

Wales Coastal Flooding Review Delivery Plan for Phase 2 Recommendations

Supporting Documents

Prepared by Natural Resources Wales
for Carl Sargeant AM, Minister for Natural Resources

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Annex A: Creating the Delivery Plan

This Annex outlines the creation of the Wales Coastal Flooding Review Delivery Plan. The approach to this Delivery Plan has included numerous ways of collaborative working with partners since May 2014, with the most notable engagement exercises described below.

Workshop in July 2014

Following the Minister's response to the 47 Phase 2 Recommendations in May 2014, Natural Resources Wales coordinated a workshop with Welsh Risk Management Authorities (RMAs) and associated partners on 31st July 2014, to outline progress to date in developing the Delivery Plan and to discuss how each Recommendation could best be taken forwards into the final Delivery Plan. At the workshop possible leads and contributing partners were identified for determining the proposed methodology for each Recommendation in the final Delivery Plan.

Appendix 1 to this Annex provides a list of attendees at the July workshop.

To help inform decisions about prioritisation of Recommendations, prior to the workshop attendees were asked to identify their 'top five' priority Recommendations on the basis of which have the potential to deliver the maximum benefit to people at risk from coastal flooding and coastal erosion in Wales, putting aside for the purpose of this exercise costs to deliver, timescale to deliver and complexity of delivery.

Attendees were invited to revisit their 'top five' assessment at the end of the workshop, with thirteen people slightly revising their views during the course of the workshop. Whilst this exercise was based on professional judgement rather than scientific evaluation it did provide a useful insight into the priorities.

The results of this exercise are presented in Figure 1, with the 'before' (blue) and 'after' (red) workshop prioritisation of Recommendations.

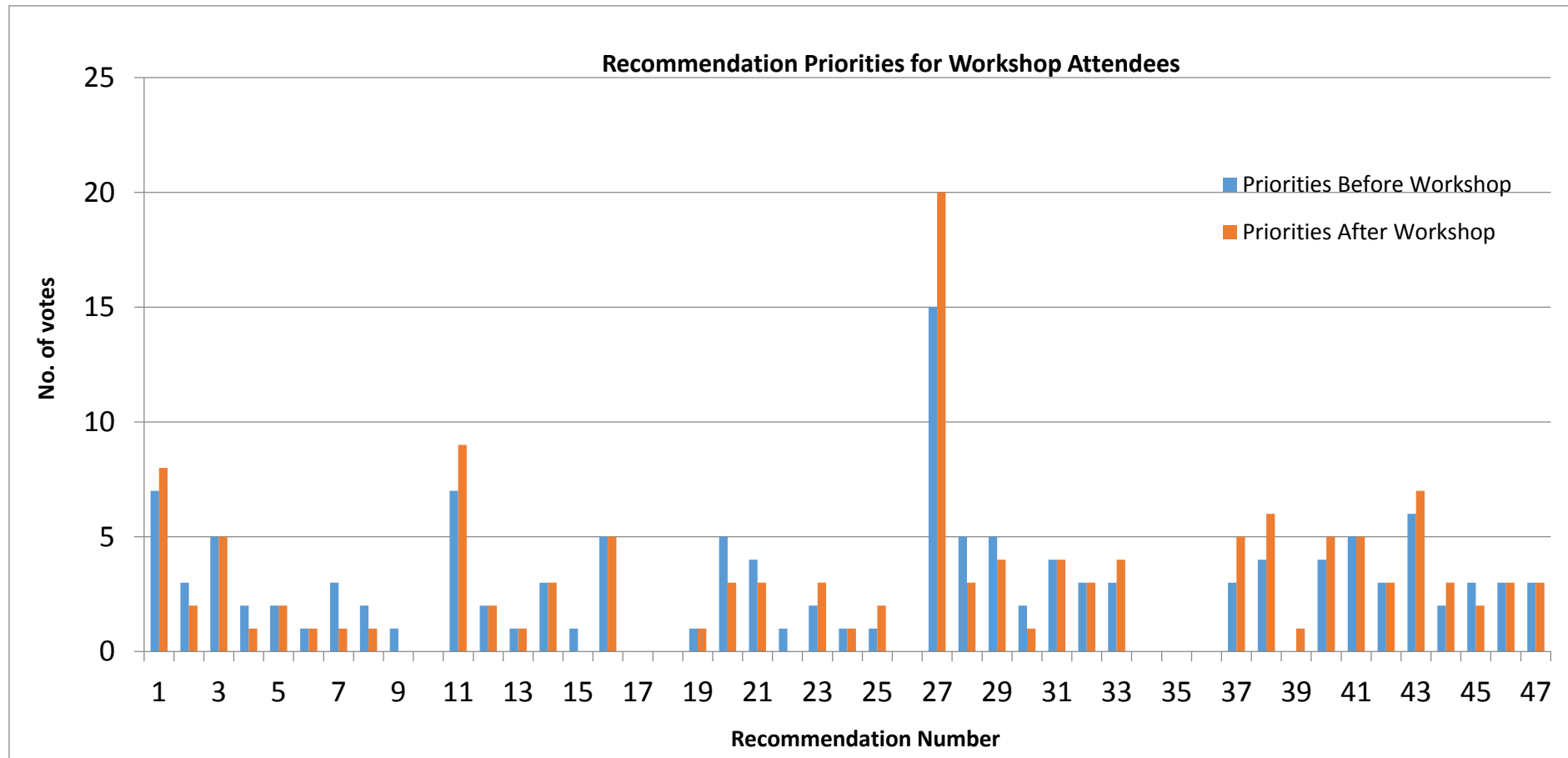


Figure 1: Recommendation Priorities as voted by Workshop Attendees, 31st July 2014

It can be clearly concluded from this exercise that the top priority identified by the workshop attendees is the need for sustained investment under Recommendation 27:

Recommendation 27: There needs to be continued sustained investment to manage the national coastal risks to acceptable levels. This must include flood forecasting, warning, awareness, response and recovery, as well as flood defences. Particular focus has to be on the existing defences to ensure they continue to be fit for purpose, as well as investment in new defences to reduce the flood risk for more locations.

Consensus suggested the remaining four top priority Recommendations, in order are:

- Rec.11 (improvements to flood warning areas and thresholds for the issue of warnings).
- Rec.1 (develop a Delivery Plan to identify how the Recommendations will be progressed).
- Rec.43 (improve how RMAs and infrastructure and utility providers work together).
- Rec.38 (clarify roles and responsibilities amongst RMAs).

As shown by Figure 1, this exercise reveals general widespread support for most of the Recommendations with only 10 of the 47 not receiving votes to be one of the top five priorities.

Whilst this exercise was largely an initial screening based on professional judgement it is useful to help focus on the priorities and actions that coastal practitioners believe have the potential to deliver maximum benefit to communities at risk.

Template completion in October 2014

Building upon workshop outputs, Natural Resources Wales then developed a template to structure the proposed methodology for each Recommendation into the Delivery Plan. The templates asked for:

- Confirmation of proposed lead and partners to scope the methodology. The purpose of this confirmation is to inform the collective consideration of the Recommendations and to provide a starting point for further development by the identified partners.
- An update on any notable progress since publication of the Phase 2 Report.
- The proposed methodology to deliver the individual Recommendations.
- Whether the Recommendation should be expanded to consider non-coastal sources of flood risk as per Recommendation 2.
- An indication of the benefits to be provided by the Recommendation in terms of implementation time, geographic scale and lasting timescale of benefits being realised to help with prioritisation decisions.

Responses were summarised into the first draft Delivery Plan, with original responses received having been saved for future reference.

Annex E to the main Delivery Plan provides summarised individual template responses to each of the 47 Phase 2 Recommendations.

Consultation on first draft Delivery Plan in November 2014

The draft Delivery Plan was shared with partners in November 2014. This included the coastal RMAs plus organisations directly involved with, or who expressed interest in, the Phase 1 and Phase 2 Reports.

A full list of the organisations invited to comment on the draft Delivery Plan is provided in Appendix 2 of this Annex.

Partners were guided to specifically comment on:

- Recommendation priorities.
- Confirm where they have been identified as a delivery partners.
- Identify if they should be added to the list of delivery partners and give reasons of the value they could add to delivery of the Recommendation.

The draft Delivery Plan was also discussed at the Wales Coastal Monitoring Centre workshop on 12th November 2014.

Finalising the Delivery Plan

The comments received on the Draft Delivery Plan were generally supportive of the Plan and the proposed way forward. A number of queries and suggestions were received and these have either been incorporated into this final document, or recorded for consideration in the future when the Recommendations are progressed.

Of the comments received the main themes were:

- Coastal monitoring (Recommendation 40) is key to many aspects of coastal flood and erosion risk management and should be prioritised.
- The Delivery Plan will need to aid the implementation of the Shoreline Management Plan (SMP2) action plans.

Monitoring is interlinked with many of the Recommendations, including providing key information for future coastal adaptation. Any monitoring programme will need to be determined on a risk based process, taking into account information from other Recommendations such as defence type and condition. As such, monitoring will be a key priority within the Delivery Plan through many of the priority Recommendations.

The Delivery Plan aims to help provide a strategic approach to coastal flood and erosion risk management across Wales. As the Recommendations themselves are progressed, linkages with the SMP2 action plans will need to be considered to enable organisations to undertake effective and efficient flood and erosion risk management. There will be some overlap between the SMP2 action plans and the Recommendations and as such, progress of the Recommendations should also work to facilitate and progress the SMP2 action plans.

Appendix 1 - Workshop 31st July 2014: Attendees

Names in italics were invited but unable to attend.

Organisation	Contact name
Flintshire County Council	Ruairi Barry
Denbighshire County Council	Wayne Hope
Conwy County Borough Council	Dyfed Rowlands
Isle of Anglesey County Council	Colin Edwards
	Barri Jones
	<i>Rowland Thomas</i>
Gwynedd Council	Huw Williams
Ceredigion County Council	Dai Lewis
	Rhodri Llwyd
Pembrokeshire County Council	Emyr Williams
	<i>Steve Jones</i>
City & County of Swansea	Colin Alford
	<i>Mike Sweeney</i>
Carmarthenshire County Council	Phillip Williams
Neath Port Talbot County Borough Council	Glen Watkins
	Ian Carter
Bridgend County Borough Council	Steve Edwards
<i>Vale of Glamorgan Council</i>	<i>Clive Moon</i>
Cardiff City Council	Gary Jenkins
Newport City Council	Matthew Jones
Monmouthshire County Council	Dave Harris
Wales Coastal Monitoring Centre	Emlyn Jones
Network Rail	Gary Vickerman
	<i>Mark Peters</i>
JBA consulting	Andrew Gubbin
Caldicot & Wentlooge Levels IDB	<i>Matt Bajowski</i>
	Mark Groves
Welsh Water	Michelle Russ
Welsh Local Government Association	Jean-Francois Dulong
Welsh Government	James Morris
	Sarah Powell
	Julia Williams
Natural Resources Wales	Richard Weston
	Steve Rhind
	Andy Irving

Organisation	Contact name
	Steve Cook Adrian Philpott Louise Pennington Amanda Paton James West

Appendix 2 - Organisations invited to comment on the draft Delivery Plan

Bridgend County Borough Council
Blaenau Gwent County Borough Council
Cadw
Caerphilly County Borough Council
Caldicot & Wentlooge Levels IDB
Cardiff Council
Carmarthenshire County Council
Ceredigion County Council
City and County of Swansea
Conwy County Borough Council
Country Land and Business Association
Denbighshire County Council
Dyfed Archaeological Trust
Dwr Cymru – Welsh Water
Farmer's Union Wales
Flintshire County Council
Glamorgan Heritage Coast
Gwynedd Archaeological Trust
Gwynedd Council
Isle of Anglesey County Council
Kenfig Nature Reserve
Merthyr Tydfil County Borough Council
Monmouthshire County Council
National Farmers Union (Wales)
National Trust
Natural Resources Wales
Neath Port Talbot County Borough Council
Network Rail
Newport City Council
North Wales Wildlife Trust
Pembrokeshire Coast National Park Authority
Pembrokeshire County Council
Powys County Council
Rhonda Cynnon Taf County Borough Council
Snowdonia National Park Authority
Severe Flood Groups
Torfaen County Borough Council
The Crown Estates

The Royal Commission on the Ancient and Historical Monuments of
Wales

Vale of Glamorgan Council

Wales and West Utilities Ltd

Wales Biodiversity Partnership – Coastal Ecosystems Group

Wales Coastal Monitoring Centre

Wales Utilities Group

Welsh Government

Welsh Local Government Association

Wrexham County Borough Council

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Annex B: Recommendations – Approval Status and Progress

This Annex provides a brief overview of the current status of the 47 Phase 2 Recommendations, both in terms of Welsh Government approval and progress made to date.

