



## Section 19 Report: Investigation into flooding on 22<sup>nd</sup> November 2017

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## Problem Reported and Initial Response

Following intense rainfall commencing in the early afternoon on the 22<sup>nd</sup> November 2017 a number of flooding incidents were reported to Blackpool Council via the Vitaline out-of-hours call centre.

None of the risk management authorities had received Met office warnings of heavy rainfall.

Due to a combination of factors, in particular that the Risk Management Authorities (RMA) were not aware of the extent of the incident in the Blackpool and Lancashire area, a major incident was not declared.

Therefore, Blackpool Council emergency planning protocols were put in place.

Council officers and staff from United Utilities attended the flood event on Thursday 22<sup>nd</sup> November 2017 and on Friday 23<sup>rd</sup> November 2017, with Vitaline providing out-of-hours communications service, keeping officers aware of the extent and locations of flooding.

Officers were present on site from both organisations for a number of days after the event.

Flooding was also reported to have caused a number of power failures in the Anchorsholme area. Welfare assistance was not required but Adult Social Care was available to provide assistance to residents if required and sports centres were on standby to provide refuge for residents should it be necessary.

In addition United Utilities provided a customer bus in Morrison's car park, which was available from Friday 23<sup>rd</sup> November and attended by United Utilities staff for 12 hours a day through to Sunday 26<sup>th</sup> November 2017.

Blackpool Council is now aware that flooding occurred in the following locations:

Anchorsholme Lane	Marble Avenue
Ashfield Road	Moor Park Avenue
Beryl Avenue	Mossom Lane
Bovington Avenue	Munster Avenue
Briarwood Drive	New Lane
Bridgewater Avenue	Penswick Avenue
Brisbane Close	Perth Close
Bromley Close	Quarry Bank
Camberra Close	Radway Close
Champagne Avenue	Sevenoaks Drive
Coriander Close	Snowhill Crescent
Cranbrook Avenue	Valentia Road
Dalby Close	Warley Road
Emerald Close	Warren Drive
Faraday Way	White Carr Lane
Fir Tree Place	Wood Green Drive
Gilford Avenue	Wroxton Close
Grassington Place	
Greenoak Place	
Hastings Avenue	
Hobart Place	
Kelverdale Road	
Lauderdale Avenue	
Limerick Road	
Lockhurst Avenue	

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The number of properties affected by this event is approximately 300.

There was also major flooding under Devonshire Road Bridge leading to a road closure.

In addition, Anchorsholme Academy was subject to flooding.

Plans A and B provide the location of some of the properties listed above that had flooding reported.

The Environment Agency produce mapping of areas at risk of flooding, and although their information is intended as a guide only, some of the areas flooded on 22<sup>nd</sup> November 2017 are shown to be at risk on the mapping but the majority of areas flooded on the 22<sup>nd</sup> November are not on the Environment Agency flood risk mapping.

Plan A Bispham



Plan B Anchorsholme



## Background

Blackpool is a low lying highly urban town with a combined sewer system serving the whole of the town.

Due to the volume of development many previously open watercourses have been culverted and now form part of the sewer system. With the exception of some small sections, the highway drainage gullies also ultimately discharge into the combined sewer network.

Data from United Utilities and others suggests that the rainfall was of intensity with a return period of 1 in 64 years. The storm return period is beyond the parameters to which highway drainage (typically designed to a range between 1 in 1 to 1 in 5 year events) and sewers (1 in 30) are designed. The storm would be classed as an exceptionally severe weather event and was the main cause of flooding in this instance. This relates to both the highway drainage and the sewers which the drainage outfalls into.

Figure 1 below shows details of the rainfall measured in three locations



United Utilities record that rain had been falling steadily from the 20<sup>th</sup> November 2017 and consequently their storm water tanks and Fylde Tunnel Sewer system were already at full capacity, in addition the ground was saturated.

