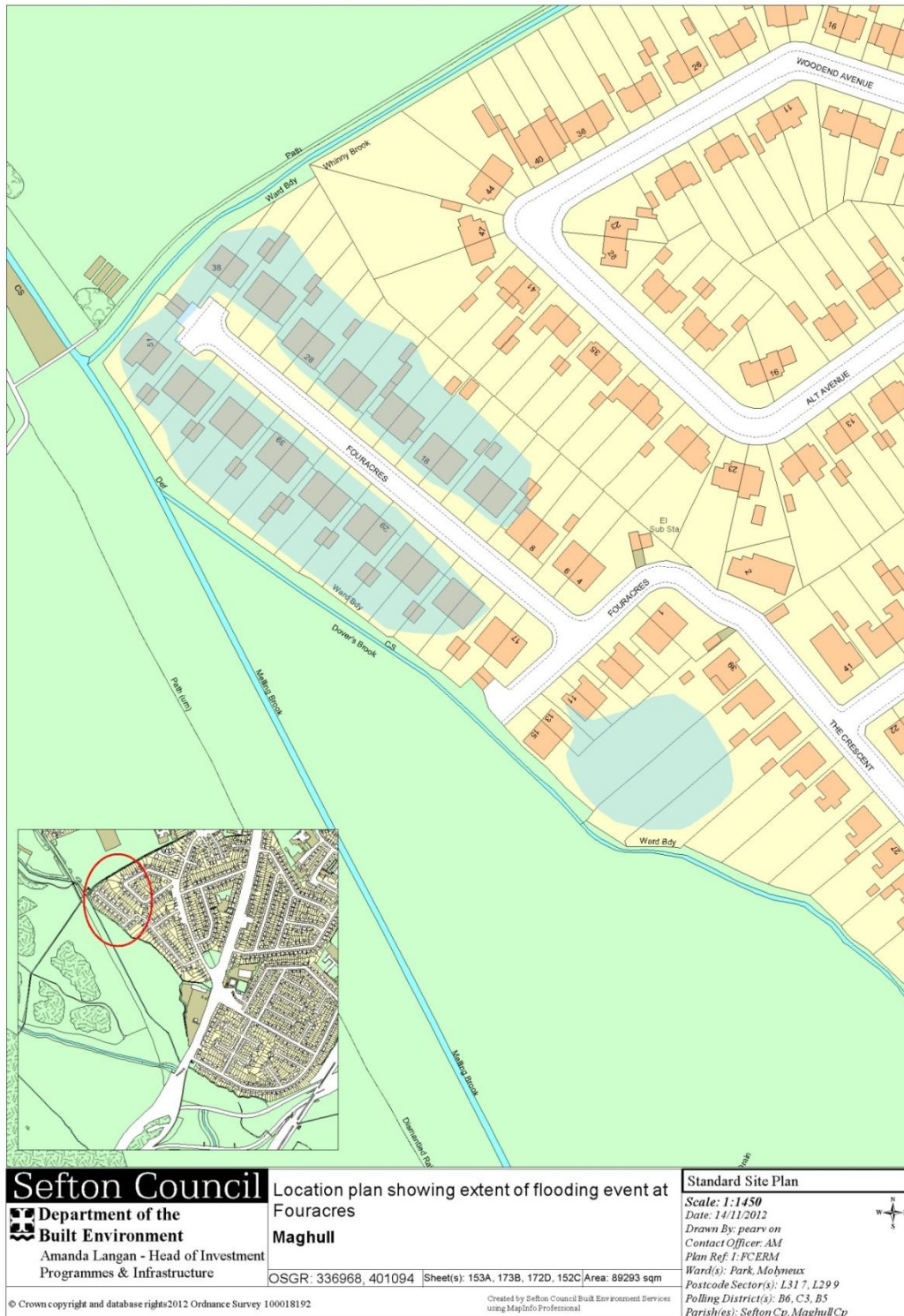
This report identifies in turn each of the locations where flood events occurred and reaches recommendations as to how such events can be prevented or mitigated in future.

2.0 Fouracres, Maghull

2.1 Site Location

Fouracres is a small residential cul-de-sac situated at the confluence of Whinny Brook and Dover's Brook on the western side of Maghull. The estate was built circa 1964.

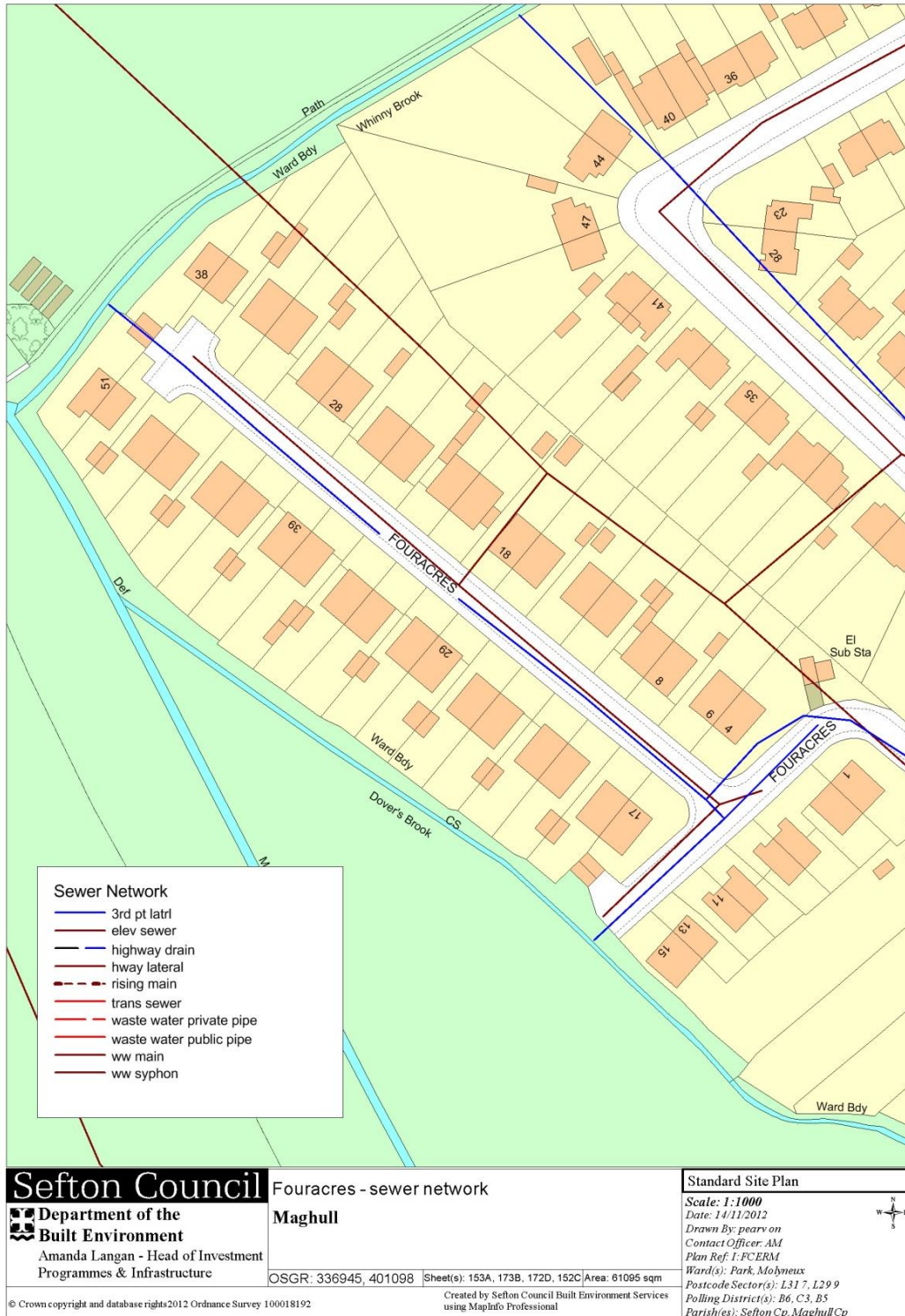
Figure 1: Site location and flood extent



2.2 How the Drainage System Works

The area is drained by normal surface water methods, within the property boundaries drainpipes discharge to gullies which connect to the surface water sewer which, depending on location within Fouracres, either discharges into Dover's Brook or Whinny Brook via an outfall. Similarly highway drainage is collected by gullies and discharges via the same mechanisms.

Figure 2: The sewer network



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.

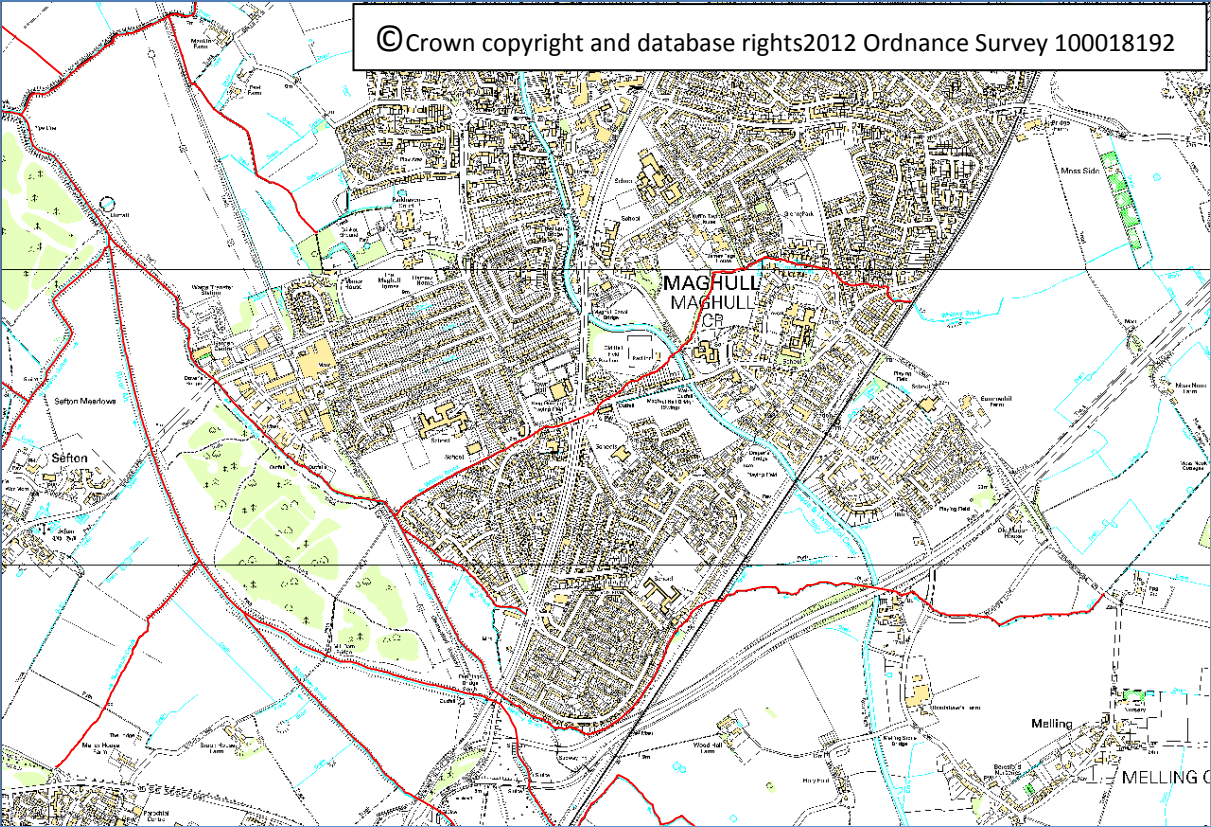
The main river starting point for Dover’s Brook is SD3729 0083, it is a rather short section of river starting on the western side of the A59.

