

Kinmel Bay Coastal Defence Improvements Scheme

Environmental Statement Addendum Final

October 2024

Prepared for:

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Abbreviations

CEMP	Construction Environmental Management Plan
EIA	Environmental Impact Assessment
ES	Environmental Statement
IEMA	Institute of Environmental Management and Assessment
LPA	Local Planning Authority
MHWS	Mean High Water Spring
NPPF	National Planning Policy Framework
NRW	Natural Resources Wales
NTS	Non-Technical Summary
PM	Project Manager
PPV	Peak Parcel Velocity
SAC	Special Area of Conservation
SI	Site Investigation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

1 Introduction

1.1 Background

Conwy County Borough Council ('the Applicant') applied to Natural Resources Wales (NRW) for a marine licence for the proposed construction and maintenance of a series of coastal defences at Kinmel Bay below Mean High Water Spring (MHWS). The application was submitted on the 24th November 2022 and was accompanied by an Environmental Statement (ES) (herein referred to as 'the submitted ES') prepared in accordance with the Marine Works (EIA) Regulations 2007.

A marine licence was granted on 15th March 2023 by NRW. Following further involvement from the contractor, and design changes as a result of the planning process, there have been two key changes to the works below MHWS. This ES addendum (the 'ES addendum') has been prepared to capture and re-assess the potential environmental impacts of the proposed scheme following these changes. This ES addendum should be read in conjunction with the submitted ES. A stand-alone Non-Technical Summary has been produced in line with the EIA Regulations.

1.2 Purpose of the Environmental Statement Addendum

The purpose of this ES addendum is to present an assessment of any new or different significant effects that are likely to result from the proposed scheme design changes.

This ES addendum only considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared; if no change is listed then the conditions and the potential effects are the same as those presented in the submitted ES.

1.3 Structure of this ES

The structure of this ES addendum is outlined below:

- Section 2: presents an overview of the changes since last submission of the submitted ES.
- Section 3: presents an update to chapters 1-3 of the Submitted ES as required (Introduction, Description of proposed scheme, and Environmental Impact Assessment Methodology).
- Section 4: presents an updated assessment of Ecology and Biodiversity to reflect the proposed changes.
- Section 5: presents an updated assessment of Noise and Vibration to reflect the proposed changes.
- Section 6: presents an updated summary of effects.

2 Description of the Proposed Scheme changes

2.1 Introduction

This chapter of the ES addendum presents a description of the proposed scheme changes since the submission of the original ES in November 2022.

Since the submission of the application, two key changes have been implemented following involvement of a contractor and negotiations within the planning application process. These changes are as follows:

- Within the original submission, two access points (AP8 and AP9) were proposed at Golden Sands Holiday Park (Towyn Revetment). However, these have been superseded for one beach access point (AP10) situated in the centre of the revetment.
- The original construction methodology proposed for the beach accesses involved a vibration-free piling methodology. However, following contractor involvement it became clear this was not possible. Therefore, traditional Vibro hammer piling will be utilised for this access point.

The requirement for piling across all other beach access points (AP3-7) across the scheme has now been removed. This has not been re-assessed as part of this ES addendum.

2.2 Scope and methodology of the ES Addendum

2.2.1 Overview

This section outlines the scope and methodology used in this ES Addendum. This ES Addendum should be read in conjunction with the submitted ES. The general assessment methodology and topic-specific methodologies, relevant legislation, policy and guidance, key assumptions and limitations set out in the submitted ES Volume I, Chapters 4-15 submitted with application remain unchanged, unless specifically stated in this ES Addendum. A preliminary environmental assessment of whether there would be any new or materially different likely significant effects on the environment arising as a result of the proposed scheme changes has been undertaken based on the above, with reference to the previous assessment presented within the submitted ES (Volume I and Volume II).

The outcome of this scoping exercise is provided in Table 2-1 below.

Updates to technical chapters of the submitted ES, where these are required, are presented in the relevant sections of this ES Addendum. There is a sample landscape page below for you to copy if you wish and another in the main report.

Table 2-1: Scoping of environmental assessments for proposed scheme changes.

Submitted ES chapter	Scoping decision	Rationale	Submitted ES Appendix	Scoping decision	Rationale
Chapter 1-3	In	Changes in proposed scheme design, as detailed above.	Appendix H - Outline CEMP	Out	Full CEMP to be updated in line with mitigation measures proposed.
Chapter 4: Ecology	In	Updates to assessment required to reflect change in proposed scheme design and construction methodology.	Appendix B.1 - Legislative and Planning Context	Out	No change
			Appendix B.2-B.4 - Phase 1 Habitat Maps	Out	No change
			Appendix B.5 - Species mix for grassland enhancement	Out	No change
			Appendix B.6 - Habitat Regulations Assessment	Out	Previous bird surveys did not record significant bird features of the Special Protection Area (SPA) in this area of the works. Therefore, given the amount of intertidal habitat available it is considered that in the unlikely event that disturbance occurs, birds have the ability to move and therefore there will be no significant impact to bird species listed as

Submitted ES chapter	Scoping decision	Rationale	Submitted ES Appendix	Scoping decision	Rationale
					qualifying features of the SPA as part of the proposed works. Changes in construction methods will not impact this assessment.
Chapter 5: Landscape and Visual	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported.	Appendix C.1 - C.14	Out	No change
Chapter 6: Coastal processes	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported.	Appendix D.1 - Tidal Diamond data	Out	Tidal diamond data presented will not be impacted by proposed changes.
Chapter 7: Hydrology and Hydrogeology	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported.	Appendix E.1 - Water Framework Directive	Out	No change
			Appendix E.2 - Flood Consequences Assessment	Out	No further modelling required as a result of the proposed scheme changes.

