Llanddulas to Kinmel Bay Coastal Defence Improvements

Water Framework Directive Assessment

September 2022

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Revision history

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Carbon footprint

JBA is aiming to reduce its per capita carbon emissions.

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Abbreviations

AOD	Above Ordnance Datum
CCBC	Conwy County Borough Council
CEMP	Construction Environmental Management Plan
CMU	Coastal Management Units
DIN	Dissolved Inorganic Nitrogen
DO	Dissolved Oxygen
DrWPA	Drinking Water Protected Area
EQSD	Environmental Quality Standards Directive
GEP	Good Ecological Potential
GES	Good Ecological Status
HMWB	Heavily Modified Water Body
HTL	Hold The Line
INNS	Invasive Non-Native Species
LDP	Local Development Plan
MAGIC	Multi-Agency Geographic Information for the Countryside
MHWS	Mean High Water Spring
RBMP	River Basin Management Plan
SMP2	Shoreline Management Plan 2
SPA	Special Protection Area

SSSI	Site of Special Scientific Interest
WFD	Water Framework Directive

1 Introduction

1.1 Background

This Water Framework Directive (WFD) assessment has been prepared to inform the development and design of the Llanddulas to Kinmel Bay Coastal Defence Improvements.

The report has been prepared following a range of guidance for WFD assessment:

- Guidance for assessing activities and projects for compliance with the Water Framework Directive, OGN72, Version 1.1, May 2017, Natural Resources Wales.
- Water Framework Directive assessment: estuarine and coastal waters – How to assess the impact of your activity in estuarine (transitional) and coastal waters for the Water Framework Directive (WFD), 9 November 2017, Environment Agency. Available at: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters
- Advice Note 18: The Water Framework Directive, Version 1, June 2017. The Planning Inspectorate. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf
- Local Authority services and the water environment: Advice note on the Water Framework Directive, Natural Resources Wales. Available at: https://naturalresources.wales/media/2627/wfd-docs-eng.pdf

It includes key elements of the Scoping Template provided within the Environment Agency Guidance (2017), which clearly sets out all potential risks to the WFD receptors associated with the proposed development. The Scoping Template has been modified to enable consideration of WFD groundwater waterbodies in addition to surface waterbodies. Data on the status of WFD waterbodies has been obtained from the Water Watch Wales website[1] and the Multi-Agency Geographic Information for the Countryside (MAGIC) website[2].

1.2 Project description

The proposed development seeks to improve the coastal defences along the 11 km coastal frontage between the village of Llanddulas and the seaside resort of Kinmel Bay, on the North Wales coast (Figure 1-1). The study area for this Water Framework Directive (WFD) report encompasses coastal waters (North Wales waterbody) transitional and river waterbodies including the Afon Clwyd and Afon Dullus.

The local planning authority has considered the proposal and concludes that it constitutes Environmental Impact Assessment (EIA) development, under The *Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017*.

The existing coastal defences comprise a combination of timber and rock groynes, rock revetments, shingle beaches and seawalls. The coastal frontage between Llanddulas and Kinmel Bay has been subject to historic coastal flooding leading to flooding of properties and local infrastructure. The proposed defence scheme aims to provide an improved standard of protection (SoP) against current and future coastal storm events associated with climate change.

[1] Water Watch Wales website. Available at: http://waterwatchwales.naturalresourceswales.gov.uk/en/ [Accessed 4 July 2018]

[2] Multi-Agency Geographic Information for the Countryside (MAGIC) website. Available at: http://www.magic.gov.uk/ [Accessed 29 August 2018]

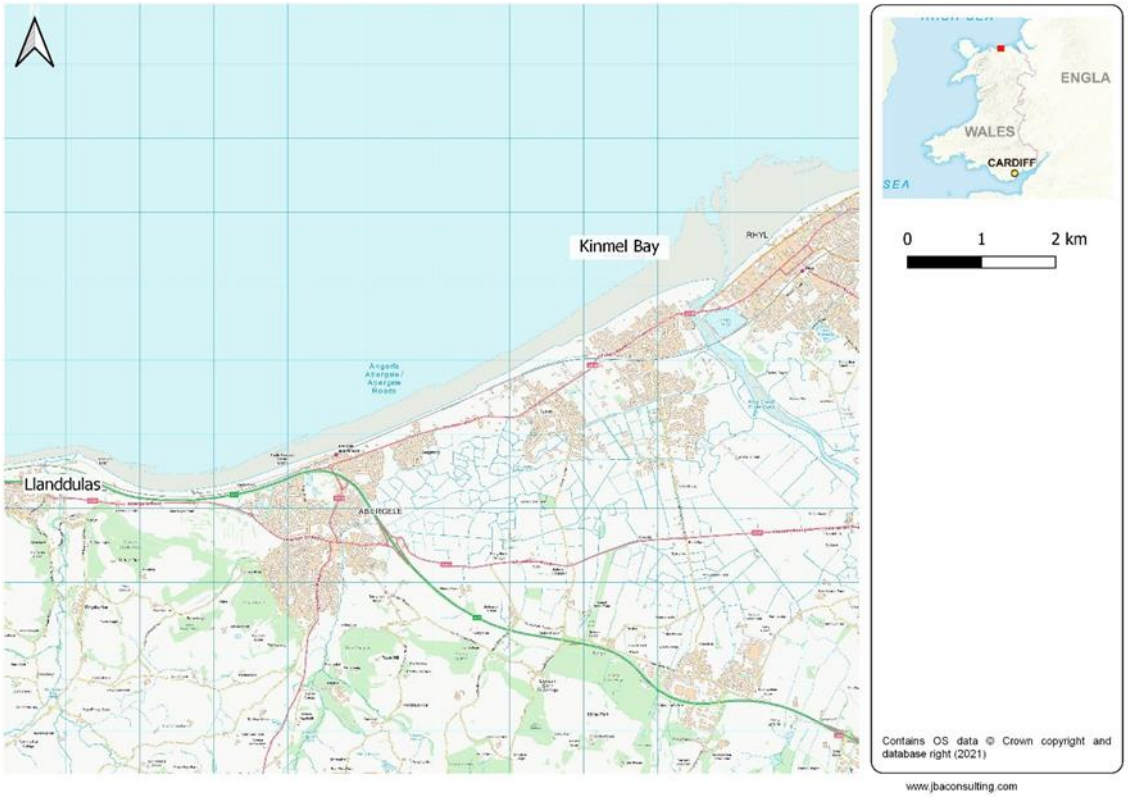

Figure 1-1: Scheme location

The objectives of the Llanddulas to Kinmel Bay Scheme are (as stated in the Outline Business Case, 2021):

- Reduce flood damages to residential and non-residential properties;
- Ensure community and stakeholder 'buy-in' for the Scheme;
- Develop a scheme that is deliverable within engineering time constraints;
- Develop a scheme that is adaptable to change; and
- Sustain and/or improve the tourist and amenity benefits through continued operation of the beach and the North Wales Coastal route.

The design life of the scheme is 100 years.

1.2.1 Proposed development

The proposed development will improve the standard of the coastal flood protection and provide an amenity area as requested by Conwy County Borough Council (CCBC).

The proposed scheme will comprise the following activities:

- Mixed approach: combining hard and soft engineering to protect against future flood risk.
- Soft engineering maximising the use of 'beach recharge' to protect the area with the support of hard structures where the beach recharge alone would not be sufficient to provide the required level of protection.
- Hard engineering using rock revetement, seawalls and replacement of existing flood gates.

Figure 1-2 provides an overview of the respective coastal management units (CMU) within the footprint of the scheme.

Figure 1-2: Scheme overview, with coastal management units (CMU's) identified

Construction methodology

The construction methodology is currently being considered and has yet to be finalised. However, the scheme will adopt the appropriate working practices to limit the impact on the immediate footprint of the scheme and the wider receptors that may be affected by the construction works. Good practice generally follows construction of rock armour revetment being conducted in 10m to 20m sections per tidal cycle. All site material (rock armour and precast concrete units) will be delivered to the site by road access. Beach access for construction works will be via a slipway located at Pensarn Beach. Temporary storage and sorting of rock will take place on the beach adjacent to where the rock will be placed in the revetment.

Construction of the rock revetment toe will require removal of the existing beach material (sand and shingle). Excavated sediments will be temporarily stockpiled next to the excavation. A geotextile membrane will then be laid directly over the excavated area, which will then be covered by a thin filter layer of stone. Graded rock armour will then be placed one-at-a-time onto the filter layer using an excavator with a grab attachment. Once the 10m to 20m section of revetment toe is complete, the previously excavated sand/shingle material will be reused to cover over the toe rock to the existing beach level. Construction of the remainder of the rock revetment section to the required crest level will then take place using the excavator positioned either at the toe area or from the rear of the beach. The works will progress in this fashion until revetment works are complete.

