



Wirral MBC
Flood Investigation
Report
Reeds Lane/Reedville
Grove, Leasowe



1 Introduction

1.1 LLFA Investigation

Wirral Borough Council as the Lead Local Flood Authority has a responsibility to record and report flood incidents as detailed below from within Section 19 of the FWMA:

Section 19

- (1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate—
 - (a) which risk management authorities have relevant flood risk management functions, and
 - (b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.
- (2) Where an authority carries out an investigation under subsection (1) it must—
 - (a) publish the results of its investigation, and
 - (b) notify any relevant risk management authorities.

It was deemed necessary to start an investigation into the flood incident affecting Reedville Close and Reeds Lane (24 Sept. 2012) due to the disruption caused and recurrence of the flooding. Although only one property flooded internally, pedestrian access to Reedville Grove was very difficult and vehicular access was not possible for an extended period. Reeds Lane, itself, had to be closed making access difficult to Commercial Units in the vicinity; Bristol-Myers Squibb had to close its factory for a day on the 25th September. This location has flooded previously on the 5th-6th September 2008 when the flood extent and depth was observed to be greater than this last flood and one property suffered serious internal flooding.

This report provides a concise review of the responsibilities of all risk management authorities involved, and an outline of their past or proposed actions. The report also makes some recommendations for further work.

1.2 Site Location

The flooding occurs at the junction of Reedville Grove and Reeds Lane. Reedville Grove is a cul-de-sac residential road in the Leasowe area of Wirral close to Leasowe Station. The area is flat and low lying approximately 5m above ordnance datum and only a metre or so above mean high water.

