Appendix 1

Cyngor Gwynedd

Local Flood Risk Management Strategy DRAFT

Document Control Sheet

Document Title:	Local Flood Risk Management Strategy
Document Author(s):	Various
Project Ref / Title:	
Project Manager:	

Revision History

Date	Version No.	Summary of Changes
09/02/2024		

Reviews

Name	Title	Date	Version

Approvals

Name	Title	Date	Version

ISO9001:2015
FS526386

ISO14001:2015
EMS 526388

ISO45001
OHS 526389

Summary

1. Foreword

2. Introduction

2.1 The need for a Local Strategy

The *Flood and Water Management Act 2010*[1] requires all 22 Lead Local Flood Authorities (LLFAs) in Wales to produce a Local Flood Risk Management Strategies (Local Strategy).

The Welsh Government's *National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales (National Strategy)*[2] sets out that over 245,000 properties across Wales are at risk of flooding from rivers, the sea and surface water, with almost 400 properties also at risk from coastal erosion. The National Strategy explains that, as the climate changes, we can expect those risks to increase, with more frequent and severe floods, rising sea levels and faster rates of erosion of the coast.

The National Strategy sets out the legislative context to FCERM activities in Wales. In certain cases, Local Authorities are also required to produce Flood Risk Management Plans (FRMP), under the *2009 Flood Risk Regulations*[3] (now revoked under the Retained EU Law Act).

Different Risk Management Authorities (RMAs) in Wales are responsible for different sources of flood risk. LLFAs are responsible for "local flood risk" which is defined as flood risk from:

- Surface water runoff
- Groundwater; and
- Ordinary watercourses (generally smaller watercourses)

This Local Strategy focuses on these local sources of flood risk but acknowledges and considers other sources of flood risk (including the sea, larger watercourses and sewers) and associated RMAs.

2.2 The purpose of this Local Strategy

We published our first Local Strategy in 2014, setting out our overarching approach to managing local flood risk. Alongside our Local Strategy, we published a FRMP. Our FRMP developed the objectives and high-level actions outlined in our Local Strategy into a more detailed plan for managing flooding in our communities.

This document is our second Local Strategy. Whilst we previously published our Local Strategy and FRMP separately, this new Local Strategy integrates the two documents into one. This reduces complexity and enables us to communicate and manage local flood risk more effectively.

[1] https://www.legislation.gov.uk/ukpga/2010/29/contents

[2] https://www.gov.wales/national-strategy-flood-and-coastal-erosion-risk-management-wales

[3] https://www.legislation.gov.uk/uksi/2009/3042/contents/made

In this document we identify the present day and future risks associated with flooding and coastal erosion. Our aim is to make the reader aware of all sources of flooding within their community, rather than focus only on the sources for which Cyngor Gwynedd act as RMA.

We also explain how these risks will be managed across our Local Authority area, consistent with the objectives, measures and related policies and legislation set out in the National Strategy.

This document considers inland and coastal risks separately, this is because there is often little correlation between the nature of the risks and the ability to mitigate them. Also there is a difference in statutory and passive roles/responsibilities, policies and strategies (including those of other agencies) between inland and coastal risks.

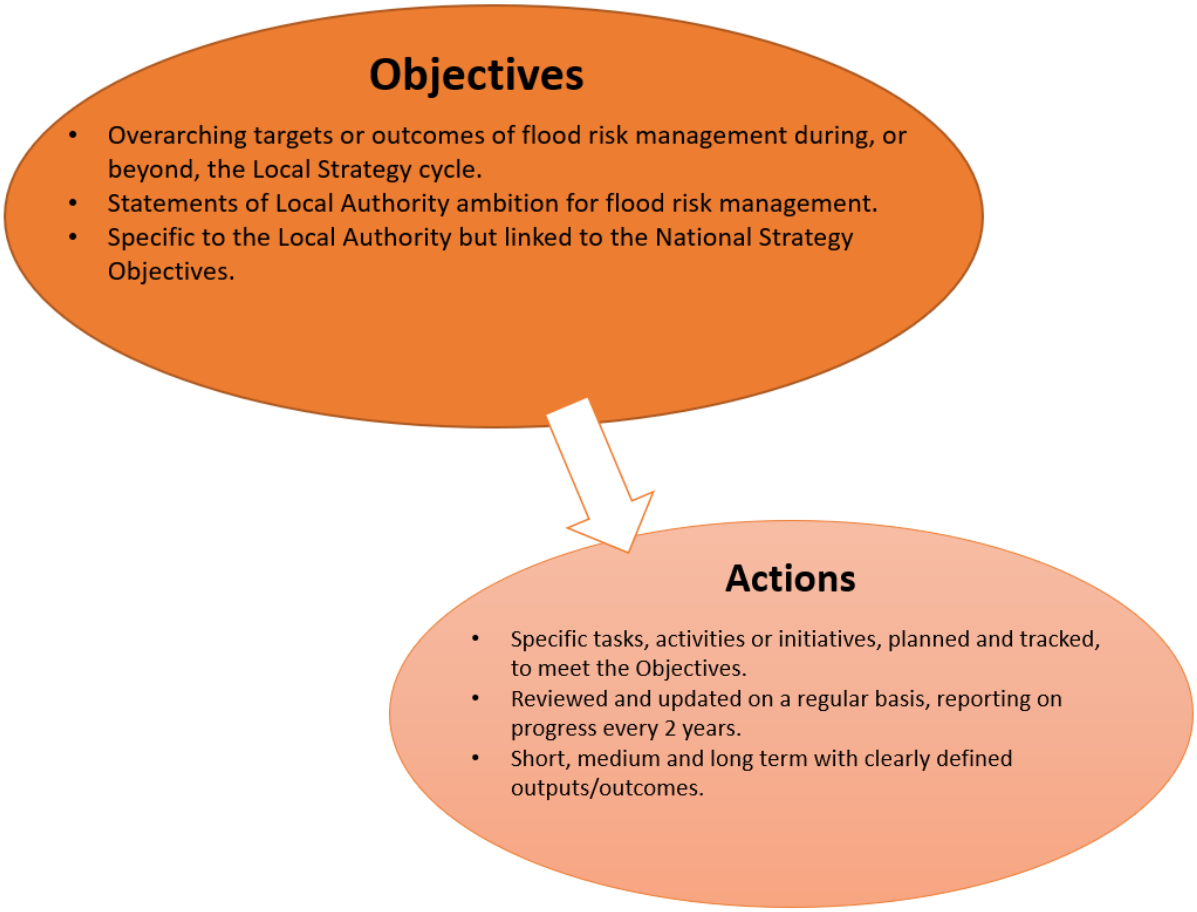
Furthermore, in order to segregate the risk across Gwynedd and help identify the areas of most concern we shall discuss inland flood risk by main hydrological catchments, of which there are 15 in total (see section 10 and Appendix A). Coastal risks are assessed and discussed according to specific lengths of the coastline termed as Management Areas (see section 10 and Appendix B).

This Local Strategy published on XXX will be reviewed in X years.

2.3 Targets within this Local Strategy – Objectives and Actions

This Local Strategy sets out our flood and coastal erosion risk management Objectives and Actions, listed in sections 11 and 12 respectively. These groupings provide different levels of detail on how risks will be managed, and the meaning of each is summarised below:

Figure 2.1: Description of Objectives and Actions as listed in this Local Strategy



3. How this strategy responds to climate change

3.1 Climate change risk in our area

The Senedd was the first Parliament in the world to declare a climate emergency. Climate change is likely to increase the risk of flooding across Wales, not only through sea level rise but also from more frequent and intense storms, flash flooding and storm surges.

In March 2019 Cyngor Gwynedd declared its own climate emergency and vowed to take definitive steps to reduce carbon emissions and to work towards a carbon-free future. Subsequently the Council have published a *Climate and Nature Emergency Plan*[4], which outlines the steps that we will take between 2022 and 2030 to reach our ambition of being a net zero council.

The level of flood risk to property across Gwynedd is expected to rise significantly in the future due to the effects of climate change, with an increase in frequency and depth of flooding to coastal and low-lying areas. Within Gwynedd we anticipate that an additional 2127 residential

[4] https://www.gwynedd.llyw.cymru/en/Residents/Climate-and-Nature.aspx

properties will be at risk of coastal flooding over the next 100 years (up 50% from 4228 at present day), and additional 1826 residential properties face risk of fluvial or surface water flooding over this time period (up 35% from 5258 at present day). This in addition to an increase in the level of flood risk for properties currently located within flood zones. Detailed flood risk definitions and projections are provided in section 9 of this Local Strategy.

The *Climate and Nature Emergency Plan* acknowledges that measures need to be taken to manage the increase in flood risk to people and properties because of climate change. This Local Strategy will help to manage some of the effects of climate change in our area. The objectives and actions identified will help us to reduce the risk of flooding where we can, as well as adapt our communities and infrastructure to become more resilient to flooding when it occurs.

3.2 How our strategy addresses these risks

This Local Strategy has been developed to continually assess and manage flood and coastal erosion risks across Gwynedd into the future and will address the increase in risks due to the effects of climate change as part of this process. The following steps are key in embedding future climate change effects into the objectives and actions of this Local Strategy:

- The flood risk projections provided in section 10 have been derived from national flood maps (including *Flood Map for Planning*) which include an allowance for climate change effects, thereby enabling us to identify areas of Gwynedd that will face an increased flood risk into the future.

- Coastal studies or schemes that may derive from this Local Strategy will coincide with the policies for future coastal management identified within the West of Wales Shoreline Management Plan 2 (see section 4), which have been developed to manage the effects of future sea level rise upon our coastal communities.

- Studies or schemes to assess and/or address flood and coastal erosion risk within particular areas of Gwynedd in the future will make the correct allowances for climate change effects to be incorporated into the modelling and design process, based on the most up to date available guidance[5]

[5] https://www.gov.wales/sites/default/files/publications/2022-11/guidance-for-flood-and-coastal-erosion-risk-management-authorities-in-wales_0.pdf

4. Coordination

4.1 How this strategy aligns with our other strategic plans

This Local Strategy is one of several strategic documents that influence how local flood risk is managed in Gwynedd. Some of the key local strategies and plans that have informed the development of this Local Strategy are listed below:

4.1.1 National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales (National Strategy)

The National Strategy sets out how the Welsh Government intend to manage the risks from flooding and coastal erosion across Wales. It sets objectives and measures for all partners to work towards over the 10 years from its publication in 2020. The links between this Local Strategy and the objectives and measures outlined in the National Strategy are outlined in section 6.

4.1.2 The Cyngor Gwynedd Plan 2023-28[6]

This plan outlines the Council's vision and priorities for the next five years by identifying a series of priorities and projects that will allow the Council to further develop and improve the services provided to the people of Gwynedd.

One of the priority fields within the plan involves protecting the county's natural beauty, and responding positively to the climate change crisis; and acting on flood risk is identified as an action to meet this priority. This Local Strategy will drive this action by identifying means to manage flood and coastal erosion risk for our communities into the future. Measures included in this Local Strategy should also enable delivery and success of the plan to be monitored over time.

The plan outlines the Council's well-being objectives which contribute directly to achieving the national well-being goals as defined in the *Well-being of Future Generations (Wales) Act 2015*[7]. Any schemes or studies that derive from this Local Strategy will be developed with full consideration of both local and national wellbeing objectives, as is a requirement of Welsh Government grant terms (see section 13).

[6] https://www.gwynedd.llyw.cymru/en/Council/Strategies-and-policies/Corporate-plans-and-strategies/The-Council-Plan/The-Cyngor-Gwynedd-Plan-2023-28.aspx

[7] https://www.legislation.gov.uk/anaw/2015/2/contents/enacted

4.1.3 The Climate and Nature Emergency Plan

This plan (discussed in section 3.1) was published in response to the Council's climate emergency declaration and outline the steps intended to be taken between 2022 and 2030 to reach our ambition of being a net zero Council.

This Local Strategy will complement the plan by contributing to a programme for responding to flooding risk, intended for future versions of the plan. Measures included in this Local Strategy should also enable delivery and success of the plan to be monitored over time.

4.1.4 Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026[8]

This plan sets out the growth strategy, vision and the policies for development and land use for the Plan area, namely the Gwynedd and Anglesey Local Planning Authority area over the period from 2011 to 2026. The Plan has a significant influence on developments for the whole area as well as individual communities by providing guidance on matters such as the location of new houses, employment opportunities, leisure facilities and community facilities.

4.1.5 Eryri Local Development Plan 2016 - 2031[9]

The plan includes strategic policies and development policies which will deliver the long-term spatial vision for the future of Snowdonia National Park.

Cyngor Gwynedd Council and Snowdonia National Park Authority have reviewed their Local Development Plans and Review Reports have been published, which outline the need for a full review of the Local Development Plans. That meant the need to prepare new Local Development Plans. Cyngor Gwynedd has prepared a Delivery Agreement for Gwynedd's new Local Development Plan to be agreed with Welsh Government in the spring of 2024, and with a timetable of 3.5 years for the preparation of the plan as stated in the Development Plan Manual meaning that the new Plan should be adopted by the end of 2027.

With regard to flood and coastal erosion risk the replacement plans, including the Strategic Flood Consequence Assessment process, will be guided by the updated version of TAN15 (Development, flooding and coastal erosion) scheduled for publication in 2023, along with the information contained within the Flood Map for Planning. Any location specific actions contained within this Local Strategy or its accompanying works programmes will also be

[8] https://www.gwynedd.llyw.cymru/en/Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Joint-Local-Development-Plan/Joint-Local-Development-Plan.aspx

[9] https://planning.snowdonia.gov.wales/policy/local-development-plan/?_gl=1*1k2umpy*_ga*NDQ3NjkyODI1LjE3MDMxNTcyMzY.*_ga_2SRYFPWD50*MTcwNjE5MzcxNC42LjEuMTcwNjE5MzcyMS4wLjAuMA..

considered during preparation of the replacement plans, so that decisions relating to flood and coastal erosion risks are based on the most up to date information.

4.1.6 West of Wales Shoreline Management Plan 2[10]

A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. The West of Wales SMP2 was prepared on behalf of the Cardigan Bay (now West of Wales) Coastal Group in 2009 and was subsequently adopted by the Council as a policy document in 2013.

The plan provides broad scale assessment of coastal risks, as well as quite specific advice to operating authorities in their management of defences, therefore the plan has a strong alignment with this Local Strategy and the way in which Cyngor Gwynedd is to manage their coastal structures into the future which ultimately dictates how flood and erosion risks will be managed for our coastal communities.

