REPORT

Appendices

Environmental Scoping Report
Holyhead Breakwater Refurbishment Scheme

Client: Isle of Anglesey County Council

Reference: PB9014-RHD-BW-XX-RP-C-0142

Status: S0/P01.01

Date: 06 April 2020

CYNGOR SIR YNYS MÔN ISLE OF ANGLESEY COUNTY COUNCIL

Stena Line

Llywodraeth Cymru Welsh Government

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Date / initials: 31/03/2020 JVG

Approved by: Jamie Gardiner

Date / initials: 03/04/2020 JVG

Classification
Project related

Appendices

Appendix A Screening Responses

A1 NRW Screening Response

Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: SC1903

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Sent by e mail

Date 01 October 2019

Dear Sarah

SCREENING OPINION UNDER THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2007 (as amended)

HOLYHEAD BREAKWATER REFURBISHMENT

I am writing further to your request for a screening opinion, dated 13 August 2019, made in accordance with The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) ("The Regulations").

The purpose of the Environmental Impact Assessment (EIA) screening procedure is to determine whether the proposed works require an Environmental Impact Assessment and submission of an Environmental Statement (ES).

In reaching our Screening Opinion we have considered the proposed works against Schedule A1 and A2 of the above regulations. We have also consulted with the bodies that we consider have an interest in the project by reason of their environmental responsibilities, or local or regional competences, as required by the above regulations.

Screening Opinion

It is our opinion that the works fall within the categories of project listed within Schedule A2, paragraph 69 of the above regulations, and therefore must be considered in terms of its size, nature and location having regard to the relevant criteria listed in Schedule 1 of the above regulations.

"69. Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works".

We have carefully considered the views of the consultation bodies alongside the criteria as set out in Schedule 1 of the Regulations, and have determined, based on the information provided; that the project **does not** require a statutory Environmental Impact Assessment.

The Conservation of Habitats and Species Regulations 2017

As part of the screening exercise, we have also considered whether the proposed project, either alone or in combination with other plans or projects, is likely to have a significant effect on any site designated as a European site of conservation importance under the above Regulations. To assist in making this judgement of likely significant effect, we have sought advice from our statutory nature conversation advisor.

It is our initial view that the following sites could be impacted by the proposal:

- North Anglesey Marine SAC
- Anglesey Terns SPA

We would encourage you to contact Natural Resources Wales to receive further pre-application advice on this product.

This Screening Opinion will be provided to all those bodies that were consulted and will be publicised on our website and on our Public Register.

If the UK leaves the EU - either with or without a deal - the legal obligations relating to compliance with environmental permits and legislation will continue to apply. NRW on behalf of Welsh Ministers will continue to issue licenses in line with our current practice. If you have any questions about your permits or licenses, please contact our Customer Care Centre on 03000 653 000.

Yours sincerely

Marine Licensing Team
Natural Resources Wales

Cc: All Consultation Bodies

Annex 1 – Comments by Consultation Bodies

To be read in conjunction with Screening Opinion SC1903

1. **Summary of Proposal Considered –** Holyhead Breakwater Refurbishment

2. **Location –** Holyhead Harbour, Anglesey

3. **Issues for Consideration**

Although it was concluded a statutory Environmental Impact Assessment was not required the following advice has been provided regarding the proposal.

Noise Disturbance / Marine Mammals

As the rock and concrete will be placed along the breakwater, and no other construction is proposed – Our internal NRW advisors don't foresee any likely significant effect on any marine mammal features of the adjacent designated sites. Underwater noise will be minimal and for a short duration, and they don't anticipate it to be of a level to cause any significant disturbance or injury.

Coastal Processes

Our internal advisors agree that hydrodynamic and sediment dispersion modelling is not appropriate for the scale of this development. However, they recommend that an overview of the potential local and regional scale changes to coastal processes be presented in the final application.

Archaeology

The scope of work relating to archaeology and cultural heritage reflects previous pre-application discussions with the Welsh Archaeological Trust and is still considered to be appropriate.

Habitats Regulations Assessment (HRA)

At this stage it is not possible to state whether an appropriate assessment will be required. Following the European Court of Justice ruling in the case of 'People over Wind and Sweetman v Coillte Teoranta (Case C-323/17)' it is no longer appropriate to consider mitigation measures when screening a plan or project to determine whether it is necessary to carry out an appropriate assessment of the implications for a European site. Rather, mitigation measures should only be considered at the appropriate assessment stage. Therefore, it is highly likely that any HRA for this project would have to go to appropriate

assessment. This does not mean to say that any potential impact pathways from the proposed development cannot be mitigated.

Navigational Safety

The Marine and Coastguard Agency (MCA) would expect the safety of navigation to be considered, with any predicted impact on shipping and navigation to be suitably mitigated. The MCA note that the site falls within the jurisdiction of Stena Line in their capacity of Statutory Harbour Authority, who would be expected to maintain safety within their waters in line with the Port Marine Safety Code, and it's Guide to Good Practice.

A2 IoACC's Screening Opinion

CYNGOR SIR
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COUNTY COUNCIL

DEWI FRANCIS JONES MSc, M.R.T.P.I
Prif Swyddog Cynllunio – Rheoleiddio a Datblygu Economaidd
Chief Planning Officer – Regulation and Economic Development

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Cais Rhif / App. No. **SCR/2019/50**

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DEDDF CYNLLUNIO GWLAD A THREF 1990 / TOWN AND COUNTRY PLANNING ACT 1990

RHEOLIADAU CYNLLUNIO GWLAD A THREF (ASESIAD AR YR EFFAITH AMGYLCHEDDOL) (CYMRU) 2017 / TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (WALES) REGULATIONS 2017

Barn sgrinio ar gyfer atgyweirio yn / Screening opinion for the refurbishment at Morglawdd, Caergybi / Breakwater, Holyhead

RHYBUDD PENDERFYNIAD

Ceisiwyd barn sgrinio ymhellach i'r datblygiad arfaethedig uchod ar.

Wrth ffurfio barn sgrinio ar effaith sylweddol tebygol o ddatblygiad arfaethedig, rhaid rhoi sylw i Rhestr 3 o'r Rheoliadau Gwlad a Thref (Asesiad ar yr Effaith Amgylcheddol) (AEA) 2017 sydd yn nodi meini prawf dethol i'w hystyried. Nodir tri maen prawf bras:

- nodweddion y datblygiad;
- sensitifrwydd amgylcheddol y lleoliadau daearyddol sy'n debygol o gael eu heffeithio gan y datblygiad; a
- math a nodweddion yr effaith bosib.

Fel arfer bydd angen asesiad ar gyfer datblygiad os yw'n:

- ddatblygiad pwysig sydd a phwysigrwydd y tu i'r lleol;
- ddatyblygiad mewn lleoliad amgylcheddol sensitive iawn; a'n
- ddatblygiad sy'n cael effaith anarferol o gymhleth ac o bosib bergylus ar yr amgylchedd.

Wedi ystyried y datblygiad arfaethedig, a chadw mewn cof y wybodaeth a gyflwynwyd a'r meini prawf dethol Rhestr 3 o'r Rheoliadau yn fy marn i bydd y datblygiad yn cael effaith sylweddol ar yr ymgylchedd ac yn hyn o beth **BYDD ANGEN AEA.**

NOTICE OF DECISION

A request for a screening opinion in respect of the above proposed development was made on.

In formulating a screening opinion on the likely significant effects on the environment of a proposed development, regard is to be had to Schedule 3 of the Town and Country Planning (Environmental Impact Assessment) (EIA) Regulations 2017 which sets out the selection criteria to be taken into account. Three broad criteria are identified:

- the characteristics of the development;
- The environmental sensitivity of geographical areas likely to be affected by development; and
- the types and characteristics of the potential impact

EIA will generally be needed for development if:

- they are major developments of more than local importance;
- they are developments in particularly sensitive or vulnerable locations; or
- they are developments with unusually complex and potentially hazardous environmental effects.

Having considered the proposed development taking into account the information submitted and the selection criteria contained in Schedule 3 of the Regulations, my judgment is that the proposed development is likely to have significant effects on the environment and that **EIA IS** required.

DYDDIAD Y PENDERFYNIAD **01/10/2019** DATE OF DECISION

DEWI FRANCIS JONES
PRIF SWYDDOG CYNLLUNIO / CHIEF PLANNING OFFICER

Croeso i chi ddelio gyda'r Cyngor yn Gymraeg neu'n Saesneg. Cewch yr un safon o wasanaeth yn y ddwy iaith. You are welcome to deal with the Council in Welsh or English. You will receive the same standard of service in both languages.

A3 Further Information for the IoACC to Inform a Second EIA Screening Request

Note

HaskoningDHV UK Ltd.
Industry & Buildings

To:	Emma Collett, Rowland Thomas
From:	Sarah Marjoram
Date:	Tuesday, 19 November 2019
Copy:	Jamie Gardiner, Neil Chamberlain, Simon Lewis
Our reference:	PB9014-RHD-ZZ-XX-MS-Z-0108
Classification:	Project related

Subject: **Holyhead Breakwater – Further Information for IoACC to inform an EIA screening request**

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1 Introduction

This note has been prepared to provide the Isle of Anglesey County Council (IoACC) with further information on elements of the proposed Holyhead Breakwater refurbishment scheme (the proposed scheme) which have resulted in the proposed scheme being considered an EIA Development. Its purpose is to provide further justification as to why the proposed scheme is not considered to have the potential to result in significant environmental impacts and therefore is not considered to be an EIA Development.

The IoACC raised comments on the following topics:

- Details and location of the concrete batching plant and further information to determine the potential effects (addressed in **Section 2.1** of this note);
- Inclusion of the Chwarel Morglawdd Caergybi Local Wildlife Site (LWS) (addressed in **Section 2.2**);
- An in-combination assessment with other plans and projects (addressed in **Section 2.3**); and,
- Details of 'best practice' mitigation measures (addressed in **Section 3**).

Please note, the information provided in this note is additional to that provided in the Screening Report (PB9014-RHD-ZZ-XX-RP-C-0062) and therefore the two documents should be read in conjunction.

Since the Screening Report was produced, there have been some minor amendments to the proposed scheme, as follows (see also **Drawing PB9014-RHD-BW-XX-DR-C-0066** at the end of this note):

- In addition to the use of Tetrapods, rock is now also being proposed to be placed at Soldiers Point, and around the nose and along a section of the leeward side of the breakwater;
- The Tetrapods will now extend around the nose of the breakwater to approximate 100m along the leeward side; and,
- It is proposed that the turning point, located approx. 100m from the end of the breakwater on the leeward side is removed.

These changes are presented in more detail in **Section 4**, along with an assessment of their potential to effect on the screening exercise.

2 Provision of Further Information

2.1 Concrete Batching Plant

The concrete batching plant is proposed to be located at one of two locations – within Holyhead Port on Salt Island or adjacent to the Breakwater on Soldiers Point. Regardless of the location chosen, clear constraints will be given to the contractor defining the area they can occupy. This will also define the programme of works to ensure there is sufficient space.

2.1.1 Salt Island

Stena Line has confirmed that there is sufficient space on Salt Island for a concrete batching plant, should it be located here (see **Figure 2.1**). Material would be delivered to Terminal 2 by sea for the manufacturing of concrete and casting of Tetrapods. There is also sufficient space to allow the Tetrapods to cure and dry before these would be transported to Soldiers Point by barge prior to placement along the seaward side of the Breakwater. The screening report for the Holyhead Breakwater refurbishment concluded that the operation of the batching plant would not have a significant impact on human or ecological receptors.

This conclusion was based on the information available within the Environmental Statement (ES) of the Holyhead Port Expansion (HPE) project (I&BPB6108R006F0.1)[1], which was not presented within the screening report. As such, relevant information from the ES is presented below to confirm that a concrete batching plant located on Salt Island is not anticipated to result in significant environmental effects to human and ecological receptors.

Potential significant environmental impacts from a concrete batching plant can arise from impacts to air quality, noise and water quality. As such, an assessment of these parameters was carried out and presented within the HPE ES. The HPE project proposes the use of a concrete batching plant to be located on Admiralty Pier, on the south side of Salt Island. A summary of the assessment is provided below.

Air Quality

The assessment of potential impacts to air quality on human receptors was carried out for the construction phase of the HPE project. There are no ecological receptors sensitive to dust on or near Salt Island.

The HPE project proposed the use of a concrete batching plant on Salt Island to support the construction of the reclamation areas. Human receptors (i.e. residents and businesses) are located within 350m of Salt Island and as such under Institute of Air Quality Management (IAQM) guidance a detailed assessment was required.

A concrete batching plant is considered to be a dusty activity and as such was assigned a Dust Magnitude of Large. The sensitivity of people to dust soiling was considered to be low, and the sensitivity of people to the health effects of PM_{10} was also considered to be low as the annual background PM_{10} concentration at the site is less than 24µg.m^{-3}.

[1] Royal HaskoningDHV, 2019. Holyhead Port Expansion Environmental Statement.

Legend:

- Salt Island Batching Plant
- Human Receptor

Base map: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Client:	Project:
IOACC	Holyhead Breakwater Refurbishment

Title:

Salt Island concrete batching plant and human receptors

Figure: 2.1 | Drawing No: PB9014-001-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	05/11/19	AB	SM	A3	1:3,000

Co-ordinate system: British National Grid

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Therefore, the assessment determined that there was a **medium risk** of potential impacts to human receptors resulting from construction activities without the implementation of mitigation measures. Recommended measures in the HPE ES included:

- Develop and implement a Dust Management Plan (DMP)
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results and make an inspection log.
- Plan the site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable.
- Erect solid screens or barriers, around the site boundary.
- Take measures to control site runoff of water.
- Produce a Construction Logistics Plan to manage the delivery of materials, thereby avoiding/minimising the time materials are stockpiled on site.
- Use enclosed chutes and conveyors and covered skips.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

The implementation of these measures was considered to ensure that the residual impact to human receptors arising from potential impacts from dust would not be significant.

With regards to the proposed scheme, the measures outlined above would also be put in place to reduce any potential air quality impacts to human receptors. Any risk to human health would therefore be not significant, as concluded for the HPE scheme.

Noise

Noise modelling was also undertaken as part of the EIA for the HPE project. This included the operation of a concrete batching plant on Salt Island that would operate 24/7. Noise sensitive receptor locations were chosen to represent the closest residential housing and businesses to the HPE project. The operation of the concrete batching plant was assessed as part of the Week 37 activities which included drilling and driving piles, filling piles with concrete, installation of anchor walls and tie rods and the placement of material within the reclamation areas by excavators. The modelling determined that these activities would have no impact on nearby human receptors (see **Figures 2.2** and **2.3** below extracted from the HPE ES – the concrete batching plant is located adjacent to Terminal 2 on Admiralty Pier, indicated by the red arrow).

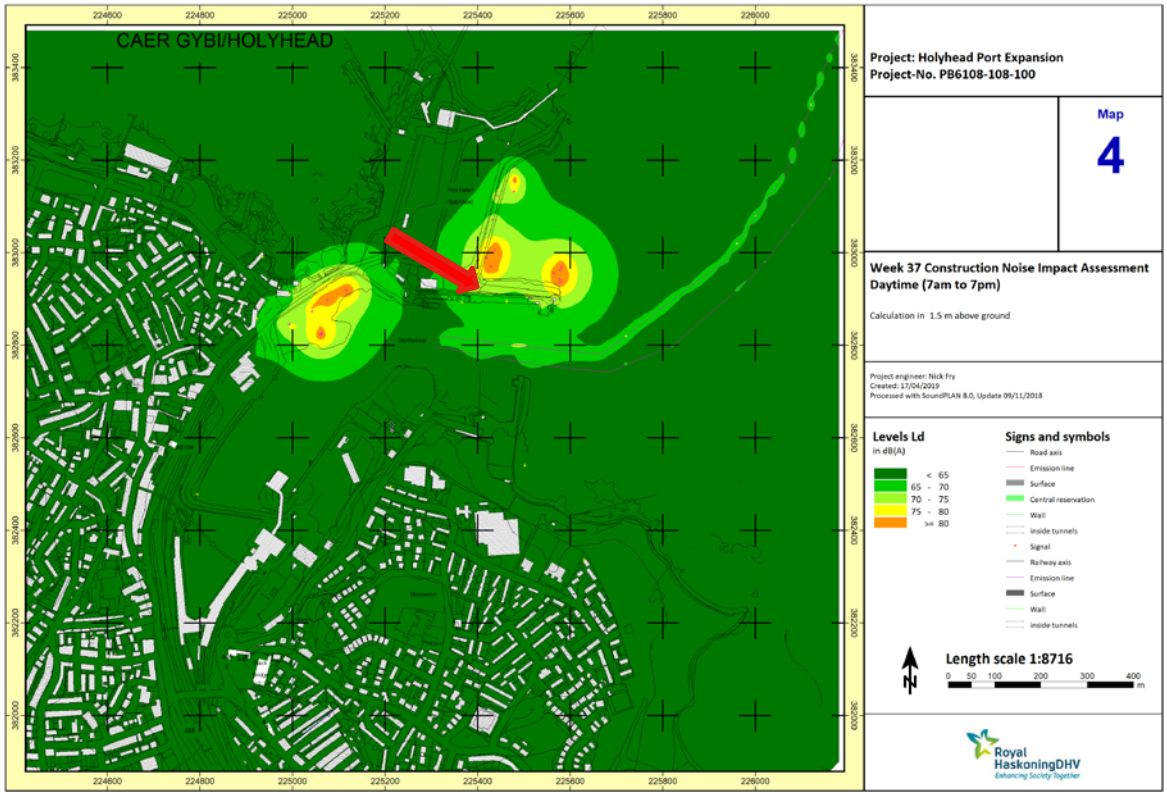

Figure 2.2 Construction Noise Impact Assessment (daytime - 7am to 7pm) (Source: Royal HaskoningDHV, 2019)

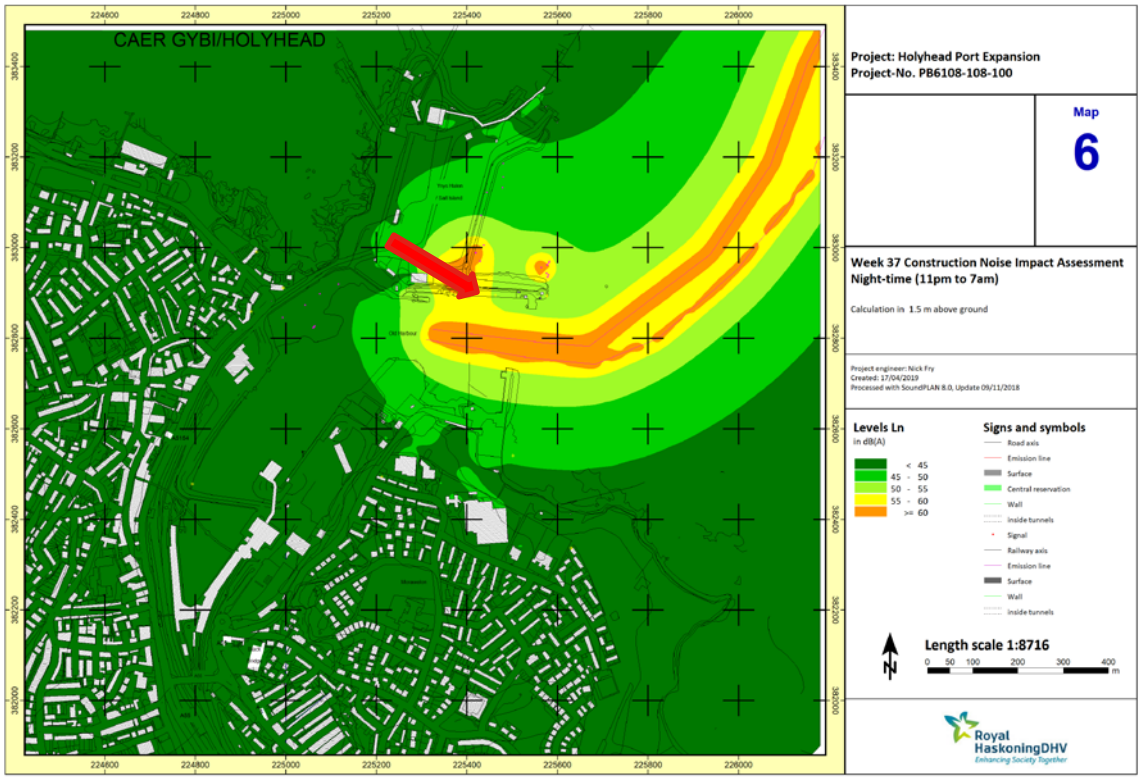

Figure 2.3 Construction Noise Impact Assessment (night-time - 11pm to 7am) (Source: Royal HaskoningDHV, 2019)

The above assessment also applies to the proposed scheme. As such it can be inferred that no impact to human receptors will arise from this activity.

There are a number of 'best practice' measures that should always be implemented on construction sites so as to be a "good neighbour" and protect the amenity of nearby human receptors. These include:

- switching off equipment when not required;
- minimising the drop height of materials;
- starting up plant sequentially rather than all together;
- increasing the distance between plant and noise sensitive receptors is the most effective method of controlling noise; and,
- on sites where it is not possible to reduce noise by increasing the distance between source and receptor, screening may be considered.

These measures would be implemented as part of the proposed scheme and as such impacts to human receptors arising from noise are considered to be **negligible**.

Water quality

Potential risks to water quality arising from the operation of a concrete batching plant arise from any run-off of water that has been contaminated with cement or other chemicals. The risk of this arising can be minimised by following standard good practice with regard to pollution prevention guidance. Construction works will be undertaken in accordance with NRW's Guidelines for Pollution Prevention No. 5 (GPP5) on works in, near and liable to affect watercourses. In addition, it will be ensured that following mitigation measures are put in place:

- concrete and cement mixing and washing areas are situated at least 10m away from the nearest watercourse,
- a settlement and recirculation system should be incorporated to allow water to be re-used;
- all washing out of equipment should occur in a contained area; and,
- all water should be collected for off-site disposal.

These measures will be put in place for the proposed scheme and would adequately mitigate any potential adverse impacts to water quality arising from the operation of the concrete batching plant.

2.1.2 Soldiers Point

Should the concrete batching plant be located on Soldiers Point, it would be located at the northern most end, closest to the Breakwater (**Figure 2.4**). As such the nearest human receptor would be located over 350m away and as such potential impacts arising from air quality and noise would not be significant. However, the mitigation measures set out above will be put in place regardless to comply with best practice and standard industry practices.

The mitigation measures set out above for water quality will also be put in place, thus ensuring that the marine environment is protected.

Legend:

- Soldiers Point Working Area
- Potential Location of Batching Plant
- Human Receptor
- Local Wildlife Site
- Local Wildlife Site 20m Buffer

Client:	Project:
IOACC	Holyhead Breakwater Refurbishment

Title:

Soldiers Point - Location of concrete batching plant and LWS

Figure:	Drawing No:
2.4	PB9014-001-002

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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2.2 LWS Chwarel Morglawdd Caergybi

A small outlier area of the LWS Chwarel Morglawdd Caergybi is located directly at the landward end of Soldiers Point (see **Figure 2.4**). This area is an important feeding and nesting area for birds. Species recorded include shelduck, oystercatcher, red-breasted merganser and ringed plover.

The LWS would be approximately 200m from the location of the concrete batching plant at the northern end of Soldiers Point. Using the findings of the air quality and noise assessments carried out to inform the HPE ES, and with adherence to the mitigation measures, no significant impacts to the site from air quality and noise are anticipated.

In order to prevent any direct damage to the LWS a buffer of 20m will be established around the boundary of the LWS to prevent any direct damage to the site during the construction phase.

2.3 Other Projects

A Habitats Regulations Assessment will be undertaken in support of the Marine Licence Application to NRW. As such potential in-combination effects on European designated sites with the plans and projects listed by the IoACC will be fully assessed.

3 Mitigation Measures for the Proposed Scheme

The following mitigation and best practice measures, as described in the sections above, will be adhered to as part of the construction of the proposed scheme.

Table 2.1 Mitigation measures that will be put in place for the proposed scheme

Topic	Mitigation Measure
Air Quality	Development and implementation of a DMP.
	Regular site inspections will be carried out to monitor compliance with the DMP, inspection results will be recorded in an inspection log.
	Site layout planned so that machinery and dust causing activities are located away from receptors, as far as is practicable.
	Where it is not possible to reduce dust by increasing the distance between source and receptors, solid screens or barriers around the site boundary will be considered.
	Take measures to control site runoff of water. (See water quality section below).
	Produce a Construction Logistics Plan to manage the delivery of materials, thereby avoiding/minimising the time materials are stockpiled on site.
	Enclosed chutes and conveyors and covered skips will be used.
	Equipment will be readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
	Sand and other aggregates will be stored in bunded areas and will not be allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
	Bulk cement and other fine powder materials will be delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
Noise	Switch off equipment when not required.
	Minimise the drop height of materials.

Topic	Mitigation Measure
	Start up plant sequentially rather than all together.
	Increase the distance between plant and noise sensitive receptors is the most effective method of controlling noise.
	Where it is not possible to reduce noise by increasing the distance between source and receptor, screening may be considered.
Water Quality	Construction works will be undertaken in accordance with NRW's Guidelines for Pollution Prevention No. 5 (GPP5) on works in, near and liable to affect watercourses.
	Concrete and cement mixing and washing areas will be situated at least 10m away from the nearest watercourse.
	A settlement and recirculation system will be incorporated to allow water to be re-used.
	All washing out of equipment should occur in a contained area.
	All water will be collected for off-site disposal.
LWS	A 20m buffer will be established around the boundary of the LWS to prevent any machinery or Tetrapods being placed within the site.

A will be produced prior to construction commencing and will be adhered to throughout the construction activities. The CEMP will include all the mitigation measures and best practice set out in **Table 2.1** above and will also include other standard mitigation measures such as tool-box talks with contractors to raise ecological awareness whilst on site.

4 Changes to the Proposed Scheme

Since the Screening Report was submitted, in August 2019, a number of minor changes to the proposed scheme have been made as the design works have progressed. These are summarised in **Table 3.1** and illustrated in **Drawing PB9014-RHD-BW-XX-DR-C-0066**, at the end of this note.

