

A Ard-Mhéara agus Comhairleoirí,

Re: Review of Flooding Events on 28th June 2012

This report to Council with regard to the flooding in Cork City on the 28th June 2012 addresses the following main areas:

- Weather warnings received from Met Eireann and their communication.
- Actions Taken
- Weather Events
- Impact
- Specific Serious Flood Situations
- City Council Response During Flooding
- Communications.
- City Council Response Post Flooding
- Assessment
- Causes of the floods..
- Steps to be taken on foot of this flood event.

WEATHER WARNINGS RECEIVED

Following the widespread flooding of November 2009, a severe weather warning system has been developed by Met Eireann and has become a national system of informing Local Authorities, Government departments and the general public of severe weather predictions by Met Eireann.

In the month of June 4 severe weather warnings have been issued by Met Eireann. On Wednesday 27th June at 16.56pm a weather warning as follows was received by the Council at 16.54pm advising that:

“Heavy rain will develop overnight and there will be some torrential and possibly thundery downpours. These falls may lead to localised flooding. Rainfall totals of 30 to 50 mm are likely but due to the thundery nature of the rain localised totals of up to 70mm are possible.”

*Valid from 18:00 hours Wednesday, 27-Jun-2012
until 12:00 hours Thursday, 28-Jun-2012*

This weather warning was countrywide.

Since the practice of the issuing of severe weather warnings was introduced nationally, the City Council has on receipt of each warning, issued it automatically by email to a range of organisations and media outlets for the purpose of onward transmission to businesses and the general public.

Included in the list of recipients of these warnings are:

- Cork Chamber
- Cork Business Association
- Individual businesses primarily located in the City who requested to be on the email list for tidal information
- Media outlets including the Irish Examiner, Evening Echo, 96fm, Redfm, RTE, TV3

On Wednesday 27th June, all above were forwarded the weather warning. The weather warnings were broadcast by both 96fm and Redfm.

In line with nationally agreed procedures, weather warnings are also an integral part of the national weather forecast broadcast. This weather warning was broadcast on the Nine O'clock news on Wednesday 27th June on RTE 1 and again was a countrywide warning

ACTIONS TAKEN

Telephone contact with the Met Office by Environment staff at 17:33 clarified that Cork County was a pivot point of a weather front that was expected to move either west over Kerry or North East towards Dublin. Rainfall of between 25 mm and 50 mm with a possibility overall up to 70 mm was forecast. The main concern arising from this was likely impact on the Lee catchment. City Council consulted specifically with the ESB to establish the situation at that time at Inniscarra Dam. This is now standard practice since the 2009 floods, following the development of a significantly increased level of communication with the ESB and other agencies such as Cork County Council and the Port of Cork as part of the assessment of potential flood risks.

Communication with the ESB at 18.00 on Wednesday 27th June established that the operations at the Inniscarra Dam were normal, that there was significant holding capacity at the dam and, that discharge rates were in line with normal electricity generating operations. Arising from this consultation, the Council staff were satisfied that there was no threat of flooding from the River Lee. It was also deemed there was no risk of tidal flooding. Final assessment in context of the weather warning over a 13 hour period was that ponding could occur on streets and Traffic Section was put on alert with regard to possible need for road closures.

WEATHER EVENT

Around midnight prolonged intense rainfall was experienced across the City and surround area.

Records at the weather station at Met Eireann indicate that for the period midnight to 3 a.m that in excess of 30 mm of rain fell with 18.3 being recorded for the period 1 a.m to 2 a.m.

Of interest also is that the total rainfall over the 48 hour period of the 27th and 28th June of 52.3mm is less than the rainfall over the 48 hour period of the 14th and 15th June of 58.7mm, weather warnings having issued for both these periods. This clearly indicates that the cause of the flooding on Thursday 28th June was due to nature of the rainfall in terms of its concentrated level over a short duration in the early hours of Thursday morning 28th June.

IMPACT

Arising from the intense rainfall over the three hours, two separate types of events emerged.