The West Wales shoreline is divided up into 309 short sections called 'Policy Units'. For each section, one of the following three policy options is recommended:

Table 4.1: Shoreline Management Policies as described in SMP2

No active intervention (NAI)	No investment in the construction of new defences, maintenance or upgrade of existing defences
Hold the line (HTL)	Keeping the line of defence in approximately the same location as it is now. Existing defences are maintained, replaced or upgraded along their current alignment. This may or may not include upgrades to counter climate change and sea level rise
Managed realignment (MR)	Landward retreat of defences, giving up some land to the sea to form a more sustainable defence in the long-term

To aid delivery of SMP2 policies an Action Plan was also published which recommends which actions should be taken at coastal areas to instigate a movement towards a more sustainable management approach and assigns a lead authority to each action. Coastal studies or schemes that derive from this Local Strategy will coincide with the policies for future coastal management identified within SMP2 and will link directly to actions assigned to Cyngor Gwynedd within the SMP2 Action Plan.

The method of identifying and prioritising FCERM improvement projects is described further in section 14.

Further information on the SMP2 and the SMP2 Action Plan can be found of the West of Wales Coastal Group website.

[10] https://www.westofwalescoastalgroup.wales/page/home-page

4.2 Coordination with others

Cyngor Gwynedd are committed to working in partnership with RMAs, other stakeholders and local communities to achieve the flood risk objectives and actions in this Local Strategy.

Cyngor Gwynedd is adopting a catchment-based approach to managing flood risk, which promotes collaborative working and forward planning with other stakeholders to reduce risk of flooding whilst also delivering wider social, economic and environmental benefits. Exploring opportunities for catchment-scale interventions, including the implementation of Sustainable Urban Drainage Schemes (SuDS) and Natural Flood Management (NFM) measures, will form a large part of our commitment to working closely with partner organisations.

The Local Strategy has been developed and will be implemented in coordination with the strategic planning processes and plans of other RMAs. A summary of which is provided below:

4.2.1 Flood Risk Management Plan for Wales (FRMP)[11]

The FRMP has been prepared by NRW to outline their priorities and subsequent actions for managing the risk of flooding in Wales. This FRMP covers flooding from rivers, reservoirs and the sea. It does not include flooding from surface water and smaller watercourses, for which LLFAs have powers and take the lead. This Local Strategy has been developed to complement the measures included within the FRMP, in particular the North West Wales Place section of the plan. As such Cyngor Gwynedd will work alongside our colleagues at NRW to ensure that the relevant authority takes the lead in managing flood and coastal erosion risks at various locations across Gwynedd, and to identify areas for collaborative working in the future.

Gwynedd specific schemes and studies contained in the FRMP are listed according to in Appendices A and B, to demonstrate the efforts made by different organisations to manage FCERM risks in each area.

4.2.2 Western Wales River Basin Management Plan (RBMP)[12] *2021-2027*

The production of the West Wales RBMP by NRW is a requirement of the *Water Framework Directive 2000* (WFD). The management plan outlines the measures that NRW plan to implement to meet the requirements of the Directive which involve improving water quality, promoting sustainable use of water as a natural resource, and habitats and species conservation. In the development of this Local Strategy's objectives and actions, Cyngor

[11] https://naturalresources.wales/evidence-and-data/research-and-reports/flooding-reports-evidence-and-data/flood-risk-management-plans/?lang=en

[12] https://naturalresources.wales/evidence-and-data/research-and-reports/water-reports/river-basin-management-plans/river-basin-management-plans-2021-2027/?lang=en

Gwynedd have considered how it can assist, and benefit from, the delivery of the WFD objectives, particularly through the use of catchment scale interventions.

4.2.3 Drainage and Wastewater Management Plan (DWMP)[13]

The Drainage and Wastewater Management Plan (DWMP) is a long-term planning study by DCWW that looks at drainage and sewerage needs over the next 25 years as a minimum. The Plan looks at future trends and embeds an approach of working together with others to investigate and identify options for the sustainable management of DCWW's wastewater services. Cyngor Gwynedd as LLFA will continue to liaise with DCWW regarding opportunities to manage surface water flood risk for our communities as part of the Plan delivery and will welcome opportunities for partnership working.

[13] https://www.dwrcymru.com/en/our-services/wastewater/drainage-and-wastewater-management-plan

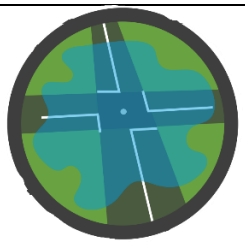
5. Roles and responsibilities for managing flood risk in our area

5.1 Sources of flooding and key points of contact

The term 'flood and coastal erosion risk' covers all flooding from rivers, the sea, reservoirs, ordinary watercourses, groundwater and surface water, as well as coastal erosion. Figure 5.1 below summarises the different types of risks and the key points of contact in each case, with the specific role of different RMAs discussed further in section 5.2.

Table 5.1: Types of risks & who you should contact

	**River flooding (fluvial)** tends to follow sustained rainfall resulting in high river levels and river banks being breached, or defences overtopped. It can also be caused by blockages where the river or stream flows within or beneath a structure such as a bridge or culvert. Contact **CG** as **LLFA** for flooding associated with **Ordinary Watercourses** Contact **NRW** for flooding associated with **Main Rivers**
	**Surface water flooding (pluvial)** happens when rainfall saturates the ground and drainage systems and excess water cannot drain away. Whilst more common in urban areas, it also affects rural communities, hitting transport, agriculture and the local economy. It can occur at any time of year: whilst winter sees more rain coming from Atlantic weather systems, the summer months bring an increased risk of flash flooding. Contact **CG** as **LLFA**
	**Coastal flooding** usually occurs when high tides combine with severe weather resulting in coastal or estuarine communities being flooded. A combination of significantly high tides, high on-shore winds and low atmospheric pressure can result in increase in tide level known as storm surge. Contact **NRW**
	**Coastal erosion** is defined as the wearing away of land by wave action, tidal currents, wave currents, drainage, weathering or high winds. Contact **CG** or **NRW** as **Coastal Protection Authorities**
	**Sewer flooding** is often caused by excess surface water entering the drainage network and exceeding the capacity of the sewer or failure of a sewer due to collapse or debris build up. During sewer flooding both foul and surface water can occur. Contact **DCWW** as the **Water and Sewerage Undertaker**

	**Flooding from Roads** occurs when the volume of rainwater does not drain away through existing drainage systems. Contact the **North and Mid Wales Trunk Road Agency** for flooding from **trunk roads**. Contact **CG** as the **Highway Authority** for flooding from other roads

5.2 Risk Management Authorities and their functions

As suggested above FCERM in Wales involves a number of organisations, including 28 RMAs which include NRW, the 22 Local Authorities, water companies, and the Welsh Government. Each RMA is required to fulfil a number of statutory duties, as defined under the *FWMA 2010*. In addition to these statutory duties, the Act sets out a range of permissive powers for RMAs, enabling them to undertake defined activities if they so wish.

The basic responsibilities of RMAs and key stakeholders in Wales are described in further detail below.

Welsh Government

Welsh Ministers set strategic direction and have overall responsibility for flooding and coastal erosion policy in Wales. As part of that role, the Welsh Government produces and publishes the National Strategy and ensures compliance and implementation of measures to achieve its objectives. It is responsible for FCERM legislation through powers under the *Government of Wales Act*. The Welsh Government manages the FCERM Programmes, including allocating budget to RMAs, appraising Local Authority schemes, and developing a programme of investment (see section 13).

Natural Resources Wales

Under the *FWMA 2010*, Natural Resources Wales is responsible for managing the risks of flooding from main rivers and the sea, and for regulating the safety of reservoirs. In addition, NRW also have a wider oversight role for all flood and coastal erosion risk management in Wales.

The oversight role is integral to the delivery of national policy on flooding and coastal erosion risk management and has been taken forward to ensure that Natural Resources Wales has the remit to support the Welsh Government across the full range of flood and coastal erosion risks affecting Wales. As part of their oversight role, Natural Resources Wales will lead on the provision of technical advice and support to other RMAs. They will also lead on national initiatives such as Flood Awareness Wales, the national raising awareness program, and be the single point of contact for enquiries and information on flood risk, via their Flood Line warning service. The *FWMA 2010* places a number of statutory duties on Natural Resources Wales including:

- Co-operating with other authorities, including sharing data;
- Reporting to the Minister on flood and coastal erosion risk in Wales including the application of the National Strategy; and
- The establishment of Regional Flood and Coastal Committees.

NRW carries out all Internal Drainage Board (IDB) functions in Wales and hence can also manage risks from ordinary watercourses in those drainage districts. Internal Drainage Districts within Gwynedd include Glaslyn and Penseflog, Llanfrothen, Dwyryd, Harlech and Maentwrog, Ardudwy Marches, Mawddach and Wnion (E and W), Dysynni Valley and Tywyn.

NRW are also afforded permissive powers as a coastal erosion risk management authority under the *Coastal Protection Act 1949*[14].

Cyngor Gwynedd

Further information on how the Council manages flood risk is provided in section 6 below.

Cyngor Gwynedd as LLFA are responsible for managing flood risk from surface water and ground water, or from ordinary watercourses. LLFAs have the following duties under the *Flood and Water Management Act 2010*:

- Prepare and maintain a Local Flood Risk Management Strategy for their areas, coordinating views and activity with other local bodies and communities through public consultation and scrutiny, and delivery planning. They must consult RMAs and the public about their strategy;
- Investigate significant local flooding incidents and publish the results of such investigations;
- Maintain a register of structures and features likely to affect flood risk
- Co-operate with other RMAs.
- Under Schedule 3 to the 2010 Act, Cyngor Gwynedd as the SuDS Approving Body[15] (the SAB) have a duty to approve SuDS (Sustainable Drainage Systems) which follow the national statutory standards. With the exception of single-curtilage sites, the SAB also has a duty to adopt such systems.

[14] https://www.legislation.gov.uk/ukpga/Geo6/12-13-14/74

[15] https://www.gwynedd.llyw.cymru/en/Residents/Planning-and-building-control/Planning/Sustainable-Drainage-Systems.aspx

Cyngor Gwynedd as LLFA has powers under the *Land Drainage Act 1991*[16], which allow them to:

- Manage flood risk from ordinary watercourses.
- Manage flood risk from surface water or groundwater.
- Monitor, maintain, operate or repair works to manage flood risk from sea.
- All such works must be in accordance with this Local Flood Risk Management Strategy.

Coastal Local Authorities such as Cyngor Gwynedd are also designated as a Coastal Erosion RMA under the *Coast Protection Act 1949*, which gives them powers to protect the land against erosion or encroachment by the sea. Under the Act, the Council can do works to protect against coastal erosion and defend against sea flooding where they are best placed to do so and with approval from NRW. This is a power but not a duty. Cyngor Gwynedd are responsible for maintaining a total of 229 coastal erosion assets across 21km of the coastline, many of which are historic structure situated along our promenades and harbours, and some of which also provide a level of protection from coastal flooding.

The role of LLFA and Coastal Erosion RMA is discharged on behalf of Cyngor Gwynedd by the Water and Environment Unit within YGC (Highways, Engineering and YGC Department).

Cyngor Gwynedd have other important responsibilities relating to flood risk management:

- Cyngor Gwynedd are responsible for drainage of local highways under the *Highways Act, s100*[17], whilst the Welsh Government has a responsibility for trunk road drainage.
- Under the *Civil Contingencies Act 2004*[18], Cyngor Gwynedd are Category 1 responders giving them duties to:
    - maintain arrangements to warn the public, and to provide information and advice to the public, if an emergency is likely to occur or has occurred
    - play a lead role in emergency planning and recovery after a flood event and must have plans to respond to emergencies,
- Cyngor Gwynedd (along with Snowdonia National Park Authority) act as local planning authority and in doing so must have regard to potential risks associated with flooding and coastal erosion when developing local policies and determining applications for development. Specialist advice is provided by NRW and the Water and Environment Unit within YGC.

[16] https://www.legislation.gov.uk/ukpga/1991/59/contents

[17] https://www.legislation.gov.uk/ukpga/1980/66/data.pdf

[18] https://www.legislation.gov.uk/ukpga/2004/36/contents

Dŵr Cymru Welsh Water

Dŵr Cymru Welsh Water (DCWW) is the regional water and sewerage treatment company serving Gwynedd. Water and sewerage companies are responsible not only for the provision of water, but also for making appropriate arrangements for the drainage of foul water, the treatment of waste, surface water sewers and combined sewers. They have primary responsibility for floods from water and sewerage systems, which can include sewer flooding, burst pipes or water mains or floods caused by system failures.

Water companies, when exercising their flood risk management functions in relation to an area within Wales, must have regard to the relevant Local Strategies and any associated guidance. The *Flood and Water Management Act 2010* places a number of statutory duties on water and sewerage companies including:

- a duty to act consistently with the National Strategy;
- a duty to have regard to the content of the relevant Local Strategy; and
- co-operate with other Authorities, including sharing data.

Water and sewerage companies often hold valuable information which could greatly aid the understanding of flood risks faced by communities across Wales. They are required to maintain a register of properties and areas that have suffered internal flooding, the DG5 register, but may have access to significantly greater information from incident records, previous investigations and hydraulic modelling.

5.3 Other responsible partners

Utility and Infrastructure Providers

Utility and infrastructure providers such as Network Rail, energy companies and telecommunication companies are not RMAs. However, they may have assets such as culverts, information about which needs to be shared with flood RMAs. They already maintain plans for the future development and maintenance of the services they provide and it is important that they factor in flood risk management issues into this planning process so that their assets and systems are resilient to flood and coastal risks and that the required level of service can be maintained.

Riparian Owners

Landowners, householders and businesses whose property is adjacent to a river or a stream or a ditch are likely to be riparian owners, owning the land up to the centre of the watercourse with recognised legal rights and responsibilities.

Riparian owners have a right to protect their property from flooding and erosion as long as they do not exacerbate the situation for others elsewhere but in most cases will need to discuss the method of doing this with NRW or Cyngor Gwynedd. They also have responsibility for maintaining the bed and banks of the watercourse and ensuring there is no obstruction,

diversion or pollution to the flow of the watercourse. For further information regarding riparian rights and responsibilities see NRW's pamphlet *A guide to your rights and responsibilities of riverside ownership in Wales*[19]

Property Owners and Residents

Ultimately it is the responsibility of householders and businesses to look after their home or business, and this extends to protection of the property from flooding.