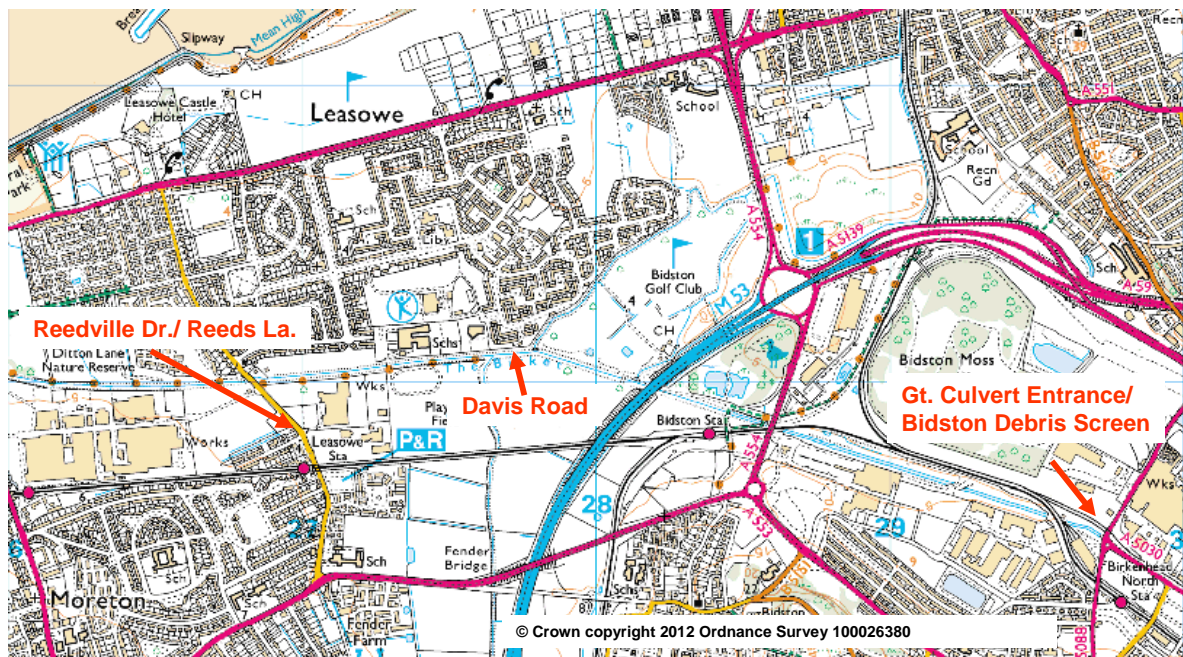


Fig. 1 Site Location

2 Flooding at Reedville Grove and Reeds Lane

2.1 Flood Incident 24/25/26th September 2012

Rain started to fall around 6.00pm on Sunday the 23rd September, it continued overnight and through the following day, stopping at around 5.00pm on the 24th. At approximately 12.00pm on the 24th Reeds Lane and Reedville Grove started to flood and by 2.00pm Reeds Lane became difficult to drive through to the extent that Bristol-Myers Squibb started to clear their site of cars, fearing that they may not be able to remove them later. At 4.00pm the Council received requests to provide sandbags to defend domestic properties and a decision was made by the Emergency Control Operators to issue sandbags although this was contrary to the Council's sandbag policy; and by 6.00pm Reeds Lane was closed. United Utilities were on site by 5.00pm on the 24th and started removing the flood water into tankers. Flood water was surcharging from manholes on the public combined sewer system. The public surface water sewer system also surcharged and was unable to drain the floodwater through the gullies in the road. High river levels on the Birket are believed to have prevented efficient discharge from the public surface water system at the flapped outfall. One property suffered some flooding to its garage/workshop and porch; and nine properties suffered flooding to their gardens and driveways, while access to Bristol-Myers Squibb Pharmaceuticals was also restricted. UU continued to pump until late in the evening but were requested to stop due to noise. The Environment Agency attended the site at 9.30pm, following reports of flooding in Reedville Grove and high river levels on the Birket. UU continued to draw off the flood water throughout Tuesday the 25th and into Wednesday 26th. Rain started again on Tuesday afternoon and continued, albeit with a lesser intensity until Wednesday morning. Bristol-Myers Squibb Pharmaceuticals remained closed on Tuesday 25th. On Wednesday 26th both United Utilities and the Council's Emergency Planning Team responded to the access problems that the flooding was causing by utilising vehicles, which included a 4x4, to assist residents to move through the flood water. The Emergency Planning Team also arranged for a Social Services Team to be on site to assist vulnerable people to access medical assistance and undertake some shopping for essential groceries. The Fire Brigade were also in attendance and assisted residents and care workers through the floodwater until the 4x4 vehicle arrived on site. On Wednesday the combined sewer manhole was still surcharging but floodwater started to slowly drain into the surface water system and into the Birket. Bristol-Myers Squibb re-opened on Wednesday and workers were helped into the factory, borrowing wellington boots to get through the flood water, their cars were parked on Reeds Lane. By Thursday morning, the 27th, the majority of the flood water had subsided, although water was still surcharging from the public combined sewer in Reedville Grove and running away down the nearby road gullies. Following a hose down of the area and gully cleaning by United Utilities the Road was inspected and re-opened. Damage to Reedville Grove footway and kerbing was identified and emergency works ordered. It is not known at this stage, if any long term damage has occurred to the Public Highway



Fig.2. Approximate extent of the flood, Reedville Grove/Reeds Lane.

2.2 Rainfall Analysis

The summer of 2012 was one of the wettest on record with over 150% of normal rainfall. September continued to be wet and maintained the saturated ground conditions. Rainfall falling on saturated ground has little chance of infiltration and consequently the rain ran-off quickly into the rivers and sewer networks. On the 23rd September rain started to fall at about 6.00pm and continued through the night and the following day, when Reeds Lane/Reedville Grove started to flood. Despite a brief respite on the evening of the 24th rain started again in the early hours of the 25th and continued most of the day; albeit at a lower intensity. The graph below shows the rainfall recorded at Moreton rain gauge and the river levels on the Birket at Davis Road close to the entrance to the Great Culvert. The rain gauge at Moreton recorded nearly 70mm in 48 hours and over 75mm in 60 hours. This amount of rainfall has a probability of occurring approximately every 20 to 25 years, or in other words, a 4% to 5% probability of occurring in any one year. The rainfall was caused by a very slow moving depression centred and circulating around the middle of England.