Further details are to be submitted once the construction methodology has been finalised.

1.2.2 Breakdown of proposed development aspects

Table 1.1 provides a breakdown of the individual components of each proposed scheme relative to the respective CMU as set out in Figure 1-2. These aspects will be assessed to determine whether they could cause or contribute to the deterioration in status of a waterbody or inhibit a waterbody from achieving its status objective.

Table 1.1: Breakdown of individual components of the proposed development

Components of the proposed development

CMU 3-2A: Llanddulas Revetment
The proposal is to maintain defences to current defence standard by regular monitoring and maintenance and appropriate actions as any issues become apparent. No further intervention is considered along this area. Monitoring and maintenance of the existing structure's toe will be required since beach levels may lower with time.
CMU 3-2B: Llanddulas Beach
It is proposed to include a setback flood wall along the CMU and the enhancement of the rock revetment at the eastern end of the frontage. The new defence will stretch roughly 350 m, along two existing bays bound by substantial rock groynes. The raised embankment will be tied into existing raised ground to prevent the new defence being outflanked in coastal flood conditions. The level of the embankment crest will provide adequate protection considering the recommended allowances for sea level rise. The new defences are designed to offer a standard of protection (SoP) up to a 1 in 200-year coastal flooding event through to the year 2041.
CMU 3-4: Pensarn Beach
This area is of great importance due to the presence of the Traeth Pensarn SSSI, an area of special botanical interest for its vegetated shingle beach plant communities. The stretch of frontage is suffering from long-term retreat and consequent realignment caused by the limited supply of shingle material from the west. The preferred option proposes an initial substantial capital beach nourishment with a programme of maintenance including periodic beach recharge which will provide supply of material to the starving beach, allowing the ridge to recover and vegetation to flourish. The nourishment will need regular maintenance to make sure the area of vegetated shingle does not narrow, given that there is limited supply of shingle material from the west due to existing coastal defence works. It is however expected that storms will still potentially affect the ridge, though a larger beach will provide valuable dissipation of wave energy. Beach recharge at this location will benefit the adjacent Pensarn Beach to the east via the eastern littoral drift of sediments. Further along this frontage there is a need to maintain defences to the current defence standard by regular monitoring and maintenance. Appropriate actions are to be taken as any issues become apparent (e.g., breached defences). Overtopping analysis has shown that although the standard of protection will decline with time, due to sea level rise, the stretch of frontage will still provide adequate protection, though may suffer from coastal squeeze in the future.
CMU 3-5A. Belgrano Beach
The coastal defence upgrade in this CMU has been divided into two schemes, one at the western end of Belgrano beach, where an existing sea wall currently offers limited coastal flood protection and the other at the eastern end where there is a set-back seawall from the beach. The proposed designs for the coastal defence upgrade will be new rock armour defences in both sites: In the western site, rock armour will be placed in front of the existing sea wall, with a crest width of 6 m and a slope angle of 1 in 4. The total length of this rock armour installation will be 500 m. The rock armour is designed to offer wave overtopping protection for a 1 in 200-year event in 2041. The eastern site will involve new rock armour, extending eastwards from the existing rock armour. The total length of the western rock armour unit will be 300 m, with a crest width of 5 m, and transitions from a 1 in 3 slope to 1 in 2 as the beach gets wider. The rock armour is designed to offer wave overtopping protection for a 1 in 200-year event in 2041.
CMU 3-5B. Towyn Revetment

The proposed upgrade will significantly increase the level of coastal flood protection offered by the current rock armour unit. The new design will keep the 1 in 4 slope angle of the current rock armour unit but increase the crest width and height so that a SoP is achieved for a 1 in 200-year event up to the year 2041. The new design reuse and repurpose the current rock armour material. The existing sea wall is being raised by 0.75 m.

CMU 3-5C. Kinmel Bay Beach

This section requires several actions comprising an increase in the height of the seawall crest by 500 mm along the entire unit, and upgrade/replace existing flood gate at the car park. The level of the seawall crest will be increased to provide improved wave overtopping flood protection to Kinmel Bay, accounting for Sea Level Rise (SLR) up to 2041.

The section also includes re-profiling the level of the entrance to the car park located at the end of St Asaph Avenue. This localised change in elevation will provide flood protection landwards by preventing water entering the main town, with any flood water returned to the sea by flap gates.

The existing rock revetment at the eastern end of Kinmel Bay Beach will be enhanced and upgraded. The existing seawall behind the rock armour will be raised by 500 mm and new rock armour installed in front. The rock armour will have the same crest level as the wall, a crest width of 5.6 m and a slope angle of 1 in 3. The length of the new rock armour unit will be approximately 420 m. Additional to the coastal flood protection offered by the rock armour design, ecological enhancements are being provided with the creation of artificial rock pools to provide new habitats and texture to the surface of the rock armour to encourage colonisation by marine invertebrates. The rock pools will be placed at different levels on the cross section of the rock armour to provide habitat opportunities during different tide cycles.

Re-instate sand dunes where necessary along the stretch to the east of the car park at the end of St Asaph Avenue, where gaps exist along the landward side of the foot/cycle path. The reduction of the overtopping along this CMU is characterised by the enhancement of the existing revetment at the eastern end. The benefit of this action is in the reduced risk of siltation problems at the mouth of River Clwyd.

1.3 Purpose of the report

1.3.1 Scope of this assessment

The WFD (2000/60/EC) is implemented in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, which revoke and replace the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. The framework for delivering requirements of the WFD is through the River Basin Management Plan (RBMP).

The Regulations require that Environmental Objectives are set for all surface (including river, lake, coastal and transitional waters and groundwaters in England and Wales to enable them to achieve a 'Good' status by a defined date. These Environmental Objectives are listed below:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least Good status for all waterbodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve Good status by 2021 or 2027;
- Meet the requirements of WFD Protected Areas;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

Surface waterbody status is made up of its ecological status and its chemical status. Ecological status is defined by a series of biological 'quality elements' and physico-chemical, hydromorphological, and chemical 'supporting elements' (which support the biological elements). Chemical status comprises a series of priority substances and other pollutants listed in the Environmental Quality Standards Directive (EQSD). These quality elements are taken from Annex V of the Directive.

The status of all relevant quality elements is classified according to five categories: 'High', 'Good', 'Moderate', 'Poor' and 'Bad'. The overall status of a waterbody is determined by the lowest elements status e.g., if all biological quality elements and supporting elements are at 'Good' status, except for one, which is at 'Moderate' status, then the ecological status is 'Moderate' and the overall status is 'Moderate'. Published guidance requires that all quality elements need to be considered as part of a WFD assessment.

Groundwater waterbody status is defined by its 'quantitative status' and its 'chemical status'. Two classes are attributed to both quantitative and chemical status: 'Good' and 'Poor'. Both elements need to be at good status before the waterbody can be classified as 'Good'.

Under the WFD, Heavily Modified Waterbodies (HMWB) are bodies of water that are substantially changed in character due to physical alterations by human activity and cannot meet 'Good Ecological Status' (GES). Therefore, mitigation measures are set for the waterbody so that it achieves 'Good Ecological Potential' (GEP). This assessment therefore must consider whether the proposed scheme will conflict with the measures in place now or planned for the future, and whether this could affect the status of the hydromorphological quality elements (and ultimately the status of the waterbody).

1.3.2 Small non-reportable waterbodies

All waterbodies are protected under WFD. This includes stretches of water considered too small to be a formal WFD waterbody, such as ditches, small streams, and brackish lagoons. As such, deterioration of such water should be prevented. In the absence of any classification data relating to these waterbodies, it should be assumed that they are at 'Good' status. Therefore, any proposed development that could affect such a waterbody should be assessed to determine whether it could cause deterioration from good status. There are no known non-reportable waterbodies within the scheme area.

1.3.3 Protected areas, priority habitats and invasive non-native species

Published guidance states that the WFD assessment must also consider the potential impacts on the following:

- Protected areas – these are defined under Article 6 of the Directive and include the following:
  - Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
  - Areas designated for the protection of economically significant aquatic species (Freshwater Fish and Shellfish);
  - Bodies of water designated as recreational waters, including areas designated as Bathing Waters;
  - Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Directive (UWWTD); and
  - Areas designated for the protection of water-dependent habitats or species, including relevant Natura 2000 sites.
- Priority Habitats – these are "habitats of principal importance for the conservation of biodiversity", which are defined under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 in England and Section 7 of the Environment (Wales) Act 2016 in Wales. Detailed assessment is required if a proposed development would significantly impact on a priority habitat that is critical to the ecological health of a waterbody i.e., directly impacts habitats that are critical to the individual biological quality elements.
- Invasive non-native species (INNS) – assessment of INNS is required if a development could cause the introduction or spread of INNS into a waterbody.

