Royal HaskoningDHV
Enhancing Society Together

Cell 1 Regional Coastal Monitoring Programme
Walkover Inspection Surveys 2018

HARTLEPOOL BOROUGH COUNCIL

Hartlepool Borough Council

September 2018

Hartlepool Borough Council

Walkover Inspection Surveys 2018

Contents Amendment Record

This report has been issued and amended as follows:

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Contents

Appendices

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[1] 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.

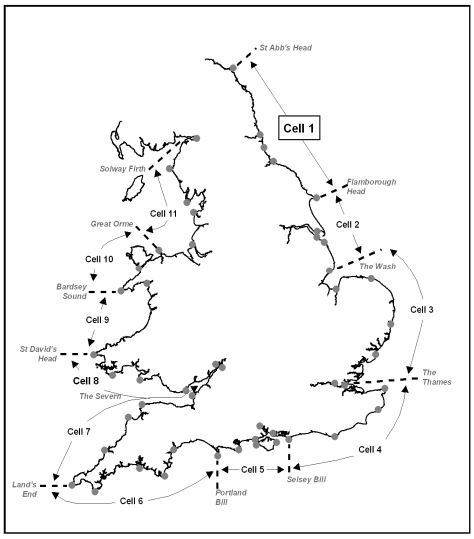


Figure 0-1 - Sediment Cells in England and Wales

The 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 2018** 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**.

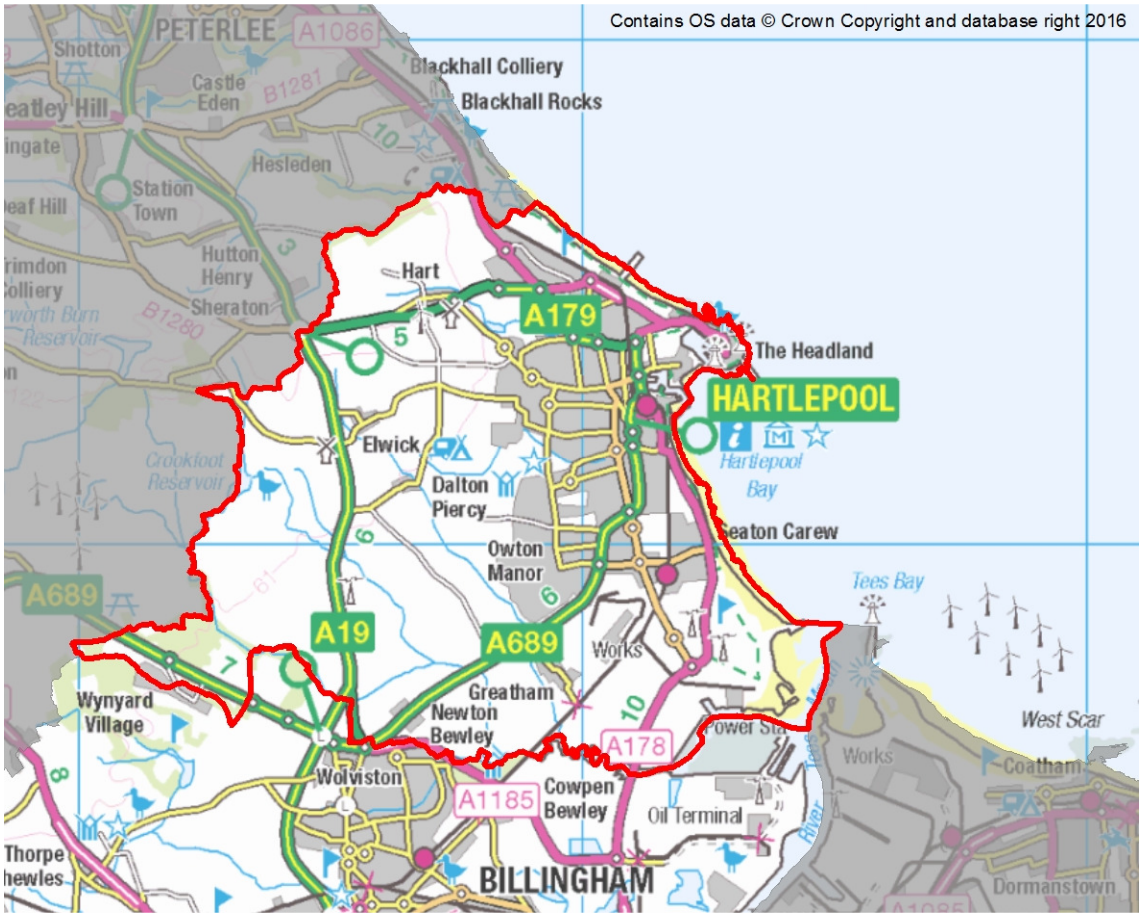


Figure 1-1: Hartlepool Borough Council study area

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 29th June and 31st July 2018. The weather experienced during the inspections was warm and fine with no access or visibility problems caused by adverse weather.

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 2016. A summary of the main differences is provided below

- **North Sands** – Significant loss of section was noted to timber support columns of the historic Steetley Pier, likely due to fire damage. 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. Redistribution of bricks continues at failed gabion basket structure south of Spion Kop cemetery. The previously unstable gabion baskets have collapsed due to local erosion and the remains continue to deteriorate. The site still presents a health and safety hazard due to exposed metalwork from gabions.

- **Marine Drive and Hartlepool Headland** –construction works were ongoing to provide new coastal defences at the Headland. High beach levels prevented inspection of lower courses of seawall in which defects were previously identified.

- **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** – the concrete apron at the toe and previous groyne repairs remain in good condition, but the crest wall (part of a Scheduled Monument) has deteriorated and is in poor condition locally, particularly on the landward side. Construction works to build a new outfall structure and masonry retaining wall/footway to the rear have been recently completed.

- **West Harbour** –
    - **Concrete Block Revetment** – Significant worsening of settlement issues to the concrete block revetment to the south of the Marina gate. Loss of concrete blocks and washout of drainage material evident.
    - **North Pier** - voiding through the apron on the seaward face.
    - **Tees and Hartlepool Yacht Club** - Undercutting of the slipway, access steps and seawall at the appear to have worsened slightly.