Submitted ES chapter	Scoping decision	Rationale	Submitted ES Appendix	Scoping decision	Rationale
Chapter 8: Cultural Heritage	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported.	Appendix F.1 - Historic Desk-Based Assessment	Out	No changes
Chapter 9: Contaminated Land	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported.	Appendix G.1 - Phase 1 Contaminated Land Desk Study	Out	No change
Chapter 10: Socio-economic	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported.	N/A	N/A	N/A
Chapter 11: Traffic and Transportation	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported.	N/A	N/A	N/A
Chapter 12: Noise and Vibration	In	Updated impact assessment to reflect changes to proposed scheme design and construction methodology.	N/A	N/A	N/A
Change 13: Other	Out	It is not anticipated that any of the changes to the	N/A	N/A	N/A

Submitted ES chapter	Scoping decision	Rationale	Submitted ES Appendix	Scoping decision	Rationale
Construction Related Effects		proposed scheme will change the residual effects reported.			
Chapter 14: Cumulative and In-Combination	Out	It is not anticipated that any of the changes to the proposed scheme will change the residual effects reported	N/A	N/A	N/A
Chapter 14: Conclusions	Out	Updated summary of likely significant effects, mitigation measures and residual effects to reflect updated assessments.	N/A	N/A	N/A

3 Changes to the submitted Environmental Statement

3.1 Introduction

This chapter of the ES addendum describes the changes to Chapters 1-3 of the submitted ES, which result from changes to the proposed scheme.

3.2 Changes to Chapters 1-3 of the submitted ES

3.2.1 Chapter 1 - Introduction

There are no changes to Chapter 1: Introduction.

3.2.2 Chapter 2 - The Proposed Scheme

As part of the original application, two access points (AP8 and AP9) were proposed in front of Golden Sands Holiday Park. Following additional ground investigations and design development, two access points (AP8 and AP9) were substituted for a single central access point (AP10) shown on Figure 3-1. Originally, both access points in front of the Holiday Park required pilling, and the submitted ES proposed a press-in piling method which avoids impacts associated with noise and vibration.

However, the press-in piling method required the attendance of a large crane to mobilise and set up the piling and lift and position the sheet piles. It was deemed too disruptive to the community and adjacent caravan park to mobilise a crane in this area.

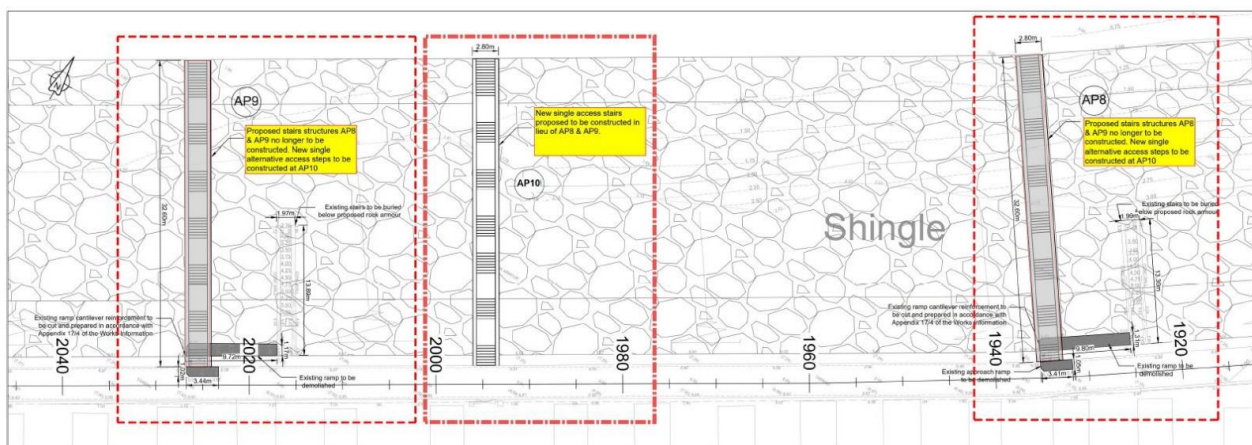


Figure 3-1: Location of new access point in relation to original proposals.

As this new access point (AP10) is located below MHWS, a temporary sheet pile cofferdam is required to provide safe and undisturbed access for construction of the access steps. This will enable the construction works and material deliveries such as a concrete to be

undertaken during the normal working hours. Without the temporary sheet pile cofferdam, the works would be constrained by the tide resulting in out of hours working.

The temporary sheet piled cofferdam is yet to undergo detailed design, however, it is expected to be approximately 25m long and 5m wide, as shown in Figure 3-2 below. The sheet piles will be approximately 12m, with a maximum pile embedment of 9m into the ground.