- (i) There was widespread ponding and heavy stream flows on roads and streets across the City, examples of this caused flooding on Watercourse Road due to flows from Sunvalley Drive and Monastery Road, also flooding on Infirmary Road and South Tce. due to flows from Old Blackrock Road, Southern Rd. This arose from the incapacity of the road gullies and sewers to cope with intensity. Manhole covers were forced up at various locations across the City. These situations occurred early in the rainstorm and on abatement of rainfall, generally rectified themselves when gullies and sewers were able to cope with the water volume. .
- (ii) Localised flooding due to lack of capacity/blockage in waterways and culverts. These proved to have far more serious impact on households and business properties and is dealt with in more detail later in this report

SPECIFIC SERIOUS FLOOD SITUATIONS

Blackpool (encompassing Thomas Davis Street, Great William O'Brien Street, Watercourse Road, Foley's Row, Orchard Court)

The River Bride runs through Blackpool. It rises east of Blarney and is joined at the City boundary by the Glenamought and then flows mostly in open channel parallel, with the Commons Road, until it reaches Blackpool. From Blackpool it is convey to two culverts, eventually discharging to the Lee at Christy Ring Bridge. When heavy rain is forecast there is a routine of checking gratings on the Bride upstream of the culvert. On this occasion, the screen upstream of the culvert, located in Orchard Court, was checked at 5 p.m on the 27th and found to be clear. A call was received via the co-ordinator at 2.26 a.m. advising of flooding. A JCB was deployed a t 3 a.m. to ensure the screen was kept free of debris.

However, despite this, the volume of water in the river was such as to exceed the capacity of the culvert. This caused backup in the channel and overflow in Orchard Court and at Blackpool Church. These combined overflows then flowed onto Thomas Davis St., Gerald Griffin Street and via Watercourse Road to the Brewery Corner. Water depths were up to 1.2m. Peak flow is estimated to have been reached between 5 a.m and 6.30 a.m. As inflow decreased the culvert was capable of handling and the flow and the flood was abated by 8.30 a.m

Considerable damage was caused to residences and businesses on these streets.

Commons Road Kilnap

The Bride river also overflowed its banks and caused flooding to the Commons Inn and adjacent houses. Whilst further upstream the Glenamought overflowed and caused flooding to one property.

Parkcourt , Meelick Park,Kempton Park, Mervue Lawn

These three estates are located north of the North Ring Road and east of Ballyhooley Road. They are discrete estates separated by large green spaces. A stream which runs south adjacent to the Ballyhooley Road, discharges into the Glen river south of the North Ring Road. From Mervue Lawn and for its entire length within the City it is piped. The entrance to the pipe system is protected by a thrash screen.

On the morning of the 28th it is clear that the trash screen became blocked causing water to overflow onto the Mervue Lawn road flooding two adjacent houses, flowed southwards dividing flow streams along Ballyhooley Road and across green to enter the recreation area adjacent.

The Ballhooley Road stream flowed southwards and then turned into Meelick Park flowing westward. The stream flowing through the recreation area reached the Kempton Park road flowed south, flooding two houses at the low point at the southern end. Both flows rejoined to continue southerly direction adjacent to the end houses in the Meelick Park and the playing fields. The volume and force of flow was such as to cause collapse of a 2m boundary wall. Flow continued southward to the relatively flat green area adjacent to and to the rear of Parkcourt. It then extended and flooded 20 houses in Parkcourt. Gullies and drainage system were not sufficient to enable water to re enter the pipe system.

CITY COUNCIL RESPONSE DURING FLOODING

The following is the broad timeframe of events as they unfolded and the activation of the Councils response:

Between 01.00 hrs and 02.30 hrs on the 28th June our Emergency Services responded to a number of calls regarding isolated flooding incidents at different locations in the City and the County. These were primarily on the edges of the City and into the adjoining county area. Three of the responses were to The Viaduct on the Bandon-Cork road. A number of other

reported incidents of localised flooding were also passed to the City Councils Out of Hours Co-Ordinator who activated local responses by Drainage, Housing and Traffic staff to deal with the issues. Again they were at a number of locations across the city and extremely localised in their nature.

Between 3:00 hrs and 03:30 hrs the City Councils Chief Fire Officer contacted the Councils Senior Engineer, Drainage and advised of the position. The Councils Senior Engineer commenced assessment of the situation but at this stage there was no evidence that extensive flooding would occur, in Blackpool in particular. Also between 03:00 hrs and 03:30 hrs the Chief Fire Officer, Cork County Council contacted the Chief Fire Officer, Cork City Council and advised of the situation in the county areas. During this period four calls were received in relation to flooding risk at Ballyvolane and in the 30 minutes that followed eight further calls were received. Calls were received at 2:30 in relation to flooding in Thomas Davis Street. Responded to by Drainage staff a Jcb was deployed at 3.00 am to keep screen clear. This was followed between 04.00 hrs and 04.30 hrs with the first calls being received with regard to the Blackpool area. It was following this that it became evident that the main Blackpool area was flooded.