The main river starting point for Whinny Brook is SD 3860 0188. Whinny Brook is the main watercourse draining Maghull cutting through the middle of the town. The watercourse is open ditch for much of its length with small sections of culverting under the railway line, canal and roads.

It can be seen from the map below the areas that may be draining into Dover’s Brook and Whinny Brook although it was outside the scope of this investigation to establish exactly which areas drain into these Brooks.

The surface water sewer and foul sewer are the responsibility of United Utilities. Dover’s Brook and Whinny Brook are defined as main rivers and as such the Environment Agency exercise permissive powers to inspect and maintain them.

Figure 3: Main River extents in Maghull



2.3 Flooding History

2.3.1 Previous Flood Events

The area is identified as being at flood risk on the Environment Agency's extreme flood zone maps and Sefton Council's Surface Water Management Plan but there are no records of this area having been subject to flood previously. One resident, who has resided there for more than 45 years advised during the course of this investigation that there has never been a flood of this nature before and this has been reinforced by other residents who have said that there has only been a relatively few incidences of ponding in gardens following severe rainfall events. However, in contradiction, one property owner reported that their property has been flooded a few times in the past 5 years with water coming up from the drains but it has never been as severe as during this event.

2.4 Flood Incident

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. The full details of the rainfall event are in appendix 1 and the timeline for the event is in appendix 2.

In response to heavy rainfall, the Environment Agency deployed officers to check assets. One officer was in the vicinity of Fouracres at 4.00pm on September 24th 2012 and was approached by a resident and made aware of the concerns. He remained on site at Fouracres until 7.30pm at which point Merseyside Fire and Rescue Service were called. They arrived prior to 8.00pm. Sefton Council's emergency response was present at 11pm, followed by United Utilities by 2.30am and Scottish Power by 5am.

During this time the flood water was rising, starting in the gardens of a number of properties and getting higher until it was approaching and in a number of instances exceeded the threshold of the property leading to internal flooding. The Fire Service deployed pumps which reduced the level of the water to a limited extent and then the levels appeared to remain constant. The Fire Service had marked the peak level of the flood water at three locations to act as a reference. They continued to pump until about 1pm on the 25th.

In the same time period the Council were on site in the emergency response role and were engaging with residents to see if they had any welfare needs. United Utilities attended 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 site. Scottish Power were on site and cut the power to the street for safety reasons at about 5am; this was re-established by 5pm on the 25th.

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 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 of the 25th 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 and it had to be turned off and repaired the water levels started to increase. With both pumps working at about

11am on the 26th the level of water started to drop. Additional small pumps were brought in later on the 26th to clear garden flooding around The Crescent and Fouracres.

2.5 Foul or 'clean' water?

There was foul water flooding to at least 3 properties along The Crescent. Some foul water escaped through the manhole (see Picture 1) in the road but the majority of it came from the manholes in the residence gardens and from the side drain that takes water from the kitchen.

Foul flooding was also reported in Fouracres but there were not enough debris to confirm this. There was clean water flooding to the back gardens of properties on The Crescent and adjacent properties on Fouracres.



Figure 4: Toilet type debris emanating from a drain in the road



Figure 5: Foul debris residence side passage

2.6 How many properties were affected?

Along Fouracres itself approximately 40 properties were affected by flood water with 24 properties being internally affected. The road itself was not affected by the flood water as it is higher than the properties.

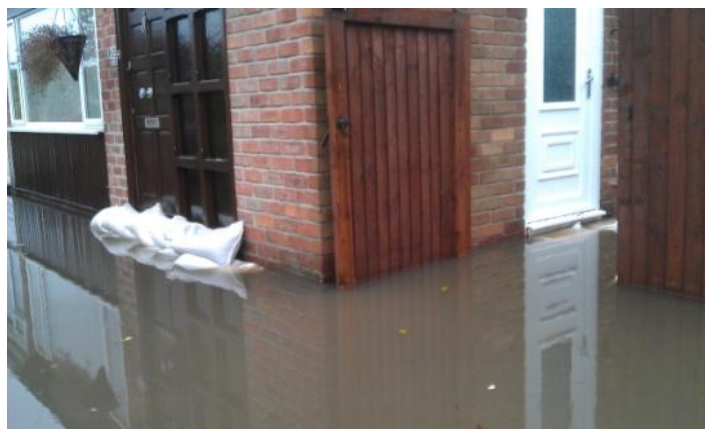


Figure 6: Illustrating the level of flooding around houses in Fouracres

2.7 Following the Flood

There was a suggestion that the cause of the flooding was that Dover's Brook had breached its bank, subsequent inspection by the Environment Agency has found no evidence of a breach or overtopping on either Dover's or Whinny Brook. As can be seen in the picture below of Whinny Brook (looking towards the head of Fouracres), the levels in the Brook were high but did not reach its full the capacity.

Dover's Brook, and Whinny Brook were already scheduled for maintenance and this is planned to be completed during this financial year. The Environment Agency will also have completed their Lunt Meadows scheme by the end of the financial year; it was partially operational at the time of the flooding but when fully operational will be able to take a greater amount of water from the system and store it until there is capacity for it to drain away.



Figure 7: Illustrating the height of water in Whinny Brook (looking towards Fouracres)

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 into it.

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 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. The Council have also undertaken an investigation and

produced this report. One of the concerns mentioned by a resident was the possibility of the canal leaking and adding to the amount of water needing to be drained, the Council has undertaken to discuss this issue with the Canal and River Trust and establish the situation.

2.8 How did the flood happen?

Based on the available data it would appear that the high water levels in the 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.

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 in via the pipework ceased and the area started to drain out through the pipework and by the pumps.

Below is a picture of the outfall from Fouracres into Whinny Brook which was taken during a period of low flow, the outfall is still partially submerged.



Figure 8: Outfall from Fouracres into Whinny Brook, taken 06/11/2012

A contributory factor to the high levels in the Brooks could be a change in the maintenance regime. The residents voiced concern that anecdotally the Brooks used to be dredged 4 times a year, reduced to twice a year and this year they allege it has not been maintained at all leading to a build up of silt on the bed, reducing the Brooks overall capacity to convey water.

The mechanism for the gardens flooding to the rear of 11, 15, 13 Fouracres and 39, 37, 35 The Crescent is still unclear. The most likely cause is rain water pooling in the low point of the gardens.

2.9 Roles and Responsibilities

The full roles and responsibilities of the Council, Environment Agency and United Utilities are set out in appendix 3 but in relation to this event the key points are:

The Environment Agency operates under permissive powers to maintain lengths of watercourses that have been designated as main rivers; they do not own these main rivers and do not have a duty to maintain them. They did not have to provide pumps during the event but chose to do so and whilst the maintenance had not been carried out it was scheduled. The reduction in maintenance is a consequence of decisions they have had to take to manage within reduced budgets. While they have satisfied their roles and responsibilities it is possible to better co-ordinate their maintenance priorities and activities with the other risk management authorities to better manage flood risk.

United Utilities attended site initially but under the impression that the cause of the flooding was a breach in the embankment chose to redeploy their resources to other locations where there were significant issues to deal with. They checked the sewer system, thus satisfying their roles and responsibilities, and found it to be working as it should but overwhelmed by the scale of the event. Sefton Council have a role under the Civil Contingencies act and discharged this in relation to checking on and where necessary supporting the welfare of residents affected by the flooding. The Council had officers present to support the efforts to manage the flood water and supplied sand bags. The Council discharged its roles and responsibilities although it should review its operational plan for such events to revise based on the lessons learnt.

2.10 Conclusion

Rainfall data for this event has concluded that a significant amount of rain fell on to an already saturated area with approximately a 1 in 30 year return period. Given the evidence collated for this investigation it is accepted that each Risk Management Authority did discharge its duties as appropriate, whilst recognising that United Utilities effort was hampered by a report of a breach leading to it leaving site earlier than it would otherwise have done.

The flooding mechanism appears to be a back flow of water along the public sewer from the main rivers and as such there was realistically very little that any authority could do to alleviate the situation until the water levels in the main rivers fell. The pumps were only reducing the flood levels slightly until the water levels in the main rivers dropped.

Key Points in relation to the flooding:

- It was a prolonged and heavy rainfall event
- The land that flooded is low lying
- The levels in the main river were high due to the rainfall
- Reduced maintenance of the Brooks may have contributed to the high water levels
- The drainage system allows water to flow from the main river into Fouracres when the water level in the Brooks is high

However, there are a number of recommendations that we would make in order to reduce the likelihood and impact of flooding in the future.

2.11 Recommendations

Number	Recommendation	Lead Risk Management Authority
1	Investigate the merit of installing flap valves/non return systems on the outfalls into Whinny Brook and Dover's Brook.	United Utilities
2	Co-ordination of maintenance priorities and works between the Risk Management Authorities	Environment Agency
3	Work with landowners with riparian duties to reduce the impact of debris and blockages.	Environment Agency
4	The Council should work more closely with the Canal and River Trust in order to understand the role and potential contribution of their systems to flood risk	Sefton MBC
5	The Council, Environment Agency and United Utilities need to review how they share intelligence and co-ordinate responsibilities	Sefton MBC
6	The risk management authorities should review other locations where this mechanism for flooding might be an issue	United Utilities

3.0 Sefton Meadows, Maghull

3.1 Site Location

Sefton Lane is on the western side of Maghull linking it with Sefton village via Bridges Lane. The road is a busy commuter route which also serves the industrial estate and the waste recycling centre at Sefton Meadows. The road name changes at the bridge over Dover's Brook to Bridges Lane.

The land on either side of Bridges Road has been used as landfill sites but the land to the north is now agricultural and the land to the south forms part of Jubilee Wood.



Figure 9: Site location and flood extent

3.2 How the Drainage System Works

Conventional urban drainage systems are made up of a complex network of sewer pipes, overflows, gullies and culverts (covered watercourses). Ownership and duties are split between various agencies and landowners. On an individual property level, rain falls on to roofs, gardens and driveways and makes its way through the gutters and channels to the drain. The less porous the surface the rain lands on the quicker the water enters the drainage system.

Where drains from individual properties connect together, the responsibility for maintenance transfers from the householder to the sewerage undertaker and is deemed to be a public sewer, this may then discharge into a surface water sewer, a foul sewer, or a combined sewer system (Foul and Surface water) or possibly a watercourse.

