Cell 1 Regional Coastal Monitoring Programme
Walkover Inspection Surveys 2022

Durham County Council

June 2022

Durham County Council

Walkover Inspection Surveys 2022

Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Prepared	Authorised
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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.

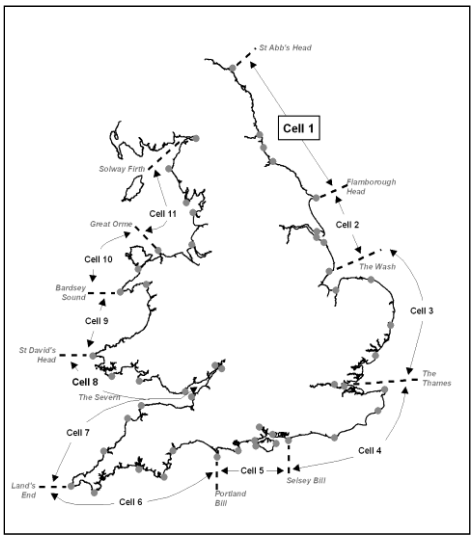


Figure 0-1 - Sediment Cells in England and Wales

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

Northumberland County Council
North Tyneside Council
South Tyneside Council
Sunderland City Council
Durham County Council
Redcar & Cleveland Borough Council
Hartlepool Borough Council
Scarborough Borough Council
East Riding of Yorkshire Council
Environment Agency
Natural England
The National Trust

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

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

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

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

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

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

1. Introduction

1.1 Study Area

Durham County Council's frontage is approximately 17.5km in length and extends from Ryhope Dene at the boundary with Sunderland in the north to Crimdon Beck at the boundary with Hartlepool in the south, see Figure 1-1. This frontage includes approximately 35 coastal assets, 27 of which are man-made assets while 8 are natural assets. Detailed maps showing the location of each of these assets are presented in **Appendix A**.