At 04.30 hrs the Chief Fire Officer briefed myself as City Manager. This followed with a briefing from the Senior Engineer, Drainage who advised that the City Councils on the ground response to the events had been activated and that the Councils services were responding to individual cases as they were notified across the City. Immediately following this, members of the Councils Crisis Management Team were contacted to convene in City Hall at 07.00am. At 06.05 hrs I briefed the Lord Mayor of the situation and advised that the Council was responding on the ground to the incidents and that the Councils Crisis Management Team were convening at 07.00 hrs.

COMMUNICATION

In terms of communication of the events, 96 fm was briefed by the City Council through its Emergency Services and a specific news bulletin interview at 06.00 hrs advised that there were flooding incidents across the City, and that there would be traffic disruptions in place. During the following number of hours 96fm, Redfm and other local radios carried extensive coverage on the affected areas, this having been an invaluable public broadcasting service.

Some commentators have asked as to why the first formal press release was not issued until 09.00hrs. In this regard, the immediate priority of the City Council was to ensure that its communications were on the ground with directly affected citizens through its Emergency Services, Civil defence Services and its out of hours Response Teams. This was in place, meeting the priority communication matters at that time in terms of assisting persons affected. The secondary matter to consider is that throughout the early morning, commencing at 06.00hrs from our own Emergency Services briefing on 96fm, the second most critical communication issue was being delivered through 96fm and other stations such as Redfm. This communication messaging was to ensure that the broader general public, in particular commuters, were made aware of the fact that areas of the City were flooded and that traffic diversions were in place. Based on the fact that the primary and secondary

communication messaging was being delivered, the formal press release was held until 09.00 hrs to ensure that it would give specific information with regard to the number of properties affected and their main locations, that the Council's flood response team had been activated since 03.30 hrs (this being history at this stage and only of value in terms of indicating that the City Council was responding throughout the night), but most importantly that all assistance in terms of clean up, housing welfare and any other assistance required would be offered. Along with this, the timing of the 09.00 hrs press release was to coincide with the changeover of the City Councils Emergency Services out of hours telephone number to the specifically set up Emergency Number of 021 4208000 which handled all matters for both City and County from 09.00 hrs onwards.

In terms of further communications during the day, further press releases were time updates at 14.00 hrs and 18.00 hrs to brief the public further. In between these periods there was little of relevance to report on generally. Again, the primary ongoing communication was through our staff engaging directly with persons affected which was the most critical aspect of communication on the day. As City Manager I also did a number of media interviews during the day which supplemented the formal press releases. All press releases were published on the Councils website and were published through the Councils twitter account. While twitter is a communications tool of merit, it is important to note that it would not be the intention of Council to engage in constant dialogue on twitter in such situations, however close monitoring of commentary would be of benefit in order to redress any misinformation or misunderstandings at different periods throughout an event of this nature.

CITY COUNCIL RESPONSE DURING FLOODING

Cork City Civil Defence was mobilised at 06.04hrs on the morning of the 28th June and provided Welfare assistance in the Cleanup operations in the Park Court and Meadow Brook Estates.

- 1) Temporary Food and Shelter was provided to Residents of the Park Court Estate in the Civil Defence and Fire Station Facility in Ballyvolane.
- 2) Welfare and Rescue assistance was provided to the residents of the Meadowbrook Estate In Glanmire.
- 3) Houses and gardens pumped of water using portable pump equipment, Civil Defence crews in conjunction with City Fire Brigade.
- 4) Civil Defence volunteers also assisted householders to remove carpets and furniture from flooded homes.

Civil Defence personnel were stood down at 18.50hrs

Housing staff were assigned to assist Council tenants with clearance works, re housing and provided advise for others in respect of assistance.

Drainage staff were deployed to reinstate manhole covers, provide assistance in releasing trapped water, washing down streets and clearing gullies.

Street cleaning staff and equipment were assigned to facilitate removal and disposal of flood damaged goods both from households and business. They carried out extensive cleaning up of mud and debris from affected streets and footways.

ASSESSMENT

In considering the Councils response to the receipt of severe weather warnings it is important to consider how beneficial they may be and, in the context of the nature of the flooding which occurred at different locations in the City on Thursday 28th June, if further measures are required to advance the City Councils capacity to have a more defined level of warning to city businesses and residents in such circumstances.