Rain that falls on the highway collects at the side of the road at the kerb and is channelled to the gullies and is piped away to either a public sewer or in some cases directly to a watercourse. Sefton Council are responsible for the drainage of local roads and public highways.

The surface water sewer and foul sewer are the responsibility of United Utilities. Dover's Brook is defined as main rivers and as such the Environment Agency exercise permissive powers to inspect and maintain it.

The main river section of Dover's Brooks flows from the A59 Northway to the confluence with the River Alt, approximately 600m away from Dover's Bridge, which discharges into the Mersey Estuary via Altmouth Pumping Station at Hightown.



Figure 10: Sewer Network at Bridges Lane, Sefton Meadows, Maghull

3.3 Flooding History

3.3.1 Previous Flood Events

The area is identified as being at flood risk on the Environment Agency's extreme flood zone maps and each Risk Management Authority has a number of records showing flooding at this location over the past 10 years. The area is additionally shown as at risk from flooding in the councils Surface Water Management Plan.

3.4 Flood Incident

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. The full details of the rainfall event are in appendix 1.

There were 2 sources of flooding in this area that affected 3 separate locations in this area each separated by a bridge:

The first source (*A, figure 11*), was from the surface water system not being able to discharge into Dover's Brook or the River Alt due to high river levels.

The first area of flooding, travelling from Sefton village towards Maghull, was a 60m stretch between the village and the bridge over the River Alt. Rainwater had come off the field on the north side and pooled in the dip and inundated the road to approximately 15cms deep.



Figure 11: Bridges Lane, area A, taken 25/09/2012

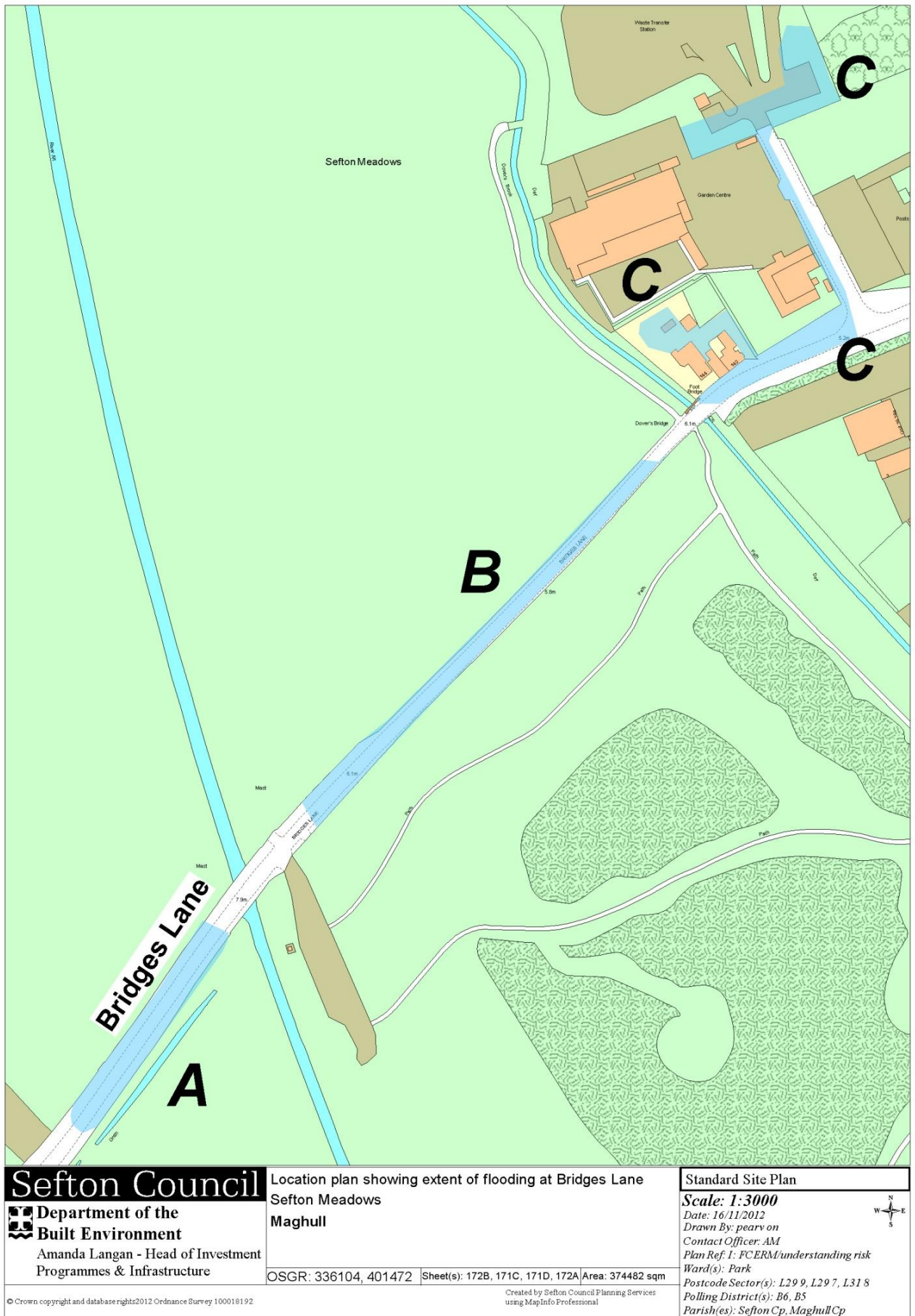


Figure 12: Separate flooding sources at Bridges Lane, Sefton Meadows, Maghull

The second stretch (B, Figure 13 and figure 14), of highway flooding was between the bridges over the River Alt and Dover's Brook to a depth of approximately 15 cms.



Figure 13: Bridges Lane, area B, taken 25/09/2012



Figure 14: Bridges Lane, area B, taken 25/09/2012

The final area of flooding (C, Figure 15), was on Sefton Lane between Dover's Brook bridge and the Cheshire Lines Bridge. There was some surface water

flooding at this site as the highway drain on the opposite side of the road was “tide” locked by the river level on Dover’s Brook.

However, the major source of flooding was from Dover’s Brook overtopping the embankment at a low spot close to Dover’s Bridge, as can be seen in the photograph below (Figure 15). The water flowed along the footpath into the highway and joined up with the surface water flooding, forming a pool across the road, approximately 12cm deep. Some water flowed along the road towards the waste recycling centre and pooled at the entrance, and some water flowed around the backs of the properties on Sefton Lane damaging outbuildings, a caravan and ingressed into at least 1 property.



Figure 15: Dover’s Brook flooding into Sefton Lane, taken 24/09/2012

On becoming aware of the situation, the Council closed the section of Sefton Lane at Dover’s Bridge to Bridges Lane near Sefton Old Hall.

3.5 How did the flood happen?

The main cause was that the River Alt and Dover’s Brook were high, due to the significant amount of rainfall, which “tide” locked the highway drainage system which in turn was unable to discharge. Once the pipes had reached their capacity the water started to flow from the gullies into the highway.

There is a possibility that there was a back flow issue here, as one resident pointed out that there was not a flap fitted to the outfall on Dover’s Brook.

The other source of flooding was again caused by high river levels in Dover’s Brook. The water level rose to a sufficient height that it was able to overtop the flood embankment at a low point close to the footbridge.

3.6 Roles and Responsibilities

The full roles and responsibilities of the Council, Environment Agency and United Utilities are set out in appendix 3 but in relation to this event the key points are:

The Environment Agency sent a Site Controller to assess the flood but as sandbags had been deployed there was little else that could be done.

It is not known if United Utilities had received any telephone calls about this area or whether they attended this site.

Sefton Council have a role under the Civil Contingencies act and discharged this in relation to checking on and where necessary supporting the welfare of residents affected by the flooding. The Council had officers present to support the efforts to manage the flood water and supplied sand bags. As Highways Authority the council closed the road between Dover's Bridge and Bridges Lane. The Council discharged its roles and responsibilities although it should review its operational plan for such events to revise based on the lessons learnt.

3.7 Conclusion

Rainfall data for this event has concluded that a significant amount of rain fell on to an already saturated area with approximately a 1 in 30 year return period.

The flooding mechanism appears to be overtopping of the flood defence at a low spot as well as the surface water system being unable to discharge into swollen rivers.

Key Points in relation to the flooding:

- It was a prolonged and heavy rainfall event
- The land that flooded is low lying
- The levels in the main river were high due to the rainfall
- Reduced maintenance of the Brooks may have contributed to the high water levels
- The drainage system was unable to discharge.

However, there are a number of recommendations that we would make in order to reduce the likelihood and impact of flooding in the future.

3.8 Recommendations

Number	Recommendation	Lead Risk Management Authority
1	Investigate installing flap valves/non return systems on the outfalls that discharge into Dover's Brook and the River Alt.	Sefton MBC
2	Environment Agency should engage in further discussions with the riparian owner at Dover's Bridge about raising the embankment, to raise the low point	Environment Agency

	in the defence.	
3	Council to discuss with the farmer any more suitable measures to stop surface water flowing from the field into the highway.	Sefton MBC
4	Environment Agency to explore the feasibility of expanding the flood warning service for this area	Environment Agency

4.0 Hawksworth Drive, Formby

4.1 Site Location

Hawksworth Drive is a small residential cul-de-sac adjacent to Eight Acre Brook on the northern side of Formby bordering Woodvale.