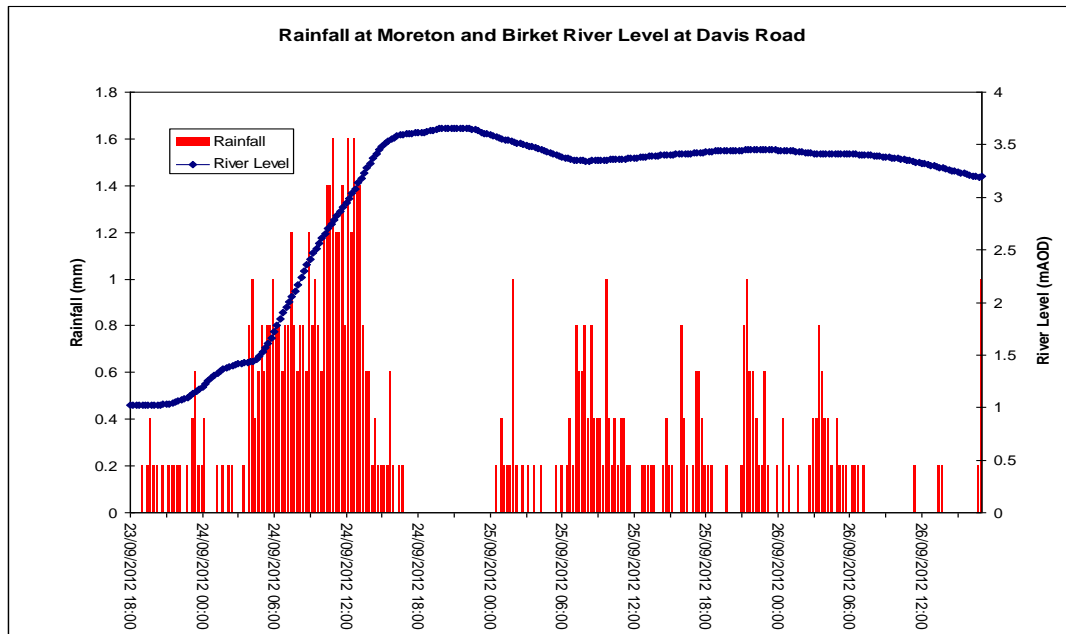


Fig.3. Rainfall and river levels.

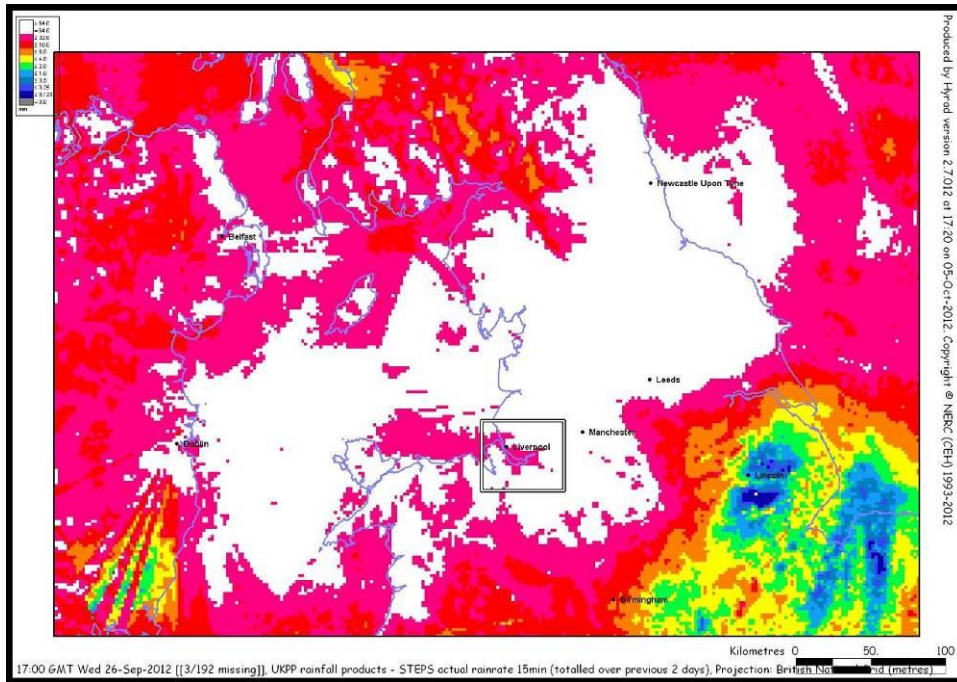


Fig.4 Rainfall Radar Accumulation over 2 days, the white area received in excess of 64mm.

