

<b>HARBOUR ENVIRONMENTAL &amp; STRUCTURE IMPROVEMENT AT NORTH PIER, PORTRUSH HARBOUR</b>	<b>6<sup>th</sup> December 2016</b>
<b>TO: ENVIRONMENTAL SERVICES COMMITTEE</b>	
<b>FOR DECISION</b>	

<b>Linkage to Council Strategy (2015-19)</b>	
<b>Strategic Theme</b>	Protecting and Enhancing Our Environments & Assets
<b>Outcome</b>	All Environments in the area will benefit from proactive decision making which protects the features, characteristics and integrity of the Borough
<b>Lead Officer</b>	Head of Capital Projects, Energy & Infrastructure
<b>Estimated Cost:</b>	£2.33m, (Excl. VAT)
<b>Maintenance Cost:</b>	Circa. £2, 500.00

## 1.1 Background

Following routine inspections of Portrush Harbour, it was detected that the North Pier Structure had occurred rock armour loss on the seaward facing side.

Subsequently, the Capital Works, Infrastructure & Energy Team conducted an investigatory survey and condition report to determine the condition and deterioration of the revetment / rock armour structure on the sea ward face of the North Pier at Portrush Harbour, constructed between 1826 & 1836.

The primary objective of the study was the assessment of the suitability of the current structure for expected exposed conditions, and recommendations for repairs / upgrade to the structure.

Investigation, intrusive site surveys, including Dive Surveys and computational modelling studies completed have identified that the installed rock armour and current structure condition is not suitable for provision to the North Pier design return period storm, (typically 1 in 100 years), from critical sea force directions.

*The term '1 in 100 years' meaning the probability of magnitude and damage which could occur within this timeframe to the structure through severe storms. The Design process confirming works to be implemented can withstand this storm probability.*

Repairs to existing structure and upgrade works are required to reduce / prevent further deterioration.

The existing rock armour installation having a 1 in 10 year return period.

Please see below Diagram 1 in which we detail areas of break water structure deterioration.



A summary of findings from inspection, are as follows:-

- A number of armour stones were noted as having 'split' or broken in-situ.
- Concrete overlay to stone pitched revetment is deteriorating with multiple localised breakdown and loss with exposed voids beneath.
- Loss of rock armour at the root of the structure along various sections, with increased exposure of down stand beam, therefore assisting with continual deterioration of same at this junction.
- Loss of rock armour at the Northern tip of the structure, (main entrance area).

Please see Appendix A of this report, in which photographs are labelled identifying the defective zone.

### **Current / situation remaining as existing:-**

Conducting no works will result in the North Pier structure rapidly deteriorating, with more substantial future Capital / Maintenance costs being required over and above that detailed in this report. The existing structure, should no works occur, will present a serious Health & Safety risk to Harbour Users & Tourists etc. This will also affect Commercial Fishing Companies who use the Harbour. The North Pier structure as a whole will continue to be compromised.