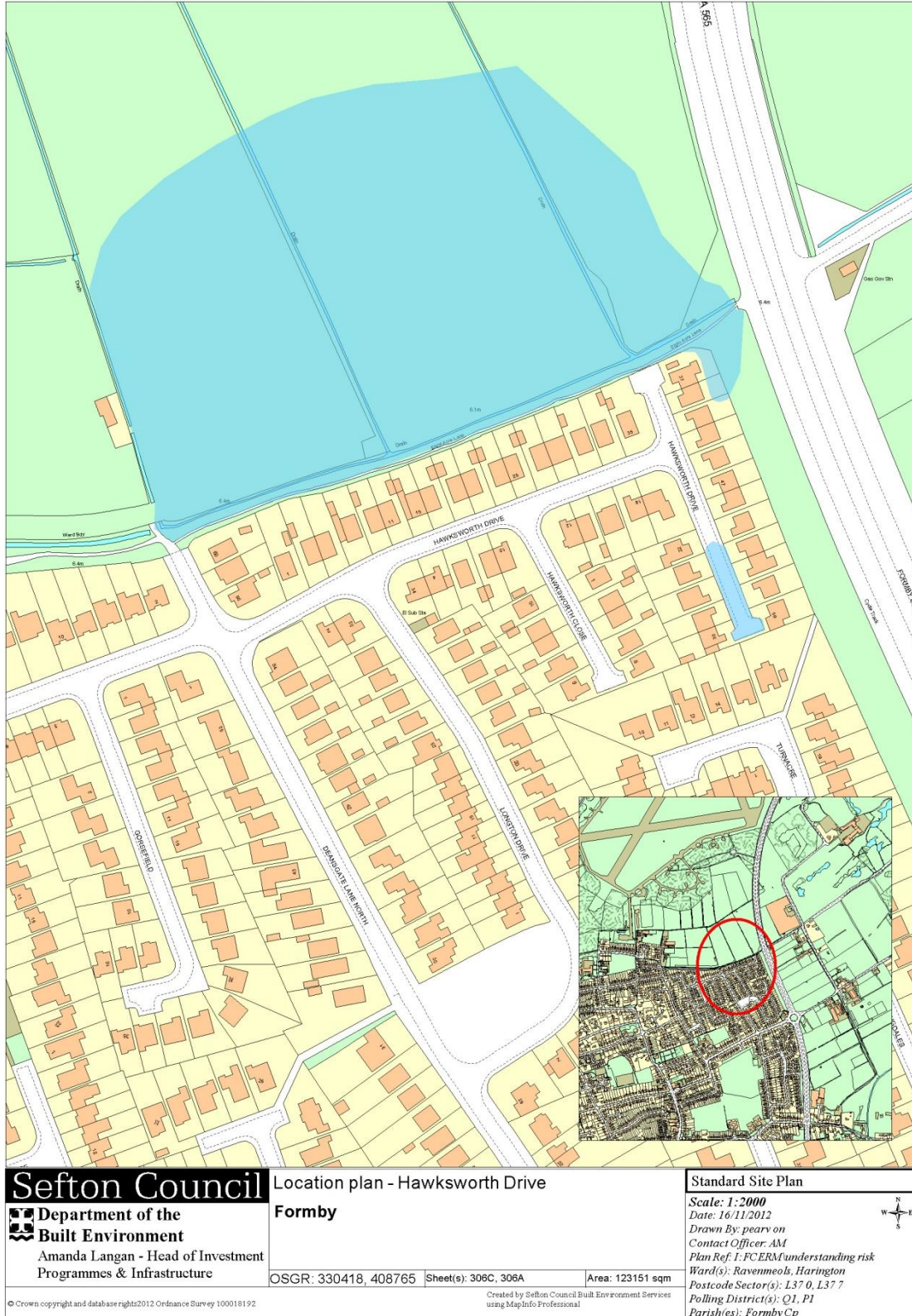


Figure 16: Site location and flooding extent

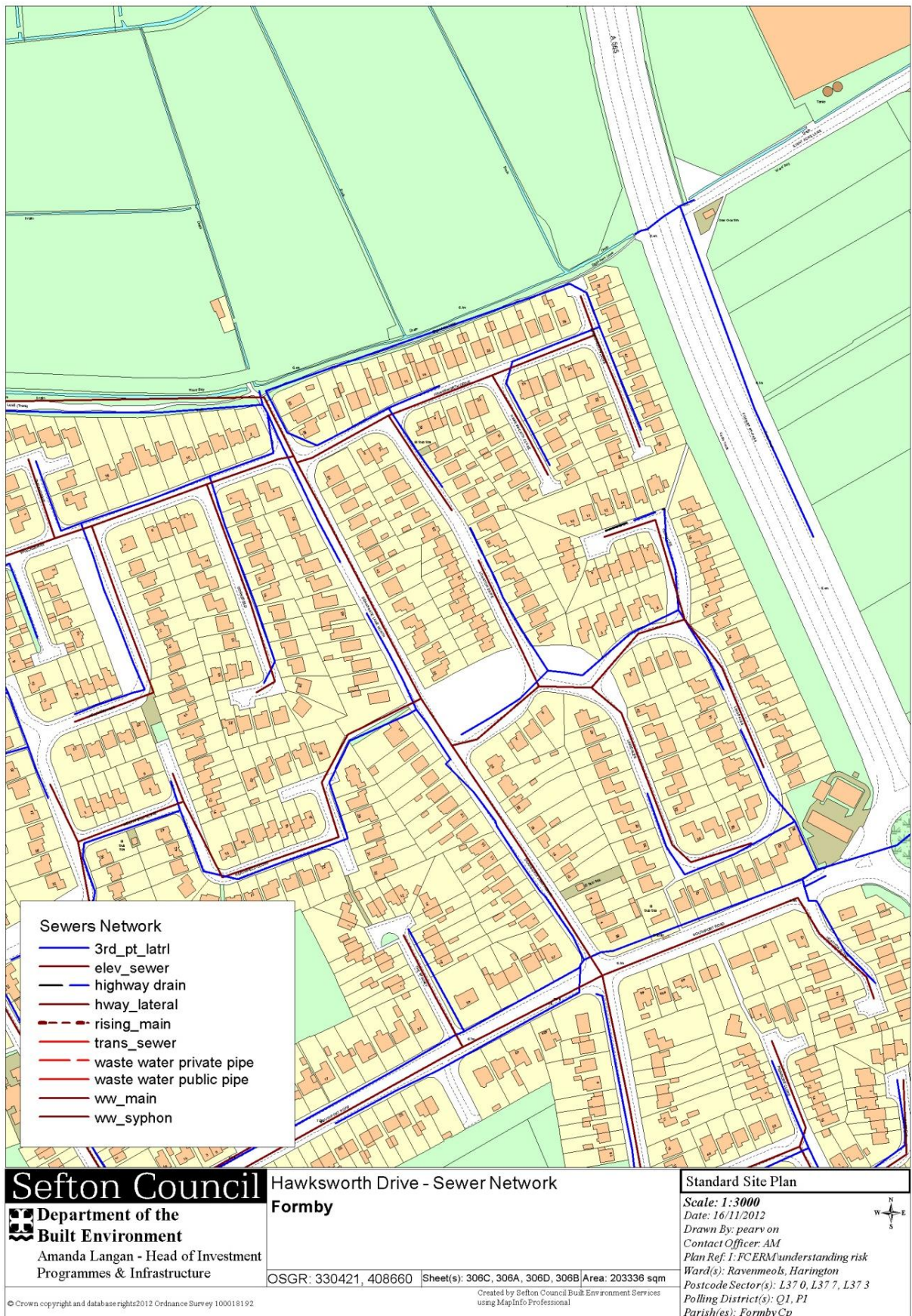
4.2 How the Drainage System Works

Conventional urban drainage systems are made up of a complex network of sewer pipes, overflows, gullies and culverts (covered watercourses). Ownership and duties are split between various agencies and landowners. On an individual property level, rain falls on to roofs, gardens and driveways and makes its way through the gutters and channels to the drain. The less porous the surface the rain lands on the quicker the water enters the drainage system.

Where drains from individual properties connect together, the responsibility for maintenance transfers from the householder to the sewerage undertaker and is deemed to be a public sewer, this may then discharge into a surface water sewer, a foul sewer, or a combined sewer system (Foul and Surface water) or possibly a watercourse.

Rain that falls on the highway collects at the side of the road at the kerb and is channelled to the gullies and is piped away to either a public sewer or in some cases directly to a watercourse. Sefton Council are responsible for the drainage of local roads and public highways.

Surface water from the area is discharged via the public sewer (shown as the blue line on the Figure 17) into Eight Acre Brook, which is a main river and as such the Environment Agency exercise permissive powers to inspect and maintain it.



Sefton Council Department of the Built Environment Amanda Langan - Head of Investment Programmes & Infrastructure	Hawksworth Drive - Sewer Network Formby		Standard Site Plan Scale: 1:3000 Date: 16/11/2012 Drawn By: peary on Contact Officer: AM Plan Ref: I:FCERM/understanding risk Ward(s): Ravenmeols, Harington Postcode Sector(s): L37 0, L37 7, L37 3 Polling District(s): Q1, P1 Parish(es): FormbyCp
	OSGR: 330421, 408660	Sheet(s): 306C, 306A, 306D, 306B	Area: 203336 sqm <small>Created by Sefton Council Built Environment Services using MapInfo Professional</small>

Figure 17: Hawksworth Drive Sewer Network

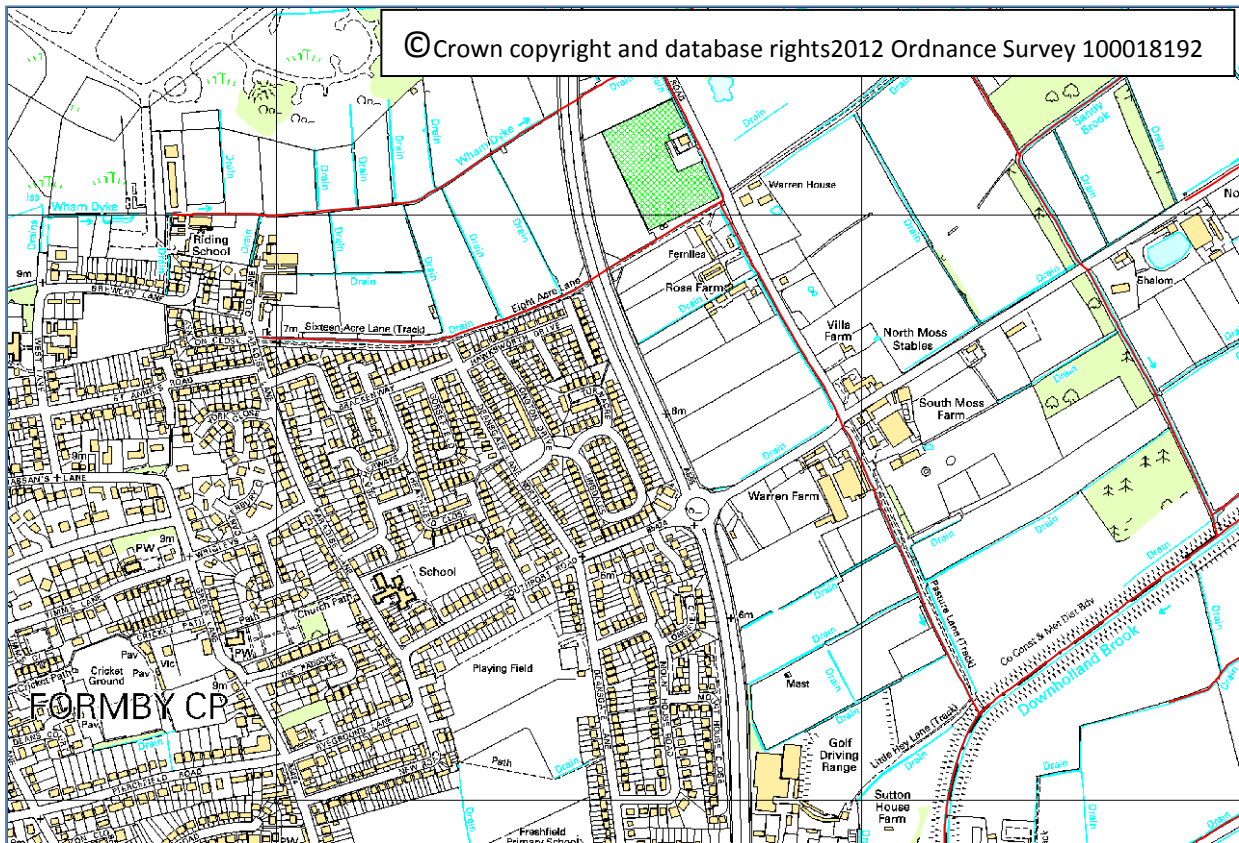


Figure 18: showing the extent of the main rivers

Eight Acre Brook flows easterly where it joins Whams Dyke (see figure 18) and then into Downholland Brook and the River Alt and discharges into the Mersey Estuary via Altmouth Pumping Station at Hightown.