Welsh Government Approval Status

In May 2014 the Minister instructed Natural Resources Wales to:

‘commence work on developing a delivery plan, co-ordinating closely with Risk Management Authorities and Welsh Government Officials’.

Following on from this, on the 22nd July 2014, John Griffiths, Minister for Natural Resources, Culture and Sport, produced a written statement in response to the 47 Recommendations made within the Phase 2 Report:

<http://wales.gov.uk/about/cabinet/cabinetstatements/2014/nrwcoastalflooding/?lang=en>

This statement accepted 42 of the 47 Recommendations outright with the remaining 5 accepted in principle, as tabulated via the following link:

<http://wales.gov.uk/topics/environmentcountryside/epq/flooding/studies/coastal-review-part-2/?lang=en>

Current Progress and Status of Recommendations

Whilst the primary purpose of this Delivery Plan is to enable the Recommendations to be considered collectively thereby enabling a strategic approach to planning and implementation, it is also important to acknowledge that Welsh Government and Coastal RMAs have, since last winter's storms, continued to deliver improvements to coastal flood and coastal erosion risk management.

A priority activity for Welsh Government and all coastal Risk Management Authorities (RMAs) has been to repair, replace and restore locations damaged by last winter's storms. Considerable activity and investment has been taking place around the coastline of Wales.

Since the winter storms of 2013/14 Welsh Government has worked collaboratively across departments to provide over £10million to Local Authorities and Natural Resources Wales to make repairs and rebuild the resilience of coastal communities around the country.

In addition to the priority given to repair and restoration of coastal defences, notable progress has been made on some individual Recommendations within the capacity of existing resources.

Of the 47 Phase 2 Recommendations:

- 5 are already complete
- 35 are ongoing (with some significant progress since last winter)
- 7 are yet to be commenced

Recommendation Progress Summary Table

The table below presents a list of the 47 Phase 2 Recommendations and identifies:

- Linkage between Recommendations ('Linked with'), where significant, which may impact on how they are taken forward.
- Welsh Government approval status, either 'Accept' or 'Accept in Principle'.
- Progress status, either Completed (C), Ongoing (O) or To be Commenced (TBC).
- Brief summary of notable progress.
- Should the Recommendation be extended to include non-coastal flood sources, either Yes (Y) or No (N). This is Recommendation 2.

Key to Table B.1: Classification of Recommendation Progress Status

RECOMMENDATION PROGRESS STATUS	
5	Recommendation complete or incorporated into the Delivery Plan process
35	Recommendation ongoing
7	Recommendation not currently in progress
<i>47</i>	<i>Total</i>

A full list of the Recommendations is provided in Appendix 1 to Annex C of the Delivery Plan.

Table B.1: Summary of Welsh Government Approval Status and Progress

Recs	Linked with	WG Status	Progress Status	Progress headline	Inclusion of non-coastal flood risk sources? (Rec. 2)
1	2	Accept	C	This Delivery Report completes this Recommendation	Y
2	1	Accept	C	This Delivery Report completes this Recommendation	n/a
3		Accept	O	Rec 3: UK Coastal Monitoring and Forecasting Service (UKCMF) Factual Report into the Coastal Storms of December 2013 and January 2014 including Joint Sea Level and Wave Analysis' produced by JBA Consulting and shared with RMAs on 9 th June. Further evaluation linked to ongoing projects within the joint Wales and England FCERM Research and Development Programme.	N
4		Accept	O	On-going engagement with the joint Wales and England Flood and Coastal Erosion Risk Management (FCERM) Research and Development programme and UK partners. Indication so far that these events in themselves are unlikely to justify need to update extreme sea level dataset at this time.	N
5		Accept	O	On-going engagement with the joint Wales and England FCERM Research and Development programme and UK partners.	N
6		Accept	O	Ongoing improvements to Flood Forecasting with 5 day forecast ensembles now being available to local Natural Resources Wales officers.	N
7		Accept	TBC	To be Commenced	N
8		Accept	O	Natural Resources Wales held a three day course for staff dealing with flood forecasting, flood incident management and flood mapping. The purpose of the workshop was to: review the performance of Natural Resources Wales coastal forecasting models over the winter; re-calibrate the model where possible with data from the winter storms; to explore	N

Recs	Linked with	WG Status	Progress Status	Progress headline	Inclusion of non-coastal flood risk sources? (Rec. 2)
				methods of improving the model and to use opportunities for sharing the model data more widely with staff.	
9		Accept	C	A permanent offshore waverider buoy has been deployed off the West Pembrokeshire coast to help improve flood forecasting.	N
10		Accept	C	Rebranding of the flood warning service in Wales is complete so the provider is clearly identified as Natural Resources Wales.	N
11	12	Accept	O	Local reviews carried out and where appropriate changes made.	N
12	11	Accept	TBC	To be Commenced	Y
13		Accept	O	National Sciencewise Research & Development programme research carried out into the way Natural Resources Wales communicates flood messages to the public. Continued work through the Flood Awareness Wales programme with communities at risk of flooding; 1156 registrations of at-risk members of the public to Flood Warnings Direct between 1st May and 30th September 2014.	Y
14		Accept	O	Through the Flood Awareness Wales programme between 1 st May and 30 th September 2014 flood plans have been completed in high risks areas, serving to support over 6000 people across residential properties, businesses, schools, tourism and infrastructure. The Ipsos Mori Wales Public flood survey has just been undertaken.	Y
15		Accept	O	Natural Resources Wales has produced an internal position statement on Property Level Protection schemes.	Y
16	17	Accept	O	Flood Awareness Wales continues to support existing community flood plans by scheduling maintenance for these plans and contacting the Flood Plan Leads or Wardens	Y

Recs	Linked with	WG Status	Progress Status	Progress headline	Inclusion of non-coastal flood risk sources? (Rec. 2)
				to check if any updates are required. In some areas, Flood Wardens recruit others to the plan, and help to publicise the existence of the plan itself amongst the community.	
17	16	Accept	O	Natural Resources Wales, in conjunction with other partners in Wales (such as Wales Council for Voluntary Action) are considering options for supporting and developing longer term volunteer schemes.	Y
18		Accept	TBC	To be Commenced	N
19		Accept	O	Local information on flood risk is available and currently used to inform the incident management process.	Y
20		Accept	O	Where required local discussions have taken place between professional partners.	Y
21	22	Accept	O	Existing emergency multi agency plans in place. Preparatory work being undertaken for Exercise Megacyma Cymru to be held in March 2015.	Y
22	21	Accept	O	The Wales Flood Group is planning a Coastal Evacuation Exercise ('Exercise Megacyma Cymru') to be held in March 2015.	Y
23		Accept	O	The 'Compact for Change' work between Welsh Government and Welsh Local Government already addresses Welsh resilience structures, with findings of Phase 2 accepted by the Wales Resilience Forum in November 2014.	Y
24		Accept	O	In Rhyl stop logs at stairwell openings have been replaced by pre-cast concrete walls and steel flood gates, and a topographic survey of Rhyl Golf Course has been completed. Consultants have been appointed to determine the severity of the 5th December 2013 event, the chances of flooding happening again at the same location and an appraisal of mitigation options.	N
25		Accept	O	A number of assets damaged during last year's coastal flooding have been reviewed and replaced.	N

Recs	Linked with	WG Status	Progress Status	Progress headline	Inclusion of non-coastal flood risk sources? (Rec. 2)
26		Accept	O	Local reviews ongoing where these were highlighted by the winter's storms of December 2013 and early January 2014.	N
27		Accept	O	Welsh Government continually works to protect budgets and the core flood budget has been maintained for 2015/16.	Y
28		Accept	O	Budgets are currently set until 2015-16 which is the final financial year for which Welsh Government have a firm settlement. Welsh Government will not know the settlement for 2016-17 and beyond until the 2015 Spending Review and their focus will be on maximising the funding available to deliver the coastal and flood risk management programme.	Y
29		Accept	O	Welsh Government has completed the draft documentation on the National Programme of Investment (now called Flood and Coast Investment Programme) to go out to consultation by the end of the year.	Y
30		Accept	O	Welsh Government have been examining the merits of an innovative finance mechanism for flood and coastal defence, having already developed successful initiatives in the roads and transport, education, and housing sectors with a combined capital value of around £470 million. Further announcement by end of 2014.	Y
31	32	Accept	O	Natural Resources Wales are replacing their existing Flood and Coastal Risk Asset Management system (called AIMS). Development and Implementation work by an appointed contractor starts in November 2014. The first phase of the solution is expected to go live in March 2015.	Y
32	31		O	Dependent on completion of Recommendation 31 above.	Y
33		Accept	O	Future approaches to flood risk mapping for Wales has been under review and discussion since the 2013/ 2014 storm events.	N

Recs	Linked with	WG Status	Progress Status	Progress headline	Inclusion of non-coastal flood risk sources? (Rec. 2)
34		Accept	O	Locations which flooded last winter - RMAs continue to progress assessments and work on a prioritised risk basis.	N
35		Accept	O	Near miss locations last winter - RMAs to continue to progress assessments and work on a prioritised risk basis.	N
36		Accept	C	<p>Completion and publication of the assessment of environmental change experienced during the December 2013 and January 2014 storms (Duigan C, Rimington N & Howe M (Eds) 2014. <i>Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change</i>, NRW Evidence Report)</p> <p>This report identifies a number of areas of further work. Where relevant these will be integrated with the Coastal Review Delivery Plan. Discussions are underway to consider the detail of how this can be achieved.</p>	Y
37	38		O	Early discussions around scope and approach begun.	Y
38	37	Accept	O	Early scoping of issues and way forward.	Y
39		Accept	O	At the meeting on 3 rd October 2014, this Recommendation was considered and a review of the coastal groups and coastal forum will be an agenda item for the next meeting in January 2015.	N
40		Accept	O	A revised Wales Coastal Monitoring Centre business case was submitted to Welsh Government in September 2014 and is awaiting determination.	N
41		Accept in principle	O	At the time of writing, approval of three Shoreline Management Plans (SMP2s) by Welsh Government (South Wales, West of Wales and Severn Estuary) is complete with the remaining one set to be submitted to the Minister for his consideration in late 2014.	Y

Recs	Linked with	WG Status	Progress Status	Progress headline	Inclusion of non-coastal flood risk sources? (Rec. 2)
				Continued progress made by the Fairbourne Multi-Agency Project Board and accompanying Task and Finish Groups in identifying valuable lessons for wider application.	
42		Accept in principle	TBC	To be Commenced	N
43		Accept	TBC	To be Commenced	Y
44		Accept	TBC	To be Commenced	Y
45	41	Accept in principle	O	Organisations such as regulators, electricity generators, transmitters, road and rail have all produced reports on what they are doing to prepare for a changing climate.	Y
46	41	Accept in principle	O	In September 2014 Network Rail published their Weather Resilience and Climate Change Adaptation plan for the Wales Route. The accompanying Director's Statement notes: " <i>This document sets out a Weather Resilience and Climate Change Adaptation (WRCCA) plan for Wales Route supported by an evaluation of the resilience of rail infrastructure to historical weather events and an awareness of potential impacts from regional climate change projections.</i> "	N
47	43 to 46	Accept in principle	TBC	To be Commenced	N

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Annex C: Background to the Delivery Plan

Coastal Storm impacts of December 2013 and January 2014

The storms and associated coastal conditions on the 5th December 2013 and between the 3rd and 6th January 2014 reached levels and a ferocity we had not seen in Wales for many years. The impacts upon the Welsh coastline were widespread and diverse in their nature.

Between the 4th and 5th December 2013, Natural Resources Wales issued 2 Severe Flood Warnings (the highest level of warning we provide) and 15 Flood Warnings along the North Wales coast. We were notified that around 155 properties were directly flooded, mostly in Rhyl, with a further 160 properties indirectly affected, for example by loss of access and flood water externally surrounding the property. The storms occurred during daylight hours; the risks to people could have been substantially greater if this incident had occurred in the hours of darkness.