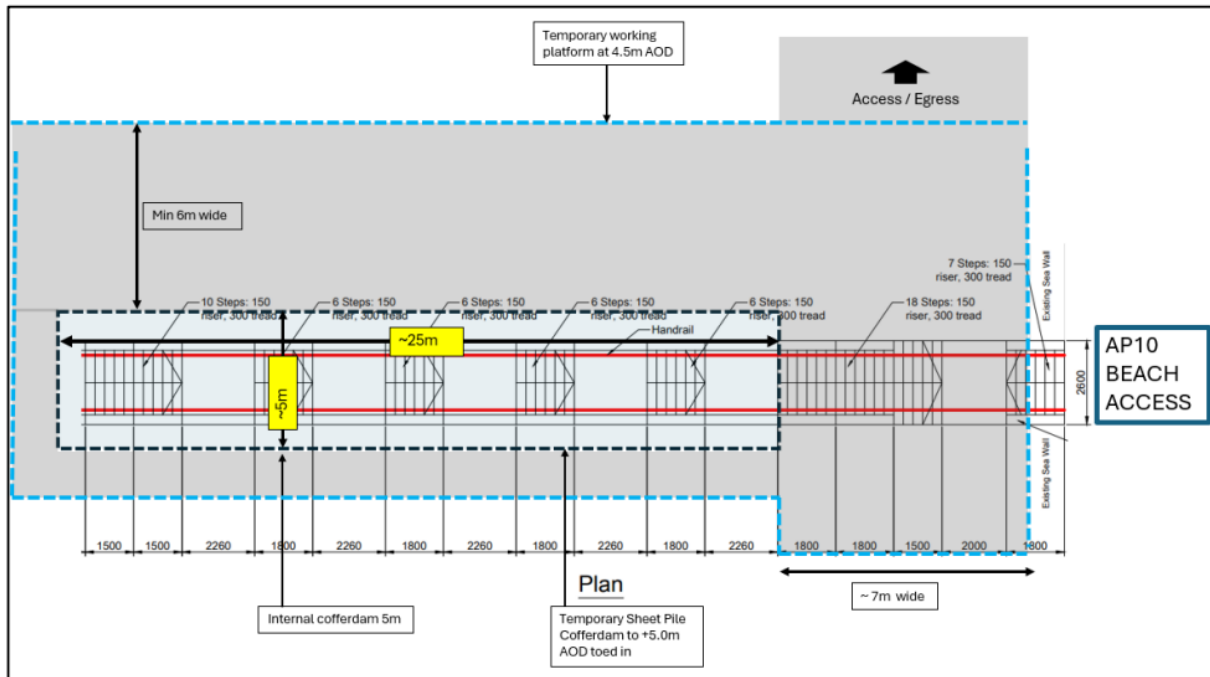


Figure 3-2: Plan view of proposed cofferdam layout.

The exact coordinates of the proposed temporary sheet piling cofferdam at AP10 are detailed in Table 3-1.

Table 3-1: Coordinate locations of the proposed temporary sheet piling cofferdam.

Latitude	Longitude
53° 18' 34.790129" N	3° 32' 6.807444" W
53° 18' 33.720776" N	3° 32' 5.669979" W
53° 18' 33.964177" N	3° 32' 4.983553" W
53° 18' 35.058054" N	3° 32' 6.131783" W

The temporary sheet piles will be installed with a leader rig using a Vibro hammer. The leader rig will be able to access the working areas along the upper areas of the foreshore without any disruption to the local community and adjacent caravan park. The installation of the sheet piles will be undertaken from above MHWS on a high level temporary working platform adjacent to the existing sea wall.

The installation of the temporary sheet piles is expected to take 2 weeks, the removal is expected to take 1 week. If the project programme allows, neap tides will be targeted for installation and removal period to benefit from the increased distance from tide levels. We expect that the piles will be in place for approximately 16 weeks.

With the exception of the changes described above, all other details of the proposed scheme design are included in the Environmental Statement submitted in November 2022.

3.2.3 Chapter 3 - Environmental Impact Assessment Methodology

There are no changes to Chapter 3 - Environmental Impact Assessment Methodology.

4 Ecology

4.1 Introduction

This chapter provides an addendum to the ecology assessment included within the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 4: Ecology of the submitted ES, Volume I.

This assessment considers the ecological effects arising from the relevant proposed scheme design changes and the respective changes to the construction methodology. This addendum considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared. If no change is listed, then the conditions are the same as those presented in the submitted ES.

4.1.1 Proposed scheme changes

The proposed scheme design change will not change the amount of habitat permanently impacted.

The change in construction methodology has the potential to increase noise and therefore disturbance to marine species. The area of intertidal habitat temporarily impacted by the works will be increased where the temporary cofferdam is to be constructed. These potential construction phase impacts are outlined further in section 4.3.1.

4.2 Changes in Legislation, Planning Policy and Guidance

There have been no changes in legislation, planning policy or guidance that will impact these works

4.3 Potential impacts and significant effects

An updated assessment of the potential impacts and significant effects on ecology has been undertaken to reflect the proposed scheme changes. The findings of this updated assessment are summarised below. The assessment findings for all of the sites where design changes are not proposed remain as detailed in the submitted ES.

