Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Investigation Report: Llanrwst Flooding December 2015

Final Report June 2016

Cyfoeth Naturiol Cymru
Natural Resources Wales

Our purpose is to ensure that the natural resources of Wales are sustainably maintained, used and enhanced, now and in the future.

We work for the communities of Wales to protect people and their homes as much as possible from environmental incidents like flooding and pollution. We provide opportunities for people to learn, use and benefit from Wales' natural resources.

We work to support Wales' economy by enabling the sustainable use of natural resources to support jobs and enterprise. We help businesses and developers to understand and consider environmental limits when they make important decisions.

We work to maintain and improve the quality of the environment for everyone and we work towards making the environment and our natural resources more resilient to climate change and other pressures.

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Rydym yn gweithio dros gymunedau Cymru i amddiffyn pobl a'u cartrefi gymaint â phosibl rhag digwyddiadau amgylcheddol megis llifogydd a llygredd. Rydym yn darparu cyfleoedd i bobl ddysgu, defnyddio a chael budd o adnoddau naturiol Cymru.

Rydym yn gweithio i gefnogi economi Cymru drwy alluogi defnyddio adnoddau naturiol yn gynaliadwy i gynnal swyddi a menter. Rydym yn helpu busnesau a datblygwyr i ddeall ac i ystyried cyfyngiadau amgylcheddol wrth iddynt wneud penderfyniadau pwysig.

Rydym yn gweithio i gynnal ac i wella ansawdd yr amgylchedd i bawb ac rydym yn gweithio tuag at wneud yr amgylchedd a'r adnoddau naturiol yn fwy gwydn yn wyneb newid yn yr hinsawdd a phwysau eraill.

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Natural Resources Wales

Flood Investigation Report

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Contents

List of Figures

Executive Summary

This report looks at the performance of the Llanrwst flood alleviation scheme during the flood event on 26th December 2015.

The scale of flooding across North Wales was significant. Estimates suggest over 100 properties suffered some form of internal flooding in over 40 communities, particularly across Gwynedd, Conwy and Anglesey.

Within the Conwy Valley river levels and the prolonged nature of the event meant it was the worst flood seen for over 30 years.

The flood alleviation scheme was built in 2009/10 as part of a wider scheme for the Conwy Valley which also included Trefriw. The scheme cost in the region of £7mllion and was funded by Welsh Government. In Llanrwst it was designed to protect up to 76 properties.

During the Boxing Day event the scheme performed as expected and protected the majority of these properties, some of which were flooded in both 2004 and 2005.

Despite this, the incomplete installation of demountable defences meant that 3 properties flooded in Conwy Terrace due to water standing on the adjacent road. The source of the standing water cannot be fully confirmed, but it is likely it was a combination of drains backing up, surface water and river flooding.

Installation of the defences across Conwy Terrace started but was halted as the river Conwy had peaked. As such they were not installed in time to protect the 3 properties that flooded.

Had the flood event continued to worsen installation of the demountable defences for Conwy Terrace would have continued and the A470 defences would have been installed when required.

Introduction

This report has been prepared as an initial investigation into the performance of the Llanrwst flood alleviation scheme during the significant flooding event on Boxing Day, December 2015. It only covers the area around the formal defences adjacent to Bont Fawr. Other areas and the wider Conwy Valley will be investigated separately, where required, following completion of a detailed hydraulic modelling exercise.

The Flood Alleviation Scheme (FAS) was built in 2009/10 as a result of previous flooding events in 2004 and 2005, where over 40 homes and businesses were flooded each time. It was delivered as part of a wider scheme covering other locations in the Conwy Valley including Trefriw.

During the Boxing Day event the Conwy catchment experienced a significant amount of rainfall on an already saturated catchment, resulting in the second highest recorded river level at our gauge at Cwmlanerch (this was marginally lower than the highest level). The Met Office rain gauge at Capel Curig recorded a total rainfall for Christmas Day and Boxing Day of 210mm. The total rainfall for December was approximately 330% higher than the long term monthly average for December.