4.3 Flooding History

4.3.1 Previous Flood Events

The area is shown as at risk in the Councils Surface Water Management Plan but is not identified as being at flood risk on the Environment Agency's extreme flood zone maps and the Council has no records of this area flooding.

4.4 Flood Incident

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. The full details of the rainfall event are in appendix 1.

There were 2 sources of flooding in this area.

The first source was from the surface water system not being able to discharge into Eight Acre Brook due to high levels. The impact of this was that 4 properties were flooded and there was some minor damage to the highway around a gully.

The second source of flooding came from Eight Acre Brook overtopping the embankment close to the A565. This water pooled behind the defence and flowed along the footpath.

The council first became aware of a problem at Hawksworth Drive at 16.40 on the 25/09/2012 when a member of public called to "Request for sandbags due to possible further flooding." Forty sandbags were dispatched to the area and a member of Sefton Security was also sent to monitor the situation. The Council contractor was also sent to remove the excess water off the highway.



Figures 19 and 20: show the flooded area, both taken on the 25/09/2012



4.5 How Did the Flood Happen?

The probable cause was that Eight Acre Brook was high, due to the significant amount of rainfall, which "tide" locked the highway drainage system which in turn was unable to discharge. Once the pipes had reached their capacity the water started to flow from the gullies into the highway, the water then pooled and found a low point in the pavement line and flowed down into the properties. It is not known by the Council at this time as to whether there are flap valves on the outfalls here, further investigation is required.

The flooding along the footpath was again caused by high river levels in Eight Acre Brook. The water level rose to a sufficient height that it was able to overtop the flood embankment at a low point close to the culvert under the A565.

4.6 Roles and Responsibilities

The full roles and responsibilities of the Council, Environment Agency and United Utilities are set out in appendix 3 but in relation to this event the key points are:

At this point in time it is not known if the Environment Agency or United Utilities had received any telephone calls about this area or attended this incident.

Sefton Council have a role under the Civil Contingencies act and discharged this in relation to checking on and where necessary supporting the welfare of

residents affected by the flooding. The Council had officers present to support the efforts to manage the flood water and supplied sand bags and gully suckers. The Council discharged its roles and responsibilities although it should review its operational plan for such events to revise based on the lessons learnt.

4.7 Conclusion

Rainfall data for this event has concluded that a significant amount of rain fell on to an already saturated area with approximately a 1 in 30 year return period.

The flooding appears to be a result of the high river levels in Eight Acre Brook, tide locking the surface water drainage system and overtopping close to the A565.

Key Points in relation to the flooding:

- It was a prolonged and heavy rainfall event
- The land that flooded is low lying
- The levels in the main river were high due to the rainfall
- Reduced maintenance of the Brook may have contributed to the high water levels
- The system was unable to discharge
- The Brook overtopped at a low point in the embankment

However, there are a number of recommendations that we would make in order to reduce the likelihood and impact of flooding in the future.

4.8 Recommendations

Number	Recommendation	Lead Risk Management Authority
1	Co-ordination of maintenance priorities and works between the Risk Management Authorities	Environment Agency
2	The level of the low spot in the embankment should be raised to the same level as the rest of the embankment.	Environment Agency
4	Investigate if there are flap valves/non return systems on the outfalls into Eight Acre Brook. And if not, consider the merit of installing them.	United Utilities

5. Water Street, Thornton

5.1 Site Location

Water Street is a residential road in the middle of Thornton, close to the greenbelt.

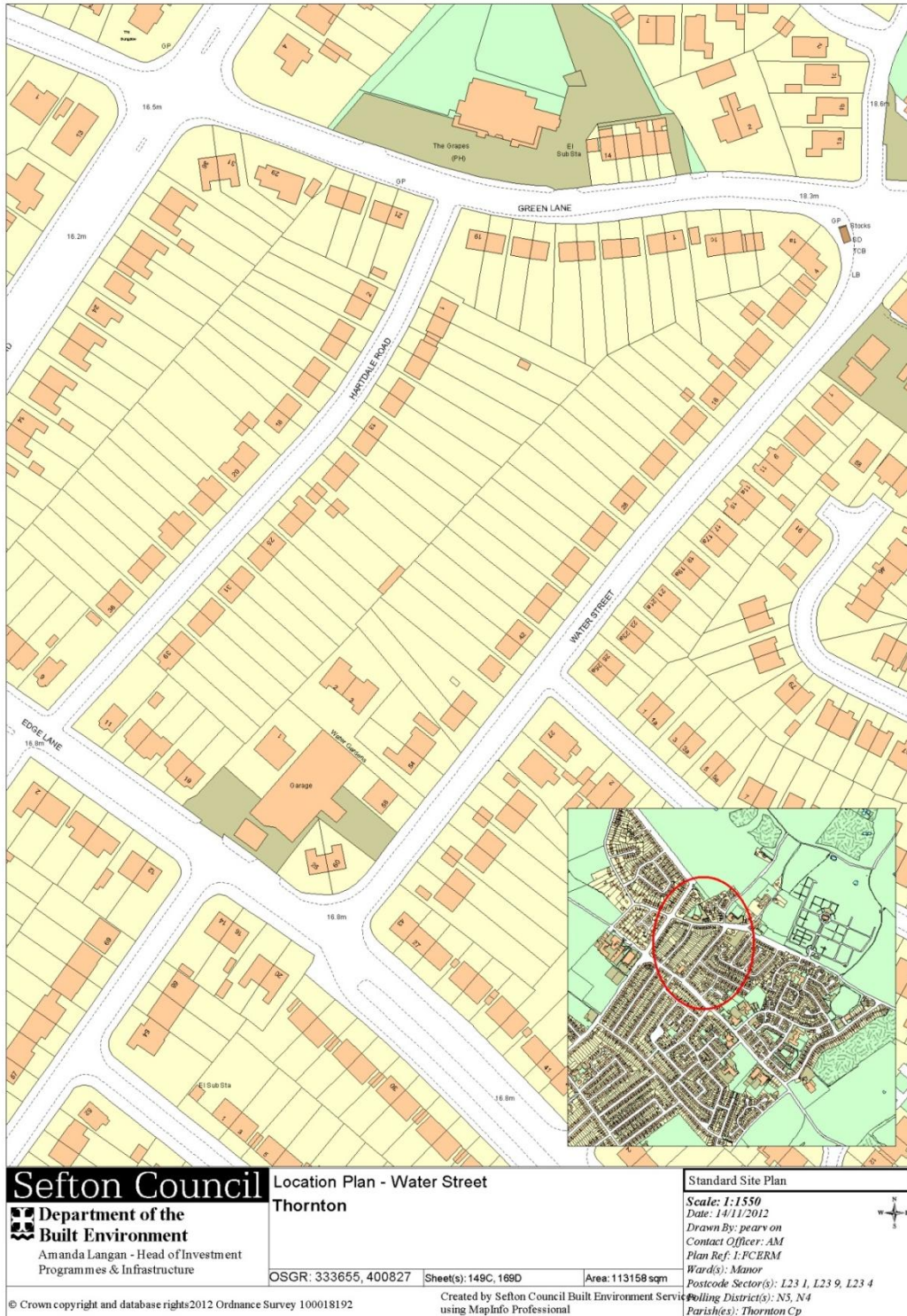


Figure 20: Water Street, Thornton - location plan

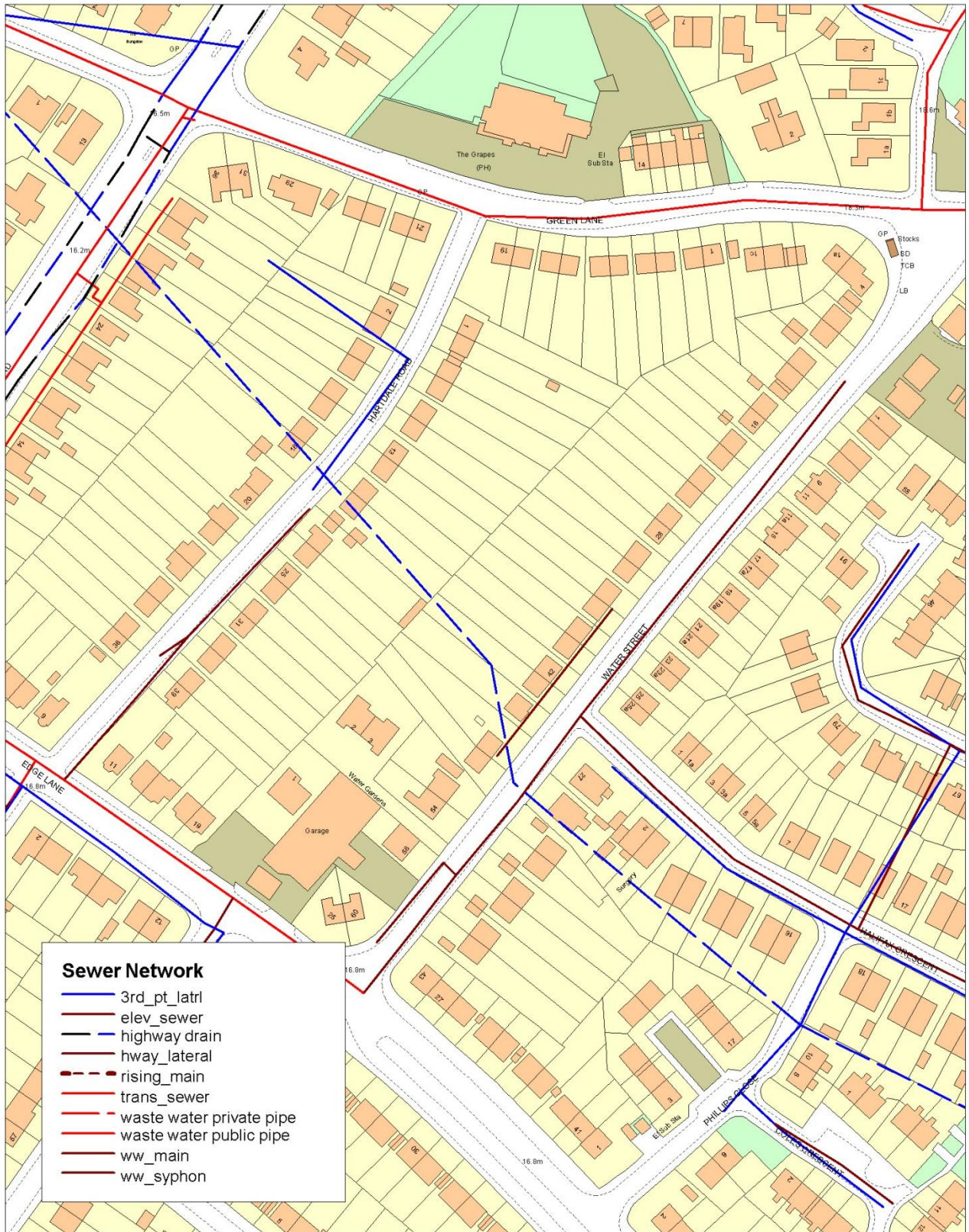
5.2 How the Drainage System Works

Conventional urban drainage systems are made up of a complex network of sewer pipes, overflows, gullies and culverts (covered watercourses). Ownership and duties are split between various agencies and landowners. On an individual property level, rain falls on to roofs, gardens and driveways and makes its way through the gutters and channels to the drain. The less porous the surface the rain lands on the quicker the water enters the drainage system.