The weather warnings issued by Met Eireann during the month of June indicated the following levels of rainfall for specified parts of the country. All weather warnings are geographically broadly based as indicated by the extracts below from the weather warnings received in June:

Date and Time warning effective for.	Rainfall and Location predicted in weather warning received.	Actual rainfall in 24 hours as per Cork Airport Weather Station
12.00 hrs June 2 nd to 21.00 hrs June 3 rd .	Between 25 and 65 mm “Initially to affect the Southwest”	June 2 nd - 24.5 mm June 3 rd - 0.9 mm
00.00 June 7 th to 00.00 June 8 th .	40 to 60mm “In Munster and Connacht”	June 7 th - 28.9 mm
18.00 June 14 th to 06.00 June 16 th .	Accumulations of 25 to 35 mm/36hrs are likely with up to 45mm/36hrs possible on mountains. “Counties: Louth, Meath, Dublin, Kildare, Wicklow, Wexford, Waterford, Cork & Kerry.”	June 14 th - 37.5 mm June 15 th - 21.2 mm June 16 th - 4.4 mm
18.00 June 27 th to 12.00 June 28 th .	30 to 50 mm are likely but due to the thundery nature of the rain localised totals of up to 70mm are possible. Countrywide warning.	June 27 th 18.6 mm June 28 th 33.7 mm

It is clear from the above that the warning on June 27th last was of a similar nature, in terms of the rainfall levels expected, to those of the 1st and 6th June in particular. Likewise, they were of a general nature in geographical terms. Considering the fact that the Council was satisfied that there was no threat from the River Lee on foot of its flood assessment consultations on the 27th June, and that the City did not experience any flooding on the 1st of the 6th June when weather warnings of a similar nature were issued, it is wholly unreasonable to take a view that the City Council could have predicted the localised and concentrated nature of the rainfall that occurred in the early hours of the 28th June and, that it would have led to flooding in the specific areas affected.

Of interest also is that the total rainfall over the 48 hour period of the 27th and 28th June of 52.3mm is less than the rainfall over the 48 hour period of the 14th and 15th June of 58.7mm, weather warnings having issued for both these periods. This clearly indicates that the cause of the flooding on Thursday 28th June was due to nature of the rainfall in terms of its concentrated level over a short duration in the early hours of Thursday morning 28th June.

The river channels and culverts affected were unable to cope with the concentrated level of rainfall that entered their respective catchments over an extremely short period. Flooding occurred within an extremely short timeframe at different locations in the city, without warning, and of a “flash flood” nature.

The localised concentrated nature of the rainfall was unpredictable and unprecedented. In any circumstances, without the benefits of sophisticated flood warning systems being in place on each of these rivers, it would not be possible to predict the impact of the rainfall and give adequate advance notice to the affected areas. In the circumstances, the City Council could not have been in a position to give more specific advance flood warnings. Any suggestion that the affected areas could have been adequately warned of flooding through the more widespread direct dissemination of the severe weather warnings received from Met Eireann to the general public by way of the existing email alert system, text alerts, or through the use of social media such as twitter, is misplaced. General public warnings were issued both locally and nationally.

In essence, because severe weather warnings are of a generalised nature as above evidenced and, because minor/secondary rivers in the City do not have sophisticated water level monitoring systems in place, linked to flood warning systems, the information available to the City Council to enable it to adequately predict and warn of expected flooding in the areas impacted, did not exist. Members should note that this is not unique to the City.

CAUSES OF FLOODING

In all cases, the flooding that occurred was not contributed to by reason of the non cleaning of gullies or drains. The Council has an active and ongoing programme of gully and drain cleaning in place which would have positively contributed to the management of rainfall and preventing more widespread flooding in many areas. The primary cause was the inability of

the water courses to contain the massive amount of rainfall that occurred over a short timeframe.

In the case of Blackpool, whilst it is clear that flooding occurred due to a lack of capacity in the culvert to handle this particular rainfall event, it is not possible to be definitive at this time whether the rainfall event is outside the designed capability of the culvert or that there is an inhibition of the culvert capacity due to a restriction within the culvert system. Further detailed internal inspection of the culvert system and assessment of the flows generated by the storm will have to be carried out to facilitate definition of the cause of capacity shortfall. It is not possible, therefore, to formulate at this time, measures to guarantee a non-recurrence.