4.3.1 Construction phase impacts

The temporary cofferdam will temporarily impact an area of intertidal sediments close to the existing sea wall. The sediments in this area consist of predominantly coarse sand which is only inundated for a couple of hours at high tide, as a result it is unlikely that the area will support large numbers of macro-invertebrates. Should the temporary impact destroy small numbers of macroinvertebrates, recruitment to the area once the cofferdam is removed will be rapid given the amount of similar habitat adjacent to the proposed scheme. It is therefore not considered that the temporary cofferdam will have a significant impact upon the habitats present. This represents a slight negative impact in line with the previous assessment carried out on intertidal habitats. If all mitigation detailed here and in the original

assessment are carried out the scheme will have no permanent significant impact upon intertidal sediments.

As detailed below in Section 5.5.2 of the noise and vibration assessment, there is the potential for noise impacts to travel through the water column if piling is undertaken in the wet. Therefore, the increase in noise disturbance arising from the use of vibro piling has the potential to disturb marine species including marine mammals and fish species. This has the potential for a significant negative effect upon marine mammals and fish species without mitigation.

There is the potential to impact seals if they haul out in the area. Given low numbers in the area this has the potential to be a slight negative impact.

Low numbers of birds have been recorded in this area of the foreshore, therefore it is not considered that the increase in noise disturbance will be significant for wintering bird species. Therefore, the impacts and mitigation measures for bird species outlined in the original assessment remain valid and birds are not considered further here.

4.3.2 Operation phase impacts

There will be no further impacts arising during the operational phase of the proposed scheme.

4.4 Mitigation measures

There is the potential for noise impacts to travel through the water column if piling is undertaken in the wet, potentially impacting marine mammals. It is proposed that piling be undertaken in the dry and paused during the hours where the tide reaches the area. As detailed below if piling is undertaken in the dry noise will be dissipated in the sands and muds of the foreshore and impacts upon the water column are considered unlikely.

There is the potential to impact seals if they haul out in the area. As detailed in the ES if a seal is observed within the area of the works, all works should stop until it has moved away from the area.

4.5 Updated residual effects

If the mitigation measures outlined in section 4.4 above are put in place no significant residual impacts are anticipated in line with the original assessment.

5 Noise and Vibration

5.1 Introduction

This chapter provides an addendum to the noise and vibration assessment included within the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 12 Noise and Vibration of the submitted ES, Volume I.

This assessment considers the ecological effects arising from the relevant proposed scheme design changes. This addendum considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared. If no change is listed, then the conditions are the same as those presented in the submitted ES.

5.1.1 Proposed scheme changes

The change in methodology during the construction phase has the potential to change the overall conclusions of the assessment undertaken in the submitted ES.

To determine these changes, a revised assessment appraisal is required to verify what effect, if any, the revised scheme will have on the noise and vibration sensitive receptor locations considered within the report.

Below is a full re-evaluation of the proposed construction phase of the scheme based upon the revised information provided. This revised evaluation will follow the format of the submitted ES to allow comparison of the changes.

5.2 Changes in Legislation, Planning Policy and Guidance

There has been no change in legislation, planning policy or guidance (national or local) which affects this chapter since the ES was submitted.

5.3 Updated baseline conditions

The baseline conditions are unchanged from the descriptions in the Environmental Statement submitted in 2022 and all survey results used remain valid.

5.4 Assessment methodology and assessment criteria

The assessment methodology and assessment criteria used remain the same as in the Environmental Statement submitted in 2022.

5.5 Potential impacts and significant effects

An updated assessment of the potential impacts and significant effects on noise and vibration has been undertaken to reflect the proposed scheme changes. The findings of this updated assessment are summarised below. The assessment findings for all of the sites where design changes are not proposed remain as detailed in the submitted ES.

5.5.1 Construction phase impacts

As with any major construction project, the development is to be completed sequentially, and each area of the site will have varying works completed.

The matrix provided in Table 5-1 details the specific construction proposals for the development with details of the average quantities of plant and equipment anticipated to be used for each phase.

Table 5-1: Proposed Coastal Defence Works Locations and Plant Matrix

Works Location and Activity Plant Proposal	40t Tipper (104 dBA)	50t Excavator (107 dBA)	20t Road Wagon (Concrete & Rock) (103 dBA)	10t Tipper (106 dBA)	3t Tipper (102 dBA)	1.5t Tipper (102 dBA)	15t Excavator (97.5 dBA)	Asphalt Spreader (92 dBA)	Sheet Piling Rig (88dBA)	Vibrating Roller (100 dBA)
Rock Armour - Kinnel Bay East & West, Towyn Revetment	2	3	10	2						
Sea Wall - Kinnel Bay East and West			4	2	1		1			
Car Parks - Kinnel Bay			2		1		1	1		1
Beach Access			2	1	1		1			
Beach Access (AP10 Only)			2	1	1		1		1	

This specific table has been amended to account for the changes to the sheet piling methodology replacing the original Giken method to Vibro Sheet Piling for beach access construction methodology. This change is noted within Jones Bros Civil Engineering UK Ltd document reference C4215-CMS-0 dated 19/08/2024 entitled 'Addendum Construction Method Statement for Temporary Sheet Piling'.

