



Cell 1 Regional Coastal Monitoring Programme Walkover Inspection Surveys 2020

Hartlepool Borough Council

Walkover Inspection Surveys 2020

Contents Amendment Record

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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.

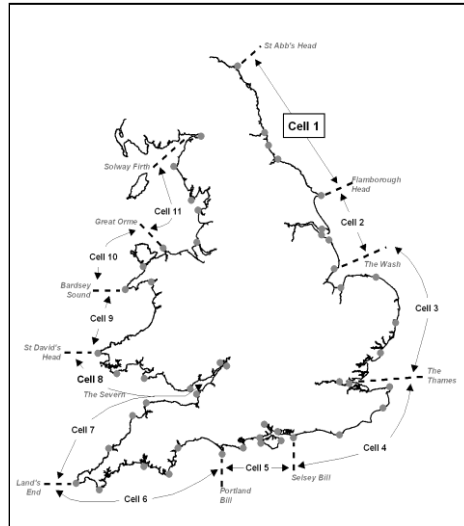


Figure 0-1 - Sediment Cells in England and Wales

The work commenced with a three-year monitoring programme in 2008 that was managed by Scarborough Borough Council on behalf of the North East Coastal Group. This initial phase was followed by a five-year programme which started in 2011 and the current five-year programme which started in 2016. The programme funded by the Environment Agency, working in partnership with the following organisations.



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 Cell 1 Regional Coastal Monitoring Programme 2016 - 2021.

The present report is **Walkover Inspection Surveys 2020** and provides a summary of the main findings from the walkover inspections of Hartlepool Borough 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 23rd July and 3rd August 2020. 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 2018. A summary of the main differences is provided below;

- **North Sands** – Although not noted to have worsened since 2018, significant loss of section to timber support columns of Steetley Pier remain. Detailed assessment of the structure should be undertaken, and if not already in place, a management plan for decommission/demolition of the structure should be produced. Children were noted to be sat on the deck of the landward section of the Pier during the 2020 inspection. Given the structural damage, it is recommended that any informal access routes onto the deck should be prevented immediately.

The section of made slope that is now undefended due to the failure of the brick gabion (reported in previous surveys) now fronts an ongoing residential development on the former industrial site to the south of Spion Kop cemetery. The proximity of the residential development and the ongoing erosion activity observed along this section means it is recommended that a formal coastal defence should be considered.

- **Marine Drive and Hartlepool Headland** – Construction works, extending from Thorpe Street access ramp to the Heugh breakwater and involving the encasement of the old seawall with pre-cast concrete units, are now complete.
- **Fish Sands / Old Pier** - cracking between the deck and crest wall of Old Pier appears to be of a broadly similar nature to previous inspections but remains a notable defect.
- **Town Wall** – Repointing works were observed occurring to Town Wall along a local section in front of Croft Gardens. Pedestrian beach access steps and handrailing, towards the harbour, have been repaired.
- **Middleton Beach** – A section of stacked gabion wall has failed further since the 2018 inspections. Several gabions have burst, dispersing bricks along the foreshore to the east. It was noted that more sheds have been constructed directly behind the failed section. It is recommended that consideration is given to extending the rock revetment to the west to provide better protection.

The retaining blockwork wall fronting the warehouse structure remains in poor condition with the area of block loss, at the interface with the adjacent asset, doubling in size since 2018. The wall has an inconsistent profile with various bulges. It is recommended that a detailed structural survey of this asset is carried out.

- **West Harbour** –
 - **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 do not appear to have worsened, however this remains a notable defect
 - **North Pier** – Continued voiding through the apron on the seaward face was observed. Anglers were noted on the pier head despite safety concerns.

- **North Gare** – Ongoing maintenance works to the structure restricted the inspection to the foreshore only. It is believed that the works involved filling 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. The structure remains in poor condition with numerous defects noted including several voids around the structure.

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 fronting Hartlepool Golf Course remained high and steep with sparse vegetation coverage at the northern extent and increasing vegetation coverage towards the south. The profiles of the dunes remained similar to the previous survey suggesting these remain relatively inactive. The large dunes adjacent to Crimdon Beck have again showed signs of small-scale local erosion, the wooden sand fence once at the crest of the dune has been bypassed by the retreating crest. A wide sandy beach was present along North Sands, with a small nearshore berm noted to have formed along the frontage to the north. It was also noted that the upper foreshore to the north was cordoned off for nesting Little Terns.



*View on steep dunes looking north
(/C0301C01)*



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

The two piled outfall structures to the north of Streetley Pier are in fair to poor condition. The sheet piles are heavily corroded, and the concrete capping beam is cracked and abraded. It was also noted that that the structures were retaining large amounts of sediment on their northern sides, especially noticeably on the southern outfall.



*Piled outfall structure retaining sediment on its
north side. (/C0302C01)*



*Heavily corroded piled outfall structure
(/C0302C01)*

There was evidence of local lowering of the dune crest and lack of vegetation caused by trampling at informal access points along the frontage. Continued property development was noted behind the dunes adjacent to Streetly Pier. The dunes in front of the development appeared healthy with embryo dunes observed to be forming. This said, the dunes at the historic pier itself were locally lower, with erosion here likely exacerbated through access and scour around the timber elements.

As reported in 2018, several timber columns supporting the historic 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 it is recommended that any informal access routes onto the pier should be reviewed urgently.

A brick manhole chamber on the southern boundary of the cemetery 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)



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



Embryo dune formation fronting housing development (/C0302C01)



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

To the south of Spion Kop cemetery, the former industrial site is now being developed upon with what appears to be residential properties. At the time of the 2020 inspection, one house appeared to be almost complete and the first floors of approximately six more properties were under development. No actual work was observed on the day of the inspection. To the south of this site, fronting the development, previous inspections reported burst brick gabions. The gabions have now all but disappeared except for a heavily distorted wire mesh believe 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.

The coastal slope to the rear appeared to be largely comprised of made ground/bricks/rubble with evidence of ongoing erosion/instability. An outlet pipe has 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.