The storms of early January 2014 were particularly widespread in their impacts and sustained over a number of tides and days. Between the 2nd and 6th January Natural Resources Wales issued 6 Severe Flood Warnings and over 100 Flood Warnings around the Welsh coastline. This severity and number of warnings is unprecedented in recent years. In total we were notified that around 150 properties were directly flooded, some on multiple occasions, with a further 415 indirectly affected.

Evacuation procedures were initiated in a number of locations, including Rhyl in December 2013 and Borth, Aberystwyth, Cardigan and areas of Newport in January 2014.

In total it is estimated that coastal defence structures in Wales suffered storm damage at around 65 locations in December 2013 and 110 locations in January 2014.

We estimated that in December and January respectively, around 24,000 and 50,000 properties had the potential to flood, but did not. Less than 1% of the properties potentially at risk experienced flooding during these storms. This was as a consequence of investment in the coastal protection and defence networks over many years and the day-to-day maintenance by many organisations.

Wales Coastal Flooding Review: Phase 1 and Phase 2 Reports

Following the above coastal flooding Alun Davies AM, Minister for Natural Resources and Food ('the Minister') asked for a Review into the flood events to be co-ordinated by Natural Resources Wales. The relevant section of the Minister's written Statement of 9th January is repeated below:

'This review will take a two-phased approach:

- *Phase one will be a swift review of the impacts across the whole of the country from both coastal flooding events and will look at the state of the coastal defences following the storm event. This will be produced by the end of January 2014.*
- *Phase two will look into the wider lessons learnt from both of these coastal flooding incidents and flood risk management in affected areas and include:*
 - *Details of the flood event, its modelling and forecasting*
 - *Operational response from flood risk management authorities*
 - *How defences performed, properties affected and estimates of those protected*
 - *Impacts on infrastructure and resilience to future flood events*
 - *Lessons learnt, so that we can be better prepared for future events.'*

The Phase 1 Report was submitted to Welsh Government on 31st January 2014 and published on 14th February 2014. The report is available at:

The Minister's statement in response to the Phase 1 Report is available at:

<http://wales.gov.uk/about/cabinet/cabinetstatements/2014/flooding/?lang=en>

The Phase 2 Report was completed and published on 30th April 2014. The report is available at:

This Phase 2 Report drew on the expertise and experience of coastal flood risk management practitioners across Wales and identified 47 Recommendations from issues arising during the December 2013 and early January 2014 storms. The Phase 2 Report identified the following 6 Priority Areas where improvements can be made to deliver a more resilient coastal flood risk and erosion management service:

- Sustained investment in coastal flood and erosion risk management.
- Improved information on coastal flood defence and erosion management systems.
- Greater clarity on roles and responsibilities.
- An assessment of the skill and capacity of Risk Management Authorities.
- More support to communities to help them become more self-sufficient and resilient.
- Locally developed and delivered plans for coastal communities and infrastructure operators.

At the Minister's request the **47 Recommendations** were grouped under the following 6 themes:

- Storm Severity
- Flood Forecasting
- Flood Warning and Community Response
- Operational Response
- Coastal Defences
- Infrastructure Resilience

Appendix 1 - List of Phase 2 Recommendations

A tabulated definition of all 47 Recommendations, taken from the Phase 2 report, is included below.

	Progressing the Recommendations
1.	<p>The recommendations included in this report are compiled into a Delivery Plan.</p> <p>This Delivery Plan will identify how the recommendations will be progressed. It will consider matters such as; the parties to be involved lead responsibility, priorities, governance and resources and capacity to deliver.</p>
2.	<p>The Delivery Plan should consider opportunities to expand the recommendations beyond just coastal flooding and erosion risks and to consider the link to risks from other sources of flooding.</p>
	Recommendations – Storm Severity
3.	<p>Further work is required to assess the joint probability of wind, waves and tides for these recent winter storms. This may take the form of an initial assessment coupled with consideration of more thorough analysis. The scope of this work will require further technical discussion.</p>
4.	<p>Review and update if required, the extreme sea level dataset around the Welsh coast. The recent tidal conditions are amongst the highest for many years. This dataset may need to be amended.</p> <p>This is to include methods for assessment of joint probability for storm severity.</p>
5.	<p>Review and update if required, the guidance used for the assessment and design of coastal standard of service against flooding. The review should consider whether more clarification is needed, in particular on the issues of the treatment of joint probabilities, in combination effects and appropriate national consistency.</p>
	Recommendations – Flood Forecasting
6.	<p>Continue to identify and implement risk based opportunities to deliver further improvements to longer range forecasts.</p>

7.	Review with partners what additional forecast information could be provided to support local incident management decisions. Identify options and recommendations.
8.	Continue to progress risk based opportunities to deliver improvements to the accuracy of the coastal forecasting service. Develop and deliver a programme of improvement works.
9.	Review the whole wave buoy network around the Welsh coast, including working with UKCMF to address a strategic gap in the offshore wave buoy network in the Irish Sea. This is required to better validate offshore wave forecasts, leading to improvements to the Wales forecasting service. <i>(UKCMF- UK Coastal Monitoring and Forecasting Service)</i>
Recommendations – Flood Warning and Community Response	
10	Complete the ongoing work by summer 2014 to ‘rebrand’ the flood warning service in Wales so that the provider is clearly identified as Natural Resources Wales.
11.	Develop and implement a prioritised programme of improvement works to flood warning areas and thresholds, using the experience and data gathered from these storms. This should include engagement with professional partners and communities as appropriate.
12.	Review and consider additional sources of validation information for future incidents. This has potential to improve confidence in both forecasting and warning. This may involve seeking feedback from professional partners and others.
13.	Work with sample communities to identify options to help sustain an effective local response to flood warnings. This should consider communities where effective response and or confidence in the warning system is low.
14.	Identify and evaluate options to help communities to become more self-sufficient and resilient and identify a recommended option
15.	Produce and communicate nationally consistent, public focused information on the types and availability of property level protection measures and the support available.
16.	Using the experience from these recent storms, identify and evaluate options for the future development of local Flood Plans in coastal areas and identify a recommended option to help these be more effective at improving community resilience.

17.	Using the experience from these recent storms, identify and evaluate options for the future development of local Flood Plan Leads / Warden Volunteers in coastal areas and identify a recommended option.
	Recommendations – Operational Response
18.	Review and identify how to improve involvement of infrastructure operators and managers in the coastal flood risk incident management process.
19.	Continue to develop potential ' <i>impact scenario</i> ' assessments, maps and/or statements. This work must be developed in close discussion with professional partners to ensure it meets all parties' requirements.
20.	Review the local decision making process associated with the issue of Severe Flood Warnings and evacuation procedures in December 2013 and early January 2014. Identify improvements and share at an all Wales level.
21.	<p>Assess our national capacity to respond to a widespread and sustained period of coastal flooding. This should include consideration of when the current national resource pool will no longer function effectively. This should also consider post incident recovery issues.</p> <p>Provide a report with recommendations for improvement.</p>
22.	<p>Assess the collective ability to provide an effective response to a potential large scale evacuation scenario in either north east or south east Wales. This should also consider post incident recovery issues.</p> <p>Provide a report with recommendations for improvement.</p>
23.	Review the Wales resilience structures and ways of working to identify what changes may be needed to enable us to collectively be better prepared and resilient to future coastal flooding.
24.	Options to seek improvements to the standard of protection at the Garford Road area of Rhyl should be identified and evaluated. This should include detailed hydraulic analysis of the capacity and performance of the storage lagoon. This should include an assessment of the stairwell and slipway openings and the interaction with the adjacent golf course area.
25.	All Risk Management Authorities (RMAs) around Wales should review their local use of stop boards, stop logs, temporary barriers or moveable gates. The purpose of this review is for RMAs to satisfy themselves that existing arrangements are appropriate and robust. Consideration should be given to replacing existing arrangements with more permanent or

	more robust temporary solutions. This review should be 'risk based' and focused on the locations with highest local risk.
26.	All Risk Management Authorities (RMAs) around Wales should review locations where they have secondary defence systems in place. The purpose of this review is for RMAs to satisfy themselves that the secondary systems will operate as designed when required. This review should be 'risk based' and focused on the locations with highest local risk.
	Recommendations – Coastal Defences
27.	There needs to be continued sustained investment to manage the national coastal risks to acceptable levels. This must include flood forecasting, warning, awareness, response and recovery, as well as flood defences. Particular focus has to be on the existing defences to ensure they continue to be fit for purpose, as well as investment in new defences to reduce the flood risk for more locations.
28.	Review and identify options to maximise certainty in flood and coastal erosion risk management funding over a longer timeframe and to maximise flexibility in the use of this funding. This would mean less focus on annual and in year budgets and more focus on delivery and budget management of 3-5 years.
29.	The development of the National Programme of Investment should be progressed as a matter of importance and its development should seek a wide range of ways of working and technical improvements to the flood and coastal erosion risk management investment allocation, decision making and prioritisation process.
30.	Review and identify options to gain additional funding to supplement core flood and coastal erosion risk management investment. This must be closely aligned with the development of the National Programme for Investment.
31.	Produce a complete national dataset of coastal protection and defence assets including details of areas benefitting. It is essential that this dataset becomes a 'live management tool' and not merely a representative picture of a snapshot in time. This dataset must therefore be associated with a process for ensuring the information is maintained.
32.	Review and identify options to achieve a more consistent approach to the inspection of the network of coastal defence systems. This must include recommendations to improve the efficiency and effectiveness of the asset inspection process.

33.	Continue to develop a nationally prioritised programme of coastal modelling and mapping improvements. This must be nationally risk based and consistent.
34.	Locations and communities which experienced flooding in December 2013 and early January 2014 should be subjected to a risk based assessment to determine if further risk management activity/intervention is needed and can be justified.
35.	Near miss locations and locations subjected to substantial foreshore change should be identified and subjected to a risk based assessment to determine if further risk management activity/intervention is needed and can be justified.
36.	Complete the ongoing update to the Phase 1 ‘rapid’ assessment of environmental changes experienced during the December 2013 and January 2014 storms.
37.	<p>Carry out a national skills and capacity audit for all Risk Management Authorities to assess and quantify the scale of the issue – to assess the size of the skills and capacity gap</p> <p>Produce an options document for how the skills and capacity gap could be addressed to meet present day flood risk management needs and future challenges.</p>
38.	<p>Clarify roles and responsibilities amongst risk management authorities at both the local and national level as required.</p> <p>Develop consistent and common communication messages and tools to convey roles and responsibilities to communities.</p>
39.	<p>Undertake a review of Welsh Coastal Groups and the Wales Coastal Group Forum. This review should include, as appropriate, links and relationships with other similar groups who have a role in the management of flood and coastal erosion risks.</p> <p>This review should identify improvement options to maximise efficient and effective delivery of flood and coastal risk management.</p>
40.	The Wales Coastal Monitoring Centre submitted a business case for the future of the centre to Welsh Government in December 2013. This business case should be determined by Welsh Government.

<p>41.</p>	<p>Welsh Government should endorse the strategic framework established by the Shoreline Management Plans (SMP2). This should be accompanied by more national and local support to communities and community involvement in the development of local adaptation options and plans.</p> <p>Develop a ‘local adaptation toolkit’ to better support communities. This may include technical guidance, templates, and engagement and communication tools and policy positions.</p> <p>Local discussions in all coastal communities need to begin now, involving professional partners and the community. These discussions should consider communities on a risk basis. These discussions need to explore and develop local plans to adapt and increase resilience over time.</p> <p>Support and draw upon the experience of the Fairbourne multi-agency group to help inform adaptation and community resilience discussions at other locations.</p>
<p>42.</p>	<p>Review and evaluate existing barriers and gaps to supporting coastal adaptation and make recommendations for improvement.</p> <p>Review, where necessary, existing climate change guidance to ensure the most appropriate approach is being used by all parties involved in all aspects of flood and coastal erosion risk management (i.e. all Government departments, RMAs infrastructure and utility operators).</p>
	<p>Recommendations – Infrastructure Resilience</p>
<p>43.</p>	<p>Review and make recommendations for how Risk Management Authorities and infrastructure and utility operators can work together operationally more efficiently and effectively. This should consider a range of working agreements to ensure clarity of roles and responsibilities between professional partners and for communities.</p>
<p>44.</p>	<p>Review and make recommendations if more needs to be done to enable infrastructure and utility operators to effectively work together and interact on issues of mutual interest. This may include a review of the role and remit of the Wales Utility Group and other options.</p>
<p>45.</p>	<p>Encourage and support the development of programmes of works to increase resilience of infrastructure and utility assets. These must be aligned with local community adaptation planning.</p> <p>Review where appropriate if there are regulatory barriers to obstruct this process of adaptation and identify regulatory improvements which could help adaptation.</p>
<p>46.</p>	<p>Review and evaluate at the national Wales level, the impacts of climate change scenarios on Network Rail infrastructure and highways infrastructure around the Welsh coastline and the long term adaptation options.</p>

47.	Undertake a periodic national assessment of infrastructure and utility resilience across Wales, in order to provide assurance of national progress towards increased resilience to coastal flood and erosion risks.
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Annex D: National Flood and Coastal Erosion Risk Management Strategy

The high level strategic direction of travel for **Flood and Coastal Erosion Risk Management** (FCERM) is set by the Welsh Government National FCERM Strategy, published in November 2011 (*‘the National Strategy’*).