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United Utilities data was obtained from a rainwater gauge installed at Fleetwood waste water treatment works. This rain gauge is a tipping bucket rain gauge that measures the intensity of the rainfall over time. These gauges are of high standard and meet industry best practice standards.

United Utilities have informed Blackpool Council that the gauges are calibrated and that the data is reviewed regularly and therefore there is no reason to believe that the records are not accurate.

## **Fylde Tunnel and associated pumping stations**

United Utilities have provided the following information in relation to the Fylde Tunnel and associated pumping stations to assist in the preparation of this report and any future actions that may be required to provide flood risk management:

*“The Fylde tunnel system starts at Manchester Square in Blackpool South and discharges at Fleetwood wastewater treatment works (WwTW). The tunnel system is the collection mechanism for Blackpool on a normal day of operation, but it is also designed to store wastewater at a number of locations in the event of a large rainfall event. The total storage capacity of the tunnel system is 200million litres of waste water at locations including Bloomfield Road, Fleetwood WwTW and the tunnel itself. This storage capacity must be full prior to discharge to sea to meet environmental protection standards set by the Environment Agency. The pump arrangement has been designed as such to meet environmental protection legislation, and is not physically able to discharge before this threshold has been met.*

*The sewer network system is a combination of both foul and storm water, which is how all cities and towns across the British Isles have been designed and built since Victorian times, only in recent decades do we aim to separate storm water as part of developments. The water industry best practice standard for sewer design is to provide for a 1:30 storm rainfall event.*

*The pumping stations along Fylde Coast at Manchester Square, Anchorsholme, and Chatsworth Avenue are only designed to operate in sequence after the tunnel system has reached its full storage capacity and additional flows are then pumped out to sea. All pumping stations and Fleetwood WwTW are monitored, operated and maintained as one system from Fleetwood by UU day and night shift teams throughout the year. In the event of any predicted storm event along the Fylde coast, UU will deploy resources to all pumping stations to ensure any potential problems are rectified quickly by qualified Engineers located on site.*

*The Anchorsholme pumping station will automatically operate when the level in the tunnel goes above the start height in the pipe that connects to this pumping station. The pumps operate sequentially to ensure the flows entering the station are dealt with efficiently, until the station reaches capacity for example in an extreme rainfall event, which is what happened on the night of 22<sup>nd</sup> November 2017. The number of pumps operating at any one time will vary depending on the volume of storm water entering the pumping station. The pumping station cannot operate if the water level in the tunnel does not get above this start height and so the pumping station cannot be operated any earlier in terms of reducing levels in the tunnel, for example to manage and reduce levels prior to forecasted rainfall.*

**The following abstract from United Utilities shows the operation of the five pumps at Anchorsholme pumping station during week commencing 20<sup>th</sup> November 2017 and the spill data for that week. These are facts provided by United Utilities.**

There are a total of 5 pumps at Anchorsholme Pumping Station, which are called into duty sequentially based on increasing levels of storm water arriving at the station from the main tunnel. Therefore as flow levels rise and fall in the Pumping Station, the number of pumps called into service will change to reflect these pre-set flow levels. Figure 3 below shows the level of flow (orange line) arriving at Anchorsholme Pumping Station from the 20<sup>th</sup>-27<sup>th</sup> November 2017. As seen below, once the

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flow reaches “station start height” pumps are called into duty (grey Line). The diagram also evidences that the flows arriving at the station were considerable, prior to the evening of the 22<sup>nd</sup> November 2017.



Site	Times of Spill	Pump Duration
Manchester Sq. PS	17.25 21 Nov – 16.00 22 Nov (intermittent)	600 minutes of 1-3 pumps operating as required.
Anchorsholme PS	4.50am 21 Nov. – 1600 22 Nov (intermittent)	1210 minutes of 1-3 pumps operating as required.
Chatswork Avenue PS	17.00 21 Nov – 16.00 22 Nov (intermittent)	760 minutes of 1-3 pumps operating as required.