Exposed pipework in made ground slope (C0302C02)



Erosion of made ground slope and collapsed former gabion structure (C0302C02)



Burst brick gabions spread along foreshore to the north (C0302C02)



Property development on former industrial site, fronted by collapsed gabion structure (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. Small local slope failure was again observed in 2020, with a larger historic failure now fully vegetated.

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.



View looking north from Marine Drive (/C0302C03)



Rock armour revetment at Marine Drive seawall (/C0302C03)



Recent local slope failure (/C0302C03)



Historic large slope failure (/C0302C03)

3.1.2 Marine Drive and Hartlepool Headland

Since the 2018 inspection, the construction works to the Hartlepool Headland seawall have been completed. 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), consist 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. The structure largely appeared in 'as built' condition along its entirety. However, it was noted that the sealant between coping units was being washed out and should be replaced as part of the routine maintenance.

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.

The approximately 200m of seawall north of Thorpe Street that was not included in the recent works, remains in fair condition. The lower courses were noted to be abraded and local damage to the cope stones and handrail at Thorpe Street access ramp remains. The concrete repair works undertaken at the northern end of Marine Drive in 2012 remain in good condition. A short (approximately 30m) length of rock armour remains towards the northern end of the wall.

The beach level fronting the seawall was generally similar to the 2018 inspections. The undercutting and toe defects previously identified were not visible, but it is assumed that they have been corrected as part of the recent repairs.



Abrasion to lower levels of seawall (/C0303C01)



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



As built condition access ramp at Arabella Street, previously undercut (/C0303C01)



Sealant being washed out of newly installed cope stones (/C0303C01)



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



As built condition seawall (/C0303C04)

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 has been in failing condition for many years, corroborated by the signage on site. The landward section of the structure generally appeared to be in fair condition when inspected from the foreshore, with mortar loss/open joints and minor abrasion locally. Numerous previous repairs were visible on

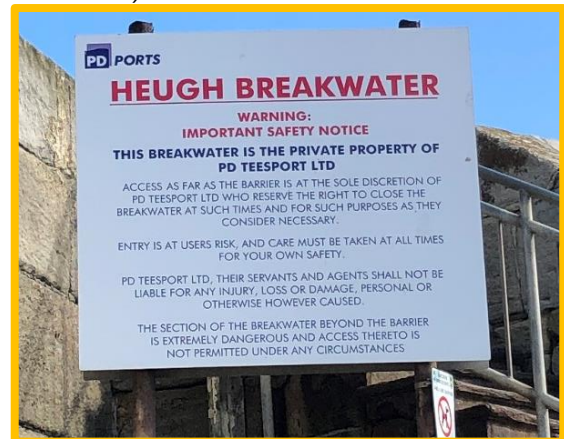
the deck of the structure. The landward end of the structure did not appear to have worsened since the 2018 inspection.



Heugh Breakwater – landward end north aspect (/C0401C01)



Heugh Breakwater – Deck slab (/C0401C01)



Heugh Breakwater - Signage (/C0401C01)

3.2 Heugh Breakwater to Little Scar (MA12)

3.2.1 Block Sands

Beach levels along the majority of Block Sands appeared comparable to that observed in 2018. The exception was to the south of the frontage at the interface with Pilot Pier, where beach levels were notably higher concealing sections of the previously exposed concrete toe.

Local cracking and spalling was observed to the recurve concrete cope along vast sections of the wall.

Numerous outfalls are present at the interface between the two assets along Block Sands (/C0401C04 or /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.

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.

A cobble beach with good vegetation cover was present where the seawall is offered protection by the rocky outcrop. It was noted the vegetated shelf was showing signs of erosion.



Low beach levels at access steps (/C0401C04)



Rear masonry wall in fair condition (/C0401C04)



Damaged cope around handrailing fixing (/C0401C04)



Broken Flap Valve (/C0401C04)

Cracks were observed in the masonry wall and access steps above the historic public conveniences but these defects had not worsened 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, like 2018, this could not be observed during the present inspections due to high beach levels. This location should be monitored with consideration given to infilling/repairing the existing undercutting/voids.



Damaged recurve cope (/C0401C05)



Damaged cope and cracking to former public conveniences (/C0401C05)

Erosion of vegetated area in the center of block sands (/C0401C05)



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

3.2.2 Old 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 with appropriate voids and interlock. As recorded in previous inspections, cracking was present through the concrete parapet wall and in the deck adjacent to the wall in several locations. This cracking may indicate settlement of the structure rather than local damage to the parapet. It was noted in 2018 that strain gauges have been installed in the deck of the structure adjacent the lighthouse.



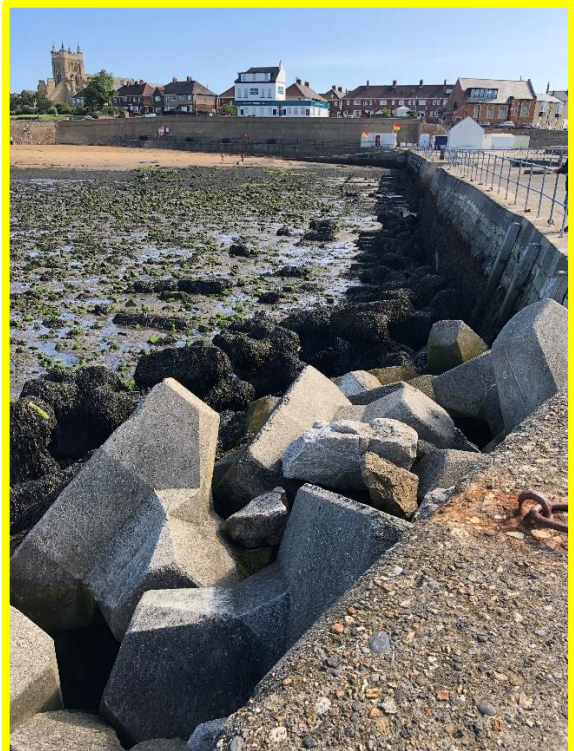
Accropode armour units around pier head taken from Middleton Jetty (/C0401C34)



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



Cracking in parapet wall and deck (/C0401C34)



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

As reported previously, the parapet wall appeared to be leaning seaward along much of the length, most notably at the roundhead.