While in some circumstances other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities. Consequently, it is important that householders whose homes are at risk of flooding, take steps to ensure that their house is protected. Information and advice intended for owners of properties at risk of flooding is widely available, including the following sources:

The *National Flood Forum* website:

https://nationalfloodforum.org.uk/about-flooding/reducing-your-risk/

Natural Resources Wales website*:*

https://naturalresources.wales/flooding/?lang=en

Cyngor Gwynedd website:

https://www.gwynedd.llyw.cymru/en/Residents/Parking-roads-and-travel/Flooding/Personal-flood-preparedness-and-resilience.aspx

[19] https://naturalresources.wales/media/680422/living-on-the-edge-final-jan-2017.pdf

6. How we manage flooding in our area

Cyngor Gwynedd manage the risk of flooding within its communities through a range of different methods, these are described in Table 6.1 below under the headings of Maintain, Plan, Respond, Regulate, Monitor and Inform.

Table 6.1: Methods adopted by Cyngor Gwynedd to manage risk of flooding and coastal erosion

Maintain	
Cyngor Gwynedd are responsible for a variety of FCERM structures such as flood walls and overflow systems on rivers, and coastal walls and groyne fields. The Council retain a register of all FCERM assets within the Council's ownership and/or responsibility, which contains key information regarding the construction and function of each asset. The register is supported by a mapping system to display the location and extents of our assets and is updated to incorporate any changes in asset information as a result of improvement works.	*YGC Water and Environment Service (as LLFA)*
The condition of the Council's FCERM assets is assessed on a regular basis using industry standard techniques, for assurance that they remain in adequate condition to provide the desired standard of defence, and to identify any defects which could compromise integrity in the future. Routine inspections are supplemented by post-storm condition inspections. Additionally, a prioritised routine inspection schedule of the Council's flood risk management assets ensures that they remain unaffected by in-channel debris which could lead to asset failure and potential flooding incidents. Some assets are served by telemetry devices which enable asset status to be inspected remotely, and over time our aim is to develop our sensor network to incorporate more of our assets, and also to provide an alert to our staff when accumulation of debris may lead to asset failure (see Action 2.4A).	*YGC Water and Environment Service (as LLFA)*
Responsibility for all bridges and culverts on the local highway network which are inspected on a regular basis to ensure that they remain functional and do not pose a flood risk. The Council also maintain all highway gulley's and drains on a cyclic programme and will undertake repairs or improvements as and when condition dictates in accordance with the Council's Highway Maintenance manual.	*GC Highways Department*
Plan	
Cyngor Gwynedd deliver FCERM improvement schemes to minimise the risk of local flooding or coastal erosion to our most vulnerable communities. Capital support for schemes of this kind is offered through the Welsh Government's FCERM Programme (see section 13). Application for Welsh Government funding is supported by business cases which demonstrate the level of flood and/or coastal erosion risk and provide clear and sufficient information to demonstrate that the preferred improvement option provides a sustainable, proportionate and economically viable solution to manage risk.	*YGC Water and Environment Service (as LLFA)*

Further information of FCERM schemes delivered by Cyngor Gwynedd can be found in section 7.	
By acknowledging that not all households can be protected from flooding through capital improvement schemes the Council also offer advice to concerned residents on measures that can be taken to reduce flood risk to their properties.	*YGC Water and Environment Service*
Respond	
During a flood event Cyngor Gwynedd will take all reasonable measures to ensure that their network of county roads remain passable for vehicles, although storm conditions, extent of flooding and availability of resources may dictate that some roads will need to be closed to ensure safety of the public.	*GC Highways Department*
During severe rainfall events the Council will make every effort to distribute sandbags to residents that are at serious risk of flooding, although **residents are strongly advised to source their own flood risk management equipment when a known flood risk exists** as the ability of the Council to share sandbags could be severely compromised during periods of adverse weather when the priority is to keep the highway network open for emergency services.	*GC Highways Department*
Under the guidance of the North Wales Resilience Forum, and the measures included in the Multi-Agency Flood Plan, the Council will take appropriate action to support the emergency services and those engaged in emergency response; will assist with evacuation by arranging transportation; set up and manage rest centre arrangements and carry out clear up work in affected communities following flooding.	*Various Council Departments*
On becoming aware that a property has experienced internal flooding following severe rainfall or tidal events Cyngor Gwynedd undertake investigations to determine source and cause of flooding. When flooding is from a source for which the Council is not RMA (see section 5), information for the investigation may be obtained through consultation with a partner authority (usually NRW or DCWW). Post-event flood investigations are a vital tool in establishing source and cause of flooding to our residents. Investigations allow us to build up an understanding of flood risk to our communities and also provide us with an opportunity to advice our most at-risk residents of any methods to manage the risk of flooding in the future	*YGC Water and Environment Unit (as LLFA)*
Regulate	
Cyngor Gwynedd (along with Snowdonia National Park Authority) act as local planning authority and in doing so must have regard to potential risks associated with flooding and coastal erosion when developing local policies and determining applications for development. The flood and coastal erosion risk associated with all planning applications received by Cyngor Gwynedd are assessed prior to determination, in accordance with the guidance provided in TAN15 (Development, flooding and coastal erosion), scheduled to be updated in 2023. Cyngor Gwynedd consult with colleagues at NRW and YGC Water	*GC Planning Department*

and Environment Unit (as LLFA) on all proposed developments for which flooding and/or coastal erosion is a material consideration.	
Cyngor Gwynedd as the SAB have a duty to approve SuDS (Sustainable Drainage Systems) which follow the national statutory standards. SAB approval is required for any development with a footprint greater that 100m^2. Apart from single-curtilage sites, the SAB also has a duty to adopt such drainage systems. In accordance with Schedule 3 of the Flood and Water Management Act Cyngor Gwynedd deliver the role of SuDS (Sustainable Drainage Systems) Approval Body for all qualifying developments. This ensures that all new developments with drainage implications meet the national SuDS standards to reduce the risk of surface water flooding and realise all other associated benefits (ecological, amenity, water quality). Over time the SAB will become responsible for maintaining more SuDS systems and therefore existing asset management systems will be expanded to include all elements adopted by the Council.	*YGC Water and Environment Unit (as LLFA)*
Under section 23 of the Land Drainage Act Cyngor Gwynedd are responsible for authorising consent to individuals, developers or authorities who wish to carry out changes to an ordinary watercourse that may affect flow or flood risk. Cyngor Gwynedd are provided further powers to regulate activities on or surrounding ordinary watercourses through the Land Drainage (Cyngor Gwynedd) Bylaws. A copy of the bylaws and the Council's position statement can be found on our website[20]	*YGC Water and Environment Unit (as LLFA)*
In many instances the partial or full blockage of a watercourse can result in flooding to land or in the worst-case properties, businesses and/or critical infrastructure. Where Cyngor Gwynedd have been made aware of a potential blockage or obstruction to an ordinary watercourse we will look to work with all parties involved to help resolve the problem before considering the use of permissive enforcement powers afforded under the Land Drainage Act.	*YGC Water and Environment Unit (as LLFA)*
Monitor	
The Welsh Coastal Monitoring Centre is funded by the Welsh Government and delivers a standard, coastal monitoring programme on behalf of Welsh RMAs to provide the evidence necessary for FCERM decisions. Cyngor Gwynedd monitor beach levels at critical locations along the coastline as part of the national programme. This programme is supplemented by some additional local surveys and also post-storm surveys to identify any large fluctuations in beach levels that may pose immediate risks to coastal assets.	*YGC Water and Environment Unit*

[20] https://www.gwynedd.llyw.cymru/en/Residents/Parking-roads-and-travel/Flooding/Ordinary-watercourses-land-drainage-consent.aspx

7. Flood and Coastal Erosion Risk Management Schemes

Over recent years, and since publication of the previous Strategy, Cyngor Gwynedd in their role as LLFA (and Coastal Erosion RMA) have carried out works to reduce the risk of flooding and coastal erosion to many communities across Gwynedd. Some of the most notable schemes are described below. These improvements have been completed using grant in aid from Welsh Government FCERM programmes described in section 13 of this Local Strategy.

In delivering this Local Strategy the Council hope to complete similar flood risk management improvement into the future which will safeguard more of our residents from the risks of flooding and coastal erosion.

Tywyn Coastal Defence Scheme	***2011***

Background

Tywyn coastal frontage has suffered significant storm damage since it was first constructed in the 1930s. Over years the width of the beach had decreased and the beach level had dropped significantly. Erosion of the beach, combined with deterioration of the groynes contributed to the undermining of the sea wall and an increase in flooding. Cyngor Gwynedd is responsible for all coastal structures on the Tywyn frontage.

Scheme Description

The completed scheme included an offshore breakwater and new rock groynes to stabilize beach levels. Refurbishment of the sea wall, restoration of the stepped revetment and new shorter timber groynes were now possible, extending the design life of the flood defence structures and substantially improving access to the beach.

Not only was the scheme designed to reduce the risk of flooding for 78 homes and various businesses, but it has transformed the beach from its dilapidated condition to a fully improved amenity with greater access to the beach, which will be a boost to tourism, business prospects and regeneration opportunities.

Tal-y-Bont Flood Alleviation	***2016***

Background

Extensive flooding history of flooding existed at Talybont near Bangor. The most notable events occured in 1987, November 2012 and most recently Boxing Day 2016. The flooding affected up to 30 properties and closed the A55 for 12 hours.

Scheme Description

The scheme consisted of 700m of new cut off channel/culvert across farmland to the north of Tal-y-Bont and the A55 trunk road to intercept catchment flows which historically flow under the A55 and through the village. 3 large concrete structures were installed to aid the transition of flow from watercourse to culvert, open channel then outfall to the River Ogwen directly upstream of the A55 Ogwen Viaduct. Sensors were installed to inform the Council of potential blockages at the new intake structure which could compromise performance of the scheme during heavy rainfall events.

Borth Y Gest Flood Alleviation Scheme	***2018***

Background

Situated on the northern side of the Glaslyn estuary Borth y Gest has suffered a number of coastal flooding events. The floods were a result of the sea breaching the footpath on the north side of the frontage and flowing along the highway and into both residential and commercial properties.

Scheme Description

The scheme consists of ~170m new sea walls to join onto the main wall that has existed in the bay since the 1800s, thereby providing flood protection from one end of the bay to the other. The new wall was designed to be able to withstand hydrostatic pressures from the sea and wave action.

The walls were constructed from reinforced concrete clad in local slate (from Blaenau Ffestiniog) and were cast in situ using bespoke formwork for each section of the wall. The walls also included two flood gates at the slipway and pedestrian access, and a number of drainage holes with non-return valves through the wall to allow any surface water to be drained away.

In combination with the wall extensions to protect against tidal flooding, a non-return gate was also installed on the inlet of the Afon Llety watercourse. This was to provide protection to the village from tidal waters backing up through the culvert and posing a flooding risk.

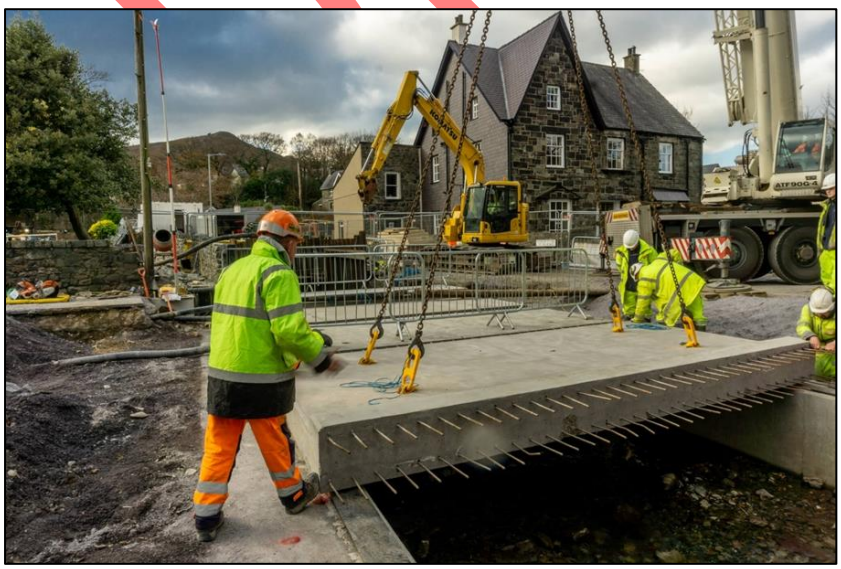
Pont Ddol – Llanberis Flood Alleviation Scheme	***2019***

Background

The Afon Goch flows through the centre of village and discharges into Llyn Padarn. Due to the steepness of catchment area, the river responds quickly to rainfall, and the river can rise rapidly. The village has flooded in the past, with the most recent flooding in 2012 affecting 81 properties near the centre of the village. This was caused by a particularly heavy rainfall and a blockage at Pont Ddol, with the river breaking its banks upstream as a result.

Scheme Description

The old Pont Ddol structure was an old masonry arch bridge, with two reinforced concrete slab extensions to provide footways for the high street. The bridge opening had a cross sectional area of 1.8m^2 and was prone to blockage from debris washed downstream. A replacement bridge was designed which had a greater span, thinner deck, and removed the arch section. This resulted in an increased opening of nearly 6m^2, resulting in improved conveyance in a flood, and reduced water levels upstream.



Beach Road, Y Felinheli Flood Alleviation Scheme	***2020***

Background

All properties along Beach Road have views towards the Menai Strait and Anglesey, with the grassed area between the road and the strait being used for community activities, including a playground, seating and hosting the annual Felinheli Festival. Beach Road is also the route of the Wales Coastal Footpath as well as Systrans's Cardiff to Holyhead cycle route 8. Properties along Beach Road have been subject to periodic flooding despite a historic land-reclamation programme from the mid-1900s as well as the addition of a new sea wall in the 1970s. On analysis , Cyngor Gwynedd identified Beach Road as being at significant tidal flood risk, with that risk expected to increase substantially over the coming century due to climate change induced sea level rise. Of the 65 homes and businesses along Beach Road, 58 were identified as being at flood risk in a 0.5% probability flood event (1 in 200 year return period).

Scheme Description

The design brief for a scheme to reduce the flood risk to Beach Road identified that, as well as providing a high standard of protection for as many properties as possible, conserving and enhancing the area's natural beauty and its use as a recreational amenity area were critical. The preferred option – a sea wall – therefore needed to be perform its function of preventing ingress of tidal water whilst at the same time not detracting from the natural beauty of the location and ensuring that access to the recreational area is not compromised.

The preferred option involved a new set-back sea wall along a 250m length of the frontage, positioned directly between the open grassed area and Beach Road itself. The wall was designed to be in-keeping with the local setting and includes 6 tidal gates to maintain access towards the frontage, which form part of the defence and have been specifically designed to ensure longevity in a marine environment. The gates are operated by a local group of volunteer Flood Wardens.