The table above highlights, that due to the amount of rainfall, which fell over the catchment there was a requirement for the three stations to pump out to sea due to the system already being full. This is a flood prevention measure for all three catchments upstream of these facilities.

The pumps at all three stations listed above, are automatically called upon (grey line), dependent on the station start height. Up until the evening of 22<sup>nd</sup> November 2017, the stations did not require to call upon the remaining pumps, as evidenced in figure 3.

On the evening of the 22<sup>nd</sup> November and during the 23<sup>rd</sup> November 2017, due to the amount of flow arriving at Anchorsholme Pumping Station, the station automatically called upon the remaining two pumps; this is shown in the Anchorsholme Pump Operation graph shown below.

It is noted that United Utilities reported intermittent tripping of pump five, throughout the evening of 22<sup>nd</sup> November 2017 but confirmed that without this pump failure the severity of the flooding would have remained the same.

United Utilities also confirmed that the beach pumps were available to be called upon during the storm event.

Unlike the data above on the five pumps, there is no specific data available in respect of the beach pumps. However, United Utilities confirmed that in the event that beach pumps are required they would have activated as it would be classed as an emergency and would not require specific permission for that event. United Utilities did not restrict the use of the beach pumps during this event as they open automatically as required by the levels in the culvert.

## Investigation, Findings and Actions

Council Officers, United Utilities Officers and Elected Members attended a number of properties following the event on the 22<sup>nd</sup> November in the Anchorsholme, Norbreck and Bispham areas which resulted in this formal Section 19 Investigation. This does not however mean that flooding did not occur in other areas.

In order to collate the information for the investigation into this flood event the following initial actions were taken (as far as officers were aware):

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- Council officers visited all the properties where flooding was reported to allow investigations of the effect of the property level flooding.
- Letters were delivered at all properties recorded as affected by flooding.
- Data collected during the end of November and beginning of December found that over 74 properties had property level flooding and 6 garages have been reported as having flooding.

In the Anchorsholme area identified in Plan B, as a result of the weather conditions during the week commencing 20<sup>th</sup> November, the sewage system was already full to capacity, ground conditions were saturated and water course levels were high.

The findings are that this flooding event resulted from the sewers systems not having enough capacity to convey the additional flows generated by the storm and the inability of water courses to pass forward water quickly enough due in the main to capacity issues resulting from classification as an exceptional severe weather event.

Water was recorded to have receded from these properties during the morning of the 23<sup>rd</sup> November 2017.

The largest area recorded with flooding was East Anchorsholme, the area bounded by Warren Drive, Sevenoaks Drive, Wood Green Drive, North Drive and Snowhills Crescent, which was impassable due to water at a depth in the region of 500mm across the highway. In addition, some areas reported loss of electricity.

Following a visit to 25 Fir Tree Place where property flooding was recorded the resident reported that water did not recede until 9.30am on the 23<sup>rd</sup> November 2017.

Further investigation has taken place in respect of the cross boundary and other Risk Management Authorities' operations during this event in particular United Utilities. United Utilities reported that following their investigations in respect of flooding on Sevenoaks Drive area, their team found a third party culvert

blocked outside the Blackpool boundary and once they unblocked it on behalf of the third party owner the water receded extremely quickly in that area.

In order to provide additional sewer capacity, United Utilities took the decision to divert flows from Skipool pumping station serving Poulton-le-Fylde and surrounding areas away from the Anchorsholme catchment. The volumes of flow generated by the storm meant most of United Utilities assets were continually spilling storm sewage to watercourses in accordance with consents issued by the Environment Agency. The diversion of storm water to the River Wyre will have undoubtedly mitigated flooding to areas of the Anchorsholme catchment.

In the Bispham area, Blackpool Council officers attended but could not alleviate the water, similarly to Anchorsholme area ground conditions were saturated and sewage systems full to capacity.

Highways teams recorded that on arrival at Valentia Road and Limerick Road there was evidence of surcharge into properties, over the carriageway and in gardens. Water had entered properties largely under the floor. The road was flooded in parts up to 1m deep.