These defects have been present since the 2014 survey and do not appear to have worsened significantly. 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 seemed to show settlement in the masonry blockwork but this does not appear to have worsened since previous inspections.

3.2.3 Town Wall and Fish Sands

The beach level at Fish Sands appeared healthy and similar to that observed in 2018. The abrasion (largely obscured by marine vegetation growth) and voiding to the access ramp adjacent to Old Pier does not appear to have worsened.



concrete repair to slipway hidden by shadow, voids/undercutting remains (/C0401C35)



Cracking to access steps (/C0401C35)

The masonry town wall was generally in fair condition with some loss of mortar, open joints in the lower courses and abrasion of masonry blocks. Repointing of the section of wall in front of Croft Gardens was occurring during the 2020 inspection. The concrete apron at the toe of the wall appeared in good condition although was obscured by marine growth.

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 crest wall is in poor condition locally on the landward side, with evidence of previous repairs which appear not to have been appropriate given the nature of the existing masonry. Loss of mortar and open jointing is evident throughout, with missing masonry locally.

The new concrete outfall, concrete abutment and footway promenade to the rear of the seawall reported in 2018 remained in 'as built' condition.



Recently constructed outfall and abutment. (/C0401C35)



Open jointing in lower masonry courses and heavily abraded masonry blocks (/C0401C35)

In 2018, the set of narrow pedestrian access steps onto the beach were heavily abraded and the timber handrailing had been severely damaged. It was noted during the 2020 inspection that the treads of the steps have been repaired with concrete and the handrailing reinstated.

As reported in 2018, the steps at the former passenger ferry landing marking the southern extent of the asset are generally in poor condition with loose and displaced masonry and heavily corroded steel ties. However they do not appear to have deteriorated further since 2018. Public access to this structure 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 displayed good interlock with a consistent slope/profile throughout and there was no evidence on the crest to suggest global movement or distress. Construction rubble, predominantly bricks, had accumulated against southern face of structure, possibly as a result of the burst brick gabions to the south (/C0401C17).



Middleton Jetty north aspect (/C0401C16)



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

A small stretch of embryo dunes are observed at the transition between Middleton Jetty and the gabion wall. However, as reported in 2018, the dunes in front of the gabion wall have been eroded.

The southern section of the stacked gabion wall to the south of Middleton Jetty has deteriorated further since the 2018 inspection to the point of failure. Local settlement of the wall was evident, numerous gabion baskets have burst and others are heavily corroded. There was no rock material piled in front of the gabions as identified in the 2016 inspection. It was noted that more sheds have been constructed directly behind the failing section of the gabion baskets since 2018. 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.



Rock armour revetment and Gabion wall looking towards Middleton Jetty (/C0401C17)



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

The short length of undefended frontage comprises an informal beach access ramp. The condition remains similar to the 2018 survey in that the southern side of the ramp is steeper and less stable than that to the north. Higher beach levels in 2020 appear to have made the ramp more accessible. Evidence of substantial fly-tipping was observed in this location in the 2020 inspection, and numerous track marks extending across the upper beach to just past the wrack line would suggest the problem is extensive.



Informal access ramp (/C0401C18)

As observed in previous surveys, the profile of the concrete blockwork wall was 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. The missing blocks at the interface between the two walls has more than doubled in size since 2018. Significantly higher beach levels concealed the minor scour observed in previous surveys. It is recommended that a detailed structural survey is carried out of the retaining blockwork wall.



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



Progressive loss of blocks at interface between two walls. Local scour at toe (2018) (/C0401C19)



Loss of blocks doubled in size since 2018. High beach levels concealing scour. (/C0401C19)



Inconsistent profile, missing copes, open joints (/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 appears to have been poured recently and is 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)



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.

3.2.6 North Pier

Public access to the North Pier and its inner arm is prevented by security fencing and signage. However, like in 2018, 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 condition. Locally lower beach levels exposed timber piles and a masonry apron with open jointing and local voiding which should be addressed urgently to prevent further deterioration. Voiding now extends greater 0.5m into the structure.



Voids in pier head of North Pier (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 arms of the North Pier were inspected from a distance (Middle Pier and South Pier). The structure appeared in fair to poor condition overall with defects including missing mortar, open joints, missing masonry, significant areas of damaged masonry and concrete. During the 2020 inspection, voids were observed in the south face of the pier head.

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. 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. The 2018 survey highlighted a significant deterioration to this area with numerous blocks reported to be displaced and missing and the area of settlement increasing. This area was not observed to have worsened in the 2020 inspection.

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.



Local settlement of concrete blocks not worsened since 2018 (C0401C26)



Local settlement of concrete blocks not worsened since 2018 (C0401C26)

The undercutting of the steps, slipway and seawall fronting the Tees and Hartlepool Yacht Club, was observed to be generally similar to that noted in the 2018 inspections. Further marine growth concealed the full extent of the undercutting, 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, voids should be repaired locally with 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)

The masonry structure to the west of the Yacht Club remains greatly obscured by marine vegetation. Generally, the Middle Pier appeared in fair condition with minor mortar loss locally. As noted in the 2016 report, significant vegetation growth was evident in the construction joints on the deck which should be removed and joints repointed. The rock armour placed around western face of the Middle Pier 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.



Outer face of Middle Pier (/C0401C28)



Extensive vegetation growth through joints in Middle Pier deck (/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. Particularly as some of the vegetation has matured considerably since the last inspection 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 2018 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)



Outer face of South Pier (/C0401C32)

3.2.7 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. The damaged slip way handrails have been repaired since 2018.

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. A number of historic repairs, particularly to the missing or damaged flexible sealant were noted as being effective. Surface water drainage holes on the landward side of the seawall were generally found to be clear and working effectively, however some buildup of litter and sand was observed, these should be cleaned to prevent attenuation of flood water (pluvial, fluvial or coastal) on the landward side of the wall.