Initial analysis suggests this was one of the most significant flooding events in the Conwy Valley in at least the last 30 years. This was based on analysis of peak river levels, volumes of floodwater and length of time the floodplain remained inundated.

As a whole the FAS worked very well and protected the majority of properties which flooded in 2004 & 2005. Nevertheless there were issues associated with demountable defences, which cross Conwy Terrace, and provide protection to properties in this vicinity.

This investigation has reviewed operation of the permanent defences and the issues associated with installation of the demountable defences.

Location

Llanrwst is located on the banks of the Afon Conwy approximately 20 Km south of Conwy Town and the mouth of the Conwy Estuary

Figure 1 – Location Map

Flood Alleviation Scheme

The Flood Alleviation Scheme was constructed in 2009/10 following an extensive study into the viability of different scheme options. The chosen option for Llanrwst consisted of a combination of flood walls, lowered spillways on adjacent agricultural flood embankments and demountable defences.

The sections of agricultural embankments that were lowered result in a significant reduction in peak water level expected in the Afon Conwy, adjacent to Llanrwst, during larger flood events. The spillways maintain a certain level of protection to the farmland behind, during smaller events, but allow flood water to spill over on flood events which may otherwise affect Llanrwst. Demountable defences were included in the scheme to stop flood water and surface water from the A470 flooding the area around Conwy Terrace and Bridge Street.
The reduction in peak river levels together with the permanent flood walls and demountable defences provide a standard of protection to Llanrwst against a flood with a 1 in 200 chance of happening in any year. 76 properties are protected in this event.

The scheme cost approximately £7million and was funded via Flood Defence Grant in Aid from Welsh Government.

Figure 2 below shows the arrangement of the scheme flood walls and demountable defences in Llanrwst.

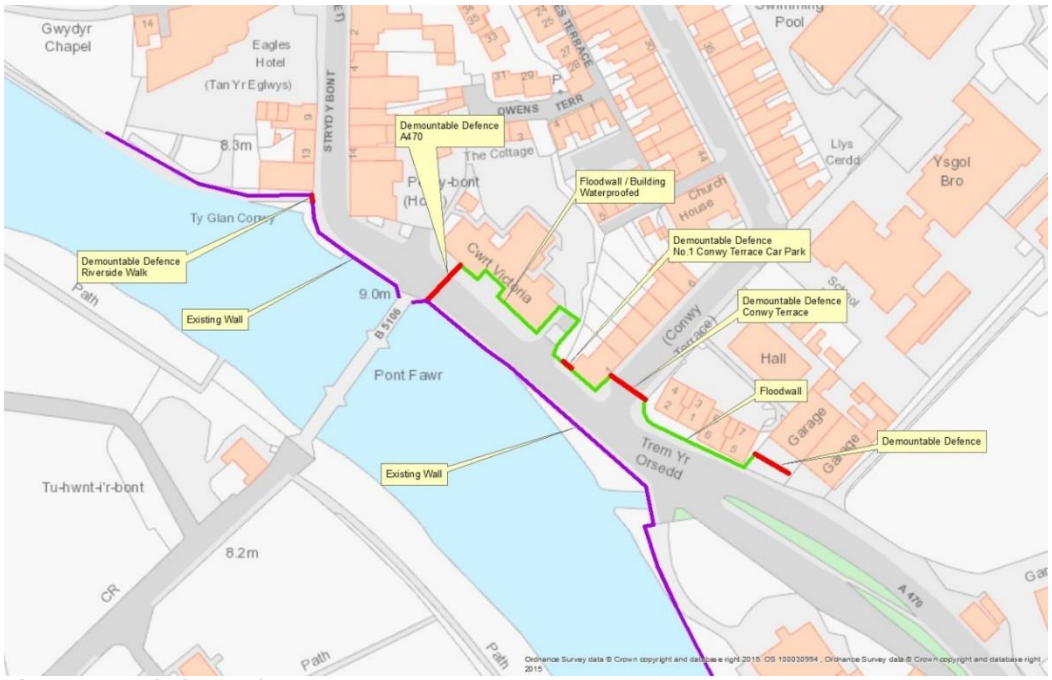

Figure 2 – Existing Defences

Figure 3 - Floodwall in front of properties

Figure 4 - Conwy Terrace Demountable Defence

Figure 5 - Floodwall / Waterproofed Building

Forecasts and Warnings

In the run up to the event the Met Office issued ‘heavy rainfall alerts’ for Conwy on both Christmas Eve and Christmas Day suggesting rainfall totals for the period, Christmas Day through Boxing Day, might be as high as 120 to 150mm. However, these were issued with Low confidence.