As detailed in Section 3.2.2, The new access point will require a temporary cofferdam to be constructed since the beach access will be constructed below the MHWS. This element of the works will be a temporary solution to allow construction of the beach access and would be removed following completion. It is noted that the installation of the cofferdam would take approximately 2 weeks to install, with a further 1 week to remove once the construction phase has been completed.

Vibro sheet piling is a noisier operation than the original Giken method with an assessment being made of 88 dBA at 10m, as per BS5228-1:2009+A1:2014 Table C.3 Ref No 8. The Giken methodology was assessed as 65 dBA at 10m for the Giken methodology. Each element of the works is located at different distances from the nearby noise sensitive dwellings, Table 5-2 details the assessed distances.

Table 5-2: Distance Matrix from Proposed Construction Works to Receptor (m)

LOCATION	PHASE	Closest Distance from Proposed Works Phase to Closest Receptor (m) Ground Floor Level		
		Assessment Location A	Assessment Location B	N/A
		Golden Sands Holiday Park	Sunnyvale Caravan Park	St Asaph Ave
Towyn Revetment	Rock Armour	30	1600	1050
	Beach Access	20	1600	1050
Kinmel Bay West	Beach Access	20	1100	130
	Sea Wall	20	1100	120
Kinmel Bay East	Rock Armour	1200	15	400
	Beach Access	900	15	130
	Sea Wall	900	15	100
	Car park	700	400	40

Given the above, the plant and equipment utilised in the noise calculations is indicated in Table 5-3, below. The primary plant and equipment complement is based on recommendations from design engineers, with specific plant noise data provided accordingly, as detailed in Table 5-1. Table 5-3 is separated into columns, these are explained as follows: Works location (Column 1); the drawing relevant to the works (Column 2); activity phase title (Column 3); the proposed activity duration (Column 4); activity contained within the Phase (Column 5); plant item identified for each operation (Column 6); The sound power level data for the specific plant under consideration provided by the client (Column 7); BS5228 plant reference, not used (Column 8). Number of plant items (Column 9); The estimated On-Time during any shift that the specific plant item will be operating is provided (Column 10).

The data provided within Table 5-3 allows for a full calculation of the anticipated site noise to be determined at specific distances from the operations. Table 5-11 details the results of the assessment

Table 5-3: Indicative Plant and Equipment Complements

KEY LOCATION	DRAWING REF	PHASE	DURATION	ACTIVITY	PLANT DESCRIPTION	No of Plant Items
Towyn Revetment	119	1	26 Weeks	Rock Armour	Tipper (40t)	2
					Excavator (50t)	3
					Road Wagon (Concrete and Rock) (20t)	10
					Tipper (10t)	2
	119	2	12 Weeks	Beach Access	Road Wagon (Concrete and Rock) (20t)	2
					Tipper (10t)	1
					Tipper (3t)	1
					Excavator (15t)	1
Kinmel Bay West	118	1, 2	12 Weeks	Beach Access	Sheet Piling Rig	1
					Road Wagon (Concrete and Rock) (20t)	2
					Tipper (10t)	1
					Tipper (3t)	1
					Excavator (15t)	1
					Sheet Piling Rig	0
	118	3	18 Weeks	Sea Wall	Road Wagon (Concrete and Rock) (20t)	4
					Tipper (10t)	2
					Tipper (3t)	1
Kinmel Bay East	116, 117	1	26 Weeks	Rock Armour	Excavator (15t)	1
					Sheet Piling Rig	0
					Road Wagon (Concrete and Rock) (20t)	2
					Tipper (10t)	1
	116, 117	1 to 3	12 Weeks	Beach Access	Tipper (40t)	2
					Excavator (50t)	3
					Road Wagon (Concrete and Rock) (20t)	10
					Tipper (10t)	2
	116, 117	3	18 Weeks	Sea Wall	Tipper (3t)	1
					Excavator (15t)	1
					Sheet Piling Rig	0
					Road Wagon (Concrete and Rock) (20t)	4
	117	4	10 Weeks	Car Park	Tipper (10t)	2
					Tipper (3t)	1
					Excavator (15t)	1
					Asphalt Spreader	1
					Vibrating Roller	1

From the plant and equipment data list it has been possible to complete a BS5228-1:2009+A1:2014 assessment of the noise levels produced by the individual phases when considered at the closest noise sensitive dwelling locations. The assessment is then defaulted to the 10-hour daytime shift period for the purposes of the Standard, even though the specific operational times on site have been advised as 7-hours daily.

For ease of identification of the significance of the activity on the residents, the individual cells are colour coded to determine compliance with the Standard's limitations at a glance. A light green cell indicates compliance. An amber and red cell indicates non-compliance.

The areas highlighted in grey are determined as excessive distances with little significance, however, these are included for robustness. The white cells are the closest to the relevant operations and therefore represent the most likely to result in an adverse impact from the site operations.

The tables below indicate the location and type of work to be completed using specific plant and equipment, including noise, and proposed on-time periods.

Using the above data, and the calculation methodology contained in BS5228-1:2009+A1:2014, Table 5-4 reports the calculated noise levels for the proposed works.