Rock armour revetment and concrete seawall (/C0401C33)



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



Concrete sea wall and repaired slipway handrail (/C0401C33)



Loss of flexible joint sealant in northern access ramp (/C0401C33)

In the 2020 inspection there was little change observed in the region of the Little Scar access ramp. 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 corroded.



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



Little Scar access ramp in 2016 (/C0401C33)



Little Scar access ramp in 2018 (/C0401C33)



Little Scar access ramp in 2020 (/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 work undertaken in 2012 along the southern half of the frontage remains in good condition.

The coverage and interlock between rock armour units was good, although very high beach levels 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. 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)



Local cracking and spalling of concrete (/C0501C05)



Defect in concrete cope. (/C0501C05)

To the south of the beach access point at Church Lane, the seawall remains in very good (as-built) condition over approximately 600m, to the landward return at the sewerage pumping station. The paved promenade to the rear of the wall was also in very good condition.

As noted in the 2018 report, there remains 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.

A 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 along this frontage remains healthy. The small windblown sand formed ridge, approximately 50m seaward of the structure, observed in the 2018 inspection was not present in 2020. However very high beach levels were observed to have built 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. Build up off sediment against seawall (/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. Embryo dunes were observed to be forming in the 2020 inspection at the toe of the existing dunes along much of the frontage. 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. This was particularly prominent at the north end of the asset, adjacent the sewage pumping station. As in previous inspections, local cliffing is evident towards the south of the frontage, in close proximity to the North Gare breakwater. The informal rock revetment is offering some protection to this and, as such, the cliffing has not worsened since 2018.



Embryo dunes forming along the frontage (/C0502C01)



Cliffing at southern extent of dunes not worsened since 2018 (/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.

The concrete and masonry structure incorporates a multitude of ad-hoc repairs. As reported since 2008, the structure remains in poor condition. 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. A significant void was observed on the landward side of north face and requires attention to prevent further deterioration.

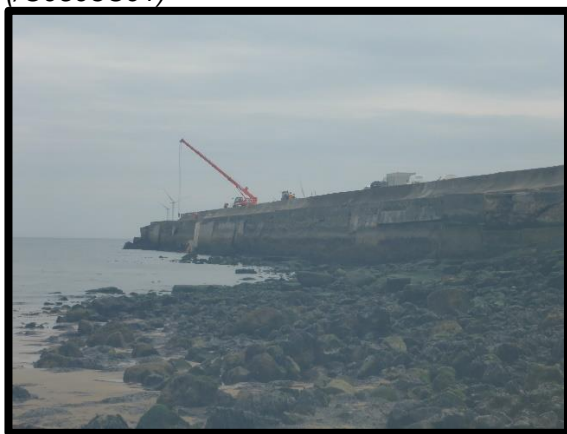
Security fencing was present to prevent unauthorized access along the deck; however, the fencing appeared to be easily bypassed, particularly to the south. During the 2020 inspection contractors were observed working on the pier deck and walls, therefore it was only possible to inspect the structure from the foreshore. It is believed the contractors were carrying out maintenance work to the structure including 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. This is on top of the maintenance works that was reported in the 2018 inspection which included the 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.



*Voiding along south face of North Gare Breakwater
(/C0503C01)*



South face of North Gare Breakwater. Dune field in lee of structure (/C0503C01)



*Contractors working on North Gare breakwater during 2020 inspection.
(/C0503C01)*



Significant voiding along north face of North Gare Breakwater (/C0503C01)

4. Comparison with Previous Assessment

The previous formal assessment across the whole study frontage was undertaken in July 2018.

The condition of many of the hard defences along the frontage is similar to the 2018 inspections, with the exception of the Hartlepool headland where construction work has now been complete and as such the condition of the relevant assets has significantly improved.

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.

There has been further land use development behind two areas of concern namely, the stacked gabions on Middleton beach and the gabions on North Sands, both of which are offering little protection to the new development behind.

5. Problems Encountered and Uncertainty in Analysis

All assets were inspected at suitable stages of the tide and therefore no problems were encountered.

The seaward extent of structures such as the Heugh Breakwater, North Pier, South Pier, Middle Pier, Victoria Harbour entrance and North Gare Breakwater are permanently submerged and were therefore not 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.

The Heugh Breakwater, North Pier and North Gare Breakwater are not accessible to the public and therefore inspection of these structures was limited.

Maintenance works on the deck of the North Gare Breakwater further limited the inspection of this structure.

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.
- Streetley Pier – Children observed on the deck of pier during the 2020 inspection. Review and prevent all informal access routes onto the Pier.
- 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.