Table 3.1 Changes to the proposed scheme

	Original Design	Updated Design
1	Only concrete armouring will be used for the refurbishment	The engineering design has confirmed that quarried rock will be required to repair the rubble mound at the lighthouse end of the Breakwater. It is anticipated that approximately 80,000m^3 of rock will be required which will vary in size from 0.001 tonne to 15 tonnes. A small section (up to 20m) along the seaward side of the breakwater will need to be infilled with rock, in order to act as an interface between the land and rubble mound at Solders Point. This will require approximately 5,000m^3 of rock. A section of the rubble mound along the leeward side of the Breakwater is too steep for the placement of ACBM. Therefore, rock will need to be placed along this length to repair the rubble mound. This will require approximately 20,000m^3 of rock. Rock will be placed below low water. In summary, an approximate total of 105,000m^3 of quarried rock will be required as part of the refurbishment of the Breakwater. All rock would be delivered by sea.
2	Articulated Concrete Block Mattress (ACBM) will be used to refurbish the leeward side of the Breakwater	A short length (approximately 120m) of concrete armouring (Tetrapods and Chevrons) will be required to refurbish a section of the leeward side of the Breakwater, from the lighthouse end, to prevent the rubble mound in this area from being eroded further. A 450m length of the leeward side from Soldier's Quay will no longer have ACBM placed along it as no refurbishment is required along this section.
3		The turning point, located approximately 100m from the lighthouse on the leeward side of the Breakwater will need to be removed as part of the proposed refurbishment.

4.1 Potential Impacts of the Changes to the Proposed Scheme

The potential impacts of the changes outlined in **Table 3.1** above on the environment are presented below:

1. The rock required for the refurbishment of the Breakwater will be suitable for placement within the marine environment.

   As with the materials required for the Tetrapod and chevron units, the rock will be delivered by sea to either Holyhead Port or Soldiers Quay for storage until it is required. It will then be transported to the construction area by barge and lifted into place by a long reach excavator which will likely be positioned on a jack-up barge or similar, as per the Tetrapods and chevrons.

   As such the use of rock within the refurbishment does not represent a material change to the methodology assessed within the Screening report and therefore the conclusions within the report would not change.

2. The use of Tetrapods and chevron units along a short section of the leeward side of the Breakwater would mean that part of the refurbishment along the leeward side of the Breakwater would be visible above mean low water spring. The potential visual impact of this will be assessed within the Visual Assessment. The potential impact of this on the setting of heritage assets will be discussed with Cadw, GAPS and the IoACC's conservation officer as part of the Listed Building Consent application.

   The removal of the ACBM from a ~450m section of the leeward side of the Breakwater, from Soldiers Quay, is considered to be beneficial in reducing the overall potential impacts of the proposed scheme.

3. The turning point is a recent addition (according to Stena this is thought to have been added around the 1970's / 80's) to the Breakwater and not part of the original structure. It is considered therefore to have no heritage importance that its removal could be seen as beneficial due to the restoration of the Breakwater to its original state.

   This will be considered further as part of the Listed Building Consent application, including consultation with Cadw, GAPS and the IoACC's conservation officer to agree how the turning point should be removed and the details of any restoration works.

4.2 Effect on Screening Conclusion

In light of the above, the minor changes to the proposed scheme are not considered to affect the conclusion of the Screening Report submitted in August 2019, and the proposed refurbishment scheme is still considered to not be an EIA Development.

A4 IoACC's Second Screening Opinion

DEWI FRANCIS JONES MSc, M.R.T.P.I
Prif Swyddog Cynllunio – Rheoleiddio a Datblygu Economaidd
Chief Planning Officer – Regulation and Economic Development

CYNGOR SIR YNYS MÔN
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Cais Rhif / App. No**. SCR/2019/69**

Ms. Sarah Marjoram
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DEDDF CYNLLUNIO GWLAD A THREF 1990 / TOWN AND COUNTRY PLANNING ACT 1990

RHEOLIADAU CYNLLUNIO GWLAD A THREF (ASESIAD AR YR EFFAITH AMGYLCHEDDOL) (CYMRU) 2017 / TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (WALES) REGULATIONS 2017

Barn sgrinio ar gyfer atgyweirio yn / Screening opinion for the refurbishment at Morglawdd, Caergybi / Breakwater, Holyhead

RHYBUDD PENDERFYNIAD

Ceisiwyd barn sgrinio ymhellach i'r datblygiad arfaethedig uchod ar.

Wrth ffurfio barn sgrinio ar effaith sylweddol tebygol o ddatblygiad arfaethedig, rhaid rhoi sylw i Rhestr 3 o'r Rheoliadau Gwlad a Thref (Asesiad ar yr Effaith Amgylcheddol) (AEA) 2017 sydd yn nodi meini prawf dethol i'w hystyried. Nodir tri maen prawf bras:

- nodweddion y datblygiad;
- sensitifrwydd amgylcheddol y lleoliadau daearyddol sy'n debygol o gael eu heffeithio gan y datblygiad; a
- math a nodweddion yr effaith bosib.

Fel arfer bydd angen asesiad ar gyfer datblygiad os yw'n:

- ddatblygiad pwysig sydd a phwysigrwydd y tu i'r lleol;
- ddatyblygiad mewn lleoliad amgylcheddol sensitive iawn; a'n
- ddatblygiad sy'n cael effaith anarferol o gymhleth ac o bosib bergylus ar yr amgylchedd.

Wedi ystyried y datblygiad arfaethedig, a chadw mewn cof y wybodaeth a gyflwynwyd a'r meini prawf dethol Rhestr 3 o'r Rheoliadau yn fy marn i bydd y datblygiad yn cael effaith sylweddol ar yr ymgylchedd ac yn hyn o beth **BYDD ANGEN AEA.**

NOTICE OF DECISION

A request for a screening opinion in respect of the above proposed development was made on.

In formulating a screening opinion on the likely significant effects on the environment of a proposed development, regard is to be had to Schedule 3 of the Town and Country Planning (Environmental Impact Assessment) (EIA) Regulations 2017 which sets out the selection criteria to be taken into account. Three broad criteria are identified:

- the characteristics of the development;
- The environmental sensitivity of geographical areas likely to be affected by development; and
- the types and characteristics of the potential impact

EIA will generally be needed for development if:

- they are major developments of more than local importance;
- they are developments in particularly sensitive or vulnerable locations; or
- they are developments with unusually complex and potentially hazardous environmental effects.

Having considered the proposed development taking into account the information submitted and the selection criteria contained in Schedule 3 of the Regulations, my judgment is that the proposed development is likely to have significant effects on the environment and that **EIA IS** required.

DYDDIAD Y PENDERFYNIAD **13/02/2020** DATE OF DECISION

DEWI FRANCIS JONES
PRIF SWYDDOG CYNLLUNIO / CHIEF PLANNING OFFICER

Croeso i chi ddelio gyda'r Cyngor yn Gymraeg neu'n Saesneg. Cewch yr un safon o wasanaeth yn y ddwy iaith. You are welcome to deal with the Council in Welsh or English. You will receive the same standard of service in both languages.

Appendix B Consultation Records

B1 Public Consultation Responses

Consultation responses received from members of the public
30/05/2019

Comment Number	Date received	What are your key interests in Holyhead Breakwater?	What are your key concerns relating to its refurbishment?	Do you have any relevant information you can share to inform the development of the proposed scheme?	Any other comments
1	20.03.2019	Yatching and boating, Using the Marina and facilitating lifeboat services	The loss of the breakwater would be catastrophic for the port and the town of Holyhead	I was under the belive that when the harbour was sold out of public ownership that all rights and obligations were transferred, did this not include the mainting the breakwater ?	
2	20.03.2019	Historic and iconic structure such as this should be more when marketing tourism on Anglesey, such as South Stack and the Church in the Sea. We should be proud of our past achievments and maintain them. It is one of the longest beakwaters in the world, a fact that is sadly forgotten. Stella Line should be in the strongest possible terms to allow the condition to deterioate by carrying out virtually no maintenance. Do something "Seaward Side"	I have no concerns regarding refurbishment (The channel tunnel was built in the 90s) All environmental issues, both environmental, technical and social would be addressed during the various "impact" processes which are statuory before such work commences. Surely the cost of repair is much less that construction of a new structure.	I'm sure that many find difficulty in interpretating the three questions on this paper. If you wish to bring people on board, ask questions that they understand and can answer. Look to the past work carried out that maintain the structure, neglect has brought us to where we are , thanks to Stenna	
3	20.03.2019	Resident Marina user ?	My concerns are the impact on the local economy if the breakwater is to fall into disrepair. What would the result be to the coastline and marine life. I think strengthening the seaward side and the groynes on the Leeward side would be the best way forward.		
4		Resident Marina user ?	Social - historic importance and contempory local icon, well used locally. Technical - Maximum maintenance more effective long term.		
5		We have a home in Tam y Bryn Rd.- We use the breakwater for recreational purposes. - We feel the breakwater is integral to the identity of Holyhead port and town	Essential to the protection of HH sea front. - It is important national monument. - It is a structure of architectural and historic importance. - It allows for safe recreational environment (dinghy sailing).	It is essential to existing and future commercial development: marina, restaurants, museum, lifeboat station, housing….	
6		To maintain a "safe haven" for locals and visiting sailors (for which Stena receive payment)	My concerns are all costs should be bourne by the owners - to maintain their operation in a safe manner.	Stena Conygar Planning App to , IOACC included "Environmental Impact Statements" which stated Stena reported the breakwater would require no work for 100 years ? IOACC Planning accepted this ?.	
7		That the public once again have vehicular access for disabled to go fishing.	That public monies are used then Stena Line who have not done any serious maintenance but whose ships have caused major wave damage to the structure, take oover the running of it. Stena Line sold it to Conegar for £1.00 ! Sealink and British rail spent millions on Rock Armour, Stena NONE !!		
8		Part of my life and my upbringing. It defends us. As sailors we knew the safety of the harbour and its history. Shelter and beauty. Bolsach and Salt Island have been ruined, ugly, station ugly	Needs sensitive restoration - not cost to wild life. Has to be in keeping with design. Its historic and we should be proud, caretake the project.	Not a development expert but please don't let it ruin any further. Don't need any more fancy developments, do not need a safe haven.	
9		Enjoy fishing especially in the summer. Also walking along the breakwater.Amount of time it will take. Realise it needs to be done			
10	01.04.2019	Having lived all my life(72 years) in Holyhead, I have seen many changes to the buildings and structures which have been detrimental to our local history, (eg St Seriols Church, Railhoose,Convent) Please find the resources to save our breakwater for the generations which will follow to walk, run, fish and just enjoy it.	If nothing is done the breakwater will eventuall breach and there will be nothing left only a pile of stone ! Our local history will be consigned to the text books (or these days on line !)	No information, but would hope that the breakwater would remain a public acsess structure and not made a private concern	
11		Keeping structurally sound and important transportation hub operational. It makes good business sense for Wales.	Done properly, the social and environmental benefits could be long lasting and inumerable. Repair the inside of the structure wall so that erosion is halted - but without decreasing harbour area. Do major structural repair and support the outer wall - there's more room.	Never neglect the sea. The stongest and most beneficial force on earth. The potential for wave energy is there, transport and food is there, think futuristically- population growths , industrial needs, DO NOT THINK SMALL	
12		The port needs to carry on the service to Ireland. Tourism – beautiful location for walks and fishing	It needs refurbishing, at the minute it is untidy and a bit of work on it would improve the environment	Only what I see while appreciating the Holyhead area	
13		It was constructed to provide a refuge for ships during severe gales and should be maintained to offer protection for yatchs now moored there.	That it should not be closed to the public for a long period of time		
14		As a resident of the town for 80 years. As the wife of a seafarer for 58 years, as someone who lives close to the structure and sees it every morning from my bedroom window, and as a resident who wishes to ensure that its refurbishment and ongoing upkeep is funded for the long term.	My key concerns are that the refurbishment offers a long term improvement to the structure and that any refurbishment includes the walkways.	Having travelled to Dunlaoghaire regularly for a number of years, I have always noticed that the seaward side of their breakwater has a curve. This allows the waves to travel up the curve and flow back on itself into the sea. You describe your option as a 'slope', this would mean that at the top of the slope the sea would come over the top of the breakwater, I assume. Would it not be better to provide a 'buffer' rather than a 'slope'? On the issue of the 'mound', you say that you will be restoring it. If this is the case will it not suffer from the same issue on the leeward side over the years to come? I have no technical knowledge, just the power of observation!	
15		I live within 100 metres of the shoreline in Newry Beach	My main concern is that Stena Line own the Breakwater and they should maintain it. It is in their interests to maintain a safe harbour and port as they are the owners of the Port and a substantial amount of and close to the surrounding shoreline. I am not in favour of scarce public funds being allocated to the repair of the Breakwater bearing in mind who the owners of the Breakwater are. If Stena Line are stating they don't have sufficient funds to pay for the repair they should consider introducing a levy on all ferry passengers using the port to pay for the upkeep of the Breakwater. It must be remembered that Stena had a very favourable deal when they acquired the Port but with this deal came some responsibilities – which includes maintaining the Breakwater.	Nothing in particular other than one from a personal perspective in that should the breakwater fail I shall have constant wet feet as the sea/tide will be lapping at my front door!	

16	28.03.2019	Emerging marine planning documents in Wales advise that marine developments should seek to enhance biodiversity, not only to minimise environmental harm. As part of the Ecostructure project (www.ecostructureproject.eu) we are investigating ways of enhancing biodiversity on artificial structures in the marine environment. We are trialling eco-engineering designs in the Irish Sea and collating a catalogue of evidence to support decision-making for ecologically-sensitive design in marine development projects. As such we are very interested in options for refurbishing Holyhead Breakwater.	Our key interests are maximising biodiversity benefits and minimising environmental impacts in marine development projects.	As part of a previous project we surveyed portions of the breakwater wall and rubble and can share biological information if of interest. When outputs from the Ecostructure project become available we will be able to share findings about what is likely to colonise different structures and how eco-engineering biodiversity enhancement interventions are likely to perform.	
17	24.03.2019	I enjoy walking outdoors and a love of the sea, the breakwater is a fantastic example of maritime engineering which should be preserved for all to enjoy.	Access should be maintained for all to walk and fish from the breakwater, is is a magnet for marine life and above all else protects Holyhead port and the marina from on shore winds.	unsure of what you are asking here	
18	24.03.2019	I write with regards to your consultation on the maintenance and upkeep of the Iconic Breakwater here at Holyhead, which has afforded a safe haven in the harbour area since 1873, and allowed continued development along the Newry Beach, Bolsach and Victoria Road areas, which would disappear without the protection afforded by this unique structure, a feat of engineering which is still to be admired to this day.	I am at present the Mayor of Holyhead, and as part of my role I have had the honour of meeting and talking to many dignitaries who have visited Holyhead during the last year, as well as the many visitors from all over the World, who visit on one of the many Cruise Ships that have Wales, and Holyhead, as an important part of their itineraries when visiting Great Britain and Ireland, holidaymakers and tourists from all parts of the Country, and they all say the same thing, how wonderful it is to be able to enjoy the Newry Beach area, protected by this amazing structure, and even walk its length to admire it for what it is, a structure affording protection to so many areas of our Town against the ever increasing storms that blow in from the Irish Sea.	I am hoping that a new marina or possibly even two marinas are to be constructed in the near future to replace the one that was totally destroyed here last year, the results of which have been felt hard by the Restaurant, Bars, Chandlers and the Sailing Club during the summer, with significant decrease in the numbers of boats and craft moorings, resulting in a big decrease in people coming to Holyhead during the Sailing season, and my fear would be that if the continued deterioration in the structure of the Breakwater, would over time, put any further developments that happen in this area in jeopardy. In conclusion, I would fully support any application for funding to start the work of securing the future of the Breakwater from a structural point view, for the reasons stated above, that is to secure the long term sustainability of the areas protected by the Breakwater since the 1800s, and secondly to allow further developments planned within this area in future, which will in my opinion, add to the economic growth of Holyhead and Ynys Môn well into the future, with the possibility of attracting further exiting new projects into the area, which will not be possible if the Breakwater were ever lost.	
19	24.03.2019	The Breakwater is essential for the protection of the port and town of Holyhead. Newry Beach and the outer harbour owes its existence to the shelter that the Breakwater has provided for more than 150 years. The Museum is located in the old Lifeboat House positioned at the water's edge at Newry Beach. It was built there as the Breakwater was being constructed. It is beyond doubt that this Grade II listed building, home to the town's collection of unique maritime artefacts, would be at serious risk of damage from the unfettered Irish Sea, should the Breakwater be breached. In addition, a very popular tourist attraction (over 5,000 visitors each Summer) could no longer operate.	The Trustees urge those now responsible for the maintenance and survival of the Breakwater do all it can to ensure that it remains in place. It would be false economy to turn backs on this magnificent structure and leave it to the mercy of the sea. All should be done to shore up and protect the seaward side of the structure. So much time has been lost since regular maintenance of the rubble base was abandoned. This surely must be the first priority. Among the Museum Trustees are two Master Mariners with extensive seagoing experience. One of the suggestions they make, seen in ports elsewhere, is the use of Tetrapods - preformed concrete shapes - to protect the seaward side of the Breakwater from wave action - see photo.		
20	23.03.2019	My main interest is fishing. I often visit to fish from there either alone or with my daughter. I fish for pleasure and also take part in various species hunt competitions where we have to try and catch as many species as possible. My results are shared with both The Angling Trust as well as CEFAS. The breakwater is home to many species of fish, which either live their permanently around it's structures or else visit at stages of the tide or season. I also take part in competitions on the breakwater. When I visit my daughter and I support the local businesses by purchasing goods as well as consumables.	From a social point of view it would affect my fishing as well as other anglers and boat owners, depending on which side is refurbished and any restrictions this will impose for access and for how long.The environmental impact again depends on which side repairs are done. Both sides are home to fish and various sea life, including crustaceans, other species, seaweeds etc. Wrasse can be caught on either side but more over on the back wall as the rocky environment provides an ideal habitat. Wrasse are territorial and are likely to remain close to where they like to breed, hunt or have hiding areas in times of danger. Last summer I caught a 3lb Ballan Wrasse there. Conger, pollack and bull Huss are also to be found in this area. On the inner area close to the wall resides smaller species of fish including the long spined sea scorpion, rockling, wrasse, tompot blennies etc. It is also visited by whiting, dog fish, bull Huss, pouting, poor cod, shannies and various Goby species. There are Off the walls near the light house there are octopus. There is also a seal which frequents the waters to hunt. also numerous prawns and shrimp which are a valuable food source. Crabs including the edible and velvet swimming crab along with lobsters are crustaceans which are in the inner area and I presume live amongst the rocks off the back wall too. There are also numerous prawns and shrimp which are a valuable food source. Crabs including the edible and velvet swimming crab along with lobsters are crustaceans which are in the inner area and I presume live amongst the rocks off the back wall too. There is also a seal which frequents the waters to hunt. Various species of seabird also visit. My concerns for the environment is the disruption that the refurbishment will cause, mostly at and below sea level. How long this disruption will be, the use of boats (adding to pollution levels) and machinery. Any damage to habitats caused by vibration, any contaminants entering the water and the dropping of rocks/concrete. Although I would rather the outer wall be strengthened by increasing the rocks or concete slabs than actual rebuilding of the wall at sea level as the latter would likely cause more habitat destruction. From an economic point of view should fishing be restricted or banned during repair work this would affect the businesses in Holyhead whereby people visit in order to fish the breakwater and they come from far and wide. In particular an Angling shop called Winnie's Worms would be very affected by it because a large part of his business especially during summer relies on not only locals that fish but moreover visitors.	Only as already listed above that careful consideration of the environment needs to be made before the final choice. Also to consider how this will affect anglers and in particular Angling businesses at Holyhead. My own preference would be to top up the rocks seaward side and to strengthen the wall only where it is absolutely necessary to repair. Otherwise the topping of the rocks would further act as a barrier to the waves and incoming tide.On the inner side I would prefer it if rocks/concrete was not dropped as it would destroy habitats and make changes to the sea bed which would alter the eco system and which creatures lived there, particularly close in. The water has only come over the bottom wall on inner during storms. Could there not be a provision to build a small wall along near the outer edge of the lower level? One which would help prevent the tide coming over? Stones or bricks which are used could have holes placed at the bottom in certain areas so if water did come over it could seep back into the sea. If the pot holes were filled in along the lower level this would help with standing water and if the whole lower level was raised slightly a slight camber could be installed towards the sea to help with water drainage. Even if this camber was only a few feet away from the edge. This would help to direct sea water away from the wall that divides the two levels and thus reduce erosion of the wall. Sadly I am unable to attend the public meeting but I wanted to express my interest in this matter and raise the concerns I have.	
21	23.03.2019	The economy of the area has been severely disrupted by the loss of the marina just over a year ago and it is essential that we retain the drive to reignite the growth of water-sports and commercial marine industries to draw people in and to support the fragile economy of the area.		Apologies for the late submission but in my opinion options 3 and 4, i.e. significant repairs to both sides of this historic monument, must be put in hand as the eventual failure of the breakwater would render the harbour lost as a port of refuge.	

22	22.03.2019	As a former "Holyheadian" I often return to visit my mum who still lives in the town. I was sad to hear about the poor state of the breakwater. I will not sadly be able to make the meeting on the 29th bur would love to hear more about the plans to look after this historic engineering project. Too many of the town's historic buildings have been pulled down or left to rot and it would be catastrophic if the same fate befell the breakwater.			
23	22.03.2019	This is one of the best venues for any disabled angler and is a key reason for visiting Holyhead. When planning a fishing trip to Holyhead I would normally spend at least £100 a trip with local businesses for the likes of bait, food and tackle. If this was multiplied by the number of people using the breakwater then I feel that would be a considerable amount. If the breakwater was not maintained and lost to angling then alot of local businesses would suffer.		No sorry	
24	22.03.2019	History:(an) historic landmark. Leisure:walking/running/fishing Protection: protects port/harbour	To Keep the Breakwater the same aesthetically ,using the same materials as the original construction -Something must be done imminently as the minimum has been done over recent years	Aggregate being placed on the lower 'deck' is recyclable material which contains clays and soils which is totally unsuitable because:a)clays and soils can be washed away I.e.environmentally undesirable b)will encourage growth of vegetation on the breakwater,leading to structural damage long-term.Recycled aggregate is a cheap alternative,but totally unsuitable for the running surface of the lower layer	I WOULD like to be kept informed as the project develops.Thankyou.
25	20.03.2019			Do nothing you don't own it! If you own it and get payed port tax then yes maintain your investment.	
26	19.03.2019	My history in the Breakwater is of a historical/cultural one. I am from Holyhead and also a local amateur historian (past-time) and Fisherman who frequently uses the Breakwater. I am well aware of the importance of the Breakwater to the History of Holyhead and Western Anglesey. The construction of the Breakwater in the 19th Century and developing a link between London to Dublin was one of the major factors why Holyhead and Western Anglesey developed and the population significantly grew.	Undoubtedly the Breakwater has not been maintained over the years which is disappointing. However my key concerns are that the original historical construct of the Breakwater may be destroyed during technical refurbishment works.	At the time of its construction in the 19th Century the Breakwater was using quite advanced construction techniques - the fact its also one of the longest breakwaters in the world is often overlooked. As part of the development of the proposed scheme I think consideration needs to be given to protecting the historical construct of the Breakwater as much as possible and also installing a new commemorative plaque once the new works have been completed.	Please can you also add my email address to your distribution list so I can be kept informed of the latest project news on the refurbishment:
27	18.03.2019				I note that erosion is being cited as a problem with the breakwater. I would to point out that in the 1980s when the port was run by the railways they would annually purchase from Penrhyn Quarries, 3000 ton of stone blocks in the size range of 8 to 10tonnes. The size of the blocks had been determined as being of sufficient mass to resist movement by the sea. These blocks were placed as and where needed using a large mobile crane over the course of the year These actions were I believe successfull in stabilising the breakwater. Regrettably when Stena took over the port this prudent maintenance work with these very large blocks of stone was discontinued.To me for Stena to now claim that the breakwater is at risk after their neglect and to request welsh government support is greed in the extreme when viewed against the profits the port has generated and the fact that it was known and quantified liability from the start
28	18.03.2019				I first became familiar with the Breakwater when I started working as a firefighter at Holyhead Fire Station in 1967, and through a friend started sea angling. I became a member of the local Holyhead and District Angling Club, and over the years up to present day I have served as the Secretary, Chairman, President. I was nvolved with organising the Holyhead Open Sea Angling Festival for over 35 yrs and have walked up and down that breakwater thousands of times. For many years there was a full time maintain acne squad that kept up a constant program of protection and maintain acne of the breakwater. A large mobile crane ran on rails along the whole length of the breakwater. Large rocks were constantly dumped over the back of the structure, and the maintain acne team knew exactly where the most vulnerable areas were. After each storm the team would be down there to check and strengthen any area weakened by the storm. Everyone that know the breakwater know, of the neglect that started to happen as on as the then Thacher government sold Sealink to American, James Blair Sherwood who Imeediately started stripping al the assets of Sealink nationwide. The maintainance of the breakwater diminished from then on, and when Stena took ove the port, ships and responsibility for the breakwater, it all went down hill after that. It was obvious to everyone that ey had no intention of running a proper on going maintainance program for the breakwaer and reluctantly carried out repairs only "if and when" required after a storm, and only carrying out the minimum work. The did not have a maintainance crew edification for the breakwater, and often they sub
29	17.03.2019		I think regardless of cost the breakwater should be re stored to its original state To let it deteriate will cause problems and drastic results and much more costly if it had ti be re paired then		