These calculations assume no mitigation and a direct line of sight between the construction works and the nearest receptor.

Table 5-4: Calculated Construction Noise Levels, LAeq, T dB, at various distances

1	2	3	4	5	Un-Mitigated Noise Level Contribution (LAeq T, dB) at Distance (m) from Proposed Works Phase										
KEY LOCATION	DRAWING REF	PHASE	DURATION	ACTIVITY	10	15	20	30	50	100	200	500	1000	1500	2000
Towyn Revetment	119	1	26 Weeks	Rock Armour	81	77	75	71	67	61	55	47	41	37	35
	119	1, 2	12 Weeks	Beach Access	74	70	68	64	60	54	48	40	34	30	28
Kinmel Bay West	118	1, 2	12 Weeks	Beach Access	74	70	68	64	60	54	48	40	34	30	28
	118	3	18 Weeks	Sea Wall	76	73	70	67	62	56	50	42	36	33	30
Kinmel Bay East	116, 117	1	26 Weeks	Rock Armour	81	77	75	71	67	61	55	47	41	37	35
	116, 117	1 to 3	12 Weeks	Beach Access	74	70	68	64	60	54	48	40	34	30	28
	116, 117	3	18 Weeks	Sea Wall	76	73	70	67	62	56	50	42	36	33	30
	117	4	10 Weeks	Car Park	73	69	67	63	59	53	47	39	33	29	27

KEY
Noise levels below 65 dBA
Noise levels between 65 dBA and 75 dBA
Noise levels above 75 dBA

Using the above data and combining the noise levels calculated at the specific distances we can determine the noise contribution at the closest noise sensitive premises to the

works activities. Table 5-5 summarises the results of the BS5228:2009+A1:2014 Part 1 assessment and compares the values against the design target limits indicated above in Table 5-2 for the various construction time periods.

The results of the calculated noise levels at the nearby noise sensitive dwellings are provided in Table 5-5 below.

Table 5-5: Calculated Un-Mitigated Construction Noise Levels at the closest residential premises

LOCATION	CONSTRUCTION PHASE	Un-Mitigated Values ($L_{Aeq,T}$, dB) For Proposed Works Phase to Closest Receptor		
		Assessment Location A	Assessment Location B	N/A
		Golden Sands Holiday Park	Sunnyvale Caravan Park	St Asaph Ave
Towyn Revetment	Rock Armour	71	37	41
	Beach Access	68	30	34
Kinmel Bay West	Beach Access	68	34	53
	Sea Wall	70	36	55
Kinmel Bay East	Rock Armour	40	77	47
	Beach Access	34	70	54
	Sea Wall	36	73	56
	Car Park	38	39	62

The predicted construction noise levels highlighted in red, and amber exceed the ABC Example 1 Threshold Values of 65 L_{Aeq} dB. Values highlighted in green are below the Threshold Values and noise is not a detrimental consideration during the construction phases. As can be seen there are limited operations exceeding the threshold values of 65 L_{Aeq} dB. These values have been assessed as the following likely effects shown in Table 5-6.

Table 5-6: Revised assessment of potential noise impacts on identified receptors.

LOCATION	CONSTRUCTION PHASE	Un-Mitigated Impact Matrix For Proposed Works Phase to Closest Receptor		
		Assessment Location A	Assessment Location B	N/A
		Golden Sands Holiday Park	Sunnyvale Caravan Park	St Asaph Ave
Towyn Revetment	Rock Armour	Moderate Adverse	Negligible Adverse	Negligible Adverse
	Beach Access	Moderate Adverse	Negligible Adverse	Negligible Adverse
Kinmel Bay West	Beach Access	Moderate Adverse	Negligible Adverse	Minor Adverse
	Sea Wall	Moderate Adverse	Negligible Adverse	Minor Adverse
Kinmel Bay East	Rock Armour	Negligible Adverse	Major Adverse	Negligible Adverse
	Beach Access	Negligible Adverse	Moderate Adverse	Minor Adverse
	Sea Wall	Negligible Adverse	Moderate Adverse	Minor Adverse
	Car Park	Negligible Adverse	Negligible Adverse	Minor Adverse

The changes to the construction methodology relate to the impacts identified for Golden Sands Holiday Park for the beach access construction phase.

Where an operation results in an amber significance value, these operations should consider additional mitigation measures to reduce the noise at source. Mitigation measures are outlined in section 5.6, no further mitigation measures are proposed to those presented in the submitted ES.

5.5.2 Seaward Noise Assessment - Sheet Piling

If we consider the noise associated with the sheet piling activities, determined as 88 dBA at 10m for airborne sound, we can assess the likely impact of the noise generated in the direction of the ocean.

Because the ocean is tidal the distance to the water column varies over time. To allow an assessment of the impact the chart below indicates the noise levels entering the water column at varying distance. This assessment has assumed that the primary noise is generated via the Vibro impact driver unit on the pile head and assumes point source propagation of sound.

Table 5-7: Sheet Piling Noise Levels entering the water column.