This National Strategy identifies the following four overarching objectives:

- **reducing the consequences** for individuals, communities, businesses and the environment from flooding and coastal erosion;
- **raising awareness of and engaging people** on flood and coastal erosion risk;
- **providing an effective and sustained response** to flood and coastal erosion events; and,
- **prioritising investment** in the most at risk communities.

Details of the National Strategy can be found at:

<http://wales.gov.uk/topics/environmentcountryside/epq/flooding/nationalstrategy/strategy/?lang=en>

Welsh Government commentary in support of the National Strategy states:

‘Implementing these objectives will be the responsibility of everyone involved in or affected by flood and coastal erosion risk management. This includes: the Welsh Government; the Welsh Risk Management Authorities; and the people of Wales.

‘By working together we can reduce the risks we face and improve the quality of life for communities across Wales.’

There are currently 31 Risk Management Authorities (RMAs) in Wales:

- Natural Resources Wales
- The 22 Lead Local Flood Authorities
- Caldicot and Wentlooge Levels Internal Drainage Board
- Lower Wye Internal Drainage Board
- Powysland Internal Drainage Board
- Dŵr Cymru Welsh Water
- Severn Trent Water
- Scottish and Southern Water
- Albion Water
- Dee Valley Water Plc.

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Annex E: Individual Recommendation Summary

This Annex presents the Delivery Plan for how to progress future implementation of the Phase 2 Report Recommendations. Each of the 47 Recommendations are developed individually, but take into account any linkages to other Recommendations. For each Recommendation the following aspects are considered:

- The appropriate Authority to lead delivery of the Recommendation.
- The appropriate Partners to be involved in delivery of the Recommendation.
- The current status of the Recommendation, in terms of any work undertaken to date.
- A proposed outline methodology to take the Recommendation forwards. This methodology is indicative and will be further developed by the partner organisations, especially where these form part of the proposed Project packages. This will include a review of the partners identified to be involved.

Progressing the Recommendations

Recommendations 1 and 2

These Recommendations identify the need for the production of a Delivery Plan and for this Delivery Plan to consider additional sources of flood risk outside of the coastal flooding and erosion remit.

Rec 1: The recommendations included in this report are compiled into a Delivery Plan. This Delivery Plan will identify how the recommendations will be progressed. It will consider matters such as; the parties to be involved, lead responsibility, priorities, governance and resources and capacity to deliver.

Lead: Natural Resources
Wales

Partners: All Risk Management Authorities

Current Status: Complete

- The Delivery Plan has been developed and presented in this Delivery Plan Report hence this Recommendation is complete.
- Within the Delivery Plan a methodology has been proposed to take forwards and progress each Recommendation. These have been developed through liaison with coastal practitioners across Wales, to draw on the expertise and experience of the key people managing flood and erosion risk across the country.

Rec 2: The Delivery Plan should consider opportunities to expand the recommendations beyond just coastal flooding and erosion risks and to consider the link to risks from other sources of flooding.

Lead: Natural Resources
Wales

Partners: All Risk Management Authorities

Current Status: Complete

- The potential to expand each Recommendation to include additional sources of flood risk has been determined within this Delivery Plan and hence this Recommendation is complete.
- Where there are linkages identified to other sources of flooding, the impact of including other flood sources upon the proposed methodology is considered.
- Including additional non-coastal sources of flooding will increase the number of partners involved in developing and implementing the Delivery Plan, requiring more liaison with partners and incorporating more ideas. This could increase the cost and time required to implement Recommendations. Expanding a Recommendation to consider other non-coastal sources may generate access to additional funding and resources and any such avenues should be investigated.

Storm Severity

Recommendations 3 to 5

These Recommendations consider joint probability analysis methodologies and the potential to update both the extreme sea level dataset and guidance used for the assessment and design of the coastal standard of service against flooding.

Rec 3: Further work is required to assess the joint probability of wind, waves and tides for these recent winter storms. This may take the form of an initial assessment coupled with consideration of more thorough analysis. The scope of this work will require further technical discussion.

Lead: Natural Resources
Wales

Partners: Met. Office
Flood Forecasting Centre

Current Status: Ongoing

- 'UK Coastal Monitoring and Forecasting Service (UKCMF) Factual Report into the Coastal Storms of December 2013 and January 2014 including Joint Sea Level and Wave Analysis' produced by JBA Consulting and shared with RMAs on 9th June. The results gave very high estimates of joint return period which were deemed implausible. It is concluded that the combination of waves and water levels which occurred made the event significantly rarer than the individual return periods.
- JBA Consulting are undertaking further analysis focusing upon Rhyl to support Denbighshire County Council.
- Natural Resources Wales (NRW) are also in discussion with the Environment Agency over the opportunity to advance joint probability analysis work via the joint Wales and England Flood and Coastal Erosion Risk Management (FCERM) Research and Development programme (the joint programme).

Methodology type: Task and Finish

- Await outputs of consultant commission for Denbighshire County Council re: December 2013 storm event severity at Rhyl.
- Building upon outputs from the above, potentially tender and appoint a consultant to undertake more detailed Joint Probability analysis using improved data sets and/or methods at high risk locations around the Welsh coastline.
- Continue to engage with joint programme.

Rec 4: Review and update if required, the extreme sea level dataset around the Welsh coast. The recent tidal conditions are amongst the highest for many years. This dataset may need to be amended.

This is to include methods for assessment of joint probability for storm severity.

Lead:	Natural Resources Wales	Partners:	Welsh Government, Welsh Coastal Monitoring Centre, Risk Management Authorities
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Current Status: Ongoing

- On-going engagement with the joint Wales and England Flood and Coastal Erosion Risk Management (FCERM) Research and Development programme and UK partners.
- This has implications for a number of ongoing projects.
- Indication so far that these events in themselves are unlikely to justify need to update extreme sea level dataset at this time.

Methodology type: Task and Finish

- Continue to liaise with colleagues through the joint Wales and England FCERM R&D Programme and the UK Coastal Monitoring and Forecasting Service (UKCMF) as potential vehicles to undertake the update if deemed necessary from the above exercises.

Rec 5: Review and update if required, the guidance used for the assessment and design of coastal standard of service against flooding. The review should consider whether more clarification is needed, in particular on the issues of the treatment of joint probabilities, in combination effects and appropriate national consistency.

Lead: Natural Resources
Wales

Partners: Welsh Government, Risk Management
Authorities, Welsh Coastal Monitoring
Centre, Environment Agency.

Current Status: Ongoing

- On-going engagement with the joint Wales and England Flood and Coastal Erosion Risk Management (FCERM) Research and Development programme and UK partners.

Methodology type: Task and Finish

- Continued engagement with the joint Wales and England FCERM Research and Development programme and UK partners.
- Identify the guidance currently accepted as industry standard.
- Talk to coastal Welsh Risk Management Authorities (RMAs) to determine the approaches they currently apply.
- Talk to coastal consultants to determine the approaches they currently apply.
- Ask both RMAs and Consultants whether more clarification is needed.
- Issue a questionnaire to consultees and convene a meeting/ workshop as required.
- Influence ongoing Research and Development work.
- Generate a report with recommendations for future consideration.

Flood Forecasting

Recommendations 6 to 9

These Recommendations relate to identifying opportunities to improve the coastal forecasting service and to review the wave buoy network around the Welsh coastline.

Rec 6: Continue to identify and implement risk based opportunities to deliver further improvements to longer range forecasts

Lead: Natural Resources
Wales

Partners: Met. Office, Flood Forecasting Centre,
All Risk Management Authorities

Current Status: Ongoing

- Longer range forecast data is now available to Natural Resources Wales as a result of recent improvements in data supply from the Met Office. Flood forecasting models can now generate a 5 day (as opposed to 48 hours previously) site specific forecast at 80 locations around Wales to better inform the flood warning service.
- These improvements provide a greater lead-in time to coastal flood events, giving a greater understanding of the potential risks earlier. This enables earlier discussions between professional partners around the scale and potential impacts of coastal flood events. Earlier and more informed discussions increase the effectiveness of both preparatory action and the resulting response.

Methodology type: Continuous Improvement

- The UK Coastal Monitoring and Forecasting Service (UKCMF) group provides a strategic overview of the current and future needs of those who provide coastal warnings. Natural Resources Wales will continue to contribute to, propose and lead, UKCMF work.
- An example of this are two projects which are currently running, the first to better align Met Office, Environment Agency and Natural Resources Wales' forecast data and the second to better understand forecasts in the Bristol Channel, both of which were instigated by Natural Resources Wales.

Rec 7: Review with partners what additional forecast information could be provided to support local incident management decisions. Identify options and recommendations.

Lead: Natural Resources Wales **Partners:** All Risk Management Authorities, Local Resilience Forums, Met Office, Flood Forecasting Centre

Current Status: To be Commenced

- No specific progress to report.

Methodology type: Task and Finish

- Natural Resources Wales' Flood Forecasting Team to provide a summary of the additional forecast information which could be provided together with an assessment of systems and resource implications.
- Coastal Risk Management Authorities (RMAs) and other partners to identify the additional information which would be useful to support their local decision making.
- Compare, identify and review options for the provision of the additional information.
- Produce a report evaluating options and generating recommendations.

Rec 8: Continue to progress risk based opportunities to deliver improvements to the accuracy of the coastal forecasting service. Develop and deliver a programme of improvement works.

Lead: Natural Resources
Wales

Partners: All Risk Management Authorities, Met.
Office, Flood Forecasting Centre.

Current Status: Ongoing

- Natural Resources Wales held a three day course for staff dealing with flood forecasting, flood incident management and flood mapping. The purpose of the workshop was to: review the performance of Natural Resources Wales coastal forecasting models over the winter; re-calibrate the model where possible with data from the winter storms; to explore methods of improving the model and to use opportunities for sharing the model data more widely with staff.
- As a direct benefit of the course the wave forecasting model is being utilised to benefit flood mapping work for South-East Wales. As well as this, improvement works are being progressed with all three Natural Resources Wales flood incident management teams.

Methodology type: Continuous Improvement

- Continue to utilise improvements in forecast data available to Natural Resources Wales. This involves working with the Met. Office and the Flood Forecasting Centre, as well as UK Coastal Monitoring and Forecasting Service (UKCMF), to both identify our needs and understand advancing scientific forecasting methods.
- Continue to improve Natural Resources Wales' coastal flood forecasting modelling capabilities.
- Continue to capture observed data where possible to verify the forecast data and help to better understand model performance.

Rec 9: Review the whole wave buoy network around the Welsh coast, including working with UKCMF to address a strategic gap in the offshore wave buoy network in the Irish Sea. This is required to better validate offshore wave forecasts, leading to improvements to the Wales forecasting service. (UKCMF- UK Coastal Monitoring and Forecasting Service)

Lead: Natural Resources Wales **Partners:** Welsh Coastal Monitoring Centre, UK Coastal Monitoring and Forecasting Service (UKCMF)

Current Status: Complete

- This Recommendation is complete as a new waverider buoy was installed off the West Pembrokeshire Coast on 11th September 2014.
- The method followed to reach this outcome comprised:
 - o The wave buoy network around the Welsh coast was reviewed and a gap identified in the network in the Irish Sea.
 - o Centre for Environment, Fisheries & Aquaculture Science (Cefas) helped assess locations and prepare for the operational deployment of the new buoy.
 - o Funding was secured via UKCMF (from the UK Government flood recovery funds).
 - o The optimal location was identified by Natural Resources Wales through consultation with professional partners and the new installation will provide directional wave data as well as wave height and wave period.
 - o A live telemetry feed supplies instantaneous data and will be used to routinely calibrate Natural Resources Wales' forecast data, as well as monitor wave conditions during storm events. The resilience and suitability of the wave buoy network will continue to be assessed including the impact of the new buoy. Any issues or strategic gaps will continue to be raised as appropriate.