30	16.03.2019	local resident, active in leisure boating. Mooring holder and member of Holyhead Sailing Club. Walking along the Breakwater. Protection and preservation of an iconic landmark and symbol of Holyhead's historic, current and future as the principal strategic sea bridge to and from Ireland.	gradual breaches leading to total failure would be a catastrophe for Holyhead directly and North Wales generally in terms of economic loss, loss of employment, social consequences of loss of tourism. Loss to seafarers of one of the only ports of refuge along the North West coast. It is difficult to imagine how Holyhead could survive as a cross-Irish Sea ferry hub without the protection of the Breakwater.	I am not an expert. However as a sailor I would expect that the only feasible and long term solution is to strengthen and protect the Seaward side. This might be done with the use of very large interlocking pre-cast concrete Tetra-Pods. The strategic importance of the Breakwater cannot be overstated and as such I believe its refurbishment should be treated as a major national infrastructure project funded through taxation.	
31	15.03.2019	That it's restored and looked after thereafter and accessible for walks/bike rides/etc.	Local people and resources used first if available. No pollution made whilst work is ongoing.	Yes It's a local icon prevalent in most of my childhood memories. Let's not have it deteriorate due to usual issues/corruption/lack of appreciation within the council and stena or whoever else is key to getting this remarkable piece of local history maintained well.	I grew up at Hibernia row and therefore looked out at the breakwater every day of my life there. And still do when we visit family often throughout every year.
32	15.03.2019	I feel very strongly about the preservation on this historical monument and everything possible should be done to preserve it. Whilst under the care of British rail it was always maintained with large stones being placed over the back of the structure into the Irish Sea - that should continue.	The environmental impact on just letting it deteriorate is not an option with more frequent extreme weather, rising seas due to climate change, ETC Failure in the breakwater would result in damage along the sea front of Newry beach and the salt island complex, causing further sea erosion, which in turn adds costs to the local economy putting people , premises and businesses at risk, it would also hamper the Port for vessels requiring refuge and the sea's waves would also impact on the Penrhos beach area causing further coastal erosion. The World economic forum global risk report identifies the above impact as one of the economic risks to face us in 2019. Anglesey in the last couple of years has seen an expansion in the tourism industry, the breakwater is only one of the very few places if interest in the area for people to see and is disabled access friendly on the upper level.		
33	15.03.2019				Further to my earlier e mail. Have a look on your Face book stream for Anglesey Council, contributor "Beth Owen" I notice she stated that the annual replacement of the rock armour policy stopped some 20 years ago!! No wonder there is a problem today !!
34	15.03.2019				I was involved in the maintenance of the breakwater for a short time as a Sealink Ports Engineer and Procurement Manager some 30 years ago, at that time the seaward side was subject to stiorm wave erosion of the facing rock armour and every year the maintenance programme replaced lost material with imported rock armour which I would not define as "rubble". The size of rock armour used required a significant size long reach crane and each individual rock was placed carefully one rock at a time. I know that the previous Port Engineer now retired now still lives in the Area and his Name is John Marchbanks, I think it worthwhile taking his advice on the maintenance strategy as given the wave power in any gale,rubble would be washed away in no time. I also recall one particular storm exposed some timber so the existing breakwater may not be Block on block construction throughout. There used to be some superb cross sectional drawings of the breakwater in the Port Engineers Office all hand drawn at the time of construction.
35	15.03.2019	I live opposite it in the old coastguard houses	The disgusting state of what should be a tourist attraction, get a railway running alomg it. What a waste !	Stena are a disgrace they have done nothing to improve the new harbour (outer harbour) or inner one	Why have these pamphlets not been distibuted to people who live along Newry and waterside areas . I got mine from a third party!
36	15.03.2019	I have keen interests in the holyhead breakwater as a keen angler who has fished this venue very frequently for the last 45 years. I also I'm the chairman of the holyhead and district angling club angling club which I've been a member for 35years. We hold our annual open competition on the every year for many years sponsored by stena we also hold many club matches on the breakwater. I also walk this venue often.when I was younger the breakwater was constantly maintained by crane dropping big bolders of the seaward side of the breakwater witch fid the trick but this practice stopped Many years ago to slow the sea to pound the main structure .if this method would of continued the breakwater would be in better condition.			
37	15.03.2019	Fishing and walking	During proposed refurbishment access would be restricted? Would the refurb affect the fish stocks? If funding was provided by Welsh office then as it is public money access for cars would be guaranteed?	The massive apertures on seaward side of the Breakwater are constantly being concrete filled is this process not working or cost efficient?	
38	14.03.2019	To see the town of Holyhead protected from the sea	to have the town benefit from the Breakwater also being used as a tourist attraction.	Once refurbished, it should remain open and accessible for the public to enjoy.	
39	13.03.2019				can you please tell me who is paying for the consultants royal haskoning dhv to fix the holyhead breakwater, also where are stena going to get the money to fix the breakwater will the Anglesey rate payers. or the Welsh assembly pick up the tabs?.
40		Cymell is a day centre for people with learning disabilities. We used to be able to go fishing every Friday onto the breakwater. We felt safe and used to meet a lot of people there to socialise	That we will not be able to go fishing and walking on the breakwater where it is a safe place for us. We also have wheelchair users who used to enjoy the opportunity to go on the breakwater	We would like the breakwater to remain open so that we can continue to go there on our fishing club day, walking and cycling.	

B2 GAPS Consultation Response

Holyhead Breakwater: Archaeology

From
Jenny Emmett
To
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Cc
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Dear all,

Thank you for the informative presentation and overview of the project so far. I'm afraid for much of the meeting today it sounded as though you were holding it in an underwater cave, so I concluded it was sensible to email comments, with apologies if anything was covered today and I missed it. I don't have email addresses for Delyth (NRW) or Simon (RSPB) so please could you send this on, if you feel it appropriate to do so.

There are essentially three areas of potential archaeological impact for the proposed work:

i) physical impact to the breakwater itself

ii) visual impact, i.e. change in appearance of the breakwater

iii) impact on nearby archaeology during pre-construction investigations and construction works.

Item (i) has already been addressed through the completion of a comprehensive building record by Gwynedd Archaeological Trust in January 2017 (GAT report 1355). This was commissioned by RHDHV, so is presumably available to the project team for reference, e.g. in relation to historical evidence for its construction method and materials.

Both item (i) and (ii) will be addressed through the listed building consent application, and Keith and John's advice leading up to this. As the current form of the structure is already recorded, item (ii) is more a design issue that lies more in the remit of the built conservation officer than me.

Item (iii) mainly concerns the numerous wrecks and their shed cargo that are recorded around the breakwater. These sites are located with varying degrees of precision, and may be at risk from disturbance or damage either from construction activities (such as the placement of a jack-up barge / construction platform) or from any sediment-testing type investigations. I'm afraid I couldn't quite hear the response to this point over the phone, so to confirm, these will need to be identified as part of the archaeological section of your environmental report, or in a separate report if a combine environmental report isn't being produced, so that they can be avoided by construction activities. You should also consult Deanna, the RCAHMW maritime officer (I note that she sent apologies for this meeting) as she is the expert on this subject.

I would be interested to know what surveys are being undertaken to inform the scheme, as these can have incidental archaeological benefit as well as impact, in producing new information. I think I heard that GPR was planned to investigate voids in the breakwater?

Based on the current information, archaeology appears to be a relatively minor topic area that can be dealt with through the various consultation stages. I would be grateful to be kept in the loop, but probably don't need to attend further workshops.

Thank you for including us at this early stage, and apologies for the inconvenience of not being able to attend in person today.

Regards

Jenny

Jenny Emmett

Uwch Archaeolegydd Cynllunio - Senior Planning Archaeologist

B3 NRW Consultation Response

Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: CAS-85309-C7N2

Ebost/Email: northplanning@cyfoethnaturiolcymru.gov.uk
Ffôn/Phone: 03000 65 5265

BY EMAIL ONLY
FAO: SARAH MARJORAM

15th May 2019

Dear Sarah,

PRELIMINARY PRE-APPLICATION ADVICE

PROPOSED HOLYHEAD BREAKWATER REFURBISHMENT

As you are aware NRW recently attended a stakeholder workshop held by Royal Haskoning to introduce new proposals to refurbish Holyhead breakwater. In the meeting we agreed that we would send you some initial comments on the proposal under our Free Preliminary Advice service.

We have considered the information received regarding the proposal in relation to our Development Planning checklist. We advise that the following matters are relevant to your site / proposed development and suggest you consider these further prior to the submission of any planning application / marine licence application required:

Flood Risk Management

- For information the area of coast from Soldier's Point, along Newry beach and further east is located within Zone C2 as defined by the Development Advice Map (DAM) referred to under Technical Advice Note 15: Development and Flood Risk (TAN15) (July 2004). The breakwater affords a degree of protection from wave action / storm conditions. Our flood maps/zones are based on extreme sea levels (0.5% & 0.1%) which do account for surges but not wave action. As such we advise that any works undertaken are unlikely to change NRW's flood maps. Can you confirm whether maps will be developed in support of the proposed scheme showing which areas of the town benefit from the breakwater.
- What breach lengths are going to be modelled and how many model runs will be carried out? We would be grateful if you could advise and agree these parameters. NRW does have breach and blockage guidance but these are for formal linear defences rather than breakwaters and as such may not be applicable.
- What are the impacts of a total breach on any development proposal along Newry beach? It is understood that at the time, the proposed waterfront development relied on the breakwater.
- What would be the lifetime of the proposed development in years?
- Which Climate change allowance is proposed for use? For information, climate change allowances for planning applications in Wales require compliance with Climate change allowances and flood consequence assessments (CL-03-16)

Further advice on development flood risk can be found on our website.

Landscape
The proposal is located just over 1km away from the Anglesey / Ynys Môn Area of Outstanding Natural Beauty (AONB). Given the scale of the proposal we would advise you to consult with the Local Planning Authority and consider the need for Landscape Assessments in accordance with published best practice guidance. We refer you to our website for further advice.

European Protected Species (EPS)
Whales, dolphins and porpoises (cetaceans) are European Protected Species (EPS). It is against the law to deliberately capture, kill, injure or disturb a cetacean. Given the proximity of the proposed development to the North Anglesey Marine / Gogledd Môn Forol Special Area of Conservation (SAC), we advise that any future planning / marine licence applications should consider impacts to harbour porpoise as an EPS. Please see our website for further advice.

Protected Sites
The proposal is located within / immediately adjacent to the Anglesey Terns / Morwenoliaid Ynys Môn Special Protection Area (SPA) and the North Anglesey Marine / Gogledd Môn Forol SAC.

The proposal is located within about 150m of the Glannau Ynys Gybi : Holy Island Coast SAC, SPA and Site of Special Scientific Interest (SSSI).

Should the proposal be subject to planning and/or a marine licence the Local Planning Authority and/or NRW will be a competent authority for the purposes of the Conservation of habitats and Species Regulations 2017. As such they must not agree to any plan or project unless they are certain that it will not adversely affect the integrity of the SACs and SPAs listed above.

The competent authorities will need to carry out a test of likely significant effects (TLSE) for the SACs and SPAs, as required under Regulation 63 of the Conservation of Habitats and Species Regulations 2017. This test applies to impacts on the SACs and SPAs from the proposed works alone and in-combination with other plans and projects.

If the test concludes there is likely to be a significant effect then an appropriate assessment of the impacts on the SAC from the proposed works, either alone or in combination with other plans and projects, will be required. We would be able to assist with that assessment in our role as the statutory nature conservation body under the above Regulations.

The Wildlife and Countryside Act 1981 (as amended) places a duty on public authorities in exercising their functions, so far as this is likely to affect the flora, fauna, geological or physiographical features of a SSSI, to take reasonable steps consistent with the proper exercise of their functions to further the conservation and enhancement of those features. We refer you to our website for further advice.

Section 7 Marine Species and Habitats
We advise that any future planning and/or marine licence application made should consider marine priority species and habitats listed on section 7 of the Environment (Wales) Act 2016. The following guidance note provides information on how to access marine ecology datasets for marine developments and activities.

Water Framework Directive
Should the proposed development require a marine licence, it is likely that any application made will need to be accompanied by a Water Framework Directive (WFD) Assessment. Further information can be found on our website and the following guidance note

Invasive Non-Native Species
Reducing the risk of the spread of invasive non-native species is an important consideration for any proposed development, particularly so at this location in Holyhead which is close by to a known location of the highly invasive non-native sea squirt *Didemnum vexillum*. We would expect any planning and/or marine licence application to be accompanied by a biosecurity risk assessment detailing measures designed to reduce the risk of spread of invasive non-natives as a result of the proposed works. We can provide further advice on this issue if required.

Please note the view expressed in this letter is a response to a pre-planning enquiry only. We trust these comments will prove helpful but they should not set a precedent for any future Natural Resources Wales' response to any formal application for planning permission or other legal consent. Such applications shall be assessed on the information submitted and regulations of relevance at that time. The details contained in this letter are based on the information available to date.

Please do not hesitate to contact us should you require further information regarding the contents of this letter.

Yours sincerely,

Delyth W Rowlands

Delyth Wyn Rowlands
Cynghorydd Cynllunio Datblygu / Development Planning Advisor
Cyfoeth Naturiol Cymru / Natural Resources Wales

B4 Proposed Scope of the Visual and Heritage Setting Assessments

Note

HaskoningDHV UK Ltd.
Industry & Buildings

To:	Cadw, Gwynedd Archaeological Planning Service (GAPS), Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), Isle of Anglesey County Council (IoACC) and Natural Resources Wales (NRW)
From:	Sarah Marjoram
Date:	Friday, 20 September 2019
Copy:	Emma Collett, Rowland Thomas, Steven Edwards, Jamie Gardiner and Neil Chamberlain
Our reference:	PB9014-RHD-BW-XX-CO-YE-0103
Classification:	Project related

Subject: **Holyhead Breakwater Refurbishment Scheme – Proposed Scope of the Visual and Heritage Setting Assessments**

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1 Introduction

Stena Line and the IoACC are proposing the refurbishment of Holyhead Breakwater. The rubble mound which supports the Breakwater superstructure is subject to movement and erosion by wave action and currents, which over the years has resulted in undermining the superstructure. The rubble mound extends approximately 120m from the seaward side of the Breakwater superstructure, and approximately 40m from the leeward side.

The refurbishment would involve the placement of concrete armour units (Tetrapods) along the length of the seaward side of the superstructure, around the lighthouse end and along the leeward side of the breakwater for approximately 100m. Chevron units would be placed at the toe of the Tetrapods to prevent these being moved by the physical force of water movement. The Tetrapods would extend approximately 30m seawards from the superstructure and would have a crest height of +6.7mCD (see **Plate 1** below). The finished design has a 50-year design life to a 100-year design standard, taking into account 1 in 100-year wave height combined with a 1 in 100-year storm surge and 50 years of sea level rise. In order to meet these standards, the design height of the seaward option is required to be 1.1m above Mean High Water Spring (MHWS) level which is +5.6mCD and would therefore be visible throughout the tidal cycle. At high tide, between eight and 15m width of Tetrapods would be visible along the length of the Breakwater.

An Articulated Concrete Block Mattress (ACBM) would be installed along the leeward side of the Breakwater, which would not be visible at any state of the tide (see **Plate 2** below). This would halt the ongoing movement of the rubble mound, providing a long-term solution to the ongoing erosion.

The construction of the refurbishment works would be undertaken entirely by marine-based plant. A jack-up or floating barge with spud legs, or an alternative form of anchoring system, would be required as a platform for a long-reach excavator.

A suitable method of anchoring the barge has yet to be confirmed; however, it could involve a series of anchor points installed on the Breakwater superstructure, or a series of concrete anchor blocks placed seaward of the rubble mound which can be used to hold the barge in place. A vessel would be used to

transport the concrete armour and mattress to the jack-up/floating barge, which would then take the material and place this onto the existing rubble mound foundation.

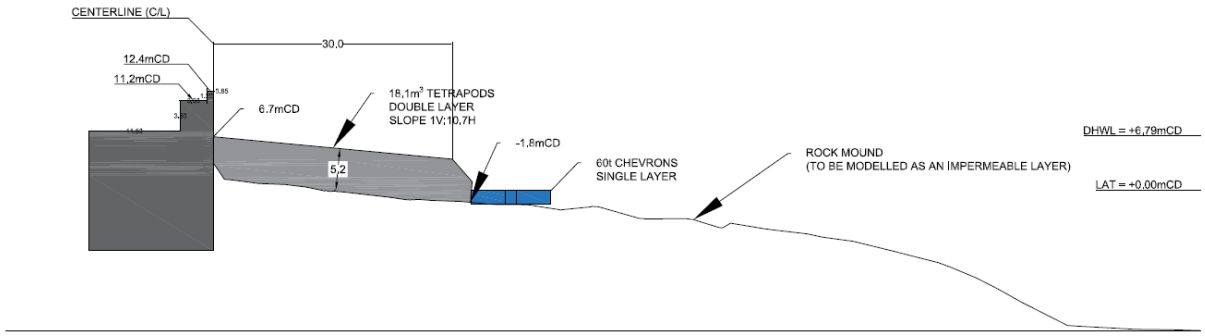

Plate 1 Proposed refurbishment of the seaward side of the Breakwater (LAT – Lowest Astronomical Tide; DHWL – Design High Water Level)

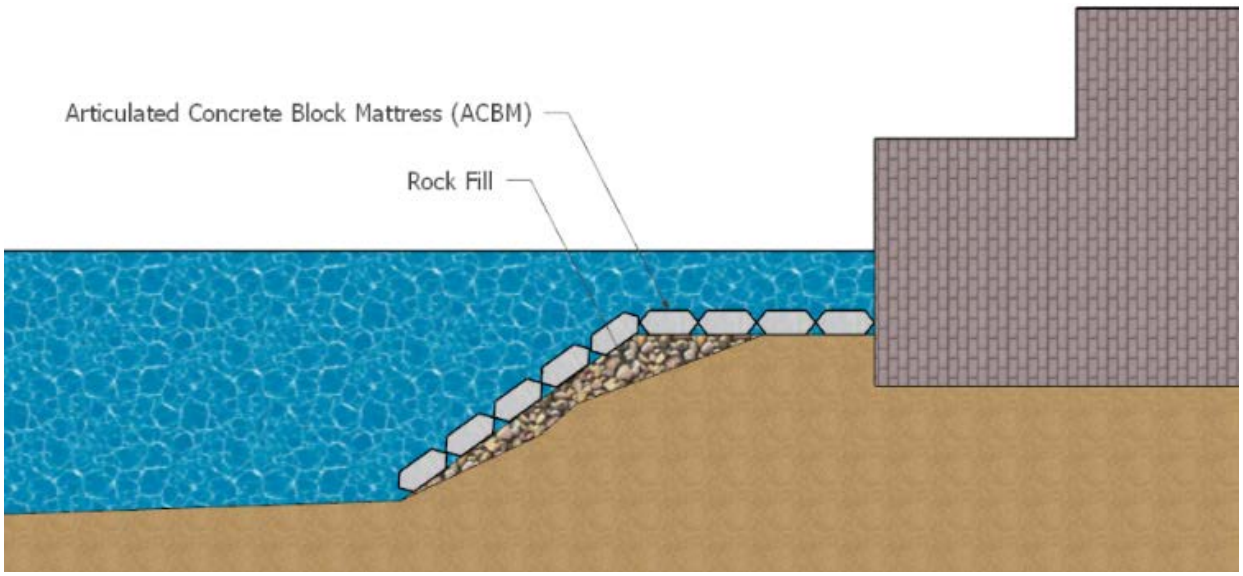

Plate 2 Proposed refurbishment of the leeward side of the Breakwater

2 Purpose of This Note

This note presents the proposed methodology and viewpoint locations for undertaking a visual assessment and heritage settings assessment of the proposed refurbishment works for agreement with GAPS, Cadw, RCAHMW, IoACC and NRW.

3 Proposed Approach

The visual assessment would comprise photomontages of the proposed scheme, which would be used to assess the potential impacts of the proposed scheme on the local visual and heritage setting. Given the nature of the proposed works being concrete armour in front of an existing structure that are only partly visible at high water, no impact on the local seascape/landscape character is anticipated and a full Landscape and Visual Impact Assessment is not considered necessary.

3.1 Viewpoints

Three viewpoints are proposed from which photomontage images of the proposed refurbishment works would be produced (see **Figure 1** at the end of this note), as follows:

- **View 1** – looking south west along the seaward side of the breakwater from the lighthouse. This would consider views from the Grade II listed lighthouse;
- **View 2** – the nearest view from the coastal path and within the Anglesey Area of Outstanding Natural Beauty (AONB) looking north east along the seaward side of the breakwater; and,
- **View 3** – an elevated view of the breakwater looking north east from Holyhead Mountain and the AONB.

These viewpoints have been chosen as they are considered to represent the most appropriate views of the breakwater from visually sensitive locations. Viewpoints from other locations have been considered, such as Newry Beach and across the bay from Penrhyn Bay Caravan Park, however the proposed refurbishment works would either not be visible (from Newry Beach) or the distance is such that the refurbishment works would not be visible (Penrhyn Bay Caravan Park) and as such these locations have been discounted.

3.2 Assessment methodology

3.2.1 Visual assessment

The assessment would be undertaken following standard industry guidance (such as the 'Guidelines for Landscape and Visual Impact Assessment', 3rd Edition) to summarise the key predicted issues and effects of the scheme.

A 3D model would be produced using Civil 3D for the purpose of depicting how the proposed refurbishment works would look like once completed. This would then be used in the production of photomontage images. Photomontage images would be produced for daytime only, given the refurbishment works would not be visible at night time. They will provide a realistic representation of what the proposed refurbishment works would look like once completed.

The following stages of development would be assessed from the agreed viewpoints:

- existing baseline condition;
- construction stage effects; and,
- visual effects once completed.

3.2.2 Heritage setting assessment

The results of the visual assessment will be used to inform a heritage settings assessment of the breakwater and lighthouse. Assessing the setting of a heritage asset and how that setting contributes to its significance follows the methodology recommended in the Setting of Heritage Assets: Historic Environment Good Practice Advice in planning Note 3 (Historic England, 2017).

This guidance document recommends a stage-based approach for assessing the implications of development proposals, as follows:

- Step 1: identify those heritage assets whose settings might be affected;
- Step 2: assess whether, how and to what degree setting makes a positive contribution to the value of those heritage assets;
- Step 3: assess the effect of the proposed development on the significance of those assets as a result of changes to setting;
- Step 4: maximise enhancement and minimise harm; and,
- Step 5: make and document decisions and monitor outcomes.

The first four steps of this process would be undertaken as part of the assessment. Given the localised nature of the proposed refurbishment works, only the breakwater and lighthouse are proposed to be included in the heritage setting assessment.

Figure 1 Proposed viewpoints

B5 Refurbishment Options and Impacts to Heritage Significance Note

Note

HaskoningDHV UK Ltd.
Industry & Buildings

To:	Emma Collett (Isle of Anglesey County Council)
From:	Neil Chamberlain and Victoria Cooper (Royal HaskoningDHV)
Date:	11 March 2020
Copy:	Jamie Gardner (Royal HaskoningDHV), Sarah Marjoram (Royal HaskoningDHV)
Our reference:	PB9014-RHD-BW-XX-FN-C-0136
Classification:	Project related

Subject: **Holyhead Breakwater Refurbishment Options and Impacts to Heritage Significance**

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1 Introduction

The Port of Holyhead is situated on Holy Island off the North West Coast of the Isle of Anglesey, close to the North Wales mainland. The harbour, which provides shelter for the port and leisure facilities including a marina, is provided by the Holyhead breakwater which is 1.5 miles (2.4km) long, is considered the longest breakwater in Europe and is protected by CADW as a Grade II* structure. A Grade II listed lighthouse is also located at the head of the breakwater.

An aerial view of the Holyhead harbour is shown in Figure 1.

Figure 1: Aerial view of Holyhead harbour (© Holyhead Port Authority)

The Holyhead breakwater was constructed between 1848 and 1873 to act as a Harbour of Refuge which can be accessed during all weather conditions and at all states of the tide. The breakwater currently provides refuge to cruise ships and coastal vessels such as ferries, fishing vessels and pleasure crafts. In addition, it is a considerable amenity to the local population and provides recreational value in addition to fulfilling a coastal and flood risk protection function to coastal amenities and parts of Holyhead town.

Although the breakwater has been subject to ongoing, regular maintenance, considerable wave action has led to movement of the rock blocks that make up the rubble mound foundation, and damage to the vertical blockwork of the superstructure. Whilst the current maintenance programme provides a temporary solution

to the problem, the likelihood of a failure of the breakwater during more frequent but less severe storm events increases with time. A more permanent solution is, therefore, required in order to secure the longevity of the breakwater as both a nationally important heritage asset and for its essential role as part of the Port's infrastructure.

Pre-application consultation advice received from the Gwynedd Archaeological Planning Service (GAPS), the autonomous planning service of Gwynedd Archaeological Trust (GAT), has drawn attention to three areas of potential archaeological impact for the proposed work:

1 Physical (direct) impact to the breakwater itself;

2 Visual impacts, i.e. change in appearance of the breakwater which could results in an impact to the setting of the breakwater and the lighthouse and other coastal heritage assets; and

3 Direct impact to archaeology in the vicinity of the breakwater during pre-construction investigations and construction works.

Following a request for a screening opinion from Natural Resources Wales (NRW) and Isle of Anglesey County Council (IoACC), it has been concluded that the breakwater refurbishment project will require an Environmental Impact Assessment (EIA). The EIA will include an assessment of potential impacts to archaeology and cultural heritage, with specific consideration of the areas of potential impact raised by GAPS.

In 2017, GAT completed a comprehensive building record (Level 4) commissioned by Royal HaskoningDHV, which will provide baseline information to inform consideration of Point 1 and Point 2. Settings impacts are also being considered with respect to visual impact assessment, supported by photographs and viewpoints from/to the lighthouse, breakwater and further coastal heritage assets, being prepared by DRaW (UK) Ltd on behalf of Royal HaskoningDHV. A Heritage Statement, based upon the EIA baseline and impact assessment, prepared by Royal HaskoningDHV will also be issued in support of an application for Listed Building Consent to IoACC.

In order to inform appropriate consideration of heritage impacts, and any requirements for additional mitigation, as part of the design of the scheme, early consultation with IoACC, Cadw and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW, with specific respect to Point 3) will be essential. This note has, therefore, been prepared to present a preliminary review of heritage considerations, with specific reference to the selection of the proposed option for refurbishment of the breakwater, to inform consultation with heritage stakeholders.

2 Breakwater Design

Details of the construction of the breakwater are recorded in a paper entitled 'Holyhead New Harbour' by Hayter and published by the ICE in 1876. The paper provides information concerning the design and construction of the breakwater and notes key decisions that were made to determine the final alignment.

The original accepted plan for the harbour was to provide protection by constructing a 1.63km long northern breakwater extending in an easterly direction from Soldier's Point and a 610m long eastern breakwater extending in a northerly direction from Salt Island to Platters and Skinners Rocks. Both these breakwaters would have provided an enclosed area of 1.1km^2. However, the east breakwater was abandoned due to the decision to principally operate as a harbour of refuge rather than to accommodate quay side facilitates such as a packet pier. The start of the east breakwater is still evident at Salt Island.

