



## **Cell 1 Regional Coastal Monitoring Programme Walkover Inspection Surveys 2022**

# Hartlepool Borough Council

## Walkover Inspection Surveys 2022

### Contents Amendment Record

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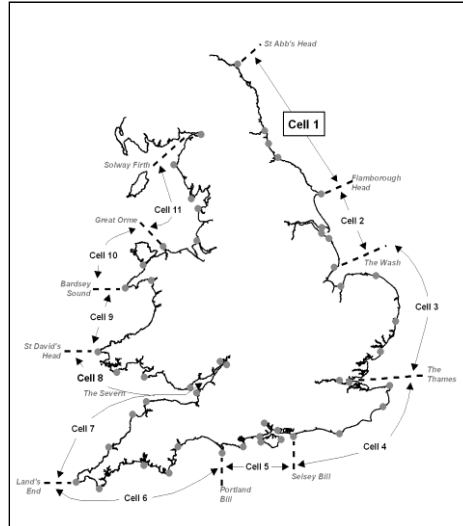
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<sup>1</sup> Scarborough Borough Council is acting as client on behalf of all Local Authorities within 'Coastal Cell 1'.



## Preamble

The Cell 1 Regional Coastal Monitoring Programme covers approximately 300km of the north east coastline, from the Scottish Border (just south of St. Abb's Head) to Flamborough Head in East Yorkshire. This coastline is often referred to as 'Coastal Sediment Cell 1' in England and Wales (Figure 0-1). Within this frontage the coastal landforms vary considerably, comprising low-lying tidal flats with fringing salt marshes, hard rock cliffs that are mantled with glacial till to varying thicknesses, softer rock cliffs, and extensive landslide complexes.



**Figure 0-1 - Sediment Cells in England and Wales**

The programme commenced in its present guise in September 2008<sup>2</sup> and is managed by Scarborough Borough Council on behalf of the North East Coastal Observatory. It is funded by the Environment Agency, working in partnership with the following organisations:



<sup>2</sup> Prior to 2008, coastal monitoring was undertaken on a consistent basis across Northumberland and North Tyneside as part of the (then) Northumbrian Coastal Authorities Group's monitoring programme which commenced in 2002, whilst several authorities between the River Tyne and Flamborough Head undertook their own local monitoring programmes.

The main elements of the Cell 1 Regional Coastal Monitoring Programme involve:

- beach profile surveys
- topographic surveys
- cliff top recession surveys
- real-time wave data collection
- bathymetric and sea bed characterisation surveys
- aerial photography
- walkover inspection surveys

Royal HaskoningDHV has been appointed to provide Analytical Services in relation to the present phase of the Cell 1 Regional Coastal Monitoring Programme, between 2016 - 2027.

The present report is **Walkover Inspection Surveys 2022** and provides a summary of the main findings from the walkover inspections of Durham County Council's frontage that are undertaken once every 2 years.

In addition, separate reports are produced for other elements of the programme as and when specific components are undertaken, such as beach profile, topographic and cliff top surveys, wave data collection, bathymetric and sea bed sediment data collection, and aerial photography.

# 1. Introduction

## 1.1 Study Area

Hartlepool Borough Council's frontage is approximately 12.5km in length, extending from Crimdon Beck in the north to the North Gare Breakwater at the mouth of the Tees estuary in the south, shown in **Figure 1-1**. It comprises natural dunes, towns defended by sea walls and revetments, and key maritime structures such as port and harbour breakwaters. The quay walls within Victoria Harbour and Hartlepool Marina were not inspected as they are not classified as coastal defence assets and they are located within privately owned areas. The frontage includes approximately 40 coastal assets, 37 of which are man-made assets while 3 are natural assets. Detailed maps showing the location of each of these assets are presented in **Appendix A**.



**Figure 1-1: Hartlepool Borough Council study area**

## 1.2 Methodology

This section presents the approach taken by the asset inspectors for the Hartlepool Borough Council coastal frontage.

The walkover inspection surveys for the Hartlepool Borough Council frontage were undertaken on 5<sup>th</sup> and 12<sup>th</sup> July 2022. The weather experienced during the inspections was adequate causing with no access or visibility problems.

The frontage has been split into a number of 'asset lengths' (Appendix A), as defined in the National Flood and Coastal Defence Database (NFCDD) that was established by the Environment Agency.

The walkover inspections cover both built defence assets and natural defence assets such as cliffs, slopes and dunes. All assets were visually inspected, photographed and graded based on their condition and an estimate made of their residual life.

For built assets the grading classification was undertaken in accordance with the Condition Assessment Manual (EA, 2012), with estimates made of the urgency of any necessary repairs. An extract of the grading classification for built assets is presented in **Table 1-1**. For ease of reference the built asset photographs presented in this report have also been bordered with the colours key indicated below.

Grade	Rating	Description
1	Very Good	'As built' condition or cosmetic defects that have no effect on performance.
2	Good	Minor defects that will not reduce overall performance of the asset.
3	Fair	Defects that could reduce overall performance of the asset.
4	Poor	Defects that would significantly reduce overall performance of the asset.
5	Very Poor	Severe defects resulting in overall performance failure of the asset.

*Table 1-1: Condition assessment grading for man-made assets.*

In addition to the above grading classification, for natural assets such as cliffs and slopes the same five point activity scale used in previous walkover inspections within Cell 1 was used. This grading classification is presented in **Table 1-2**. For ease of reference the natural asset photographs presented in this report have also been bordered with the colours key indicated below.

Grade	Class	Description
1	Dormant	Features with no interaction with marine processes.
2	Inactive	Features with no visible evidence of erosion or landsliding activity.
3	Locally active	Features with localised evidence of small erosion or landsliding activity.
4	Partly active	Features with widespread evidence of small erosion or landsliding activity or areas of intense erosion or landsliding.
5	Totally active	Features with large-scale or intense erosion or landsliding.

*Table 1-2: Condition assessment grading used for natural assets (cliffs/ slopes).*

This report provides an overview of the findings from the walkover inspections, summarising each locality in general but also specifically identifying individual assets in 'poor' or 'very poor' condition. It is anticipated that this summary will help identify areas for maintenance or capital investment. Full details of the inspection of each asset are provided in **Appendix B**.

In addition to this report, full details of the inspection and a selection of appropriate photographs have been entered into the SANDS (Shoreline And Nearshore Database System) database and provided along with this report with SANDS viewer software.



## 2. Overview

The walkover inspection identified limited changes in the condition of the built and natural defence assets along the Hartlepool frontage since the previous formal inspections in Summer 2020. A summary of the main differences is provided below;

- **North Sands** – The dunes surrounding Steetley Pier have deteriorated locally, possibly as a result of the storms (including Storm Arwen) during winter 2021/22.

Residential development has continued on the former industrial site backing the section of made slope that is now undefended due to the failure of the brick gabion.

- **Marine Drive and Hartlepool Headland** – The recently completed works to the seawall around the headland remains in as built condition. However, a significant percentage of the sealant between the precast units has been washed out.

A project to rejuvenate the Elephant Rock amphitheatre, located on the lower promenade and forming a secondary defence, has been complete since the previous inspection.

- **Old Pier (Pilot pier)** - Cracking between the deck and parapet wall on the Old Pier roundhead appears to have deteriorated.
- **Town Wall** – The masonry wall has benefited from recent repointing works since the previous inspection

A significant defect was noted to the most easterly stone abutment where several blocks were missing. It was unclear whether this was a previous repair that had unravelled or whether the repair was in progress and this is being checked by Hartlepool Borough Council (as the works are being undertaken by PD Teesport).

- **Middleton Beach** – A failed section of stacked gabion wall has continued to deteriorate and poses a health and safety risk to the cabins on the top of the slope.

Erosion has started to outflank the adjacent blockwork seawall causing the retreat of the southern section of the informal access ramp

- **West Harbour** –
  - **North Pier** – Continued voiding through the apron on the seaward face was observed. Anglers were noted on the pier head despite safety concerns.
  - **Concrete Block Revetment** – The settlement issues, including loss of blocks and washout of material, to the concrete block revetment to the south of the Marina gate have deteriorated. It is estimated a 4m by 2m area of drainage layer is now exposed as a result of block loss.
  - **Tees and Hartlepool Yacht Club** - Marine vegetation was locally scaled back revealing the significant extent of undercutting, particularly at the access steps but also along the precast unit wall.

- **North Gare** – Further repairs works have been carried out since the previous inspection including the placement of concrete blocks and bagwork on northern face towards the landward end to fill a large void..

### 3. Condition Assessment

#### 3.1 Blackhall Rocks to Heugh Breakwater (MA11)

##### 3.1.1 North Sands

The northernmost defence asset within Hartlepool Borough Council's coastal frontage starts at the dunes at the Hart Warren Nature Reserve. The undefended frontage then extends approximately 3.1km, to the southern boundary of Spion Kop cemetery. The dunes along North Sands are fronted by a wide sandy beach. The upper foreshore to the north is cordoned off for nesting Little Terns.

The first ~500m length of dunes, adjacent to Crimdon Beck, are high and steep with an unvegetated foredune. Minor cliffing is noted at the crest. The dunes here have again showed signs of local erosion. The wooden sand fence once at the crest of the dune has been bypassed and is now on the face of the dune.