1.3.4 Approach to WFD Assessment

All new activities in the water environment need to take account of the requirements of the WFD. For a project or activity to be compliant with the WFD, it should demonstrate that:

- There is no risk of it causing a deterioration in the status of any element; in addition for groundwater, it will limit or prevent the input of pollutants;
- There is no risk of it preventing WFD protected areas from achieving their objectives;
- It will not jeopardise any waterbody from achieving good status/potential; and
- It will contribute to the protection, enhancement, and restoration of waterbodies.

Therefore, this WFD assessment aims to determine whether the proposed development would have the potential to cause or contribute to the deterioration in status of a WFD waterbody or inhibit a waterbody from achieving its status objective. It also assesses the potential for the development to contribute to the objectives of the WFD.

The assessment identifies all activities that will take place as part of the proposed development, during both construction and operation, and where risks of an impact on the WFD quality elements might arise due to these activities.

This assessment follows published good practice guidance and has been undertaken following a staged approach:

- Stage 1: screening – to determine whether any activities associated with the proposed development do not require further consideration i.e., do not need to go through the scoping or impact assessment stages because there is no more than a low risk of a potential impact on a waterbody;
- Stage 2: scoping – identifies the potential risks associated with the proposed activities and the WFD receptors that are at risk i.e., those risks that need impact assessment; and
- Stage 3: impact assessment – a detailed assessment of the potential impacts of each activity, including consideration of ways to avoid or minimise impacts, and possible enhancement opportunities, to determine whether an activity may cause deterioration or jeopardise the waterbody from achieving good status.

This staged approach is summarised in Figure 1-3, which reproduces an assessment flow checklist taken from the Natural Resources Wales WFD guidance (2017). The NRW guidance also includes detailed screening criteria that can be used to determine whether a proposed activity is not likely to cause a deterioration in the status of a waterbody. This includes a list of activities that in general will not cause a deterioration, such as 'temporary' works that do not normally last more than six months and are not likely to have a residual impact on a waterbody. The guidance also lists other physical works and defines screening thresholds for each; these thresholds help to determine whether any activity presents a risk to a waterbody and any requirements for further assessment. However, these thresholds are for guidance only and expert judgement is required to determine if a proposed activity may have an impact on a waterbody.

A more detailed WFD assessment would be required if it cannot be concluded that the proposed development would not cause deterioration or inhibit the objective status of a waterbody. Further to this and in line with WFD requirements, there would be a need to apply the Article 4.7 test to seek approval for progression of the development if, after the full WFD assessment (including the implementation of mitigation measures), it cannot be determined that the development would not cause deterioration to a waterbody or prevent it from achieving its status objectives.

1.3.5 Cumulative and in-combination impacts

Good practice guidance published by NRW (2017) requires that the proposed development is also assessed for potential cumulative and in-combination impacts.

Cumulative impacts are multiple impacts on the same waterbody quality element that arise from the proposed development together with those from all developments that have been built and are operational.

In-combination impacts are those impacts that may arise from the proposed development in-combination with other plans and projects proposed/consented but not yet built and operational i.e., those developments that are separate from the baseline. These include:

- Activities started but not yet completed;
- Activities consented but not started;
- Ongoing activities subject to repeated authorisations (e.g., annual licenses);
- Application submitted but not yet determined; and
- Activities not requiring consent, but which have been approved by the relevant competent authority.

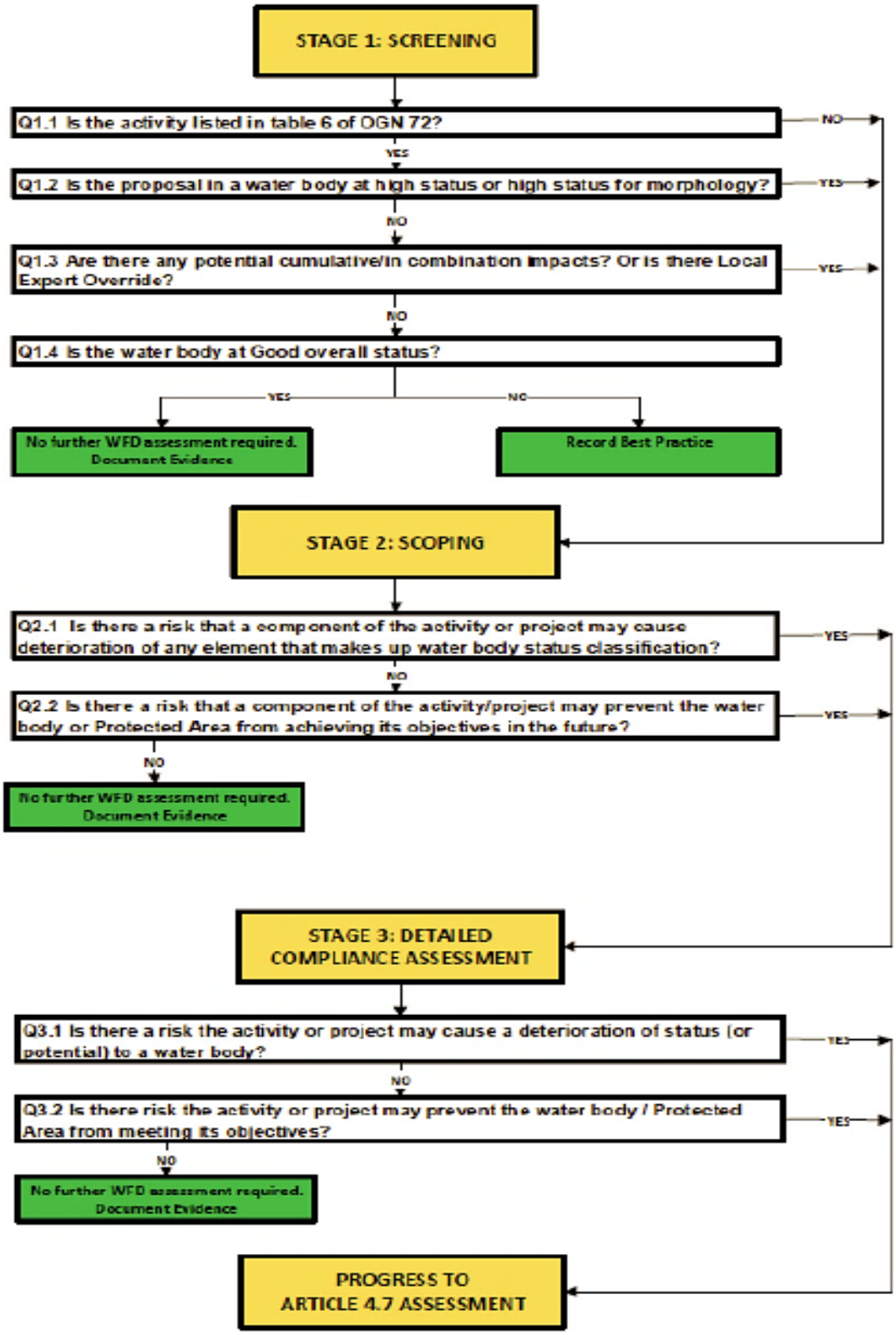

Figure 1-3: WFD assessment process flowchart obtained from Natural Resources Wales WFD guidance (2017).

2 Baseline conditions

2.1 Relevant WFD waterbodies

The Water Watch Wales website shows that the proposed scheme lies within the 'North Wales coastal waterbody' (WFD Ref: GB641011650000).

2.2 North Wales coastal waterbody

The North Wales coastal waterbody encompasses a 45km stretch of the North Wales coast from Great Ormes Head to the Wales/England border, equating to an area of 146.25km^2. The waterbody is designated as a Heavily Modified Waterbody (HMWB) due to modification associated with coastal protection.

The waterbody is currently assessed as having an overall status of 'Moderate', with 'Moderate' ecological potential, whilst its chemical status is currently 'Fail'. The quality elements that are contributing to the failing status of the waterbody include mercury (and it compounds) from an unknown source and Dissolved Inorganic Nitrogen (DIN) from dairy and beef farming and non-mains domestic sewage. Table 2.1 provides a summary of the previous RBMP Cycle 2 (2015) and RBMP Cycle 3 (2021) status of the WFD quality elements for the waterbody.