Although during the design stage, it was felt that the original plan would provide sufficient capacity for the harbour, it soon became apparent as the construction of the north breakwater neared completion that it would prove too small to act as a harbour of refuge given the number and frequency of incoming vessels. Given this, the then harbourmaster requested the Lords of Admiralty to increase the length of the northern breakwater by a further 760m to form a total length of 2.4km from the shore, which would more than double the capacity of the harbour whilst providing deep water for larger vessels. However, rather than simply continuing the breakwater in a due east direction, it was decided that the extension of the breakwater would dogleg to take a north-easterly direction in order to shelter a greater area and to enable vessels to more easily access the harbour.

The breakwater is typical of one built during the Victorian period and consists of a mound of rubble stone (hereon known as 'rubble mound'), upon which is erected a substantial stone superstructure (hereon known as the 'superstructure'), the end of the breakwater being terminated by a head, on which sits a Grade II Listed lighthouse. A cross-section of the breakwater, taken from Hayter's Paper, is reproduced in Figure 2.

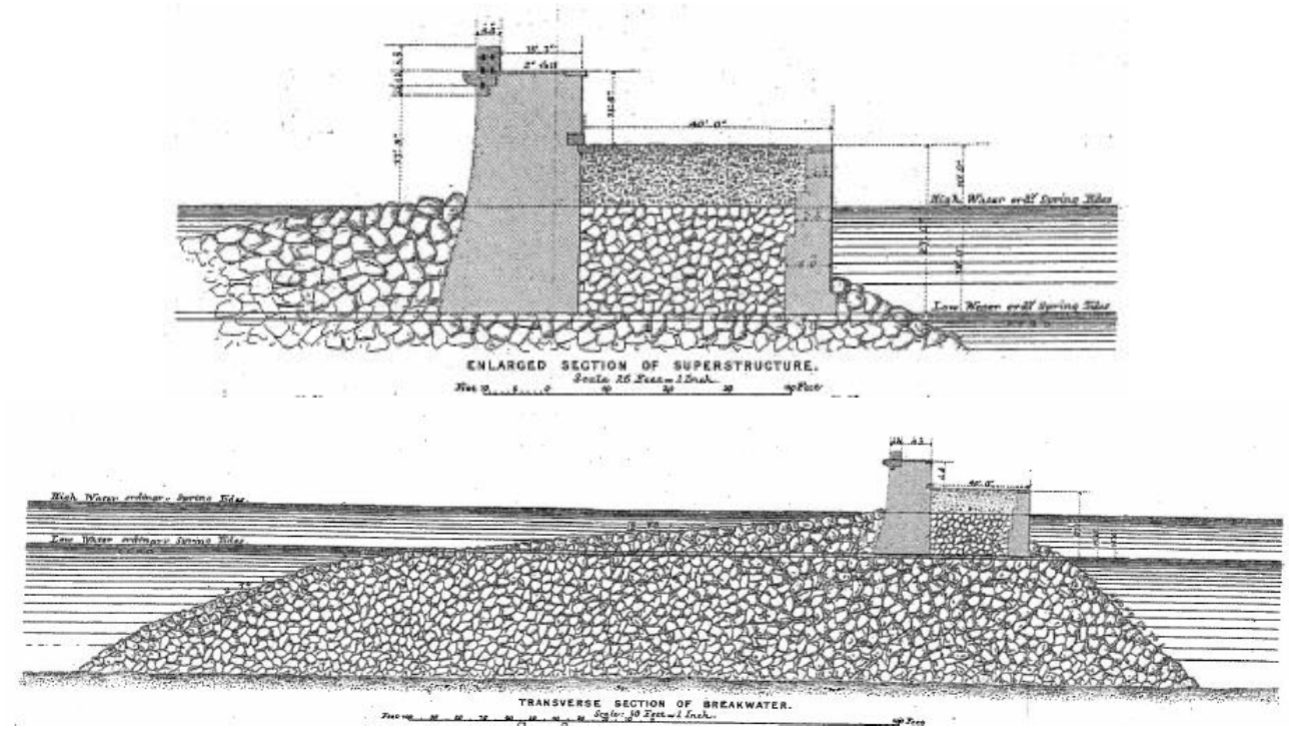

Figure 2: As built cross-section through Breakwater (Hayter, 1876)

The construction of the rubble mound was formed by dumping a large quantity of rock and using the natural processes of the sea this rock was moved around by the action of waves. The rock was then regularly replenished until the sea shaped the rubble mound to the form required. The completed rubble mound contained some 7 million tonnes of quartzite that was quarried from the nearby Holyhead Mountain.

Once the rubble mound had been formed, and consolidated by the natural processes of the sea, the superstructure was built along the rubble mound crest. The superstructure consisted of a solid sea wall of masonry, built principally of larger quartz rock (individual units weighing up to 15ton), again quarried from the Holyhead Mountain, and set in lias-lime mortar. The foundation of the superstructure approximates to

0.0mCD and was placed following the excavation of loose rock along the crest of the mound. The top of the sea wall is at 12mCD which is further increased to 13.2mCD by the use of a parapet structure. The sea wall supports a 12.2m wide promenade road-way which is also supported by a lee side retaining wall, which is founded at 0.0mCD. The promenade and the top of the lee wall are set at a level of 8.5mCD. The space between the sea wall, lee wall and promenade surface is filled with a layer of stone placed on a loose stone core material. The plinths, cornices, parapets, paving, coping and other ashlar works are constructed from Anglesey limestone.

The head at the seaward end of the breakwater is a structure 45.7m (150ft) long and 15.2m (50ft) wide. It is founded on the rubble mound at -5.8mCD and is mostly built of ashlar masonry using stone that is partly Runcorn sandstone and partly Anglesey limestone set dry below MLWS or Anglesey limestone set in mortar above MLWS.

3 Management Regime

Stena Line Ports Limited (Stena) owns and is responsible for the management of the breakwater, having acquired the asset from Sealink (previously British Rail) in 1993. Stena has the power to raise funds for the maintenance and up-keep of the breakwater through port dues and through grants and awards.

As part of the Project Appraisal Report (PAR) study undertaken in 2016/2017, records dating back to 1960 were reviewed and they indicated that the breakwater has been subject to a prolonged period of a planned maintenance, which has generally included the strategic replenishment of large quantities of rock to the rubble mound and other major repair work such as making good of holes which appear in the masonry face of the structure and general re-pointing. Indeed, records indicate that 3,000 to 4,000 tonnes of rock was tipped on the rubble mound each year between 1967 and 1976 (note that records of the quantities of rock tipped outside of this period was not available). The source of this rock is understood to be Holyhead Mountain but when the quarry closed down rock was sourced from much further afield namely Beshesda slate quarries and Penamanemawr granite quarries.

Due to financial constraints (mainly due to the significant increases in rock transportation costs), Sealink Ports Ltd took the decision in 1984/1985 to abandon the planned rock replenishment programme, although the level of maintenance had actually been diminishing for a number of years beforehand. Contrary to popular belief the rock replenishment programme ceased some 5 years before Stena Line become involved in the Port. It is to be noted that up until 1985 the Port owners were British Rail (the State), In 1984 the Port was sold to Seacontainers Ltd who then sold the Port to Stena Line Ports Limited on 9th April 1990.

Since 1985, when the port was transferred to the private sector, there has been ongoing maintenance of the superstructure (e.g. repairing cavities in the superstructure as and when they appear and general re-pointing) at a cost of approximately £210k/year. This maintenance regime generally consists of impromptu walk over inspections during spring/early summer to identify areas of winter damage to the superstructure then to remedy as part of a maintenance programme carried out during the summer months. The £210k/year budget is clearly insufficient to keep up with the rate of deterioration of the superstructure / rubble mound. Since taking ownership of the Port in 1990 Stena has carried out a number of detailed surveys of the breakwater and its rubble mound and has commissioned several studies in order to gain a better understanding of the structure and its weaknesses.

4 Historical Problems

Since its construction in the 1870's, Holyhead Breakwater has suffered from inherent weaknesses in its initial design and construction. The quartz rock used to form the original rubble mound was unsuitable by modern standards for use in the harsh marine environment, suffering relatively rapid attrition. This led to a reduction in stone size in the rubble mound and subsequent mobility of the rock along and away from the breakwater.

The removal and re-distribution of significant quantities of rubble mound material increases the depth in front of the structure. This allows larger wave heights to impact on the front face of the masonry superstructure, causing damage to the masonry and accelerates the attrition of the rubble mound rock. This leads to a viscous cycle, whereby initial damage to the mound leads to bigger waves which cause more damage to the mound.

Deterioration of the mound on the seaward side is concerning because the rubble mound protects the footing of the masonry wall, which is instrumental in reducing overtopping, breaking waves and preventing a breach of the breakwater.

In addition, the slope of the rubble mound on the leeward side was constructed at a relatively steep angle. Therefore, the exposure of the toe and subsequent collapse of the leeward side masonry wall has historically been a threat to the continued service of the structure.

Various studies and reviews of the breakwater over time have identified concerns about the loss and re-distribution of material from both the toe and crest of the rubble mound. These concerns apply to both the seaward side and leeward side of the breakwater.

5 Management Options

The breakwater's function of providing shelter to Holyhead Harbour is fulfilled, in most part, by the blockwork superstructure and this structure must be capable of withstanding storm waves.

The long-term future of the superstructure is dependent on maintaining its integrity and a secure foundation. It derives strength as a coherent structure and will always be vulnerable to rapid deterioration if local damage such as missing pointing between blocks or slabs it is not maintained or if dislodged blocks are not made good.

The critical aim for any breakwater management strategy is to maintain the integrity of the superstructure and is all about raising the threshold of storm severity that will cause damage, by making it difficult for waves to disrupt the structure, relieving wave loads on the structure and protecting the foundation.

A number of management options were considered as part of the PAR and Outline Business Case (OBC) study in 2016/17. These management options are outlined below for both the seaward and leeward side:

Seaward Side:

- "Do Nothing" – baseline case where existing structure is allowed to deteriorate over time;
- "Do Minimum" – Continue the existing maintenance strategy for the existing structure;
- "Do Something" (various options):
    - Option S3 – Reinforce or strengthen the existing superstructure;
    - Option S4 – Provide detached breakwaters / offshore reefs to reduce the waves impacting the superstructure;

- Option S5 – Restore rubble mound with robust rock armour to a suitable level to create a "wave dissipating beach";
- Option S6 – Provide armoured slope to seaward face of superstructure to reduce wave impact forces and wave overtopping;
- Option S7- Periodic Replenishment of the Rubble Mound.

Leeward Side (harbour):

- "Do Nothing" – baseline case where existing structure is allowed to deteriorate over time;
- "Do Minimum" – Continue the existing maintenance strategy for the existing structure;
- "Do Something" (various options):
  - Option L3 – Construct rock groynes to reduce loss of rubble mound due to alongshore transport of material along the leeward side of the superstructure;
  - Option L4 – Restore rubble mound to original levels using robust rock armour;
  - Option L5 – Restore rubble mound to original levels using concrete mattresses;
  - Option L6 – Periodic Replenishment of the Rubble Mound.

The PAR study assessed each of these options and the conclusion of the OBC study was that the preferred options for the seaward and leeward sides were selected considering a balance across all the appraisal categories (technical, environmental, economic, and they aligned with the Well-Being Act and Critical Success Factors).

The preferred option selected for the seaward side is Option S6: Lower crest armoured slope, as it is the most economically attractive option that does not have significant uncertainties or risks associated with its ability to perform the function of protecting the superstructure of the breakwater over the full 100-year appraisal period. Environmentally this option minimises the effect on the area's visual setting and benthic habitats.

On the leeward side Option L5: Restore mound using concrete mattress, has the highest benefit-cost ratio, performs the best technically, has the best alignment with the Well-Being Act and Critical Success Factors, and environmentally is considered the best option.

6 Preferred Option

Although the preferred option for both the seaward and leeward side were chosen on the grounds of balancing the appraisal objectives, clearly one of the main drivers for the solution which has recently been developed into a workable construction scheme is the engineering performance of the scheme relative to any other option that could have been considered.

As mentioned above, there are a several issues with the Holyhead breakwater which stem from its initial design and construction. The main issue affecting the performance of the Holyhead breakwater today is the lowering of the rubble mound on the seaward side due to wave attrition, which is reducing the stone size and allowing this material to be moved by the everyday wave and tidal conditions. The same process is also happening on the leeward side to a lesser extent because the tidal currents and wave climate in this region is less. Clearly as the rubble mound lowers, then the wave climate becomes large and this exacerbates the situation.

The other issue that the Holyhead Breakwater suffers from is the ongoing deterioration of the masonry superstructure due to the large waves crashing into the front face of the structure. These waves create impulsive wave conditions, which effectively means that the wave is thrown vertically upwards due to the violent action of the waves crashing into the superstructure. This phenomenon creates large wave forces,

which can damage the pointing between the blocks and under certain circumstances can cause a block to pop out or be dislodged particularly at the crest of the superstructure.

The violent action of the waves on the seaward side of the Holyhead Breakwater can been seen on any windy day when sheets of water are thrown up and over the superstructure and land on the structure behind. Under extreme storm conditions this phenomenon looks very spectacular but is extremely dangerous for anyone on the breakwater and can lead to significant damage to the superstructure. The photograph below shows the water being thrown vertically and then over Holyhead Breakwater during Storm Doris on 23rd February 2017.

Figure 3: Storm Doris (23 February 2017) (Copyright DJ Photography)

To prevent the rubble mound from lowering anymore and eventually leading to the catastrophic failure of the masonry superstructure, it is important to hold as much of this this rubble mound material in place. To achieve this some form of additional layer needs to be placed over the rubble mound on the seaward and leeward side.

The historical solution has been to replenish the rubble mound with any rock material that is available locally to maintain the level of the mound at or close to the high-water level. This means given the lack of replenishment for many years that significant quantities of rock are now urgently required. Given any suitable rock material that is used is not stable under wave action means that this will be easily eroded, and wave attrition will continue to reduce the size of the material placed on the rubble mound, so effectively this is an on-going yearly maintenance activity. Back in the mid 1980's this was deemed to be unsustainable and therefore this will never be a practical and/or long-term solution.

The best engineering solution would be to build a very large revetment structure on the seaward side, which would protect the rubble mound but also prevent the waves from violently impacting the vertical masonry superstructure completely. However, this is likely to be completely unacceptable on heritage

grounds because the iconic masonry superstructure would be hidden from view. Therefore, a compromise has been developed where large concrete armour units (2 layers of Tetrapods) are placed on the rubble mound to hold the top portion of the rubble mound in place (30m) whilst also trying to minimise the violent action of the waves crashing into the listed masonry superstructure.

Due to the aggressive nature of the wave climate approaching Holyhead under storm conditions the size (18.1m^3) and weight (42t) of the concrete armour units is significant. Although every effort has been made to minimise the height of the proposed Tetrapod scheme, which has to be formed from 2 layers, it will stand approximately 5.2m high above the existing rubble mound and therefore, it is unfortunate that it will hide some of the existing seaward masonry superstructure from view. A typical cross section of the Tetrapod solution is presented below in Figure 4 which shows that to hold the 2 layers of Tetrapods in place, a double line of 60t chevrons is also required.

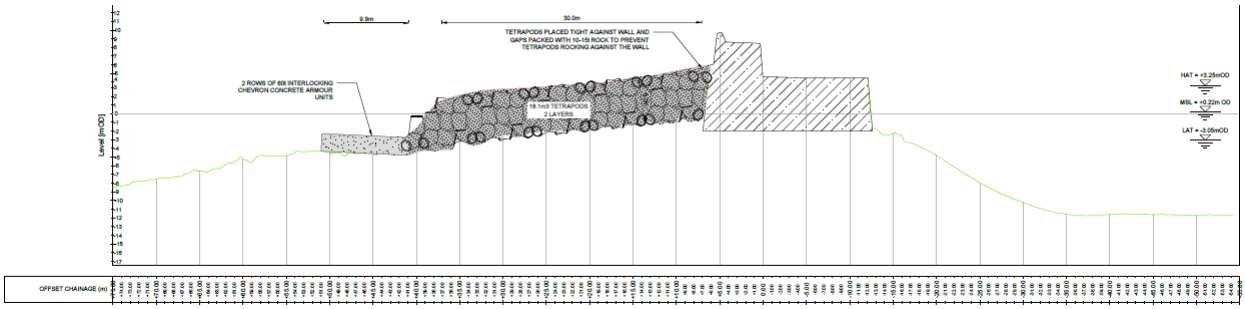

Figure 4: Typical cross section through proposed Tetrapod solution for the seaward side.

An option to use a more modern concrete armour unit was also considered (Xbloc). However, although the Xbloc units are smaller in size than the Tetrapods armour units and only one layer of them is required, this option had to be discounted on both performance, construction and financial grounds.

A draft indicative view of the tetrapod solution is shown in Figure 5.

Figure 5: Draft view of tetrapod solution (DRaW (UK) Ltd)

This image demonstrates that there will be a noticeable visual impact on the breakwater and, consequently, a change to the setting of these heritage assets which is anticipated to have an adverse effect upon their significance. However, from the breakwater itself, the tetrapods along the seaward side would only be visible from the upper promenade.

Based upon preliminary assessment, the visual impact upon adjacent, coastal assets from this solution is anticipated to be negligible. Additional viewpoints will be presented in due course so that any potential changes to the setting of these further afield heritage assets can be better understood.

The only practical alternative to the tetrapod solution would be to import a large quantity of rock with an individual mass in excess of 15t each. The problem with this solution is that rock with a mass greater than 15t can only be sourced from Norway. In Norway (Larvik), they produce dimension stone for the architectural industry, which can be produced in any size, due to the way they cut rather than blast the rock from the mountain. Not only would importing large quantities of very large rock from Norway be prohibitively expensive, the lack of an obvious competitor for the supply would lead to a scheme which would be unlikely to obtain a financial commitment from the local, and/or national Government. nor from a commercial organisation such as Stena without cost certainty.

In addition, although rock in excess of 15t will be more robust than the original material used to form the rubble mound, it could still easily be picked up and thrown around by the waves under extreme storm conditions. This may lead to significant damage to the historic masonry superstructure and could lead to damage to the leeward side of the structure if any of these rock pieces were thrown over the structure. Furthermore, this could also cause potentially serious injury to anyone on the breakwater at the time of the

storm. For all of these reasons, using very large rock piece in excess of 15t is impractical and would not prevent the rubble mound from continuing to lower over its lifetime. This would mean more frequent replenishment of the rubble mound which is a very costly and unsustainable solution.

On the leeward side the preferred solution is to place an articulated concrete block mattress (ACBM) on to the existing rubble mound profile, see Figure 6.

Figure 6: Example of an articulated concrete block mattress (ACBM), (Credit: Maccaferri)

This ACBM would be located below the water surface and consequently, is not anticipated to result in any settings impacts. As this is a relatively easy solution, which can be undertaken as and when required without the need for specialised marine construction equipment, and could also be undertaken from the breakwater itself, it is possible that this might be progressed by Stena as part of their ongoing maintenance activity, rather than forming part of the final proposed refurbishment project.

7 Conclusion

A number of options were considered for the long-term management of the Holyhead breakwater. These options were appraised against technical, environmental and economic criteria and a preferred solution for the seaward and leeward side were promoted.

Since the PAR/OBC study was completed in 2016/17, the preferred scheme has been developed into a workable construction scheme and the actual detail of the proposed construction has been thoroughly worked through and optimised to achieve the technical requirements whilst minimising its impact on the listed heritage structure and on the surrounding environment.

From a heritage perspective there is no perfect solution, however, the proposed scheme using Tetrapods is considered to be the only viable solution that will maintain the Holyhead Breakwater for future generations. Any other solutions require on-going maintenance and possible large-scale replenishments, which is not financially viable and is not considered a sustainable solution.

If the Holyhead Breakwater is breached, then the cost of repair is likely to be prohibitively expensive and a significant breach could ultimately lead to the closure of Holyhead Port. In such an event, any redevelopment plans for Holyhead including reestablishment of a marina in Holyhead would be unviable due to the increased wave climate within the existing harbour and the increased flood risk to low lying areas.

The Level 4 building record provides a detailed account of the breakwater and its significance and, as such, in itself represents a primary form of mitigation for heritage impacts. Potential direct impacts are currently understood to be limited in nature and extent, although this will require further consideration as part of the EIA.

In conclusion, whilst the ACBM solution on the leeward side will have no impact upon heritage significance, the introduction of Tetrapods along the seaward side will, without question, adversely affect the visual character of the heritage assets, and consequently result in an adverse effect upon the significance of the breakwater and lighthouse. However, in securing the longevity and ongoing utility of the structure, and in minimising the risk of significant breaches and storm damage to the superstructure, including the lighthouse, over time, the public benefit represented by the Tetrapod solution, which, as described in this note, has been identified as the only viable solution for refurbishment, must be weighed against the significance of the identified impact. It may also be possible to consider additional mitigation, such as colour matching, to minimise the visual impact as far as possible. To this end, further consultation with Cadw and IoACC is essential in order to fully understand the nature of any additional considerations or requirements which might be possible, in line with the proposed scheme.

Appendix C Level 4 Building Study of Holyhead Breakwater

1355

HOLYHEAD BREAKWATER

Level 4 Building Record

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

HOLYHEAD BREAKWATER

Level 4 Building Record

Prosiect Rhif / Project No. G2489

Adroddiad Rhif / Report No.1355

Prepared for: YGC

January 2017

Written by: Rob Evans & Neil McGuinness

Front cover image: View of Holyhead Breakwater from the west showing a ferry passing beyond the lighthouse (Archive Image: G2498_020)

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Contents

FIGURES

PLATES

Plate 01:
Holyhead Breakwater's landsend with view of the of the remnants storage and working area on the portside and decorated bollard on the seaward side (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 988.jpg).

Plate 02:
View from portside of the landsend of former storage and working area and beginning of parapet marked by the decorated bollard (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 1088.jpg).

Plate 03:
Seaward view of the parapet at landsend, showing large rubble foundation blocks supporting the parapet (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 1086.jpg).

Plate 04:
Birdseye view of breakwater showing the parapet's ashlar masonry of quarried stone from Moelfre and the slip road with former manhole access in view (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 256.jpg).

Plate 05:
Seaward side view of rubble sourced from Holyhead Mountain used as supporting foundations of the parapet (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 186.jpg).

Plate 06:
Seaward view of parapet with the remnants of a later addition of a ladder, possibly used in emergencies (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 206.jpg).

Plate 07:
View of mid - 20th century concrete repairs to the seaward side of the breakwater, with the upper slabs molded to resemble original ashlar masonry of the parapet (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 193.jpg).

Plate 08:
View of further concrete repair work along seawards side of the breakwater
(sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 203.jpg).

Plate 09:
Birds-eye view of breakwater showing remnants of original surface on portside, former manhole, and the ashlar masonry of quarried stone from Moelfre and rubble sourced from Holyhead Mountain on the seaward side (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 062.jpg).

Plate 10:
Portside view of mooring post, and staircases leading into the sea, and onto the parapet. Note two original alcoves with masoned seated areas possibly used for shelter during shipments (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 377.jpg).

Plate 11:
Portside view of the tail end of breakwater showing relationship with the ashlar masonry with view of former storage and convenience area (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 151.jpg).

Plate 12:
Seaward view of the breakwater's tail end showing large stone ballast, as seen in Figure 08 (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 168. jpg).

Plate 13:
Aerial view of the tail end of the breakwater with the light house (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 225.jpg).

Plate 14:
View of full length of breakwater showing its curve leading towards landsend at Holyhead Mountain (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 160.jpg).

Plate 15:
Holyhead Breakwater - view from east looking towards Holyhead Mountain from upper parapet (archive image: G2498_042).

Plate 16:
Holyhead Breakwater - general view from the southwest looking from the upper parapet (archive image: G2498_047).

Plate 17:
Holyhead Breakwater - view from northeast detailing surviving remnant of rail at landward end of hardstanding/building area (archive image: G2498_001).

Plate 18:
Holyhead Breakwater - view from southeast of large stone drum with roped design at end of the parapet (archive image: G2498_003).

Plate 19:
Holyhead Breakwater - interior view of barrel vaulted refuge chamber (archive image: G2498_009).

Plate 20:
Holyhead Breakwater - view from southwest of three barrel vaulted refuge chambers (archive image: G2498_010).

Plate 21:
Holyhead Breakwater - view from east of bollard for tying up vessels; located along lower breakwater walkway (archive image: G2498_013).

Plate 22:
Holyhead Breakwater - view from south of refuge within the breakwater parapet and stairway between upper and lower levels (archive image: G2498_015).

Plate 23:
Holyhead Breakwater - view from west of wooden sleepers located along lower breakwater walkway near the lighthouse (archive image: G2498_022).

Plate 24:
Holyhead Breakwater - view from southeast of upper parapet storage area and central latrines (archive image: G2498_015).

Plate 25:
Holyhead Breakwater - view from west of the lighthouse (archive image: G2498_025).

Plate 26:
Holyhead Breakwater - view from southeast of parapet ashlar showing cyclopean blocks (archive image: G2498_037).

Plate 27:
Holyhead Breakwater - view from east-southeast of breakwater dog leg showing seaward side (archive image: G2498_040).

Plate 28:
Holyhead Breakwater - view from east of storm damage repair to the parapet and carriageway (archive image: G2498_046).

Plate 29:
Holyhead Breakwater - view from north of former wharf at southwestern end of the breakwater (archive image: G2498_050).

Plate 30:
Holyhead Breakwater - view from northwest of the breakwater quarry (archive image: G2498_058).

1 SUMMARY

Gwynedd Archaeological Trust was commissioned by Royal HaskoningDHV to carry out a historic building appraisal and record of Holyhead Breakwater, Ynys Môn. Holyhead Breakwater comprises a 2.4km long stone-built structure designed to provide maritime shelter at the Port of Holyhead, as well as protection from coastal erosion.

The breakwater was built between 1848 and 1873 and is a Grade II listed structure. In addition to the pier, which forms the main structure, the breakwater also includes a pier end three-storey lighthouse, built in 1873, a large stone quay from which the breakwater extends, built in 1847, and a late 19th century small stone building located at the end of the quay.*

The Level 4 building record provides a comprehensive analytical record and draws on the full range of primary and secondary sources of information about the breakwater and discusses its significance in terms of architectural, social, national and economic history. In particular, this includes its relationship with similar 19th century breakwaters and the impact on Holyhead socially and economically during construction and use.