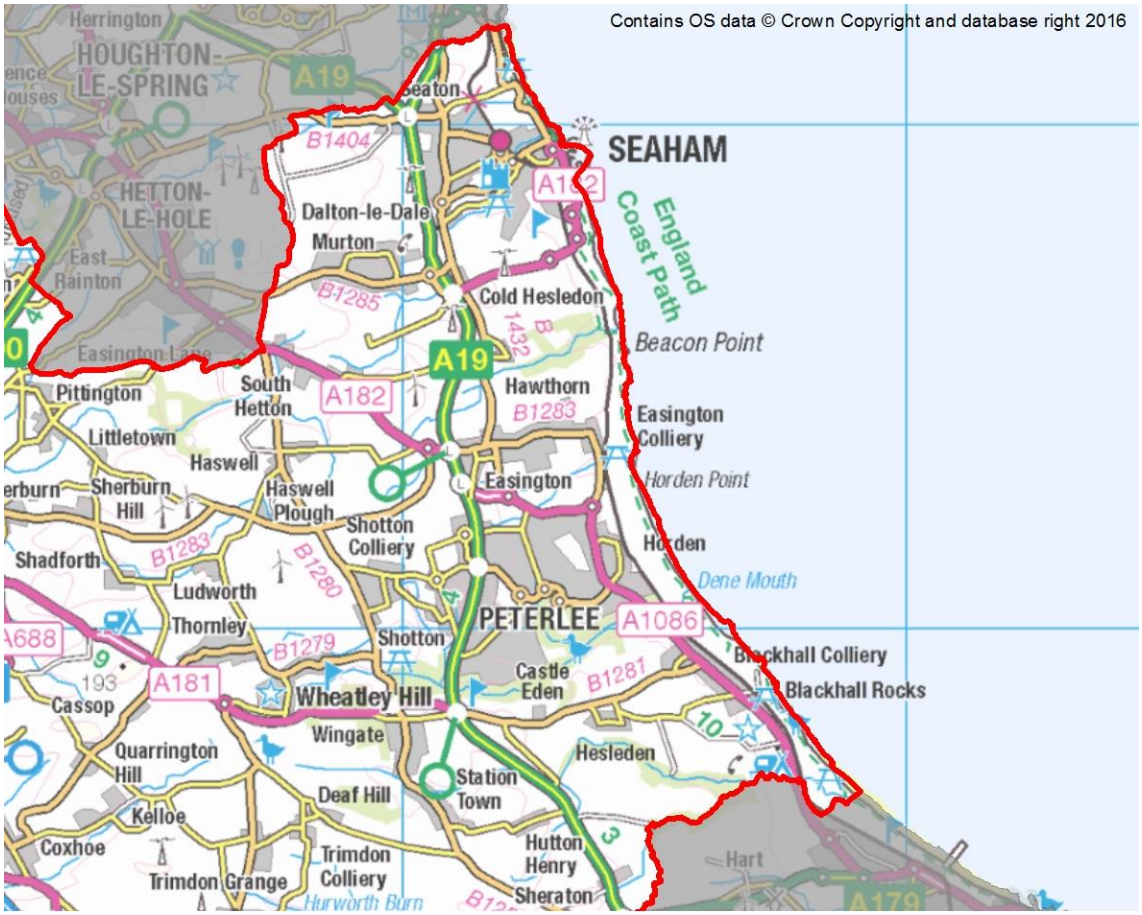


Figure 1-1: Durham County Council study area

1.2 Methodology

This section presents the approach taken by the asset inspectors for the Durham County Council coastal frontage.

The walkover inspection surveys for the Durham County Council frontage were undertaken on 31st May and 13th June 2022. The weather experienced during the inspections was adequate causing 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 following significant findings were observed during the 2022 walkover inspection surveys:

- **Ryhope Dene to Seaham Hall picnic site** – There is ongoing slumping of the upper Glacial Till layer along the entirety of the frontage, creating a scalloped cliff top. The England Coast Path runs in close proximity to the cliff top and will likely need to be rolled back as the cliff retreats.

- **Seaham Hall picnic site** – The fill material has been washed out from the revetment adjacent to the beach access steps, leaving the revetment at risk of immediate failure. The outflanking has not worsened.

- **Seaham sea wall and promenade** – The condition of the structure continues to deteriorate. The deterioration is accelerated to the south with abrasion of the seawall becoming more significant and regular, exposing reinforcement in places. The bullnose of the wall is also damaged with cracking/spalling evident. The damaged/missing flap valves remain. The shallow sloping concrete apron to the south is in poor condition with large sections missing and voiding visible beneath toe. The apron was concealed in 2022 by beach sediment. Derelict groynes remain on the foreshore.

- **Shot Rock to Loom** – The cliffs continue to erode actively with significant debris slumped at the toe. At Loom, the retreating cliff top is creating a pinch point with the coastal path where the path is backed by mature vegetation, this should be monitored closely and plans put in place to divert the path. The large failure through the coastal footpath, reported previously, has been fenced off and the footpath diverted.

- **Horden Beach** – Erosion of the colliery spoil platform has created an approximately 2m cliff in places, cutting off access onto the foreshore. As a result, informal access steps have been benched through the spoil to maintain access. The steps have started to round through marine action.

3. Condition Assessment

3.1 Pincushion Rocks to Chourdon Point (MA 09)

3.1.1 Ryhope Dene to Seaham

The most northern asset length (/804C01) within Durham County Council's jurisdiction extends along undefended sea cliffs from Ryhope Dene to the picnic site located at the north of Seaham, near Seaham Hall. The cliffs comprise of a large glacial till layer, mantled on smaller Magnesian Limestone base. As reported in previous inspections, the glacial till is experiencing significant slumping. The lack of vegetation on the slump deposits and on the cliffs themselves indicates that the failures are recent highlighting the ongoing erosion. Much of the limestone base to the north is concealed by the slumping till. At one location there is a relatively large, historic, 'bench' type failure involving a substantial volume of material.

Along the asset length, the England Coast Path runs in close proximity to the cliff top, within 0.5m in places. It is likely the footpath will need to be rolled back in the near future as the cliff continues to retreat.

Glacial Till slumping along the majority of the frontage (/0804C01)

England Coast Path in close proximity to retreating cliff top (/804C01)

Further towards the southern end of the frontage length, the harder Magnesian Limestone base is more prominent. There are frequent caves and arches formed in the limestone rock at the base of the cliffs caused by differential erosion by waves. The caves did not appear to have significantly worsened since 2020. At these locations, there is again evidence of recent local slumping in the upper till cliff.

Undefended sea cliffs with till sitting on limestone (/0804C01)

Localised slumping of upper till within the cliffs (/0804C01)

Within this asset length is a set of access steps from the picnic site car park near Seaham Hall with a small stream discharging to the foreshore over an adjacent stone revetment. The stone revetment is heavily overgrown and continues to be outflanked to its north. The fill material below the revetment has been notably washed out putting the revetment at risk of immediate collapse. There is also a small diameter pipe encased in concrete running alongside the steps. Neither the stream nor the pipe was discharging at the time of the inspection.