Table 2.1: WFD quality elements and status for North Wales coastal waterbody

Waterbody criteria		RBMP Cycle 2 (2015)	RBMP Cycle 3 (2021)
Ecological quality elements			
Phytoplankton		High	Moderate
Invertebrates		Good	Good
Physico-chemical supporting elements			
Flow		Pass	Pass
Dissolved Oxygen		High	High
Dissolved Inorganic Nitrogen		Moderate	Good
Annex 8 Chemicals		High	High
Chemical quality elements			
Arsenic		Good	High
Copper		Good	High
Iron		Good	High
Zinc		Good	High
Annex 10 Chemicals	Benzo(a)pyrene	Good	High
	Cadmium	Good	High
	Fluoranthene	Good	High
	Hexachlorobenzene	Good	High
	Hexachlorobutadiene	Good	High
	Lead and its compounds	Good	High
	Mercury and its compounds	Fail	Moderate (Fail)
	Nickel and its compounds	Good	High

2.3 The current site WFD status

Within the vicinity of the Llanddulas to Kinmel Bay Coastal Defence Improvements scheme there are various waterbodies that are subject to status classifications under the Water Framework Directive. These waterbodies and the associated status from the most recent assessment Cycle (2021) is listed in Table 3.

Table 2.2: Summary of WFD Waterbodies

Waterbody Type	Name	Status (2021)
Transitional	The River Clwyd	Moderate
River	The River Clwyd	Moderate
	The River Elwy	Good
	The River Dulas (lower)	Poor
	The River Dulas (upper)	Good
	Nant y Fedw (Dulas)	Moderate
Coastal	North Wales	Moderate
Groundwater (chemical)	Clwyd Permo-Triassic Sandstone and Clwyd Silurian	Good
	Conwy	Poor

2.3.1 River water status

Figure 2-1 identifies the river Water Framework Directive waterbody status of the site. This includes the following waterbodies

- The River Clwyd marks the boundary between Rhyl and Kinmel Bay. The transitional (between riverine and coastal) water body near the river mouth has "Moderate" status under the Water Framework Directive's classifications.
- The river waterbody of the River Clwyd has "Moderate" status and the tributary, River Elwy, has "Good" status.
- The lower River Dulas, in Llanddulas also has "Poor" status while the upper is "Good".
- The Nant y Fedw (Dulas) River is designated "Moderate".

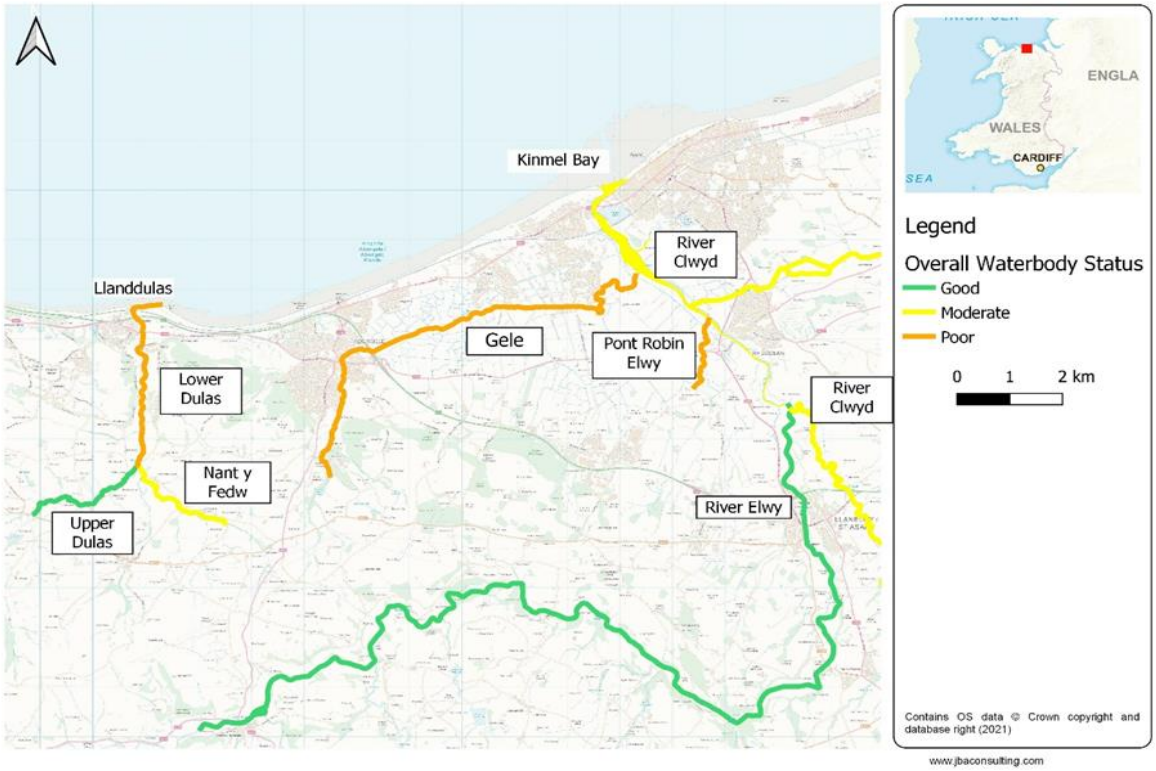

Figure 2-1: Water Framework Directive - River Waterbody Status

2.3.2 Groundwater Status

The Groundwater (Quantitative) classification for the study area is "Good" and the Groundwater (chemical) is mostly "Good", with the exception of a section to the south of Llanddulas where the Upper Dulas and Nant y Fedw meet the lower Dulas. The adjacent Groundwater body is classified as "Poor" for chemical status, although this is not expected to be impacted by the proposed defence scheme, Figure 2-2.

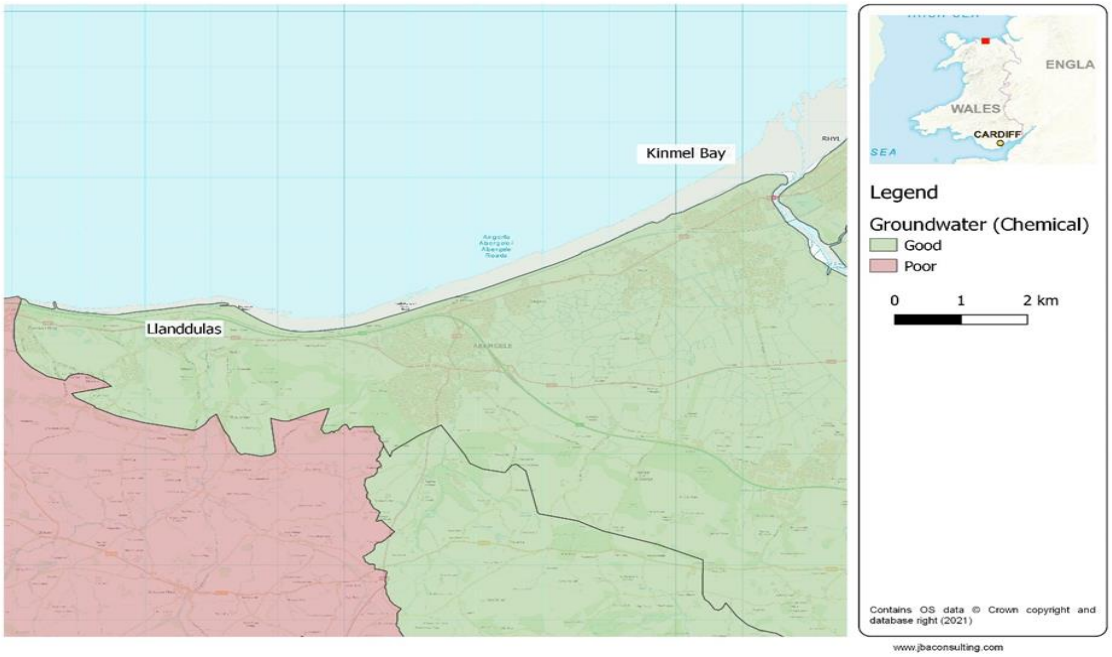

Figure 2-2: Water Framework Directive - Groundwater (chemical) status

2.3.3 Coastal Waterbody

The North Wales Coastal Waterbody is designated as a Heavily Modified Water Body and has an overall status classification of "moderate" based on the 2015 assessment, Figure 2-3. It is classified as "moderate" ecological status and "fail" for chemical status, as of 2015.