Further south, the dunes appear healthier with vegetation coverage increasing and some signs of embryonic dune growth noted. Overall, the profiles of the dunes remained similar to the previous survey suggesting these remain relatively inactive.



*High, steep, unvegetated dune with eroding crest adjacent to Crimdon Beck (/C0301C01)*



*Healthy well vegetated dunes fronting Hartlepool golf course (/C0301C01)*

The two piled outfall structures to the north of Steetley Pier are in fair to poor condition. The sheet piles are heavily corroded, and the concrete capping beam and slab are cracked and abraded. Despite the notable defects, the structures appear stable. The structures were again noted to be retaining sediment, albeit not to the same extent as in 2020.



*Cracking / spalling to piled outfall structure deck (/C0302C01)*



*Heavily corroded piled outfall structure (/C0302C01)*

Continued property development has occurred behind the dunes adjacent to Steetley Pier since 2020, sprawling north towards the golf club. The dunes fronting the development are overall in fair condition with local sections in poor condition. The worse condition dunes are those either side of Steetley Pier itself where the foredune is showing significant cliffing. Heavy footfall in the area has also resulted in swathes of unvegetated dunes.

The deterioration of the dune locally may be as a result of the particularly stormy winter, where several named storms occurred. Non worse than Storm Arwen in November 2021, where record wave heights were recorded at all buoys along the Cell 1 coast during the event. The dunes should be monitored for signs of potential recovery.



*Dunes locally poor adjacent to Steetly Pier  
(/C0302C01)*



*Embryonic dune growth on the foredune  
(/C0302C01)*

As reported previously, several timber columns supporting the historic Steetley Pier structure have significant loss of section, likely due to fire damage. Children were observed on the deck of the structure during the 2020 inspection and so if not done already, it is recommended that any informal access routes onto the pier should be reviewed urgently.

North of the Pier, on the southern boundary of the cemetery, a brick manhole chamber is a focal point for erosion and is at risk of collapsing onto the foreshore. It is recommended that the chamber is decommissioned.



*Loss of section to timber support columns of historic pier structure, likely due to fire damage  
(/C0302C01)*



*Manhole chamber at risk due to ongoing erosion  
(/C0302C01)*



To the south of Spion Kop cemetery, the former industrial site is subject to ongoing residential development. The most seaward properties are approximately 45m from the cliff top.

As reported in 2020, the development is fronted by a coastal slope largely comprised of made ground/bricks/rubble with evidence of ongoing erosion/instability. The slope was formerly fronted by brick gabions however, the gabions have now all but disappeared except for a heavily distorted wire mesh believed to be the remains of the baskets. The bricks spilling from the previous structure have been spread along the foreshore, particularly visible within the cobbles/shingle of the upper beach to the north. Several outlet pipes have been exposed through ongoing erosion.

In light of the property development in the vicinity, it is recommended a formal coastal defence is considered in this area.



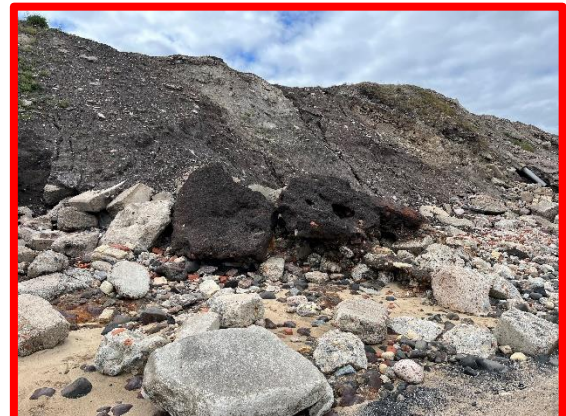
Property development on former industrial site, fronted by collapsed gabion structure (/C0302C02)



Burst brick gabions spread along foreshore to the north (/0302C02)



Erosion of made ground slope in 2020 (/C0302C02)



Erosion of made ground slope in 2022 (/C0302C02)

The embankment to the north of Marine Drive appears to comprise made ground /slag /rubble. Local undercutting and overhanging was observed, with this being more prevalent towards the southern extent of the asset.

Large pieces of slag material previously poured to form a protective apron had continued to break up although the material is likely to remain *in situ*. Rock armour revetment (also incorporating several concrete tank blocks) at the interface with Marine Drive sea wall appeared in fair condition.





*Deteriorating slag-poured apron (/C0302C03)*



*Historic slipping in coastal slope (/C0302C03)*



*Rock armour revetment at Marine Drive seawall (/C0302C03)*

### **3.1.2 Marine Drive and Hartlepool Headland**

In 2019, the construction works to the Hartlepool Headland seawall were complete. The works, ranging from the Heugh Breakwater in the south through to Thorpe Street beach access ramp in the north (401C03 to the southern section of 303C01), consisted of the encasement of the original seawall with pre-cast concrete units, including new coping units. The wall to the south is also fronted by a shallow profiled, rock armour revetment.

In 2022, the structure generally remained in 'as built' condition with the exception of the sealant which, as reported in 2020, is being washed out from between the precast units and precast copestones. It is estimated that up to 40% of the sealant has been washed out. It is recommended that this should be replaced as part of the routine maintenance. A section of the handrail on the access ramp adjacent to Vane Street has also been damaged.

The north east tip of the headland was limited to inspection from the promenade only as the foreshore was inaccessible due to densely vegetated marine growth and wet rocks but again appeared in 'as built' condition.





*Damaged handrail on access ramp at Vane Street (/C0303C01)*



*Sealant being washed out between precast units (/C0303C01)*



*As built condition sea wall – inaccessible foreshore to the south. (/C0303C02)*



*As built condition seawall (/C0303C04)*

The approximately 200m of seawall north of Thorpe Street that was not included in the recent works, remains in fair condition overall, dropping to poor and very poor in places. The lower courses of the masonry wall are heavily abraded along the frontage. The access ramp and steps adjacent to Thorpe Street are in particular poor condition with significant damage to the coping stones and handrails noted locally. A short (approximately 30m) length of rock armour remains towards the northern end of the wall.



*Damaged cope to Thorpe Street access ramp (/C0303C01)*



*Local damage to coping/handrails at Thorpe Street access steps (/C0303C01)*

In 2021 a project to rejuvenate the Elephant Rock amphitheater, located on the lower promenade and forming a secondary defence, was complete. It remains in as built condition.



*Elephant Rock – Outdoor Event Area  
(/C0303C02)*



*Elephant Rock – Outdoor Event Area  
(/C0303C02)*



### 3.1.3 Heugh Breakwater

The privately owned Heugh Breakwater is not accessible to the public beyond halfway along its length, enforced with fencing and signage present. It is understood the seaward end of this structure, past the fencing, has been in failing condition for many years, thought to be as a result of differential settlement from varying founding material. The landward section of the structure generally appeared to be in fair condition when inspected from the foreshore. Some cracking/abrasion was observed in the deck slab and parapet wall. The handrails were also experiencing minor corrosion. Numerous previous repairs were visible on the deck of the structure.



Spalling of concrete (/C0401C01)



Cracking to the deck slab (/C0401C01)



Northern aspect of the Heugh Breakwater (/C0401C01)



Southern aspect of the Heugh Breakwater (/C0401C01)



### 3.2 Heugh Breakwater to Little Scar (MA12)

#### 3.2.1 Block Sands

Block Sands, located between Heugh Breakwater and Pilot Pier, is backed by a tiered defence formed of concrete recurve wall between beach and lower prom and a vertical masonry wall between lower and upper prom.

The concrete recurve wall is generally in fair to poor condition. Local cracking and spalling was observed to the face and recurve cope along extensive sections of the wall. Minor undercutting and voiding was also observed locally. The rear masonry wall was generally in fair condition throughout, with voids/loss of mortar observed locally, and several areas where historic repairs have taken place.

Numerous outfalls are present at the interface between assets /C0401C04 and /C0401C05. It was noted of the five outfalls, three have no protection, one has a WaStop non-return valve which appeared in working condition and the final outfall has a failed flap valve. It is recommended that the protection to these outfalls is reviewed and the flap valve replaced if necessary.



*Healthy beach levels at Block Sands adjacent to Heugh Breakwater (/C0401C03)*



*Rear masonry wall in fair to good condition (/C0401C03)*



*Damaged cope around handrailing fixing (/C0401C04)*



*Broken Flap Valve (/C0401C04)*

A steep, cobble beach with good vegetation cover is present where the seawall is offered protection by the rocky outcrop. Minor cliffing to the vegetation shelf was previously reported, however continued vegetation growth has continued seaward of this erosion line.

Cracks were observed in the masonry wall and access steps above the historic public conveniences, but these defects have not deteriorated since 2018.



At the interface with the Old Pier the wall had sustained damage to the concrete recurve. A large crack extended the full height of the wall, potentially suggesting a global movement of the structure; however no distress was evident in the promenade immediately above this section of wall. Undercutting was identified at the interface with Old Pier in 2016, however has not been visible since due to high beach levels. This location should be monitored with consideration given to infilling/repairing the existing undercutting/voids.



*Damaged recurve cope (/C0401C05)*



*Voiding at toe of wall (/C0401C05)*



*Steep pebble beach fronting vegetated area (/C0401C05)*



*Spalling damage to recurve wall, significant crack suggesting settlement. Old Pier to left of image (/C0401C05)*



### 3.2.2 Old Pier (Pilot Pier)

The masonry and concrete structure generally appeared to be in fair condition. The Accropode armour units at the head of the structure appeared to maintain a good profile. Some larger voids were noted suggesting potential displaced units.