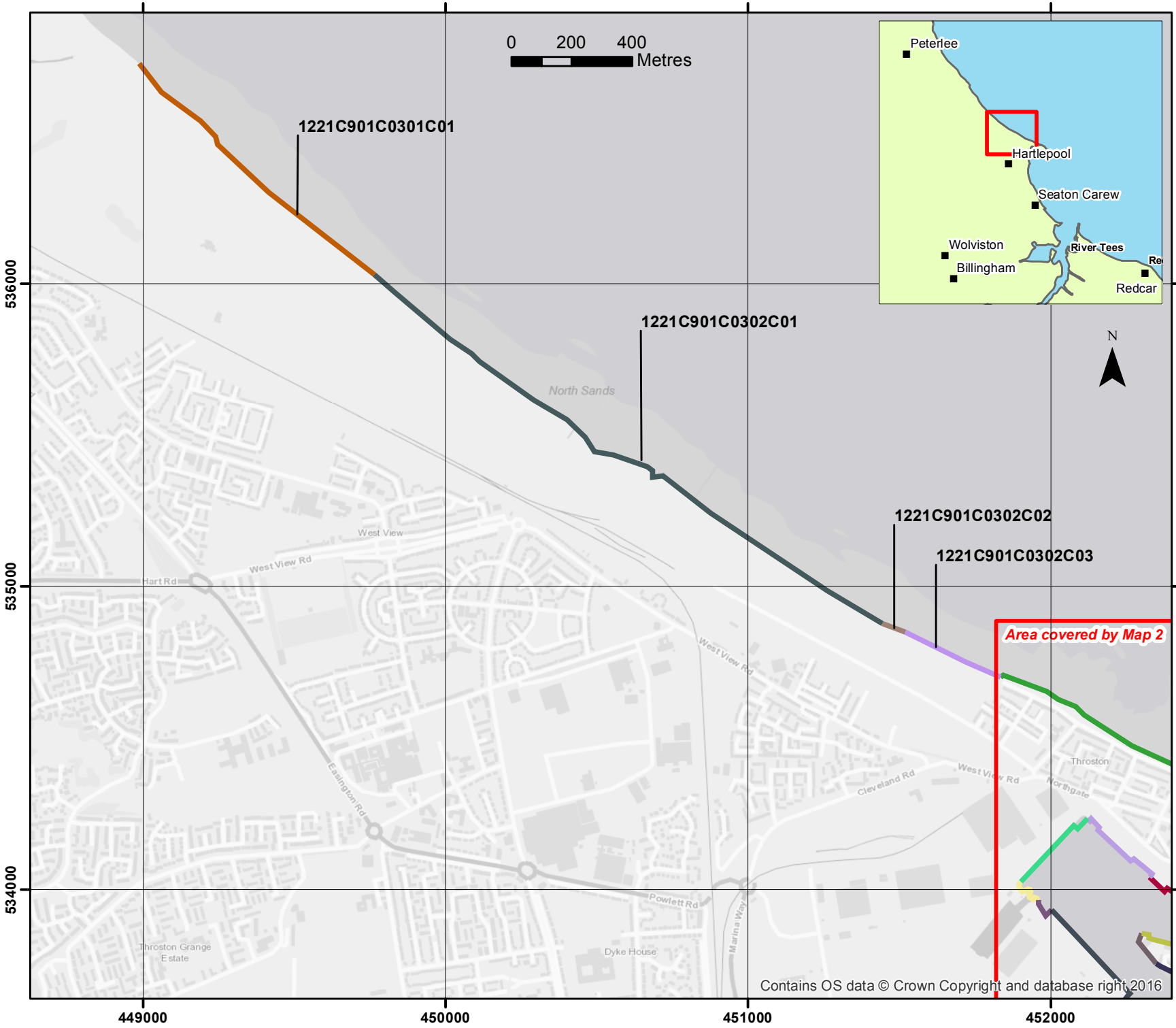
- North Pier – infill/repair voids in masonry apron to north face. Address public access (health and safety issue)
- Repair damage to precast concrete block revetment in Hartlepool Marina

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

- Asset location
- NFCDD Asset Number

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

Figure 1 - Map 1

Hartlepool Council Frontage

Asset Inspection Report

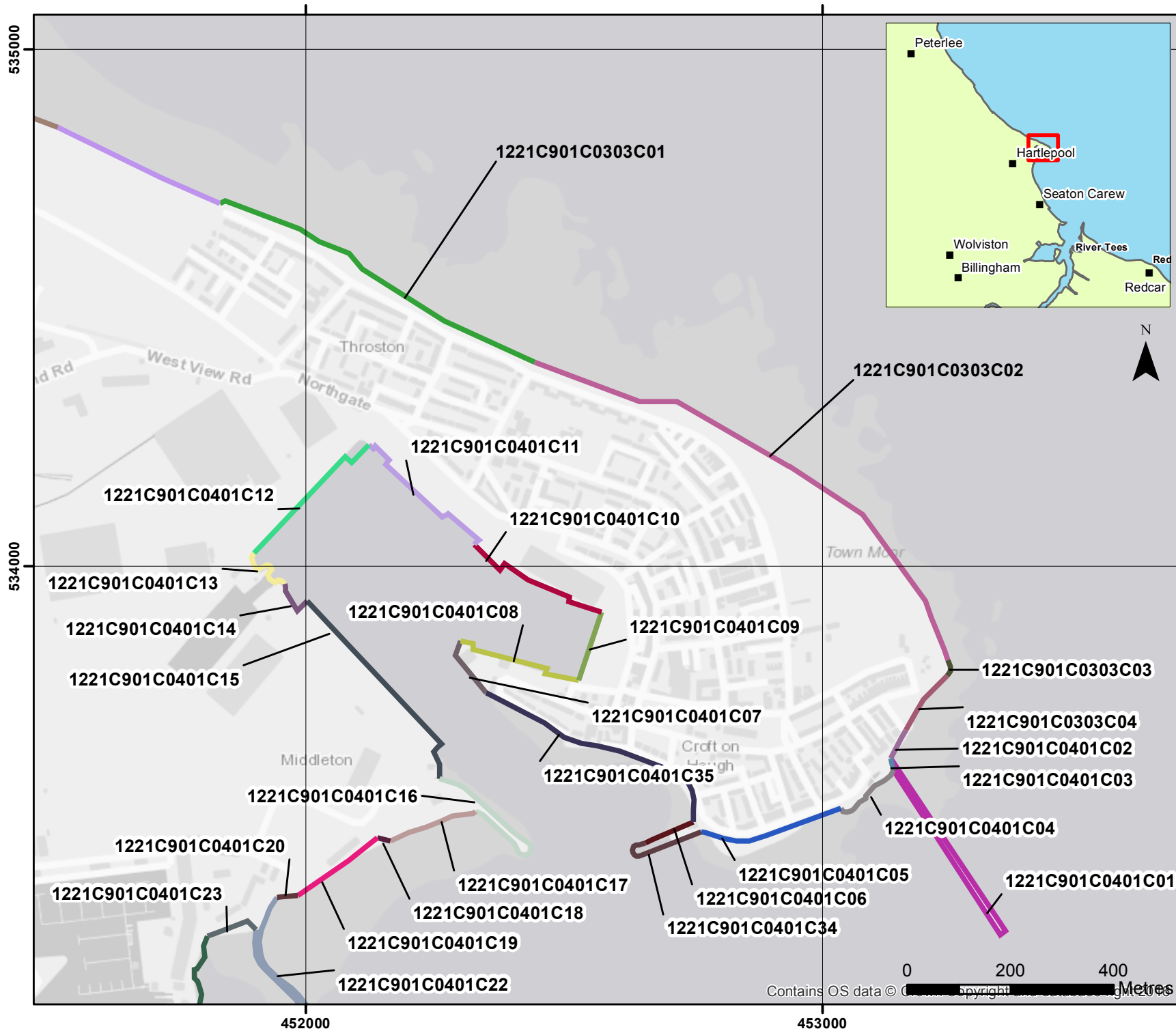
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Legend
 Asset location
 NFCDD Asset Number