- **Seaton Carew** – recently constructed walls remain in ‘as new’ condition.

- **North Gare** – The structure remains in poor condition despite recent concrete repair work, noted as ongoing following the 2016 inspection. Numerous new defects including several voids were noted 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 approximately 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 that of 2016 suggesting these remain relatively inactive with evidence of small-scale local erosion, particularly evident at the toe of the slope adjacent to Crimdon Dene. A wide sandy beach was present along North Sands.

View on dunes looking south (/C0301C01)

Looking north along dunes from Crimdon Dene (/C0301C01)

There was evidence of local lowering of the dune crest and lack of vegetation caused by trampling at informal access points, such as that fronting Spion Kop cemetery. The dunes at the landward end of the historic pier were lower than adjacent dunes, with erosion here likely exacerbated through access and scour around the timber elements. Several timber columns supporting the historic pier structure were noted to have significant loss of section, likely due to fire damage. Embryo dunes were present with initial establishment of vegetation. The backing slope formed from made-ground along the former Steetley industrial site remained largely clear of vegetation.

Informal access at Spion Kop cemetery (/C0302C01)

Informal access at Spion Kop cemetery (/C0302C01)

Steeper, lowered dunes around historic pier structure with less vegetation (/C0302C01)

View on dunes looking north (/C0302C01)

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)

To the south of Spion Kop cemetery, the demolition/site clearance works at the former industrial site appeared to be complete. At the north of this site, several gabion baskets from the previously demolished retaining structure remained, however these have collapsed since the 2016 inspection. 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 to the south of the former gabion structure.

Collapsed former gabion structure (/C0302C02)

Erosion of made ground slope and collapsed former 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. However, the slopes were generally 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)

Local slope failure (/C0302C03)

Oversteepened coastal slope, slag apron breaking up (/C0302C03)

3.1.2 Marine Drive and Hartlepool Headland

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.

Construction works were ongoing (by Hall Construction) to encase the existing seawall along the Hartlepool Headland therefore the inspection of coastal assets could not be undertaken between Arabella Street and the Heugh Breakwater. The works appeared to have progressed significantly and comprise construction of pre-cast seawall and coping units with fronting rock armour revetment. At the time of inspection, activities were ongoing at the south of the site, with works to the access ramp north of the Heugh Breakwater being undertaken

The beach level fronting the seawall was generally similar to the 2016 inspections and the undercutting and toe defects previously identified were not visible. The ramp at Arabella Street was observed to be undermined in 2014, however this was not visible during the current inspection.

Where rock outcrops were exposed, no voiding/undercutting was evident. On this basis, the condition grading remains as fair.

Evidence of local repairs to the masonry and concrete coping are generally holding up well. Local spalling, minor cracking and displacement of the concrete coping and minor mortar loss from the masonry were evident and require attention.

Repaired access ramp at northern end of Marine Drive (/C0303C01)

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

Access ramp at Arabella Street, previously undercut (/C0303C01)

Ongoing construction of seawall encasement works along Marine Drive (/C0303C01

No access along Sea View Terrace due to construction works (/C0303C02)

Ongoing encasement works north of Heugh Breakwater (/C0303C04)

To the south of the apex of the headland, it appeared that further work was to take place to tie-in the newly constructed defences into the existing seawall (temporary works were still in place).

Approximately 90% of this asset length has undergone construction work since the 2014 inspection. This length of defence (most notably the former buttresses) that was previously identified as containing significant defects has now been addressed by the new seawall and as a result the overall condition of the asset was deemed to be fair.

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. 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.

Heugh Breakwater - North aspect (/C0401C01)

Heugh Breakwater – South aspect (/C0401C01)

3.2 Heugh Breakwater to Little Scar (MA12)

3.2.1 Bock Sands

Beach levels appeared similar to 2016 levels immediately in the lee of Heugh Breakwater and appeared to be higher than 2016 levels to the south, in the vicinity of the access steps and at the bend (interface between the two asset lengths). Beach levels were further reduced locally by scour beneath a running outfall. Previously, where beach levels were low, the toe of the concrete wall was exposed with evidence of undercutting/void formation locally although this was largely obscured by marine growth. Local cracking and spalling was observed to the recurve concrete cope and appeared to be similar to that observed in 2014.

The rear masonry wall was generally in fair condition throughout, with voids/loss of mortar observed locally, and several areas where repairs have taken place. A cobble beach with good vegetation cover was present where the seawall is offered protection by the rocky outcrop.

View looking south from Heugh Breakwater (/C0401C04)

Low beach levels at access steps (/C0401C04)

Rear masonry wall in fair condition (/C0401C04)

Damage to recurve concrete cope (/C0401C04)

Cracks were observed in the masonry wall and access steps above the historic public conveniences.

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 this could not be observed due to high beach levels. This location should be monitored with consideration given to infilling/repairing the existing undercutting/voids.

Former public conveniences. High beach with vegetation in foreground (/C0401C05)

Void at toe of seawall obscured by marine growth (/C0401C05)

Cracking in former public convenience building (/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 that strain gauges have been installed in the deck of the structure adjacent the lighthouse.

Outer face of North Pier (/C0401C34)

Cracks in concrete parapet wall and deck filled in with cement/grout (/C0401C34)

Cracking in parapet wall and deck, and gaps between 'buttresses' and wall filled in with cement/grout (/C0401C34)

Inner face of North Pier – note potential settlement of masonry blocks (/C0401C06)

Several cracks had been filled with cement/grout in the deck since 2016, these cracks run parallel to the parapet wall, including around the roundhead. The parapet wall appeared to be leaning seaward along much of the length, most notably at the roundhead.

These defects were noted in the 2014 and 2016 survey and do not appear to have worsened significantly. It was noted 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 2016. Significant abrasion (largely obscured by marine vegetation growth) and voiding beneath the concrete deck was observed in the access ramp adjacent to Old Pier.