As recorded in previous inspections, an approximately 30m crack is present between the concrete parapet wall and main slab around the roundhead. This cracking may indicate settlement of the structure or seaward rotation of the parapet rather than local damage. These defects have been present since the 2014 survey, although appear to have worsened since the previous inspection. It was noted in the 2018 inspection that strain gauges were installed on the lighthouse structure which suggests monitoring of the structure is ongoing.

The inner face of the structure (Pilot Pier) generally appears in fair condition with some abrasion noted to the masonry blocks. Significant vegetation growth may be concealing more defects. Local bulging of the wall has been reported previously but does appear to have worsened since the previous inspection.



*Southern aspect of the Old Pier (Pilot Pier)  
(/C0401C34)*



*Inner face of North Pier – uneven profile  
suggesting potential settlement of masonry  
blocks (/C0401C06)*



*Cracking in parapet wall and deck  
(/C0401C34)*



*Cracking in parapet wall and deck (/C0401C34)*



### 3.2.3 Town Wall and Fish Sands

The beach level at Fish Sands appeared healthy and within the range observed during previous inspections. The abrasion and voiding to the access ramp adjacent to Old Pier was largely obscured by marine vegetation growth and beach sediment.

The masonry Town Wall, and supporting abutments, incorporate a multitude of historic *ad hoc* repairs but generally remains in fair condition. The wall has benefitted from recent local repointing works since the 2020 inspection. A significant defect was noted to the most easterly stone abutment where several blocks were missing. It was unclear whether this was a previous repair that had unraveled or whether the repair was in progress. It is recommended that this is addressed immediately to prevent further deterioration compromising the structure. A number of the other masonry abutments are heavily abraded and rounded at the toe.

The masonry and concrete groynes were in good to fair condition. Beach levels increased with progression along the frontage to the west, with a sudden change at the westernmost groyne, in the lee of which the beach level drops by approximately 2 to 3m with this level then consistent to the western extent of the Town Wall.

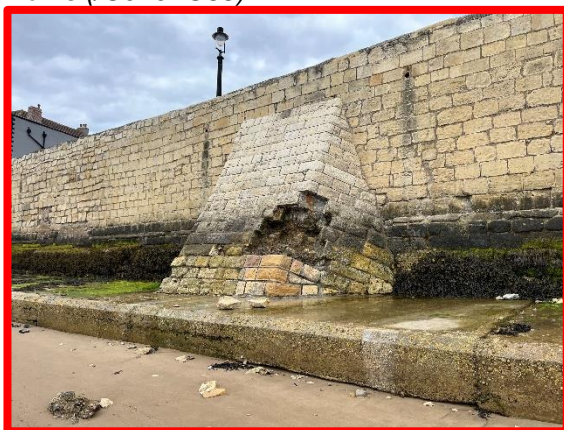
The more recent repairs works to the concrete outfall, concrete abutment and footway promenade to the rear of the seawall, reported in 2018, remain in good condition.



*Town Wall benefiting from recent repointing works (/C0401C35)*



*Town Wall benefiting from recent repointing works (/C0401C35)*



*Significant defect to masonry abutment (/C0401C35)*



*Recently constructed outfall and abutment. (/C0401C35)*

The narrow pedestrian access steps, providing access onto the foreshore from Town Wall Road, have recently been repaired (pre 2020) with new concrete treads and a reinstated timber handrailing. The steps have not deteriorated since the previous survey although it was noted the handrail is slightly loose and should be monitored.

The steps at the former passenger ferry landing marking the southern extent of the asset remain in poor condition with loose and displaced masonry and heavily corroded steel ties. Public access to this structure, from the road, is prevented by a masonry wall and signage.



*Repaired handrailing and beach access steps (/C0401C35)*



*Damage to steps at former passenger ferry landing (/C0401C35)*



### 3.2.4 Middleton

The concrete Accropode armour units, forming Middleton Jetty, displayed good interlock with a consistent slope/profile throughout and there was no evidence on the crest to suggest significant global movement or distress. Construction rubble, predominantly bricks, had accumulated against southern face of structure, as a result of the burst brick gabions to the south (/C0401C17).

A small stretch of embryonic dunes are observed forming at the transition between Middleton Jetty and the gabion wall. The dunes are heavily trodden and the vegetation coverage is sparse. The dunes in front of the gabion wall have been eroded.



*Middleton Jetty south aspect. Buildup of construction rubble in the foreground (/C0401C16)*



*Embryonic dunes between Jetty and stacked gabion wall (/C0401C17)*

As reported in 2020, the southern section of the stacked gabion wall to the south of Middleton Jetty has failed. Local settlement of the wall is evident, numerous gabion baskets have burst and others are heavily corroded. The failing structure is posing a health and safety risk to the sheds at the crest of the slope. It is recommended that the existing larger rock armor revetment to the south, that remains in good condition, is extended to provide protection to this section.



*Stacked gabion wall in very poor condition especially to the south (/C0401C17)*



*Stacked gabion wall in very poor condition especially to the south (/C0401C17)*



The short length of undefended frontage comprises an informal beach access ramp. Erosion has started to outflank the adjacent seawall causing the retreat of the southern section of the ramp. It is likely that the ramp will become unusable if erosion continues. As a result the need for the ramp should be reviewed. Evidence of fly-tipping was again observed in this location, but not to the same extent as in 2020.



*Informal access ramp 2020 (/C0401C18)*

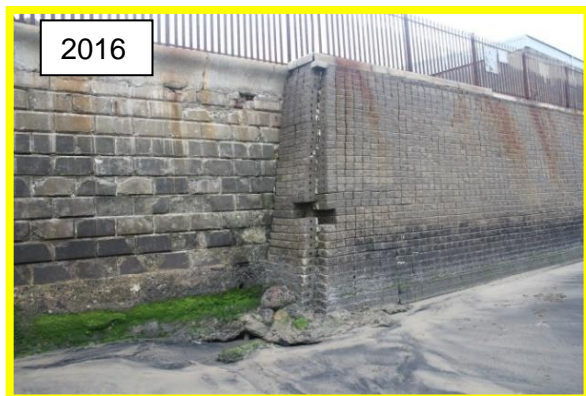


*Erosion outflanking seawall at Informal access ramp (/C0401C18)*

The concrete blockwork wall, fronting a derelict industrial site, is in poor condition. The profile of the wall is not consistent, with bulges of various sizes visible along the full length. The majority of concrete coping units were missing. Opening joints were evident, suggesting global movement of the structure. An additional missing block was observed in the face of the wall in 2022 which should be monitored closely to prevent unravelling of the wall as per further south.

The missing blocks at the interface between the two walls has been progressively failing since 2016, however no further block loss in this location was observed since the previous inspection. High beach levels again concealed the minor scour observed in previous surveys. It is recommended that a detailed structural survey is carried out of the retaining blockwork wall.

The palisade fencing on the crest of the wall has been replaced since the previous survey.



*Missing blocks at interface between two walls. Local scour at toe (2016) (/C0401C19)*



*Progressive loss of blocks at interface between two walls. (/C0401C19)*



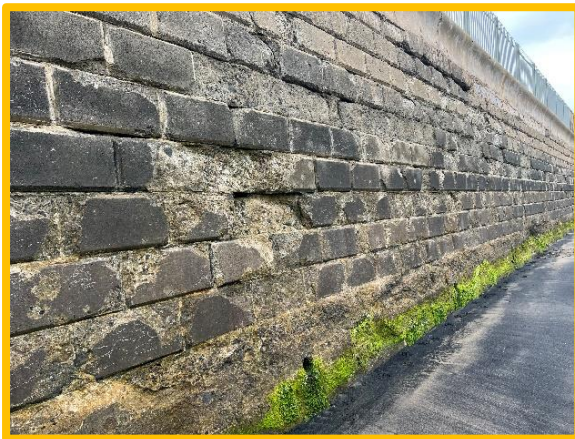


*Inconsistent profile, missing copes, open joints  
(/C0401C19)*



*additional block loss (/C0401C19)*

The large blockwork wall was significantly spalled with abrasion to the lower courses especially at the seaward bend cracking to the concrete coping. Several cracks extended through the parapet wall and through the full height of the seawall. These should be monitored. The Middleton Beach access structure is in fair condition with areas of concrete is showing signs of abrasion. The short section concrete toe beam to the splash wall remains in good condition. The blockwork parapet wall is insubstantial and is not believed to offer an additional protection.



*Spalling/abrasion of concrete blocks  
(/C0401C19)*



*Vertical crack through parapet and seawall  
(/C0401C20)*



*Access structure to Middleton beach in fair  
condition (/C0401C20)*



### 3.2.5 West Harbour

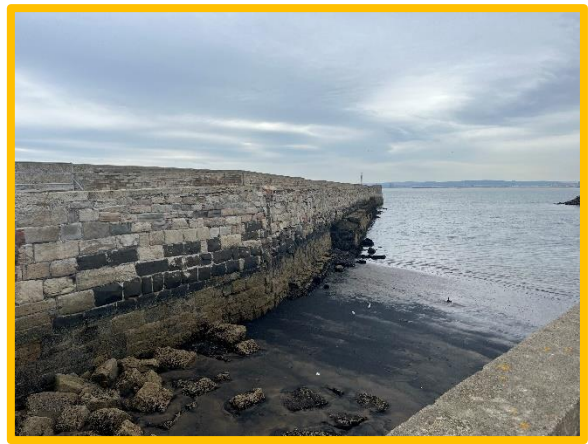
West Harbour provides access to Hartlepool Marina via a lock and is sheltered by North Pier and South Pier.