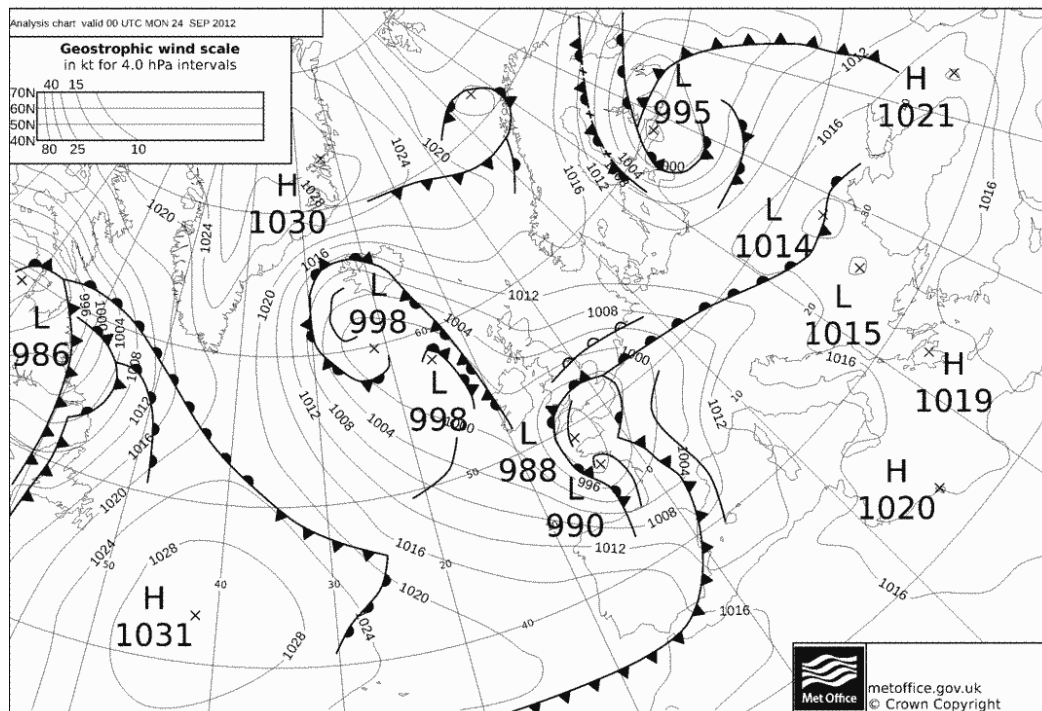


Fig.5. Synoptic Chart for 0000 hours on the 24th Sept

2.3 Previous Flood Incidents

Although this location floods on a regular basis, the last significant incident occurred on the 5th-6th September 2008 when the flood extent and depth was observed to be greater than this last flood but again only one property suffered serious internal flooding.

The flooding at the time was exacerbated by operating difficulties with the debris screen at the Great Culvert Entrance and the Environment Agency agreed to investigate the possibility of undertaking improvements to its operation and these improvements were completed earlier this year.

The United Utilities public combined sewer surcharged and was unable to cope with the flows generated and the pumps at the pumping station at Moreton were reported to have tripped on overload when the flows arriving at the station exceeded its operational pumping capacity. They agreed to investigate the capacity issues and the possible installation of a storm tank. They undertook some work on the public sewers to desilt and de-scale them and improvements to the pumping station. Unfortunately, the provision of a storm tank was later not considered to be a cost effectively viable solution for the degree of property flooding being experienced.

2.4 Surface Water and Foul Drainage System

The area is presently drained via a public combined and surface water drainage system. The combined sewers drain to a pumping station located close to the Moreton Driving Range at Tarran Way South and are then pumped to the United Utilities waste water treatment works at Moreton, while the surface water system, which takes run-off from the public highway, flows generally north for about 250 metres before discharging into the Birket via a flapped outfall. The combined and surface water sewer networks are the responsibility of United Utilities. The combined sewer accepts both foul and some surface water drainage.



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Fig.6 United Utilities sewer network and approximate flood outline.

3 Potential Causes of Flooding

3.1 River Flooding

The rainfall during the 23rd to 26th of September fell on saturated ground and rapidly ran-off into the river system forcing the levels to rise quickly, rain fell over three days, off and on, and maintained the rivers at a high level for several days. The river height came up to within about 1m of the bank top in the area close to the Debris Screen at the Great Culvert Entrance and level monitoring gauge at Davis Road but still had a great deal of capacity in the channel. There are three major elements of infrastructure affecting the Birket, a recently upgraded debris screen at the entrance to the Great Culvert, a pumping station operated by United Utilities that intercepts the River Birket flows and pumps them into the West Float Docks, the pass forward flows, particularly during storm conditions then combine with discharges from the surrounding public sewers and pass to a further pumping station which lifts the flows to the United Utilities Shore Road treatment works on the River Mersey. During the period of the flooding, the debris screen was in operation and both the pumping stations were reported to be running at their maximum capacity. Although none of the flooding in Reeds Lane area was due to the Birket overtopping its banks, the continued high levels prevented the discharge of the flooding for an extended period.