Recent concrete repair to slipway, voids/undercutting remains (/C0401C35)

The masonry wall was generally in fair condition with some loss of mortar and open joints in the lower courses which would benefit from repointing. The concrete apron at the toe of the wall appeared in good condition although was obscured by marine growth.

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.

A new outfall and concrete abutment have been recently constructed (twin HDPE pipes awaiting reinforced concrete surround). A new footway promenade had been recently constructed to the rear of the seawall.

Recently constructed outfall and abutment. Significant corrosion/rust staining previously observed (/C0401C35)

Open jointing in lower masonry courses. Local undermining of concrete buttress (/C0401C35)

Heavily abraded masonry at crest of wall. In some areas mortar used in repointing appears to be stronger than masonry and stands proud of stone (/C0401C35)

Several open joints in masonry (/C0401C35)

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. Public access to this structure is prevented by a masonry wall and signage.

Recently completed masonry wall and walkway to rear of seawall along Northgate. (/C0401C35)

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

The masonry and concrete groynes were in good to fair condition. Beach levels increased moving 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.

3.2.4 Middleton

It was not possible to inspect the toe of the jetty structure as this was submerged at low tide. 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. Wind-blown sand had accumulated at the landward end, with vegetation growth.

Middleton Jetty north aspect (/C0401C16)

Middleton Jetty south aspect (/C0401C16)

Beach levels appeared lower than the 2016 inspection, with previously observed embryo dunes having been eroded from in front of the gabion wall exposing debris material.

The stacked gabion wall to the south of Middleton Jetty appeared in a similar condition to the 2016 inspection, although it appeared that rock material piled in front of the gabions had been lost since the 2016 inspection. Local settlement of the wall was evident although the gabion baskets remained intact. Consideration should be given to extending the existing larger rock armour revetment from the south to provide additional protection to the settled section.

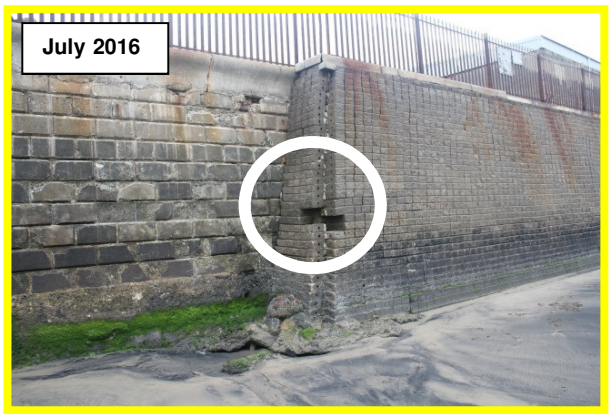
Gabion wall and embryo dunes from Middleton Jetty (/C0401C17)

Settlement in stacked gabion wall (/C0401C17)

The short length of undefended frontage comprises an informal beach access ramp. The condition remains similar to the 2016 survey in that the southern side of the ramp is steeper and less stable than that to the north.

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. Numerous concrete coping units were missing. Opening joints were evident, suggesting global movement of the structure. Further blocks were missing, evidence that the defects had worsened and minor scour / local lowering of beach levels was observed similar to the 2016 survey.



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)

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.

Spalling/abrasion of concrete blocks (/C0401C19)

Scour hole and evidence of settlement visible at northern end of seawall (/C0401C19)

Vertical crack through parapet and seawall (/C0401C20)

Vertical crack through parapet and seawall /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 should be prevented by security fencing and signage, however on the day of survey all of the security gates were open. 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, however the low beach levels exposed timber piles and a masonry apron with open jointing and local voiding which should be addressed urgently to prevent further deterioration.

North face of North Pier (/C0401C22)

North face of North Pier (/C0401C22)

Voids in apron of North Pier, approx. 0.5m depth extending under concrete and through timber piles (/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. It was difficult to identify any significant deterioration since the 2014 survey, however it is a reasonable assumption that any defects will further worsen over time. The concrete head of the inner arm appeared to be in fair condition.

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.

Head of inner arm of North Pier (/C0401C21)

South face of North Pier (/C0401C22)

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.

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. During the 2018 survey the area of concrete blocks affected, and the extent to which they were affected, was found to be significantly greater than in the 2016 survey. The settlement is indicative of an increasingly large area of lost fill material. In contrast to previous years surveys, where no blocks were missing from the structure, there are now numerous blocks displaced and missing. They are visible, although part obscured with marine vegetation, along the toe of the revetment.

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 in 2016 (/C0401C26)

Local settlement of concrete blocks (/C0401C26)

Local settlement of concrete blocks (/C0401C26)

Local settlement of concrete blocks (/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 2016 inspections. Lower beach levels exposed more undercutting, particularly beneath the access steps and along the toe of the wall to the west of the slipway. Additionally, the seaward end of the access steps handrails was found to be heavily corroded, however they remained stable. As was recommended in 2016, voids should be repaired locally with additional rock armour placed to avoid further scour damage.

Undercutting of access steps (/C0401C27)

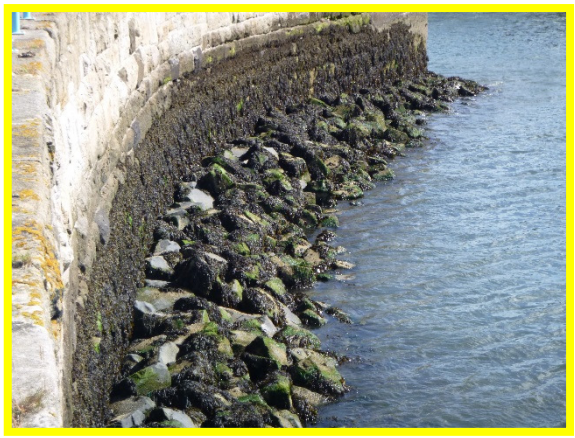
Void behind concrete wall units and beneath concrete ramp (/C0401C27)

Undercutting of slipway exposing gabion baskets (/C0401C27)

Low beach levels exposing undercutting of concrete toe (/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.

Eastern face of Middle Pier (/C0401C28)



Outer face of Middle Pier – note profile of rock armour at seaward end (/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 2016 there were no signs of global movement so a boat survey is not imperative.