It should be noted that the culvert capacity originally designed in 1982 was subsequently reassessed before construction commenced in 2003. This catchment was also modelled and assessed as part of the Lee CFRAMS and gave no cause for concern 

In the case of Parkcourt, Meelick Park, a full survey of the piped stream will be necessary to ascertain whether there are any capacity limitations and to review accessibility for external flows. A review of the thrash screen arrangement and maintenance procedures will also be necessary before definitive proposals can be made to mitigate a re-occurrence of this flooding

STEPS TO BE TAKEN ON FOOT OF THIS FLOOD EVENT

Based on a review of all matters associated with the flooding that occurred and, taking account of the circumstances of same the following actions are merited:

1. There is a need for the National Major Emergency Management Office in conjunction with Met Eireann to examine the nature of the weather warnings issued to local authorities. In particular, there is a need to establish if more detailed and location specific weather alerts can be developed. The current generalised nature of the warnings have shortcomings as evidenced by the events of Wednesday 27th and Thursday 28th June. This is a matter that will be progressed through the Regional and National Major Emergency Management structures.
2. For future weather warnings received from Met Eireann, the Council will immediately offer the general public the opportunity to be included on its email list for automatic onward transmission of same. All Met Eireann weather warnings will be published on the Councils website. This facility will be publicly advertised and will be capable of being signed up to through our website.
3. A text alert system will be introduced immediately offering the general public the opportunity to receive an SMS alert, advising that a weather warning has been received from Met Eireann and, that it is posted on the Councils website. This facility will be publicly advertised and will be capable of being signed up to through our website.
4. Weather warnings once received will be disseminated via the City Councils twitter account. This will point the reader to the Councils website which will have the weather alert posted.

5. Members of Council already receive by email the weather alert. This will be supplemented by SMS message.
6. The Council's website and twitter account will be updated with relevant information as it becomes available during severe weather. It is not proposed to engage in a dialogue type communication. This procedure was followed last week.
7. The warnings are already disseminated to key media outlets and business associations. This is for the purpose of public information bulletins through local media and, to allow business associations such as Cork Chamber and Cork Business Association to advise their members. Confirmation from these will be sought that they are activating their communication channels as expected.
8. The matter of improving the city flood early warning systems will continue to be pursued through the OPW. Liaisons with the County Council will also continue and a joint approach with the County Council to furthering, through the OPW, flood warning systems on the waterways that enter the city, will continue to be pursued. In particular, the Council will continue to pursue as a matter of urgency the further development of the Lee Cframs project through the OPW. Completion of the hydraulic modelling exercise by the OPW to enable it to commence the design of the required flood defence systems for the city is a pressing priority.
9. As a measure to assist Council tenants, and to protect our own assets, the Council will procure flood barriers for distribution to its own houses in high risk flood areas. The immediate priority will be those affected last week. This will be progressed through our Housing and Community Directorate. In doing so, there also is merit in developing a support system for vulnerable tenants, and other vulnerable households, through the community and voluntary fora. It is a matter for private property owners to purchase their own flood barriers.

It should be noted that while the above will improve the dissemination of weather warnings, it will not in any way result in the Council being capable of predicting if and where flooding may occur. The difficulties in doing this are already set out in this report. Weather alerts have shortcomings, they are not specific such as those that currently allow very specific information to be disseminated on the Jack Lynch Tunnel text alert system. The wider dissemination will be of interest to the public and of information value however, the Council will not be in a position to respond to specific queries such as, whether or not areas of the City may be flooded, on foot of the current weather alerts we receive.

It should also be noted that the Bride catchment will be reviewed on behalf of the OPW by the South West CFRAMS project team.

The issue of rate reliefs and the difficulties that some property owners may have in securing adequate insurance has been raised. In the case of rates, it is not proposed to offer reductions. Rates are effectively a form of local taxation and the Council has not varied them in the past in light of specific or differing individual circumstances. However, the Council has a good track record in engaging with our ratepayers and indeed we encourage those experiencing difficulty to engage with us early so that we can assess each individual circumstance and agree appropriate schedules of payment arrangements where such is warranted. In the case of insurance, this is a matter for private property owners to pursue with their insurers.

Finally I wish to thank all members of staff of the City Council who responded during the flood events evolving and thereafter in the clean up and providing assistance of many type to persons affected. Again, staff have responded magnificently without question and in the true spirit of public service. They are to be commended. I would also like to thank the members of Council for their support to staff. While acknowledging the very serious impact that a flood event has on property and on residents and business owners personally, I wish to acknowledge the forbearance of those impacted, and thank them for the courtesy shown to our response staff on the ground.

TIM LUCEY
CITY MANAGER

5th July 2012