Flood Warning and Community Response

Recommendations 10 to 17

These Recommendations address opportunities to improve the flood warning service and to consider how best to both communicate with and support communities at risk to become more self-sufficient and resilient.

Rec 10: Complete the ongoing work by summer 2014 to ‘rebrand’ the flood warning service in Wales so that the provider is clearly identified as Natural Resources Wales.

Lead: Natural Resources Wales **Partners:** Environment Agency

Current Status: Complete

- This Recommendation is now complete and all flood warnings issued in Wales will clearly identify Natural Resources Wales as the provider of the service.

Methodology type: Task and Finish

- Natural Resource Wales continue to work in partnership with the Environment Agency for provision of online supporting information and are working with them to improve their webpages to further help with this clarity.

Rec 11: Develop and implement a prioritised programme of improvement works to flood warning areas and thresholds, using the experience and data gathered from these storms. This should include engagement with professional partners and communities as appropriate.

Lead: Natural Resources Wales

Partners: All Risk Management Authorities,
Local Resilience Forums

Current Status: Ongoing

- Local reviews carried out and where appropriate changes made.

Methodology type: Continuous Improvement

- **Context – Align with Rec 12 below.**
- The accuracy of tidal forecasts which are based on theoretical models need to take into account anecdotal and real time evidence for the purposes of calibration and future improvements to the service.
- The critical elements are those fixed asset's thresholds together with onsite observations of actual tidal conditions.
- The locations affected (communities) are many around the coast and the pool of available resources from professional partners limited.
- It is anticipated that the exercise of data collection could become embedded as part of the community response to flooding, with information being fed back to Natural Resources Wales teams for validation and improvement of flood warning thresholds and areas.
- In order to do this concise guidance would need to be provided to enable consistent returns. This will require liaison with professional partners and local communities.
- **Way Forward:**
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Produce a report evaluating options and generating recommendations.

Rec 12: Review and consider additional sources of validation information for future incidents. This has potential to improve confidence in both forecasting and warning. This may involve seeking feedback from professional partners and others.

Lead: Natural Resources Wales

Partners: All Risk Management Authorities,
Local Resilience Forums

Current Status: To be Commenced

- No specific progress to report

Methodology type: Task and Finish

- Linked to and align with Recommendation 11.
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Produce a report evaluating options and generating recommendations.

Rec 13: Work with sample communities to identify options to help sustain an effective local response to flood warnings. This should consider communities where effective response and or confidence in the warning system is low.

Lead: Natural Resources Wales **Partners:** Local Resilience Forums, Risk Management Authorities, Community/Town Councils.

Current Status: Ongoing

- Workshops were held in September 2014 as part of England and Wales Research and Development project Sciencewise. The project looks at communication and warnings and will help create sustainable local responses to warnings using co-cooperation methodology. Local feedback is being considered by Natural Resources Wales.
- Local Doorstep surveys were carried out by Natural Resources Wales, for example in South East Wales (Usk and Crindau Pill), following issuing of flood warnings to ascertain what action people took on receipt of warnings and why.
- Natural Resources Wales have continued work across the Flood Awareness Wales programme with communities at risk of flooding, including promotion and sign up of at-risk members of the public to Flood Warnings Direct, with 1156 registrations achieved in the period 1st May – 30th September 2014.

Methodology type: Continuous Improvement

- Contact Partners named above plus other relevant statutory and voluntary organisations to ascertain work completed to date.
- Identify sample communities with support from partners. Arrange workshops for sample communities and invite community members and partners to attend to offer their understanding of their perceived risk and to discover how the warning systems work. At the workshops explain what actions can be taken before and during a flood incident and collect information on what support the community require in order to feel more confident.
- Consider content of both Sciencewise and Ipsos Mori research (see Recommendation 14) to inform the workshops and the 2013 report on '*Flood Advocacy and Support Service for communities in Wales*' which emphasises the need for communities to trust those bodies delivering flood support services.
- Co-ordinate and share a report on the findings from the community workshops and identify positive actions that can be taken to increase confidence in Flood Warnings and to empower and support communities.
- Produce a report evaluating options and generating recommendations. This will be informed by the findings from the activities above and will identify positive actions that can be taken to increase confidence in Flood Warnings and to empower and support communities.

Rec 14: Identify and evaluate options to help communities to become more self-sufficient and resilient and identify a recommended option

Lead: Natural Resources Wales

Partners:

Welsh Government,
Risk Management Authorities,
Wales Council for Volunteering
Action

Current Status: Ongoing

- Flood Awareness Wales work continues to raise awareness of flood risk and advise on actions to reduce the impact of flooding on communities at risk across Wales. From 1st May to 30th September 2014 flood plans have been completed in high risk areas, which cover over 6,000 people across residential properties; businesses; schools; tourism and infrastructure.
- An Ipsos Mori Wales Public flood survey has been undertaken. This samples flood risk public across Wales (including those that have recently experienced flooding) and is being considered by Natural Resources Wales. It contains recommendations that will help to identify barriers to communities becoming more self - sufficient against flooding. This will help to identify a range of options that multiple partners can consider as part of their future planning and delivery around managing flood risk.
- National Sciencewise Research and Development programme is undertaking research into the way Natural Resources Wales communicates flood messages to the public.

Methodology type: Task and Finish

- Consider findings of both Ipsos Mori and Sciencewise Research and Development research carried out and share these with partners for comment and discussion.
- Consider recommendations from the Welsh Government commissioned 2013 report on 'Flood Advocacy and Support Service for communities in Wales'.
- Ascertain what advice and support the communities at risk require by consultation with public at risk. Also, consult public on possible networks of communication to ensure needs are met.
- Determine how best to meet these needs through delivery via existing staff and/or partners.
- Consider adopting a National Flood Identity branding so that all partners can use it for public communication around flooding for clarity and consistent messages on one subject matter.
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Produce a report evaluating options and generating recommendations.

Rec 15: Produce and communicate nationally consistent, public focused information on the types and availability of property level protection measures and the support available.

Lead: Natural Resources Wales **Partners:** Risk Management Authorities, Local Resilience Forums, Communities Affected.

Current Status: Ongoing

- Natural Resources Wales has produced an internal position statement on Property Level Protection schemes.

Methodology type: Task and Finish

- Liaise with partners to assess and gather data on the information and support currently available and any gaps and inconsistencies.
- Jointly develop consistent guidance for the public on what Property Level Protection is available, clarified with roles and responsibilities, the support available before, during and after a flood and the funding mechanism.
- Publish and communicate Property Level Protection guidance through existing mediums; websites, literature, local awareness raising work.
- The impact of including additional sources of flood risk (non-coastal) would be fairly minimal as property level resistance and resilience measures are typically similar for all sources of flooding.
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Produce a report evaluating options and generating recommendations.

Rec 16: Using the experience from these recent storms, identify and evaluate options for the future development of local Flood Plans in coastal areas and identify a recommended option to help these be more effective at improving community resilience.

Lead: Natural Resources Wales

Partners: Risk Management Authorities,
Local Resilience Forums

Current Status: Ongoing

- Flood Awareness Wales continues to support existing community flood plans by scheduling maintenance for these plans and contacting the Flood Plan Leads or Wardens to check if any updates are required. In some areas, Flood Wardens recruit others to the plan, and help to publicise the existence of the plan itself amongst the community.
- See comments regarding Sciencewise and Ipsos Mori work under Recommendations 13 and 14 respectively.

Methodology type: Task and Finish

- Link and align with Recommendation 17.
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Produce a report evaluating options and generating recommendations.
- **Consider the following:**
- Contact partners to discuss progress to date and future work planned around community flood plans.
- Consider Ipsos Mori Wales Public flood survey results, Sciencewise evidence, Welsh Government 'Flood Advocacy & Support Services for Communities in Wales' report.
- Identify actions to be taken by professional partners, Natural Resources Wales and the public and consult with all parties to fully agree these responsibilities.
- Identify gaps in training or understanding that pose a risk to the successful implementation of these plans and remedy through training provision.
- Consider further working with Partners and Public to develop overarching resilience plans that meet each community's specific needs.
- Plan and execute a testing exercise to highlight any failings in the plan and address these fully before signing off plan with partners and public.
- Encourage the community to take ownership of the resilience plan with appropriate input and agreed support from other agencies.

Rec 17: Using the experience from these recent storms, identify and evaluate options for the future development of local Flood Plan Leads / Warden Volunteers in coastal areas and identify a recommended option.

Lead: Natural Resources Wales **Partners:** Risk Management Authorities,
Local Resilience Forums

Current Status: Ongoing

- Natural Resources Wales, in conjunction with other partners in Wales (such as Wales Council for Voluntary Action) are considering options for supporting and developing longer term volunteer schemes.
- In August 2014, Flood Awareness Wales carried out an exercise to quantify time spent by volunteers (Community Flood Plan Leads/Wardens), and estimated a contribution of 6 hours per year and with 296 volunteers to date (30/08/14) at £8 p/hr the value of their contribution is estimated to be £14,208 per year.

Methodology type: Task and Finish

- Link and align with Recommendation 16.
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Produce a report evaluating options and generating recommendations.
- **Undertake the following:**
- Consider the Welsh Government 'Flood Advocacy & Support Service for Communities in Wales' report recommendations and Natural Resources Wales' Volunteer Scheme working group outputs with partners.
- Consult with existing Flood Plan Lead volunteers to ascertain what resource and support is required to carry out their roles to the best of their ability.
- Consider arrangement of a co-ordinated support network across Wales with input from partners and Volunteer Flood Plan leads.
- Investigate training needs including specific risk-management to ensure safeguarding of volunteer Flood Plan Leads.
- Consider giving Flood Plan Lead volunteers direct access to local staff during times of flooding (e.g. Duty Officer).
- Consider succession planning when recruiting Flood Plan Lead volunteers as well as deputies and back-up volunteers.

- Note inclusion of non-coastal sources of flooding would require greater numbers of volunteers.

Operational Response

Recommendations 18 to 26

These Recommendations consider participation, preparation and decision making associated with operational response to a flood event and how such response can most effectively be delivered. The latter Recommendations consider operational response with regards to temporary defence installations and the role of secondary defences.

Recommendation 18 – Operational Response



Rec 18: Review and identify how to improve involvement of infrastructure operators and managers in the coastal flood risk incident management process.

Lead:	Natural Resources Wales	Partners:	Welsh Government, Risk Management Authorities, Local Resilience Forums, Infrastructure operators and managers
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Current Status: To be Commenced

- No specific progress to report.

Methodology type: Task and Finish

- Develop and distribute a questionnaire to Local Resilience Forums to enquire whether they need improved involvement from infrastructure operators and managers, and if so specifically who and how could they best get involved.
- Develop and distribute a questionnaire to Infrastructure operators and managers to enquire whether they believe that there could or should be work undertaken to improve their engagement in the coastal flood risk incident management process, and if so how the task could best be actioned.
- Review responses and produce report with recommendations.

Recommendation 19 – Operational Response



Rec 19: Continue to develop potential ‘impact scenario’ assessments, maps and/or statements. This work must be developed in close discussion with professional partners to ensure it meets all parties’ requirements.

Lead: Natural Resources Wales	Partners: Local Resilience Forums, Risk Management Authorities, Welsh Local Government Association
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Current Status: Ongoing

- Local information on flood risk is available and currently used to inform the incident management process.