Inner face of South Pier (/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 with some localized minor defects which will require attention.

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 damage to slip way handrails and an obvious encroachment of the revetment toe onto the foreshore north of the Newburn Bride outfall structure.

Other noticeable defects included hardened and missing flexible sealant in construction joints of the concrete seawall and minor local spalling and cracking of the concrete 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)

Possible displaced rock in foreground (/C0401C33)

Displaced rock armour and damaged guardrail at northern access ramp (/C0401C33)

Loss of flexible joint sealant (/C0401C33)

In the region of the Little Scar access ramp, beach levels were lower than observed in the 2014 inspection, and marginally lower than 2016 – note on the pictures overleaf the greater exposure of rock armour berm. Despite this, they remained 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 since 2016. Local repairs should be undertaken and monitored to ensure this does not become a more significant issue.

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

Little Scar access ramp in 2016 *(/C0401C33)*

Little Scar access ramp in 2018 *(/C0401C33)*

Cracks in concrete seawall at Little Scar access 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. Beach levels remained similar to those observed in 2014. 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, As noted in 2016, there were several areas where rock armour units appeared to have advanced seaward from the visible toe. This may indicate some localized displacement and a loss of interlock between units and therefore should be monitored.

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 south (/C0501C05)

Local cracking and spalling of concrete (/C0501C05)

Crack in concrete cope. Note previous repair/fill now failing (/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 2016 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.

The beach along this frontage remains healthy and particularly towards the southern end of the new structure a small windblown sand formed ridge has developed and now lies approximately 50m seawards of the defence.

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)

Promenade looking south towards pumping station (/C0501C02)

Southern corner of seawall (/C0501C02)

Buildup of windblown sand around apex of curve in defence line (/C0501C03)

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. 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.

Mature dunes viewed from North Gare (/C0502C01)

Cliffing at southern extent of dunes (/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 was present to prevent unauthorised access along the deck; however, the fencing appeared to be easily bypassed, particularly to the south. It was noted following the 2016 inspection that a site compound was present on the structure and there appeared to be some ongoing work. It was unclear during the 2018 inspection exactly what this work had been relating to however, it is suspected that the seaward nose of the pier was encased and concrete blocks were repositioned around the base of the structure. Additionally, a number of flexible tied precast concrete block mattresses appear to have been placed since the last inspection. The mattresses have been placed in a haphazard manor and were considered to be in poor condition despite having been recently placed.

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.

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

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

North face of North Gare breakwater.
(/C0503C01)

4. Comparison with Previous Assessment

The previous formal assessment across the whole study frontage was undertaken in June/July 2016.

The condition of many of the hard defences along the frontage is similar to the 2016 inspections.

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.

Ongoing construction work at the Headland restricted access during the survey. When these works are complete, the condition of the relevant assets will be significantly improved.

Since the 2016 inspection there has been a significant worsening of the settlement issues to the concrete block revetment to the south of Hartlepool Marina gate, with the damaged area now missing a number of concrete blocks and washout of drainage material evident.

The North Gare breakwater remains in poor condition and despite recent repairs shows signs of ongoing degradation, including voiding and loss of deck slabs, extensive cracking and spalling to both deck and face, and washout of fill material from beneath grouted revetments.

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.

Ongoing construction works by Hall Construction at the seawall around the Headland prevented access to this section of the study frontage.

6. Conclusions and Recommended Actions

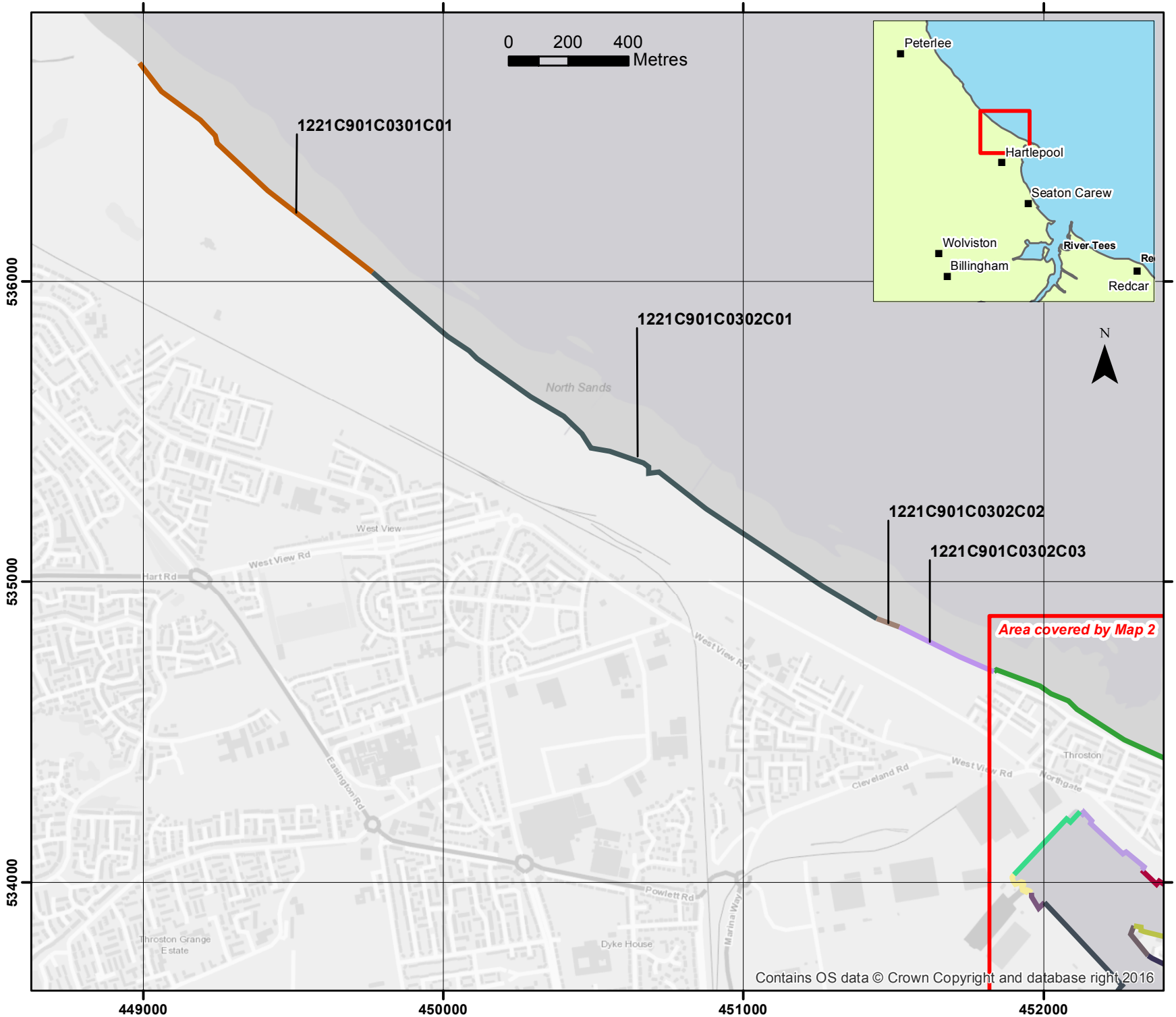
Further to the visual inspection of all assets, specific conclusions and recommendations for individual assets are given in **Appendix B**. The main urgent recommendations are:

- North Sands – remove failed gabions
- 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
- North Gare Breakwater – repairs required to maintain integrity of structure

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

Drawing Scale 1:17,000 at A4

WATER
Royal HaskoningDHV
Marlborough House
Marlborough Crescent
Newcastle upon Tyne
NE1 4EE

Tel: +44 (0)191 211 1300
Fax: +44 (0)191 211 1313
www.royalhaskoning.com

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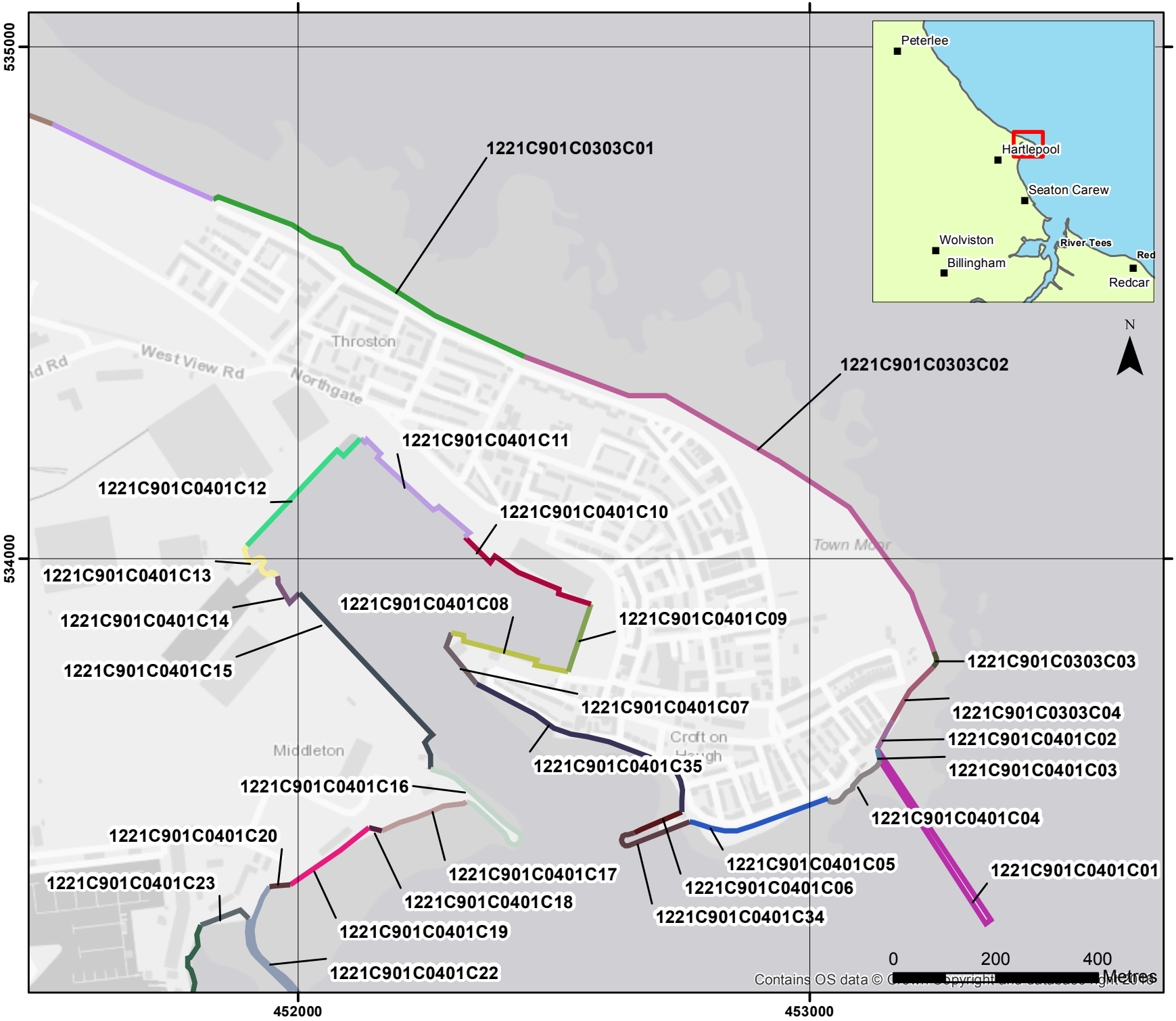

Legend

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

WATER
Royal HaskoningDHV
Marlborough House
Marlborough Crescent
Newcastle upon Tyne
NE1 4EE