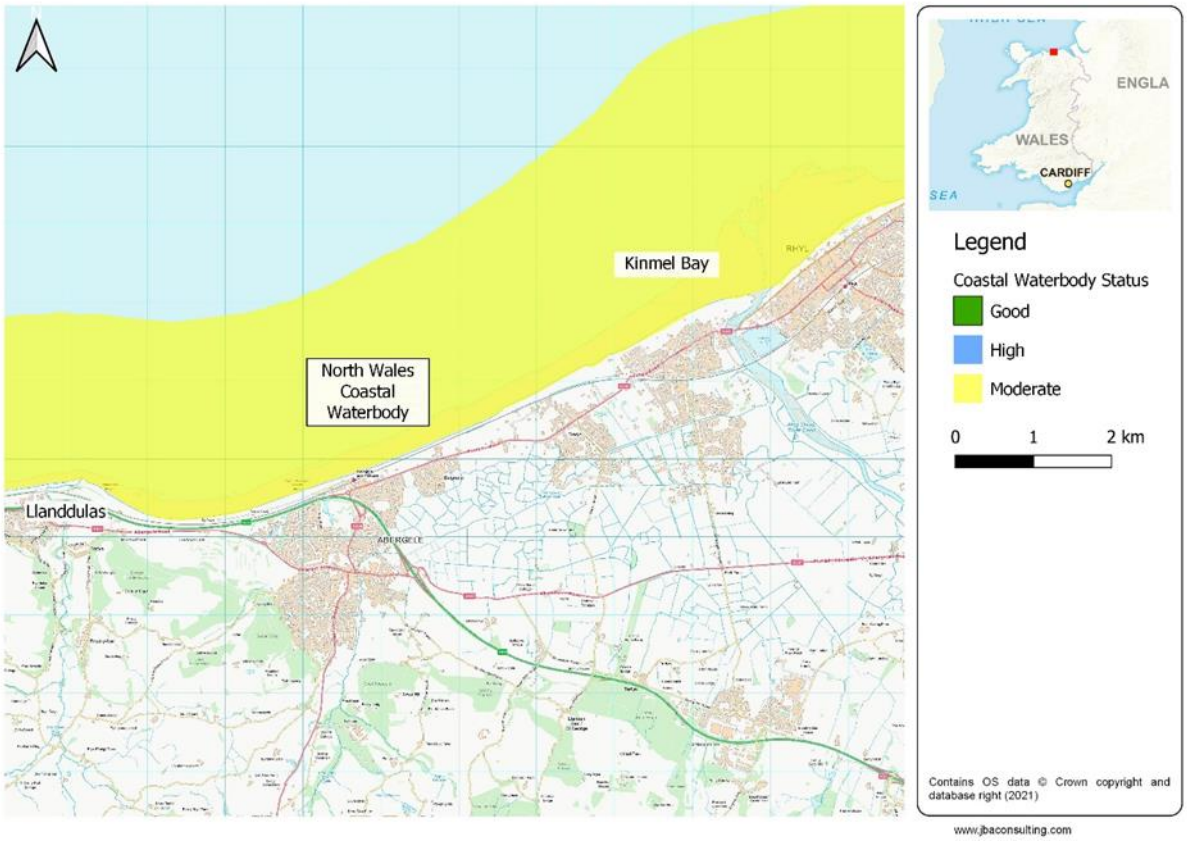

Figure 2-3: Water Framework Directive: North Wales Coastal waterbody

2.3.4 Mitigation measures

For each HMWB, mitigation measures are set within the RBMP to ensure the hydro-morphological characteristics of a waterbody are consistent with GEP.

For the North Wales coastal waterbody, a series of mitigation measures are identified. Many of these measures are related to the control of dredging activities and disposal of dredged materials; as such the proposed scheme will not affect these activities or decision-making relating to the control of these activities. Therefore, these measures are not considered further. The following mitigation measures are relevant to the proposed scheme:

- Indirect mitigation
- Reduce sediment resuspension
- Manage disturbance
- Retain habitats
- Enhance ecology
- Realign flood defence
- Preserve or restore habitats

Typically, for a waterbody to be able to achieve GEP all mitigation measures must be in place and functioning. An assessment of the mitigation measures for the North Wales coastal waterbody (see Water Watch Wales website) identifies that the status of these mitigation measures is "Good" and that the measures listed are 'not currently applicable – not required in this waterbody'. This indicates that the hydromorphological characteristics of the waterbody are consistent with GEP and that implementation of further mitigation measures is not required at this time.

2.4 Clwyd Permo-Triassic Sandstone groundwater body

The Clwyd Triassic Sandstone groundwater body spans a broad area along the North Wales Coast, from Llanddulas to Prestatyn, and south to Llysfasi. It encompasses an area of 237.32km^2 in size.

The waterbody has a quantitative status of 'Good' and a chemical status of 'Good', giving it an overall status of 'Good'.

2.5 Protected areas, priority habitats and invasive non-native species

The coastline is of high biodiversity value based on the variety and importance of ecological designations. The MAGIC website identifies that there are several WFD Protected Areas within 2km of the proposed scheme. These comprise:

Within scheme area

- Clwyd Permo-Triassic Sandstone Drinking Water Protected Area
- Abergele (Pensarn) Bathing Water
- Kinmel Bay (Sandy Cove) Bathing Water

Within 500m of the scheme area

- Liverpool Bay Special Protection Area (SPA)
- Marine Lake Bathing Water

Within 2km of the scheme area

- Rhyl Bathing Water
- Rhyl East Bathing Water

The following priority habitat (as defined by Section 7 of the Environment (Wales) Act 2016) is present within 500m of the proposed scheme:

- Subtidal sands and gravels located amongst the scheme area.

The following WFD Higher Sensitivity Habitats are present within 500m of the proposed scheme:

- Mussel Beds (*Modiolus modiolus*, *Mytilus edulis* & others)

The ecology surveys of the scheme area undertaken May 2022 did not identify the presence of this habitat and concluded that the habitat may be ephemeral, with the potential to return in the future.

The following WFD Lower Sensitivity Habitats are recorded within 500m of the proposed scheme:

- Intertidal Soft Sediment (Sand, Mud & Mixed A2.2, A2.3, A2.4) within and immediately adjacent to the scheme area.
- Small amounts of Rocky shore (Intertidal rock A1) within and immediately adjacent to the scheme area.

An Ecological Impact Assessment (EcIA) of the proposed development confirmed that there are no historic records of INNS within 2km of the development site.

2.6 Assessment of other activities (plans and projects) requiring assessment for potential cumulative and in-combination impacts

The following plans and projects have been reviewed to identify the potential for cumulative or in combination impacts.

Welsh National Marine Plan

The Draft Welsh National Marine Plan ended its consultation period in March 2018. This is directly informed by High Level Marine Objectives set out in the Marine Policy Statement (2011)[3]. The Plan will guide decision-making on the sustainable use and management of the Welsh coastline.

The Plan sets out the following Plan Objectives that are relevant to the WFD:

- Plan Objective 6: Support enjoyment and stewardship of our coast and seas and their resources by encouraging equitable and safe access to the marine environment, whilst protecting and promoting valuable landscapes, seascapes and heritage assets.
- Plan Objective 7: Improve understanding and enable action supporting climate change adaptation and mitigation
- Plan Objective 8: Support the achievement and maintenance of Good Environmental Status (GES).
- Plan Objective 9: Protect, conserve, restore and enhance marine biodiversity to halt and reverse its decline.
- Plan Objective 10: Maintain and enhance the resilience of marine ecosystems and the benefits they provide in order to meet the needs of present and future generations.

The objectives of the draft Plan are consistent with those of the WFD and the policies it proposes seek to ensure clean, healthy, and biologically diverse seas. As such, there should be no cumulative or in-combination effects with the draft Marine Plan.

Western Wales River Basin Management Plan (Natural Resources Wales, December 2015)

The measures contained within this plan aim to improve the ecological and chemical status of the waterbody. These measures are not likely to cause an adverse effect on the waterbody and may deliver significant benefits. As such, there would be no cumulative or in-combination effects with the proposed development.

Great Orme's Head to Scotland Shoreline Management Plan (SMP2) (North West England and North Wales Coastal Group, 2018)

The SMP2 sets out the long term (100 year) strategic policies to manage coastal flood and erosion risk in the strategy area, which encompasses Llanddulas, Kinmel Bay and the wider North Wales coastline. It informs decision-making at project level and coastal flood defence activities should be taken in-accordance with the overarching strategic policies as defined by the SMP2.