Public access to the North Pier and its inner arm is prevented by security fencing and signage limiting the inspection to the foreshore and adjacent structures only. The signage states the pier is in a “dangerous condition”. Despite the signage on the day of survey all of the security gates were open and anglers were observed fishing of the pier head. In addition, access could be gained from the foreshore to the north at low tide. This may be considered a health and safety issue.

The landward end of the structure was viewed from the foreshore. As identified in previous surveys, the masonry structure appeared in fair to poor condition. Locally lower beach levels exposed timber piles and a masonry apron with open jointing and local voiding. As reported previously, the voiding should be addressed urgently to prevent further deterioration.



North Pier signage (/C0401C22)



South face of North Pier (/C0401C22)



North face of North Pier (/C0401C22)



Voids observed in toe of north face of North Pier(/C0401C22)

The seaward ends of the inner and outer arm of the North Pier were inspected from a distance (from the Middle Pier and South Pier). The condition of the structures appeared to vary. The pier head of the inner arm is of newer construction and appeared (from afar) to be good condition. The rest of the structure appeared in fair to poor condition overall with defects including open joints, missing masonry, block displacement and significant areas of damaged masonry and concrete.

Consideration should be given to undertaking a more detailed survey of the structure, including a boat/dive survey to inspect the permanently submerged seaward ends. It is recommended that repair works are carried out urgently to prevent further deterioration of the structure.





*Inner arm pier head (/C0401C21)*



*Inner arm south face (/C0401C21)*

The concrete structures forming the lock entrance were in good condition with marine growth obscuring the lower sections. The masonry elements to both north and south sides were in fair condition, with evidence of various local repairs which appeared to be performing well and the more recent parapet wall constructed as part of Navigation Point development was in good condition throughout. As per previous inspections, the toe apron to the south of the entrance was completely obscured by marine growth, although the consistent profile suggested fair condition. The concrete wall to the rear of the apron was in good condition.



*Local repairs to masonry seawall to north of harbour entrance (/C0401C24)*



*Concrete blockwork revetment obscured by vegetation (/C0401C25)*

The concrete blockwork revetment to the south is generally in fair condition. However, since 2008 it has been reported that an area of concrete blocks approximately 10m from the northern corner of the revetment has been showing signs of settlement. This defect has continued to unravel with displaced blocks starting to pile up at the toe of the revetment. An approximately 4m by 2m area of gravel subbase is now exposed. It is strongly recommended that a repair solution is found immediately, as further loss of either fill material or concrete blocks could lead to extensive damage to the corner of the revetment, and properties at its rear. The toe of the southern section of the revetment appears to be steeper than elsewhere causing the joints between the blocks to be larger. This should continue to be monitored to ensure a similar defect does not occur.





*Unravelling of concrete blockwork revetment (/C0401C26)*



*Steeper profile to the south (/C0401C26)*

The undercutting of the steps, slipway and seawall fronting the Tees and Hartlepool Yacht Club remains. Less vegetation growth in 2022 revealed more of the undercutting, which is noted to be significant, particularly at the access steps. The seaward end of the access steps handrails was found to be heavily corroded, however they remained stable.

As was recommended in previous inspection, the voids should be repaired locally and additional rock armour placed to avoid further scour damage, particularly to the west of the asset where undercutting to the toe beam is exposed.



*Undercutting of access steps (/C0401C27)*



*Low beach levels exposing undercutting of concrete toe to the west. (/C0401C27)*

Generally, the Middle Pier appeared in fair condition. The inner face, inspected from the foreshore, is heavily overgrown with marine vegetation. Minor mortar loss was noted to the lower courses, however it is thought that the vegetation might be concealing the true extent of the defects. The rock armour placed against the outer face remains in good condition, however at the seaward end of the structure the coverage became increasingly sparse. It is recommended that rock armour is re-profiled, to ensure efficient and effective coverage around the structure. As noted in previous reports, significant vegetation growth was evident in the construction joints on the deck which should be removed and joints repointed. Cracking to the cope stones around the handrailing fixings is also noted.





*Rock armour against outer face of Middle Pier (/C0401C28)*



*Inner face of Middle Pier heavily vegetated (/C0401C28)*

South Pier remains in good condition. The rock armour placed to the inner face maintained a consistent profile and good interlock. As noted in previous surveys the vegetation growth observed at the crest of the rock armour, should be removed to prevent the root network damaging the concrete structure or rock revetment. Some of the vegetation is now mature and presents a significant risk to the integrity of both the wall and the revetment.

The concrete Accropode units placed on the seaward face of the South Pier maintained a consistent crest height and profile with good interlock between units. The roundhead was viewed from Middle Pier, however due to the nature of the structure, inspection of the lowest parts of the outer face was not possible and a boat survey at low tide should be considered. As in 2020 there were no signs of global movement, so a boat survey is not imperative.



*Rock revetment breakwater in good condition bar mature vegetation growth (/C0401C30)*



*Old quay wall structure in fair condition (/C0401C31)*



*Inner face of South Pier. Vegetation can be seen on crest. (/C0401C32)*



*South Pier roundhead (/C0401C32)*



### 3.2.6 Carr House Sands

To the south of South Pier, the Accropode revetment ties into a rock armour revetment with a concrete crest wall which runs for approximately 2.3km to Little Scar at the north of Seaton Carew. As in previous inspections the defences along this section remained in good overall condition.

At Newburn Bridge towards the northernmost end of Carr House Sands, as noted in previous surveys there has been some local displacement of rock armour units. This is evidenced by an obvious encroachment of the revetment toe onto the foreshore north of the Newburn Bridge outfall structure.

On the adjacent access ramp, several rock armour stones have been displaced, damaging the handrail in one location. Mature vegetation growth is observed towards the top of the ramp and should be removed as not to compromise the structures integrity. As reported previously, the sealant between deck slabs has been washed out. In one location the exposed joint has started to abrade creating a potential trip hazard.

Other noticeable defects included hardened and missing flexible sealant in construction joints of the concrete seawall, minor local spalling and cracking of the concrete access steps and corroded handrails on access steps. Despite this, the seawall and various access steps remain generally in fair to good condition. Surface water drainage holes on the landward side of the seawall were generally found to be clear and working effectively.



*Rock armour revetment and concrete seawall (/C0401C33)*



*Displaced rock at toe north of Newburn Bridge outfall structure. (/C0401C33)*



*Displaced rock damaging handrail (/C0401C33)*



*Loss of flexible joint sealant in northern access ramp, potential trip hazard (/C0401C33)*

The Little Scar access ramp remained unchanged since the previous inspection. Beach levels in the area were broadly comparable to the previous inspection with the sediment reaching halfway up the lower ramp. This is higher than those observed in 2012 and 2010 (prior to reconfiguration of the

berm). Cracks were observed in the concrete seawall at the access ramp remained. They appear to be associated with the fixings for the handrail, and do not appear to have worsened. Local repairs should be undertaken and monitored to ensure this does not become a more significant issue. The handrail on the lower ramp is heavily corroded.



*Exposed rock armour berm at Little Scar access ramp (/C0401C33)*



*Heavily corroded handrail on lower section of ramp (/C0401C33)*



### 3.3 Little Scar to Coatham Sands (MA13)

#### 3.3.1 Seaton Carew

The defences along the Seaton Carew frontage consist of a various concrete and masonry seawall and access structures with rock armour toe protection.

The coverage and interlock between rock armour units was good, although high beach levels again concealed much of the toe of the revetment structure. As a result, the displacement of rock armour identified in 2018 was not visible. This displacement should be monitored as it may indicate a loss of interlock between units.

Minor defects were observed along the asset, these will require attention, and consisted of localized cracking and spalling of the cope and face of the wall and missing or damaged joint sealant. Several large vertical cracks were noted to be running the full height of the structure. There was evidence of historic repairs, including grouting / filling of spalled sections and cracks. Some of these repairs appeared to be in poor condition and should be revisited.



*Northern access steps (/C0501C05)*



*View looking north. High beach levels concealing toe of revetment structure. (/C0501C05)*



*Vertical cracking through cope and wall (/C0501C05)*

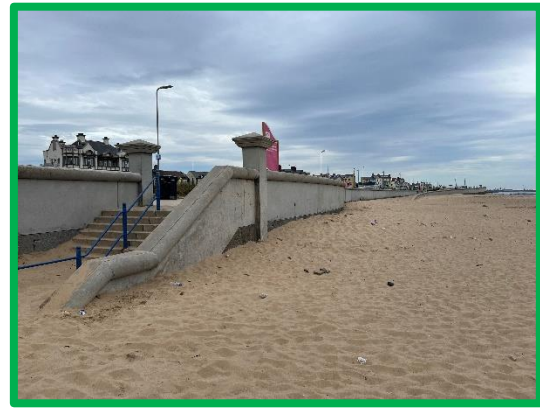
To the south of the beach access point at Church Lane, the seawall remains in very good condition over approximately 600m, to the landward return at the sewerage pumping station. The majority of defects observed were cosmetic only including outfall staining and graffiti. There does remain some localized vegetation growth from joints between the precast concrete façade units fronting the new

seawall. This should be removed to prevent damage to the precast units. As in previous years, an 150m section of the frontage was cordoned off for nesting Little Terns, as a result the wall could only be inspected from a distance. The beach levels along this frontage remains high, with notable vegetation observed growing in the windblown sand up against the structure.