Tel: +44 (0)191 211 1300
Fax: +44 (0)191 211 1313
www.royalhaskoning.com

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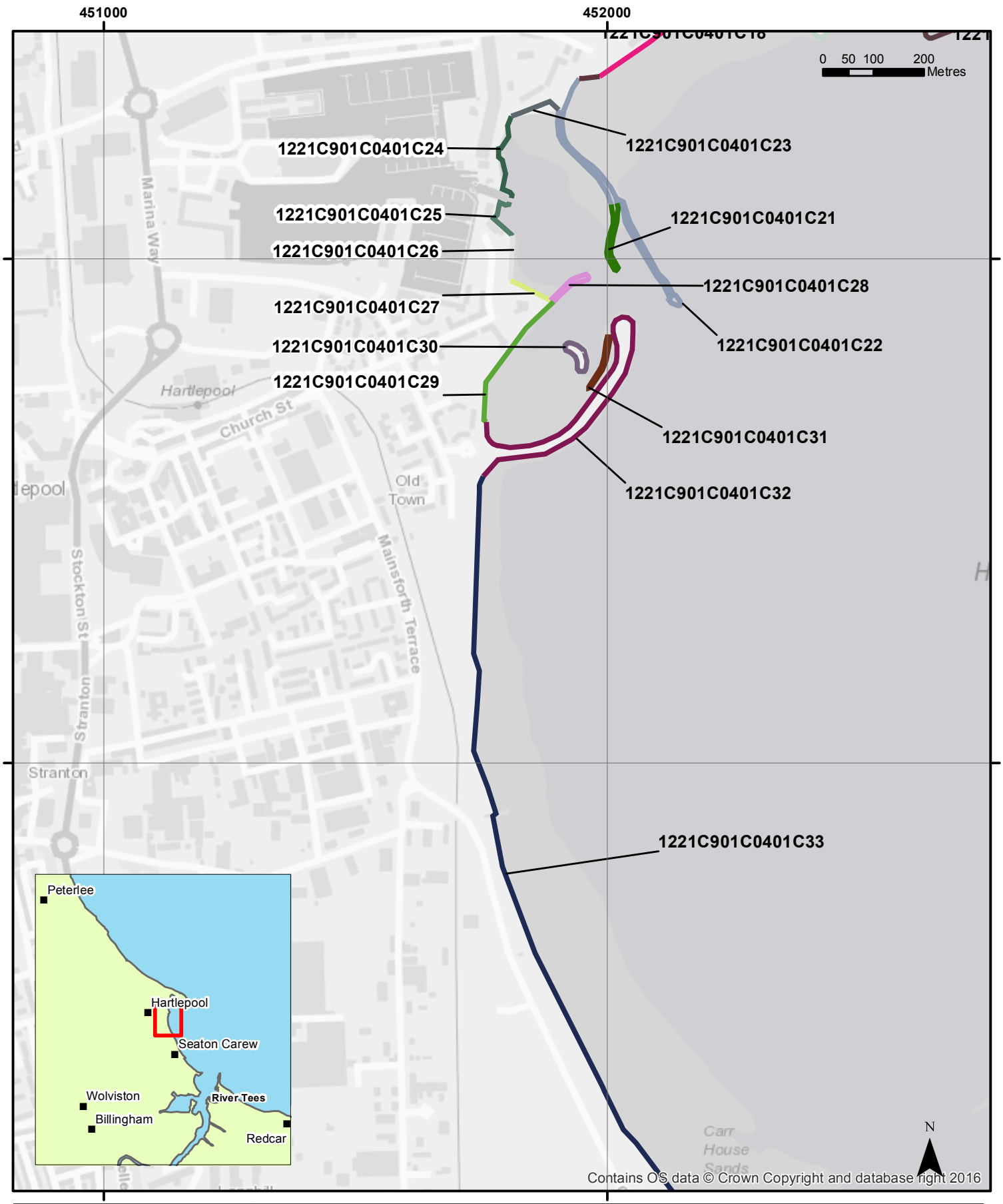
Enhancing Society Together