The construction of the Holyhead Breakwater reflects governmental interest in the question of harbours of refuge, reflected in the work of a Royal Commission which in 1847 discussed the need for a harbour of refuge at Holyhead to protect shipping on its way to or from Liverpool as well as the safeguarding of the Holyhead packet boats, similar to that employed at Portland for Channel shipping. The Breakwater was also of international significance as technology and equipment were exported to overseas breakwater developments, including the breakwater at Ponta Delgada in the Azores.

The building of the breakwater had a great effect on the town itself. The population increased from 3,869 in 1841 to 8,863 in 1851. The larger population was particularly drawn to Holyhead after 1845 when preparatory work was started on the Great Breakwater. There was also much other work available from a host of employers,

which resulted in a move from rural Anglesey as men left farms and smaller communities for Holyhead with its offer of more profitable work.

The effect of these developments was, however, to result in the port becoming something of a 'through port' moving goods and people from England to Ireland, with more limited benefit for the town of Holyhead itself. The port and railway did however continue to provide significant employment in the town.

2 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was commissioned by by *Royal HaskoningDHV* to prepare a historic building appraisal and record of Holyhead Breakwater, Ynys Môn (Primary Reference Number (PRN) 11821; NGR SH24008420; Figure 01). Holyhead Breakwater comprises a 2.4km long stone-built structure designed to provide maritime shelter at the Port of Holyhead/Holyhead, as well as provide protection from coastal erosion. The breakwater was built between 1848 and 1873 and is a Grade II* listed structure (ref. 5743). In addition to the pier, which forms the main structure, the breakwater also includes a pier end three-storey lighthouse (PRN 11822; NGR SH2567484751), built in 1873, a large stone quay from which the breakwater extends, built in 1847 (PRN 34000; SH23818388), and a late 19th century small stone building located at the end of the quay (PRN 34025; NGR SH23868389).

The historic building appraisal and record has been completed as part of a project appraisal report (PAR) for a flood risk management appraisal in line with Flood and Coastal Erosion Risk Management – Appraisal Guidance (FCERM-AG), which will appraise a range of options.

The historic building appraisal and record has been completed in accordance with the following guidance:

- Conservation Principles (Cadw, 2011);
- Guide to the conservation of historic buildings, BS7913:2013;
- Guidelines for digital archives Royal Commission on Ancient and Historic Monuments of Wales, 2015;
- Management of Archaeological Projects (English Heritage, 1991);
- Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide (Historic England, 2015);
- Standard and guidance for the archaeological investigation and recording of standing buildings and structures (Chartered Institute for Archaeologists, 2014); and

- Understanding Historic Buildings: A guide to good recording practice (Historic England, 2016).

The following sources of information have also been consulted as part of the record (as identified in the *Scope Holyhead Breakwater Project Appraisal Report*):

- Holyhead Breakwater Environmental Scoping Report, Black & Veatch Ltd., 2009;
- Outline design drawings and indicative landscape plan; Black & Veatch/Stena, 2009;
- Engineering report, Black & Veatch Ltd, 2009;
- High resolution aerial photographic survey undertaken on 28th September 2015 (1109 images), capable of being post-processed to provide a dense point cloud of the breakwater along with 3d mesh in AutoCAD format.

A copy of the draft report must be approved by Gwynedd Archaeological Planning Services (GAPS) and the Isle of Anglesey County Council (IOACC) Senior Planning and Conservation Officer prior to final issue.

3 AIMS AND PURPOSE

3.1 Level 4 Building Recording

This historic building appraisal and record has been completed in accordance with a Level 4 building record as described in *Understanding Historic Buildings: A guide to good recording practice* (Historic England, 2016).

Level 4 recording provides a comprehensive analytical record and draws on the full range of primary and secondary sources of information about the breakwater and discusses its significance in terms of architectural, social, national and economic history. In particular, this includes its relationship with similar 19th century breakwaters and the impact on Holyhead socially and economically during its construction and use.

The Level 4 record was completed using a combination of a photographic record, a drawn record and an analytical record.

4 SPECIFICATION, METHODS AND TECHNIQUES

4.1 Photographic Record

A photographic record of the breakwater was completed by *Civil Engineering Solutions* undertaken on 28th September 2015. A total of 1109 high resolution aerial photographic images were taken during the survey; the location of each image is detailed on *Civil Engineering Solutions* drawings CES391-1 to CES391-7. These images have been used by GAT as the core photographic record for the Level 4, as they include images in plan and elevation of the entire structure, including views that would not be possible from a landward record. Selected images have been used to illustrate the structural appearance, function and phasing of the breakwater, including any industrial remains. GAT has also prepared general views of the breakwater in its wider setting and landscape (GAT ref.: G2489_001 to G2489_060).

4.2 Drawn Record

The drawn record does not include additional plans and elevations prepared on site by GAT. The drawn record includes:

- A site plan based on the 1:10000 Ordnance Survey County Series locating the breakwater within the regional landscape;
- Reproduction of contemporary drawings that illustrate the construction and use of the breakwater;
- Reproduction of historic maps that illustrate the construction and use of the breakwater.

A list of primary and secondary illustrative source materials are included in the bibliography (see Section 10 below).

4.3 Analytical Record

The analytical record includes a detailed examination of available primary and secondary sources. Information was sourced from the following:

1. The regional Historic Environment Record (HER, Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, Gwynedd LL57 2RT) was examined for information concerning the breakwater and a 100m area. This included an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held;
2. Archive data and historic maps were consulted in the regional archives at Llangefni (Anglesey Archives, Industrial Estate Rd, Llangefni LL77 7JH) and at the Bangor University Department of Manuscripts (Bangor University, Bangor, Gwynedd LL57 2DG);
3. The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) was checked for sites additional to those recorded in the HER.
4. On-line catalogue search of the National Library of Wales;
5. The National Archives (Kew, Richmond, Surrey TW9 4DU) was examined for primary sources.
6. The Welsh Newspapers Online portal curated by The National Library of Wales (http://www.llgc.org.uk/index.php?id=4723) was examined for contemporary newspaper articles.

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5 ARCHIVING

Upon final approval, a final copy of this report will be sent to the client and Gwynedd Archaeological Planning Services. It will also be sent to the Historic Environment Record located at the Gwynedd Archaeological Trust. Submission of digital information to the Royal Commission on the Ancient and Historical Monuments of Wales will be undertaken in accordance with the RCAHMW Guidelines for Digital Archives Version 1 (2015). Digital information will include the photographic archive and associated metadata.

6 RESULTS

6.1 Introduction

The Great Breakwater at Holyhead Harbour, constructed between 1847 and 1873 was a major engineering project, involving up to 1,300 workers at the height of its construction, along with many other workers in ancillary trades. The construction was also an element of wider developments and expansion at the port, along with the arrival of the railways at Holyhead. The broader history of the development of the port has been widely recorded, for example by Richard Scott Jones' *Holyhead Waterfront, Holyhead, Anglesey. Archaeology and Cultural Heritage Desk Based Assessment* (2010) and the *Holyhead Harbour Conservation Plan* (2003) produced by Donald Insall Associates, which includes a detailed chronology. Further published sources also give a historical overview of the development of the breakwater and the associated quarry, including Owens (1987) and Hughes and Williams (1981).

This report therefore concentrates on the social, national and economic history, architecture, development and significance of the Great Breakwater itself, with some contextualisation to help to explain its wider significance.

6.2 Historical Development of the Breakwater

Following the shift in marine transport from sail to steam ships operating between Holyhead and Ireland, which began in the 1820s, the existing pier had become over used, and it was also exposed in bad weather. As a result, plans for a new harbour and port were drawn up, including the construction of a Great Breakwater. The contract for the work was signed by Messrs J. and C. Rigby and others with the Lords of the Admiralty on 2nd February 1848 (National Archives, RAIL 837/2).

The engineer in charge of planning the developments was James Meadows Rendel. His proposals included the building of a new harbour, to be created by a long north breakwater leaving the shore at Soldiers Point, west of Salt Island, and an east breakwater running off the north end of Salt Island (National Archives, RAIL 837/81; Figure 02). A new pier for the railway and steam packets was to be built, and the railway was to run in a tunnel under Holyhead to emerge by the new pier. The first year of work involved laying down a seven foot gauge tramway from the proposed

quarries to the south-west to the start of the north breakwater, and along the shore to Salt Island to service the east breakwater. Small branch lines were constructed for the proposed railway pier, also linking a creosote works and sawmill. Work commenced on the north and east breakwater, however the latter was stopped because of dangerous working conditions, with the intention of continuing it when the north breakwater was long enough to offer protection. It was never restarted, and the railway pier was also never built when the Chester and Holyhead railway decided to withdraw from the arrangement. The north breakwater, however, was continued, and in view of the large number of vessels requiring refuge within it, was subsequently extended on two occasions.

The initial design of the breakwater was an ‘L’ shape with the shorter length attached to the land before turning east, measuring 5,100 feet long, from Soldier’s Point to terminate at the Platter’s Buoy, and a 2,100 foot pier from Salt Island, enclosing an area of 316 acres, three quarters of a mile long, at an estimated cost of £700,000. Two contracts were initially let to Messrs Rigby (National Archives, RAIL 837/2 and 837/4), the first took care of the preliminary works and consisted of walling around Soldier’s Point and establishing the tramways between the quarry site, the north breakwater and the east breakwater on Salt Island. The second contract was for the construction of the two breakwaters and steam packet pier, which began in January 1848, with approximately 1,300 men employed on the project. Initially the works were described as ‘getting on very slow’ in a letter of February of that year, but the pace of work soon picked up (Anglesey Archives, WDAX/21). The north breakwater was designed to be formed 150 feet wide at low water. The building of the breakwater and the quarry works is described in detail in Edwin Owens *The Holyhead Breakwater and Quarries* (1987).

The work was hazardous, and more than 40 men died between 1849 and 1852 (Jones 2010, 33). The timber staging was constructed 150ft wide, on which ran five separate rail lines 20ft above high water. Some 250 waggons were employed, tipping an average of 4,000 tons of stone a day. Locomotives were used on the staging, though horses were used on the line to and from the quarry (Hayter 1876). Hayter describes in depth the technical details of the waggons and locomotives used and the details of their operation.

In February 1854 Commander Skinner, the harbourmaster, wrote to the Lords of the Admiralty urging them to consider enlarging the harbour. It was decided that the proposed entrance to the harbour, and the requirement for anchorage space, was too small for the safety of the sailing ships, which were the majority of the ships using the harbour. The proposed east breakwater and packet pier, shown on the 1852 plan, were abandoned (Figure 02). The north breakwater was extended by 2,500ft, with a dramatic turning north-east, making the breakwater one and a half miles long, at that time the longest in Europe, and giving the harbour three times the area and much deeper water. It is this change of plan that gave the breakwater its unique, peculiar and distinctive shape.

The decision to lengthen the initial structure by some 2,000ft, led Rendel to turn the breakwater back to the north, creating a 'z' shape, and a total length of 7,860ft thus making it the largest breakwater in Britain. James Rendel died on 21st November 1856, and his role as chief engineer was taken by John Hawkshaw. However the resident engineer was George Dobson, who was a brother-in-law to Rendel. In 1857 the breakwater was extended by a further 500ft by Messrs Rigby, using the same method as agreed in the initial build, for which the contractor was paid 2s 7d for every ton of stone deposited, an improvement on the previous 2s 4d a ton (National Archives, RAIL 837/10). In 1851, by which time 626,000 tons of stone had been deposited in the sea, 182 vessels took shelter in the harbour. By 1854 1,801 vessels were making use of the new harbour and in 1876 it was noted that an average of 3,500 vessels per annum used the new harbour and facilities (Owens 1987, 13 and 29).

The rubble used to form the foundations of the breakwater came from the northern side of Holyhead Mountain. The methodology employed in the rubble quarrying is described in detail by Harrison Hayter in 1876, but involved the improvement over time in blasting technique and consequently the volume of stone that could be quarried at any one time. Occasionally blasts were unsuccessful, and on July 2nd 1852 a blast caused the windows of the harbourmasters house to be blown out (Anglesey Archives, WM/18). Rubble quarrying reached a peak when 100,000 tons was removed in a single blast (Anglesey Archives, WDD/1731). This incident is described in detail (with a slightly lower estimate as to the volume of rock dislodged) by R.T. Williams, an eye-witness to the event, '*on 6th September 1854, 6,000lbs of*

explosive brought down 40,000 tons of rock, and on Friday 16th January 1857 the most tremendous explosion of all took place when 16,000lbs of explosive removed 90,000 tons of rock' (Hughes and Williams 1981, 89).

The stone was deposited on the rubble breakwater core from waggons running over a temporary wooden staging (Hayter 1876, 105-106). The railway system employed was completely isolated and was laid to the broad 7ft gauge. This ensured stability in operation on a very exposed and windswept site, and was used on a number of other locomotive-worked breakwater and harbour railways, such as Portland in Dorset (Neale 1997, 20).

The original specification for the works states that '*the stone is to be deposited in the works in layers of from 15 to 20 feet in thickness from wooden stages with railways laid upon them from which the waggons are to be emptied. In the lower layers of the work the stone which arises in opening the quarries on the mountain is to be used. In the succeeding layers the proportion of large stone must be increased, so that the top or upper layer shall have the largest proportion of large stone. But in each of the layers a proper proportion of small stone shall be deposited to insure the solidity of the whole mass, and the better to secure that important object, the quarries shall be kept clear by conveying to the work, day by day and in the same waggon, the various sized materials as they arise in the process of quarrying'* (National Archives, RAIL 837/4).

The staging for the breakwater was intended solely as a scaffolding for the work. Upon every fourth pile a cast iron bollard for ships mooring against the scaffold. During the process of forming the rubble core mound, '*the staging at the end of the work was frequently washed away by gales before it was well surrounded; but it was considered by the contractors better to adopt the staging described than to be at the cost of one of a more permanent and expensive character, especially as the timber removed during gales could, as a rule, be recovered'* (Hughes and Williams 1981, 106). A violent storm in 1856 caused £8,000 worth of damage to the staging. Timber was ripped off the structure and driven up on the Newry Beach. The contractors had vessels on site which collected the timber and it was re-used in the staging. The superstructure on the seaward side of the breakwater was constructed principally of

massive quartz-rock stone blocks from the Holyhead Mountain quarries (Figure 04-05, Plate 30).

Laying the foundations was the most difficult and dangerous part of the work, which was frequently hindered by storms, and it is recorded that 20 workmen lost their lives between 1849 and 1852. The depth of the water was in places 55ft, and the rubble mound, 250ft to 400ft wide at the base had to be continually reinforced owing to storm damage (Lane 1989, 53). In total it has been estimated that 7,000,000 tons of stone was laid in the construction of the breakwater (Hayter 1876, 105). A solid wall of stone was laid on top of the foundation, 39 ft high, of two decks, with a rail track laid on the lower, and a parapet on the seaward side.

The huge limestone blocks used for the plinths, cornices, parapets, paving, copings and other ashlar of the breakwater were of limestone and were brought from Moelfre on the east side of Anglesey by sailing boat. These were set in lime mortar (Figure 04). The specification stated that ‘ *the heads of the breakwaters are to be brought up with block work to the level of low water spring tides by the aid of diving bells. The bell work for the head of the North Breakwater to commence by levelling the rubble stone deposits to receive the square blocks at a level of 30 feet below low water spring tides. This levelling to be done by the deposit of a greater proportion of small stone which will readily admit of a bed being made fit for the reception of the first course of blockwork* (National Archives, RAIL 837/4). The rear of the ashlar blocks was to be left rough to make a good bond with the rubble core.

Some underwater walling was in sandstone brought from Runcorn in Cheshire (Davidson, *forthcoming*, Hayter 1876). A drawing of a section through the breakwater created after the completion of the works shows the relationship between the stone foundations, rubble core and superstructure (Figure 05).

The Breakwater Quarry (PRN 7165) is more than 500 feet wide all along its length, and in some parts very deep. Such was the demand for stone that during its operation huge blasting operations were carried out on a daily basis, sometimes up to three times a day (Lane 1989, 52). Following the completion of the breakwater in 1876, the quarry at Holyhead Mountain was leased to William Wild, who established a brickworks at the quarry. The Moelfre Quarry, used for the ashlar masonry was known as Jersey Quarry.

The lighthouse at the end of the breakwater was built between 1845 and 1873 and probably designed by John Hawkshaw, the Superintendent Engineer of the harbour works from 1857 to 1873. This three storied lighthouse has chamfered angles and a stepped plinth set on an oval platform on the breakwater, and has a roll-moulded string course projecting above the first floor level and is 22ft 3in square. A moulded cornice supports a walkway around the circular lantern (Denton and Leach 2011, 78-79). The lighthouse is designated a Grade II Listed Building.

The breakwater work was completed in 1873, at a cost of £1,285,000 (Hollands 1973; Haslam *et al.* 2009; Figure 03) and the Prince of Wales performed the opening ceremonies. A watercolour painted by G.H. Andrews conveys the scene at the time (Figure 06). An inscribed plaque on the wall of the lighthouse reads:

"*This Breakwater was commenced in 1845, and on August 19th, 1873,*

Albert Edward, Prince of Wales, declared the work to be complete.

Superintendent Engineers – James Meadows Rendel, 1845-56

John Hawkshaw 1851-73 G.C. Dobson, Resident Engineer.

J. & E. Rigby, Contractors."

The Great Breakwater today is regarded as the finest breakwater in the British Isles and is a Grade II* Listed Building (Figures 01 to 08).

6.2.1 Development and Modifications to the Breakwater

Work on the breakwater has been continuous since it was opened, with repairs frequently required due to damage caused by the gales that hit the coastline during winter (Plate 28). In 1878 William Williams, contractors of Holyhead, were paid £1,100 by the Treasury for repairing the foundations, and further huge amounts of rubble were deposited in 1880, 1886, 1887, 1889-1890 (National Archives, RAIL 837/23) and 1904 (National Archives, RAIL 837/30; Figure 07). In 1911 and 1913 S. Pearson and Sons, contractors of Westminster added 267,000 tons to the foundations from the quarry, and in 1914, 24 steel cases filled with concrete were placed around the north-east end of the breakwater, which remain clearly visible today (National Archives, RAIL 837/32, Figure 08; Plate 12). A 'Breakwater Gang'

who carried out continuous maintenance to the breakwater was maintained up to and including the time that British Rail owned the breakwater from 1948 to 1993 (Roberts 2002, 16-27).

6.3 Technical Specification and Construction associated with the Breakwater

6.3.1 The Great Breakwater

The Great Breakwater is 2.4 miles long and is z-shaped in plan, and was constructed between 1848 and 1873. It was designed by J.M. Rendel, who was replaced by John Hawkshaw after the former's death on 21st November 1856. The resident engineer, who oversaw the day to day work on the breakwater, was John Dobson, and the contractors were J and C Rigby. The breakwater was, in engineering terms, a very significant development, and several new techniques were pioneered during its construction. The breakwater was built by dumping stone from Holyhead mountain to form a rubble mound, upon which was erected a massive wall faced with limestone blocks (Plate 26).

The seaward side rises nearly 40 ft above high tide, ending in a parapet wall which protects a walkway some 3m wide and a lower quay 13m wide. The latter carried a railway along its length for maintenance, and at the end of the breakwater marks are visible of the former rails, some apparently of the 7ft gauge tramway (Plate 23). Every 183 metres (200 yards) pairs of steps go down to the water, with a mooring post alongside (Plate 21). Another set of steps leads to the higher parapet, with an arched opening alongside (Plate 22). Interspersed equally between each set of steps are refuge shelters built into the breakwater wall between the upper and lower stages, consisting of three small chambers, with two outer square headed doors and a central round headed one (Plate 20). Many are now blocked but it would appear that the two outer chambers contained benches at each end, whereas the central chamber may have been for animal shelters (Plate 19). Towards the north-east end of the breakwater, a wider section of parapet housed two store rooms and a former latrine (Plates 24). The breakwater ends in a large oval platform with a square lighthouse. This is reached from the lower quay by large steps, at one side of which is a round drum pillar with rope-moulded decoration around a horizontal band - a similar pillar can be seen at the start of the breakwater (Plate 18).

6.3.2 Breakwater Lighthouse

The lighthouse was built to a design by John Hawkshaw to mark the end of the Breakwater (Plates 14, 25). It was built in 1873 and was square in plan, with chamfered angles, and a stepped plinth. It has horizontal roll moulding at first floor level. There is a walkway around circular lantern, on moulded cornice supports and with iron railings. Inside there are three floors and a basement entered through the lower stage of the breakwater.

The interior of the lighthouse was not observed, but the following description is taken from Davidson (*forthcoming*).' A *Central pillar runs up from basement to light workings. Basement has storage tanks etc and ladder up to ground floor. Ground floor now largely empty with stairs up to first floor which has three bunks built into cupboards against the walls, and a base where stove was situated. Second floor has large dresser - turntable for light visible in roof. Slate steps up to third floor - parapet walls c. 1m high surmounted by circular glass walls in large diamond panes and iron glazing bars. The light has been removed, but a large turntable is supported on rollers, with two sets of gears to turn it in a glass fronted cylindrical cabinet below*'.

6.3.3 Breakwater Quay

A large quay survives, which formed the first stage of the construction of the breakwater, following the start of the construction work in 1847. It is still in use for storage, and has steps down to the sea at the north end, and a single stone structure of uncertain use (PRN 18137) remains from the 19th century (Plates 01-02, 29). It is a small square building of stone, with large blocked openings in the wall, and a fireplace inside, which is probably a guard or watchman's hut. The building is shown on the 1887 Ordnance Survey map. The structures built on the breakwater quay are shown on an LNWR plan of late 19th century date (Figure 09).

6.3.4 Kilns and Associated Structures Soldier's Point

Now all demolished, but they werestill standing in 1890, when there were two ranges of buildings, both with chimneys. A brick platform still survives which may be one of the chimney bases. A kiln was constructed as early as 1850 (shown on Rendel's

map), and this was referred to as "old kiln" on the 1900 OS 1:500 scale plan, second edition sheet V.14.

6.3.5 Engine Shed, Breakwater

A large engine shed, built soon after the start of works, sometime between 1850 and 1857. This is far too large and well-built to be simply a loco shed, and is almost certainly the core part of an engineering complex that included the repair and maintenance of the locomotives and probably the wagons and cranes. The building was burnt down in the 1970's, and has been entirely re-roofed, but nonetheless it is an important survivor, both as an essential part of the breakwater construction site, and on a wider scale as a rare example of a construction company's repair facilities. The building is some 74m long by 13m wide. It is divided into a series of bays by wide piers and long windows between each pier, starting about 1m above the ground, and continuing to eaves heights. The front is divided into two openings by a single pillar, and all built of local rubble. Rails of standard gauge are visible in front of the shed. The building has a right-angled wing at the east end, which appears to be original, but was originally longer.

6.3.6 Breakwater Tramway

A 7ft gauge tramway was built 1848-9 to carry stones from a quarry to the proposed breakwater off Soldier's Point. An extension was also built to Salt Island, though that scheme was later abandoned. Special wagons designed by the resident engineer Dobson were used to tip stones from a timber staging to create a wide mound upon which the breakwater was subsequently built. Written records testify to their being five parallel tracks running along the staging (Davidson, *forthcoming*). The tramway continued to be used for maintenance, though in 1910, when a contract for major repair works was let to S Pearson and Son, a new standard gauge line was laid alongside, and following 1913 only this gauge was used. Rail marks visible at the end of the breakwater are 7ft in width, though sleepers which remain in situ close by (laid longitudinally not across the track) are of standard gauge width. Remains of the standard gauge rails are visible outside the Engine Shed (PRN 18110), and further north, where the track to the breakwater crosses the fence line (Plate 17; Figure 09).

6.3.7 Breakwater Tramway to Salt Island

The original tramway from the quarries to the proposed pier off the north end of Salt Island (PRN 18109) was constructed 1848-9. It was built to a broad 7ft gauge, primarily because the broader footprint allowed greater stability for the very heavy weights to be transported. The rails were taken up sometime after 1853, and the line of the tramway is now followed by the main access route to the Breakwater Quarry Country Park to the west, and underlies much of Beach Road to the east. A section may remain buried east of the coastguard station, though the area is now grassed over. There were two branches from it, one to the creosote works, and one to a proposed pier off Newry beach which was never constructed (Figure 09). An archaeological evaluation, involving two trenches cut across this tramway, was carried out north of Hibernia Row, Holyhead in 2004 (Smith, 2004). This identified that the track bed survives intact in many places, together with its sleeper stones, although without the iron chairs, fixing pins and rails (*ibid.* 3).

6.3.8 Soldier's Point

The house at Soldier’s point was built in 1849 by Rigby, the contractor for the Breakwater. Built to impose with considerable use of towers and turrets, it is, perhaps, a natural successor to the work carried out by Rigby at Swindon and Bristol Temple Meads, where castellated ornamentation is much in evidence. It is now in a dilapidated and decayed state. Similar work was carried out by Jesse Hartley for Point Lynas lighthouse.

7 HISTORICAL CONTEXT AND SIGNIFICANCE

7.1 National and International Significance

The 1840s were a period of unprecedented maritime development in the United Kingdom and in 1845 the government set up the Tidal Harbours Commission. They were concerned about the state of many harbours around the British coastline, and the Admiralty considered that Holyhead, with an ever increasing number and size of vessels using the port as a harbour of refuge, required further improvements. The port was also of significance as it was used by the Irish Mail packet boats, having been furnished with the Admiralty pier by John Rennie Senior in the 1820s.

The construction of the Holyhead Breakwater reflects governmental interest in the question of harbours of refuge, reflected in the work of a Royal Commission which in 1847 discussed the need for a harbour of refuge at Holyhead to protect shipping on its way to or from Liverpool, as well as the safeguarding of the Holyhead packet boats, similar to that employed at Portland for Channel shipping. At the same time as the construction of the breakwater at Holyhead the Liverpool dock system was expanding rapidly and was of crucial importance to Britain's growing dominance in world trade. The docks at Liverpool are a World Heritage site as a supreme example of Britain's pre-eminence as a world maritime trading power. Holyhead breakwater was a massive undertaking which reflected the importance with which the protection of shipping was viewed, and was closely connected to the expanding trade from Liverpool (Insall 2003, 56). The importance of harbours of refuge, very current in the mid-19th century at the time the breakwater was constructed, had declined by the time the breakwater was finished, owing to the dominance of steam ships for maritime trade at this slightly later time.