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

Figure 1 - Map 2

Hartlepool Council Frontage

Asset Inspection Report

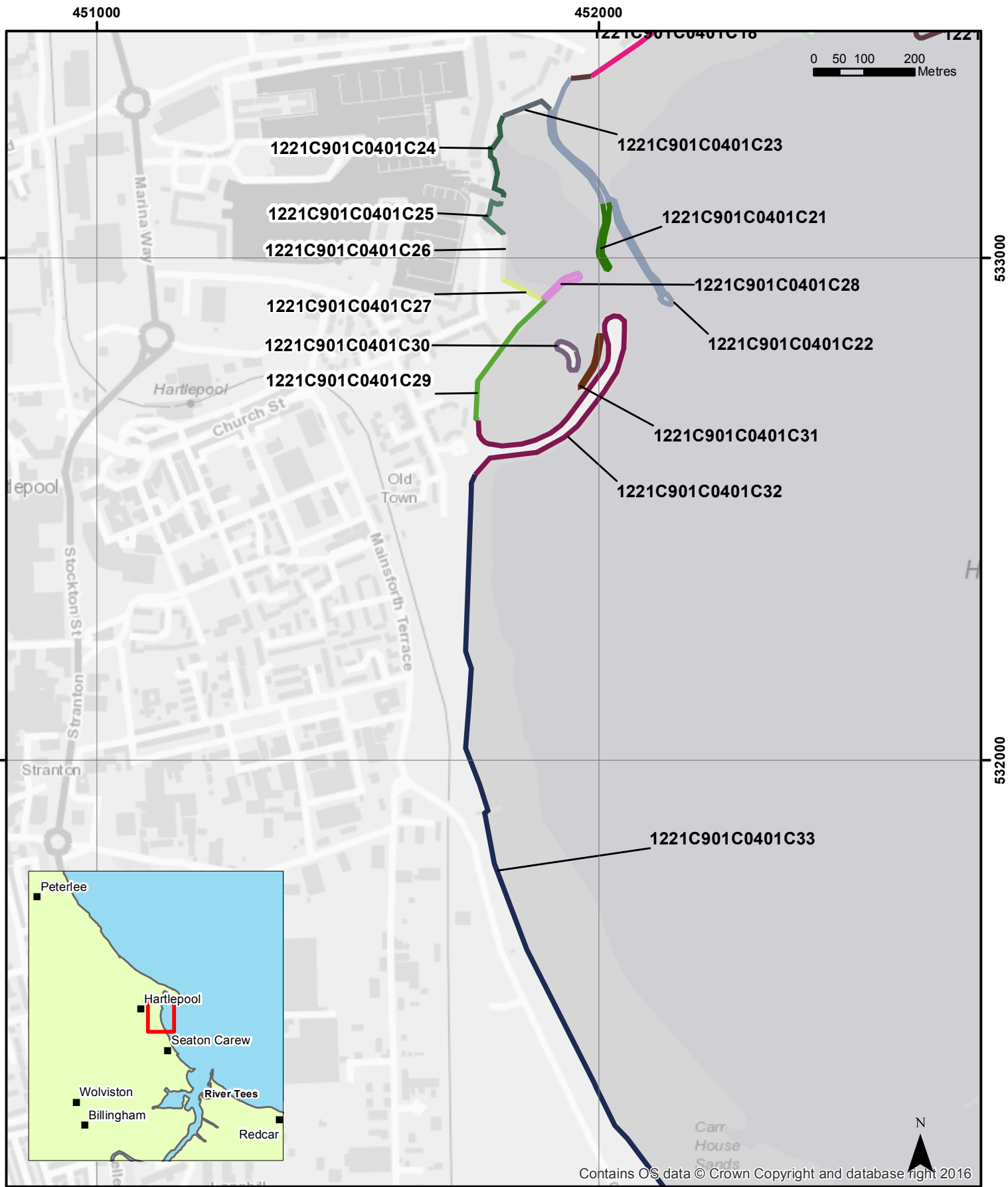
Drawing Scale 1:10,000 at A4

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
-  Asset location
-  NFCDD Asset Number