Where drains from individual properties connect together, the responsibility for maintenance transfers from the householder to the sewerage undertaker and is deemed to be a public sewer, this may then discharge into a surface water sewer, a foul sewer, or a combined sewer system (Foul and Surface water) or possibly a watercourse.

Rain that falls on the highway collects at the side of the road at the kerb and is channelled to the gullies and is piped away to either a public sewer or in some cases directly to a watercourse. Sefton Council are responsible for the drainage of local roads and public highways.

Surface water from the area is discharged either directly from the highway drains or via the public sewer (shown as the blue line on the Figure 20), into a piped watercourse that flows from Runnels Lane to Brook Road and discharges into a watercourse which flows into Hunts Brook and then into the River Alt and then into the Mersey Estuary via Altmouth Pumping Station at Hightown.



- Sewer Network**
- 3rd_pt_latr
 - elev_sewer
 - highway drain
 - hway_lateral
 - - - rising_main
 - trans_sewer
 - waste water private pipe
 - waste water public pipe
 - ww_main
 - ww_syphon


Sefton Council  Department of the Built Environment Amanda Langan - Head of Investment Programmes & Infrastructure	Water Street Sewer Network Thornton		Standard Site Plan Scale: 1:1550 Date: 14/11/2012 Drawn By: peary on Contact Officer: AM Plan Ref: I.FCERM Ward(s): Manor Postcode Sector(s): L23 1, L23 9, L23 4 Polling District(s): N5, N4 Parish(es): Thornton Cp
	OSGR: 333655, 400827	Sheet(s): 149C, 169D	Area: 113158 sqm
© Crown copyright and database rights 2012 Ordnance Survey 100018192			Created by Sefton Council Built Environment Services using MapInfo Professional

Figure 21: Water Street, Thornton – sewer network

5.3 Flooding History

5.3.1 Previous Flood Events

This area is prone to flooding and has a history of frequent flooding, this year alone Water Street has been inundated 4 times. The photograph below (figure 22) shows the extent of flooding on Water Street taken during an incident in July 2010.



Figures 22: showing the flooded area, taken in July 2010

5.3.2 Flood Incident

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. The full details of the rainfall event are in appendix 1.

The initial source of flooding is from the surface water drains not being able to discharge into the piped watercourse, this leads to puddles forming around the gullies. Subsequently the flooding surcharges the manholes, firstly Water Street and then Hartdale Road.

The impact was of internal flooding to at least 1 property with gardens and out buildings also flooded.

The Council upon becoming aware of the flooding sent sandbags and put signs across the road advising drivers of the flood water.

5.3.3 How did the flood happen?

Prior to the August flooding the Council had undertaken hydraulic modelling of the piped watercourse. The width of the culvert got narrower down stream of Water Street and this constriction led to water backing up within the system and eventually surcharging the manholes located within Water Street. This flooding then rose to a level which was sufficient to cause internal flooding.

After the August flooding the Council carried out a cctv survey of the culvert which showed that a section of pipe had completely collapsed and is now exploring options to resolve this and increase the capacity of the system.

5.4 Roles and Responsibilities

The Council had officers present to support the efforts to manage the flood water and supplied sand bags and flood warning signs. The Council discharged its roles and responsibilities although it should review its operational plan for such events based on the lessons learnt.

5.5 Conclusion

Rainfall data for this event has concluded that a significant amount of rain fell on to an already saturated area with approximately a 1 in 30 year return period.

Given the evidence collated for this investigation it is accepted that the council as the sole Risk Management Authority involved did discharge its duties as appropriate.

The flooding mechanism appears to be insufficient capacity of the culvert due to the collapse of it near Brook Road.

Key Points in relation to the flooding:

- It was a prolonged and heavy rainfall event
- The drainage system is not working effectively.

Recommendations

Number	Recommendation	Lead Risk Management Authority
1	The Council will continue to work towards a solution that remedies defects (including the collapsed pipe) and increases capacity for this area within financial constraints.	Sefton MBC

6. Moss Lane, Lydiate

6.1 Site Location

Moss Lane is situated on the rural outskirts of Lydiate, close to the boundary with West Lancashire District Council.

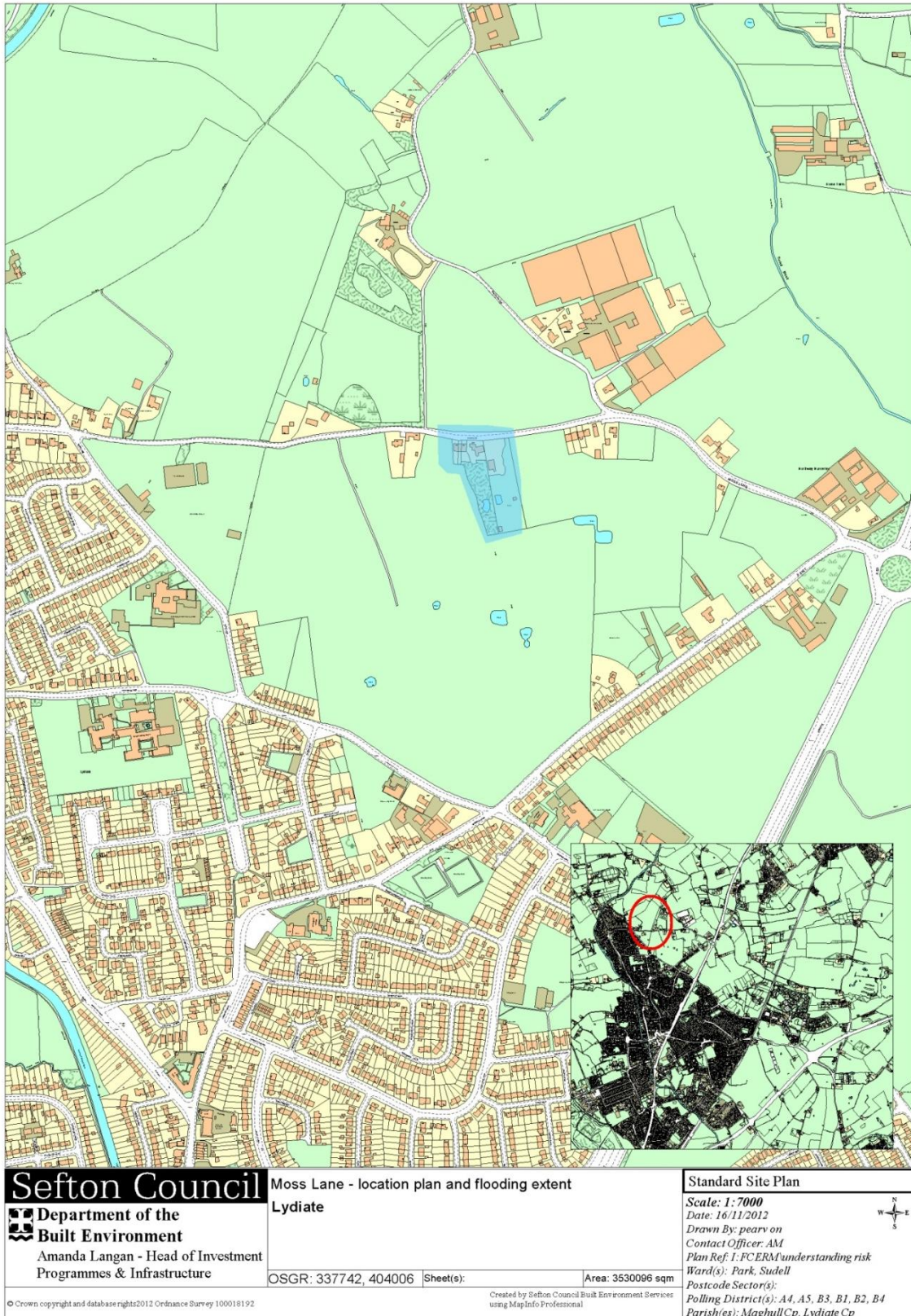


Figure 23: Site location and flooding extent

6.2 How the Drainage System Works

Due to its rural location there is no public sewer system, the rainwater drains via the watercourses that cross the area. There is a small watercourse that flows north which drains the properties on Moss Lane and the adjacent agricultural land. Close to the properties the watercourse enters a culvert and flows under the highway before discharging into Sudell Brook (which is classed as main river). The fields to the south of the properties are higher and water falling on this area contributes to the flow in the watercourse.

6.3 Flooding History

6.3.1 Previous Flood Events

There is a history of frequent flooding for this area dating back to 2001. One of the more significant floods was in 2008 when there was an extreme rainfall event which led to excessive internal flooding to 8 properties in Moss Lane, with flood depths of over 600mm. Apart from internal flooding to properties, the floodwater affected the high-grade agricultural land and led to collapses in the highway due to floodwater washing away structural elements of the carriageway.

6.3.2 Flood Incident

Following a prolonged period of rainfall water draining from the fields was sufficient to overwhelm the drainage system causing it to overflow. The water overflowing from the drainage system found its way to the properties following the natural ground contours.

The impact was of internal flooding to at least 1 property with gardens and out buildings also flooded.

The Council upon becoming aware of the flooding sent sandbags. Unfortunately this was not sufficient so after receiving a phone call from a resident on the afternoon of the 24th pumps were also sent to help. The combination of sandbags and pumping limited the impact of the event to residents.

6.4 How did the flood happen?

The capacity of the culvert which the watercourse flows into was not sufficient to handle the flow during this event. The watercourse serving the agricultural land at the rear of the even numbered properties in Moss lane connects to this culvert near to 68 Moss Lane. This culvert is inadequate for flows of this magnitude and this leads to flooding as storm water backs up and overflows the banks of the open ditch affecting the farmed fields, residential properties and the highway.

Moss Lane is served by a 150mm and a 225mm culvert that connects into the 450mm diameter pipe at the junction with the A59-North Road. It is not known if the culvert capacity was ever sufficient for these types of flows or whether something has changed upstream to affect the rate of discharge from the land.