Methodology type: Continuous Improvement

Requirements: (for discussion and development by Delivery Partners)

- The information required by all planning and responding agencies is a readily accessible, consistent dataset indicating the extent of flood risk to the community.
- The flood information needs to highlight the nature of the flooding e.g. fast/slow moving, deep/shallow flooding, quick/slow inundation etc.
- The dataset must include reference to affected infrastructure (direct and indirect to the community) and any local arrangements, e.g. rest centre locations and safe egress routes.
- Much of the data required already exists, but is held within individual Organisations and sharing could be improved.
- It is suggested that work concentrates on identifying the appropriate datasets, and developing a template to display the appropriate datasets so that Professional Partners can, at a glance, understand, plan and react to a flood incident within a particular community.
- The end product is a combination of all these datasets provided in an easily viewable and understandable format.
- Establish a Multi-Agency steering group (task and finish) to agree key objectives with partners. Task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- .Set up a technical working group to determine the process to capture all relevant datasets necessary to input to the product.
- Engage Wales Flood Group and Multi Agency Local Resilience Forum sub groups.
- Consider data management options - Data could potentially be managed on one central system with a rolling programme of adding risk sites.

- Additional sources of flood risk could be included. Data are currently available for all, fluvial, tidal and surface water flood risks. The net product, an impact assessment and management datasheet is based on a community boundary which remains geospatially similar.
- Produce a report evaluating options and generating recommendations.

Rec 20: Review the local decision making process associated with the issue of Severe Flood Warnings and evacuation procedures in December 2013 and early January 2014. Identify improvements and share at an all Wales level.

Lead: Natural Resources Wales **Partners:** Wales Flood Group,
Local Resilience Forum

Current Status: Ongoing

- Where required local discussions have taken place between professional partners.

Methodology type: Task and Finish

- Establish all Wales Multi-Agency Task and Finish group to scope a detailed action plan. The task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Document and consider all current formal guidance relating to the issue of Severe Flood Warnings.
- Document the rationale used in the decision making process for issuing Severe Flood Warnings in December 2013 and January 2014.
- Undertake gap analysis between formal guidance and practical decision making, and document reasons for differences.
- Consult with external partners in regard to their requirements for the issue of a Severe Flood Warning.
- Identify key factors influencing the issue of Severe Flood Warnings.
- Develop a consistent decision making matrix based on outcomes of the above.
- Produce a report evaluating options and generating recommendations. Agree the revised guidance and decision making matrix with partners across Wales and then promote through an awareness raising exercise.

Rec 21: Assess our national capacity to respond to a widespread and sustained period of coastal flooding. This should include consideration of when the current national resource pool will no longer function effectively. This should also consider post incident recovery issues.

Provide a report with recommendations for improvement.

Lead: Local Resilience Forums **Partners:** Natural Resources Wales,
Risk Management Authorities,
Welsh Local Government
Association, Welsh Government
Resilience

Current Status: Ongoing

- Existing emergency multi agency plans in place.
- Preparatory work being undertaken for Exercise Megacyma Cymru to be held in March 2015.

Methodology type: Task and Finish

- Link with Recommendation 22 (and 37).
- The LRFs (Local Resilience Forums) and their Flood/Severe Weather Groups are best placed to lead on this work as each area has recovery plans in place, which they have tested against flood scenarios.
- Recommendation 22 and the coastal evacuation exercise ('Exercise Megacyma Cymru') to be held in March 2015 will help inform the process of how we prepare for major incidents but ultimately this Recommendation relates to local multi-agency planning which is already taking place; particularly in the high risk areas.
- In terms of national capacity, the emergency services have national arrangements for wide-area support for all emergencies but nothing like this exists for Local Authorities. In taking forward planning at the local level the LRFs also need to consider how Local Authorities broker mutual aid not only with neighbouring authorities but also with those from further afield.
- Review output and lessons learnt from Megacyma Cymru exercise 2015.
- Consider findings and implications of Recommendation 37 (skills and capacity audit).
- Following of the above establish an all Wales task and finish group to identify further actions required.

Rec 22: Assess the collective ability to provide an effective response to a potential large scale evacuation scenario in either north east or south east Wales. This should also consider post incident recovery issues.

Provide a report with recommendations for improvement.

Lead: Wales Flood Group **Partners:** Local Resilience Forums, Emergency Services, Natural Resources Wales, Met Office, Welsh Government

Current Status: Ongoing

- Coastal evacuation exercise Megacyma Cymru is being planned by a sub group of Wales Flood Group to be held on Tuesday 10th March 2015.

Methodology type: Task and Finish

- Link with Recommendation 21 above (and Recommendation 37).
- Implement the large-scale coastal evacuation exercise in March 2015 that will focus on a coastal surge along the Severn Estuary coastline impacting upon South Wales and Gwent Local Resilience Forums.
- This will have an impact on large populations and test a coordinated response across 2 areas. Due to the size and scale of the exercise, it will not include post incident recovery issues, however consideration will be given by those involved as to the steps to be taken in terms of recovering from such an event.
- Follow up report to be produced identifying lessons learnt and good practice.

Rec 23: Review the Wales resilience structures and ways of working to identify what changes may be needed to enable us to collectively be better prepared and resilient to future coastal flooding.

Lead: Local Resilience Forums **Partners:** Welsh Local Government Association,
Local Authorities, Natural Resources
Wales

Current Status: Ongoing

- The Simpson Report and the subsequent Compact for Change between Welsh Government and Welsh Local Government already covers this.
- There has already been a change in local government structures and the feasibility of multi-agency regionalisation needs to be completed by September 2015.

Methodology type: Task and Finish

- The findings of Phase 2 of the Compact for Change accepted by the Wales Resilience Forum on 13th November 2014. The Local Resilience Forums now have responsibility for implementing these changes.
- The outcome of the changes to the Wales resilience structures under the Compact for Change will be tested by a coastal flooding scenario in March 2015 through Exercise Megacyma Cymru and any learning will be applied to ensure we are better prepared for such incidents.
- This review will cover all sources of flood risk.

Rec 24: Options to seek improvements to the standard of protection at the Garford Road area of Rhyl should be identified and evaluated. This should include detailed hydraulic analysis of the capacity and performance of the storage lagoon. This should include an assessment of the stairwell and slipway openings and the interaction with the adjacent golf course area.

Lead: Denbighshire County Council

Partners: The Welsh Government,
Natural Resources Wales

Current Status: Ongoing

- Stop logs at stairwell openings replaced by pre-cast concrete walls and steel flood gates.
- Consultants have been appointed to carry out hydraulic analysis of the coastal defences in order to establish the current standard of protection, including the capacity and performance of the storage lagoon. The consultants' brief is to determine the severity of the 5th December 2013 storm, the chances of flooding happening again at that the same location and to make future suggestions for flood risk mitigation.
- A topographical survey of the Rhyl Golf Course has been carried out. Analysis of the survey shows that there is potential storage capacity within the golf course boundary equivalent to approximately 5 times the storage capacity of the Garford Road storage lagoon.

Methodology type: Task and Finish

- Excavate a wide ditch from Garford Road storage lagoon to ensure connectivity to the golf course.
- Analyse the findings of the consultants' work, including any recommendations, to determine whether further analysis is required.
- Discuss the findings of the consultants' work with the 'partners' (Welsh Government and Natural Resources Wales).
- Replace the existing boarded slipway opening with a steel flood gate.
- Install steel flood gates across the promenade at Splash Point and the east end of the golf course.

Recommendation 25 – Operational Response



Rec 25: All Risk Management Authorities (RMAs) around Wales should review their local use of stop boards, stop logs, temporary barriers or moveable gates. The purpose of this review is for RMAs to satisfy themselves that existing arrangements are appropriate and robust. Consideration should be given to replacing existing arrangements with more permanent or more robust temporary solutions. This review should be ‘risk based’ and focused on the locations with highest local risk.

Lead: Welsh Local Government Association

Partners: Natural Resources Wales, Risk Management Authorities

Current Status: Ongoing

- A number of assets damaged during last year’s coastal flooding have been reviewed and replaced.

Methodology type: Task and Finish

- Linked to Recommendations 31 and 26.
- Establish an all Wales task and finish group to facilitate coordination and sharing of best practice.
- Initial scoping exercise will assess current arrangements across all Risk Management Authorities (RMAs). This will include locations of use, when are the structures installed and removed, current inspections, maintenance regimes and gather good practice from across Wales.
- The outcome of this scoping exercise will help establish current mechanisms in place, and assess gaps in current methods.
- Following the initial scoping, work with the three regional Flood Risk Management Groups to look at a consistent approach and align installation, removal and maintenance programmes at a regional level.
- Structures which are damaged during storms, vandalised or need replacing are often replaced by more up to date assets.
- The task and finish group should consider the need for specific advice and guidance. This could include matters such as consideration of betterment or replacement to allow for climate change and sea level rise and overall better resilience of assets (subject to risk based prioritisation of funding), as well as opportunities for improving maintenance and health and safety considerations.
- Produce a concluding report which summarises the work and recommendations of the task and finish group and confirms that RMAs are satisfied that existing arrangements have been reviewed and considered appropriate and robust.

Recommendation 26 – Operational Response



Rec 26: All Risk Management Authorities (RMAs) around Wales should review locations where they have secondary defence systems in place. The purpose of this review is for RMAs to satisfy themselves that the secondary systems will operate as designed when required. This review should be ‘risk based’ and focused on the locations with highest local risk.

Lead: Welsh Local Government Association

Partners: Natural Resources Wales, Risk Management Authorities, Welsh Coastal Monitoring Centre

Current Status: Ongoing

- Local reviews ongoing where these were highlighted by the winter's storms of December 2013 and early January 2014.

Methodology type: Task and Finish

- Linked to Recommendations 31 and 25.
- Establish an all Wales task and finish group to facilitate coordination and sharing of best practice. This will include representatives from the Welsh Local Government Association (WLGA) technical officers from Natural Resources Wales (NRW) and Lead Local Flood Authorities (LLFAs).
- The first part of the methodology will be to agree on a common definition of what is classed as secondary defence. This will be used as standard across all Risk Management Authorities (RMAs). The group will also agree on a common tool for condition assessment to ensure consistent assessment across Wales (scaling from 1-3 or similar).
- A standardised guidance document setting out the scope of the exercise will be forwarded to all RMAs.
- The WLGA also propose as part of the exercise to identify ownership of secondary defences in high risk areas. This exercise could be done by RMAs as a desktop study and each RMA should keep record of assets and ownership in a register.
- Experience and results from the forthcoming coastal asset survey in North Wales should be considered.
- The task and finish group should consider the need for specific advice and guidance. This could include matters such as consideration of betterment or replacement to allow for climate change and sea level rise and overall better resilience of assets (subject to risk based prioritisation of funding), as well as opportunities for improving maintenance and health and safety considerations.
- The task and finish group should consider the need for further investigations and studies to understand the operation and performance of local asset systems.

- Produce a concluding report which summarises the work and recommendations of the task and finish group and confirms that RMAs are satisfied that existing arrangements have been reviewed and considered appropriate and robust.

Coastal Defences

Recommendations 27 to 42

These Recommendations consider:

- Future flood and coastal erosion risk management funding streams.
- The need for greater consistency in asset management datasets, asset inspections.
- Coastal mapping and modelling improvements.
- A risk based assessment of locations that experienced flooding or a near miss during last winter's storms.
- Completion of the assessment of environmental change during last winter's storms;
- The need for greater clarity on the skills, capacity, roles and responsibilities of Risk Management Authorities.
- The role of Coastal Groups.
- The future of the Wales Coastal Monitoring Centre.
- The strategic framework established by the Shoreline Management Plans and means to deliver coastal adaptation.

Recommendation 27 – Coastal Defences

Rec 27: There needs to be continued sustained investment to manage the national coastal risks to acceptable levels

This must include flood forecasting, warning, awareness, response and recovery, as well as flood defences. Particular focus has to be on the existing defences to ensure they continue to be fit for purpose, as well as investment in new defences to reduce the flood risk for more locations.

Lead: Welsh Government – Flood and Coastal Erosion Risk Management	Partners: Natural Resources Wales, Lead Local Flood Authorities, Wales Coastal Monitoring Centre
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Current Status: Ongoing

- Welsh Government continually work to protect budgets and the core flood budget has been maintained for 2015/16.
- Announcement on additional coastal funding due by the end of 2014 should see a significant boost to flood and coastal erosion risk management investment.
- Flood and Coastal Erosion Risk Management (FCERM) budgets already cover all risk management activity including funding for forecasting, warning, mapping, awareness, response and recovery alongside flood defence schemes.