3.2 Sewer Flooding

The flooding on Reeds Lane and Reedville Grove was caused by a combination of flows from the surcharged combined sewer in Reedville Grove and surface water which was unable to discharge to the separate surface water sewer through the road gullies due to high river levels that prevented free discharge at the surface water sewer outfall into the Birket. The flood water level at the low point in the road was at a similar level to the peak water level of the Birket at the outfall and over the period of flooding the river level remained fairly constant. The road started to drain when the river level had dropped sufficiently to allow the flap valve at the outfall to open.

3.3 Highway Drainage

The highway gullies drain into the surface water sewer system that discharges into the Birket via the flapped outfall. The surface water sewer was prevented from discharging by the high river levels during the flood but drained when the river levels went down (see above), thus relieving the flooding through the highway gullies. The gulleys were cleaned out by United Utilities after the flood water receded as a precautionary measure. The inability of the highway drainage system to discharge to the surface water system and hence the Birket will have contributed to the flooding.

3.4 Groundwater Flooding

In this area of the Wirral the groundwater aquifer is capped by a layer of mudstone and flooding from this source is unlikely. But due to the flat nature of the area it is highly unlikely groundwater emergence significantly contributed to the flooding. However a high water table and saturated ground would likely have prevented natural infiltration of the rainfall into the ground and this run-off would have gone into the sewer system and watercourses.

3.5 Analysis and Conclusions on the Cause of Flooding

Flooding was caused by a combination of under capacity in the combined sewer network and the Moreton Pumping Station which led to the sewers surcharging, resulting in flooding in Reedville Grove; and the locked surface water drainage system, which prevented discharge from the highway. The rainfall on the preceding days fell on to saturated ground and rapidly ran-off into the river system forcing the levels in the Birket to rise quickly, locking the surface water sewers preventing any discharge.

The water being unable to drain from either system inundated the road and gardens and eventually caused some internal flooding in one property. The area that flooded is in a low point and has been identified as an area susceptible to surface water flooding on the Environment Agency's Flood Map for Surface Water. (Fig 7)

It should be noted that there will always be a risk of flooding at this location due to its

proximity to the River Birket and its low lying aspect.

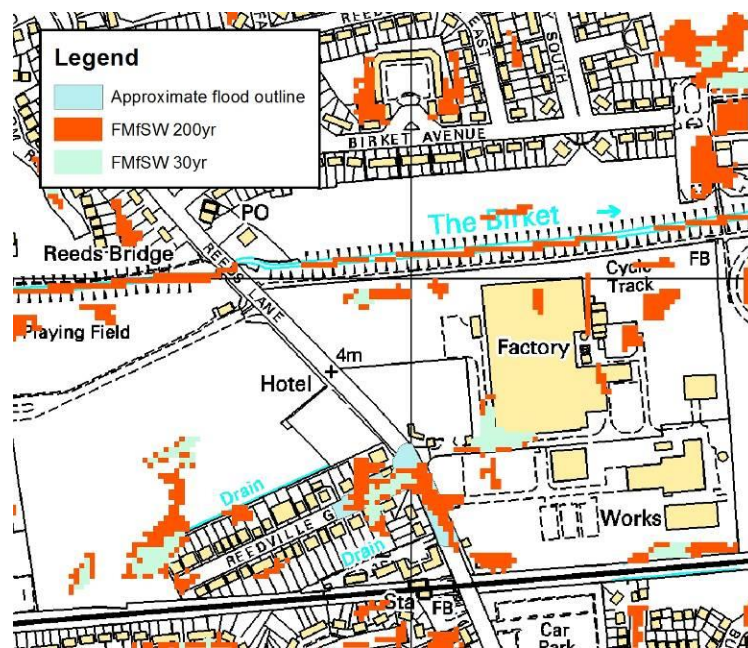


Fig.7. Environment Agency flood outline maps

4 Roles and Responsibilities

4.1 Lead Local Flood Authority

As a lead local flood authority, Wirral Borough Council has a role in overseeing the management of local flood risk, including:

- Groundwater flooding - caused when heavy or prolonged rainfall makes the groundwater table rise above its normal level.
- Surface water (rainfall) runoff - flows from, or over, surfaces such as roads, roofs and patios that cannot easily absorb water.
- Ordinary watercourses (streams and ditches) - channels which cannot contain large volumes of surface water runoff during or after heavy rain.