All other forecast information received on Christmas Eve and Christmas Day suggested it would be a very wet period but nothing to suggest that it would be such an extreme rainfall event.

On the Morning of 26th December the forecasts worsened. Due to this the ‘Flood Guidance Statement’ issued by the Flood Forecasting Centre was coloured ‘Amber’. This was highlighting a MEDIUM likelihood of significant impacts from surface water and river flooding for the counties of Denbighshire and Conwy. This instigated a Telecon between Category 1 Responders (Police, Fire Service, NRW, Local Authorities and other professional partners).

NRWs Flood Forecasting model, which takes Met Office forecast rainfall data and predicts peak river levels for 36 hours ahead, was also not showing significant river levels prior to the morning of 26th December.

As part of the ongoing monitoring role NRW had staff on a 24hr on call rota. Based on conditions and pre-set thresholds Flood Warnings were issued for the Conwy Valley on 4:30pm on Christmas Day.

Flood Event 26th December

The flood event on 26th December was widespread and affected numerous communities, predominantly in North Wales. Estimates suggest over 100 properties suffered some form of internal flooding in over 40 communities. This gives an indication of the scale and severe nature of the flooding problems in Gwynedd, Conwy and Anglesey.

During Boxing Day the Conwy catchment experienced a significant amount of rainfall on an already saturated catchment. The Met Office rain gauge at Capel Curig recorded a total rainfall for Christmas Day and Boxing Day of 210mm with a total for the whole of December (up to 28th December) of 1012mm. The total rainfall for December was approximately 330% higher than the long term monthly average for December.

Within the Conwy Valley river levels on the Afon Conwy were the second highest on record at Cwmlanerch gauging station (the record extends back to 1964 and were only 2mm lower than the highest recorded in 2009). However, due to the time the river remained high

and the consequent volume of water it was the most severe flood event experienced in at least the last 30 years.

The Afon Conwy peaked at 11:00am at Cwmlanerch and reached a level of 11.589mAOD. At the gauge at Bont Fawr it peaked at 12:00pm at a level of 8.380mAOD. The level at Bont Fawr remained close to its peak (above 8.3mAOD) for an extended period 10:30am to 1:15pm.

The Flood Alleviation scheme was designed to protect 76 properties, in Llanrwst. Although no return period has been assigned to the event the scheme protected properties that would have been flooded in both 2004 and 2005.

Despite this, the incomplete installation of demountable defences meant that 3 properties flooded in Conwy Terrace due to water standing on the adjacent road. This flooding was exacerbated due to bow waves created by cars driving through the water. The source of the standing water cannot be fully confirmed, but it is likely it was a combination of drains backing up, surface water and river flooding.

One property (No. 1 Conwy Terrace) installed their own flood protection to the front door which prevented the ingress of water.

Figure 6 below shows the rough area of flooding within Conwy Terrace and the adjacent area:

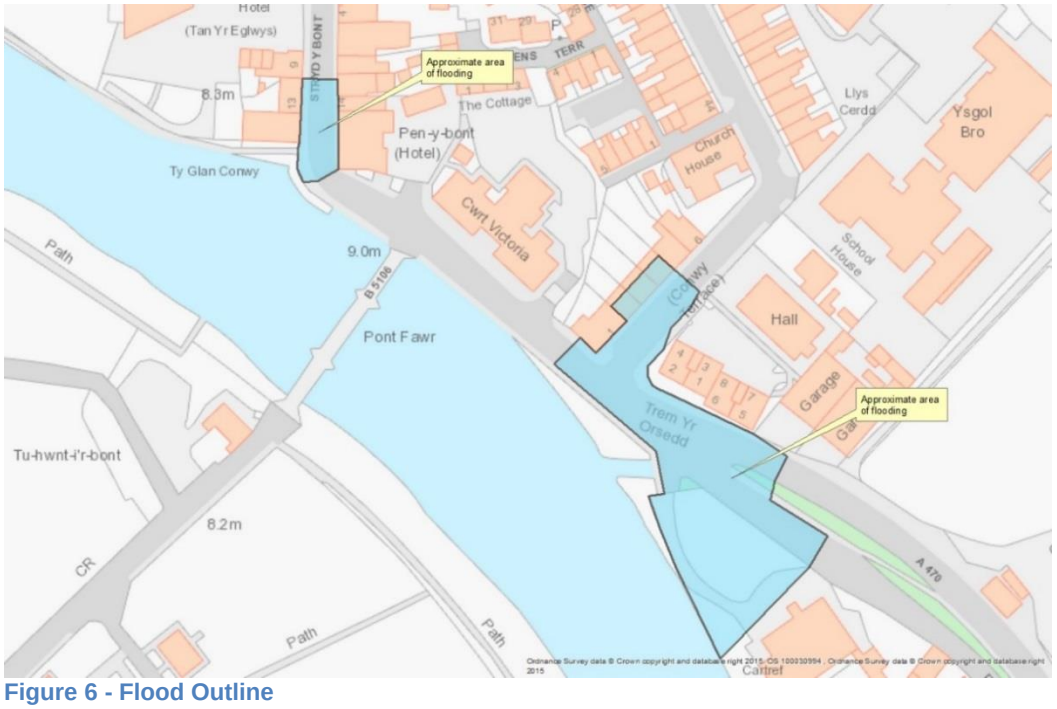

Figure 6 - Flood Outline

NRW Operational Procedure at Llanrwst

NRWs operational response is undertaken out of hours by duty staff on a 24hr rota. There are 3 primary roles:

- Flood Warning Duty Officer (FWDO) – responsible for monitoring river levels and issuing flood alerts and warnings
- Flood Incident Duty Officer (FIDO) – responsible for co-ordinating operational response and instigating operational procedures
- Assistant Flood Incident Duty Officer (AFIDO) – responsible for co-ordinating operations delivery staff on-site

In addition to these 2 further roles are activated during flood events. These are:

- Site Controller – a designated, trained officer from NRWs Operations Delivery team.
- Bronze Liaison Officer – a designated, trained officer from one of the Flood Risk Management teams. This officer attends the Forward Command Post.

These roles are not covered by a duty rota, appropriate staff are identified on an ad-hoc basis as and when required.

Key operational response tasks, for Llanrwst, are listed below:

- Issue of Conwy Valley Flood Warning - Install Stop Logs at Riverside Walk
- Install pump at Cartref y Borth
- 8.14mAOD River level alarm at Bont Fawr – receive alarm call from Incident Communication Centre (ICC)
- 8.14mAOD Consider Installing Demountables at Conwy Terrace (Send site controller to Llanrwst and complete checklist)
- 8.24mAOD Consider Installing Demountables at Conwy Terrace (Complete Checklist with site controller) and set up forward command post at Glasdir Centre (Council Building), Bronze Liaison Officer to attend.
- 8.44mAOD Must Install Demountables at Conwy Terrace
- 8.83mAOD Consider Installing Demountables on A470
- 9.03mAOD Must Install Demountables on A470

Based on the above threshold levels the stop logs at Riverside Walk are installed first then the demountable defences in Conwy Terrace (Including the car park for No.1). The defences across the A470 would be the last to be installed.

The demountable defences together with keys are stored in NRWs Tan Lan depot within the Conwy Valley, a short distance from Llanrwst.

Since the flood alleviation scheme was constructed this is the first time the thresholds for installing the demountable defences have been crossed.

The above information and response is supplemented by the 'Multi Agency Flood Response Plan for the Conwy Valley and Surrounding areas'. The aim of this plan is to facilitate a combined multi-agency response to flooding or potential flooding in the Conwy Valley and surrounding area.