Methodology type: Continuous Improvement

- Flood and coastal erosion risk management remains a priority for this Government. We will not know the settlement from UK Government for 2016-17 and beyond until the 2015 Spending Review. However, all indications are that public spending constraints are likely to continue. Although there remains uncertainty as to the future settlement beyond 2015/16, Welsh Government will continue to maximise opportunities to sustain investment within the funding envelope available.
- Welsh Government FCERM team to continue discussions with finance colleagues.
- Whilst investment needs to continue to ensure existing defences continue to be fit for purpose, investment also needs to focus on further and improved flood forecasting, warning, awareness, response and recovery as well as new defences.
- Any flood and coastal erosion risk management will consider all types of flooding.
- Delivery of this Recommendation should include consideration of Recommendations from 'the Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change' report delivered under Recommendation 36.

Rec 28: Review and identify options to maximise certainty in flood and coastal erosion risk management funding over a longer timeframe and to maximise flexibility in the use of this funding. This would mean less focus on annual and in year budgets and more focus on delivery and budget management of 3-5 years.

Lead: Welsh Government – Flood and Coastal Erosion Risk Management **Partners:** Natural Resources Wales, Risk Management Authorities

Current Status: Ongoing

- Continued discussions with finance colleagues regarding completion of the draft consultation on a Flood and Coast Investment Programme to prioritise investment according to national risk from all sources of flooding.

Methodology type: Continuous Improvement

- Budgets are currently set until 2015-16 which is the final financial year for which we have a firm settlement. We will not know our settlement for 2016-17 and beyond until the 2015 Spending Review. Our focus will be on maximising the funding we have available to deliver the coastal and flood risk management programme.
- The development of the Flood and Coast Investment Programme will provide a long term programme of schemes for future investment.
- Completion of the Flood and Coastal Investment Programme consultation and implementation of this programme to provide a methodology for prioritisation of funding.
- Existing funding for flood and coastal erosion risk management considers all types of flood risk management and interventions and the Flood and Coast Investment Programme will consider all sources of flooding.

Rec 29: The development of the National Programme of Investment should be progressed as a matter of importance and its development should seek a wide range of ways of working and technical improvements to the flood and coastal erosion risk management investment allocation, decision making and prioritisation process.

Lead: Welsh Government – Flood and Coastal Erosion Risk Management

Partners: Natural Resources Wales, Welsh Local Government Association, Local Authorities, Dŵr Cymru Welsh Water

Current Status: Ongoing

- Completion of draft consultation on National Programme of investment (now called Flood and Coast Investment Programme) to go out to consultation by the end of the year.

Methodology type: Task and Finish

The consultation on a Flood and Coast Investment Programme will be issued later this year considering all elements of Welsh Government funding. This programme will set out a prioritisation methodology to enable areas of Wales to be ranked according to risk from all sources of flooding.

- Consultation on Flood and Coast Investment Programme.
- Completion of prioritisation methodology including an index of combined flood risk.
- Use index to help identify schemes and prioritise funding.
- The Flood and Coast Investment Programme will consider all sources of funding.

Rec 30: Review and identify options to gain additional funding to supplement core FCERM investment. This must be closely aligned with the development of the National Programme for Investment.

Lead: Welsh Government – Flood and Coastal Erosion Risk Management

Partners: Natural Resources Wales, Risk Management Authorities

Current Status: Ongoing

- Draft consultation of National Programme of Investment (now called Flood and Coast Investment Programme) will be published later this year.
- Continuously looking for additional funding opportunities or partnership funding opportunities.
- Welsh Government have been examining the merits of an innovative finance mechanism for flood and coastal defence, having already developed successful initiatives in the roads and transport, education, and housing sectors with a combined capital value of around £470 million. Further announcement by end of 2014.

Methodology type: Continuous Improvement

- As per Recommendations 28 and 29.
- Over the next few months work will continue with delivery partners in local authorities to examine the case for an innovatively funded coastal flood defence programme. There will be further announcements about this scheme later in 2014.
- Any additional sources of funding should consider all sources of flooding, although the innovative finance programme will focus solely on coastal defence as identified in the outline proposal in line with Shoreline Management Plans. The additional coastal funding will indirectly benefit fluvial and surface water flood risk schemes by allowing core funding to concentrate on these areas.

Rec 31: Produce a complete national dataset of coastal protection and defence assets including details of areas benefitting.

It is essential that this dataset becomes a ‘live management tool’ and not merely a representative picture of a snapshot in time. This dataset must therefore be associated with a process for ensuring the information is maintained.

Lead: Natural Resources Wales

Partners: Risk Management Authorities,
Asset Owners

Current Status: Ongoing

- Natural Resources Wales are replacing their existing Flood and Coastal Risk Asset Management system called AIMS. This system was brought over from the Environment Agency, one of their legacy bodies.
- Development and Implementation work by an appointed contractor starts in November 2014. The first phase of the solution is expected to go live in March 2015.
- Risk Management Authorities have their own approaches to collection and storage of coastal data.
- Other partners have their own approaches to collection and storage of coastal data.

Methodology type: Task and Finish

- Link with Recommendation 32.
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.
- Review and evaluate existing datasets and approaches.
- Identify the national requirements.
- From the above identify gaps, risks and opportunities.
- Identify and evaluate options.
- Produce a report evaluating options and generating recommend way forward.
- Delivery of this Recommendation should include consideration of Recommendations from the ‘Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change’ report delivered under Recommendation 36.

Rec 32: Review and identify options to achieve a more consistent approach to the inspection of the network of coastal defence systems. This must include recommendations to improve the efficiency and effectiveness of the asset inspection process.

Lead: Natural Resources Wales **Partners:** Risk Management Authorities, Asset Owners

Current Status: Ongoing

- Early scoping of implications and need to incorporate into consideration of Recommendation 31.

Methodology type: Task and Finish

- Align and incorporate this Recommendation into Recommendation 31.
- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities, risks and constraints.
- Consider and evaluate a common approach to asset inspection and assessment methodology.
- Review and evaluate current inspection methodologies and consider opportunity to implement a common, consistent approach.
- Consider and evaluate opportunities to improve efficiency and effectiveness of the asset inspection process, both at a local and national scale.
- Consider practical implications of implementing any changes.
- Produce a report evaluating options and generating recommendations.
- Delivery of this Recommendation should include consideration of Recommendations from the 'Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change' report delivered under Recommendation 36.

Rec 33: Continue to develop a nationally prioritised programme of coastal modelling and mapping improvements. This must be nationally risk based and consistent.

Lead: Natural Resources Wales

Partners:

Welsh Coastal Monitoring Centre,
Risk Management Authorities

Current Status: Ongoing

- Future approaches to flood risk mapping for Wales has been under review and discussion since the 2013/ 2014 storm events.

Methodology type: Continuous Improvement

Primarily centred on the need to replace the National Flood Risk Assessment data and methodology, the project team is looking at creating a brief to produce a more fit for purpose dataset for displaying Flood Hazard for Rivers and the Sea for Wales.

- Develop a brief to produce a better Flood Hazard Map for Wales.
- Work with potential suppliers to procure an improved Flood Hazard map.
- Produce a Flood Risk Modelling and Mapping Strategy/Work plan for Wales.

Rec 34: Locations and communities which experienced flooding in December 2013 and early January 2014 should be subjected to a risk based assessment to determine if further risk management activity/intervention is needed and can be justified.

Lead: Natural Resources
Wales

Partners: Risk Management Authorities,
Welsh Local Government Association

Current Status: Ongoing

- A brief update is included in Table E1 below.

Methodology type: Task and Finish

- Risk Management Authorities to continue to progress assessments and work on a prioritised risk basis.

Table E1: Update on Flood Locations – Recommendation 34

These are locations and communities that experienced flooding during the storms of 5th December 2013 and early January 2014 and were identified in the Phase 2 Report.

Community name	County/Authority	Which event	Status
Rhyl (Splash Point)	Denbighshire	Dec'13	Structural repair works complete and scoping of flood alleviation scheme underway. See Recommendation 24
Kinmel Bay	Conwy	Dec'13	Shingle replenishment works underway and a replacement floodgate planned.
Llanbedr	Gwynedd	Jan'14	Structural repair works completed and ongoing monitoring
Barmouth	Gwynedd	Jan'14	Options appraisal study for north Promenade underway.
Borth	Ceredigion	Jan'14	Previously planned structural works underway.
Aberystwyth	Ceredigion	Jan'14	Project Appraisal Report underway.
Aberaeron	Ceredigion	Jan'14	Funding application submitted for scheme detailed design.
Llangrannog	Ceredigion	Jan'14	Structural works completed.
Cardigan	Ceredigion	Jan'14	Project Appraisal Report underway.
Lower Town Fishguard	Pembrokeshire	Jan'14	Ongoing community resilience project.
Little Haven	Pembrokeshire	Jan'14	Scheme design underway.
Amroth	Pembrokeshire	Jan'14	Structural repair works complete.

Rec 35: Near miss locations and locations subjected to substantial foreshore change should be identified and subjected to a risk based assessment to determine if further risk management activity/intervention is needed and can be justified.

Lead: Natural Resources
Wales

Partners: Risk Management Authorities,
Welsh Local Government Association

Current Status

- A brief update is included in the Table E2 below.

Methodology type: Task and Finish

- Risk Management Authorities to continue to progress assessments and work on a prioritised risk basis.

Table E2: Update on ‘Near Miss’ Locations – Recommendation 35

The storm events of 5th December 2013 and early January 2014 resulted in some ‘near miss’ locations. These locations were identified in the Phase 2 Report

Community name	County/Authority	Which event	Status
Prestatyn (Tower Gardens, Central Beach)	Denbighshire	Dec'13	Structural works planned.
Llanfairfechan	Conwy	Dec'13	Structural works completed and beach nourishment works proposed.
Hen Wrych	Conwy	Dec'13	Structural and beach nourishment works planned.
Pensarn Shingle Bank	Conwy	Dec'13	
Abererch and Traeth Crugan	Gwynedd	Jan'14	Dune reinforcement work completed at Abererch. Structural repairs underway at Traeth Crugan.
Borth-y-Gest	Gwynedd	Jan'14	Investigation into event completed.
Ceredigion – various locations	Ceredigion	Jan'14	Structural works being undertaken at Tresaith and Aberaeron South Beach.
Loughor, Burry Port, Llansteffan, Pendine and Machynys.	Carmarthenshire	Jan'14	Structural works completed at Burry Port, Llansteffan, Pendine and Machynys. Loughor. Inspection and monitoring at Millenium Coastal Park
Mumbles	Swansea	Jan'14	Structural repairs completed. Structural works planned.
Swanbridge	Vale of Glamorgan	Jan'14	Structural repairs completed. Potential strategy study proposed. .
Sandy Bay, Porthcawl (Coney Beach fairground)	Bridgend	Jan'14	Potential future options appraisal.
Shaftesbury and Crindiau	Newport	Jan'14	Structural works planned.

Community name	County/Authority	Which event	Status
Northern and Hawarden Embankments along Dee from Connah's Quay to Chester	NRW	Dec'13	Strategy complete for Tidal Dee Area. Plan for works being developed where required.
Abererch	NRW	Jan'14	Repair and reinforcement work on the dune system complete.
Newton (near Porthcawl)	NRW	Jan'14	Temporary repair works complete. More permanent solution being developed.
Caerleon	NRW	Jan'14	Work identified and planned for 2015.

Recommendation 36 – Coastal Defences



Rec 36: Complete the ongoing update to the Phase 1 ‘rapid’ assessment of environmental changes experienced during the December 2013 and January 2014 storms.

Lead: Natural Resources
Wales

Partners: Wales Biodiversity Partnership, Coastal Ecosystem Group, National Trust, Wildlife Trusts, RSPB, British Trust for Ornithology, Kenfig Reserve, Glamorgan Heritage Coast, Risk Management Authorities

Current Status: Complete

Recommendation 36 has been **completed** via publication of Duigan C, Rimington N & Howe M (Eds) 2014. *Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change*, NRW Evidence Report 33.

This report identifies a number of areas of further work. Where relevant these will be integrated with the Coastal Review Delivery Plan.

Discussions are underway to consider the detail of how this can be achieved.

Rec 37: Carry out a national skills and capacity audit for all Risk Management Authorities to assess and quantify the scale of the issue – to assess the size of the skills and capacity gap.

Produce an options document for how the skills and capacity gap could be addressed to meet present day flood risk management needs and future challenges.

Lead: Welsh Local Government Association **Partners:** Natural Resources Wales, Risk Management Authorities, Wales Coastal Monitoring Centre

Current Status: Ongoing

- Early discussions around scope and approach begun.