The Holyhead breakwater is amongst the largest ever constructed in Britain and Ireland, with Plymouth, Portland and Dublin breakwaters being constructed at around the same time. All these examples, with the exception of Dublin, were constructed with rail tipped stone. The Holyhead and Portland breakwaters were amongst the most important works designed by the engineer James Meadows Rendel. It is considered that he himself wished to be remembered for Holyhead and Portland

harbours, which he considered his greatest works and which were unfinished at the time of his death. His sons George and Stuart later attempted to get plaques placed in both ports naming Rendel as the creator of them. They had by then become established as major port installations, which reflected the importance with which they were viewed (Rendel 1998, 79).

Certainly Rendel's work at Portland provides the clearest parallels for his work at Holyhead, and it is clear that he designed the same type of breakwater for both locations. Very similar construction methodologies were also used also at the two breakwaters, except convict labour was used at Portland whereas free labour was used at Holyhead (Legg 2000; Jackson 1999, 63-73). The Brunel gauge railway, cranes, wagons and timber staging used during the construction were a clear parallel with Holyhead. It must also be borne in mind that Portland was a strategic fortified port, whereas Holyhead was unfortified. However it is clear that Portland forms a close parallel, not only in terms of personnel and methods involved but also in terms of surviving historic remains.

The construction of breakwaters on an industrial scale can be traced back internationally to the fortified breakwater at Cherbourg, begun in 1783, which as late as 1847, when the Holyhead Breakwater was being constructed, was '*the greatest piece of hydraulic engineering ever executed*', though this was followed by substantial breakwaters at Le Harve and Marseilles (Kirkpatrick 1998, 13). The first example of this kind of breakwater in England is at Plymouth, built in 1811, and the main characteristic of this and its successors is the use of forms of contractors' railways to ensure a regular flow of stone to the work site (Naish 1992, 37-56).

The locomotives and engineering material used in the construction of the Holyhead Breakwater were in great demand owing to the state of the art nature of the equipment being used. Joseph and Charles Rigby Ltd. also acted as agents for the supply of machinery and equipment for the breakwater at Ponta Delgada on the island of São Miguel in the Azores, which was finally completed in the early 1900s, although work had commenced in 1861. At least two broad gauge locomotives were sent from Holyhead to the Azores. This resulted in the use of the broad gauge for the harbour railway there, and its introduction to European rail systems. A large cast iron water tank and two lathes were also supplied from Holyhead. Plaques to this effect

were attached to at least one of the engines and are thought to have survived until the 1960s. A cement mixer, mounted on a broad gauge wagon frame has a plaque inscribed:

J. & C. RIGBY

HOLYHEAD HARBOUR
WORKS

This machinery survives today at Ponta Delgada, along with a large raised water tank for locomotive use with the above inscription but dated to 1862. These indicate the significance of the engineering links worldwide that the creation of harbours of refuge in the mid-19th century were to have on harbour engineering worldwide (Ponta Delgada and the Broad Gauge Harbour Railways, seen at www.internationalsteam.co.uk/trains/azores01.htm and www.churcher.crcml.org/Articles/Article2010_08html). Equipment from the work at Portland Harbour also found its way to Ponta Delgada. These worldwide links demonstrate the international nature of major engineering projects, and the reach of British commercial interests and trade at the height of the British Empire in the mid to late 19th century.

7.2 Local Significance

The building of the breakwater had a great effect on the town of Holyhead itself. The population increased from 3,869 in 1841 to 8,863 in 1851 (figures from census returns, quoted in Hollands 1973; Owens 1987, 11-12). The larger population was particularly drawn to Holyhead after 1845 when preparatory work was started on the Great Breakwater. Messers Rigby as the main contractors sub contracted a certain amount of the work, and men from Parys Mountain near Amlwch were employed on Holyhead Mountain to quarry the quartzite. There was much other work available from a host of employers, which resulted in a move from rural Anglesey as men left farms and smaller communities for Holyhead with its offer of work (Owens 1987, 12). As the town grew rapidly, more infrastructure was required, and in 1866 water was piped into the town from Traffwll Lake near Caergeiliog, and drainage was installed. Many of the new port working householders were not wealthy enough to pay to have the water piped into their home, but would have collected it from taps placed at street corners (*ibid.* 106). The town developed such that there were 58 public houses, inns and hotels by 1897, and historic map evidence shows that development in the area of the New harbour and Newry beach was expanding at this time (Ordnance Survey 1st edition 25 inch map of 1887-89).

The harbour of refuge was largely redundant for its original purpose by the time it was completed, as steam power dominated on the Irish Sea by 1873 (Jackson 1983, 95). However the harbour improvements under Rendel were mirrored by the improvement of land communication. The railway, masterminded by George and Robert Stephenson was fast approaching Holyhead. When the Llanfair to Holyhead section of the railway opened on 1st August 1848, complementing the already completed Chester to Bangor section, the Admiralty Packets were sent on the first train to Holyhead. The government steamers from Birkenhead were now instructed to take up their new stations on the Holyhead to Dublin route. Four new packet ships were built for this service by the government, though the Chester and Holyhead Railway had been hoping to receive a contract for carrying the mails, and had ordered new steamers ready for the Holyhead to Dublin service. Thus began a dual service of rail passengers and mails by rail and steamer that came to characterise the nature of the port of Holyhead well into the 20th century. In 1856 the port of Holyhead was described as being an '*extensive and commodious one*' and was now

fully linked with the railway connection (Hughes and Williams 1981, 99). The construction of the Great Breakwater considerably affected the layout of the port, enabling it to develop these characteristics.

The effect of these developments was, however, to result in the port becoming something of a through port moving goods and people from England to Ireland, with more limited direct benefit for the town of Holyhead itself. The port and railway did, however continue to provide significant employment in the town. The Royal and the Castle Hotels served passengers through the railway and port, and were considered high class hotels in the 1850s. However in 1859 '*the uncomfortable looking fishing village of Holyhead [was] full to repletion and woe betide the unlucky voyageur* (sic) *that comes down by the night train in the expectation of getting a bed. Paltry little dens and roadside alehouses command a price for dingy accommodation which would make our best London houses stare. However the daily number of visitors is greater now than ever it was at Portland…*' (*ibid.* 96-97). Thus outside the main established accommodation Holyhead remained significantly underdeveloped. This began to change from the 1860s onwards, with considerable expansion within the town itself and the port area. This expansion is to some extent a result of the construction of the Great Breakwater at Holyhead.

8 STATEMENT OF SIGNIFICANCE

The breakwater as a whole forms a very significant element within the port's historic landscape for which there is no parallel in Wales, with the closest parallel being the breakwater and port at Portland in Dorset, where similarities can be noted in terms of personnel involved, methodology and surviving historic remains. The scale of the undertaking at Holyhead needs to be viewed in terms of this and other harbours worldwide. These monuments form one of the best preserved maritime engineering landscapes of the mid-19th century. The concentration of later development around the inner harbour has meant that much has been preserved from the 19th century breakwater era within the wider port.

The construction of the Holyhead Breakwater reflects governmental interest in the question of harbours of refuge, reflected in the work of a Royal Commission which in 1847 discussed the need for a harbour of refuge at Holyhead to protect shipping on its way to or from Liverpool as well as the safeguarding of the Holyhead packet boats. The breakwater was a massive engineering undertaking which reflected the importance with which the protection of shipping was viewed. The town of Holyhead was also changed significantly by the construction of the breakwater, with a significant increase in population.

The work at Holyhead had close links with international harbour breakwater projects, including direct ones at Ponta Delgada on the island of São Miguel in the Azores, reflecting the importance of British trade and engineering at the height of the British Empire.

In addition to the evidential, historical and aesthetic value of the breakwater as analysed throughout the Level 4 report, the breakwater can also be considered to have significant communal value. Communal value can be interpreted in many ways, including its role in collective experience, identity or memory and as an asset with social value and a source of social interaction distinctiveness. The breakwater reflects many of these values as it is a significant and monumental representation of the town's *raison d'être* as a major port and port town and Holyhead draws elements of its identity and collective memory from the breakwater. It is still used by the local

community as a promenade, providing a focal point of social interaction and distinctiveness, including an appreciation of the views over the surrounding port, town and countryside.

It is clear that the breakwater and its associated hinterland should be viewed as being of **local, national and International** significance.

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10 BIBLIOGRAPHY

10.1 Primary Sources

Anglesey Archives, Llangefni

WDAX/21 Letter to Mr William Hughes, 26 Hampton Street, Toxteth Park, Liverpool from his father at Ty Mawr, Holyhead, dated 9th February 1848

WDD 1731 Newspaper cuttings relating to Holyhead Breakwater, dated 26th December 1882

WM18 Book kept by William Nance, Manager, for the six years ending in October 1857, of the mining operations for the stone required for the breakwater at Holyhead

Bangor University Archives

X/KG 338 Report on Anchorage of proposed Refuge Harbour at Holyhead by James H. Christie

Gwynedd Archives, Caernarfon

X/LNWR/356 Late 19th century plan of Soldier's Point at the landward end of the breakwater showing the structures and tramway located on it

Institute of Civil Engineers Library, London

British Railways Board *Holyhead Breakwater* 1876 (copy)

PCD D9 M12 Plan of Proposed Harbour of Refuge 1846-7

PCD D9 M16 Chart of the New & Old Harbours of Holyhead, 1852

National Archives, Kew, London

RAIL 837/2 dated February 1848 Initial Contract for the construction of the Breakwater

RAIL 837/4 dated 16th August 1848 Contract for the construction of the two breakwaters and the Steam Packet Pier at Holyhead

RAIL 837/8 dated 8th August 1904 Contract for Repairs to the Holyhead Breakwater

RAIL 837/10 dated 23rd April 1857 Contract for the Extension of the North Breakwater at Holyhead between Messers Rigby and others with the Lords of the Admiralty

RAIL 837/23 18th November 1889 Contract for repairing and strengthening and for constructing a new building near the end of the superstructure of the North Breakwater of the harbour of refuge.

RAIL 837/32 16th March 1914 Specification for the provision of steel cased concrete blocks at the head of Holyhead Breakwater

RAIL 837/81 Plan of James Rendel's Breakwater Proposals of 1846

10.2 Secondary Sources

British Geological Survey 1980 *Soil Map of England and Wales Sheet 2*

Chartered Institute for Archaeologists (CIfA) 2014a, *Standards and guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*

Chartered Institute for Archaeologists (CIfA) 2014b, *Standard and guidance for Historic Environment Desk-Based Assessment*

Davidson, A.D. *forthcoming* 'Holyhead Harbour II'

Denton, T. and Leach, N. 2011 *Lighthouses of Wales* (Lichfield)

Donald Insall Associates Ltd. 2003 *Holyhead Harbour Conservation Plan, Holyhead, Anglesey, North Wales*

English Heritage 1991 *Management of Archaeological Projects*

English Heritage 2015 *Management of Research Projects in the Historic Environment (MoRPHE)*

Fenton, R. 1917 *Tours in Wales 1804-1813* (Cambrian Archaeological Association)

Gwynedd Historic Environment Record

Haslam, R, Orbach, J. and Voelker, A. 2009 *The Buildings of Wales; Gwynedd* (Pevsner Architectural Series)

Hayter, H. 1876 ‘Holyhead New Harbour’, *Minutes of the Proceedings of the Institution of Civil Engineers.* Vol. 44, 95-112

Hollands, L.J. 1973 *The Holyhead Breakwater.* Centenary Souvenir Programme

Hughes, D.L. and Williams, D.M. 1981 *Holyhead: The Story of a Port*

Jackson, B.L. 1999 *Isle of Portland Railways Volume 1: The Admiralty and Quarry Railways*

Jackson, G. 1983 *The History and Archaeology of Ports*

Jarvis, A. and Smith, K. 1998 (eds.) *Perceptions of Great Engineers II. Papers given at a One-day Conference held at Merseyside Maritime Museum 22 November 1997*

Jones, R.S. 2010 *Holyhead Waterfront, Holyhead, Anglesey. Archaeology & Cultural Heritage Desk Based Assessment.* Unpublished Cambrian Archaeological Projects Report No. **645**

Kirkpatrick, C.R.S. 1998 ‘The development of dock and harbour engineering’ in Adrian Jarvis (ed.) *Port and Harbour Engineering*, 13, 41- 43

Lane, M.R. 1989 *The Rendel Connection. A Dynasty of Engineers.* (London)

Legg, D.R.G. 2000 *Portland Prison Illustrated*

Manning, I. 1998 ‘Broad gauge Rolling Stock at Holyhead Breakwater’, *Industrial Gwynedd* Vol. 3, 17-21

Naish, J. 1992 ‘Joseph Whidbey and the building of the Plymouth Breakwater’, in *The Mariner’s Mirror,* 78, 37-56

Neale, A. 1997. ‘Broad Gauge at Holyhead’, *Industrial Gwynedd*. Vol.2, 18-25

Ordnance Survey 1st edition Anglesey County Series 25 inch map of 1887-89, sheet XI.14-15

Owens, E.R. 1987 *The Holyhead Breakwater and Quarries* (Holyhead)

Rendel, R. 1998 ‘James Meadows Rendel: Why he is forgotten.’ In Jarvis, A. and Smith, K. (eds.) *Perceptions of Great Engineers II. Papers given at a One-day Conference held at Merseyside Maritime Museum 22 November 1997*

Roberts, J.G. 2002 *Hard Men, Hard Stone, Hard Bricks. The Story of a Mountain and its Men* (Holyhead)

Smith, G.H. 2004 *Hibernia Row Pumping Station, Holyhead. Archaeological Field Evaluation.* Unpublished GAT Report No. **520**

Waite, J. 2017 *Ponta Delgada and the Broad Gauge Harbour Railways,* seen at www.internationalsteam.co.uk/trains/azores01.htm on 27th January 2017.

Figure 01: Location Map, based on 1:10000 Ordnance Survey County Series Map Sheet SH28sw and SH28se. Scale: 1:10000@A4.

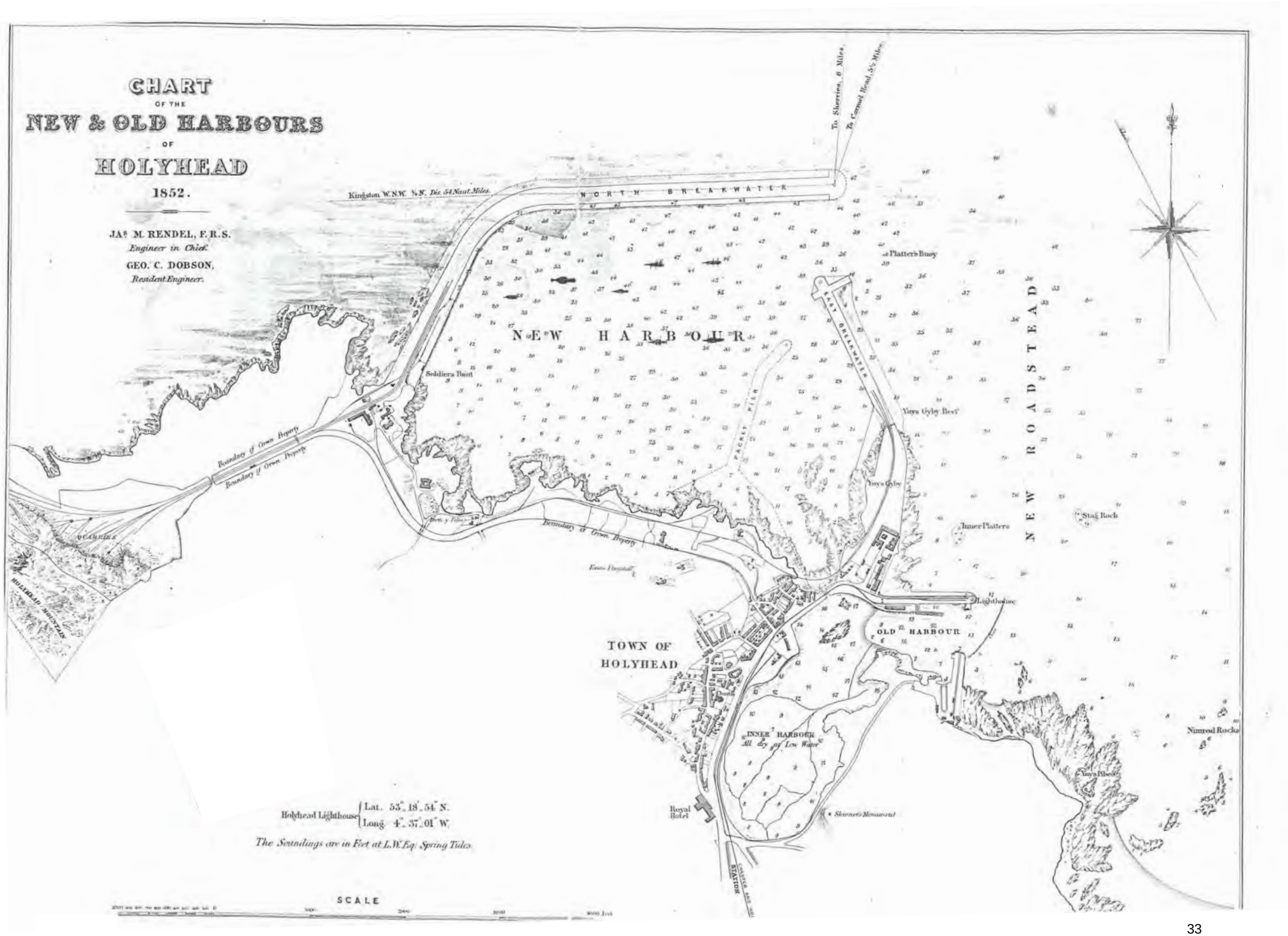

Figure 02. Plan of the proposed North Breakwater dated to 1852, two years before it was amended with the 2,500 yard north-eastern extension

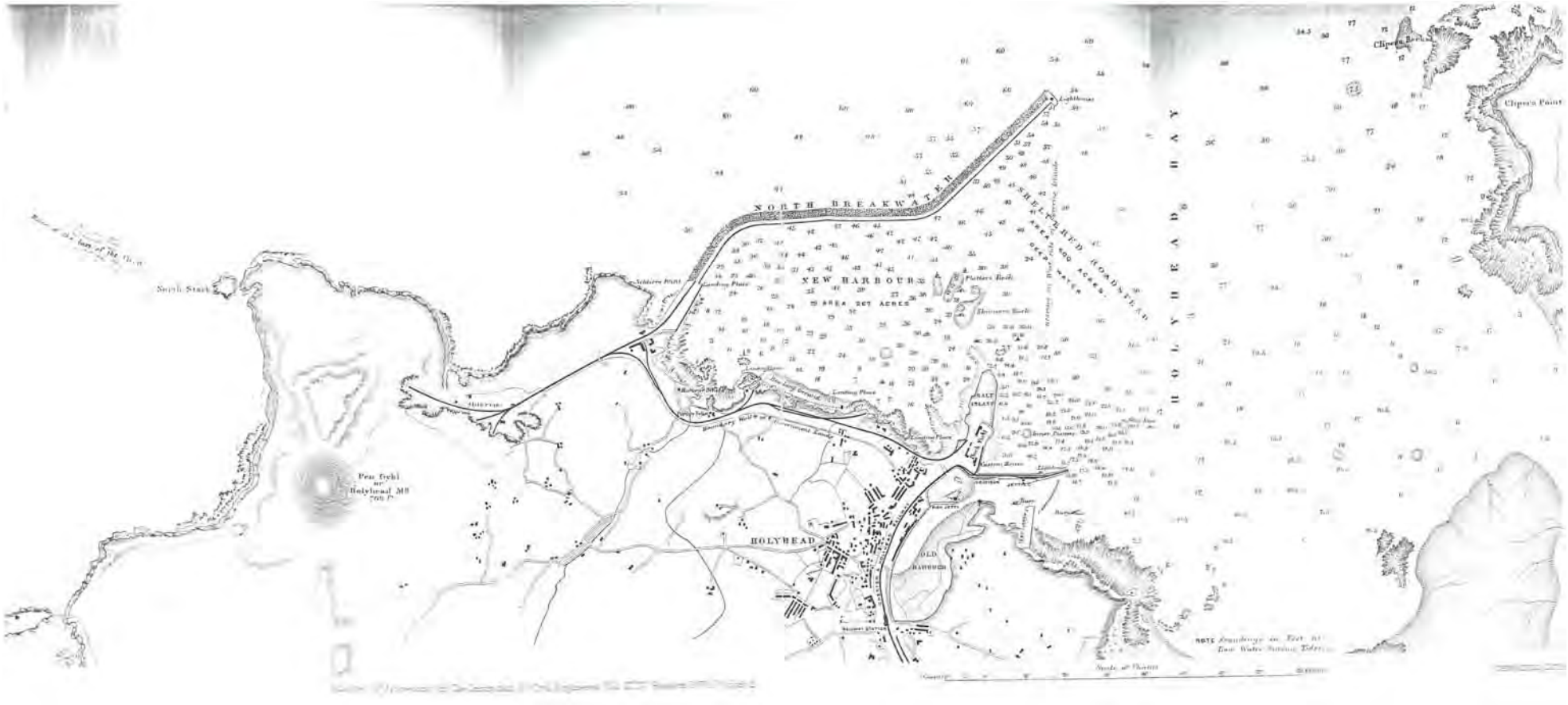

Figure 03: The Great Breakwater as completed in 1873. Drawing taken from the *Minutes of Proceedings of the Institution of Civil Engineers Vol. XLIV Session 1875-76. Part 2*. Not to Scale

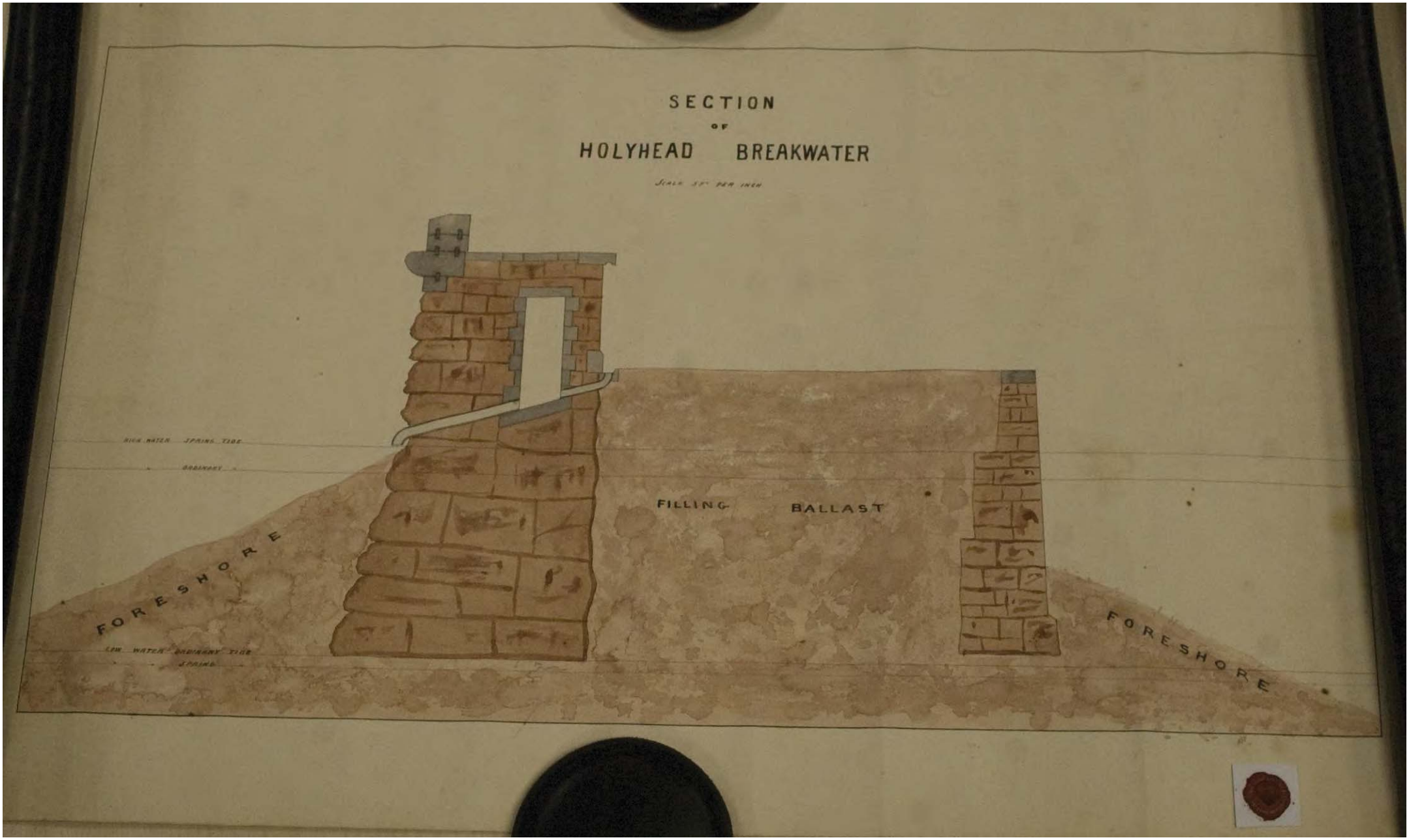

Figure 04: Cross-section through the Holyhead Breakwater, drawn in 1852 (Anglesey Archives WDD/86). Image not to scale, black items are weights used to hold the drawing down flat for photography.