The three previous defence asset references covering the section have been reconfigured in the SANDS database to align with the new structures.



*Vegetation growing in joints – should be removed (/C0501C04)*



*High beach levels at access steps (/C0501C04)*



*Cordoned off section of frontage for nesting Little Terns (/C0501C02)*



*Cordoned off section of frontage for nesting Little Terns (/C0501C02)*

### **3.3.2 Seaton Sands**

To the south of the sewage pumping station, the frontage is undefended over approximately 1 kilometre and comprises a relatively stable, well-developed dune system (which includes the Seaton Dunes Nature Reserve) and a wide, healthy beach. The dunes are very well established and have a good coverage of vegetation particularly along their landward edge.

At the northern end, embryo dunes are again observed to be forming at the toe of the existing dunes. To the south, cliffing of the foredune has deteriorated since the previous inspection and is at its worse just north of the informal rock revetment. Although the dunes backing the informal revetment are also showing signs of cliffing, the revetment is offering some protection.

The deterioration of the dune locally may be as a result of the particularly stormy winter, where several named storms occurred. Non worse than Storm Arwen in November 2021, where record wave heights were recorded at all buoys along the Cell 1 coast during the event. The dunes should be monitored for signs of potential recovery.

Erosion was evident locally due to trampling from members of the public walking amongst the dunes, with dune crest heights lowered locally on the most heavily trafficked routes.



*Embryo dunes forming along the frontage  
(/C0502C01)*



*Cliffing of foredune deteriorating since 2020  
(/C0502C01)*



### 3.3.3 North Gare Breakwater

The southern extent of the Hartlepool coastal frontage is marked by the privately-owned North Gare Breakwater. The structure protects the entrance to the Tees estuary mouth, stabilises the shoreline to the north, retaining the beach and dune system and also provides shelter to the beach located in the lee to the south where a stable dune field has developed. Security fencing is present across the deck to prevent unauthorised access and therefore the inspection is restricted. This said, the fencing appears to be easily bypassed, particularly to the south.

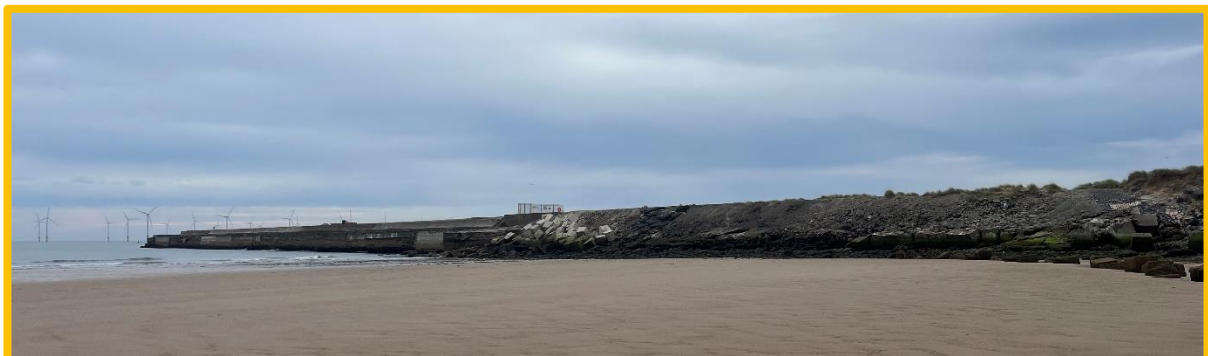
The concrete and masonry structure incorporates a multitude of *ad hoc* repairs and, as reported since 2008, appears in poor to very poor condition. Visible defects include cracking, spalling, undercutting, void formation, loss of masonry, loss of concrete render, evidenced of settlement/displacement of previous concrete infill repairs and displaced/damaged slabs. Significant voiding to the northern face of the breakwater was reported in 2020 causing substantial washout of material.

Ongoing maintenance repairs have been noted during previous inspections, these are summarized below;

2022 – Concrete blocks and bagwork placed on northern face towards landward end to fill large void.

2020 – Infilling voids, the construction of a 300mm thick skin across a 20m section of the structure and the installation of a new section of concrete deck.

2018 – Encasement of the seaward nose of the pier, repositioning of the concrete blocks around the base of the structure and the placement of a number of flexible tied precast concrete block mattresses in a haphazard manor.



Northern aspect of North Gare Breakwater (/C0503C01)



Concrete blocks and bagwork repairs to voiding.(/C0503C01)



Southern aspect of North Gare Breakwater (/C0503C01)

#### 4. Comparison with Previous Assessment

The previous formal assessment across the whole study frontage was undertaken in July/August 2020.

The condition of many of the hard defences along the frontage is broadly similar to the 2020 inspections, with a minor net deterioration.

The undefended dunes have also deteriorated locally, possibly as a result of the high number of storms (including Storm Arwen) occurring over Winter 2021/22.

Defects identified in the current inspection were generally similar to those observed in previous surveys which have remained or experienced further deterioration in the interim period.

Defects were predominantly local defects which would not adversely affect the overall performance of assets, but which would benefit from focused maintenance activity.

#### 5. Problems Encountered and Uncertainty in Analysis

The, Heugh Breakwater North Pier and North Gare are all closed to the public, enforced with security signage and fencing, and therefore were inspected from the foreshore or adjacent structures only.

The seaward extent of the Heugh Breakwater, North Pier, South Pier, Middle Pier, Victoria Harbour entrance and North Gare Breakwater are permanently submerged and therefore cannot be inspected.

The quay walls within Victoria Harbour and Hartlepool Marina were not inspected as they are not classified as coastal defence assets and they are located within privately owned areas.

#### 6. Conclusions and Recommended Actions

Further to the visual inspection of all assets, specific conclusions and recommendations for individual assets are given in **Appendix B**. The main urgent recommendations are:

- **North Sands** – Remove failed gabions. Consider a formal defence in this area due to ongoing residential development behind failed gabion baskets in area of erosion activity.
- **Steetley Pier** – Children observed on the deck of pier during the 2020 inspection. Review and prevent all informal access routes onto the Pier.
- **Town Wall** – Repair significant defect to most easterly masonry abutment.
- **Middleton Beach** – Stacked gabion wall fronting timber sheds has failed. Consider extending rock armour revetment to the east to replace failed structure and provide protection to development behind. Detailed structural survey to be carried out on blockwork wall fronting warehouse due to inconsistent profile and noticeable bulges along length.
- **North Pier** – infill/repair voids in masonry apron to north face.
- Repair damage to precast concrete block revetment in Hartlepool Marina

All condition assessment data and selected photographs have been uploaded to SANDS (Shoreline and Nearshore Database System). This includes all data and photographs from the previous inspections since 2002 that were originally held on an MS Access Databases that had become obsolete.

# Appendices



# **Appendix A**

## **Asset Location Maps**



**Legend**

- Coastal Asset location
- NFCDD Asset Number

© HaskoningDHV UK Ltd.  
 World Imagery: Maxar, Microsoft, Hybrid Reference Layer: Esri UK, Esri, HERE, Garmin, GeoTechnologies, Inc, METI/NASA, USGS,  
 OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri

Client:	Project:
North East Coastal Group	Cell 1 Regional Coastal Monitoring Programme

Title:

**Figure 1 - Map 1**

**COASTAL ASSET LOCATIONS**

**Hartlepool Borough Council Frontage**

Report:

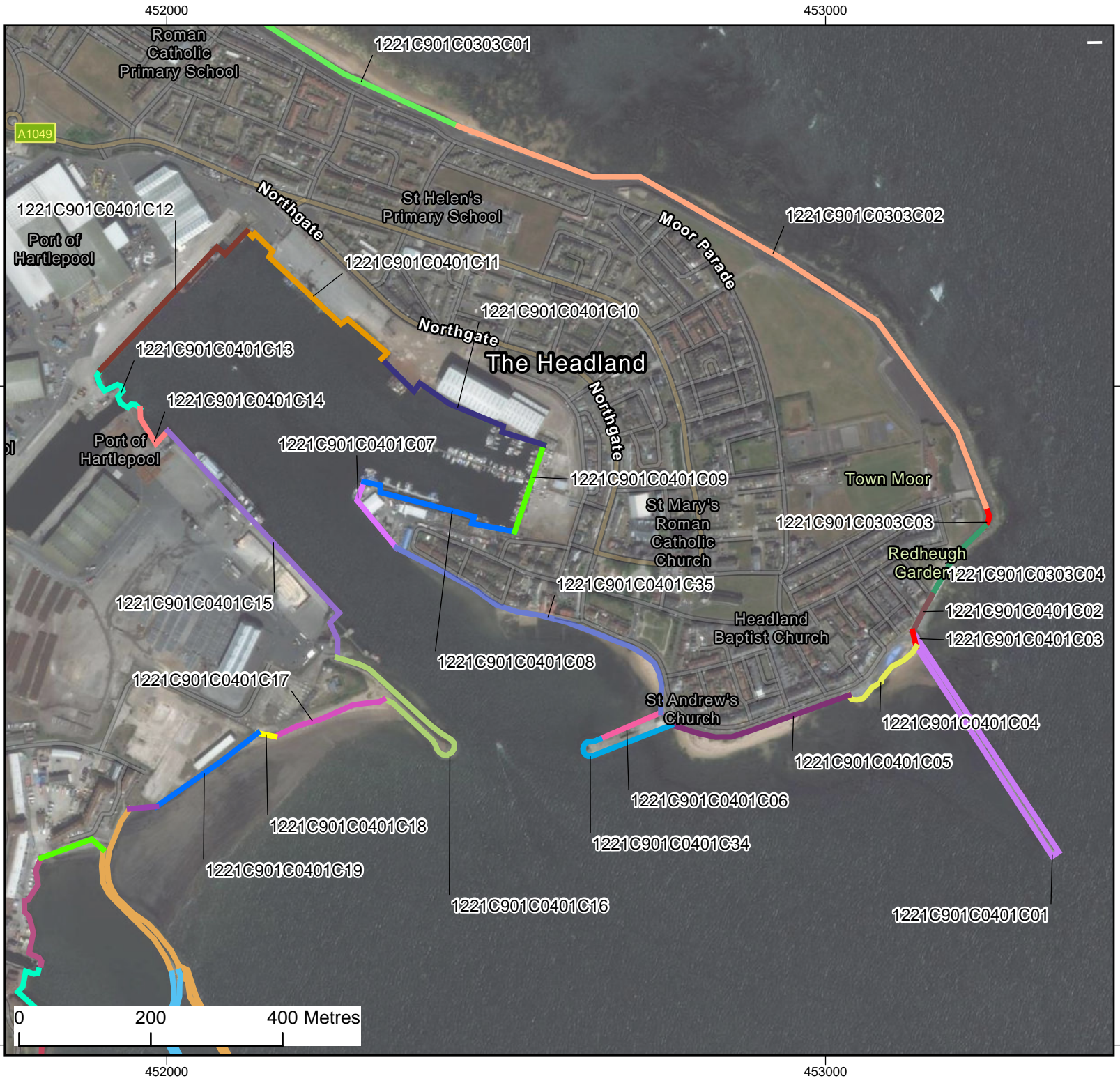
Asset Inspection Report

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid







**Legend**

- Coastal Asset location
- NFCDD Asset Number

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 World Imagery: Maxar, Microsoft, OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri, Hybrid Reference Layer: Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, GeoTechnologies, Inc, METI/NASA, USGS

Client:	Project:
North East Coastal Group	Cell 1 Regional Coastal Monitoring Programme

Title:

**Figure 1 - Map 2**

**COASTAL ASSET LOCATIONS**

**Hartlepool Borough Council Frontage**

Report:

Asset Inspection Report

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	n/a	TC	NJC	A4	1:8,000

Co-ordinate system: British National Grid



533000

534000

452000

453000

452000

453000





**Legend**

- Coastal Asset location
- NFCDD Asset Number

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 World Imagery: Maxar, Microsoft, OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri, Hybrid Reference Layer: Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, GeoTechnologies, Inc, METI/NASA, USGS

Client:	Project:
North East Coastal Group	Cell 1 Regional Coastal Monitoring Programme

Title:

**Figure 1 - Map 3**

**COASTAL ASSET LOCATIONS**

**Hartlepool Borough Council Frontage**

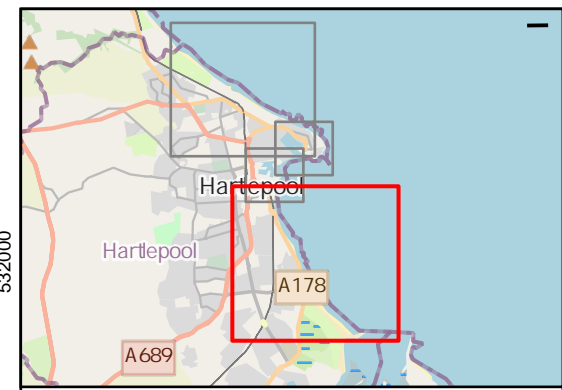
Report:

Asset Inspection Report

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	n/a	TC	NJC	A4	1:8,000

Co-ordinate system: British National Grid





**Legend**

- Coastal Asset location
- NFCDD Asset Number

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 World Imagery: Maxar, Microsoft, Hybrid Reference Layer: Esri UK, Esri, HERE, Garmin, GeoTechnologies, Inc, METI/NASA, USGS,  
 OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri

Client:	Project:
North East Coastal Group	Cell 1 Regional Coastal Monitoring Programme

Title:

**Figure 1 - Map 4**

**COASTAL ASSET LOCATIONS**

**Hartlepool Borough Council Frontage**

Report:

**Asset Inspection Report**

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	n/a	TC	NJC	A4	1:23,000

Co-ordinate system: British National Grid



# **Appendix B Asset Condition & Recommendations**



Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0301C01	Undefended	Undefended	536720	1052	05/07/2022	Royal HaskoningDHV	Local erosion, particularly to dunes adjacent to Crimdon Beck. Wooden sand fence displaced on dune due to retreating crest. Vegetation cover increases progressing south. Wide sandy beach present along North Sands.	2	>20	Continue to monitor.	no repairs
1221C901C0302C01	Undefended	Undefended	536030	2070	05/07/2022	Royal HaskoningDHV	Dunes along frontage in varying condition. Worst condition adjacent to Streetley Pier where foredune has significant cliffing and swathes of unvegetated areas. Some evidence of localised lowering of dune crest due to beach access. Elsewhere, wide, healthy beach with some embryo dune formation. Two piled outfall structures to north of historic pier in poor condition and are retaining sediment on northern sides. Historic pier in poor condition, with several column elements showing signs of fire damage.	3	11 - 20	Prevent access onto historic pier. Decommission at risk manhole chamber before it collapses onto foreshore.  Continue to monitor dune lowering around access points and historic pier.	urgent  routine
1221C901C0302C02	Undefended made slope - Formerly brick filled welded mesh gabions.	Undefended	534870	81.9	05/07/2022	Royal HaskoningDHV	Gabion baskets have failed with bricks spread along foreshore to the north. Development of residential properties on the former industrial site behind this at risk due to ongoing erosion. Pipework exposed due to erosion.	5	1 - 5	Make safe failed gabion baskets, remove spilled bricks from foreshore. Consider formal coastal defence Infront of residential development to replace failed gabion baskets.	urgent
1221C901C0302C03	Slag waste embankment with poured slag apron to toe.	Embankment	534840	345.5	05/07/2022	Royal HaskoningDHV	Local undercutting and slope failure. Slopes generally vegetated. Rock armour revetment at tie in with seawall. Protective apron continuing to be broken up however material appears to remain in-situ.	3	1 - 5	Continue to monitor.	no repairs

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0303C01	Concrete block wall	Seawall	534700	691	05/07/2022	Royal HaskoningDHV	The construction works to the Hartlepool headland seawall were complete in 2019. The works ranged from the Heugh Breakwater to the south through to Thorpe street beach access ramp to the north and consisted of the encasement of the original seawall in pre cast concrete units including new coping units. As a result half asset C0303C01 is in "as built" condition. North of Thorpe street beach access ramp, the wall (excluded from recent works) is in fair condition, dropping to poor and very poor in places . The lower courses of masonry wall are heavily abraded. The ramp and steps adjacent to Thorpe Street have significant defects to the concrete cope stones.	3	11 - 20	Local repairs to concrete cope (in area excluded from recent construction activities)	routine
1221C901C0303C02	Encased seawall with precast concrete units	Wall	534390	1038	05/07/2022	Royal HaskoningDHV	The construction works to the Hartlepool headland seawall were completed in 2019. The works, ranging from the Heugh Breakwater to the south through to Thorpe street beach access ramp to the north, consist of the encasement of the original seawall in pre cast concrete units including new coping units. The wall to the south is also fronted by a shallow profiled, rock armour revetment. The structure largely appeared in as built condition except the continued washout of sealant between coping unit. In 2021 a project to rejuvenate Elephant Rock amphitheatre was complete.	1	>20	Replace sealant	routine

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0303C03	Encased seawall with precast concrete units	Wall	533780	33.1	05/07/2022	Royal HaskoningDHV	The construction works to the Hartlepool headland seawall were completed in 2019. The works, ranging from the Heugh Breakwater to the south through to Thorpe street beach access ramp to the north, consist of the encasement of the original seawall in pre cast concrete units including new coping units. The wall to the south is also fronted by a shallow profiled, rock armour revetment. The structure largely appeared in as built condition except the continued washout of sealant between coping unit.	1	>20	Replace sealant	routine
1221C901C0303C04	Encased seawall with precast concrete units	Apron	533680	133	05/07/2022	Royal HaskoningDHV	The construction works to the Hartlepool headland seawall have been completed. The works, ranging from the Heugh Breakwater to the south through to Thorpe street beach access ramp to the north, consist of the encasement of the original seawall in pre cast concrete units including new coping units. The wall to the south is also fronted by a shallow profiled, rock armour revetment. The structure largely appeared in as built condition except the continued washout of sealant between coping unit.	1	>20	Replace sealant	routine
1221C901C0401C02	Encased seawall with precast concrete units	Wall	533620	62.2	05/07/2022	Royal HaskoningDHV	The construction works to the Hartlepool headland seawall have been completed. The works, ranging from the Heugh Breakwater to the south through to Thorpe street beach access ramp to the north, consist of the encasement of the original seawall in pre cast concrete units including new coping units. The wall to the south is also fronted by a shallow profiled, rock armour revetment. The structure largely appeared in as built condition except the continued washout of sealant between coping unit.	1	>20	Replace sealant	routine



Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C03	Concrete and masonry wall poor in places. Protected by breakwater. Amenity area then wall to road and property behind.	Wall	533600	23.5	05/07/2022	Royal HaskoningDHV	Short section of protected wall at root of breakwater.	2	>20	Routine inspection & maintenance	routine
1221C901C0401C01	Old breakwater, some repair carried out in 1990 but major problems foreseen particularly at seaward end. Important protection to areas South.	Breakwater (Heugh Breakwater)	533280	791.9	05/07/2022	Royal HaskoningDHV	Heugh Breakwater. Seaward end/inside face not inspected. No public access past fencing at mid length. Landward end in fair condition. Some cracking/abrasion was observed in the deck slab and parapet wall. The handrails were also experiencing minor corrosion. Numerous previous repairs were visible on the deck of the structure.	3	11 - 20	Structural inspection incl. boat/dive survey	routine
1221C901C0401C04	Concrete recurve wall Fronting Bock Sands paddling pool.	Wall	533530	141	05/07/2022	Royal HaskoningDHV	Recurve wall generally in fair to poor condition. Cracking and spalling to face and recurve cope along extensive sections. Minor undercutting and voiding observed locally to toe. Broken flap valve on one outfall. Rear masonry wall in fair condition with localised cracking and spalling.	3	11 - 20	Infill voids/undercutting. Scour protection beneath outfalls. Repair flap valve.	routine
1221C901C0401C05	Concrete recurve wall.	Wall	533480	282.5	05/07/2022	Royal HaskoningDHV	Steep cobble beach with vegetation growth in centre - protected by rock outcrop. Erosion observed to vegetation shelf. Spalling/cracking of recurve concrete crest notably at each end. Vertical crack in proximity to Old Pier. Undercutting noted in 2016 not observed due to high beach levels. Cracking in historic public convenience building and access steps. Rear masonry wall in fair condition.	3	11 - 20	Local repairs to concrete. Infill void/undercutting.	routine
1221C901C0401C06	Old Pier (Pilot Pier) Inner Masonry Wall .	Wall	533460	101.2	05/07/2022	Royal HaskoningDHV	Settlement of masonry blocks (historic) adjacent to accropodes. Generally fair condition. Some bulging of wall evident.	3	11 - 20	Continue to monitor. Structural inspection of Old Pier.	routine

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C34	Old Pier (Pilot Pier) outer face and roundhead. Fishing breakwater with armoured head. Important protection to inner area.	Breakwater	533450	181.3	05/07/2022	Royal HaskoningDHV	Old Pier. Accropodes revetment at head appeared in good condition overall, although some larger voids were noted suggesting potential displaced units. Cracking in deck and through parapet wall may indicate settlement of the structure. Parapet wall appears to be rotating away from deck. It was noted in the 2018 inspection that strain gauges have been installed in the deck of the structure. Evidence of recent cement & grout repairs.	3	>20	Structural survey. Fill cracks, continue to monitor.	routine
1221C901C0401C35	Town Wall. Masonry apron to toe of wall over mid section.	Wall	533750	509.1	05/07/2022	Royal HaskoningDHV	The masonry Town Wall, and supporting abutments, incorporate a multitude of historic ad hoc repairs but generally remains in fair condition. The wall has benefitted from recent local repointing works since the 2020 inspection. A significant defect was noted to the most easterly stone abutment where several blocks were missing. It was unclear whether this was a previous repair that had unravelled or whether the repair was in progress. A number of the other masonry abutments are heavily abraded and rounded at the toe. Concrete apron in good condition. Loss of mortar/recessed mortar throughout esp. to lower courses – undercutting of concrete buttress at outfall/concrete wall section. The crest wall is in poor condition with missing masonry and mortar to its landward side. Recently constructed outfall, concrete abutment and footway promenade in good condition.	3	>20	Local repair/infill voids at slipway. Repointing/repair of crest wall.  Address defect to abutment immediately to prevent further deterioration compromising the structure.	routine  Urgent
1221C901C0401C07	673601 Blue brickwork quay.	Wall	533750	123.7		Royal HaskoningDHV	Not inspected				
1221C901C0401C08	673701 Timber suspended deck Fish Quay.	Wall	533850	259.8		Royal HaskoningDHV	Not inspected				
1221C901C0401C09	673801 Masonry quay wall.	Wall	533770	139.1		Royal HaskoningDHV	Not inspected				

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C10	673901 Rubble revetment to Quay.	Revetment	534040	302.7		Royal HaskoningDHV	Not inspected				
1221C901C0401C11	674001 Sheet steel piling with suspended dock in front.	Piling	534230	319.1		Royal HaskoningDHV	Not inspected				
1221C901C0401C12	674101 Suspended deck concrete quay on concrete piles.	Piling	534020	320.5		Royal HaskoningDHV	Not inspected				
1221C901C0401C13	674201 Masonry quay wall with apron.	Wall	534010	131.4		Royal HaskoningDHV	Not inspected				
1221C901C0401C14	674301 Rubble revetment.	Revetment	533910	86.2		Royal HaskoningDHV	Not inspected				
1221C901C0401C15	674401 Sheet steel pile and steel tubular pile quay wall with concrete coping.	Wall	533580	455.5		Royal HaskoningDHV	Not inspected				
1221C901C0401C16	Concrete armour units to breakwater with slag core. Acts to protect to North and retain beach to South.	Breakwater	533580	378.1	12/07/2022	Royal HaskoningDHV	Middleton Jetty. Accropodes armoured breakwater. Good condition - coverage and interlock. No signs of significant distress on crest. Build of construction rubble, predominantly bricks, against southern face. Embryo dunes observed at transition between Jetty and Gabion wall. Previously observed embryo dunes in 2016 having been eroded from in front of the gabion wall exposing debris material.	2	>20	Routine inspection & maintenance	routine
1221C901C0401C17	Brick filled welded gabions fronted by rock armour revetment. Protects RNLI, boat club and industrial property.	Gabions	533460	175.2	12/07/2022	Royal HaskoningDHV	Brick filled gabions stacked to form wall, fronted by small rock armour (rip-rap) for majority of length, with larger rock armour towards south. Previously identified section of failed gabions required immediate attention. Rock material locally displaced exposing numerous burst and heavily corroded gabions. Further sheds noted to have been built directly behind at risk section.	5	1 - 5	Extend/reprofile larger rock armour from south.	Urgent
1221C901C0401C18	Undefended	Undefended	533470	26.4	12/07/2022	Royal HaskoningDHV	Informal access point to foreshore between two defended lengths. Steep slope to south. Slope to north shallower and ties into rock armour. Erosion has started to outflank adjacent seawall reducing useable ramp width. Evidence of substantial fly tipping.	4	11 - 20	Review need for access ramp. Place rock armour to prevent outflanking.	routine



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1221C901C0401C19	Warehouse and industrial property above. Blockwork wall.	Seawall	533360	189.7	12/07/2022	Royal HaskoningDHV	East 2/3 is small concrete block retaining wall. Missing blocks locally particularly on the corner directly adjacent interface with wall to south. Numerous coping stones missing. Opening of joints is thought to be caused by global movement of the structure. Wall bulges throughout and beginning to be undercut at W corner. West 1/3 is large concrete block wall. Significant abrasion/damage to faces.	4	11 - 20	Continue to monitor. Replace missing blocks/copes.  Detailed structural survey of block retaining wall recommended.	Urgent
1221C901C0401C20	Concrete block wall with commercial property above.	Wall	533350	40.5	12/07/2022	Royal HaskoningDHV	Large concrete blocks. Significant abrasion/spalling to faces. Damaged blocks. Significant vertical crack through full height close to western/inland extent. Cracks in coping units.	3	11 - 20	Local repair of voids. Infill crack – continue to monitor.	routine
1221C901C0401C21	New concrete head to masonry breakwater.	Breakwater (Inner arm of North Pier)	532970	279.3	12/07/2022	Royal HaskoningDHV	North Pier (inner arm). No Public Access due to "dangerous condition" as stated on signage. Generally structure appears (from afar) in fair condition overall, some evidence of damaged deck slabs, loss of mortar and blockwork along face. Evidence of settlement along wall face. Concrete roundhead remains in fair condition. Several large voids in the toe on north face.	3	>20	Structural inspection incl. boat/dive survey.	routine