NRW Operational Response

To investigate the issues associated with installing the demountable defences a review of the following has taken place:

- NRWs operational procedures including trigger levels
- Actions taken during the event taken from Duty Officer Logs
- Discussions with NRW Duty Officers
- Discussions with Conwy CBC Officers
- Information received from members of the community during the public drop-in session on 7th January

The issues below have been identified:

The 'Multi Agency Flood Response Plan for the Conwy Valley and Surrounding areas' was not activated or used by NRW or contributing partner Organisations.

Historically NRW procedures included for deploying a pump at Cartref y Borth during a flood event. The pump was mainly to reduce water levels on the A470. Following monitoring of this during smaller flood events the action to deploy a pump was removed as it was felt the pump only circulated water and wasn't reducing risk. In this event a pump at this location may have reduced the levels of water on the road, allowing more time to install the demountable defences.

The 8.14m Bont Fawr alarm was not received by the FWDO from ICC. This alarm was triggered at 8:51am. The role in ICC deals with both the telemetry and the incident hotline. On the 26 December the ICC was being operated on a single manned out of hours shift rota. The rapid change in the forecast did not allow time for the ICC to bring in additional resource to deal with the increased volume of alarms and calls. Unfortunately this one alarm was overlooked and this was not passed through to the FWDO until later that morning.

Receipt of this alarm would have instigated the sending of a site controller to Llanrwst and also the completion of a checklist to consider installation of the Conwy Terrace demountables. This was not done.

At 9:50am the FWDO was notified by ICC that river levels at Bont Fawr had exceeded the 8.14m threshold level and had also exceeded the 8.24m threshold level – this level was passed at approximately 9:40am. Exceedance of this level required completion of checklist to consider installation of the Conwy Terrace demountables together with setting up of the forward command post. The check list was not completed as there was no site controller on site.

At 10:10am the FIDO requested a site controller be sent to Llanrwst. Due to it being Boxing Day fewer staff were available to respond and no-one was available to attend site until mid-day. As such duty staff were relying on the telemetry gauge at Bont Fawr for decision making.

At 10:26am the FIDO tried to contact Conwy CBC to arrange the setup of the Forward Command post and arrange the road closure of Conwy Terrace. The FIDO was unable to contact Conwy CBC. Over the next hour four other attempts to contact Conwy CBC were unsuccessful.

The number given to NRW for contacting Conwy CBC is for a call centre which is a shared out of hours facility with Gwynedd Council. It is understood from discussions with Conwy CBC Officers that, due to the scale of the event and the widespread problems in both Gwynedd and Conwy, the call centre was overwhelmed with calls.

The forward command post was not opened, and as such, there was no presence on site from either NRW or Conwy CBC. The multiagency response plan for the Conwy Valley was not activated.

The inability to contact Conwy CBC meant that road closures and associated diversions were not able to be put in place to allow the demountable defences to be installed. In accordance with NRWs procedures and agreed protocols with Conwy CBC road closures must be in place before demountable defences can be installed.

At approximately 10:45am NRW operations staff enroute to Trefriw noticed flood water on the road near Conwy Terrace. This prompted a call to another member of the operations team to bring the demountable defences and keys to Llanrwst from the Tan Lan depot. As no site controller or Bronze Liaison officer were present this was the first time NRW staff had been in Llanrwst. This flood water was also reported by a member of the public at the same time through ICC.

First reports in officer logs suggest Conwy Terrace started flooding at 11:00am. At this time the manual reading on the Bont Fawr gauge board was 8.5mAOD and the telemetered reading was 8.337mAOD. This would imply that readings from on-site staff gauge and telemetry used by duty officers were inconsistent.

Consequently the 8.44mAOD trigger at which the Conwy terrace demountable must be installed may have been passed even though the telemetered gauge peaked at 8.369mAOD.

At 11:15am NRW Ops staff were requested to start installing the demountable defences even though there were no road closures in place. This started by 11:30am. The demountable defence to the rear of No.1 Conwy Terrace (Accountants car park) was installed and a start was made on installing the defence across Conwy Terrace. At this stage there was standing water on the line of the defences and the 3 properties had flooded.