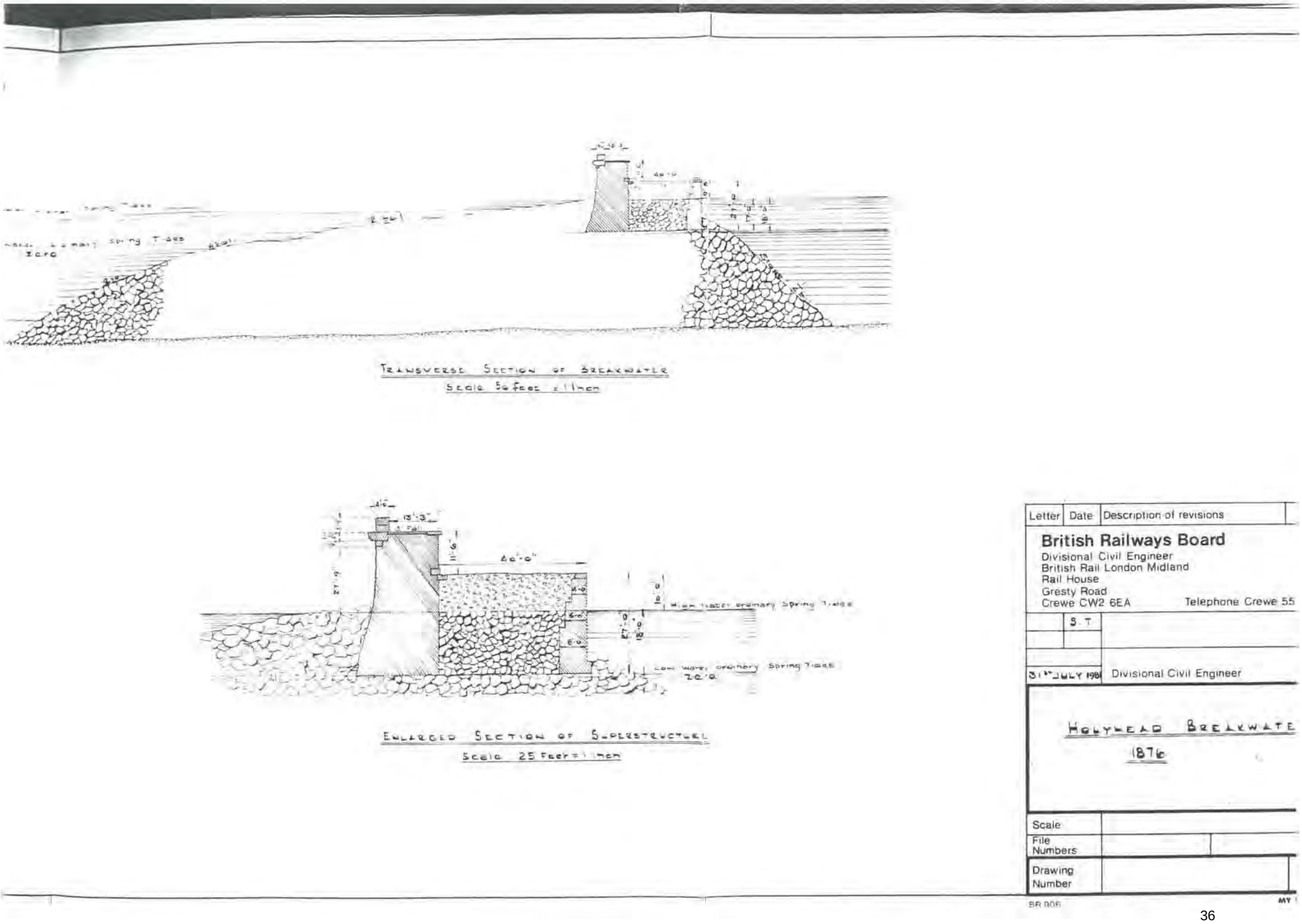

Figure 05: British Railways Board copy of section drawings of the Holyhead Breakwater in 1876 upon completion of the breakwater. Not to Scale

Figure 06: View of the Great Breakwater at Holyhead in 1874 shortly after its completion. Image by G.H. Andrews (NLW)

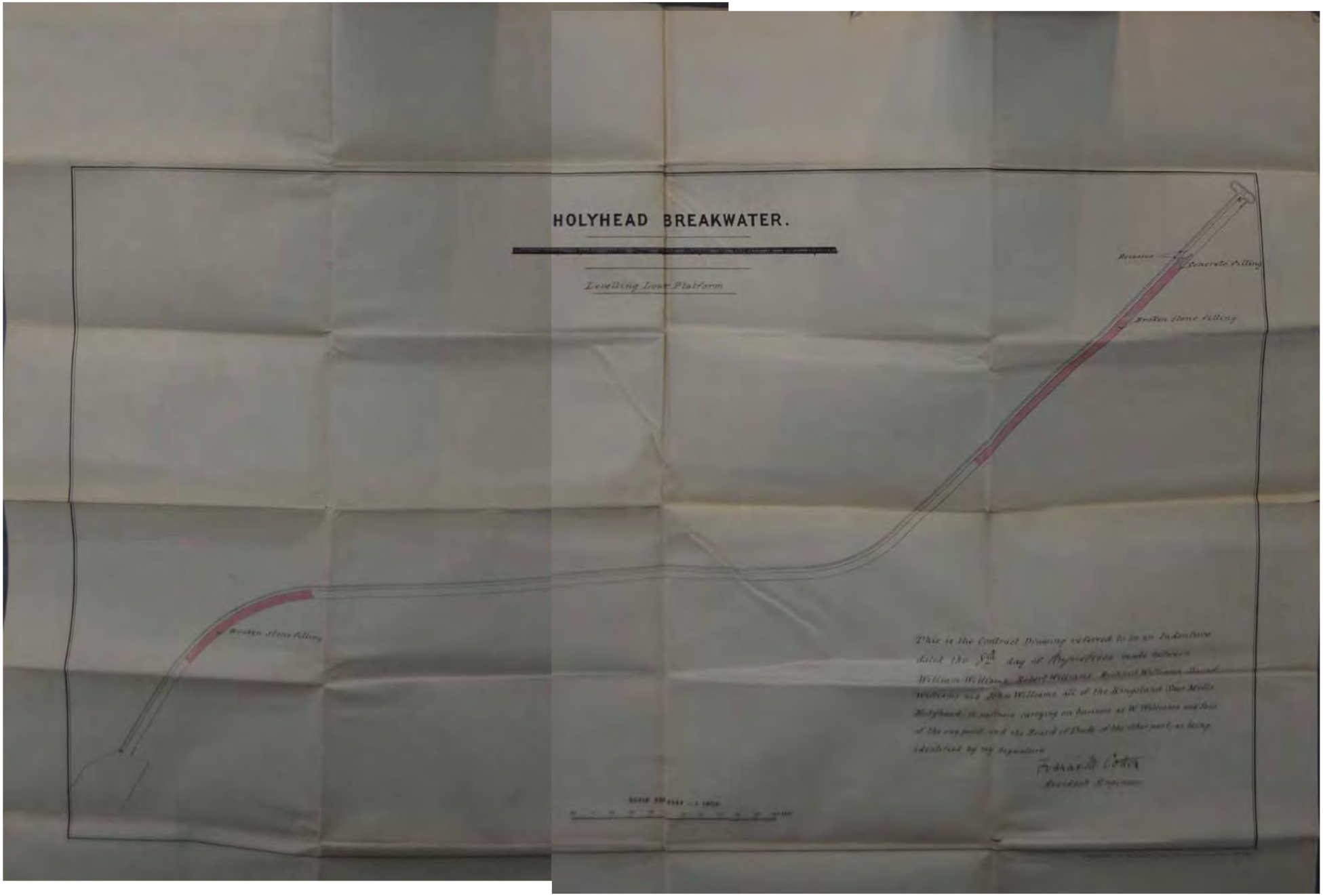

Figure 07:Plan showing area to be repaired of the Holyhead Breakwater in 1904 (National Archives, RAIL 837/8).

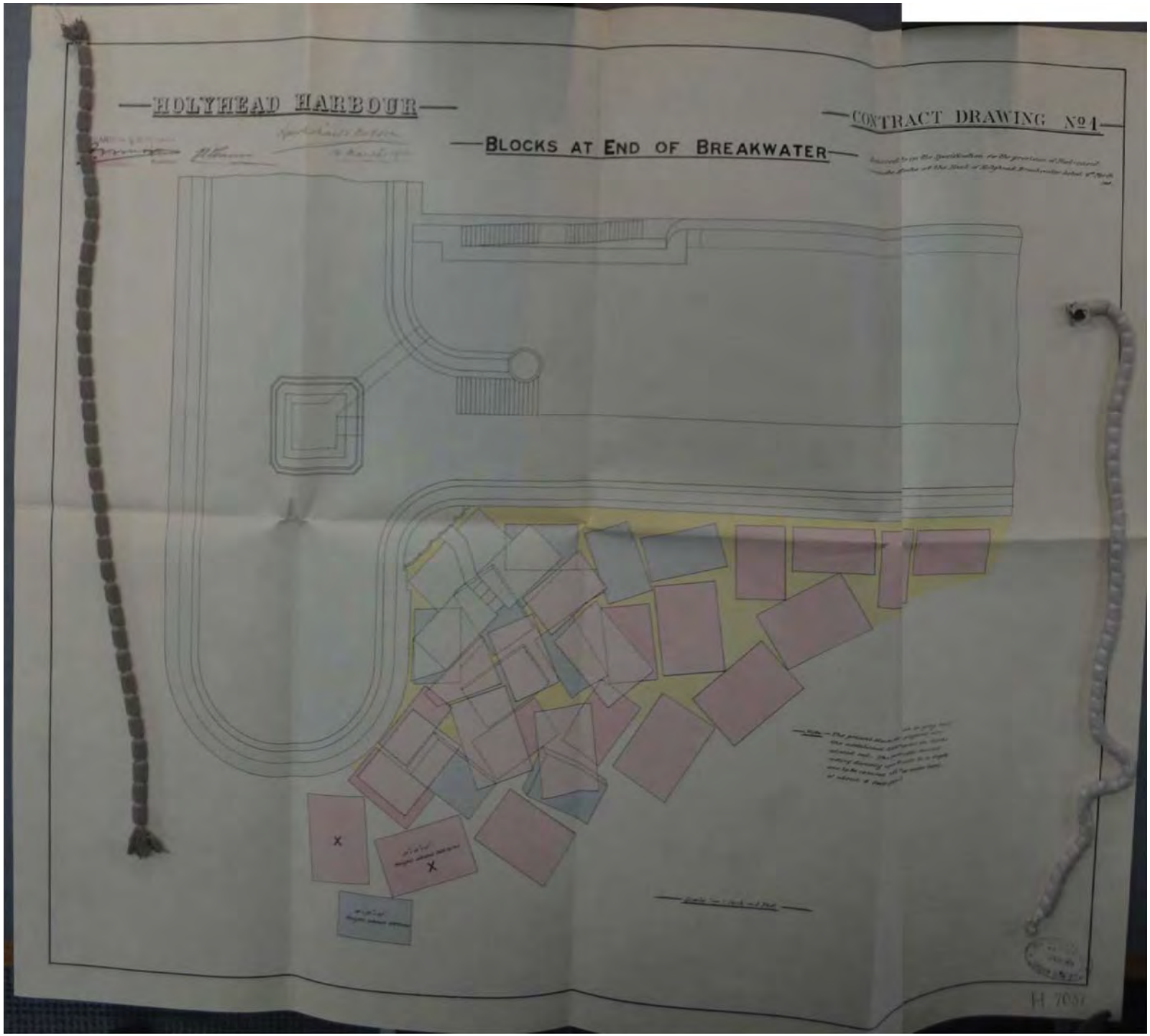

Figure 08: Plan showing steel encased stones deposited at the north-east end of the breakwater in 1914 as a protective measure (National Archives, RAIL 837/32). Not to Scale

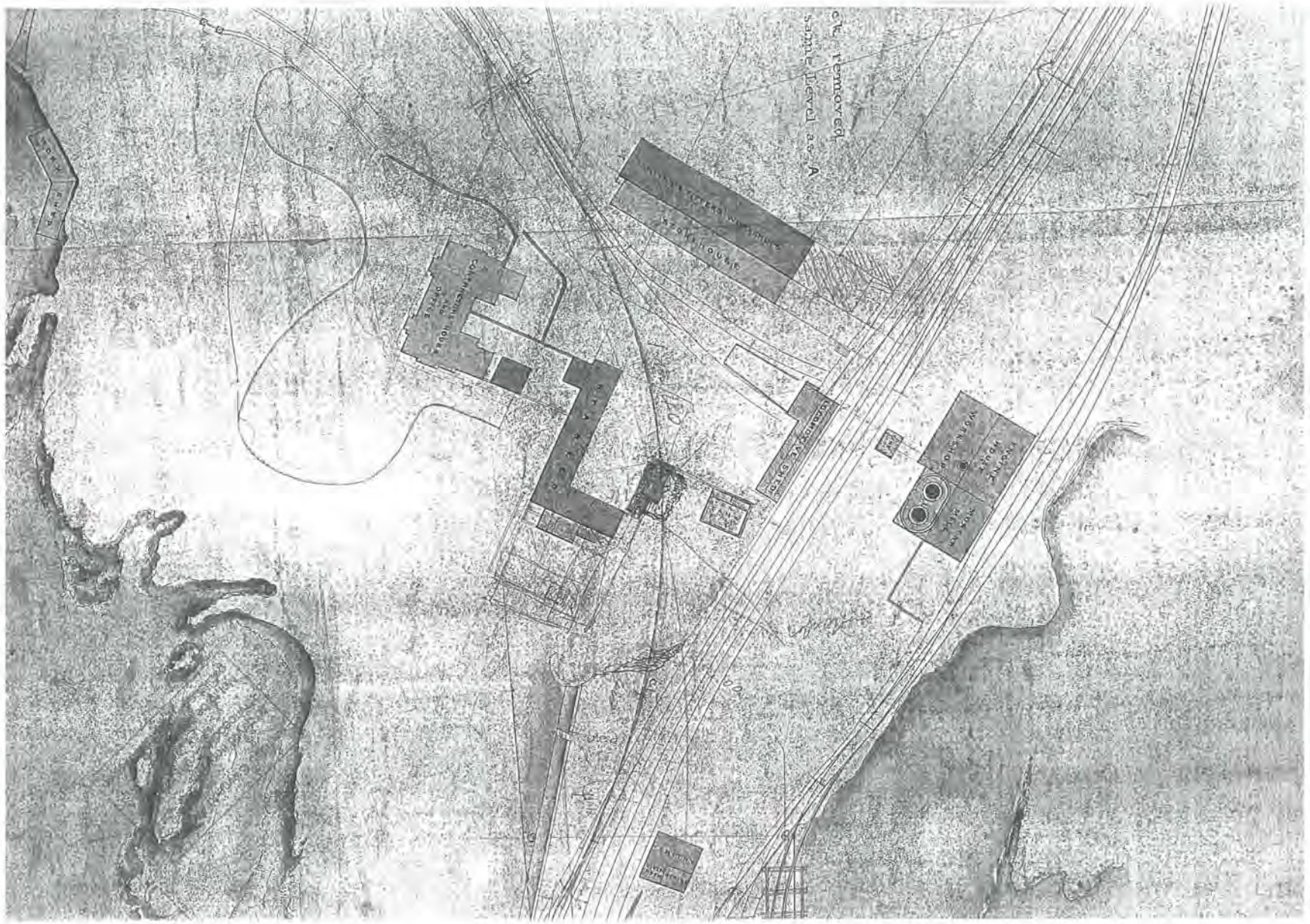

Figure 09: Late 19th century plan of Soldier's Point at the landward end of the breakwater showing the structures and tramway located on it (Gwynedd Archives; X/LNWR/356).

Plate 01: Holyhead Breakwater's Landsend with view of the remnants storage and working area on the portside and decorated bollard on the seaward (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 988.jpg).

Plate 02: View from portside of the lands end of former storage and working area and beginning of parapet marked by the decorated bollard (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 1088.jpg).

Plate 03: Seward view of the parapet at landsend, showing large rubble foundation blocks supporting the parapet (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 1086.jpg).

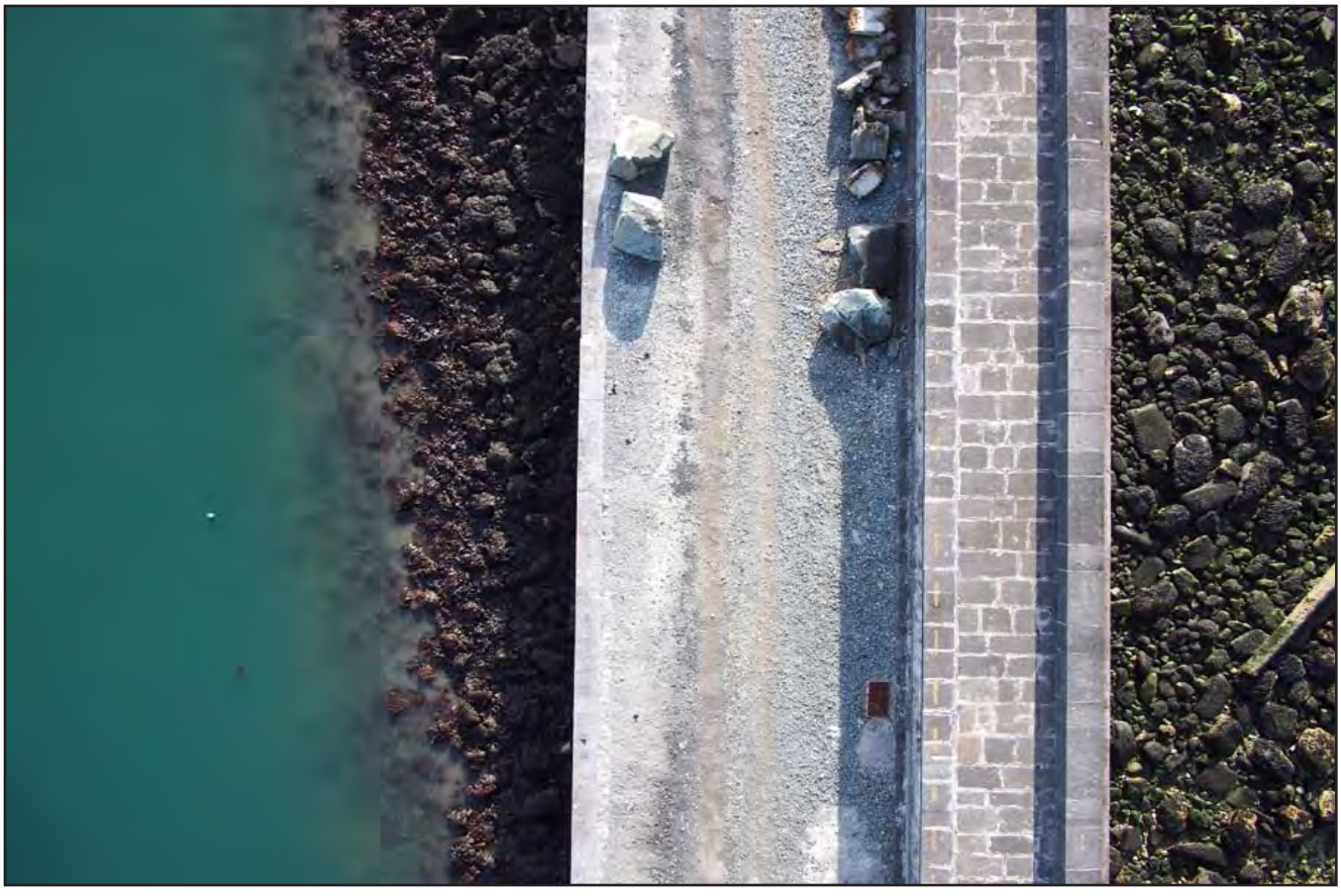

Plate 04: Birdseye view of breakwater showing the parapet's Ashlar masonry of quarried stone from Moelfre and the slip road with former manhole access in view (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 256.jpg).

Plate 05: Seaward side view of rubble sourced from Holyhead Mountain used as supporting foundations of the parapet (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 186.jpg).

Plate 06: Seaward view of parapet with the remnants of a later addition of a ladder, possibly used in emergencies (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 206.jpg).

Plate 07: View of mid - 20th century concrete repairs to the seaward side of the breakwater, with the upper slabs molded to resemble original ashalr masonry of the parapet (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 193.jpg).

Plate 08: View of further concrete repair work along seawards side of the breakwater (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 203.jpg).

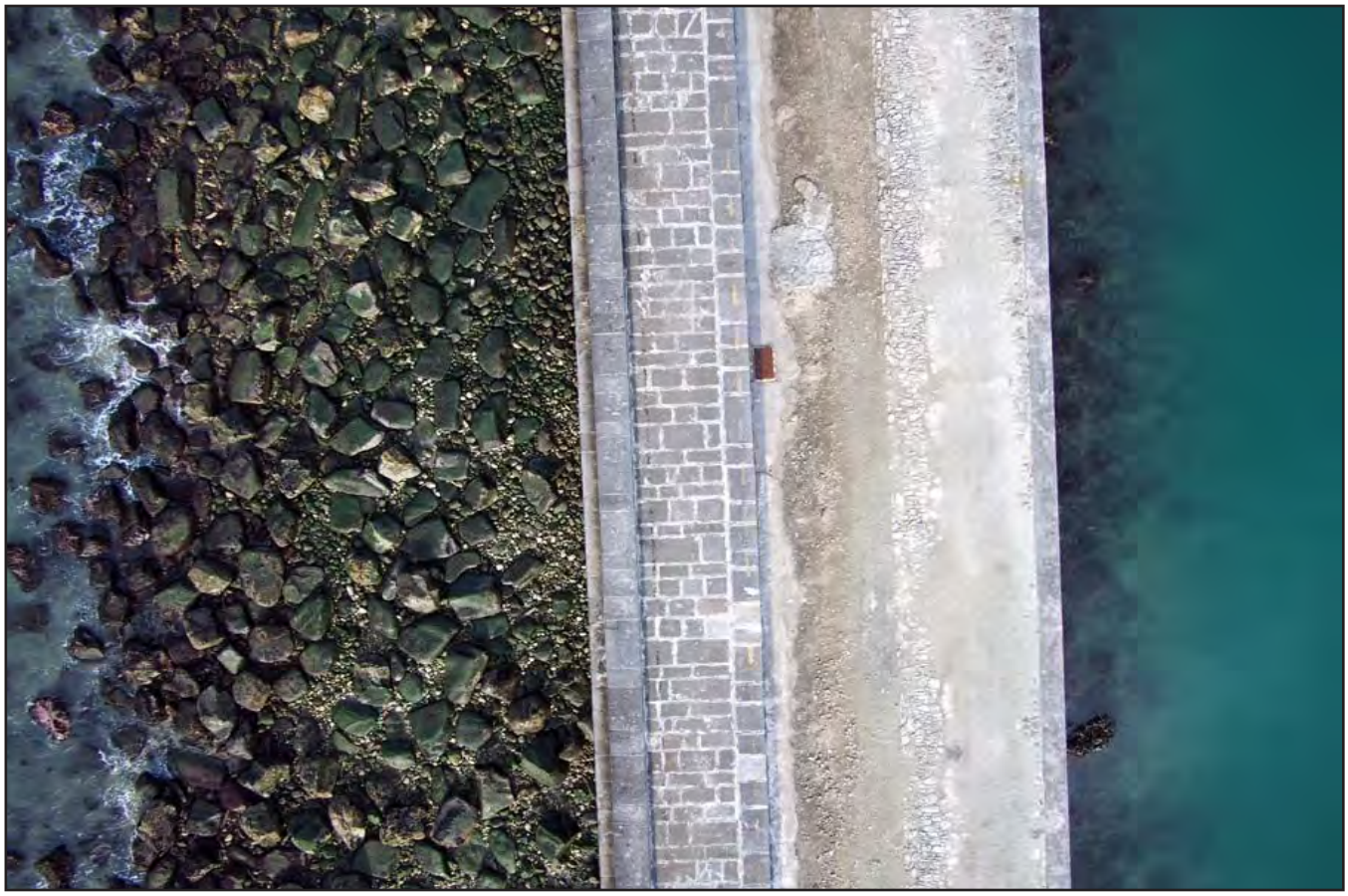

Plate 09: Birds-eye view of breakwater showing remnants original surface on portside, former manhole, and the ashlar masonry of quarried stone from Moelfre and rubble sourced from Holyhead mountain on the seaward side (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 062.jpg).

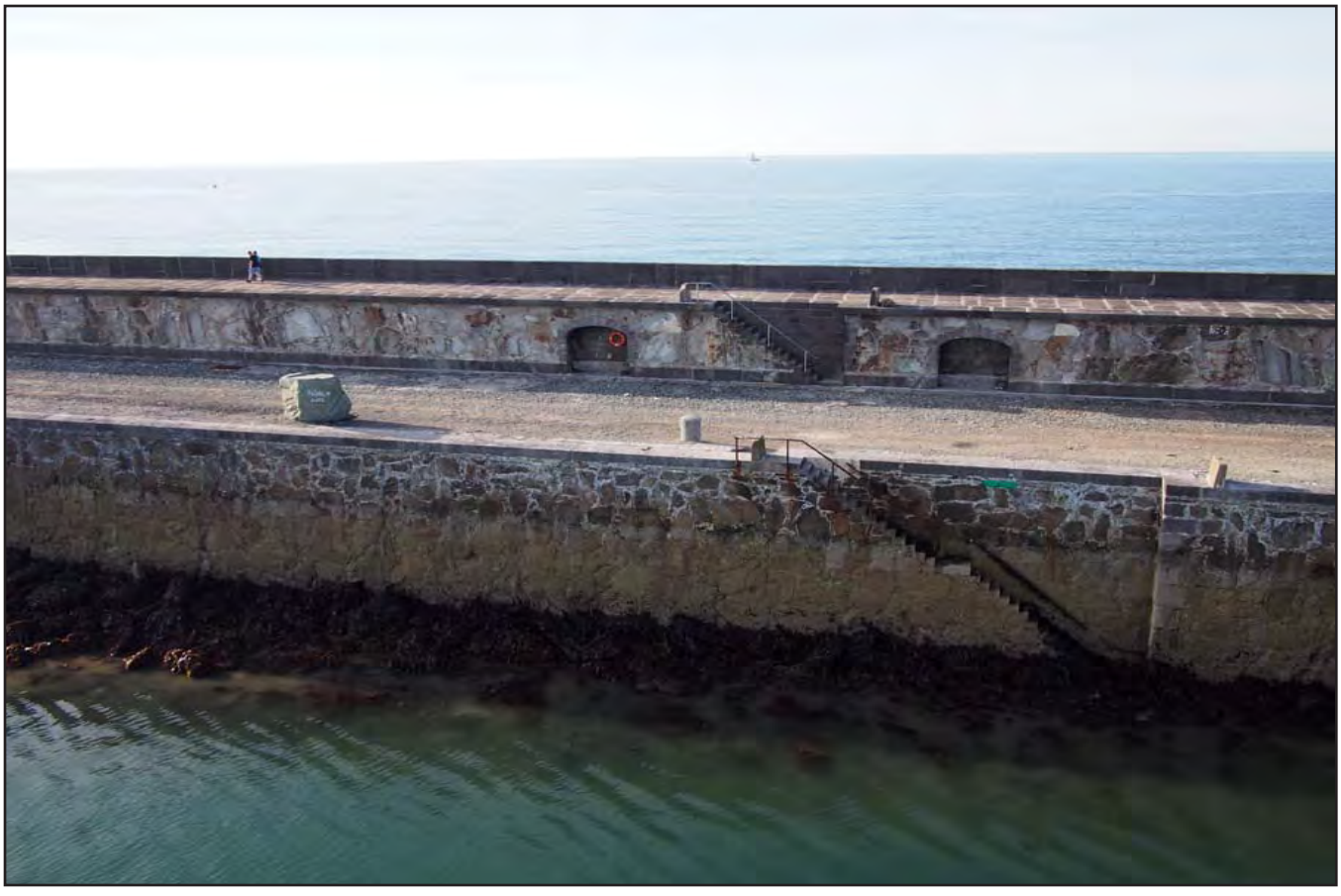

Plate 10: Portside view of mooring post, and staircases leading into the sea, and onto the parapet. Note two original alcoves with masoned seated areas possibly used for shelter during shipments (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 377.jpg).