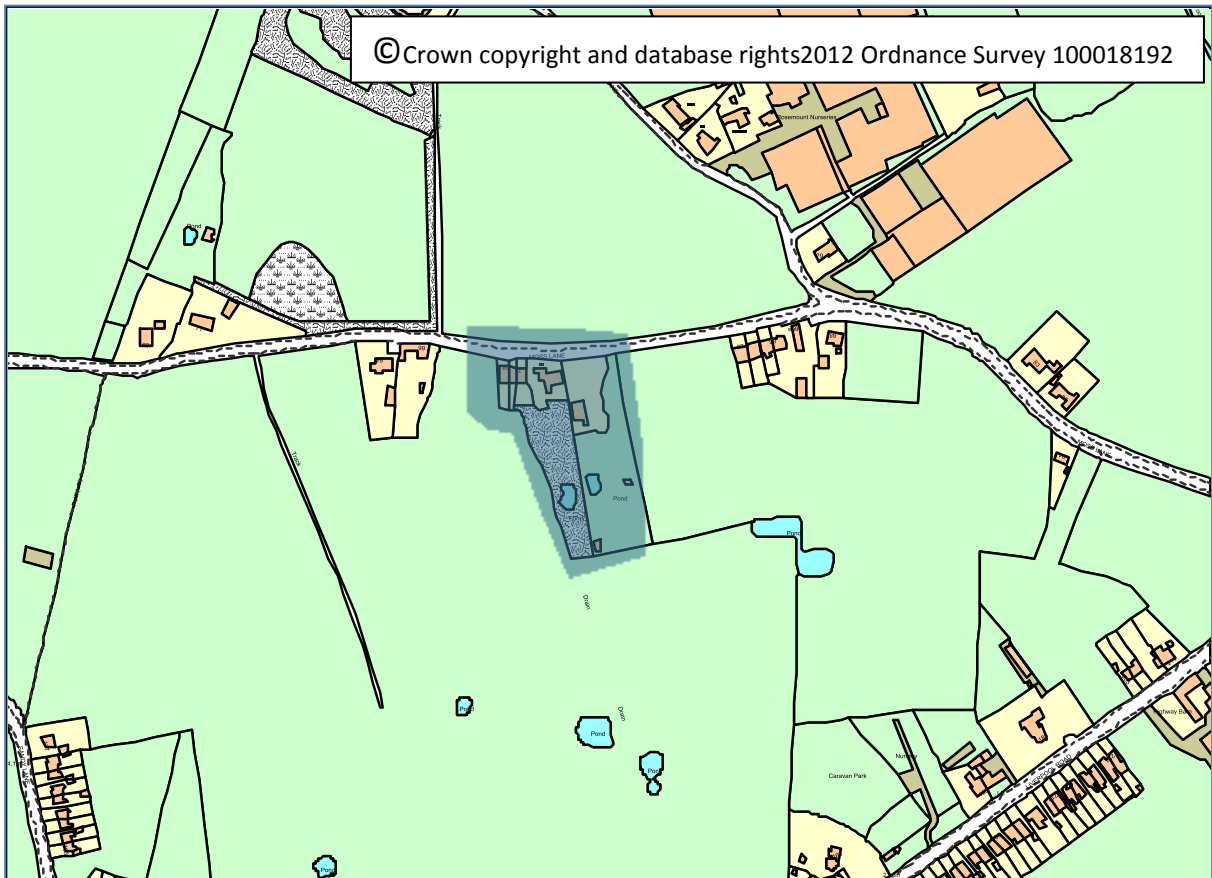


Figure 24: map showing the approximate flood envelope

6.5 Roles and Responsibilities

The Council had officers present to support the efforts to manage the flood water and supplied sand bags and pumping equipment. The Council discharged its roles and responsibilities although it should review its operational plan for such events based on the lessons learnt.

6.6 Conclusion

Rainfall data for this event has concluded that a significant amount of rain fell on to an already saturated area with approximately a 1 in 30 year return period.

Given the evidence collated for this investigation it is accepted that the Council as the sole Risk Management Authority involved did discharge its duties as appropriate.

The flooding mechanism appears to be insufficient capacity of the culvert that runs behind the even numbered properties on Moss Lane.

Key Points in relation to the flooding:

- It was a prolonged and heavy rainfall event
- The land that flooded is low lying
- There are multiple landowners responsible for the drainage system

However, there are a number of recommendations that we would make in order to reduce the likelihood and impact of flooding in the future.

Recommendations

Number	Recommendation	Lead Risk Management Authority
1	Discuss the issues with the riparian land owners and seek to negotiate a solution	Sefton MBC

7. Overall Conclusions / Lessons Learnt

- 7.1 It is clear that the rainfall event of 24th September 2012 was exceptional, came during an extended period of exceptionally wet weather when the ground was already heavily saturated and river / brook levels high. While the rainfall itself amounted to a one year in thirty event, combined with other factors, it created an extreme scenario. Add to the fact that the areas affected are low lying and in essence a flood event was to some extent unavoidable,
- 7.2 As Lead Local Flood Authority, the Council's duty is to investigate flood events. As Highway Authority, the Council's role is to keep the highway clear. In terms of civil contingencies, the council's role is to ensure that the welfare of residents / those affected by such events, is considered.
- 7.3 The main responsibilities for addressing emergency flood issues rest with the Fire and Rescue Service, United Utilities and the Environment Agency. It is clear that all agencies attended the sites affected during the event and all fulfilled their minimum statutory responsibilities and, together with the Council's actions, prevented more homes being affected by floodwater.
- 7.4 In addition to the weather events and ground conditions being exceptional, two other major factors contributed towards the flooding events;
- Inadequate drainage systems
 - Poorly maintained infrastructure limiting capacity
- 7.5 The Council is responsible for highway drainage and it is clear that regular maintenance is required in order to maintain capacity and also, where outfalls to adjacent brooks exist, that non return systems are fitted in order to prevent 'backflow' when brook levels become raised.
- 7.6 The Environment Agency have permissive powers to maintain those watercourses that are designated as Main Rivers. However, their powers are not mandatory.
- 7.7 Owners with Riparian duties have responsibilities for;
- maintaining watercourse beds and banks;
 - allowing the flow of water to pass without obstruction;
 - controlling invasive alien species such as Japanese knotweed.
- 7.8 United Utilities is responsible for maintaining water supply pipework and public sewerage system.
- 7.9 While the report concludes that each agency undertook their role in an acceptable manner, it is incumbent upon all affected agencies that the reasons for the flood events are determined and corrective action put in place so as to mitigate future events. In pursuance of this, the Council will discuss with the agencies concerned a plan of action intended to improve drainage and reduce the likelihood of flood events.

- 7.10 The council will also discuss with private owners with Riparian duties the actions that they require to undertake in order to prevent a repeat of flooding should similar events re-occur in the future.
- 7.11 A programme of work related to highway drainage will be developed and considered by Cabinet Members for Environment and Transportation, both of whom have a role to play in flood events. Meetings will be convened with the other named agencies in order to agree a wider response and joint action plan in order to prevent / mitigate future flood events.
- 7.12 In terms of the Council's emergency response, each major event is analysed subsequently in order to ascertain if the Council needs to review its approach. In this case, it appears that the response was effective, with teams on the ground during the evening of the event pumping water and providing sandbags, with welfare teams offering alternative accommodation. Follow up responses included the provision of further advice and assistance on a range of issues relating to flood recovery and insurance and financial issues.
- 7.13 Ultimately, it was the severity and longevity of rainfall, exacerbated by existing saturated ground and high river levels, that led to flood events that affected the borough. While improved maintenance of infrastructure, together with effective co-ordination between the relevant agencies will improve the response and mitigate the impact of severe weather events, the low lying nature of the area and increased frequency of extreme weather events does mean that future events of this nature cannot be ruled out.

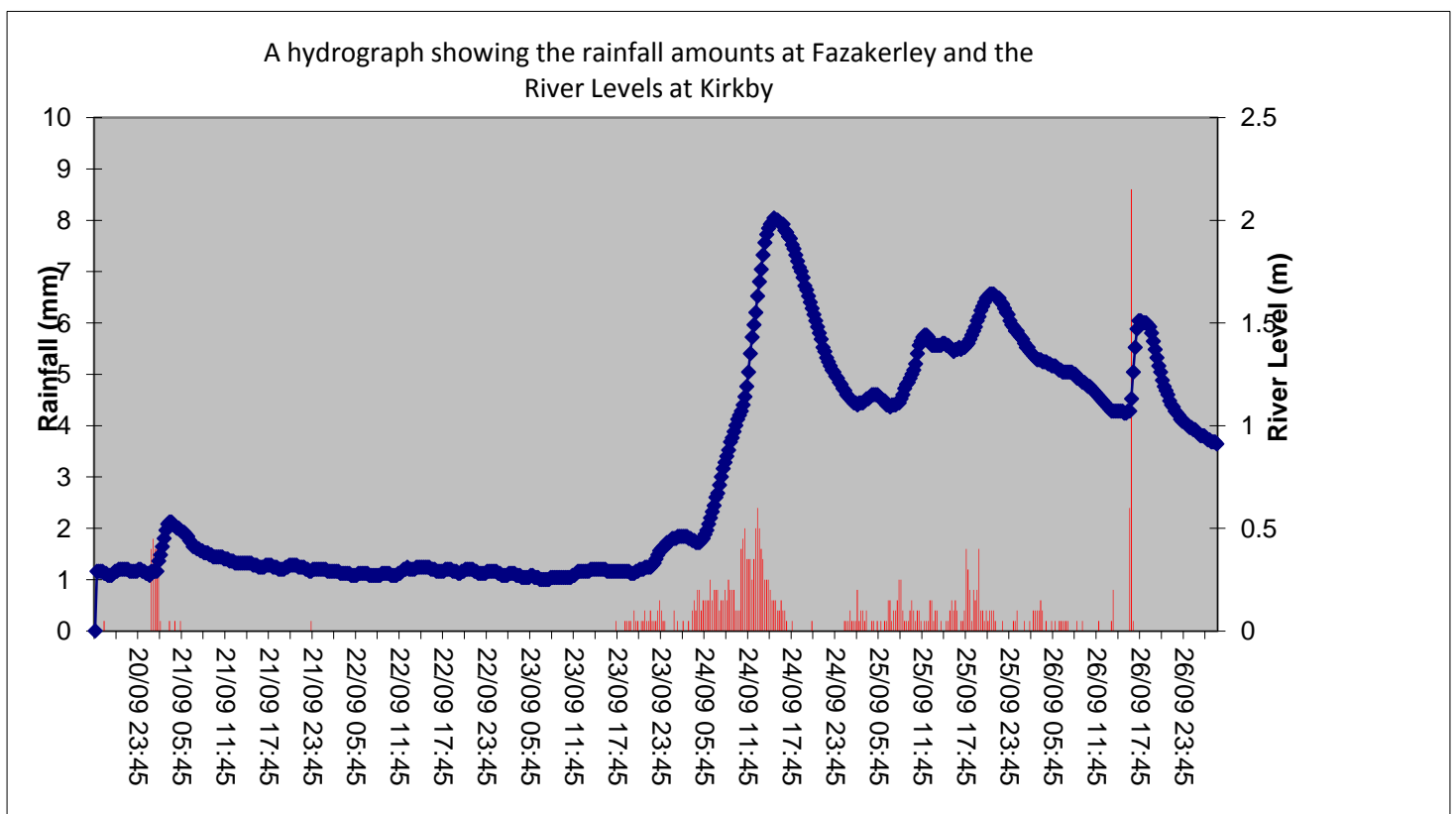
Appendix 1

Description of weather event for the 24th September 2012

The flood guidance statement on the 22nd September 2012 forecast "heavy, persistent rain from Sunday to Tuesday with significant disruption possible across much of England and Wales." At this point the alert level was raised to yellow. At 06.00 on the 24th September the alert level was raised to amber (medium risk). At 10.49 on the 24th the Environment Agency issued a Flood Alert for the Alt catchment.