Wirral Borough Council attended the flooding on Tuesday 25th September when the Highway Inspector for the area closed Reeds Lane and although this was contrary to its sandbag policy, sandbags were also provided as part of its call out. On Wednesday 26th September it arranged for vehicles to be provided to enable residents to move in and out of the flooded areas and a team of Social Workers visited the site to assist any vulnerable residents. It also liaised with its partners to ensure that the infrastructure that drained the Birket and the combined sewers were operating.

A multi agency public meeting was organised by the local Councilors to allow both residents and partner organisations to discuss the flooding issues and possible solutions.

4.2 Environment Agency

The Environment Agency has permissive powers to carry out maintenance work on Main Rivers under Section 165 of the Water Resources Act. The Environment Agency performs maintenance activities on main rivers based on risk. The River Birket is a Main River. The Environment Agency attended the site at Reeds Lane at 9.30pm on the 24th September following reports of property flooding. The Environment Agency had already been out to check the operation of the debris screen close to the great culvert entrance after reports of flooding to the pavement on Davis Road and high river levels on the Birket at around 5.30 to 6.00pm. The Birket has embankments that provide around a 1% standard of protection. (A flood you would expect to see every 100 years.). The flooding at Reeds Lane was not due to

the River Birket overtopping its banks but high river levels will have prevented the surface water system operating effectively. A flood Alert for river flooding was issued for the Birket at 12:22pm on the 24th Sept 2012.

4.3 Highways Authority

Wirral Borough Council has a duty to maintain the highway under Section 41 of the Highway Act 1980. There are road gulleys on Reeds Lane and Reedsville Drive that are maintained by the council and cleaned annually in May. The road gulleys were believed to be functioning correctly but are connected to the surface water sewer network which was locked off by high river levels. The area drained away via the road gulleys on Reeds Lane/Reedville Grove, suggesting that they were operating and not blocked.

4.4 Sewerage Undertaker (United Utilities)

United Utilities is the sewerage undertaker in this area and is responsible for foul and surface water drainage from residential and commercial properties, they also take water in many cases from the highway drainage system into the sewer network. The latest design criteria for the public sewer network aims to prevent flooding up to a storm with a 30 year return period providing around a 3.3% standard of protection.

United Utilities were contacted by a number of residents and attended the site on Reeds Lane at around 5.00pm on the 24th September and continued to draw the flood water off and on until Wednesday 26th September when the flood water started to slowly drain away from the site through the surface water sewers. United Utilities cleaned up the site following the flooding by hosing down areas and clearing road gulleys of any debris and silt deposited during the flooding incident.

United Utilities have confirmed that a scheme within the catchments is at present being developed that may significantly reduce the flood risk at this location. However, although United Utilities prioritise all flooding schemes and this area has been identified as high in priority and is being considered to receive a permanent solution for sewer flooding, possibly within the current investment period (i.e. 2010 – 2015), they cannot firmly commit at this stage to the delivery of the scheme as other factors will need to be considered. These include detailed design, land acquisition, planning permissions and the overall cost to deliver it.

United Utilities will be meeting its Partners, the Environment Agency and Wirral Borough Council in January 2013 to consider the proposed scheme further.

5 Recommendations

- United Utilities should check the functionality of the flapped outlet from the surface water sewer into the Birket.
- The Environment Agency together with United Utilities and Wirral Borough Council should consider whether there are any viable options to minimise river locking of the surface water outfalls into the Birket.
- United Utilities should review the performance of their assets/infrastructure during the event and consider any viable options to reduce the surcharging of the system at this low point.
- Wirral Council to investigate any flood reports from the nearby area to see if they are in anyway linked to this location.
- Wirral Council to consider as part of its flood risk planning at this location the early closure of the road to prevent problems from the wake of buses and cars
- In partnership with the Local Community, the Council's Emergency Planning Team will develop a local flood response plan, as any works proposed or undertaken are unlikely to completely remove the risk of flooding at this location. Resident's expectations concerning any proposals need to reflect the Partners individual funding methods and the future funding changes likely to be experienced by both the Environment Agency

and Local Government, particularly over the next 3 years.

- Residents, supported by Councillors and Partner Organisations, to consider the development of a local neighbourhood/community flood group.
- Local Councillors to be kept informed of progress with these recommendations to enable feedback to residents.
- A further public meeting to be arranged early in the New Year.