Rhostryfan Fluvial Flood Alleviation Scheme	***2021***

Background

Rhostryfan has suffered a number of flood events since the early 1980s, most recently in 2012. The River Wyled flows from the upper catchment through the village through a significantly altered river channel. The channel has high stone walls, a number of bridge crossings and a 30m length culvert. These structures were pinch points along the river and were prone to blockage due to the size restrictions below the structures. At the mouth of the culvert there was a debris screen which was prone to blockage from woody debris and gravel washed down from the upper catchments. Combined with significant structural defects within the culvert, which was made from large stones with a slate sofit, the culvert and screen posed a significant risk of flooding to the village.

Scheme Description

The scheme consisted of replacement of a vehicle bridge, a foot bridge, removal of other informal crossing over the river, river bank repairs, upgrade of the culvert and removal of the debris screen. The implementation of the scheme would reduce the risk of river flooding to 38 residential properties up to an including the 1 in 100 year event with an allowance for climate change. The culvert was replaced with 15 box culvert units under the square in the village which meant that the debris screen could be removed. The culvert replacement increased the capacity from the old culvert by 4 times. The two bridges were replaced with precast bridges and lifted into place. All excavated material was taken to a local quarry for recycling and was used to repair a local football clubs car parking area. The scheme took 12 months to complete with a final cost of £1.9M.

Aberdyfi Wharf	***2023***

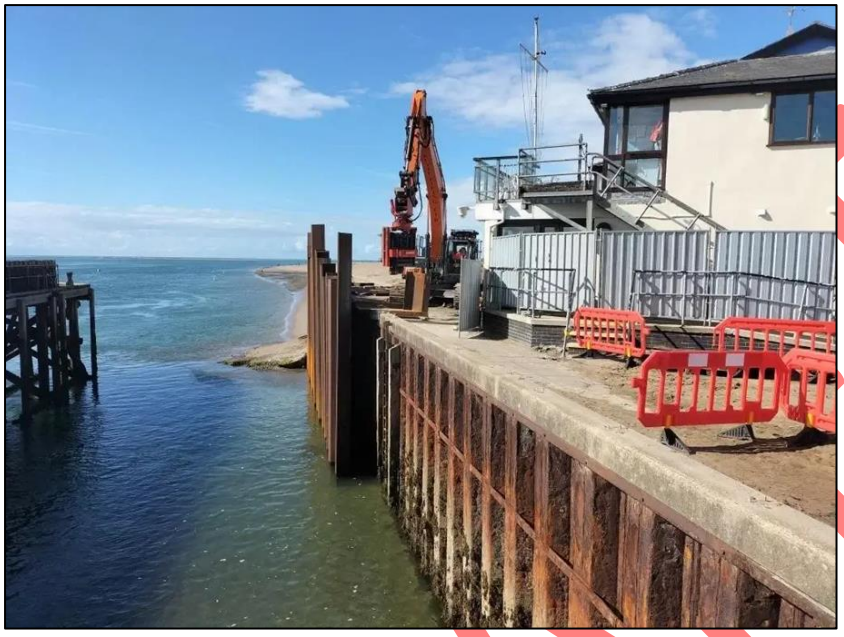
Background

The quay wall in Aberdyfi is located in the heart of the village, the structure on the wharf is crucial to a wide range of harbour activities which contribute significantly to the local economy. Over the years, the state of steel sheet piles steel has been deteriorating, and the situation was constantly monitored by the Coast Protection Unit. As part of the monitoring arrangement, a report was commissioned in October 2012, this report stated that the structure was nearing the end of its life and a new quay wall was needed in the next few years.

Scheme Description

The project involved the installation of a new sheet pile line in front of the existing piles that had deteriorated significantly. The anchor ties were extended to support the new piles. The top of the existing piles including the capping beam was removed and the new wharf surfacing cast over the top of the original pile line.

The new pile face incorporated inset stairs to complement traditional ladder access down the piles to allow safer access for users.



Wnion catchment Natural Flood Management	***2022***

Background

Gwynedd Council and Snowdonia National Park Authority collaborated on a project aimed at introducing NFM measures within an area of the Afon Wnion catchment near Rhydymain. The project made use of Welsh Government funding with the objectives of reducing peak surface water run-off and introducing multiple ecological benefits. The project ran from 2020 to 2022. The project was set up collaboratively to make best use of expertise. SNPA had a prominent role in the project as main liaison for landowners due to close relationship with the industry, woodlands and hedges expertise as well as providing ecological advice.

Scheme Description

Natural Flood management is a term used to describe works that seeks to alleviate peak waterflows through natural controls to prevent flooding downstream. Works include but not exclusive – planting of trees and hedges, creation of ponds for attenuation, sediment traps and blocking of drainage ditches on uplands (see photos below).

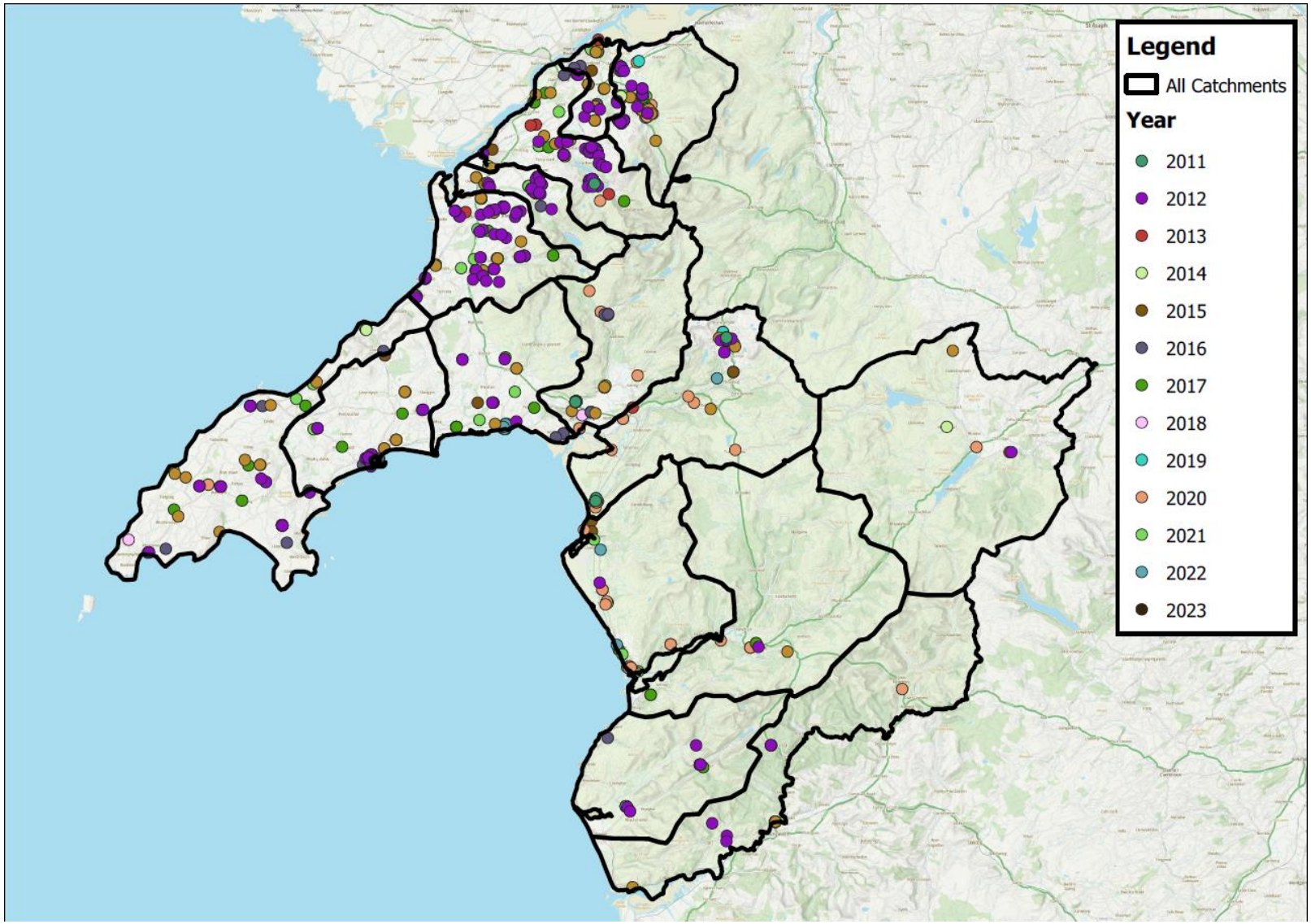
8. Historic flooding in Gwynedd

Since adopting the role of LLFA in 2010 Cyngor Gwynedd have a duty to investigate incidents of flooding to property, and as such have a comprehensive record of flooding incidents that have been bought to our attention from this date. Historic flooding problems exist from different sources across all areas of Gwynedd, with rainfall patterns and local conditions dictating which areas suffer most damage during any given storm event. Table 8.1 summarises the number of properties that have flooded within Gwynedd during each year from 2010 and also shows which areas have suffered multiple property flooding during this period. Figure 8.1 shows the distribution of known historic flood incidents. Most of the incidents on record are associated with fluvial (mainly ordinary watercourse) or surface water flooding sources. Further details regarding the cause and nature of these flooding incidents are held by the Council.

Table 8.1: Flood incident records held by Cyngor Gwynedd between 2011-2023

Year	Total properties flooded	Areas mainly affected	
2011	11	Tremadog (5)	
2012	357	Llanberis (81) Pwllheli (35) Deiniolen (35) Mynydd Llandygai (17) Talybont (17)	Llanllyfni (11) Nantlle (10) Rhostryfan (8) Groeslon (7) Dinorwig (6)
2013	12	No obvious clusters	
2014	20	Trefor (11) Pwllheli (6)	
2015	111	Bontnewydd (9) Tremadog (9)	
2016	34	No obvious clusters	
2017	56	No obvious clusters	
2018	4	No obvious clusters	
2019	13	Pwllheli (6)	
2020	102	Beddgelert (47) Bethesda (13)	
2021	46	Barmouth (7)	
2022	38	Criccieth (26)	
2023	19	No obvious clusters	

Figure 8.1: Distribution of flood incident records held by Cyngor Gwynedd between 2011-2023



9. What is the risk of flooding in Gwynedd?

9.1 How we assess flood and coastal erosion risk

This section will provide information regarding the number of residential properties, non-residential properties and essential services considered to be at risk from flooding in Gwynedd. Not all properties or receptors identified as being at risk will have experienced flooding in the past, however they are located within a specific band of flood risk according to the national-scale flood modelling exercises described below.

Table 9.1 below summarizes the type of receptors that form part of the assessment, which we feel best represent the severity of flood risk to our communities. Receptor data has been retrieved from the *National Receptor Dataset*[21] which is a spatial dataset of risk receptors primarily intended for use in FCERM.

Table 9.1: Type of receptors considered when establishing flood and coastal erosion risk across Gwynedd

Category	Receptor type
Residential	Dwelling House in Multiple Occupation Residential Institution
Essential services	Education Industrial (Recycling plant only) Medical Office (government) Utility Emergency rescue service
Non-residential	Agriculture Community services Hotels Inustrial (except recycling plant) Lesiure Animal centers Office (except government) Retail Millitary Place of worship

As discuss in section 5 flooding can occur from several sources and different authorities are assigned as RMA according to the source of the risk. For the purpose of this Local Strategy, we intend to highlight the risk of flooding from all natural sources (i.e. excluding sewer, reservoir) regardless of leading RMA. Some receptors may well be susceptible to flooding from more than one source, but this can complicate explanations and data presentation, so flood risk sources have been divided into two broad categories:

[21] https://support.environment.data.gov.uk/space/DPK/15859733/How+Can+I+Get+A+Copy+Of+The+National+Receptors+Dataset+(NRD)%3F

- inland (watercourses and surface water)
- coastal

To identify areas and receptors at risk of flooding we have used information obtained from the national flood maps developed by NRW; these include the *Flood Risk Assessment of Wales* (FRAW[22]) map and also the *Flood Map for Planning* (FMfP[23]), both of which are considered as the most up to date high level flood risk assessment product available in Wales. Flood outlines were retrieved from these maps during January 2024.

The level of flood risk to any area, and subsequently to any receptor, is described as the likelihood or 'chance' of flooding in any year. There are three risk categories provided by FRAW that are summarised in Table 9.2 below. To consider future changes in flood risk across Gwynedd as a result of climate change we also incorporate an additional level of flood risk, which includes areas not considered to be at present day flood risk (up to 1 in 1000 or 0.1%) but are expected to face risk of flooding over the next century, mainly due to forecasted sea level rise.

Table 9.2: Flood risk categories used in our assessment

Level of flood risk	Likelihood of flooding
High	This area has a chance of flooding greater than 1 in 30 in any given year (annual probability of flooding 3.3%)
Medium	This area has a chance of flooding between 1 in 100 (1%) and 1 in 30 (3.3%) in any given year
Low	This area has a chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%) in any given year
Climate Change	Expected to be at risk of flooding due to climate change effects (mainly sea level rise)

Our assessment identifies the number of receptors within each flood risk band for a particular area but does not consider the depth or velocity of flood water to any receptor. Also, as we don't have information regarding floor heights or construction fabric of each receptor there is no way to determine at which flood depth they may become truly susceptible to ingress of flood water.

The risk assessment takes into account the effect of flood defences where information is available. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail.

[22] https://naturalresources.wales/flooding/check-your-flood-risk-on-a-map-flood-risk-assessment-wales-map/?lang=en

[23] https://naturalresources.wales/flooding/flood-map-for-planning-development-advice-map/?lang=cy

Properties at risk from coastal erosion (see Table 9.4) have been estimated using information from the National Coastal Erosion Risk Management (NCERM) maps, using erosion rates for the long-term scenario assuming no active intervention to protect the coastline and applying figures from the 'medium' confidence level estimates. Further information regarding the data displayed on the NCERM maps is contained on NRW's website[24].

9.2 Overview of flood risk in Gwynedd

This section provides an overview of inland and coastal flood risk across the whole of Gwynedd according to the assessment described above.

9.2.1 Inland flood risk in Gwynedd

Table 9.3 summarises the number of residential properties within various inland flood risk zones across Gwynedd and Figure 9.1 displays the geographic spread of these properties as a heatmap; for this map the transparency of each receptor has been adjusted according to level of flood risk, i.e. a cluster could represent an area with a high number of low risk receptors, or alternatively a relatively low number of high risk receptors.