In addition these properties had suffered electrical disruption.

Blackpool Council deployed sandbags to divert water but these proved ineffective as water levels had risen quickly and sewer surcharge had entered the property under the floor.

The residents were advised to contact United Utilities to assist with the clean-up.

Valentia Road was also visited after the event on 22<sup>nd</sup> November 2017.

Residents were informed along with others in the area that there was sewer surcharge in the flooding and as such United Utilities should be involved in the investigation. It is understood that this area is a known area of risk of highway flooding and as such led to the road being closed on a number of previous occasions.

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(Property level flooding has not been previously recorded).

One of the main issues for Valentia Road and Limerick Road is that Bispham Dyke which is classified as a main-river and as such is the responsibility of the Environment Agency, is connected into the sewer network. In addition there is surface water runoff from network rail owned land.

Investigations are now planned to look into the prevention of flooding and to identify resilience measures that can be provided.

There was major flooding on Mossom Lane, manholes lifted which led to the road being closed. Initial investigation raised questions about the ability of Anchorsholme pumping station to operate during this event which could be the reason that Mossom Lane flooded, however, United Utilities have provided a report that states that the pumping station was operational on the evening of the 22<sup>nd</sup> November and that the pumps were operating intermittently as they would expect them to as previously highlighted and explained.

Properties at numbers 393 to 373 and 398 to 378 Warley Road were impassable due to 500mm depths of water. There was also electricity failure to properties in this area. The road was closed but water is reported to have receded at 3am.

Residents have contacted the Flood Risk Manager and further investigations are taking place in respect of Warley Road and Bromley Close.

Devonshire Road Bridge was closed due to flooding, this bridge has a history of closure during heavy rainfall. Officers are working with United Utilities to better understand what measures can be taken collectively to address the flooding in this location.

## Conclusions

Given the rapid onset of this incident and the lack of Met office warning there was little opportunity for preparation. However the investigations by the Flood Risk Manager and close working with other risk management authorities (RMA's) show that the undertaking of duties by Blackpool Council and United Utilities were deployed.

It is concluded that the flooding was caused by an exceptionally severe weather event as the entire integrated drainage system including highway drainage system, watercourses, sewers, main-river and the water table was completely saturated.

Given the speed with which the flood receded it is understood that gullies in the area were operational and not blocked. With the intensity of the rainfall it is not suggested that there was any blockage in the sewer system other than that already noted impacting Sevenoaks Drive, with the capacity of water not allowing the highway gullies to drain away.

## Flood Management Options and recommendations

Given the high intensity short rainfall it is not thought that any improvement in capacity of United Utilities sewers is required.

However, options for flow management could be investigated to better manage the water flow away from properties.

Further investigations are being made into improvements in the following areas:

- Applications have been made to the Environment Agency so that a study and modelling can be carried out to better understand the causes of flooding and mitigation measures in all areas that were flooded;
- In certain properties, particularly Valentia Road and Limerick Road, it may be advisable to investigate the potential for flood resilience;

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- Work with Highways England to ensure that their culverts are not impeding the flow of water;
- Investigation and clearance of watercourses but more importantly better management of surface water in the catchment areas. This will include applications to the Environment Agency for funding to undertake studies on the impact of watercourses and projects to improve the efficiency including possible surface water separation;
- In respect of Devonshire Road Bridge, discussion has already commenced with United Utilities on the impact of the continued disruption during heavy rainfall and the potential solutions or management of flooding at the bridge, with network rail needing to be included in these discussions;
- Full review sandbag/flood response practical assistance tyre policy taking into account more modern methods of protection;
- Information is provided on the Council's web site to assist and update residents and direct residents to the flood hub;
- Implement flood resilience forum in Blackpool;
- Partnership work with Wyre Council and United Utilities to provide improvement to water storage and flow in the Hillyaide Brook and Royles Brook Rivers including ensuring other risk management authorities (RMA's) are informed.

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