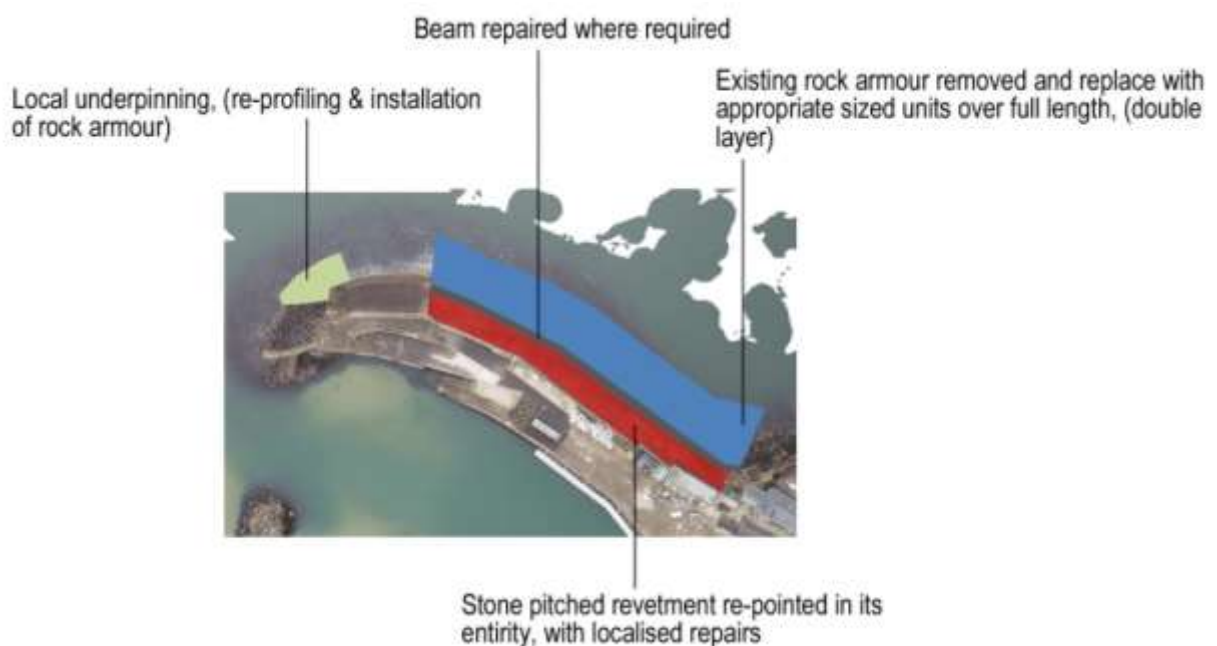
### **Proposed works:-**

It is proposed to repair and upgrade existing seaward facing structure approx. 140m's in length, which will future proof the North Pier of the Harbour, whilst resolving H&S and continual deterioration.

Required works in order to conserve the Harbour, consisting of the following complex works are to be undertaken:-

- Approx. 10-20% of Rock Armour currently in place will be utilised to raise depressions of under layer or core material and / or fill localised voids identified during the works. Appropriately sized armour, ranging from 8T to 14T with a total of 12, 213T's of rock armour being required, which will provide Council with a 1 in 100 year event coverage.
- Edge beam, (section supporting pitched revetment area at intersection point with rock armour), will be repaired in localised positions where defective.
- Concrete sloping revetment will be replaced, with re-pointing to stone pitched area and isolated repairs carried out.
- Localised underpinning and repair works will be undertaken at the North West, (main harbour entrance area), of the structure.

*Diagram 2A below details in general works to be undertaken:-*



Key factors to act upon (subject to approval being gained to Proceed to Stage 2 of the procurement process), include:-

- Implement and complete a procurement process for the services of a Professional Lead Consultant, with experience in the delivery of similar projects of scale and complexity.
- Consultation with Transport NI.
- Public Realm Interface.
- Consultation with Harbour Group(s).
- Consultation with Local Businesses & Residents, (consultation evenings)
- Statutory Approvals to include;
  - a. Planning,
  - b. Marine License and
  - c. HRA and associated Assent.

## **1.2 Programme & Methodology**

To minimise the potential impact upon the local Town, and given the size and quantity of Rock Armour required, it is envisaged that Rock Armour will be delivered to site via a barge, which will only be possible in spring / summer.

An important element of procurement is optimising time on-site, during September, October & November months to coincide with Rock Armour delivery and favourable conditions for construction.

A contract duration of 3-months on-site is envisaged, but will be subject to Contractors Methodology, Rock Armour availability, and weather conditions.

It is envisaged that the above methodology provides least impediment upon Harbour activities, whilst reducing cost and programme risk to the Employer.

*Please refer to Estimated Works Programme under Appendix B for key elements of works and durations.*

## **1.3 Costs**

Due to the Nature, Scale and Complexity of this project, a pre-tender budget cost was formulated on the following basis:-

- In-House expertise and appointed experienced Marine & Coastal Engineering consultancy, providing Technical & Cost advice.
- Used rates previously received through competitive tender for similar rock armour works in Northern Ireland.
- Allowed a 10% risk allowance, which is industry standard given the nature of the project.
- We held talks with Barge, Plant & Rock Armour suppliers directly.

There is a limited number of suitable Main Contractors who would have the necessary skills and experience to carryout works of this scale and nature. Costs are very much dedicated by market forces, not least the availability of suitable plant and machinery at the time it is required, whilst in addition the availability of suitable rock armour is critical. This makes determining budget for such a project extremely difficult to predict, but based on research of similar schemes in Northern Ireland, a suitable budget would be in the order of £2.5m.

#### **1.4 Recommendation**

Based on information provided above, it is recommended that Members approve the above repair works for the project, and to proceed to Stage 2 of the Capital Programme Management & Procurement System, with an estimated spend of £2.5m.



## Appendix A



**Image 1.1** – Typical view of breakwater and pitched revetment from the root of the structure



**Image 1.2** – Deterioration of concrete overlay to stone pitched revetment, (multiple locations)



**Image 1.3** – Loss of rock armour at root of the structure and exposed down stand beam



**Image 1.4** – Loss of rock armour adjacent to sloping revetment



**Image 1.5** – Deterioration of exposed down stand beam at root of structure





**Image 1.6 – Variation of Rock Armour Size / Mass**



**Image 1.7 – Split in rock armour**



## Appendix B – Estimated Works Programme