Legend

Asset location

NFCDD Asset Number

Figure 1 - Map 3

Hartlepool Council Frontage

Asset Inspection Report

Drawing Scale 1:10,000 at A4

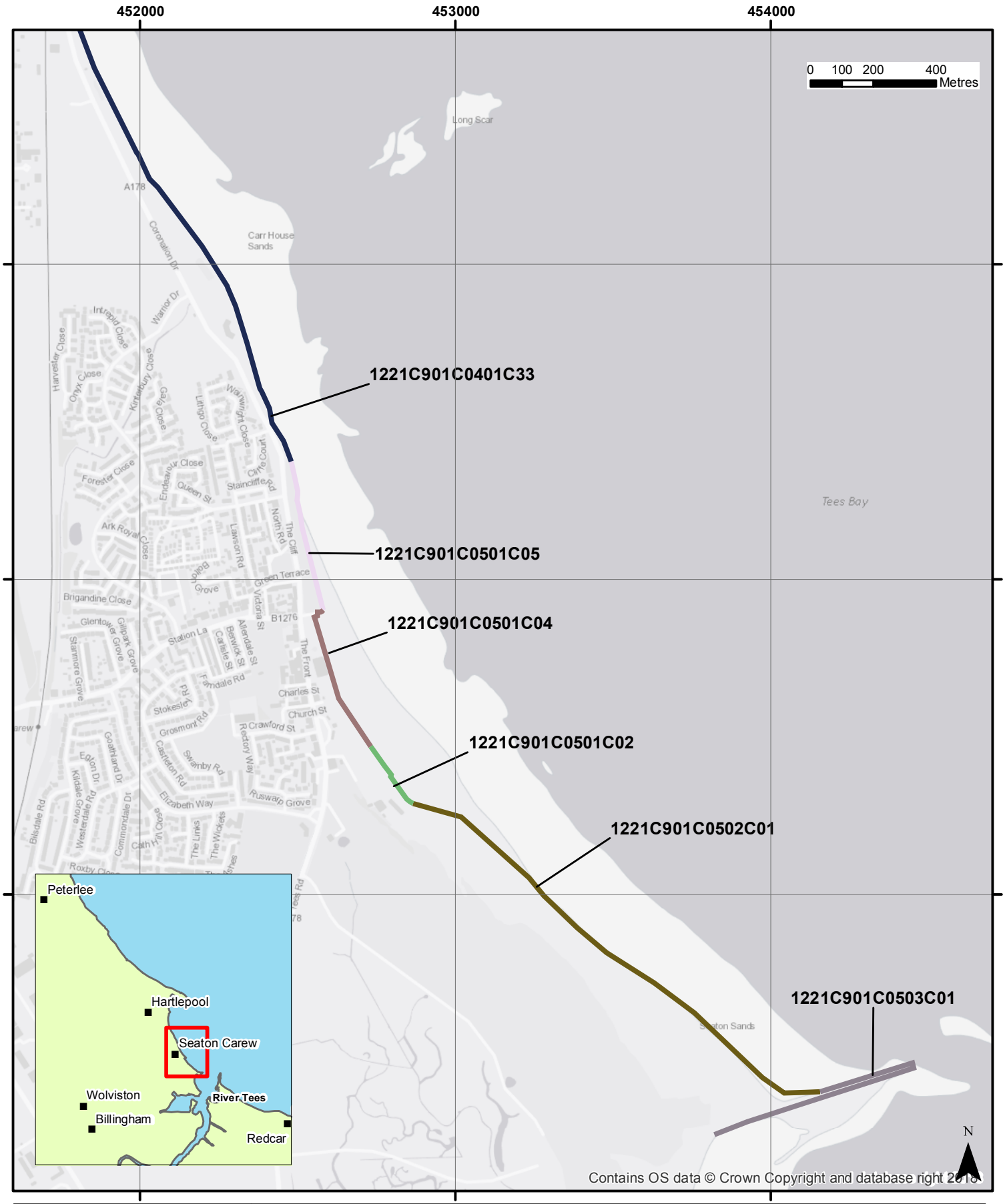
Client:
North East Coastal Group

Project:
Cell 1 Regional Coastal Monitoring Programme

WATER
Royal HaskoningDHV
Marlborough House
Marlborough Crescent
Newcastle upon Tyne
NE1 4EE

Tel: +44 (0)191 211 1300
Fax: +44 (0)191 211 1313
www.royalhaskoning.com

Royal HaskoningDHV
Enhancing Society Together



Legend

Asset location

NFCDD Asset Number

Figure 1 - Map 4

Hartlepool Council Frontage

Asset Inspection Report

Drawing Scale 1:16,000 at A4

Client:
North East Coastal Group

Project:
Cell 1 Regional Coastal Monitoring Programme

WATER
Royal HaskoningDHV
Marlborough House
Marlborough Crescent
Newcastle upon Tyne
NE1 4EE

Tel: +44 (0)191 211 1300
Fax: +44 (0)191 211 1313
www.royalhaskoning.com

Royal HaskoningDHV
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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	1052	29/06/2018	Royal HaskoningDHV	As 2016. Local erosion, particularly at south of Crimdon Beck. Vegetation cover increases progressing south. Wide, healthy beach. Wide sandy beach present along North Sands.	2	>20	Continue to monitor.	no repairs
1221C901C0302C01	Undefended	Undefended	536030	2070	29/06/2018	Royal HaskoningDHV	Some evidence of localised lowering of dune crest. Lack of vegetation local to historic pier and locally at informal access points. Wide, healthy beach with some embryo dune formation with initial establishment of vegetation. Historic pier in poor condition, with several column elements showing signs of fire damage.	3	11 - 20	Monitor historic pier structure. Continue to monitor dune lowering around access points.	routine
1221C901C0302C02	670101 Brick filled welded mesh gabions with rubble above. Gabions in very poor condition.	Gabions	534870	81.9	29/06/2018	Royal HaskoningDHV	Remaining gabion baskets have failed since the 2016 inspection. Demolition works to rear now complete. Ongoing erosion of made ground to south. Bricks spread along foreshore esp to north.	5	1 - 5	Monitor erosion of made ground. Make safe failed gabion baskets, remove spilled bricks from foreshore.	urgent
1221C901C0302C03	Slag waste embankment with poured slag apron to toe.	Embankment	534840	345.5	29/06/2018	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
1221C901C0303C01	Upper revetment in need of repairs.	Seawall	534700	691	29/06/2018	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. Undercutting at Arabella Street not observed due to high beach levels. Construction works were ongoing between Arabella Street and the Heugh Breakwater. The works comprise of the encasement of the existing seawall around the Hartlepool Headland through the construction of pre-cast concre seawall and coping units with fronting rock armour revetment. At the time of the inspection the works appeared to have progressed significantly and activities were ongoing at the south of the site.			Under construction	

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0303C02	Concrete block wall voiding to joints and spalling.	Wall	534390	1038		Royal HaskoningDHV	**Unable to inspect asset due to ongoing construction works.** (Construction works were ongoing between Arabella Street and the Heugh Breakwater. The works comprise of the encasement of the existing seawall around the Hartlepool Headland through the construction of pre-cast concre seawall and coping units with fronting rock armour revetment. At the time of the inspection the works appeared to have progressed significantly and activities were ongoing at the south of the site).			Under construction	
1221C901C0303C03	Concrete wall to Coastguard with toe (02).	Wall	533780	33.1		Royal HaskoningDHV	**Unable to inspect asset due to ongoing construction works.** (Construction works were ongoing between Arabella Street and the Heugh Breakwater. The works comprise of the encasement of the existing seawall around the Hartlepool Headland through the construction of pre-cast concre seawall and coping units with fronting rock armour revetment. At the time of the inspection the works appeared to have progressed significantly and activities were ongoing at the south of the site).			Under construction	
1221C901C0303C04	Concrete toe to high wall. Access ramp to part of length.	Apron	533680	133		Royal HaskoningDHV	**Unable to inspect asset due to ongoing construction works.** (Construction works were ongoing between Arabella Street and the Heugh Breakwater. The works comprise of the encasement of the existing seawall around the Hartlepool Headland through the construction of pre-cast concre seawall and coping units with fronting rock armour revetment. At the time of the inspection the works appeared to have progressed significantly and activities were ongoing at the south of the site).			Under construction	