The scheme area is located within SMP2 sub-cell 11a; the strategic policy to manage coastal flood and erosion risk is Hold the Line (HTL) for the next 100 years (to 2105). The policy states that maintaining and improving/raising the existing defences is required. This is justified in the SMP due to the commercial, residential and amenity assets, infrastructure, cycle routes and footpaths that are vulnerable to flooding under a do nothing scenario. The proposed scheme is therefore consistent with the strategic flood risk management policies for this coastline.

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[3] Welsh Government, 2015. The Welsh National Marine Plan Initial Draft. [Online] Available at: https://beta.gov.wales/sites/default/files/consultations/2018-02/draft-plan-en.pdf

Conwy Local Development Plan 2007-2022 (Conwy County Council, October 2013)

The adopted Local Plan includes policy provisions for the protection of the water environment in-accordance with national policy. This includes Policy NTE/5, which protects important statutory and locally designated coastal sites from adverse impacts from development, and NTE/3 which seek to safeguard biodiversity (e.g., protected species and nature conservation sites) and NTE/4, which aims to conserve special landscape areas from future development. These elements of the Local Plan require any proposed development to integrate mitigation and minimise impacts as part of any scheme.

In addition, the LDP includes policy provisions promoting other aspects of the Plan area and identifies the Llanddulas and Kinmel Bay area as an important local tourism/recreation centre that has the potential to contribute to the growth of the local economy. The LDP supports this through a range of policy provisions including Policy DP/1 (Sustainable Development Principles), DP/5 (Infrastructure and New Developments), TOU/1 (Sustainable Tourism), CFS/1 (Community Facilities and Services) and CFS/3 (Primary Shopping Areas).

Implementation of these and other associated environmental policies will deliver benefits to the water environment and support achievement of WFD objectives. In addition, permission for development allocated in the LDP should only be granted if these developments are in-accordance with these environmental policies; these developments should include adequate safeguards to ensure no adverse impact on the water environment and should support deliver of WFD objectives. As such, there will be no cumulative or in-combination effects with the proposed development.

Local development projects

A review of other local development projects has been undertaken to determine the potential for significant cumulative and in-combination effects. These are documented in Table 2.3.

Table 2.3: Proposed development projects which may cause cumulative and in-combination effects, impacting on the status of WFD waterbodies.

Application number	Location	Description	Status
0/49272	Old Colwyn Coastal Defence & Active Travel Improvements: Porth Eirias in the west to Splash Point (By Old Colwyn Arches) in the east	Coastal and storm defence scheme including construction of a rock revetment and improved pedestrian and cycle access with associated public realm improvement works along Colwyn Bay. Construction and completion of works based on period of 20 months (two phases of 10 months). Material may be delivered by road and barge.	Registered 04/01/2022
0/49274	Penrhyn Bay Coastal Defence and Public Realm Improvements: Penrhyn Bay Conwy	Construction of coastal defences including a T-shaped rock groyne, eastern groyne raising, repairs to the existing seawall, beach nourishment and public realm improvements including pedestrian/cycle crossing, beach access ramp, re-located and extended car parking, street furniture, promenade resurfacing and soft landscaping.	Registered 04/01/2022

0/49306	Beach and Promenade at Colwyn Bay between Colwyn Bay Station and Abbey Road	The Colwyn Bay Phase 2B: coastal works, public realm promenade improvements, and landscaping works.	
-	Central Rhyl Coastal Defence Scheme	New concrete stepped revetment and wall wave, with promenade raising/widening, and section with rock scour protection and concrete repairs to the existing sea defence structures. Construction works to commence in late 2022 for a period of 2.5 years. The eastern section will take place over 1.5 years at the start of the main construction period and finishing first, while the western works will be ongoing throughout the construction period.	
-	Awel-y-Mor (AyM) Offshore Windfarm	An 78km^2 offshore wind farm 10.5 km off the Welsh coast. Construction works are expected to start after 2025. AyM export cables will be installed using trenchless technology to pass under existing coastline infrastructure including North Wales Coast Line railway, Robin Hood Holiday Park, Rhyl Coast Road A548, Rhyl golf club fairway and the promenade. Construction period will be 7 months in total.	PAC period ended 11th October 2021

The developments described have the potential to create cumulative and/or in-combination effects when considered in addition to the Llanddulas to Kinmel Bay scheme. Any such effects may have a detrimental effect on the associated WFD waterbodies, namely, the North Wales coastal waterbody. The developments with the exception of Awel-y-Mor Offshore Windfarm, are located adjacent to the North Wales coastal waterbody; any impacts arising from these proposed works whilst not considered significant, are expected to result in increased construction related activities. This mat result in increased sediment entrainment into the waterbody potentially increasing turbidity. However, the scale of these works relative to the area of the waterbody (146.25 km^2) are considered to not be significant.

A review of planning applications and permissions submitted to the online planning portal in 2020 – 2022 has been undertaken for electoral districts Kimnel Bay, Towyn, Pensarn, Pentre Mawr, Gele, Llanddulas and Llysfaen. Those applications received are not considered to create a significant cumulative impact on any WFD waterbodies.

3 Stage 1: Screening assessment

Published guidance states that a WFD assessment is not required if an activity is assessed as being low risk, i.e., all criteria set out in stage 1 screening are met (see

) or where there is no (adverse) impact pathway to a WFD waterbody. Maintenance, repair, and changes to the operation of existing structures still in use for their original design

purpose, where the design and the footprint of the structure remain the same, and the same or equivalent materials are used, can in most cases be screened out.

In relation to the Clwyd Permo-Triassic Sandstone groundwater body, no aspect of the proposed works would include abstraction of water, or excavation of land large enough to impact upon this groundwater body. No hazardous chemicals would be used during construction or operation of this structure, and no pathway would be created linking any construction materials to the groundwater waterbody. Therefore, no impact upon the quantitative or chemical status of the waterbody is anticipated and no further assessment upon this waterbody is undertaken.

The outcomes of the screening assessment in relation to the North Wales coastal waterbody are summarised in Table 3.1.

Table 3.1: Screening assessment**Error! Reference source not found.**

On the basis of the above screening assessment, potential risks to the North Wales Coastal Waterbody are limited to the following activities:

- Construction of rock armour revetment.
- Operation of the completed flood defence scheme.
- Beach recharge scheme CMU 3-3 and CMU 3-4.

These aspects will be taken forward to the next stage (Stage 2) of the assessment process, impact scoping, to further assess the potential for an adverse impact on the status on the North Wales coastal waterbody and its associated WFD objectives.

4 Stage 2: scoping assessment

The purpose of the Scoping Assessment is to identify whether aspects of the proposed development not screened out during Stage 1 could present a significant risk to any of the WFD quality element receptors. In doing so, it assesses whether these activities may cause deterioration in the status of a quality element or prevent the waterbody (or protected area) from achieving its WFD objectives in the future, Table 4.1. to Table 4.6.

It utilises the Scoping Template provided within the Environment Agency guidance (2017), which comprises a series of scoping tables that aim to identify the need for a further, more-focussed impact assessment (Stage 3). Such a detailed impact assessment draws upon more in-depth evidence to determine whether the risks identified for each quality element could cause a deterioration in the status of a waterbody or prevent a waterbody from achieving its WFD objectives.

4.1 Hydromorphology

Table 4.1: Hydromorphology assessment

Could any activity:	Yes/No	Hydromorphology risk issue(s)
Impact on the hydromorphology of a waterbody at High status?	No	The North Wales coastal waterbody is not at High status for its hydromorphological supporting elements.
Is in a waterbody that is heavily modified for the same use as the activity?	Yes	The North Wales coastal waterbody is a HMWB due to modifications associated with coastal protection.
Significantly impact the hydromorphology of any waterbody?	No	A detailed coastal processes assessment has been undertaken to determine whether the proposed scheme could have a significant impact on sedimentary processes, beach morphology and hydromorphology. The assessment considers potential impacts in relation to the storage of rock along the beach frontage, excavation of the rock revetment area, and as a result of operation of the completed scheme. **It concludes that potential impacts are not likely to be significant.** Excavation of the rock revetment toe will require the temporary storage of excavated materials on the beach. The expectation is that this material will be excavated, stored, and returned to the excavated area as backfill within a single tidal cycle; as such, all works will be undertaken in dry conditions and the risk of entrainment of material will be significantly reduced. However, in a worst-case scenario, if excavated materials are mobilised, the impact on the existing sediment regime and near shore turbidity is assessed as being slight. Operation of the finished flood defence scheme is not likely to significantly affect sediment supply or longshore drift processes. The primary sediment supply mechanism along this section of coastline is considered to be via onshore movement of sand ridges. Sediment distribution continues to extend alongshore and is subsequently moved onshore through wave action. The presence of the rock revetment has the potential to retain sediment and thereby remove it from the longshore transport budget. However, the total footprint of the rock revetment is small in relation to the available intertidal area and therefore any impact on the sediment regime is likely to be no more than slight. The proposed beach recharge between CMU 3-3 and CMU 3-4 has the potential to impact on the North Wales coastal waterbody with increased sediment inputs. However, it is suggested that the

		impacts would be slight in comparison to natural entrainment of subtidal and intertidal material (through onshore/offshore sediment flux and beach ridge migration) and would have a negligible impact on the existing sediment regime and nearshore turbidity. As such, no significant impact on waterbody status is likely.