Figure 1 - Map 3

**Hartlepool
Council Frontage**

Asset Inspection Report

Drawing Scale 1:10,000 at A4

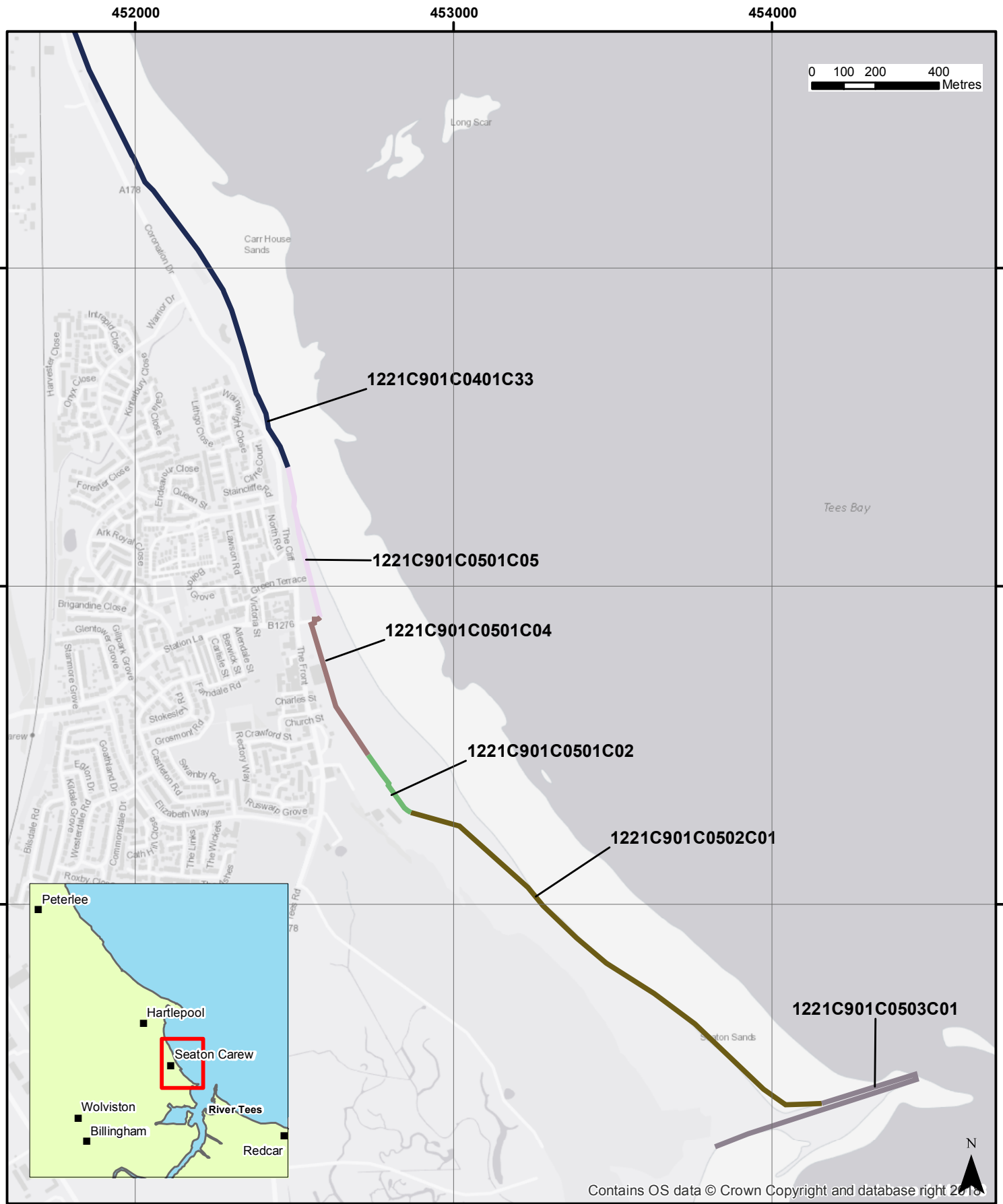
Client:
North East Coastal Group

Project:
Cell 1 Regional Coastal
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
-  Asset location
-  NFCDD Asset Number

Figure 1 - Map 4

**Hartlepool
Council Frontage**

Asset Inspection Report

Drawing Scale 1:16,000 at A4

Client:
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Project:
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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	1051.5	03/08/2020	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. Small nearshore berm forming to north.	2	>20	Continue to monitor.	no repairs
1221C901C0302C01	Undefended	Undefended	536030	2070.3	03/08/2020	Royal HaskoningDHV	Some evidence of localised lowering of dune crest due to beach access. Lack of vegetation local to historic pier. Wide, healthy beach with some embryo dune formation with initial establishment of vegetation. 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.	Gabions	534870	81.9	03/08/2020	Royal HaskoningDHV	As reported in 2018, gabion baskets have failed with bricks spread along foreshore to the north. Development of residential properties on the former industrial site fronted by failed gabion baskets at risk. Ongoing erosion of made ground, 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	03/08/2020	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	03/08/2020	Royal HaskoningDHV	Rock armour fronting seawall towards northern extent. Local repairs evident. Local spalling/cracking of concrete coping. High beach levels potentially obscuring defects at toe (as reported in 2016). Repairs undertaken to upper concrete revetment and promenade. 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 washout of sealant between coping unit.	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	1037.6	03/08/2020	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 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
1221C901C0303C03	Encased seawall with precast concrete units	Wall	533780	33.1	03/08/2020	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 washout of sealant between coping unit. Inspection is limited to from the promenade only due difficult access to foreshore	1	>20	Replace sealant	routine
1221C901C0303C04	Encased seawall with precast concrete units	Apron	533680	133	03/08/2020	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 washout of sealant between coping unit.	1	>20	Replace sealant	routine
1221C901C0401C02	Encased seawall with precast concrete units	Wall	533620	62.2	03/08/2020	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 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	03/08/2020	Royal HaskoningDHV	Short section of protected wall at root of breakwater. Good condition.	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	03/08/2020	Royal HaskoningDHV	Heugh Breakwater. Seaward end/inside face not inspected. No public access past fencing at mid length. Landward end in fair condition. Minor loss of mortar locally.	3	11 - 20	Structural inspection incl. boat/dive survey	routine
1221C901C0401C04	New concrete wall but with some voiding to toe in places.	Wall	533530	141	03/08/2020	Royal HaskoningDHV	Fronting Bock Sands paddling pool. Exposure, abrasion and undercutting of concrete toe where beach levels low at bend/access steps. Local scour fronting outfall pipes. Broken flap valve on one outfall. Rear masonry wall in fair condition with localised cracking and spalling.	3	>20	Infill voids/undercutting. Scour protection beneath outfalls. Repair flap valve.	routine
1221C901C0401C05	Concrete wall as (01) but with high beach levels.	Wall	533480	282.5	03/08/2020	Royal HaskoningDHV	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	Concrete wall inside protection of jetty. Upper wall to road and houses.	Wall	533460	101.2	03/08/2020	Royal HaskoningDHV	Settlement of masonry blocks (historic) adjacent to accropodes. Generally fair condition.	3	11 - 20	Continue to monitor. Structural inspection of Old Pier.	routine
1221C901C0401C34	Fishing breakwater with armoured head. Important protection to inner area.	Breakwater	533450	181.3	03/08/2020	Royal HaskoningDHV	Old Pier. Accropodes revetment at head in good condition, good profile and interlock. Cracking in deck and through parapet wall may indicate settlement of the structure. Parapet wall appears to be moving away from deck – note cracking and gap between buttresses and parapet wall. 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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C35	Masonry apron to toe of wall over mid section.	Apron	533750	509.1	03/08/2020	Royal HaskoningDHV	Town Wall. Slipway from Old Pier; masonry blocks significantly abraded, voids forming beneath deck. 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. Repointing to sections of wall Infront of Croft Gardens ongoing during 2020 inspection. Repaired pedestrian beach accessed steps.	3	>20	Local repair/infill voids at slipway. Repointing/repair of crest wall.	routine
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				
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				