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C02	Dressed stone wall continuing from pier.	Wall	533620	62.2		Royal HaskoningDHV	**Unable to inspect asset due to ongoing construction works.** (Construction works were ongoing between Arabella Street and the Heugh Breakwater. The works comprise of the encasement of the existing seawall around the Hartlepool Headland through the construction of pre-cast concre seawall and coping units with fronting rock armour revetment. At the time of the inspection the works appeared to have progressed significantly and activities were ongoing at the south of the site).			Under construction	
1221C901C0401C03	Concrete and masonry wall poor in places. Protected by breakwater. Amenity area then wall to road and property behind.	Wall	533600	23.5	29/06/2018	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 forseen particularly at seaward end. Important protection to areas South.	Breakwater (Heugh Breakwater)	533280	791.9	29/06/2018	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	29/06/2018	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. Rear masonry wall in fair condition with localised cracking and spalling.	3	>20	Infill voids/undercutting. Scour protection beneath outfalls.	routine
1221C901C0401C05	Concrete wall as (01) but with high beach levels.	Wall	533480	282.5	29/06/2018	Royal HaskoningDHV	Cobble beach with vegetation growth in centre - protected by rock outcrop. 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	29/06/2018	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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C34	Fishing breakwater with armoured head. Important protection to inner area.	Breakwater	533450	181.3	29/06/2018	Royal HaskoningDHV	Old Pier. Accropode 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
1221C901C0401C35	Masonry apron to toe of wall over mid section.	Apron	533750	509.1	29/06/2018	Royal HaskoningDHV	Town Wall. Slipway from Old Pier; masonry blocks significantly abraided, 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. It was noted that the twin HDPE outfall pipes were awaiting a concrete surround.	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 revtment 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	29/06/2018	Royal HaskoningDHV	Middleton Jetty. Accropode armoured breakwater. Good condition - coverage and interlock. No signs of distress on crest. Beach levels appeared lower than in 2016, with previously observed embryo dunes 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	29/06/2018	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. Settlement of gabions to north of large rock armour - baskets remain intact.	3	11 - 20	Continue to monitor gabions. Extend/reprofile larger rock armour from south.	routine
1221C901C0401C18	Undefended	Undefended	533470	26.4	29/06/2018	Royal HaskoningDHV	Informal access point to foreshore between two defended lengths. Steep slope to south. Slope to north shallower and ties into rock armour. Condition remains similar to that in 2016.	4	11 - 20	Continue to monitor. Place rock armour to prevent outflanking.	no repairs
1221C901C0401C19	Warehouse and industrial property above. Blockwork wall.	Seawall	533360	189.7	29/06/2018	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 (further worsening since 2016). Numerous coping stones missing. Opening of joints is thought to be caused by global movement of the strucure. Wall bulges throughout and beginning to be undercut at W corner. West 1/3 is large concrete block wall. Significant abrasion/damage to faces.	3	11 - 20	Continue to monitor. Replace missing blocks/copes.	routine
1221C901C0401C20	Concrete block wall with commercial property above.	Wall	533350	40.5	29/06/2018	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	31/07/2018	Royal HaskoningDHV	North Pier (inner arm). No Public Access, gates remained open as in 2016. 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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C22	Breakwater and root wall to sheds and protection of redeveloped harbour area.	Breakwater (North Pier)	532900	1034	31/07/2018	Royal HaskoningDHV	North Pier (inlc 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	31/07/2018	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	31/07/2018	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.	3	>20	Routine inspection & maintenance.	routine
1221C901C0401C25	New concrete block quay wall with a block revetment apron.	Wall	533040	110.3	31/07/2018	Royal HaskoningDHV	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

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C26	Concrete splash wall to precast concrete block revetment.	Revetment	532950	89.7	31/07/2018	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.	5	1-5		urgent
1221C901C0401C27	Block wall with rubble foreshore.	Wall	532950	87.1	31/07/2018	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
1221C901C0401C28	Masonry structure with concrete head.	Wall (Middle Pier)	532910	187.3	31/07/2018	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	31/07/2018	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.	3	>20	Local repairs / repointing.	routine
1221C901C0401C30	Undefended	Undefended	532770	161.9	31/07/2018	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.	2	>20	Undertake more detailed survey of structure, particularly along seaward face.	no repairs

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0401C31	Old breakwater within harbour.	Breakwater	532740	229.6	31/07/2018	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	31/07/2018	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	31/07/2018	Royal HaskoningDHV	Rock armour maintains good coverage and interlock along entire frontage. Several displaced rock armour units have damaged both landward and seaward facing guardrails at the northern access ramp. 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 2016. Varying beach levels along asset, in places several steps were buried. Minor cracking, spalling and missing joint sealant to recurved crest wall. Outfall structure at Newburn Bridge is retaining sediment on its northern face.	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	31/07/2018	Royal HaskoningDHV	Rock armour in fair condition. Some evidence of displacement along the toe locally, particularly at southern end, around slight headland. Minor cracking and spalling of concrete sea wall. Some cracks show evidence of historic repairs, some of which are failing as noted in 2016. 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	31/07/2018	Royal HaskoningDHV	Concrete wall in as new condition. Promenade in as new condition. Wide healthy beach. Wind - blown sand formed ridge moved away from wall and now lies approximately 50m seawards of wall. 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 maintanen particularly around transitions, access ramps and steps. Ensure all drainage outfalls are cleaned and free of sand and litter.	routine

Asset Name	Description	Type	Sort by N	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
1221C901C0501C03	Concrete revetment. High accreting sand levels moving into dune area.	Revetment	529440	100.3	31/07/2018	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	31/07/2018	Royal HaskoningDHV	Concrete wall in as new condition. Promenade in as new condition. Wide healthy beach. Wind - blown sand formed ridge moved away from wall and now lies approximately 50m seawards of wall. 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 maintanen particularly around transitions, access ramps and steps. Ensure all drainage outfalls are cleaned and free of sand and litter.	routine
1221C901C0502C01	Undefended	Undefended	529280	1755	31/07/2018	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).	2	>20	Consider fencing to control access/trampling.	no repairs
1221C901C0503C01	North Gare Breakwater	Breakwater	528230	986.7	31/07/2018	Royal HaskoningDHV	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 deckslabs. 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.	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