4.2 Physico-chemical

Table 4.2: Physico-chemical scoping assessment

Could any activity:	Yes/No	Physico-chemical risk issue(s)
Affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns continuously?	No	Extensive earthworks are required adjacent to the existing defences to enable construction of the rock armour revetment. These works are temporary in nature. The rock armour will be installed in short sections. For each section, all excavated beach material will be temporarily stockpiled adjacent to the excavation and then returned to the excavated area once the rock armour is in place and before it is inundated by the incoming tide. Notwithstanding this, the impact of beach sediment entrainment has been assessed as part of a wider coastal processes chapter. This assessment concludes that should excavated beach material be entrainment, the effect on the sediment regime and near shore turbidity would be moderate at worst. However, this risk is mitigated by the phased approach to the excavations, significantly reducing the amount of material available for entrainment at any one time. As such, the risk of a significant impact on water quality as a result of sediment mobilisation is assessed as being low. No impacts on water quality are anticipated as a result of operation of the proposed scheme.
Is in a waterbody with a phytoplankton status of moderate, poor or bad?	No	The phytoplankton status of the waterbody is High.
Is in a waterbody with a history of harmful algae?	No	There is no evidence to indicate that the waterbody has a history of harmful algae.

4.3 Biology

4.3.1 Habitats

Table 4.3: Biology (habitats) scoping assessment

Is the footprint of any activity:	Yes/No	Biology (habitats) risk issue(s)
0.5km^2 or larger?	No	The area of works associated with construction of the rock armour revetment is significantly less (0.02km^2) than 0.5km^2.
1% or more of the waterbody's area?	No	
Within 500m of any higher sensitivity habitat?	Yes	The nearest higher sensitivity habitat (mussel bed) is located approximately 30m to the north of the proposed rock revetment, on Rhyl Beach. However, no evidence of this habitat was identified during ecology surveys of the beach area in March 2017 and June 2018, and it is possible that the habitat is ephemeral.

		Priority habitats within 500m include *Sabellaria alveolata* reef, which has historically been recorded on the timber groynes present along the foreshore (but was not recorded there during the 2017 and 2018 surveys – the nearest extent was located approximately 300m north of the proposed scheme area at the low tide mark), and subtidal sands and gravels located approximately 300m to the north of the scheme area. An EcIA of the proposed scheme (see ES Chapter 5) concludes that the proposals are not likely to have a significant impact on these habitats. No impact on subtidal habitats is anticipated, whilst in relation to *Sabellaria alveolata* reef, the potential for significant smothering is assessed as being low.
1% or more of any lower sensitivity habitat?	No	The habitats within the scheme are classified as WFD lower sensitivity habitat. However, this habitat extends along the entire North Wales coast from the Little Orme to the Dee Estuary. Therefore, the proposed scheme will result in temporary and permanent impacts on only a very small proportion of this habitat.
Impact on macrophyte or phytoplankton community diversity, condition, or distribution?	No	No adverse impacts on macrophyte or phytoplankton communities are anticipated. Construction of the rock armour has the potential to provide new habitat opportunities for a range of marine fauna and flora.
Impact on invertebrate community diversity, condition or distribution?	No	Within the footprint of the scheme (excavated rock revetment area), the invertebrate community is assessed as being relatively impoverished. However, species living in this area will be directly affected by the excavation of beach material and installation of the rock armour. Notwithstanding this, the significance of any impacts on the invertebrate community are very low given the abundance of similar adjacent habitats and likely rapid re-colonisation of the works area. As such, no adverse impacts on invertebrates are predicted; conversely, construction of the rock armour has the potential to provide new habitat opportunities for a range of marine fauna and flora.

4.3.2 Fish

Table 4.4: Biology (fish) scoping assessment

Could any activity:	Yes/No	Biology (fish) risk issue(s)
Impact on normal fish behaviour, such as movement, migration or spawning?	No	Impacts on fish foraging behaviour during construction (due to rock armour stockpiling reducing available sand foraging habitat) are not likely to be significant due to the abundance of similar habitat in the wider area. In addition, the risk of sediment mobilisation or chemical contamination affecting fish during construction is considered to be low. No significant impacts on fish are anticipated as a result of operation of the proposed scheme.
Could cause entrainment or impingement of fish?	No	Construction and operation of the proposed scheme does not include any aspects that could cause entrainment or impingement of fish.

4.4 Chemical

Table 4.5: Water quality (pollutants) scoping assessment

Could any activity use or release chemicals:	Yes/No	Water quality risk issue(s)
That are on the Environmental Quality Standards Directive (EQSD) list?	No	Beach sediments along the coastal frontage are generally coarse in nature and as such do not provide a favourable substrate for contaminants. Subsequent Ground Investigation works are to be carried out which will involve sediment sampling to determine concentrations of contaminants in accordance with Cefas Action Levels.
That disturbs sediment with contaminants above Cefas Action Level 1?		

Table 4.6: Water quality (mixing zone) scoping assessment

If your activity has a mixing zone consider if:	Yes/No	Water quality risk issue(s)
The chemicals released are on the EQSD list?	No	The proposed scheme will not create a mixing zone.

4.5 WFD Protected Areas

Table 4.7: WFD Protected Areas scoping assessment

Is any activity:	Yes/No	Protected Area risk issue(s)
Within 2km of any WFD protected area?	Yes	There are several WFD Protected Areas within 2km of the proposed scheme. However, no significant impacts on these designated areas is anticipated. Designated Bathing Waters are also present in the area however, the construction and operation of the scheme are not expected to present a detrimental impact on bathing water quality. In addition, a EcIA confirms that the proposed scheme is not likely to have a significant adverse effect on the features of the Liverpool Bay SPA. No impacts on the Clwyd Permo-Triassic Sandstone Drinking Water Protected Area or Nitrate Vulnerable Zone (NVZ) 135 are anticipated.

4.6 Invasive non-native species

Table 4.8: Invasive non-native species scoping assessment

Could any activity:	Yes/No	INNS risk issue(s)
Introduce or spread INNS?	No	There is the potential to contribute to the spread of the invasive barnacle *Austrominius modestus*, which has been identified on some of the timber groynes during the EciA. However, risks associated with this species can be effectively managed through application of good construction practice and robust environmental management procedures, such as storing any affected timber groynes removed during construction above the high-water mark.

4.7 Scoping summary and requirement for impact assessment

The preceding sections provide the scoping assessment of the potential risks to WFD quality element receptors as a result of the proposed scheme. The outcomes of this work are summarised in Table 4.9.

Table 4.9: Scoping summary and further assessment

WFD receptor	Potential risk to WFD receptor?	Risk issue(s) for impact assessment
Hydromorphology	No	The proposed scheme is in a waterbody that is heavily modified for the same use as the activity (coastal protection). However, the most recent WFD status information for the waterbody (taken from the Water Watch Wales website) indicates that the status of mitigation measures is 'Good' and confirms that the identified measures are 'not currently applicable – not required in this waterbody'. In addition, detailed assessment of coastal processes has shown that construction and operation of the proposed scheme is not likely to have a significant effect on sediment supply or longshore drift processes. Therefore, no significant impacts on the hydromorphology quality elements are predicted.
Biology (habitats)	No	The proposed scheme will cause temporary and permanent impacts on beach habitats (WFD Lower Sensitivity Habitat), flora and fauna. However, these impacts are not likely to be significant given the availability of this habitat in the wider area. No impacts on designated sites or WFD Higher Sensitivity Habitats/Priority Habitats are anticipated. Conversely, construction of the rock armour has the potential to provide new habitat opportunities for a range of marine fauna and flora.
Biology (fish)	No	No impacts on fish as a result of construction or operation of the proposed scheme are anticipated.
Physico-chemical	No	The proposed scheme is not likely to have an adverse effect on physico-chemical conditions in the waterbody. Any potential risks to water quality during construction of the scheme will be carefully managed through implementation of good construction practice and closely monitored throughout construction.
Chemical	No	Sediment particle size is not considered favourable for adsorption by contaminants. Future ground investigation and sample analysis are expected to confirm this.
Invasive non-native species (INNS)	No	Whilst the invasive barnacle *Austrominius modestus* is present on some of the timber groynes in the wider area, appropriate biosecurity good practise can be implemented throughout construction to effectively minimise the risk of its spread.
Protected Areas	No	No significant, detrimental impacts to designated areas are anticipated.