Access steps adjacent stone revetment (/0804C01)

Outflanking of revetment causing washout of fill (/0804C01)

Immediately south of the car park access steps is a short undefended length of cliff which continues to show local slippages. This is followed by several concrete blocks that lead into a short (approximately 10m) length of low-level wall at the tie-in to the main Seaham seawall to the south.

3.1.2 Seaham

Backing the southern end of the low-level tie-in wall, and continuing behind the very northern end of the Seaham sea wall, is a blockwork revetment on the backing slope. The revetment remains in fair condition despite noticeable bulging. The outflanking at its northern end, reported previously, was again visible in 2022 due lowered beach levels, however it does not appear to have worsened since 2018. There are small slippages in the slope above the revetment, and a more significant slippage was again observed at the north end of the seawall. Spalling was noted to the concrete bullnose below the revetment. The access ramp at the northern end to the main Seaham promenade has small cracks in the deck.

Bulging blockwork revetment and small slippage of till above. (/0102C01)

Minor outflanking to low level wall. Low beach levels exposing concrete blocks. (/0102C01)

The main Seaham sea wall is fronted by a shingle beach that varies in height along its length. Both the wall and promenade are in fair condition overall, however the condition of the wall deteriorates with progression south, with some areas considered in poor condition. As previously reported, the joints in the main sea wall are mostly intact but a few areas would benefit from re-sealing,

particularly between access steps and the main sea wall. There is some vegetation growth in construction joints and cracks in the promenade, which should be removed and the joints sealed.

Northern section of Seaham sea wall with minimal abrasion (/0102C01)

Horizontal cracking to bullnose (/0102C01)

The abrasion damage to the main sea wall increases to the south, roughly corresponding with the location of the failed beach groynes. The abrasion in some locations has exposed the reinforcement in the face of the wall and also in the concrete toe beam. In local areas, spalling/corrosion damage was noted to the bullnose of the seawall, again worsening with progression south. All plastic and cast iron flap valves along the wall have failed and are absent.

Spalling of bullnose on sea wall to the south (/0102C01)

Heavily abraded wall exposing reinforcement (/0102C01)

Heavily damaged section of sea wall to the south (/0102C01)

Missing cast iron flap valve (/0102C01)

To the rear of the sea wall and promenade there is an area of stone infill between the coastal slopes and the steeper cliffs, which may have been installed to repair a past slope failure. The area of stone infill appears to have ‘sunken’ into the slope and remedial works are recommended.

Towards the southern end, the sea wall is fronted by remnants of timber and steel groynes supported in a concrete base. The timber boards are no longer present, leaving the steel piles upstanding and exposed. The piles are heavily corroded and many have sheared in half. At its southern end, the seawall is also fronted by a shallow sloping concrete apron. It was reported in 2020 to be in poor condition, with large sections broken up and voiding visible beneath the toe. These defects were not visible in 2022 due to high beach levels.

High beach levels concealing failed section of concrete apron identified in 2020 (/0102C01)

Remnants of derelict groynes (/0102C01)

At the southern end of the sea wall, the access ramp is heavily abraded and its deck is cracked/broken locally exposing underlying fill which may be vulnerable to washout. It was reported in 2018 and 2020 that reinforcement is exposed due to abrasion damage posing a health and safety hazard. It is recommended that remedial works should be undertaken to trim protruding bars.

The cliffs behind the promenade are steeper and past episodes of slippage have left a headscarp visible. No ‘fresh’ slippages have been noted since the 2020 inspection, indicating a period of stability.

Hole in deck of ramp and exposed reinforcement (/0102C01)

Headscarp in backing cliffs formed by previous slippages (/0102C01)

To the south of the seawall there is a rock armour berm providing toe protection to the cliffs around the headland adjacent to Featherbed Rocks. The rock armour continues south of the headland, initially protecting a short length of concrete wall with a large outfall from the culverted Dawdon Dene, and then protecting the cliffs in front of Allotment Gardens and the northern end of the Seaham War Memorial Gardens. The rock armour remains in good condition.

As previously reported, some cliffs to the rear of the rock armour still show evidence of slow erosion and slumping of the upper till layers. This is particularly apparent at the northern face of Featherbed Rocks headland where evidence of small failures were again apparent in 2022.