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1221C901C0401C22	Breakwater and root wall to sheds and protection of redeveloped harbour area.	Breakwater (North Pier)	532900	1034	12/07/2022	Royal HaskoningDHV	North Pier (inlc outer arm).No Public Access due to "dangerous condition" as stated on signage. Gate remained open and fisherman were observed along structure. Along the north face of the structure low beach levels further exposed decaying timber piles. Several large voids noted in toe on North face. Extensive cracking and spalling of grouted masonry apron. Extensive evidence of settlement along pier walls. Several areas of missing blockwork to face. Parapet walls in poor condition, some sections of wall missing entirely, extensive loss of coping stones. One large void at the eastwards facing root of the pier. South face, steel sheet piles appear to be in fair condition. Extensive damage to deck slabs along structure including evidence of failing repairs and several lifted slabs and missing / recessed mortar and blockwork.	4	11 - 20	Localised repairs to wall face including infilling / grouting of voids. A detailed structural inspection is recommended along with a boat and dive survey, particularly the damage to the eastern facing section at the root of the pier.	urgent
1221C901C0401C23	Rock armour revetment.	Revetment	533280	105	12/07/2022	Royal HaskoningDHV	Rock revetment in fair condition, rock size noted as being smaller at the eastern end of the revetment. Some cracking to the concrete slab and damage to retaining wall at rear.	3	>20	Local repairs to concrete slabs.	routine
1221C901C0401C24	Massive masonry quay wall.	Wall	533120	188.9	12/07/2022	Royal HaskoningDHV	Soft ground – difficult to access. Masonry wall with various repairs. Extensive marine vegetation cover to lower section. Concrete lock entrance in fair condition. More recent flood wall/parapet wall in good condition. Lock Structure in good condition. Repointing repairs evident.	3	>20	Routine inspection & maintenance.	routine
1221C901C0401C25	New concrete block quay wall with a block revetment apron.	Wall	533040	110.3	12/07/2022	Royal HaskoningDHV	Concrete quay wall in good condition. Missing joint sealant between precast concrete block facade units of wall. Blockwork apron obscured by marine vegetation. Consistent profile and no signs of distress. Lock entrance structure in good condition.	2	>20	Routine inspection & maintenance.	no repairs

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1221C901C0401C26	Concrete splash wall to precast concrete block revetment.	Revetment	532950	89.7	12/07/2022	Royal HaskoningDHV	Concrete splash wall in good condition. Some damage to railing along crest. Settlement noted at eastern end of revetment has now worsened significantly. Area affected is approximately 4 high and 2m wide, Maximum depth of settlement approximately 300mm from face of revetment. Evidence of washout of drainage material, and several blocks were visible, though partially obscured by marine vegetation at the toe of the structure. Has continued	5	1-5	Repair concrete block revetment.	urgent
1221C901C0401C27	Block wall with rubble foreshore.	Wall	532950	87.1	12/07/2022	Royal HaskoningDHV	Due to low beach levels extensive undercutting along structure, slipway and access steps was visible, Large void present beneath access ramp to west of slipway. Precast concrete block wall unsupported. Gabion baskets visible beneath slipway structure.	4	11-20	Infill voids / undercutting particularly around access steps and beneath access ramp and slipway. Add rock armour / toe protection along base of structure.	urgent
1221C901C0401C28	Masonry structure with concrete head.	Wall (Middle Pier)	532910	187.3	12/07/2022	Royal HaskoningDHV	Middle Pier. Vegetation growth in construction joints of deck. Lower structure obscured by marine vegetation. Generally fair condition – minor loss of mortar/open joints locally. Rock armour toe protection in fair condition – good coverage and interlock. Reasonably consistent profile. Does not extend all way around head.	3	>20	Remove vegetation from deck & repoint. Local repairs / repointing. Additionally, extend rock armour around base of roundhead if navigation channel will allow. Reprofile rock armour along inner face to ensure sufficient coverage at seaward end.	routine
1221C901C0401C29	Masonry quay wall with later addition of upper concrete wall.	Wall	532670	289.8	12/07/2022	Royal HaskoningDHV	Lower course of blockwork obscured by marine vegetation. Loss of mortar / open joints locally (esp in lower courses). Crest wall in good condition. Rock armour in fair condition but largely covered with marine vegetation.	3	>20	Local repairs / repointing.	routine



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1221C901C0401C30	Undefended	Undefended	532770	161.9	12/07/2022	Royal HaskoningDHV	Due to soft ground along mudflats it was not possible to access the structure directly. Generally the structure appeared in good condition, with a consistent profile and good coverage and interlock of rock armour. Mature vegetation growing on armour crest.	2	>20	Undertake more detailed survey of structure, particularly along seaward face.	no repairs
1221C901C0401C31	Old breakwater within harbour.	Breakwater	532740	229.6	12/07/2022	Royal HaskoningDHV	Historic quay wall structure. Open joints between masonry blocks. Vegetation growth through deck. Loss of coping stones and masonry blocks along face.	3	>20	Undertake more detailed survey of structure, particularly along seaward face.	no repairs
1221C901C0401C32	Concrete unit armour to breakwater on rock core.	Armour	532560	964.3	12/07/2022	Royal HaskoningDHV	South Pier. Good condition. Rock armour to inner face, concrete accropodes to head and outer face – consistent profiles, good interlock, no signs of distress. Vegetation (shrubs/bushes) growing on armour crest (inner face)	2	>20	Remove vegetation. Survey of outer face/head from boat.	routine
1221C901C0401C33	Concrete recurved splash wall above concrete wall and behind rock armour. Promenade and development land behind.	Recurved Wall	531270	2381	12/07/2022	Royal HaskoningDHV	Rock armour maintains good coverage and interlock along the frontage. Some evidence of displaced rock at toe north of Newburn Bridge outfall structure. Displaced rocks have damaged handrail on access to north. Access ramp itself remains in good conditions with some minor cracking and spalling of deck slabs. Minor cracking and spalling to access steps locally and corrosion noted on a several sections of access step handrail. Varying beach levels along asset, in places several steps were buried. Minor cracking, spalling and missing joint sealant to recurved crest wall.	2	>20	Local repairs access steps/ramp. Repair/replace flexible joint sealant. Monitor.	routine
1221C901C0501C05	Concrete wall generally in fair condition but beach low by Northern corner and evidence of voiding in promenade. Corner of wall interacts with waves lowering beach levels.	Wall	529900	482.8	12/07/2022	Royal HaskoningDHV	Rock armour in fair condition. High beach levels obscured toe of revetment in 2020 and there displacement of armour along the toe locally was not visible. Minor cracking and spalling of concrete sea wall. Some cracks show evidence of historic repairs, some of which are failing as noted in previous inspections. Frequent cracking along cope stone.	2	>20	Local repairs to cracks/spalling as required. Monitor rock armour.	routine

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1221C901C0501C04 (southern end re-aligned, 40m further offshore, continues south into 1221C901C0501C02)	Pre-cast concrete recurve wave return wall above a precast shallow stepped concrete revetment.	Wall	529440	500.3	12/07/2022	Royal HaskoningDHV	Concrete wall in as new condition. Promenade in as new condition. Wide healthy beach. Vegetation growth from open construction joints between pre-cast concrete block facade units. Varying beach levels along asset, in parts this facade is completely obscured.	1	>20	Routine inspection. Remove vegetation from construction joints. Routine inspection and maintain particularly around transitions, access ramps and steps. Ensure all drainage outfalls are cleaned and free of sand and litter.	routine
1221C901C0501C03	Concrete revetment. High accreting sand levels moving into dune area.	Revetment	529440	100.3		Royal HaskoningDHV	Asset has become obsolete. No longer inspected. Seawall 1221C901C0501C04 has been re-aligned and lengthened.				
1221C901C0501C02 (continues north into 1221C901C0501C04)	Pre-cast concrete recurve wave return wall above a precast shallow stepped concrete revetment.	Wall	529280	230	12/07/2022	Royal HaskoningDHV	Concrete wall in as new condition. Promenade in as new condition. Wide healthy beach. Vegetation growth from open construction joints between pre-cast concrete block facade units. Varying beach levels along asset, in parts this facade is completely obscured. Approx. 150m section cordoned off due to nesting little terns.	1	>20	Remove vegetation from construction joints. Ensure all drainage outfalls are cleaned and free of sand and litter.	routine
1221C901C0502C01	undefended	Dunes	529280	1755	12/07/2022	Royal HaskoningDHV	Wide dune field, relatively stable with good coverage of well-established vegetation. Cliffling to foredune observed along large sections of dune, particularly to the south, in 2022. Informal rock revetment offering some protection to the dunes adjacent to north gate. although erosion still evident. Localised erosion caused by public makeshift footpaths through dunes. Embryo dunes forming to the north.	3	>20	Consider fencing to control access/trampling.	no repairs

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1221C901C0503C01	North Gare Breakwater	Breakwater	528230	986.7	12/07/2022	Royal HaskoningDHV	North Gare pier structure closed to the public and therefore the inspection is limited. Massive structure comprising multiple masonry and concrete elements and numerous ad - hoc repairs, some of which are now failing. Appears in poor to very poor condition throughout. Multiple defects observed from the landward end include cracking, spalling, displacement settlement, undercutting, void formation. Repairs works include; concrete blocks and bagwork placed on northern face towards end to fill large void (noted in 2022). Infilling voids, the construction of a 300m thick skin across a 20m section of the structure and the installation of a new section of concrete deck (noted in 2020). Encasement of the seaward nose of the pier, repositioning of the concrete blocks around the base of the structure and the placement of a number of flexible tied precast concrete block mattresses (noted in 2018).	4	6 - 10	Detailed structural inspection including boat / dive survey. Repair defects.	urgent