Table 9.3: Summary of properties at risk of inland flooding across Gwynedd

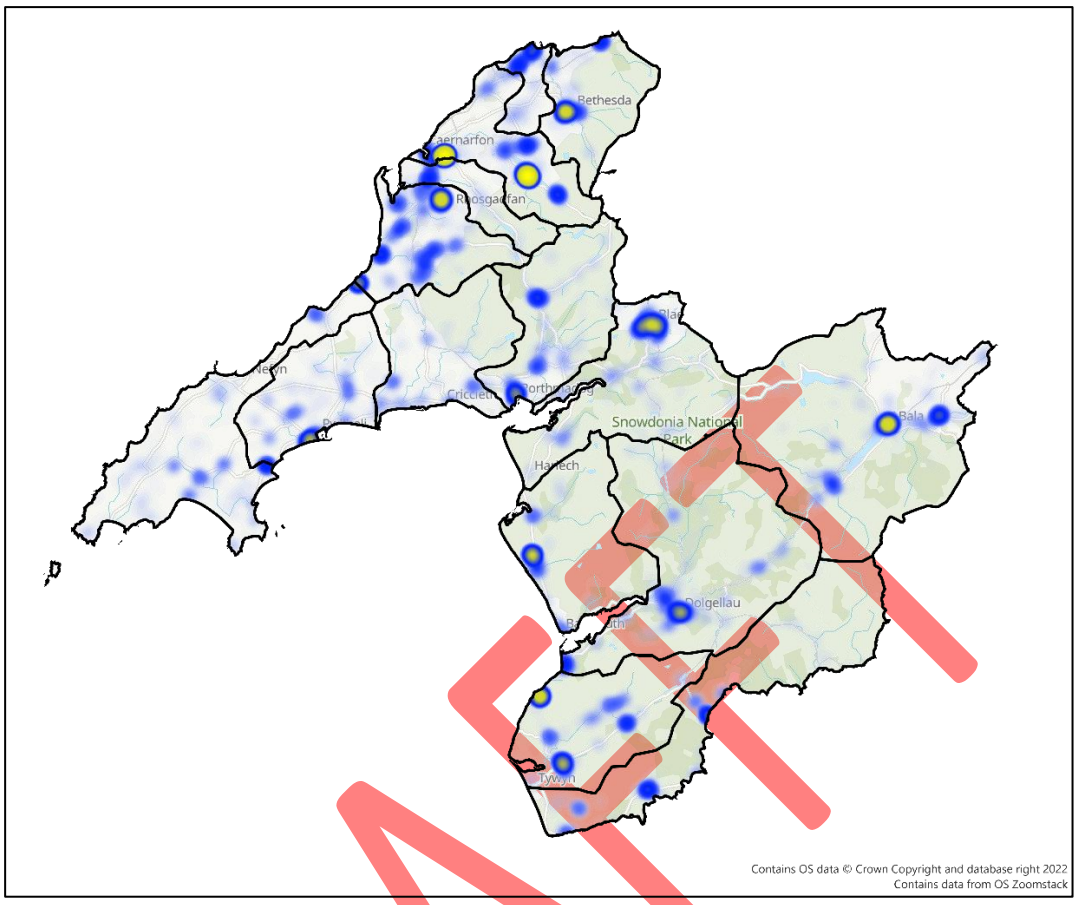
Number of properties at flood risk					***Number of Essential Services / Non-residential properties at flood risk***
Total	***High risk***	***Medium risk***	***Low risk***	***Very Low risk***	
7084	**1048**	**721**	**3489**	**1826**	**2023**

Figure 9.1 demonstrates that inland flood risk is generally spread across the whole of Gwynedd, except for the most mountainous and rural areas. As expected, the largest concentrations of flood risk receptors are located within the most populated areas, with obvious hotspots occurring at Caernarfon, Llanberis, Bethesda, Blaenau Ffestiniog and Y Bala; and in most of these cases the risk is linked to large watercourses flowing through or nearby populated areas. In general, areas where a high number of properties are at risk from a single source are afforded protection in the form of flood defences (e.g. Bala, Porthmadog, Pwllheli), however this is less often the case where source of flooding is more sporadic.

Table 9.3 suggests that the effects of climate change could be prominent in the future with an increase of 35% in the number of properties at risk from inland flooding; this in addition to an increase in the level of flood risk for present day receptors.

[24] https://naturalresources.wales/flooding/check-your-coastal-erosion-risk-national-coastal-erosion-risk-management-map/?lang=en

Figure 9.1: Geographic spread of properties at risk of inland flooding as a heatmap (description above)



9.2.2 Coastal flood risk in Gwynedd

Table 9.4 summarises the number of properties within various coastal flood risk zones across Gwynedd and similarly Figure 9.2 displays the geographic spread of these receptors as a heatmap, with a similar representation of different flood risk levels as described above.

According to Figure 9.2 the areas of highest coastal flood risk are centred around highly populated lowland locations, where large rivers such as the Dysynni, Mawddach, Dwyryd, Glaslyn, Rhyd-Hîr and the Erch enter Cardigan Bay. There are also areas of increased flood risk in the populated centres along the southern edge of the Menai Strait, including Caernarfon, Y Felinheli and Bangor. Most of the areas at risk of coastal flooding are defended from inundation, however the standard of protection afforded by defences will vary between different areas, and defences in general are not adequate to withstand increase in sea level expected because of climate change. Furthermore, future shoreline policies outlined in SMP2 may dictate that certain defences are gradually abandoned or moved in-land, which would change the flood risk profile of coastal areas over time as a result.

Figure 9.2: Geographic spread of properties at risk of coastal flooding as a heatmap

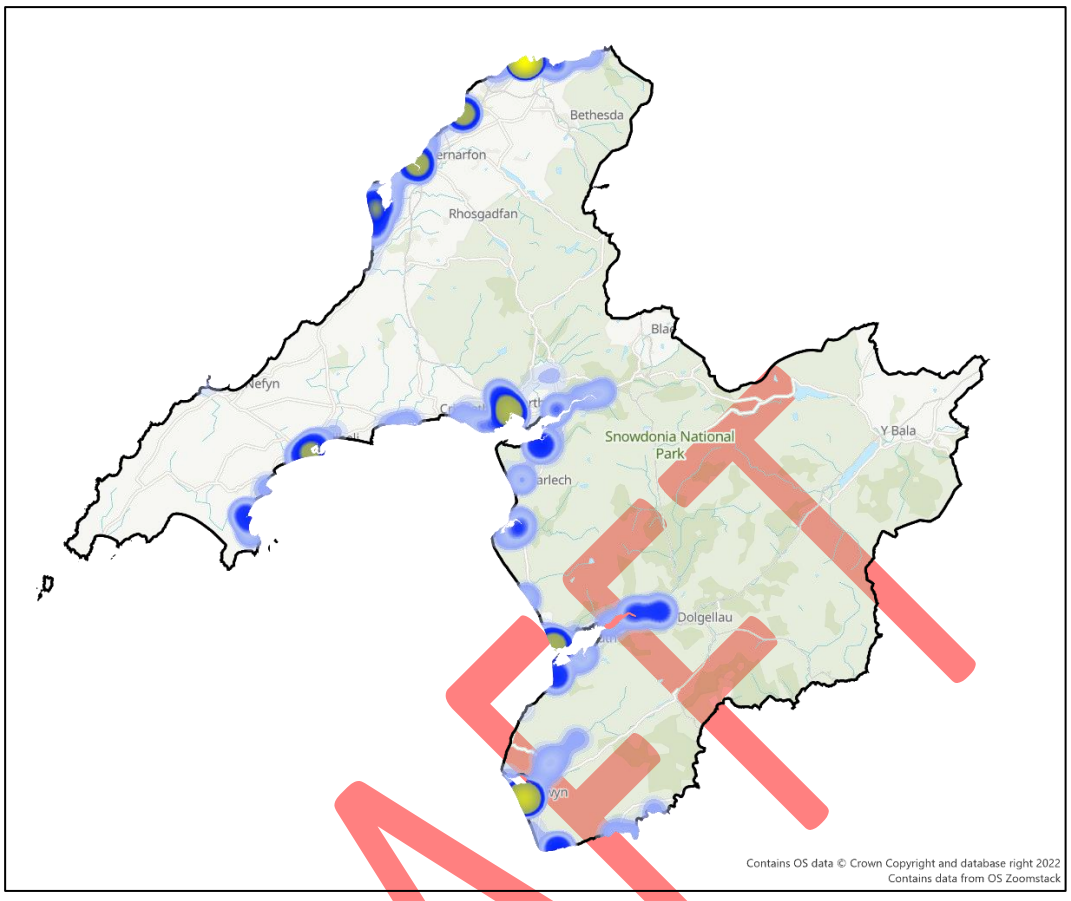


Table 9.4: Summary of properties at risk of coastal flooding and erosion across Gwynedd

Number of properties at flood risk					Number of Essential Services / Non-residential properties at flood risk	Properties at risk of coastal erosion
Total	High risk	Medium risk	Low risk	Very Low risk		
6355	520	237	3471	2127	1864	508

Table 9.4 suggests strongly that unmitigated effects of future sea level rise could be significant for coastal areas, with an increase of 50% in the number of properties expected to be at risk of flooding; as per the inland scenario this figure is in addition to the increase in flood risk level expected for present day receptors. The number of properties estimated to be at risk form coastal erosion is also contained in Table 9.4, although the distribution is not represented in Figure 9.2.

10. Risk by Area

10.1 Inland risk by Catchment

This section dissects the flood risk information provided in section 9 further by looking at flood risk within specific areas. To segregate the risk across Gwynedd and help identify the areas of most concern we shall discuss inland flood risk by main hydrological catchments, of which there are 15 in total. Figure 10.1 below shows the location and extent of all catchments described. Table 10.1 provides the number of receptors at risk of flooding for each catchment respectively.

Appendix A provides further information regarding the nature and setting of each catchment along with a description of the spatial distribution of flood risk zones, and how this corresponds with location of defences and historic flood records.

For a more detailed view of flood risk distribution within an area of interest the reader is referred to the Flood Risk Assessment Wales maps on NRW's webpage.

Figure 10.1: Hydrological catchments in Gwynedd

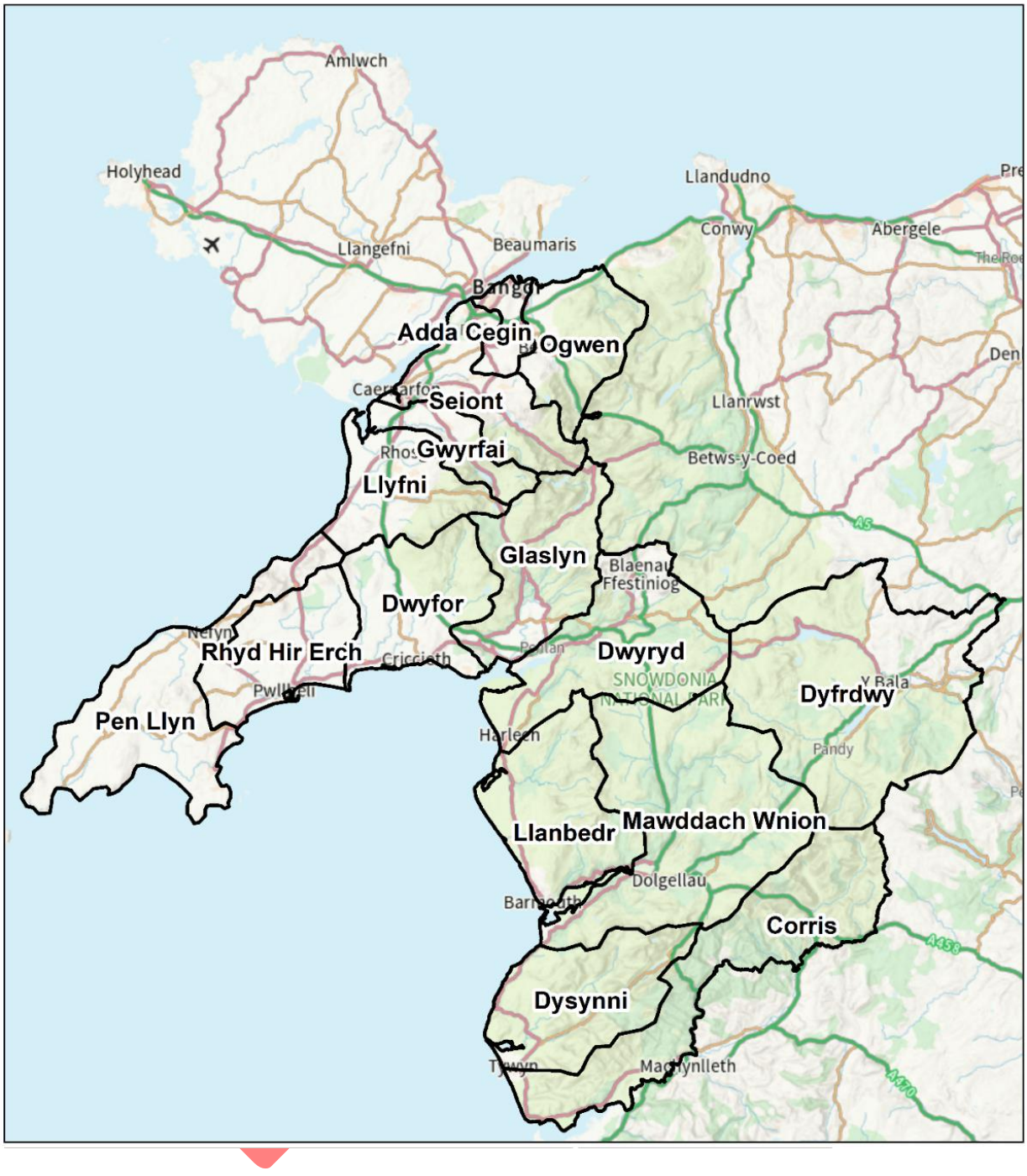


Table 10.1: Number of receptors at risk of flooding for each area (catchment)

Catchment	***Communities***	***Number of properties at flood risk[25]***					***Number of Essential Services / Non-residential properties at flood risk[26]***	***Number of known incidents[27]***
		Total	***High risk***	***Medium risk***	***Low risk***	***Very Low risk***		
Adda-Cegin	Bangor Penrhosgarnedd Glasinfryn Minffordd Pentir Rhiwlas Sling	353	17	80	153	103	60	28
Corris	South Tywyn Aberdyfi Pennal Corris Dinas Mawddwy Mallwyd Aberllefenni	272	88	34	104	46	52	15
Dwyfor	Chwilog Cwm Pennant Garndolbenmaen Criccieth Morfa Bychan Bryncir Pant Glas	125	31	16	42	36	38	51

[25] See section 9.1

[26] See section 9.1

[27] Number of individual properties known to have suffered from internal flooding according to records held by Cyngor Gwynedd