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C16	Concrete armour units to breakwater with slag core. Acts to protect to North and retain beach to South.	Breakwater	533580	378.1	22/07/2020	Royal HaskoningDHV	Middleton Jetty. Accropodes armoured breakwater. Good condition - coverage and interlock. No signs of 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	22/07/2020	Royal HaskoningDHV	Brick filled gabions stacked to form wall. Rock material placed in front of the gabion baskets had been lost since 2016. Fronted by high beach to north, small rock armour (rip-rap) for majority of length, with larger rock armour towards south. Previously identified section of settled gabions deteriorated further since 2018 to the point of failure. Numerous gabions burst and heavily corroded. Further sheds noted to have been built directly behind at risk section.	4	11 - 20	Extend/reprofile larger rock armour from south.	Urgent
1221C901C0401C18	Undefended	Undefended	533470	26.4	22/07/2020	Royal HaskoningDHV	Informal access point to foreshore between two defended lengths. Steep slope to south. Slope to north shallower and ties into rock armour. Higher beach levels in 2020 appear to have made the ramp more accessible. Evidence of substantial fly tipping.	4	11 - 20	Continue to monitor. Place rock armour to prevent outflanking.	routine
1221C901C0401C19	Warehouse and industrial property above. Blockwork wall.	Seawall	533360	189.7	22/07/2020	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 (missing blocks doubled in size since 2018). 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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C20	Concrete block wall with commercial property above.	Wall	533350	40.5	22/07/2020	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	22/07/2020	Royal HaskoningDHV	North Pier (inner arm). No Public Access, gates remained open as in 2018. Generally structure in fair condition, 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.	3	>20	Structural inspection incl. boat/dive survey.	routine
1221C901C0401C22	Breakwater and root wall to sheds and protection of redeveloped harbour area.	Breakwater (North Pier)	532900	1033.5	22/07/2020	Royal HaskoningDHV	North Pier (incl outer arm). No Public Access, gate remained open and fisherman were observed along structure. Along the north face of the structure low beach levels further exposed decaying timber piles. 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. As 2016, landward face generally in fair condition however as with the seaward face areas of missing blockwork and extensive cracking and settlement visible.	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	22/07/2020	Royal HaskoningDHV	No change since 2018. 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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C24	Massive masonry quay wall.	Wall	533120	188.9	22/07/2020	Royal HaskoningDHV	No change since 2018. 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.	3	>20	Routine inspection & maintenance.	routine
1221C901C0401C25	New concrete block quay wall with a block revetment apron.	Wall	533040	110.3	22/07/2020	Royal HaskoningDHV	No change since 2018. Masonry wall in fair condition. Undercutting of toe visible in western corner. 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. Additionally - detailed inspection of masonry wall particularly toe at western corner. Seal open joints between facade units.	no repairs
1221C901C0401C26	Concrete splash wall to precast concrete block revetment.	Revetment	532950	89.7	22/07/2020	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. Not worsened since 2018.	5	1-5		urgent
1221C901C0401C27	Block wall with rubble foreshore.	Wall	532950	87.1	22/07/2020	Royal HaskoningDHV	Due to low beach levels extensive undercutting along structure, slipway and access steps was visible, as in 2016 this was more apparent towards the southern end of the asset. 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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C28	Masonry structure with concrete head.	Wall (Middle Pier)	532910	187.3	22/07/2020	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	22/07/2020	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
1221C901C0401C30	Undefended	Undefended	532770	161.9	22/07/2020	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	22/07/2020	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	22/07/2020	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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C33	Concrete recurved splash wall above concrete wall and behind rock armour. Promenade and development land behind.	Recurved Wall	531270	2381.1	22/07/2020	Royal HaskoningDHV	Rock armour maintains good coverage and interlock along entire frontage. Damaged guardrails at the northern access ramp have been repaired. Access ramp itself remains in good conditions with some minor cracking and spalling of deck slabs. Further minor cracking and spalling to access steps locally as noted in 2018 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	22/07/2020	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
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	22/07/2020	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. Some drainage outfalls were blocked with litter (i.e. bottles and plastic bags).	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	22/07/2020	Royal HaskoningDHV	Asset has become obsolete. No longer inspected. Seawall 1221C901C0501C04 has been re-aligned and lengthened.				

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0501C02 (continues north into 1221C901C0501C04)	Pre-cast concrete recurve wave return wall above a precast shallow stepped concrete revetment.	Wall	529280	230	22/07/2020	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. Some drainage outfalls were blocked with litter (i.e. bottles and plastic bags). 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	Undefended	529280	1755.2	22/07/2020	Royal HaskoningDHV	Wide dune field, relatively stable with good coverage of well-established vegetation. Localised erosion caused by public makeshift footpaths through dunes. Retreat of dune cliff at the southern extent of the asset (adjacent North Gare structure). Embryo dunes forming along much of the frontage.	2	>20	Consider fencing to control access/trampling.	no repairs
1221C901C0503C01	North Gare Breakwater	Breakwater	528230	986.7	22/07/2020	Royal HaskoningDHV	Inspection via foreshore only due to ongoing construction works. North Gare pier structure closed to the public and generally in a poor to very poor condition. 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 and lifted and missing deck slabs. There are a number of relatively recent repairs to the seaward facing nose of the structure, these include a concrete encasement and precast concrete blocks placed around the toe. It is believed ongoing maintenance works will include 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.	4	6 - 10	Detailed structural inspection including boat / dive survey. Numerous local repairs to infill voids and replace missing deck slabs and blockwork from wall face.	urgent