An Operational Message was issued to inform residents that the demountable defences were to be installed.

At 12:30am the decision was taken to stop installation of the demountable defences at Conwy Terrace as the river level had peaked on the river Conwy.

A Flood Warning was not issued for Llanrwst.

Pumps were successfully sourced at 12:00 and at 12:45pm a pump was installed at Cartref y Borth to help evacuate water.

Conclusion

The demountable defences at Llanrwst are one element of a complex scheme that is the Conwy Valley Flood Alleviation Scheme.

During the Boxing Day event the Llanrwst part of the scheme performed well, protecting up to 76 properties. However issues installing demountable defences, for Conwy Terrace, meant that 3 properties were flooded. One property (No.1 Conwy Terrace) installed their own door mounted defence which stopped them from flooding. The source of this flooding may have been a combination of drains backing up, surface water and river flooding.

Due to the first telemetry alarm for Bont Fawr not being received it was over an hour before duty officers were aware that river levels in Llanrwst required the first consideration to install the demountable defences.

Lack of operational resource from NRW (Bronze Controller and Operations Site Controller), in Llanrwst, meant that operational procedures could not be followed properly. All rostered duty staff were busy dealing with the incident across the whole of North Wales and extra staff were not available due to the holiday period. The only additional staff that could be found for the Bronze Controller role could not get to Llanrwst due to the significant transport disruption and road closures across North Wales.

Due to the widespread nature of this event NRW standby operatives were dealing with other incidents of properties already flooding and areas where there were concerns of imminent failure of assets protecting other communities.

Duty officers were relying on trigger levels to determine when demountable defences should be installed, rather than being able to discuss with a designated officer on site. Potential problems with the gauging station readings at Bont Fawr suggest that river levels could have been higher than duty officers expected. With no officers on site this could not be checked manually.

Other sources of flooding such as surface water and drains surcharging exacerbated the problem. This source of flooding would not have been picked up by the river gauge.

Inability to contact Conwy CBC to close both highways (Conwy Terrace and A470) meant that installation of the defences in accordance with agreed procedures was not possible, as NRW does not have the necessary Legal Powers to put a road closure and associated diversions in place.

Despite this, the decision was taken to start installing the defences, regardless of the road closure, but at this stage it was too late. In the event that river levels were continuing to

rise installation of the defences would have continued and the scheme would have been fully implemented.

A combination of factors, rather than any one specific factor, resulted in the demountable defences crossing Conwy Terrace not being installed in time.

Recommendations & Lessons Learnt

1. Investigate call handling procedures and telemetry alarm system to identify potential issues with receipt/handling of river level alarms
2. Review threshold levels for issue of Alerts, Warnings and operational response
3. Review the requirement to install a pump at Cartref y Borth with both Conwy CBC and NMWTRA (North & Mid Wales Trunk Road Agency)
4. Review accuracy of Bont Fawr gauge and give consideration to installing a secondary gauge
5. Review operational response – do short term measures need to be implemented whilst the investigation is continuing
6. Double man duty rotas during public holidays when it is likely that finding extra officers at short notice will be difficult
7. Investigate the possibility of Flood Wardens providing feedback to the incident room about on-site conditions especially in instances where NRW has no presence on-site.
8. Review possibility of simplifying the procedure and checklists for installing the Conwy Terrace demountable defences and installing them based on a set trigger level earlier in a flood event, on a precautionary basis – this might create a few occasions when they are installed but not needed.
9. Alternatively review the possibility that installation of the demountables is managed by a Site Controller who is present on site from an earlier point in the flood event. A decision can be made on when to install the defences based on on-site conditions and forecast river levels.
10. Working with the Met Office, continue to review and improve the performance of Met Office numerical rainfall predictions models which are used as inputs in our flood forecasting models.
11. More training exercises required – to include professional partners
12. Investigate the possibility of providing IPP for other properties on Conwy Terrace to use in a similar way to that used by No.1. This will also reduce the possibility of flooding from other sources such as surcharged drains and surface water
13. Investigate installing CCTV to allow a better understanding of on-site conditions for duty officers in the Incident room
14. As priority review communications channels with Conwy CBC
15. As a priority review arrangement for closing the roads in conjunction with Conwy CBC and NMWTRA (North & Mid Wales Trunk Road Agency / WG Transport).