Catchment	*Communities*	*Number of properties at flood risk*					*Number of Essential Services / Non-residential properties at flood risk*	*Number of known incidents*
		Total	*High risk*	*Medium risk*	*Low risk*	*Very Low risk*		
Dwyryd	Blaenau Ffestiniog Llan Ffestiniog Gellilydan Llandecwyn Penrhyndeudraeth Harlech Trawsfynydd	654	83	100	355	116	131	38
Dyfrdwy	Bala Llanuwchllyn Llandderfel Frongoch Talardd Llanfor Glan Yr Afon	800	112	37	573	78	276	5
Dysynni	North Tywyn Bryncrug Llwyngwril Abergynolwyn Llangelynnin Tal Y Llyn Rhyd Yr Onen	378	145	56	117	60	110	16
Glaslyn	Nant Gwynant Beddgelert Nantmor Tremadog Porthmadog Croesor Borth Y Gest	877	20	54	194	609	211	77

Catchment	*Communities*	*Number of properties at flood risk*					*Number of Essential Services / Non-residential properties at flood risk*	*Number of known incidents*
		Total	*High risk*	*Medium risk*	*Low risk*	*Very Low risk*		
Gwyrfai	Llanfaglan Caeathro Bontnewydd Waunfawr Betws Garmon Ceunant Rhyd Ddu	140	22	20	74	24	31	45
Llanbedr	Llanfair Llanbedr Llanddwywe Dyffryn Ardudwy Llanaber Abermaw Bontddu	255	16	41	123	59	46	27
Llyfni	Penygroes Rhostryfan Nantlle Talysarn Pontllyfni Llanllyfni Aberdesach	495	205	64	123	103	63	95
Mawddach - Wnion	Dolgellau Fairbourne Brithdir Ganllwyd Llanfachraeth Arthog Llanelltyd	994	54	33	676	231	385	8

Catchment	*Communities*	*Number of properties at flood risk*					*Number of Essential Services / Non-residential properties at flood risk*	*Number of known incidents*
		Total	*High risk*	*Medium risk*	*Low risk*	*Very Low risk*		
Ogwen	Llandygai Tal Y Bont Abergwyngregyn Tregarth Bethesda Mynydd Llandegai Rachub	412	52	37	254	69	81	89
Penllyn	Aberdaron Botwnnog Abersoch Mynytho Tudweiliog Nefyn Morfa Nefyn	246	62	43	115	26	103	66
Rhyd Hîr-Erch	Pencaenewydd Llangybi Y Ffor Llannor Efailnewydd Pwllheli Boduan	472	62	67	247	96	164	63
Seiont	Nant Peris Llanberis Deiniolen Llanrug Bethel Caernarfon Felinheli	611	79	39	339	154	272	187

10.2 Coastal risk by Management Area

The following section describes coastal flood risk in greater detail by considering each coastal Management Area in its turn. Management Areas (MA) along the Gwynedd coastline have been defined within the Shoreline Management Plan (SMP2) and represent a length of the coastline where the various frontages are interdependent in terms of coastal processes, and therefore should be managed as a collective to achieve the desired environmental outcome. With this in mind the policies for neighbouring frontages within a MA are designed to complement each other.

Management Areas is Gwynedd extend from MA 20 on the north side of the Dyfi estuary to MA 46 on the north coast, to the east of the mouth of the Afon Ogwen (see Figure 10.2 below). Table 10.2 provides the number of receptors at risk of flooding for each MA respectively as well as an estimate of the number of properties at risk of coastal erosion, according to information provided in the latest NCERM Map.

Appendix B provides further information regarding the nature and setting of each MA along with a description of the spatial distribution of flood risk zones, and how this corresponds with location of defences and changes in future shoreline policies (as described in section 4).

For a more detailed view of flood risk distribution within an area of interest the reader is referred to the Flood Risk Assessment Wales maps on NRW's webpage.

Figure 10.2:Distribution of Management Areas along Gwynedd coastline

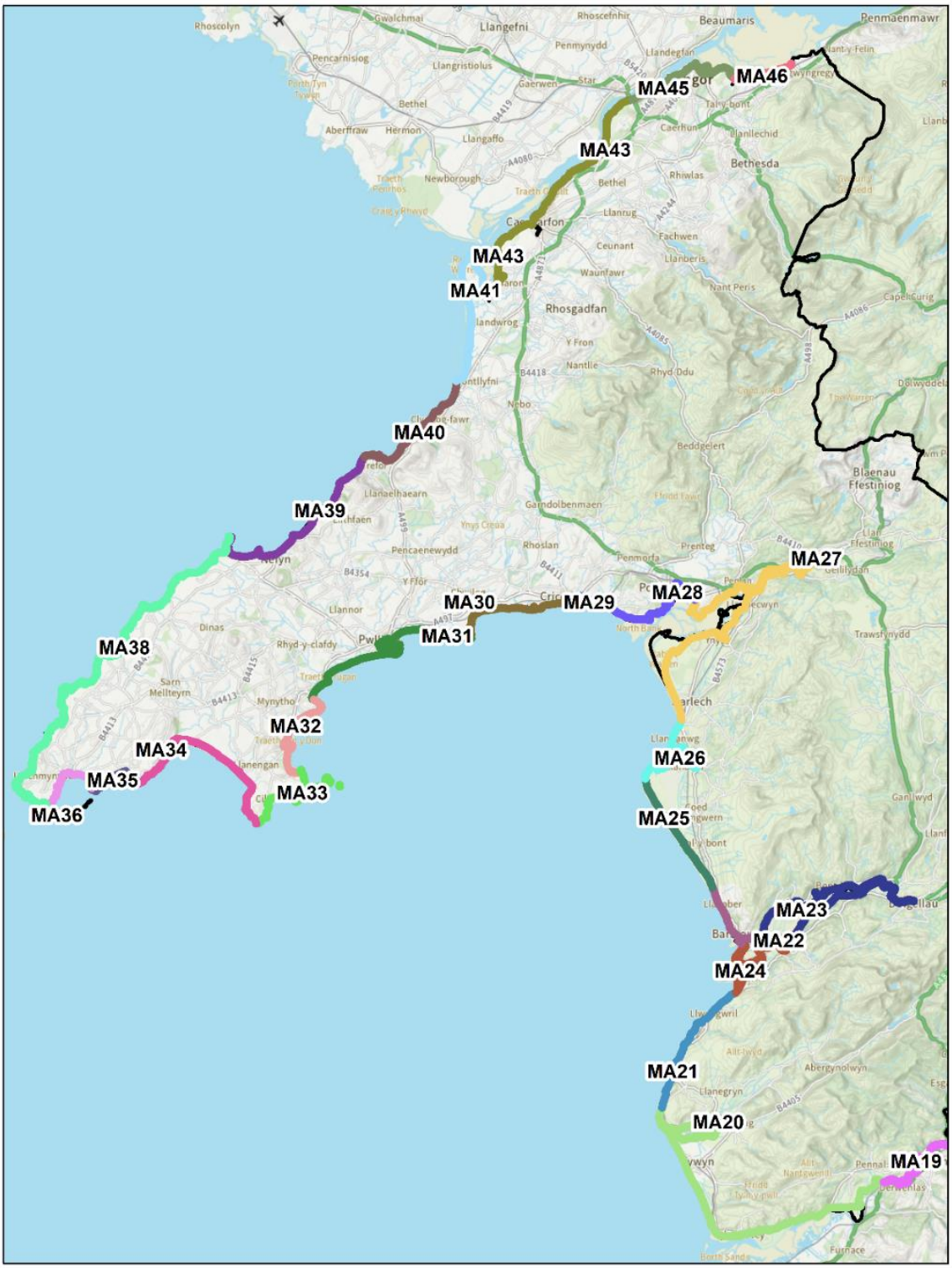


Table 10.2: Number of receptors at risk of coastal flooding/erosion for each area (MA)

Management Area	***Communities***	***Number of properties at flood risk[28]***					***Number of Essential Services / Non-residential properties at flood risk[29]***	***Properties at risk of coastal erosion[30]***
		Total	***High risk***	***Medium risk***	***Low risk***	***Very Low risk***		
19	Pennal	1	1	0	0	0	1	0 (0)
20	Bryncrug Tywyn Aberdyfi	500	170	44	53	233	45	138 (138)
21	Llwyngwril	0	0	0	0	0	0	0 (0)
22	Fairbourne Arthog Friog	493	1	1	449	42	63	No data available
23	Llanelltyd Pen Y Bryn Bontddu Penmaenpool	62	25	5	7	25	14	0 (0)
24	Abermaw	548	12	7	308	221	127	0 (0)

[28] See section 9.1

[29] See section 9.1

[30] See section 9.1

Management Area	*Communities*	*Number of properties at flood risk*					*Number of Essential Services / Non-residential properties at flood risk*	*Properties at risk of coastal erosion*
		Total	*High risk*	*Medium risk*	*Low risk*	*Very Low risk*		
25	Talybont Dyffryn Ardudwy	2	0	1	0	1	7	4 (4)
26	Llanbedr Pen-sarn Llandanwg	41	1	10	2	28	48	5 (5)
27	Penrhyndeudraeth Maentwrog Llandecwyn Talsarnau Harlech	516	8	46	93	369	52	2 (2)
28	Porthmadog Morfa Bychan Borth Y Gest	1877	27	7	1358	485	583	51 (51)
29	Criccieth (East)	1	0	0	0	1	0	50 (48)
30	Afon Wen Criccieth (West)	1	0	0	0	1	0	78 (78)

Management Area	*Communities*	*Number of properties at flood risk*					*Number of Essential Services / Non-residential properties at flood risk*	*Properties at risk of coastal erosion*
		Total	*High risk*	*Medium risk*	*Low risk*	*Very Low risk*		
31	Pwllheil Abererch Penrhos Llanbedrog	1498	0	1	1091	406	428	1 (1)
32	Abersoch	69	23	8	11	27	44	13 (13)
33	Llanengan	1	0	0	0	1	0	0 (0)
34	Botwnnog	4	0	0	1	3	0	0 (0)
35	Uwchmynydd	0	0	0	0	0	0	0 (0)
36	Aberdaron	6	0	0	1	5	11	29 (29)

Management Area	*Communities*	*Number of properties at flood risk*					*Number of Essential Services / Non-residential properties at flood risk*	*Properties at risk of coastal erosion*
		Total	*High risk*	*Medium risk*	*Low risk*	*Very Low risk*		
37	Ynys Enlli	0	0	0	0	0	0	0 (0)
38	Tudweiliog	0	0	0	0	0	1	2 (2)
39	Porthdinllaen Nefyn Morfa Nefyn	25	13	4	5	3	13	31 (8)
40	Aberdesach Trefor	6	0	0	0	6	1	15 (11)
41	Dinas Dinlle Pontllyfni	72	8	34	5	25	49	0 (0)
43	Caernarfon Y Felinheli Saron Llanfaglan	305	26	42	68	169	226	89 (89)

Management Area	*Communities*	*Number of properties at flood risk*					*Number of Essential Services / Non-residential properties at flood risk*	*Properties at risk of coastal erosion*
		Total	*High risk*	*Medium risk*	*Low risk*	*Very Low risk*		
45	Bangor Treborth	313	199	24	17	73	44	9(9)
46	Tal Y Bont Abergwyngregyn	14	6	3	2	3	3	0 (0)

11. Our strategic Objectives

11.1 National Strategy Objectives

The Welsh Government National Strategy provides the framework for flood and coastal erosion risk management in Wales. The framework is centred around five key objectives and the measures to achieve those objectives.

The aim of the National Strategy is to 'reduce the risk to people and communities from flooding and coastal erosion'. The aim is supported by five objectives that complement and overlap each other with the intention of reducing the risk to life. These are summarised in Table 11.1 below.

Table 11.1: The five main objectives identified within the National Strategy

11.2 Local Strategy Objectives

For this Local Strategy, we have developed our own strategic objectives which both align with the National Strategy objectives and reflect our local context and priorities. Our objectives are listed in Table 11.2 and have been selected to address our greatest areas of priority whilst considering the Council's remit for managing risks associated with local flooding and coastal erosion. All objectives are supported by a range of actions, listed and described in section 12.

Table 11.2: The strategic objectives of our Local Strategy

Local Strategy Objectives	Link to National Strategy Objectives
Objective 1: To aim to reduce the level of flood and coastal erosion risk to the residents of Gwynedd	**C, D**
Objective 2: To further develop an understanding of the flood risk to Gwynedd and the impacts of climate change	**A**
Objective 3: To continue to work with all relevant bodies to ensure appropriate and sustainable development in Gwynedd	**B, D**
Objective 4: Raising awareness of local flood and coastal erosion risk	**A**
Objective 5: Working collaboratively with all other RMAs and relevant groups/bodies to ensure a coordinated response to flood and coastal erosion events	**E**

12. Strategic Actions

12.1 Introduction to Actions

Cyngor Gwynedd's objectives for managing flood and coastal erosion risk to our communities are listed in section 11, each objective is supported by the range of actions described below. These actions supplement the methods currently employed by the Council to manage FCERM risks, as described in section 6. The majority of the actions included below are to be discharge by the Water and Environment Unit within YGC (as LLFA), however where listed some actions are the responsibility of other departments. The mechanisms for financing and monitoring delivery of these actions over time are described in sections 13, 14 and 15.