Plate 11: Portside view of the tail end of breakwater showing relationship with the ashlar masonry with view former storage and convenience area (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 151.jpg).

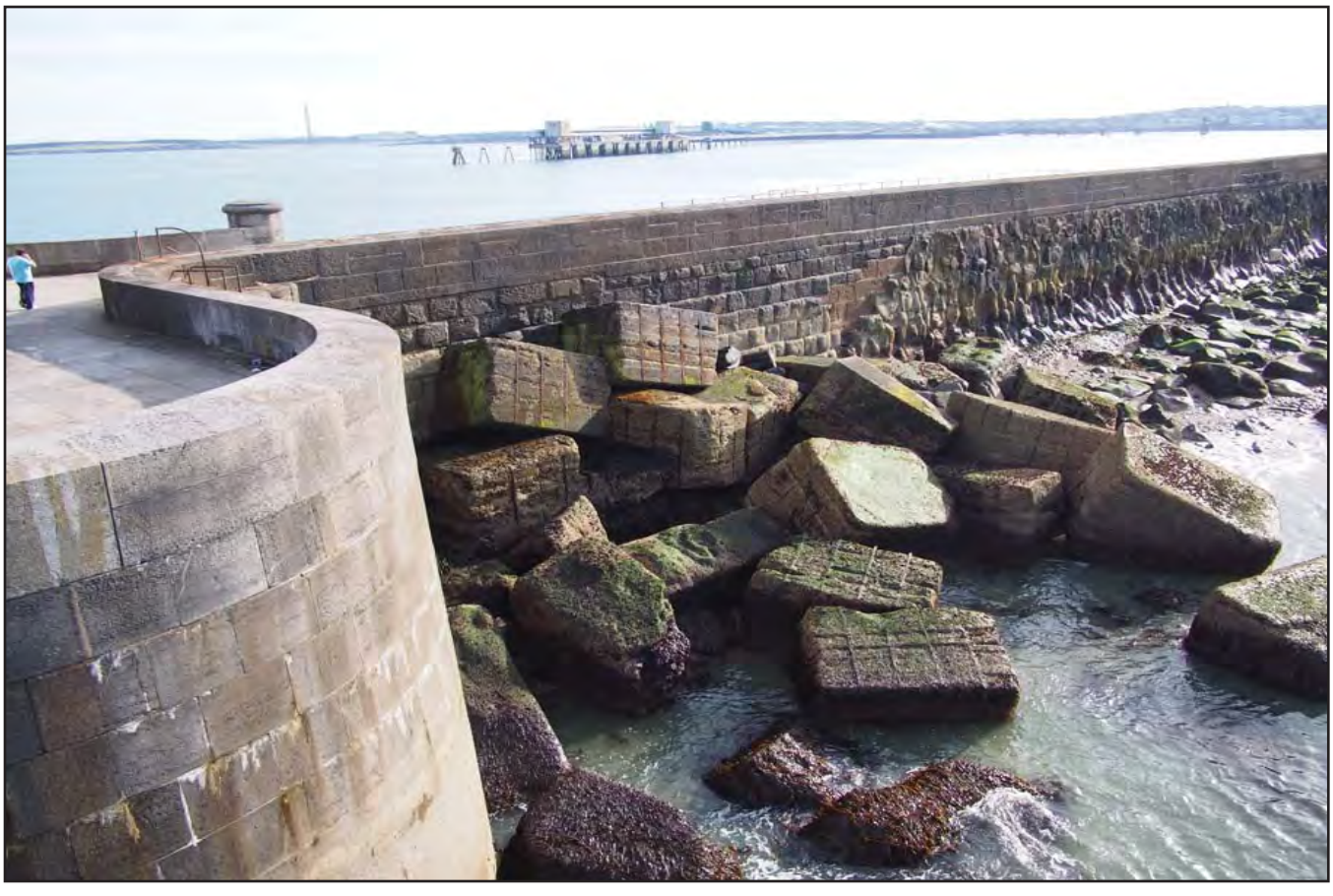

Plate 12: Seaward view of the breakwater's tail end showing large stone ballas, as seen in Figure 08 (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 168. jpg).

Plate 13: Aerial view of the tail end of the breakwater with the light house (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 225.jpg).

Plate 14: View of full length of breakwater showing its curve leading towards landsend at Holyhead Mountain (sourced from Civil Engineering Solutions: 20150928 Holyhead Breakwater 160.jpg).

Plate 15: Holyhead Breakwater - view from east looking towards Holyhead mountaing from upper parapet (archive image: G2498_042).

Plate 16: Holyhead Breakwater - general view from the southwest looking from the upper parapet (archive image: G2498_047).

Plate 17: Holyhead Breakwater - view from northeast detailing surviving remnant of rail at landward end of hardstanding/building area (archive image: G2498_001).

Plate 18: Holyhead Breakwater - view from southeast of large stone drum with roped design at endof the parapet (archive image: G2498_003).

Plate 19: Holyhead Breakwater - interior view of barrel vaulted refuge chamber (archive image: G2498_009).

Plate 20: Holyhead Breakwater - view from southwest of three barrel vaulted refuge chambers (archive image: G2498_010).

Plate 21: Holyhead Breakwater - view from east of bollard for tying up vessels; located along lower breakwater walkway (archive image: G2498_013).

Plate 22: Holyhead Breakwater - view from south of refuge within the breakwater parapet and stairway between upper and lower levels (archive image: G2498_015).

Plate 23: Holyhead Breakwater - view from west of wooden sleepers located along lower breakwater walkway near the lighthousse (archive image: G2498_022).

Plate 24: Holyhead Breakwater - view from southeast of upper parapet storage area and central latrines (archive image: G2498_015).

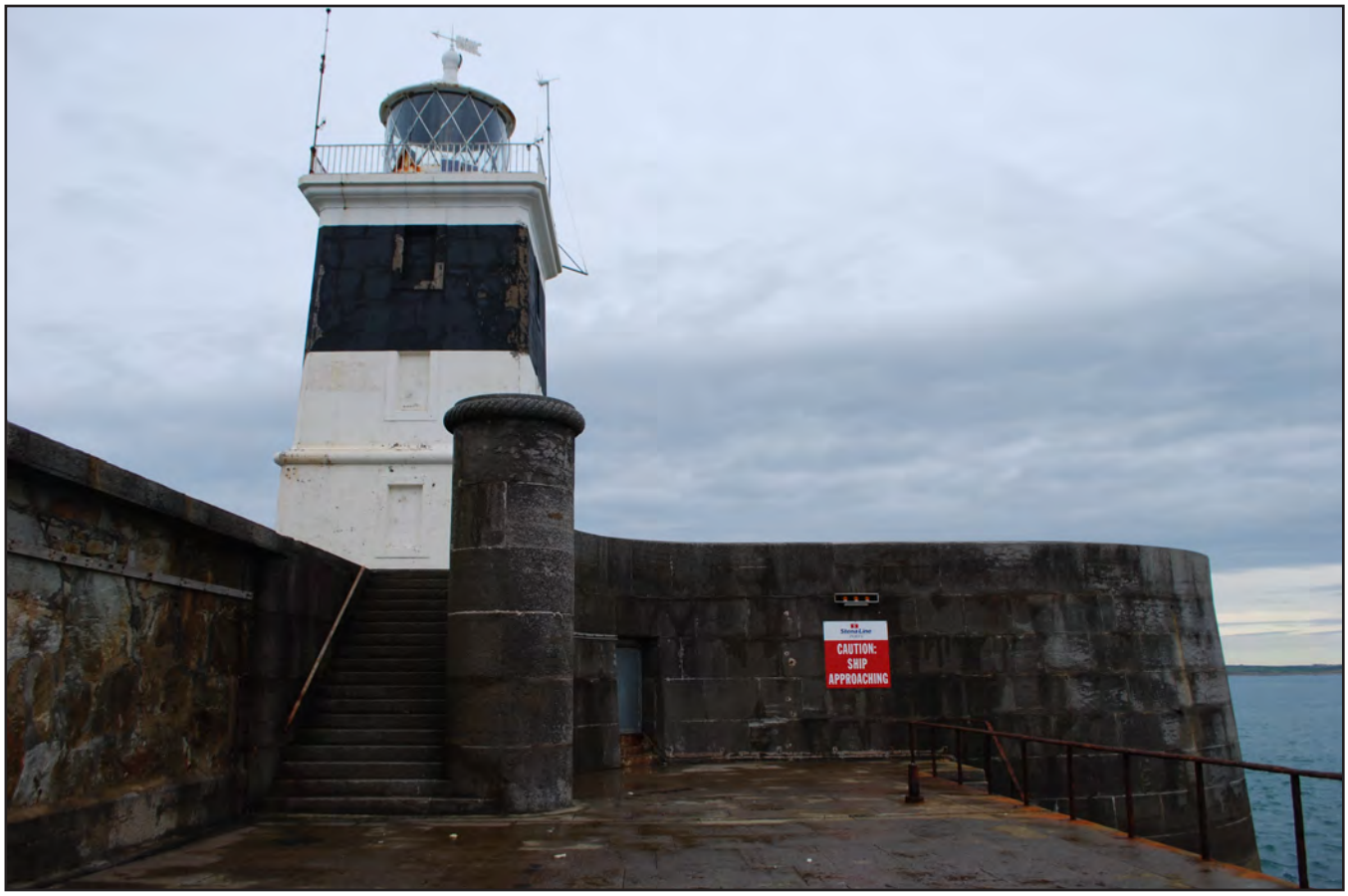

Plate 25: Holyhead Breakwater - view from west of the lighthouse (archive image: G2498_025)

Plate 26: Holyhead Breakwater - view from southeast of parapet ashlar showing cyclopean blocks (archive image: G2498_037)

Plate 27: Holyhead Breakwater - view from east-southeast of breakwater dog leg showing seaward side (archive image: G2498_040).

Plate 28: Holyhead Breakwater - view from east of storm damage repair to the parapet and carriageway (archive image: G2498_046).

Plate 29: Holyhead Breakwater - view from north of former wharf at southwestern end of the breakwater (archive image: G2498_050).

Plate 30: Holyhead Breakwater - view from northwest of the breakwater quarry (archive image: G2498_058).

11 APPENDIX I: PROJECT DESIGN

HOLYHEAD BREAKWATER (G2489)

PROJECT SPECIFICATION FOR:
LEVEL 4 BUILDING RECORD

Prepared for

ROYAL HASKONINGDHV

December 2016

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

HOLYHEAD BREAKWATER

PROJECT SPECIFICATION FOR LEVEL 4 BUILDING RECORD

Prepared for *Royal HaskoningDHV*, December 2016

CONTENTS

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by *Royal HaskoningDHV* to prepare a project specification for a historic building appraisal and record of Holyhead Breakwater, Ynys Môn (Primary Reference Number (PRN) 11821; NGR SH24008420; Figure 01). Holyhead Breakwater comprises a 2.4km long stone-built structure designed to provide maritime shelter at the Port of Holyhead/Holyhead as well as protection from coastal erosion. The breakwater was built between 1848 and 1873 and is a Grade II* listed structure (ref. 5743). In addition to the pier, which forms the main structure, the breakwater also includes a pier end three-storey lighthouse (PRN 11822; NGR SH2567484751), built in 1873, a large stone quay from which the breakwater extends, built in 1847 (PRN 34000; SH23818388), and a late 19th century small stone building located at the end of the quay (PRN 34025; NGR SH23868389).

The historic building appraisal and record will be completed as part of a project appraisal report (PAR) as part of a flood risk management appraisal in line with Flood and Coastal Erosion Risk Management – Appraisal Guidance (FCERM-AG), which will appraise a range of options. The historic building appraisal and record will be completed in accordance with a Level 4 building record as described in *Understanding Historic Buildings: A guide to good recording practice* (Historic England 2016).

The historic building appraisal and record will be completed in accordance with the following guidance:

- Conservation Principles (Cadw, 2011)
- Guide to the conservation of historic buildings, BS7913:2013;
- Guidelines for digital archives Royal Commission on Ancient and Historic Monuments of Wales 2015;
- Management of Archaeological Projects (English Heritage, 1991);
- Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide (Historic England, 2015);
- Standard and Guidance for the archaeological investigation and recording of standing buildings and structures (Chartered Institute for Archaeologists, 2014); and
- Understanding Historic Buildings: A guide to good recording practice (Historic England 2016).

The following information will also be consulted as part of the record (as identified in the *Scope Holyhead Breakwater Project Appraisal Report*):

- Holyhead Breakwater Environmental Scooping Report, Black & Veatch Ltd., 2009;
- Outline design drawings and indicative landscape plan;
- Engineering report;
- High resolution aerial photographic survey undertaken on 28th September 2015 (1109 images), capable of being-post processed to provide a dense point cloud of the breakwater along with 3d mesh in AutoCAD format.

Additional available information is also identified in the *Scope Holyhead Breakwater Project Appraisal Report* section 3, which may also be consulted as part of the record.

Gwynedd Archaeological Trust is certified to ISO 9001:2008 and ISO 14001:2004 (Cert. No. 74180/A/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

2 METHODOLOGY

The historic building appraisal and record will be completed in accordance with a Level 4 building record as described in *Understanding Historic Buildings: A guide to good recording practice* (Historic England 2016).

Level 4 provides a comprehensive analytical record and will draw on the full range of primary and secondary sources of information about the breakwater and discuss its significance in terms of architectural, social, national and economic history. In particular, this will include its relationship with similar 19th century breakwaters and the impact on Holyhead socially and economically during construction and use.

The Level 4 record will be completed using a combination of a photographic record, a drawn record and an analytical record.

2.1.1 Photographic Record

A photographic record of the breakwater has been completed by *Civil Engineering Solutions* undertaken on 28th September 2015. A total of 1109 high resolution aerial photographic images were taken during the survey; the location of each image is detailed on *Civil Engineering Solutions* drawings CES391-1 to CES391-7. These images will be used by GAT as the core photographic record for the Level 4, as they include images in plan and elevation of the entire structure, including views that would not be possible from a landward record. Selected images will be used to illustrate the structural appearance, function and phasing of the breakwater, including any industrial remains. GAT will also prepare general views of the breakwater in its wider setting and landscape.

2.1.2 Drawn Records

The drawn record will not include additional plans and elevations prepared on site by GAT. Any plans and elevations will be generated using the aerial photographic images completed by *Civil Engineering Solutions*.

Drawn records will include:

- A site plan based on the 1:10000 Ordnance Survey County Series locating the feature within the regional landscape;
- Reproduction of contemporary drawings that illustrate the construction and use of the breakwater;
- Reproduction of historic maps that illustrate the construction and use of the breakwater.

2.1.3 Analytical Record

The analytical record will include a detailed examination of available primary and secondary sources. Information will be sourced from the following:

1. The regional Historic Environment Register (HER, Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, Gwynedd LL57 2RT) will be examined for information concerning the study area. This will include an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held;
2. Archive data and historic maps, will be consulted in the regional archives at the Llangeni (Anglesey Archives, Industrial Estate Rd, Llangefni LL77 7JH) and at the Bangor University Department of Manuscripts (Bangor University, Bangor, Gwynedd LL57 2DG);
3. The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be checked for sites additional to the HER, and if required additional supporting information will be examined at the NMR.
4. On-line catalogue search of the National Library of Wales;
5. The National Archives (Kew, Richmond, Surrey TW9 4DU) will be examined for primary sources. The National Archives currently list 42 record items related to the breakwater.
6. The Welsh Newspapers Online portal curated by The National Library of Wales (http://www.llgc.org.uk/index.php?id=4723) will be examined for contemporary newspaper articles. The Welsh Newspapers Online portal currently lists 112,307 articles related to the breakwater.

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2.2 Monitoring Arrangements

A copy of this design and all subsequent reporting must be approved by Gwynedd Archaeological Planning Services (GAPS) and the Isle of Anglesey County Council (IOACC) Senior Planning and Conservation Officer prior to final issue in each instance. The GAPS Archaeologist will need to be informed of the project timetable and the role of GAPS must be acknowledged in all reporting. The relevant contact details are:

GAPS

- Ashley Batten ashley.batten@heneb.co.uk | 01248 370926; and
- Jenny Emmett jenny.emmett@heneb.co.uk | 01248 370926.

IOACC Senior Planning and Conservation Officer:

- David Jump djxpl@ynysmon.gov.uk | 01248 752461

3 PROCESSING DATA, ILLUSTRATION, REPORT AND ARCHIVING

Following completion of the stages outlined above, a report will be produced within one month incorporating the following:

1. Non-technical summary
2. Introduction
3. Aims and purpose
4. Specification
5. Methods and techniques, including details and location of project archive
6. Level 4 Results
7. Summary and conclusions
8. List of sources consulted.
9. Appendix I – approved GAT project specification

The Level 4 results will provide a comprehensive analytical record and will draw on the full range of primary and secondary sources of information about the breakwater and discuss its significance in terms of architectural, social, regional and economic history. In particular, this will include its relationship with similar 19th century breakwater's and the impact on Holyhead socially and economically during construction and use.

4 DISSEMINATION AND ARCHIVING

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. The Historic Building Recording requirements and approaches outlined in this project specification will be undertaken during December 2016 and January 2017. A final report will be submitted to the Historic Environment Record within six months of submitting the draft report (subject to approval).

The following dissemination will apply:

- A paper report(s) plus digital report(s) will be provided to the client (draft report then final report).
- A digital report will be provided to GAPS (draft report then final report).
- A paper report plus a digital report will be provided to the regional Historic Environment Record, Gwynedd Archaeological Trust; this will be submitted within six months of report completion (final report only).
- A digital report and archive (including photographic and drawn) data will be provided to Royal Commission on Ancient and Historic Monuments, Wales (final report only) in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. Digital information will include the photographic archive and associated metadata.

4.1 Historic Environment Record

In line with the regional Historic Environment Record (HER) requirements, the HER must be contacted at the onset of the project to ensure that any data arising is formatted in a manner suitable for accession to the HER. This will include the completion of a HER Enquiry Form at the start of the project.

5 PERSONNEL

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section and attended by a team of project archaeologists experienced in historic building recording. The team will be responsible for completing the Level 4 record in accordance with the methodology listed in section 2.0.

6 INSURANCE

Public Liability

Limit of Indemnity- £5,000,000 any one event in respect of Public Liability

INSURER Aviva Insurance Limited

POLICY TYPE Public Liability

POLICY NUMBER 24765101CHC/000405

EXPIRY DATE 22/06/2017

Employers Liability

Limit of Indemnity- £10,000,000 any one occurrence.

The cover has been issued on the insurers standard policy form and is subject to their usual terms and conditions. A copy of the policy wording is available on request.

INSURER Aviva Insurance Limited

POLICY TYPE Employers Liability

POLICY NUMBER 24765101CHC/000405

EXPIRY DATE 22/06/2017

Professional Indemnity

Limit of Indemnity- £5,000,000 in respect of each and every claim

INSURER Hiscox Insurance Company Limited

POLICY TYPE Professional Indemnity

POLICY NUMBER

HU PI 9129989/1208

EXPIRY DATE 23/07/2017

7 SOURCES CONSULTED

1. British Standards Institute, 2013. *BS 7913:2013 Guide to the conservation of historic buildings*
2. Cadw, 2011. *Conservation Principles*.
3. *Civil Engineering Solutions* drawings CES391-1 to CES391-7
4. Chartered Institute for Archaeologists, 2014.Standard and Guidance for the archaeological investigation and recording of standing buildings and structures.
5. Historic England, 2016. Understanding Historic Buildings: A guide to good recording practice.
6. Royal Commission on Ancient and Historic Monuments of Wales 2015 Guidelines for digital archives

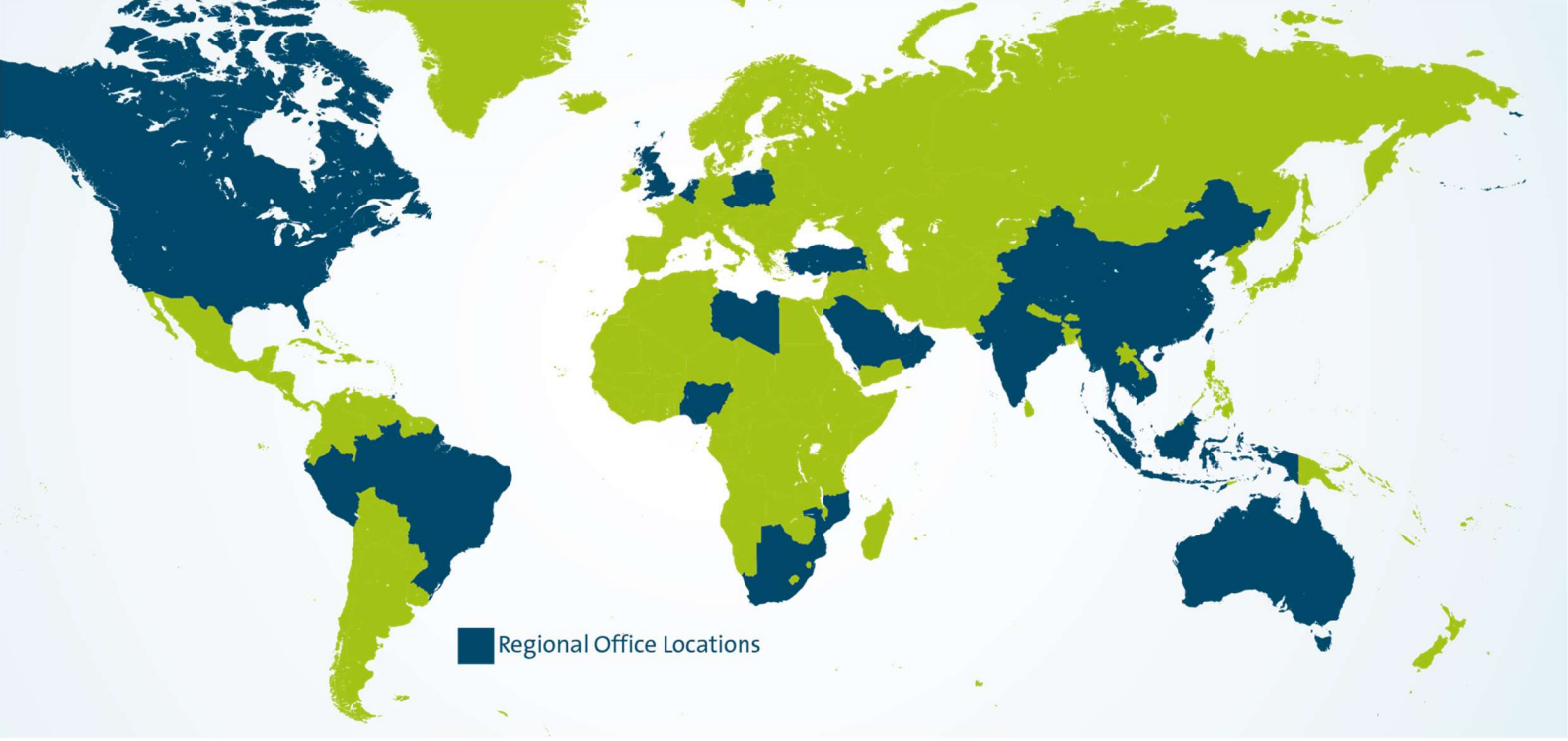
8 FIGURE 01

8.1 Location Map, based on 1:10000 Ordnance Survey County Series Map Sheet SH28sw and SH28se. Scale: 1:10000@A4. Crown Copyright. All Rights Reserved. License number AL100020895.

Figure 01: Location Map, based on 1:10000 Ordnance Survey County Series Map Sheet SH28sw and SH28se. Scale: 1:10000@A4.

Gwynedd Archaeological Trust
Ymddiriedolaeth Archaeolegol Gwynedd

Craig Beuno, Ffordd y Garth, Bangor, Gwynedd. LL57 2RT
Ffon: 01248 352535. Ffacs: 01248 370925. email:gat@heneb.co.uk



Royal HaskoningDHV is an independent, international engineering and project management consultancy with over 138 years of experience. Our professionals deliver services in the fields of aviation, buildings, energy, industry, infrastructure, maritime, mining, transport, urban and rural development and water.

Backed by expertise and experience of 6,000 colleagues across the world, we work for public and private clients in over 140 countries. We understand the local context and deliver appropriate local solutions.

We focus on delivering added value for our clients while at the same time addressing the challenges that societies are facing. These include the growing world population and the consequences for towns and cities; the demand for clean drinking water, water security and water safety; pressures on traffic and transport; resource availability and demand for energy and waste issues facing industry.

We aim to minimise our impact on the environment by leading by example in our projects, our own business operations and by the role we see in “giving back” to society. By showing leadership in sustainable development and innovation, together with our clients, we are working to become part of the solution to a more sustainable society now and into the future.

Our head office is in the Netherlands, other principal offices are in the United Kingdom, South Africa and Indonesia. We also have established offices in Thailand, India and the Americas; and we have a long standing presence in Africa and the Middle East.

ETHIC Intelligence
CERTIFICATE ANTI-CORRUPTION COMPLIANCE SYSTEM

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Enhancing Society Together