16. As some of the issues are surface water related, investigate the possibility that Conwy Council are given responsibility for installing the demountable defences at Conwy Terrace as they also have the Legal power to close the road.

17. As some of the issues are surface water related, investigate the possibility that NMWTRA are given responsibility for installing the demountable defences on the A470. There will be a requirement for a TRO that gives the power to close the highway. This will require WG agreement after an application from NMWTRA. WG are the Highway Authority, NMWTRA are agents for WG.
18. Investigate the possibility of developing a community flood plan to a higher level where NRW we hand over other responsibilities to the community. This would include locally monitoring flood events, alerting the operating authorities of situations on the ground and possibly even the installing temporary defences.

Glossary

Category 1 responders – designation in the Civil Contingencies Act 2004 for key organisations
FAS – Flood Alleviation Scheme
Flood Forecasting Centre - is a partnership between Natural Resources Wales the Environment Agency and the Met Office, providing a specialised hydrometeorology service. The centre forecasts for all natural forms of flooding - river, surface water, tidal/coastal and groundwater.
Flood Guidance Statement - provides information for Category 1 and 2 responders to help them with their emergency planning and resourcing decisions. It presents an overview of the flood risk for England and Wales across five days and identifies possible severe weather, which could cause flooding and significant disruption to normal life.
Flood Wardens – Specific members of the community trained to help with organisation and communication during a flood event
HRA – Heavy rainfall Alert – Met Office warning of significant rainfall based on Counties
ICC – Incident Communication Centre – NRWs 24hr communication centre
mAOD – meters Above Ordnance Datum – the measurement units used to measure heights of the river
NMWTRA – North and Mid Wales Trunk Road Agency

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Appendix 1

Summary Table

Identified Issue	Action
1. Duty Officers not received alarm trigger from ICC	• Investigate call handling procedures and telemetry alarm system to identify potential issues with receipt/handling of river level alarms
2. Availability of suitable duty officers to attend site	• Implement double up duty roles over public holidays
3. Communication with Conwy CBC	• Review communication channels with Conwy CBC
4. Road closure at Conwy Terrace	• Review road closure protocol with Conwy CBC and NMWTRA (Traffic Management Centre)
5. Flooding not identified on site	• Investigate installing CCTV on site • Consider with Conwy CBC providing IPP to properties in Conwy Terrace to reduce the risk from surface water flooding • Consider if/how Flood Wardens could provide live feedback to duty officers
6. Level monitoring equipment reading inconsistent	• Consider installation of secondary gauge at Bont Fawr for greater resilience
7. Operational Response	• Review Flood Warning Service alarm triggers • Review road closure protocol • Review & look for opportunities to streamline Operational Procedures following the review of triggers • Consider whether Conwy CBC or NMWTRA can assist in installing demountable defences in Conwy Terrace in future • Discuss options for joint exercises with Conwy CBC and NMWTRA in Llanrwst
8. Conwy Flood Forecasting Model	• Work with the Met Office to improve the performance of numerical rainfall predictions models that feed into our flood forecasting models
9. Community Flood Plan	• Consider development of a detailed community flood plan

Appendix 2 – Recommendations – Progress status

Key to Table 1

PROGRESS TABLE	
4	**Recommendation Complete**
17	**Recommendation In progress**
3	**Recommendation not currently in progress**

Directorate/National lead is Natural Resources Wales

Acronyms:

NRW – Natural Resources Wales
CCBC – Conwy County Borough Council
NMWTRA – North and Mid Wales Trunk Road Agency
NWC-REPS – North Wales Councils Regional Emergency Planning Service
NWP – North Wales Police