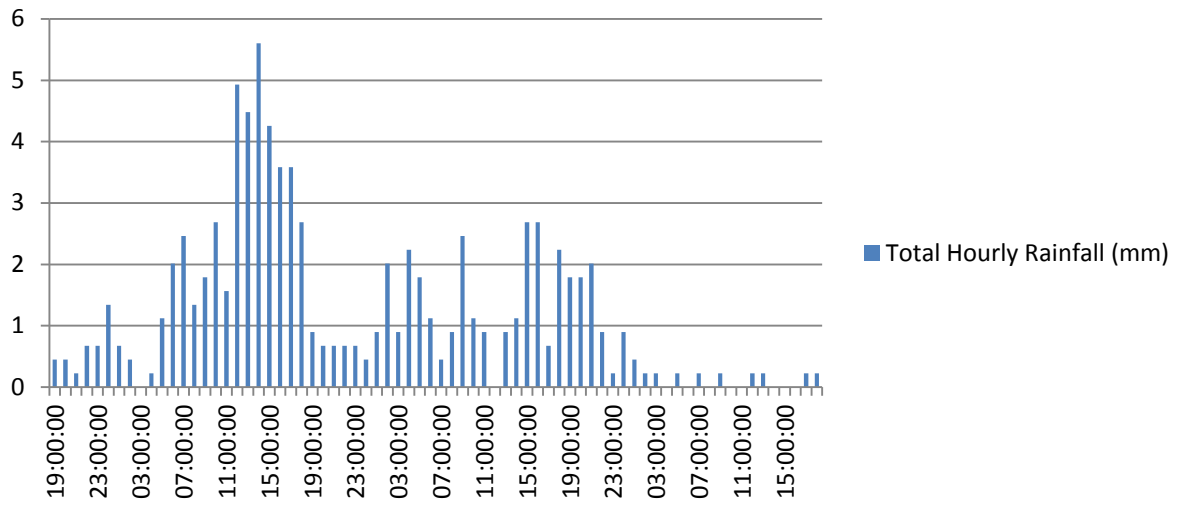
The rainfall started at 18.45 on the 23rd September the peak rate was 1.98mm in 15mins achieved at 12.45 on the 24th. The total amount of rainfall recorded at Crosby Lakeside Adventure Centre raingauge for this event was 55.74mm. Whilst the total amount of rainfall recorded at Orchard Lane, Birkdale, raingauge, was 86.4mm. Whilst the EA raingauge at Fazakerley recorded 89mm in 60 hours giving an approximate 1 in 35 year return period.

In response to the heavy rainfall the River Alts levels, measured at the Environment Agency's Kirkby gauging station, rose from 0.285m at 21.00 on the 23rd and peaked at 2.01m at 15.45 on the 24th September, as shown in the graph below.



NB all gauging times are GMT.

Raingauge Data for Orchard Lane, Birkdale for the 23rd to 25th September



Appendix 2

Timeline of event for Fouracres

24/09

16.00 According to the EA NIRS records, a Site Controller arrived at Fouracres.

19.30 EA Site Controller called Merseyside Fire and Rescue Service (MFRS)

20.00 MFRS on site holding a fire bronze meeting at 20:00.

23.00 SMBC arrive on site

25/09

*It was reported that the emergency services were on site at 01.00 and had opened some manhole covers and had started pumping.

02.30 UU arrived on site and checked their assets and there was no fault at that time and were informed the river had burst its banks and after speaking to a number of residents left site.

05.00 Scottish Power cut the power to the road after an Operational Coordinating Group meeting, with Police, Fire, SMBC and Scottish Power

08.00 SMBC Core Crisis Team arrived to check on householders looking for vulnerable people who may require assistance.

12.02 SMBC FCERM Officers arrive MFRS pump hoses being directed straight into Whinney Brook.

13.00 MFRS disinfect and remove pumps.

14.00 Multi Agency meeting held at Magdalen House, Bootle, SMBC, MFRS and Police attend.

15.30 EA site controller reports Brook close to breaching/overtopping.

16.00 SMBC FCERM officers arrive back on site

16.48 EA order 2 pumps.

17.00 Power restored to Fouracres.

18.00 FCERM officers leave site and head to Moss Lane, then Hawksworth Drive.

18.30 Core Crisis team back at site – maybe earlier

19.15 FCERM officers return to Fouracres

19.20 Sandbags arrived from Town Council

19.40 Sandbags arrive from SMBC

19.30 EA pumps arrive

21.30 EA pumps are activated.

23.45 SMBC staff leave the site.

26/09

08.30 SMBC staff back at Four Acres

11.00 SMBC made aware of foul sewer flooding at the Crescent

11.30 MFRS return to assist with further pumping, but as water had receded and Council pumps were on site, MFRS were thanked for their offer and left site

13.00 EA and SMBC staff discuss issues all known flooding in Sefton

14.00 SMBC staff leave site

27/09

08.15 SMBC staff on site

10.00 SMBC staff turn 1 pump off due to no water being present in the pipe

11.40 SMBC staff leave site

28/09

08.30 SMBC arrive on site, both pumps now off.

09.00 SMBC leave site

10.00 EA email SMBC to report one pump being removed.

10.30 Resident Clive phones AM to say HIAB are on site to remove both pumps and he is worried with the heavy rainfall forecast for the weekend.

10.35 AM calls EA to explain the situation, both pumps are left on site.

29/09

08.45 SMBC staff arrive on site, UU engineer already on site at No.41. Pumps off

09.45 SMBC staff leave site

18.30 SMBC staff arrive and leave site after brief inspection

30/09

09.00 SMBC staff arrive on site and leave site after brief inspection

16.15 SMBC staff arrive on site and walk down Whinney Brook

17.30 SMBC staff leave site after brief inspection

Appendix 3

Roles and Responsibilities

Sefton MBC

As a Lead Local Flood Authority, Sefton MBC has a lead role and responsibility for overseeing local flood risk management in respect of surface water, groundwater and ordinary watercourses.

Under the Flood and Water Management Act 2010 Sefton have the powers to:

- commission works to manage flood risk from surface runoff or groundwater
- request information from any person in connection with the authority's flood and coastal erosion risk management functions
- give consent for any changes to ordinary watercourses
- designate any features which have a significant impact on flood risk so they cannot be removed or replaced without consent
- ensure that developments drain in a manner which does not increase flood risk elsewhere, as well as trying to reduce the risk of flooding wherever possible.

Sefton also has the duties to:

- record flood assets and identify those responsible for maintaining them
- work with organisations such as the Environment Agency and United Utilities to develop a local flood risk management strategy for managing surface runoff, groundwater and ordinary watercourses.
- record, investigate and publish reports on significant floods in the borough

Sefton also has responsibilities as a Planning Authority, Highways Authority and a Maritime Authority.

As the Lead Local Flood Authority the council is carrying out the flood investigation. The council is also leading on Recovery with the assistance of the other Risk Management Authorities.

Environment Agency

The Environment Agency has the role of implementing government policy on flood risk, and has a strategic overview of coastal erosion and flooding from all sources.

The EA has responsibilities for its flood defences and powers and duties relating to the drainage, maintenance and operations of the main rivers. Its overall aim is to reduce the risk of flooding from main rivers and the sea. The EA has the duty to produce flood risk maps and issue flood warnings.

The EA develops a number of management plans to understand the threat of flooding, and plan for the sustainable management of those risks over the long-term. It is also a statutory consultee to the development planning process and certain planning applications that affect its interests.

United Utilities

United Utilities will:

- In exercising flood risk management have regard to local and national strategies and guidance.
 - Co-operate with other relevant authorities in the exercise of their flood risk management functions.
 - Share appropriate information with another relevant authority.
 - Comply with requests made by an overview and scrutiny committee for information or response to a report.
 - Have regard to reports and recommendations of an overview and scrutiny committee.
-
- More generally in relation to sewer flooding; United Utilities will:
 - Provide & maintain sewers for the drainage of buildings and associated paved areas within property boundaries.
 - Implement a prioritised programme of investment to address underlying hydraulic issues.
 - Offer a prioritised response to sewer flooding based on whether such problems are affecting a property internally or externally and subject to work/incident volumes.
 - When attending sewer flooding incidents make all efforts to reactively resolve operational problems such as blockages etc. within one visit. Where this is not possible necessary further work will be carried out in such a manner as to attempt to avoid any repeat incident.
 - When sewer flooding is caused by overloaded sewers, i.e. no operational defect present, United Utilities will clean up as flood waters subside.
 - For all types of sewer flooding; external hard surfaced areas will be cleaned and disinfected and internally flooded property occupants will be offered an assisted clean up service.
 - All sewer flooding incidents will be investigated by at least undertaking a CCTV survey of the local sewer network.
 - Where upon inspection it is established that the flooding is not connected with United Utilities assets our representatives will advise customers accordingly and direct them to the responsible party or authority where known.
 - United Utilities will not carry out work in connection with assets for which they are not responsible.

Riparian Owners

Under common law, a riparian owner is someone who has a watercourse within or adjacent to a boundary of their property. Where a watercourse is sited between two or more property boundaries each owner may be equally responsible.

Under the Flood and Water Management Act, riparian owners retain all the duties and responsibilities for watercourses on their land as set out in the Land Drainage Act 1991.

Riparian landowners have certain rights and responsibilities, including the following:

- i. They must maintain the bed and banks of the watercourse, and also the trees and shrubs growing on the banks.
- ii. They must clear any debris, even if it did not originate from their land, this debris may be natural or man-made.
- iii. They must keep any structures that they own clear of debris. These structures include culverts, trash screens, weirs and mill gates.
- iv. if they do not carry out their responsibilities, they could face legal action under the Land Drainage Act 1991.

Riparian landowners must be aware that any works in, over or under a watercourse, require formal consent from Sefton MBC for Ordinary Watercourses and the Environment Agency for Main Rivers.

More information regarding riparian Rights and Duties can be found in the Environment Agency document titled "[Living on the Edge](#)"

Residents

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 land owners/householders have a responsibility to prevent surface water runoff flowing onto neighbouring land.