Rock berm around Featherbed Rocks headland (/0103C01)

Small scale failures to North face of Featherbed Rocks headlands (/0103C01)

To the south of Featherbed Rocks headland, the Dawdon Dene culvert remains in fair condition. Beach levels during the 2022 were higher than during the 2020 concealing more of the lower rock armour. The northern wing wall to the culvert remains damaged with sections of reinforcement exposed. A short length of low masonry wall around the southern edge of the outfall's concrete platform is damaged as previously reported.

At the tie-in between the outfall's concrete platform and the cliffs to the north, a section of masonry wall above a sloping poured concrete revetment has failed, leaving a section of the wall partially suspended. Although no change was again identified in 2022, this remains an area of concern as a secondary failure appears imminent.

Immediately south of the outfall's concrete platform, cliff recession continues to affect the fence line in the vicinity of the Coastguard Station. In 2022, it was noted a sheet of corrugated steel, previously observed forming part of the fence line, had been displaced and was located on the cliff face itself suggesting further erosion had occurred in this location.

Masonry wall and concrete revetment at tie-in to cliffs breaking-up (/0103C04)

Rock berm around Dawdon Dene culvert and further south (/0103C04)

Erosion affecting fence line of properties to south Dawdon Dene Outfall -2018 (/0103C02)

Erosion affecting fence line of properties to south Dawdon Dene Outfall - 2020 (/0103C02)

The rock armour starts to taper out with progression south and forms a transition from defended to undefended sections of cliff. The cliff line generally appears stable and was noted to be well vegetated in 2022 inspection. However, as reported previously, there does appear to small areas of historic local slumping. Access to the cliff top has been prevented by fencing along the War Memorial Gardens.

The beach access ramp and steps to the small pocket beach below these cliffs, located just north of Seaham Harbour, are supported by a vertical concrete retaining wall that has a number of cracks in the rendered face and visible gaps between the wall and its coping. A deck slab has moved, potentially due to settlement, posing a trip hazard. There is some vegetation growth in open joints of the deck slab that should be removed.

Local slumps in cliffs (/0103C06)

Access ramp and steps (/0103C07)

Cracking in retaining wall to access steps and ramp (/0103C07)

Movement of deck slabs in access ramp (/0103C07)

As per previous inspections, the cobble beach running from north of the access steps through the small pocket bay to the north of Seaham Harbour was high and the backing cliff was vegetated and appeared stable at the time of the inspection.

At the southern end of the bay there is a rock armour revetment which forms the link to the root of the North Pier of Seaham Harbour. Its function is to limit the risk of outflanking of the North Pier. The rock revetment is formed from armour of varying sizes. The low spot in the crest adjacent to steel mesh structure, first observed in 2018, has not appeared to have worsened.

Stable cliff fronted by healthy cobble beach (/0103105)

Revetment preventing outflanking of the North Pier(/0104C02)

3.1.3 Seaham Harbour

Seaham Harbour is privately-owned by the Seaham Harbour Dock Company. The Council-supported £3m North Dock Regeneration Project, including a floating pontoon, lock gates and dock-side facilities, opened in early 2013.

Access to the North Pier is restricted by a locked access gate at the landward end. It is understood that access is restricted to manage angling rather than for safety concerns. The concrete deck shows cracking on the accessible sections, although the massive structure still clearly provides an effective coast protection function and is therefore assumed to be in fair overall condition.

Repointing repairs to previously-reported defects to the deck and both coping and upper sections of the inner face were noted beyond the access gate, but these could not be inspected in detail. The inner face was inspected from the beach at low tide and appeared unchanged from 2020, thus it remains in fair condition. It is recommended that, if not already in place, more detailed vessel-based and underwater inspections are undertaken by the Dock Company and if not already in progress a maintenance programme should be put in place.