Instantaneous Sheet Piling Noise Levels Entering Water Column at Varying Distances													
Distance to Water Column m	1	3	5	10	15	20	25	30	35	40	45	50	100
Resultant Sheet Piling Noise dBA	108	98	94	88	84	82	80	78	77	76	75	74	68

The base value of 88 dBA at 10m has been used to determine the varying distance noise levels. These calculations have been utilised in the assessment of potential effects on marine ecology in Section 4.3.

5.5.3 Vibration

The vibration assessment and recommendations will remain the same as in the Environmental Statement submitted in 2022.

However, with the alterations to the sheet piling methodology, from Giken to Vibro sheet piling in 1 No location only, a re-assessment of the likely impact is required.

The following impact assessment provides the necessary information. The area affected by the construction of the pile-driven cofferdam is the eastern side of Towyn Bay Revetment and is identified as beach access point AP10 within the construction details, as indicated with a black star on the plan below.



Figure 5-1: Local Plan showing key areas within proposed scheme.

It is proposed to install the temporary sheet piles with a leader rig using a Vibro hammer. The leader rig shall be self-sufficient and not require the support of a crane. The leader rig can access the working area along the upper areas of the foreshore without any disruption to the local community and in particular Golden Sands Caravan Park.

All temporary sheet pile installation will be undertaken from above MHWS on a high-level temporary working platform adjacent to the existing sea wall.

No piling will be undertaken directly into water. Piling will stop during peak of high tide if water becomes within proximity of the toe of the working platform. This is only envisaged during spring tides. Assessment for transfer of vibration during pile driving & extraction for the revised installation methodologies as follows.

Based upon the following equation the theoretical PPV levels have been calculated to demonstrate the required safe distance to work within the stated limits to avoid undue loss of existing amenity for the nearby sensitive receptors.

$$V = C \sqrt{(W) / r} \text{ mm/s}$$

Where

$V = PP$, mm/s

$C =$ Soil / hammer parameter

$W =$ Hammer energy per blow / cycle

$r =$ distance to recipient

Table 5-8: Theoretical PPV levels calculated.

Radial Distance	m	1	3	5	10	15
PPV	mm/s	80.6	26.9	16.1	8.1	5.4
Radial Distance	m	20	25	30	35	40
PPV	mm/s	4.0	3.2	2.7	2.3	2.0
Radial Distance	m	45	50	60	70	80
PPV	mm/s	1.8	1.6	1.3	1.2	1.0
Radial Distance	m	90	100	200	300	500
PPV	mm/s	0.9	0.8	0.4	0.3	0.2

Taking account of the limiting vibration levels, set at 7.5mm/s to avoid structural damage, it can be determined that any vibration receptor beyond 12m from the piling activities will not be unduly impacted.

Inspection of the site plan indicates that the closest sheet pile will be placed in the ground at a distance of 16m to the closest caravan located on the Golden Sands Holiday Park, with

a calculated resultant vibration level of exactly 5.0 mm/s. This value is below the level at which structural damage will occur to any fixed structure or building.

Whilst the vibration values of 5.0mm/s are significantly above the baseline values recorded at 0.825mm/s at this location, with prior notice of the works provided to the residents, the likely undue impact and loss of amenity will be reduced.

As noted above, sheet piling will cease when the water level approaches the piling toe which will minimise the likely effect of the vibrational energy entering the water column.

Taking the vibration values assessed, north towards the ocean, the above table can be utilised to determine the impact of the sheet piling activities when considered through the sand into the sea and the likely impact on the ocean environment.

As noted above, the ocean is tidal at this location therefore, there will be a maximum and minimum assessed value for the vibration levels entering the water which can be determined from the above table.

Table 5-9: Vibration impacts for identified receptors.

LOCATION	CONSTRUCTION PHASE	Vibration Impact Matrix For Proposed Works Phase to Closest Receptor		
		Assessment Location A	Assessment Location B	N/A
		Golden Sands Holiday Park	Sunnyvale Caravan Park	St Asaph Ave
Towyn Revetment	Rock Armour	Negligible Adverse	Negligible Adverse	Negligible Adverse
	Beach Access	Moderate Adverse	Negligible Adverse	Negligible Adverse
Kinmel Bay West	Beach Access	Negligible Adverse	Negligible Adverse	Negligible Adverse
	Sea Wall	Negligible Adverse	Negligible Adverse	Negligible Adverse
Kinmel Bay East	Rock Armour	Negligible Adverse	Negligible Adverse	Negligible Adverse
	Beach Access	Negligible Adverse	Negligible Adverse	Negligible Adverse
	Sea Wall	Negligible Adverse	Negligible Adverse	Negligible Adverse
	Car Park	Negligible Adverse	Negligible Adverse	Negligible Adverse

As can be seen from the above all locations result in a 'Negligible Adverse' impact due to sheet piling at AP10, with the exception of the Golden Sands Holiday Park. As noted, the closest recipients are the caravans which are located only 16m from the sheet piling activities and subject to 5.0mm/s for the short duration of the 2 weeks for driving the piles and 1 week for the pile removal.

Cosmetic structural damage will not usually occur in any unreinforced or light framed fixed structure where the vibration value has been determined as below 15 mm/s to 20mm/s dependent upon driving frequency.

5.5.4 Operation phase impacts

There will be no changes to the operational phase of the original scheme as determined within the ES produced in 2022.