4.8 Discussion

4.8.1 Hydromorphology

Assessment undertaken at Stage 1 (screening) and Stage 2 (scoping) has identified that the proposed scheme is not likely to present a significant risk to hydromorphology of the North Wales coastal waterbody.

The temporary storage of rock material on the beach has the potential to create a layer of turbulent flow in and around any rock pile, which could cause localised beach erosion. However, this is not likely to have more than a localised effect within the immediate vicinity of the rock pile. Following construction of the rock revetment the beach profile will be reinstated using excavated beach materials and no permanent effects are anticipated.

The primary sediment supply mechanism along the coastline is the onshore movement of sand ridges and sediment entrainment from west to east through longshore drift. The presence of the rock revetment has the potential to retain sediment and thereby remove it from the longshore transport budget. However, the total footprint of the rock revetment is very small in relation to the available intertidal area and therefore any impact on the sediment regime is likely to be limited.

The Western Wales RBMP identifies a series of mitigation measures for the North Wales coastal waterbody. Many of these measures focus on the management of dredging activities; however, a number are relevant to the proposed scheme, particularly those that seek to improve the ecological value of defence structures and preserve or enhance habitats.

The Water Watch Wales website confirms that the measures listed for this waterbody are 'not currently applicable – not required in this waterbody' and that the mitigation measures are at 'Good' status. This means that the hydromorphological characteristics of the waterbody are consistent with GEP and that implementation of further mitigation measures is not required. This conclusion is supported by the 'reasons for failure' data, which identifies that the waterbody is failing to achieve its status objectives due to issues with DIN and mercury (and its compounds).

Notwithstanding this, the proposed scheme is not likely to conflict with the identified mitigation measures (should they be required in the future). The scheme is consistent with the SMP2 HTL policy and so realignment of flood defences is not appropriate in this location. The scheme does support implementation of measures that seek to improve the ecological value of coastal habitats. These are to be addressed with the creation of planted and grassed areas along the frontage that will provide benefits in terms of landscape and recreational amenity as well as ecological benefits. Furthermore, the proposed beach recharge presents an opportunity for valuable shingle plant communities to develop, enhancing the existing SSSI at Traeth Pensarn.

The proposed rock revetments also have the potential to provide new habitat opportunities for a range of (rocky shore) fauna and flora. However, further ecological enhancements could be included in the design of the rock revetment to provide additional opportunities for rocky shore species to colonise.

4.8.2 Biology

The proposed scheme will cause both temporary and permanent impacts on beach habitat (these habitats are classified as a WFD Lower Sensitivity Habitat), flora and fauna. No impacts on designated sites (including the Liverpool Bay SPA, Section 7 Priority Habitats, or WFD Higher Sensitivity Habitats) are anticipated.

Construction of the rock armour revetment will require excavation of beach materials and the installation of rock armour; this will cause habitat damage and disturbance to the affected beach areas and the addition of a new habitat type (rock armour). Excavated beach material will be backfilled in the same area once the rock armour has been installed. The damage to this habitat will be largely temporary and no significant impacts on WFD

Lower Sensitivity Habitat is anticipated, particularly given the abundance of this habitat type in the immediate vicinity of the scheme and likely rapid re-colonisation of the scheme area by marine fauna.

The addition of new rock armour habitat has the potential to provide an ecological benefit by providing opportunities for existing and new flora and fauna to colonise the scheme area, potentially increasing biodiversity. This includes providing new roosting opportunities for waterbirds and the rock armour may encourage establishment of WFD Higher Sensitivity Habitats, including mussel beds and polychaete reefs, which are already present in the wider area.

4.8.3 Water chemistry

The North Wales coastal waterbody is currently assessed as having an overall status of 'Moderate', with a chemical status currently at 'Fail'. The quality elements that are contributing to the failing status include (i) Dissolved Inorganic Nitrogen (DIN) from dairy and beef farming and non-mains domestic sewage and, (ii) mercury (and it compounds).

The source of mercury (and it compounds) within the waterbody are currently unknown. Whilst it is a naturally occurring element, much of the mercury currently found in the environment results from historic industrial activity. Excessive levels of mercury contamination have been reported from adjacent coastal sub-cells on the western coast of England.[4]

Ground investigation and subsequent sediment sampling and analysis are due to be conducted in the future in accordance with Cefas Action Levels. Chemical analysis may provide insight to establish if the source of pollution lies within the footprint of the scheme. If levels of mercury are found to be above the stipulated Cefas Action Levels remediative action will be required to mitigate ant impacts to the waterbody and wider environmental and ecological receptors.

4.8.4 Protected Areas

The proposed scheme is located within the Bathing Waters at Abergele (Pensarn) and Kinmel Bay (Sandy Cove), designated under the Bathing Water Regulations 2013 (2013/1675), and the Clwyd Permo-Triassic Sandstone Drinking Water Protected Area (DrWPA), which encompasses the underlying groundwater body.

Previous monitoring of the designated bathing waters dating from 2017 to 2021 suggests periodic episodes of bacterial contamination to bathing water quality. These bathing waters are subject to short term pollution caused when heavy rainfall washes faecal material into the sea from livestock, sewage and urban drainage via rivers and streams. The proposed scheme will not alter existing sewerage infrastructure or surface runoff patterns or result in the direct release of foul water/faecal matter into the bathing water. Therefore, no impacts on the designated bathing waters are anticipated.

Notwithstanding this, it is recommended that visual monitoring of the construction area is undertaken daily during the construction period to identify any signs of sewage debris, animal faeces, litter, and oil or tar that has been discharged into the area, particularly after storm or heavy rainfall events. If any such debris is identified, it should be removed from site to a suitable waste disposal facility. This will minimise the risk of bacterial contamination adversely affecting both users of the beach/bathing waters and construction personnel.

No impacts on the groundwater DrWPA are anticipated because the scheme does not include any significant abstraction of water or discharge to ground and does not require use of any hazardous chemicals.

The beach recharge between CMU3-3/CMU3-4 is proposed to enhance biodiversity and promote growth of valuable vegetated shingle habitat. This will help stabilise the deposited

[4] Environment Agency (2019), Mercury: sources, pathways and environmental data

sediment and provide opportunity to reconnect and extend the Treath Pensarn SSSI. This is seen as benefiting the protected area and providing ecological enhancements to the coastal defence scheme and wider community.

5 Conclusion and recommendations

The proposed scheme is not likely to have a significant impact on any WFD receptors. No significant long-term impact on existing coastal processes is predicted, whilst impacts on beach habitats, including damage and disturbance during construction, will be temporary in nature and are not considered to be significant. Conversely, construction of the rock armour revetment may provide an ecological benefit and the proposed beach recharge scheme is expected to prolong the protection of the Treath Pensarn SSSI. No impacts on WFD Protected Areas are anticipated.

The following recommendations are made to support the delivery of the proposed scheme and compliance with the requirements of the WFD:

- It is recommended that the proposed scheme seeks to contribute to any future requirement for additional mitigation measures. This should principally focus on opportunities to provide further ecological enhancement of the rock armour revetment.
- Proposed ground investigation works, and subsequent sediment analysis should be used to determine the presence of any existing contamination within the footprint of the site. Should sampling analysis highlight the presence of contaminants of concern at concentrations above the stipulated Cefas Action Levels then mitigation measures will be required to reduce the potential mobilisation of any harmful contaminants which may be detrimental to the current and/or future WFD status.
- A Construction Environmental Management Plan (CEMP) should be prepared, which sets out the actions that will be implemented to control construction of the proposed scheme so as to avoid adverse impacts on the environment. The CEMP should form part of the construction contract. It should adhere to construction best practice for works on the coast so as to reduce the risk of environmental contamination during construction and include biosecurity procedures to prevent the spread of INNS (see below).
- Visual monitoring of the construction area should be undertaken daily during the construction period to identify any signs of sewage debris or any other contaminated materials, which should be removed offsite for disposal. This will minimise the risk of bacterial contamination adversely affecting beach users and construction personnel.
- Where construction works coincide with the development of future proposed coastal defence and infrastructure projects within the wider sub-cell, caution should be employed to limit any potential cumulative, in-combination effects.

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