Methodology type: Task and Finish

- Establish a task and finish group to identify and evaluate options, with consideration given to opportunities risks and constraints.

The first stage of the audit needs to establish the technical skills and capacity we currently have across all Risk Management Authorities (RMAs). This will inform the best way forward for the second stage of the audit which will identify where the gaps are to ensure long-term resilience.

- A desktop study to look at what specific skills are needed for effective Flood Risk Management. This research could be transposed into recommendations or a small report to ensure we focus development in the right areas.
- We are also proposing to work closely with the Wales Coastal Monitoring Centre and utilise the findings of their survey undertaken with coastal practitioners last year.
- In addition, the Welsh Local Government Association (WLGA) will run a workshop to look at the skills we will need to develop across Wales in the long-term for efficient Flood Risk Management.
- A specific survey will be established based on this information and passed on to all RMAs. The survey will ask practitioners to assess what extra skills / capacity are needed within their organisation in the long-term to address issues like climate change, ageing staff and loss of expertise.
- While the survey is undertaken, we will speak to Welsh universities and further afield to look at opportunities for further developments for present and future flood and coastal erosion practitioners.
- Finally, the WLGA has introduced a Training Grant for Lead Local Flood Authorities (LLFAs) for 2014-15. Officers applying for the grant will automatically be entered into a skills

database held by the WLGA. This database will allow the WLGA to constantly update skills across all 22 LLFAs.

- Produce a report evaluating options and generating a recommended way forward.
- Note that including additional flood risk sources will increase cost / time requirements. However, the benefits of broadening the scope of the research to include RMAs other than coastal would outweigh any additional impacts. With resources diminishing in the Public Sector, we need to look further afield for support and solutions.
- Delivery of this Recommendation should include consideration of Recommendations from the 'Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change' report delivered under Recommendation 36.

Rec 38: Clarify roles and responsibilities amongst risk management authorities at both the local and national level as required.

Develop consistent and common communication messages and tools to convey roles and responsibilities to communities.

Lead: Natural Resources Wales **Partners:** Risk Management Authorities, Welsh Government.

Current Status: Ongoing

- Early scoping of issues and way forward.

Methodology type: Task and Finish

- Establish a task and finish group to facilitate coordination of this work.
- Develop and distribute a questionnaire to partners via established operational working groups to specifically identify where there are issues of confusion and lack of clarity in existing roles and responsibilities.
- Review content and specific requirements of relevant legislation.
- Seek legal advice and guidance as and where necessary.
- Identify what is needed to improve clarity of roles for both professional partners and wider.
- Develop and agree a briefing document with and for professional partners.
- Identify and develop messages to communicate beyond professional partners.
- Produce a report evaluating options and generating a recommended way forward.

Rec 39: Undertake a review of Welsh Coastal Groups and the Wales Coastal Group Forum. This review should include, as appropriate, links and relationships with other similar groups who have a role in the management of flood and coastal erosion risks.

This review should identify improvement options to maximise efficient and effective delivery of flood and coastal risk management.

Lead: Welsh Government/ External consultant	Partners: Coastal Group Chairs, Risk Management Authorities, Welsh Coastal Monitoring Centre, Natural Resources Wales, Welsh Local Government Association
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Current Status: Ongoing

- Ongoing work with coastal groups.
- At the meeting on 3rd October 2014, this Recommendation was considered and a review of the coastal groups and coastal forum will be an agenda item for the next meeting in January 2015.

Methodology type: Task and Finish

- A review of the Welsh Coastal Groups and the Wales Coastal Group Forum will be an agenda item for the next meeting in January 2015.
- It may be appropriate to commission an independent consultant to carry out a review of the work of Welsh Coastal Groups and the Wales Coastal Group Forum, this can be discussed by the Forum.
- Develop and agree scope and terms of reference for this review.
- Carry out the review.
- Produce a report with recommendations.

Rec 40: The Wales Coastal Monitoring Centre submitted a business case for the future of the centre to Welsh Government in December 2013. This business case should be determined by Welsh Government.

Lead: Welsh Government – Flood and Coastal Erosion Risk Management **Partners:** Wales Coastal Monitoring Centre

Current Status: Ongoing

- The Wales Coastal Monitoring Centre (WCMC) has prepared a business case stating the future coastal monitoring requirements for Wales and outlining further coastal monitoring needs. A revised version of the business case was submitted in September 2014 and is currently being considered by Welsh Government.

Methodology type: Task and Finish

- Consideration of the business plan submitted by WCMC.
- Consideration of all options for a WCMC and decision on most viable.
- Procure service.
- Delivery of this Recommendation should include consideration of Recommendations from the 'Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change' report delivered under Recommendation 36.

Rec 41: Welsh Government should endorse the strategic framework established by the Shoreline Management Plans (SMP2). This should be accompanied by more national and local support to communities and community involvement in the development of local adaptation options and plans.

Develop a ‘local adaptation toolkit’ to better support communities. This may include technical guidance, templates, and engagement and communication tools and policy positions.

Local discussions in all coastal communities need to begin now, involving professional partners and the community. These discussions should consider communities on a risk basis. These discussions need to explore and develop local plans to adapt and increase resilience over time.

Support and draw upon the experience of the Fairbourne multi-agency group to help inform adaptation and community resilience discussions at other locations.

Lead: Welsh Government (sign off SMPs), Risk Management Authorities (for guidance)	Partners: Natural Resources Wales, Lead Local Flood Authorities, Coastal Groups, Community Councils, Utility providers, National Trust
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Current Status: Ongoing

- At the time of writing, three Shoreline Management Plan 2’s (SMP2) have been approved by the Minister for Natural Resources (South Wales, West of Wales and Severn Estuary).
- Submission of the remaining SMP to Minister for Natural Resources towards the end of 2014.
- Welsh Government Officials have been working with a multi-agency group in Fairbourne to support the community in planning for future changes.

Methodology type: Continuous Improvement

- At the time of writing, SMP2s are being reviewed and submitted for sign off by the Minister for Natural Resources. Three SMP2s have been approved and the remaining one will shortly be submitted, pending approval by the end of the year.
- Delivery and communication of SMP2s needs to be done at a local level, understanding local issues and needs and involving local communities. Welsh Government can provide strategic direction and support, however decision making, planning and adaptation needs to be delivered locally.

- Welsh Government Officials are involved with the multi-agency group at Fairbourne, which includes the local authority and the Fairbourne Facing Change Community Action Group, and will continue to support this group.
- Good practice may be identified and brought together in a guidance document. This should be prepared and led by the Coastal Groups, with support from Natural Resources Wales and Welsh Government.
- Continue with Ministerial sign off process for the one remaining SMP.
- Collaborative work with coastal groups and coastal communities.
- Delivery of this Recommendation should include consideration of Recommendations from the 'Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change' report delivered under Recommendation 36.

Rec 42: Review and evaluate existing barriers and gaps to supporting coastal adaptation and make recommendations for improvement.

Review, where necessary, existing climate change guidance to ensure the most appropriate approach is being used by all parties involved in all aspects of flood and coastal erosion risk management (i.e. all Government departments, RMAs infrastructure and utility operators).

Lead: Welsh Government **Partners:** Lead Local Flood Authorities, Natural Resources Wales, Utilities Providers, Planning, Communities, National Trust

Current Status: To be Commenced

- Two clarification letters have been sent out in 2014 on planning guidance around flood risk, firstly to Chief Planning Officers about the changes to insurance cover for properties at risk from flooding and secondly to all local authority planning leads as a reminder of the importance of recognising flood risk, the use of Welsh Government Planning Policy and advice contained within Planning Policy Wales and TAN 15.
- Planning policy officials remain in discussion with Natural Resources Wales and the flood and coastal erosion risk management branch on coastal flood risk and adaptation and how planning policy can help in reducing long-term flood risk to homeowners and communities.

Methodology type: Task and Finish

- Discussions around planning policy advice and implications for coastal communities in respect to climate change and increased flood risk.
- Contact partners involved in coastal adaptation and seek their advice as to any existing barriers and gaps.
- Delivery of this Recommendation should include consideration of Recommendations from the 'Welsh Coastal Storms, December 2013 & January 2014 – an assessment of environmental change' report delivered under Recommendation 36.

Infrastructure Resilience

Recommendations 43 to 47

These final five Recommendations consider how infrastructure and utility operators can work more effectively both with Risk Management Authorities and each other, and the possible means of increasing resilience of infrastructure and utility assets into the future.

Rec 43: Review and make recommendations for how Risk Management Authorities and infrastructure and utility operators can work together operationally more efficiently and effectively. This should consider a range of working agreements to ensure clarity of roles and responsibilities between professional partners and for communities.

Lead: Welsh Government **Partners:** Risk Management Authorities, Utility and Infrastructure Operators

Current Status: To be Commenced

- No specific progress to report.

Methodology type: Task and Finish

- Establish a task and finish group to facilitate coordination of this work.
- Collate a list of organisations that need to work together such as Risk Management Authorities (RMAs), infrastructure companies, utility operators and establish a contacts list.
- Define which of the identified organisations contribute to Flood Risk Management and which are only impacted by flood risk.
- Seek advice from parties above as to how these organisations can work together operationally more efficiently and effectively.
- Review and make recommendations for different options for identified parties to work together more efficiently and effectively. This will include assessment of a range of working agreements to ensure clarity of roles and responsibilities between professional partners and for communities.
- Produce report of recommendations and options and disseminate to relevant parties.

Rec 44: Review and make recommendations if more needs to be done to enable infrastructure and utility operators to effectively work together and interact on issues of mutual interest. This may include a review of the role and remit of the Wales Utility Group and other options.

Lead: Welsh Government **Partners:** Risk Management Authorities,
Utility and Infrastructure Operators

Current Status: To be Commenced

- No specific progress to report.

Methodology type: Task and Finish

- Establish a task and finish group to facilitate coordination of this work
- Review how infrastructure and utility operators currently work together and whether this is effective.
- Among other options, review the role and remit of the Wales Utility Group.
- Develop options and recommendations for improvements which can be made to enable better collaborative working between the infrastructure and utility operators.
- Consult with all relevant partners to determine how this currently works and seek their advice as to how improvements could be made.
- Produce an options and recommendations report.

Rec 45: Encourage and support the development of programmes of works to increase resilience of infrastructure and utility assets. These must be aligned with local community adaptation planning.

Review where appropriate if there are regulatory barriers to obstruct this process of adaptation and identify regulatory improvements which could help adaptation.

Lead: Welsh Government **Partners:** Risk Management Authorities, Utility and Infrastructure Operators

Current Status: Ongoing

- Organisations such as regulators, electricity generators, transmitters, road and rail have all produced reports on what they are doing to prepare for a changing climate. Reference to the reports and guidance from Defra can be found at:

<https://www.gov.uk/government/policies/adapting-to-climate-change/supporting-pages/adaptation-reporting-power>

Methodology type: Continuous Improvement

- To be aligned with Recommendation 41 and coastal adaptation.
- Ask the relevant companies about regulatory barriers.
- Seek an update and write to them periodically for progress updates.
- In terms of WG Transport's commitment to embedding resilience to flooding in our strategic and operational decisions, this will be covered in the new National Transport Plan for Wales which is currently being drafted and which will cross-reference the flooding 'hotspots' in Wales.

Rec 46: Review and evaluate at the national Wales level, the impacts of climate change scenarios on Network Rail infrastructure and highways infrastructure around the Welsh coastline and the long term adaptation options.

Lead: Welsh Government

Partners: Risk Management Authorities, Utility and Infrastructure Operators

Current Status: Ongoing

- Network Rail recently published their Route Weather Resilience and Climate Change Adaptation plans

Methodology type: Task and Finish

- To be aligned with Recommendation 41 and coastal adaptation.
- As above for Recommendation 45.
- Engage with WG as transport policy lead but also need to engage with Trunk Road Agencies and local highways authorities.

Rec 47: Undertake a periodic national assessment of infrastructure and utility resilience across Wales, in order to provide assurance of national progress towards increased resilience to coastal flood and erosion risks.

Lead: Welsh Government **Partners:** Risk Management Authorities,
Utility and Infrastructure Operators

Current Status: To be Commenced

- No specific progress to date.

Methodology type: Continuous Improvement

- This is subject to agreements of 43 to 46.
- Infrastructure and utility operators will already be reviewing the resilience of their assets and this will need to be continued.

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