12.2 Our Action Plan

Objective 1:	***To aim to reduce the level of flood and coastal erosion risk to the residents of Gwynedd***
1.1	***Flood and coastal erosion risk management programmes***
Action 1.1A	*Maintain long term capital programme to reduce risk of inland flooding*
	Cyngor Gwynedd will prepare and maintain a long-term programme of studies and schemes to manage the risks of inland (river and surface water) flooding upon our communities. The programme will contain high-level details of the objectives and potential benefits of each item and identify opportunities to work alongside partner organisations and/or other stakeholders. The programme will be reviewed and updated annually as more information regarding flood risk and flooding incidents becomes available. Schemes currently included on the Councils inland flood risk management programme are listed in Appendix A of this Local Strategy.
Action 1.1B	*Maintain long term capital programme to reduce risk of coastal flooding/erosion, incorporating actions identified within SMP2*
	Cyngor Gwynedd will prepare and maintain a long-term programme of studies and schemes to manage the risks of coastal flooding and coastal erosion upon our communities. The programme will contain high-level details of the objectives and potential benefits of each item and identify opportunities to work alongside partner organisations and/or other stakeholders. Our programme will incorporate the actions identified within SMP2 to move towards a sustainable approach of coastal management. The programme will be reviewed and updated annually as more information regarding risk and condition of coastal assets becomes available. Schemes currently included on the Councils coastal risk management programme are listed in Appendix B of this Local Strategy.
1.2	***Flood and coastal erosion risk management improvements***
Action 1.2A	*Prepare annual list of schemes from long term action plan to reduce risk of flooding and coastal erosion to be presented for inclusion on WG capital programme*
	Our works programmes (inland and coastal) will form the basis of our annual submission of studies and schemes to be included on the national FCERM programmes thereby securing grant support from Welsh Government. Further

	information regarding prioritisation of work and means of funding our programmes is provided in section 13 and 14. As well as reducing flood and coastal erosion risks all schemes will be developed with the aim of maximising environmental and socio-economic benefits to the study areas. This will include reducing any adverse effects on designated ecological sites which will be driven by EIA and HRA processes.
1.3	***Management of flood/coastal erosion risk management assets***
Action 1.3A	*Develop register and map of highway drainage assets in flood prone areas*
	Information regarding the layout of surface water drainage systems within the Council's ownership and responsibility, as well as supporting records, are often incomplete. The Council will work to improve the records that exist in high surface water flood risk areas, so that opportunities to the improve the network can be identified and that adequate maintenance and/or management plans can be developed to reduce surface water flood risk for our communities. The record of drainage assets shall include information on sensitive environmental features associated with the asset (if applicable), such as any archaeological and/or biodiversity designations, so that these can be considered if any maintenance arises.
Action 1.3B	*Develop register and map of all SuDS elements adopted by the Council*
	I their role as SAB Cyngor Gwynedd has a duty to adopt sustainable drainage systems that have been constructed to comply with national standards. The Council will develop a detailed inventory of adopted drainage systems, including information on the construction and function of each element as well as appropriate inspection and maintenance schedules.
1.4	***Maintenance and deployment of flood/coastal erosion risk management assets***
Action 1.4A	*Prepare and deliver minor works programme (revenue) based on findings of asset condition assessment to maintain standard of protection afforded by flood risk/costal erosion assets*
	Following completion of our asset inspection programme the Council shall identity a risk-based programme of maintenance or minor works to ensure that asset condition is maintained and present-day standard of protection is not compromised. Any works that cannot be carried out using the Council's dedicated revenue budget for any given year will be included on a capital works programme (see Actions 1.1).

Objective 2:	***To further develop an understanding of the flood risk to Gwynedd and the impacts of climate change***
2.1	***Working with partner RMAs***
Action 2.1A	*Contribute to stakeholder events with colleagues from partner RMAs and other stakeholders i.e. North Wales Regional Flood Group, West of Wales Coastal Group*
Action 2.1B	*Hold regular discussions regarding flood risk issues within Gwynedd with colleagues from NRW and DCWW*

	Working alongside partner RMAs and other stakeholders at a local and regional level will allow Cyngor Gwynedd to better understand flood challenges from all sources, and make us aware of policies, studies or schemes that are proposed by partner authorities to manage flood risk. Regular discussions with other organisations will also enable us to identify opportunities for partnership working, by sharing resources or knowledge to address challenges.
2.2	***Flood investigations***
Action 2.2A	*Develop and improve current mechanisms to identify incidents of flooding within Gwynedd as early as possible*
	Experience has shown us that information gathering exercises following storm events can take longer than we would like which can delay the commencement of investigation work. We are also aware that the Council are not alerted of all incidents of flooding to properties. Therefore, to build up a complete picture of flood impacts and to enable us to engage with effected residents as early as possible we intend to look at alternative methods of collecting information.
2.3	***Flooding to highway network***
Action 2.3A	*Initiate study to identify areas of the county highway network that are most vulnerable to flooding and will become more susceptible as a results of climate change effects in the future*
	Prevention of access towards populated areas during storm events is a significant risk to our communities and therefore a good understanding is needed of present day and future risks of flooding to the highway network so that measures to mitigate these risks can be considered.
2.4	***Flood Modelling***
Action 2.4A	*Development of high quality hydrological and hydraulic modelling to build on national maps and better understand flood risk at local level*
	Detailed investigation of flood risk in high-risk areas will be supplemented by modelling work to enable the Council to estimate the extent and depth of flooding for a range of rainfall and/or tidal events and also for various conditions (blockages, defence failure etc.).
Action 2.4B	*Incorporate most up-to-date climate change projections into all flood modelling exercises*
	All hydrological and/or tidal modelling exercises carried out to inform investigation or design work will make the correct allowances for future climate change effects, based on the most up to date available guidance
Action 2.4C	*Sharing of local flood modelling information with NRW so that national maps can be updated as appropriate*
	All hydrological and/or tidal modelling exercises carried out to inform investigation or design work will comply with NRW modelling standards to allow the national flood maps to be updated with more detailed and current information as appropriate. Challenging and updating national flood maps will enable the Council to identify the number of properties and other receptors that have benefitted from FCERM

	schemes in the future, thereby allowing success of this Local Strategy to be measured (see section 15).
2.5	***Data Collection***
Action 2.5A	*Enhancing our network of LoraWAN sensors to measure water levels within watercourses as well as groundwater level in areas of particular interest*
	Cyngor Gwynedd are in the processing of developing a network of telemetry sensors that can continually measure tidal level, the level of water within watercourses and groundwater. We intend to enhance the current network of sensors to build a better picture of the areas most affected by storm events. Further application of the sensors should also enable the Council to be alerted when flood risk requires intervention (e.g., to clear a blocked screen or culvert).
Action 2.5B	*Develop and implement a monitoring programme for areas of the coastline where cliff instability poses a risk to people, property and infrastructure.*
	The risk of coastal erosion is prevalent along certain areas of the coastline which could lead to instability of property or infrastructure in certain locations. Cyngor Gwynedd is to identify the areas where coastal erosion risks are highest and develop a programme to monitor any movements within the cliff face so that risk can be measured over time and actions to manage these risks can be identified.

Objective 3:	***To continue to work with all relevant bodies to ensure appropriate and sustainable development in Gwynedd***
3.1	***Development Planning/Development Control***
Action 3.1A	*Incorporation within the Local Development Plan of the requirements contained within TAN15 with regard to Strategic Flood Consequence Assessment*
	Cyngor Gwynedd's Local Development Plan is currently under review with replacement plan intended for the period from 2027 in preparation. The replacement plan will be guided by a Strategic Flood Consequence Assessment undertaken in accordance with the updated version of TAN15 (Development, flooding and coastal erosion) scheduled for publication in 2024, along with the information contained within the Flood Map for Planning.
Action 3.1B	*Regard within the Local Development Plan of recommendations for future changes in coastal policy, and subsequent implications for land use near the coastline*
	The current Local Development Plan includes a Climate Change Management Area policy intended to direct vulnerable developments away from coastal areas that may face a greater risk of flooding and/or coastal erosion in the future due to changes in coastal policies, as outlined in the SMP2. Consideration will be given to include a corresponding policy within the new Plan, ensuring that that policy meets the relevant planning policy requirements and guidance.
3.2	***Works near watercourses***
Action 3.2A	*Review of all policies relating to Land Drainage consenting procedures to ensure best practice is maintained and proposed developers are aware of design and construction requirements*

	Cyngor Gwynedd is opposed to the culverting of watercourses because of the adverse ecological, flood risk, human safety and aesthetic impacts. Watercourses are important linear features of the landscape and should be maintained as continuous corridors to maximise their benefits to society. The Council have a culverting policy which explains to applicants in which circumstances culverting is appropriate and also provides general design criteria[31]. We shall review the content of this policy to ensure that this guidance provided is fit for purpose and in line with industry guidance. Opportunities to deliver environmental enhancement will be included in such policies where relevant, including proactive use of green infrastructure and restoring natural processes. WFD objectives and measures are to be delivered where reasonable to do so.
3.3	***Sustainable Drainage Systems (SuDS) and Natural Flood Risk Management (NFM)***
Action 3.3A	*Identify opportunities for the implementation of SuDS and NFM schemes in areas which will deliver meaningful flood risk benefits as well as other environmental and amenity benefits*
	SUDS are drainage systems that are considered to be environmentally beneficial, causing minimal or no long-term detrimental damage. They are often regarded as a sequence of management practices, control structures and strategies designed to efficiently and sustainably drain surface water, while minimising pollution and managing the impact on water quality of local water bodies. NFM involves working with nature to reduce the risk of flooding for communities. It uses various techniques to restore or mimic the natural functions of rivers, floodplains and the wider catchment. It aims to store water in the catchment and slow the rate at which water runs into rivers, to help reduce flooding downstream. A key priority of the National Strategy is to deliver more schemes of this kind, and with this in mind Cyngor Gwynedd will identify urban and upland areas that are suitable for delivery of SuDS and NFM interventions respectively, either as stand-alone projects or as part of wider flood risk management schemes.
Action 3.3B	*Work with partner authorities and landowners to deliver NFM schemes as part of a national programme*
	As funding becomes available for NFM schemes Cyngor Gwynedd will identify and work alongside landowners and partners to deliver successful projects that realise all potential benefits associated with NFM. A successful example of partnership working on NFM schemes can be found in section 7 above.
Action 3.3C	*Develop position statement which clearly outlines how NFM schemes should be designed and developed to obtain necessary watercourse consents (S23 and LD bylaws) from Cyngor Gwynedd*
	As explained above Cyngor Gwynedd are responsible for consenting of in-channel works as well as works adjacent to ordinary watercourses. In this role our general aim is to ensure that river channels remain free from obstruction to allow effective conveyance of flow and reduce risk of out of channel flooding. However, some NFM

[31] https://www.gwynedd.llyw.cymru/en/Residents/Documents-Residents/Parking,-roads-and-travel/Flooding/Ordinary-watercourses/Gwynedd-Council-Culverting-Policy.pdf

	measures are generally opposed to this idea and instead look to re-connect the channel with its floodplain further up the catchment from flood-prone areas, so that peak flows are delayed. Cyngor Gwynedd will develop a position statement to establish design criteria for NFM measures which require our consent to avoid any conflict with our current consenting procedures. Our criteria will promote options that provide environmental enhancement measures.

Objective 4:	***Raising awareness of local flood and coastal erosion risk***
4.1	***Raising awareness of local flood risk***
Action 4.1A	*Cyngor Gwynedd will raise awareness of flood risk to its residents*
	As the Council considers the risk of flooding to a community through a scheme or a study we will engage with residents and business/property owners of the area of interest to make them aware of risk from different flood sources. We shall also let our communities know where to find the most up to date information relating to flood risk.
Action 4.1B	*Cyngor Gwynedd will advise on and promote flood resilience and resistance measures amongst its residents*
Action 4.1C	*Cyngor Gwynedd will prepare and publish an information pamphlet available to all residents within flood risk areas, and any residents that have experienced flooding to their properties*
	The Council encounter many residents that face a continuous risk of flooding to their properties, and in some cases reducing the level of risk is not feasible or viable. In such cases we shall advise our residents on ways to live alongside the risk in the form of an information pamphlet prepared alongside the National Flood Forum. We shall also provide advice on methods to reduce the likelihood of damages through property level protection, and direct our residents towards reputable agents or suppliers that can provide the quality assured products.
4.2	***Raising awareness of coastal erosion risk***
Action 4.2A	*Cyngor Gwynedd will raise awareness of coastal erosion risk to its residents, focusing on the most at risk areas*
	Cyngor Gwynedd will engage with residents and business/property owners in areas where costal erosion is of concern in order to make them aware of present-day risks and any likely changes in ground stability over time. We shall also let our communities know where to find the most up to date information on coastal erosion risk.

Objective 5:	***Working collaboratively with all other RMAs and relevant groups/bodies to ensure a coordinated response to flood and coastal erosion events***
5.1	*Preparation and testing of Emergency Plans*
Action 5.1A	*Cyngor Gwynedd will review and update its flood emergency plans alongside North Wales Councils Regional Planning Service; to include evacuation and rest centre plans.*
	The Council has an important role to play if our communities are unfortunate enough to experience a significant flood event. It is therefore important that concrete plans are in place to protect our residents in such an event and that these plans are tested occasionally to ensure that they are appropriate and that all the relevant agencies have an understanding of their responsibilities.

13. Funding and Prioritisation

13.1 Funding options

Measures to manage flood and coastal erosion risk are funded from a range of sources with most of the funding available through the Welsh Governments capital and revenue programmes. Welsh Government run a variety of capital works programmes which are aimed at different types and scales of FCERM schemes – these programmes are described briefly in table 13.1 below.

Cyngor Gwynedd will also makes funds available for capital works where match-funding is a pre-requisite for Welsh Government grant, and also makes annual contribution towards revenue funding which supplements the grant received from Welsh Government.

Table 13.1: FCERM funding sources

Welsh Government FCERM Capital Grant Funding: Intended to support the development, design and construction of new flood alleviation schemes as well as major maintenance works. The Welsh Government will work with RMAs to develop a 5- to 10-year investment programme of future FCERM capital schemes, justified in accordance with the FCERM Business Case Guidance[32]. Cyngor Gwynedd are usually required to match-fund at least the construction phase of a Capital Grant project with the rate of contribution varying between 15-25%. Match-funding is subject to a timely application to the Council for core funding.
Welsh Government Small Scale Work Grant: Supports Local Authorities carry out smaller works, resilience measures on a community scale, NFM and essential maintenance through a simplified process. Funding is available annually for works up to £200,000 (2022/23) and has proved successful in driving delivery and risk reduction, with up to £4.3 million allocated annually for such schemes (2020-21). Works under this programme are subject to 15% match-funding which is usually provided from the annual FCERM core funding made available to the department (Highways, Engineering & YGC) by Cyngor Gwynedd.
***Welsh Government NFM Accelerator Grant*:** This programme aims to accelerate RMAs delivery of natural flood management interventions by providing funding for the delivery of NFM schemes, including appraisal, design, construction and monitoring equipment.
Welsh Government Revenue Funding: Revenue funding remains a vital part of FCERM funding intended to support the duties and functions of LLFAs under the FWMA. In addition to work such as flood investigations, awareness raising and maintenance of assets, Cyngor Gwynedd have historically used revenue funding to carry out monitoring tasks, provide training opportunities for FCERM staff and invest in equipment.
Cyngor Gwynedd Revenue Funding and Staff Costs: As discussed above Cyngor Gwynedd provide an annual FCERM allowance to the Highways, Engineering & YGC department. This core funding secures staff salaries, allows for minor works and asset maintenance, and can be used as match funding against Welsh Government grant contribution (usually only Small Scale Works).

[32] https://www.gov.wales/sites/default/files/publications/2019-06/flood-and-coastal-erosion-risk-management-fcerm-business-case-guidance_0.pdf

Partnership Funding: Opportunities for partnership working amongst RMAs is encouraged by Welsh Government and therefore options for partnership funding should be explored more thoroughly in the future as a way of achieving FCERM objectives which are of mutual interest to parties. This type of funding will become more important as we look to integrate flood schemes with other infrastructure and environmental projects to bring multiple benefits, seek sustainable and better value interventions.