5.6 Mitigation measures

There will be no changes to the proposed mitigation measures from the original scheme as determined within the ES produced in 2022.

However, inclusion of the proposed mitigation measures will result in amended resultant noise levels when considered at the closest noise sensitive locations and as such is provided for robustness of the addendum report. The assessed mitigation methods possible during the construction phase is provided in the table below.

Table 5-10: Recommended mitigation measures.

LOCATION	PHASE	Possible Mitigation Methodology	Potential Mitigation, dB
Towyn Revetment	Rock Armour	Acoustic screening of plant. Isolate plant when not operating	10 dB
	Beach Access		
Kinnel Bay West	Beach Access	Acoustic screening of plant. Isolate plant when not operating	10 dB
	Sea Wall		
Kinnel Bay East	Rock Armour	Acoustic screening of plant. Isolate plant when not operating	10 dB
	Beach Access		
	Sea Wall		
	Car Park	None Required	0 dB

In relation to vibration impacts on nearby receptors, advance notice of these activities provided to the affected units, the undue effect could be minimised accordingly. The timing of the works will be undertaken during the winter to avoid peak season for the Holiday Park. No further mitigation measures are available for these impacts.

5.7 Updated residual effects

If we assume that the above mitigation measures are implemented the exposure values can be re-calculated as follows.

Table 5-11: Calculated Mitigated Construction Noise Levels at the closest residential premises.

LOCATION	CONSTRUCTION PHASE	Mitigated Impact Matrix For Proposed Works Phase to Closest Receptor		
		Assessment Location A	Assessment Location B	N/A
		Golden Sands Holiday Park	Sunnyvale Caravan Park	St Asaph Ave
Towyn Revetment	Rock Armour	Minor Adverse	Negligible Adverse	Negligible Adverse
	Beach Access	Minor Adverse	Negligible Adverse	Negligible Adverse
Kinmel Bay West	Beach Access	Minor Adverse	Negligible Adverse	Negligible Adverse
	Sea Wall	Minor Adverse	Negligible Adverse	Negligible Adverse
Kinmel Bay East	Rock Armour	Negligible Adverse	Moderate Adverse	Negligible Adverse
	Beach Access	Negligible Adverse	Minor Adverse	Negligible Adverse
	Sea Wall	Negligible Adverse	Minor Adverse	Negligible Adverse
	Car Park	Negligible Adverse	Negligible Adverse	Minor Adverse

As can be seen from the above, the majority of the construction works with inclusion of mitigation measures is likely to result in a Negligible or Minor Adverse impact on the nearby noise sensitive receptors, with the exception of the Rock Armour construction works at Kinmel Bay East close to the Sunnyvale Caravan Park, where this has been determined as producing a Moderate Adverse impact on the receptors.

With engaging communication between the developer and the affected receptors regards the impact the construction works are likely to have at these locations, adverse comment and complaints are usually averted. Where noise is considered to be unduly intrusive alternative mitigation measures could be considered in the form of reduced working hours such as a later start and earlier finish than time, however, this approach may result in prolonged construction duration and should only be considered if all other options have been exhausted.

The residual effects regarding the construction vibration impacts are as described in Table 5-9 as no further mitigation measures are available. Due to short timescale and temporary nature of the proposed works, it is not anticipated to generate significant disturbance to receptors.

It should also be noted that the worst-case scenario has been considered within the impact assessment provided. Since we are dealing with an extended linear workplace, along the beach front, it is anticipated that the maximum values determined within this impact assessment will only last for short periods of time and the construction noise effects should therefore be minimised accordingly.

Once the construction phase has been concluded there will be no further impact either noise or vibration relating to the scheme during the operational phase.

6 Conclusions

This chapter provides an update to the conclusions drawn from the chapters of this ES Addendum. This chapter draws upon Chapters 4 and 5 of this ES Addendum which have considered the potential environmental impacts and effects of the proposed scheme design changes.

The likely significant residual environmental effects of the proposed scheme design changes have been identified following implementation of the embedded mitigation or impact avoidance measures for the proposed scheme.

Table 6-1 was included in the submitted ES to present a summary of the likely effects, mitigation measures and residual effects. This table has been updated to reflect the new findings of this addendum.

Table 6-1: Summary of the changes to the likely effects, mitigation measures and residual effects from the submitted ES.

Stage	Effects identified	Significance	Mitigation	Residual effect
Ecology				
Construction	Disturbance to marine species from noise and vibration.	Minor negative	All piling will be undertaken in the dry and paused during high tides if the area of works is inundated.	Negligible
	Loss of intertidal habitats	Minor negative	No further mitigation than identified in the submitted ES.	Negligible
Noise and Vibration				
Construction	Disruption from noise on identified residential receptors (Golden Sands Holiday Park)	Moderate adverse	Acoustic screening of plant, and isolate plant when not operating.	Minor adverse

Stage	Effects identified	Significance	Mitigation	Residual effect
	Disruption from vibration on identified residential receptors (Golden Sands Holiday Park)	Moderate adverse	Advance notice of these activities provided to the identified receptors. Work to be undertaken outside of Holiday Park peak season.	Moderate adverse.

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