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Rec No	Status	Recommendation	Update	Delivery Lead	By When
1a		Investigate call handling procedures and telemetry alarm system to identify potential issues with receipt/handling of river alarms	Awaiting Telemetry Review as part of NRWs' Business Area Review	National	Spring 2017
1b		Investigate telemetry alarms and procedures are aligned	Review in progress	Directorate	Summer 2016
2a		Review threshold levels for Flood Alerts, Flood Warnings and Operational Messages in all four flood warning areas	Work commenced	Directorate	Summer 2016
2b		Simplify Flood Alerts e.g. trigger based/automated etc.	Options paper developed and signed off for National implementation	Directorate/National	Summer 2017
3		Review requirement for pump at Cartref y Borth with both CCBC and NMWTRA	Pump reviewed, NRW to supply	Directorate	Complete
4		Review Bont Fawr gauge and consider installation of secondary gauge	Meeting arranged with NMWTRA	Directorate	Winter 2016/17
5		Survey river bed profile upstream of Bont Fawr	Feed into the Conwy Valley model review	Directorate	Spring 2017
6		Review operational response - short term measures to be implemented whilst investigation continues	Duty officers finalised by October	Directorate	Autumn 2016
7		Review resilience of duty rotas	Further clarification on scope requested	Directorate	Summer 2016
8		Investigate use of Flood Wardens providing feedback to the incident room on site conditions, supporting NRW.	Not within current roles and responsibilities of Flood Wardens. To be raised at National level.	Directorate/National	TBC

Rec No	Status	Recommendation	Update	Delivery Lead	By When
9		Review the procedure and checklists for installing the Conwy Terrace demountable defence.	Reviewed and no change	Directorate	Complete
10		Review performance of the NRW flood forecasting model, including quality of Met Office input forecast rainfall data.	National Flood Forecasting team investigating	Directorate/National	Winter 2016/17
11		Duty Officers training/exercises required - to include professional partners. Familiarisation of both organisational procedures required.	All duty officer procedures to be updated before training/exercises can commence	Directorate	Winter 2016/17
12		Investigate the possibility of providing Property Level Protection (PLP) to properties in Conwy Terrace as used by property No.1	Raised during the Conwy Valley Flood Partnership Group, and group confirmed that PLP would be provided to properties. Awaiting confirmation from Conwy CBC of delivery	Directorate/Conwy County Borough Council	Summer 2016
13		Investigate installation of CCTV on site in Llanrwst to provide improved understanding of on-site conditions.	Communication commenced between NRW/CCBC and NMWTRA	Directorate	Summer 2016
14		Review communications channels between NRW & Conwy CBC	Discussions ongoing	Directorate/CCBC	Summer 2016
15		Review arrangement for closing the roads in conjunction with CCBC and NMWTRA	Meeting to be set up with relevant parties	Directorate/CCBC /NMWTRA/NWP	Winter 2016/17

Rec No	Status	Recommendation	Update	Delivery Lead	By When
16		Investigate options for CCBC to install demountable defences at Conwy Terrace	Meeting to be held up with CCBC	Directorate/CCBC	Winter 2016/17
17		Investigate options for NMWTRA to install demountable defences on the A470	Meeting to be held with NMWTRA	Directorate/NMWTRA	Winter 2016/17
18		Investigate the development of a community flood plan where NRW transfer some flood response responsibilities to the community	Would have to be considered and agreed at National level as not current role and responsibility of a flood warden.	Directorate/National	TBC
19		Review the Flood Guidance Statement Telecons	Improved and incorporated within duty officers procedures	Directorate	Complete
20		Review the various flood plans (e.g. Conwy Valley Flood Plan/North Wales Forward Command Post Plan/Multi Agency Flood Plan)	Conwy Valley Flood Plan – Owned by NWC-REPS Multi Agency Flood Plan – Owned by North Wales Local Resilience Forum FCP Plan – Owned by North Wales Local Resilience Forum Meetings taken place and all plans to be reviewed	NWC-REPS NRW NWP	Spring 2017
21		Review setup of the Forward Command Post (Bronze) at Glasdir	Review has taken place, no changes required	Directorate	Complete
22		Llanrwst Town Council to take lead on producing a Community Flood Plan and recruitment of flood wardens	Invite received to attend next Town Council meeting	Directorate	TBC