13.2 Prioritisation

Section 14 below explains how Cyngor Gwynedd will develop works programmes (inland and coastal) to benefit from the funding sources described above, with all schemes and/or studies reviewed and prioritised by Welsh Government before funding programmes are announced each year.

The Welsh Government prioritises FCERM schemes which primarily reduce risk to homes. Businesses and public buildings can also benefit from schemes, in particular those which reduce risk to a mix of development types such as homes and shops along a high street or local district centre. Schemes which only reduce risk to businesses remain eligible but should not be prioritised over schemes which reduce risk to homes. Funding is not available to enable new development.

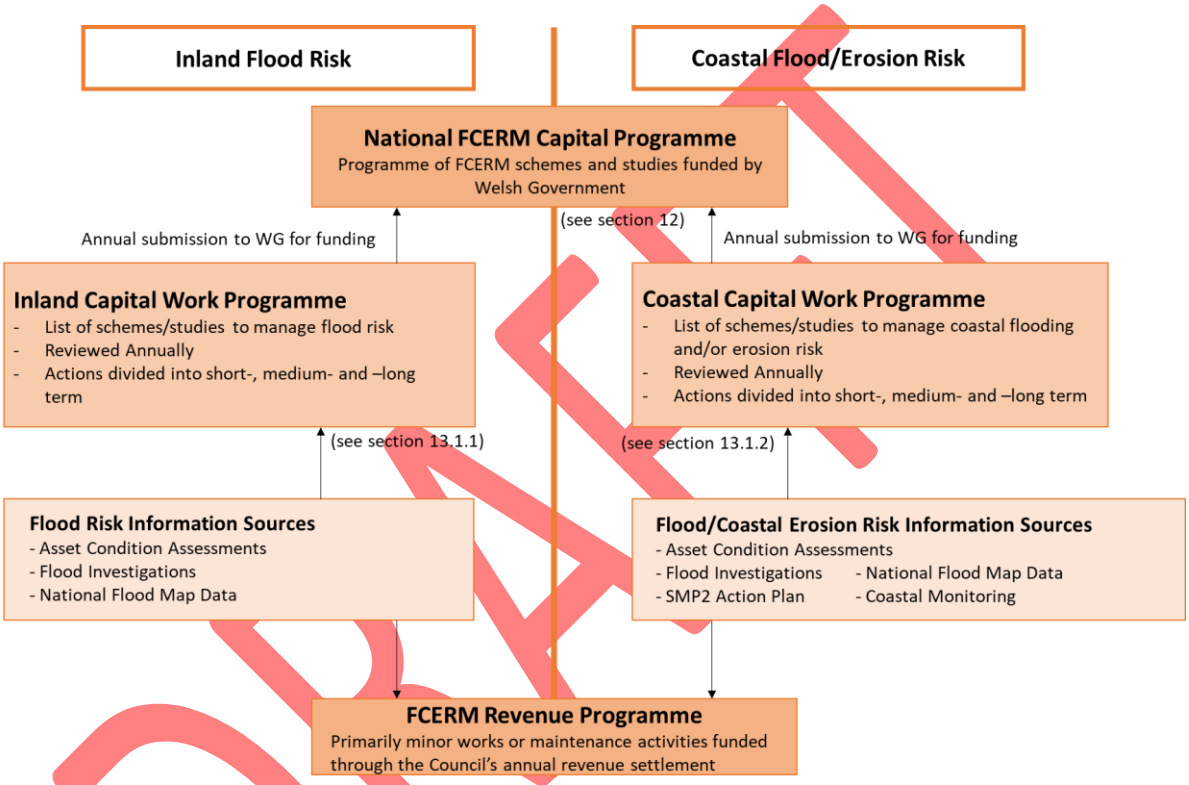
RMAs applying for funding are encouraged to identify wider benefits such as regeneration opportunities, improvements to habitats/biodiversity, mental health or recreational benefits. Early consideration of aligning multiple benefits to secure wider funding is encouraged. Where significant benefits are identified to third parties, it is expected RMAs will work both internally and externally (for example with infrastructure providers, utilities, industry and commerce) to identify and secure appropriate partnership funding contributions from those benefitting from a scheme.

14.0 FCERM Works Programmes

Actions 1.1A – 1.3A in section 12 describe how the Council will prepare long-term capital programmes centred around inland and coastal risks to our communities into the future. The preparation and delivery of our works programmes is pivotal to successful delivery of this Local Strategy.

Figure 14.1 below summarises how Cyngor Gwynedd FCERM programmes will be identified and promoted, using the different funding streams described above for delivery.

Figure 14.1: Development and promotion of Cyngor Gwynedd FCERM schemes



14.1 Capital Programme

Each year Cyngor Gwynedd will prepare a pipeline of FCERM schemes and/or studies to be included on Welsh Governments capital programme for the following year/s, the pipeline submission will be based on the two separate long-term works programmes described below. Whilst we acknowledge that Cyngor Gwynedd are the lead organisation for the schemes and studies included on our programmes, we do anticipate that certain project will involve working in partnership with other RMAs.

Schemes are separated into short-, medium- and long-term projects according to priority (<5 years, 5-10 years and 10+ years respectively). Priority will mainly be assigned according to level of flood/coastal erosion risk, but other factors such as the Council's legal responsibilities will also influence priority. The selection of schemes from our programmes onto the annual

pipeline will be according to priority and the Council's confidence of delivering a scheme or stage of scheme within the approaching funding window.

All schemes promoted though the inland/coastal programme and onto our pipeline submission will be developed in accordance with the FCERM Business Case Guidance to ensure that an affordable and sustainable solution is identified.

These works programmes will be reviewed by the Council on an annual basis.

14.1.1 Inland Flood Risk

The inland flood risk management programme will include a list of flood risk management scheme and studies that have been identified from of the sources described in Table 14.2 below.

Table 14.1: Sources of information used to develop inland flood risk management programme

Asset inspection: Routine inspection of our flood risk assets will enable us to identify when damage or deterioration could lead to an unacceptable risk of flooding. In such cases we shall plan for necessary repair or replacement works to reduce flood risk to an acceptable level.
Flood risk data: Information provided on the national flood maps (as presented in Appendix A) will indicate the areas where flood risk is greatest and where further study could provide more detail regarding nature and level of risk, and whether feasible solutions exist to manage this flood risk as necessary.
Flood Investigation: The greatest trigger for flood risk management intervention is responding to actual flooding events where people and property have been affected. In such cases the Council will build on initial investigation works to identify a solution which will reduce the risks of a similar incident.

Schemes currently included on the Councils inland flood risk management programme are listed in Appendix A of this Local Strategy. The programme includes local flood risk management schemes that have previously been identified and are currently at various stages of the business case cycle. Our desire is to assess flood risk across each hydrological catchment in its turn to identify a series of integrated flood risk management interventions within each catchment. This approach allows us to take a broad view of flood risks and concerns to develop schemes that can complement each other to provide benefit for a high number of properties.

14.1.2 Coastal Flooding and Erosion Risk

The coastal flood/erosion risk management programme will include a list of flood and coastal erosion risk management scheme and studies that have been identified from any of the following sources:

Table 14.2: Sources of information used to develop coastal risk management programme

Asset inspection: Routine inspection of our FCERM assets will enable us to identify when damage or deterioration could lead to an unacceptable risk of flooding or coastal erosion. In such cases we shall plan for necessary repair or replacement works to reduce risk to an acceptable level.
Flood risk data: Information provided on the national flood maps (as presented in Appendix B) will indicate the areas where flood risk is greatest and where further study could provide more detail regarding nature and level of risk, and whether feasible solutions exist to manage this flood risk as necessary.
Flood Investigation: The greatest trigger for flood risk management intervention is responding to actual flooding events where people and property have been affected. In such cases the Council will build on initial investigation works to identify a solution which will reduce the risks of a similar incident.
SMP2 Action Plan: The action plan provides a framework for delivering the long-term coastal management objectives identified within the SMP2 document. Actions are assigned for different areas of the coastline with a lead organisation designated to deliver each action. Cyngor Gwynedd are tasked with managing flood and coastal erosion risk and promoting coastal adaptation according to the West of Wales SMP2 Action Plan. A copy of the Action Plan can be found on the West of Wales Coastal Group's website.

Schemes currently included on the Councils coastal risk management programme are listed in Appendix B of this Local Strategy. The programme includes coastal risk management schemes that have previously been identified and are currently at various stages of the business case cycle, as well as schemes or studies which are included on the SMP2 Action Plan to manage risks associated with climate change effects on our coastline in the future. The type of intervention which emerge from our SMP2 studies could be wide ranging depending on the nature of the risk and opportunities for adaptation and will not always involve construction or upgrading of physical defences.

14.2 Revenue Programme

The Council's revenue works programme mainly consists of asset management, maintenance and repair tasks which have been identified following routine and post-storm condition inspections. Minor drainage improvements are also carried out as part of the revenue programme. The programme is updated on a more regular basis as issues come to the Council's attention over the course of a year. Generally, such works do not require advance planning or detailed design phases and therefore the programme has a shorter turn-around.

15. Monitoring progress

15.1 How we measure progress

As the LLFA, Cyngor Gwynedd is responsible for monitoring the implementation of this Local Strategy. Measuring progress of strategy implementation will focus upon the delivery of the actions described in section 12, and the benefits derived from these actions. All actions have been developed to supplement the methods currently employed by the Council to manage FCERM risks, in order to achieve the objectives within this Local Strategy.

Measures will focus on but not limited to the following aspects:

- Number of properties benefitting from FCERM schemes included on the capital work programmes described under Actions 1.1A and 1.1B (and further in section 13.1 above)
- Long-term value to the Council of the schemes included on the capital works programmes (described under Actions 1.1A and 1.1B)
- Number of our FCERM assets in adequate condition to fulfil their function
- Effectiveness of flood investigation procedure

15.2 How regularly we monitor progress

Generally, progress will be monitored through the Council's 'Performance Challenge and Support' procedure, which requires all services to report against a list of specific measures every 2 months. However specific reporting periods will need to be agreed for measures that focus on longer-term benefits, for example the number of properties benefiting from FCERM schemes or interventions may only be reviewed annually.

In addition to this a progress report on the delivery of actions will be published every 2 years to monitor progress against the Local Strategy's objectives and actions and will be made available on the Council's website. As described in section 14 the capital works programmes will be reviewed on an annual basis to reflect the Council's continual assessment of flood and coastal erosion risks to our communities, and updates will also be available on the Council's website.

16. Environmental assessments

Assessments have been undertaken alongside the development of this Local Strategy to ensure the Objectives and Actions presented take into account potential impacts on the environment.

16.1 Strategic Environmental Assessment (SEA)

A Strategic Environmental Assessment (SEA) is a way of assessing and monitoring the likely effects (positive and negative) of plans, programmes and strategies on the environment. It applies at the level of the plan or strategy (i.e. Local Strategy) which sets the direction for future development projects.

An SEA is a legal requirement to accompany a Local Strategy. Such assessments help to enable informed and transparent decision-making for the benefit of plan makers and the wider community in Wales.

The SEA was developed alongside this Local Strategy and is contained within a separate report.

The main environmental effects of the Local Strategy are considered to be a result of the delivery of minor works programme associated with flood risk / coastal erosion asset maintenance, and the implementation of SMP2 coastal policies. It was assessed that potential negative environmental effects could arise from works carried out at the project level (minor works programme) that does not allow for consideration of Environmental effects on biodiversity (such as disturbance of protected species), water quality (through water pollution from construction activities), and cultural heritage (disturbance / damage to cultural heritage features), depending on the extent and location of such work. Potential negative environmental effects were identified with actions associated with implementing coastal policies (SMP2), which could adversely affect SEA objectives due to potential loss of habitat, loss of agricultural land, and loss of cultural heritage features.

Proposed mitigation and enhancement measures to alleviate such effects are outlined. Assuming that the recommended mitigation is implemented for Local Strategy Objectives 1 and 3 the potential negative effects associated with them would be expected to be avoided or at least reduced so that they were no longer significant. Monitoring will involve testing the assessment criteria that have been proposed for the SEA objectives using the relevant indicators.

16.2 Habitats Regulations Assessment (HRA)

A Habitats Regulations Assessment (HRA) considers the possible harm a project or plan could cause to certain specially protected sites, with the aim of ensuring damage to these sites is avoided.

Due to the potential of this Local Strategy to impact the Natura 2000 network of protected sites, namely Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, it was identified that a HRA needed to be undertaken in parallel with the SEA process.

The full HRA is contained within a separate report, the conclusions of the HRA process is summarised as follows.

A scoping exercise was initially completed to identify the European sites that fall within the Local Strategy area. This exercise then proceeded to identify which of these sites are likely to remain unaffected by the Local Strategy and hence not requiring to be considered further. 7 sites were scoped out, leaving 25 European sites, comprising 18 SAC's, 4 SPA's, and 3 Ramsar Sites, to be considered in the assessment.

A scoping exercise was also completed to investigate which of the Local Strategy Objectives / Actions have the potential for a significant effect on European sites. Potential adverse effects associated with the Local Strategy may occur from a limited number of the Local Strategy objectives. Many of the options are involved with non-environmentally damaging operations, such as development of flood risk community engagement and emergency planning, and hence will not have an adverse effect on the environment.

A screening process was undertaken which involved an assessment of likely significant effects on the identified European sites screened in, taking account of the screened in Local Strategy objectives and the likely impacts from these objectives / actions. The screening exercise concluded that likely significant effects (LSE) could not be ruled out for a total of 18 SAC's, 4 SPA's, and 3 Ramsar sites. Therefore, an appropriate assessment was required for these likely significant effects.

The Appropriate Assessment found that some of the objectives/actions of the Local Strategy could effect the integrity of European sites. However, due to the high level of the strategy it is not possible to conclude with any certainty which, if any sites will be effected, or if the effects will be significant. Subsequent plans and projects / schemes arising from the Local Strategy will need to be subject to HRA if there is a potential to affect European Designated Sites, under the Habitats Regulations.

The assessment showed that for identified likely impacts, effective mitigation approaches are available at lower – tier levels. Provided that effective and appropriate mitigation is implemented it can be concluded that no adverse effects on European Site integrity will occur as a result of adopting the Local Strategy. The Appropriate Assessment therefore concluded that the Local Strategy is not likely to have any significant adverse effects on European sites, alone or in combination with other plans or projects. Detailed assessments will be required at lower-tier levels to identify any likely significant effects at the site-specific level and implementation of the required mitigation to avoid these.