Seaham Harbour North Pier Inner Face (/0104C03)

Seaham Harbour North Pier Inner Face (/0104C03)

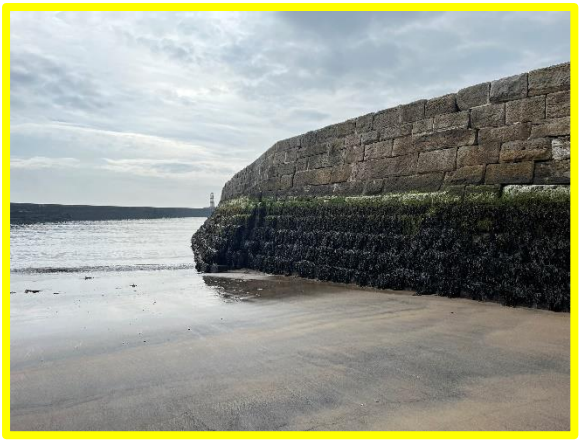
The wall at the back of the beach in the outer harbour (0104C05) consists of two parts, the first being a vertical wall at the car park, which ties into North Pier, and the second a dressed masonry sloping revetment that ties into the breakwater to the south of the beach. The vertical wall remains in good condition. However, as previously reported the masonry revetment is in fair to poor condition. There are open joints throughout the structure, that in places are harboring vegetation growth. The vegetation appears to be trapping sediment which is encouraging dune development particular towards the crest of the structure. The revetment also has an uneven profile particular at its western extent where the lower blocks appear to have settled. This was particular noticeable during the 2022 inspection as the beach levels were lower than the 2020 inspection. This is not a new defect but should be monitored closely.

Open joints and vegetation growth on masonry revetment. High sediment levels (/0104C05)

Uneven profile (/0104C05)

The sections of the North Dock that can be inspected, do not appear to have deteriorated since the 2020 inspection. As per the 2020 inspection, access was further limited as the slipway to the inner beach was closed for health and safety reasons.

The walls around the North dock are in fair to poor condition, but all have some open joints between masonry blocks in their faces and these would undoubtedly benefit from a routine maintenance programme involving re-pointing. The two assets which appear to require the most attention are *(/0104C09) and (/0104C12)* where the open joints are more significant and some block displacement is visible.



Inner Pier north face largely obscured by marine growth (/0104C06)

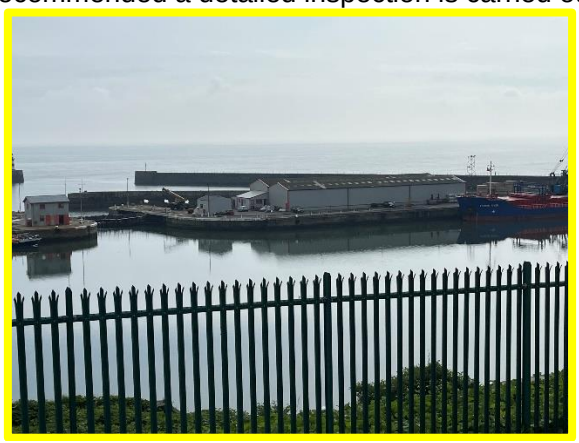
Loss of blocks and open joints (/0104C09)

Gaps between blocks at Seaham North Dock (/0104C12)

Inner face appeared in good to fair condition (/0104C10)

Access to South Pier and South Dock is prohibited due to port-related activity and so the structures could only be inspected from a distance on the adjacent A182 road. As per previous inspections, the South Pier appeared from afar to have significant damage to sections of the crest and outer face, particular apparent at the pier root outer face. An ununiform profile along this section potentially suggests settlement issues, although it was difficult to establish from afar whether this had worsened since 2020.

At the root of the pier, rock armour has been placed at the tie-in to the coast as part of a previous phase of regeneration. There is an area of tipped rubble in front of the rock armour. The armour continues to the south protecting the port access road and appeared to be in good condition. It is recommended a detailed inspection is carried out to assess the damage.



No Access - Seaham Harbour South Pier (/0104C17)

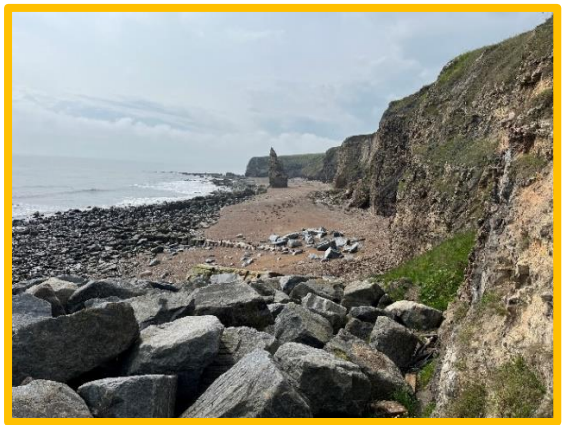
No Access - Tipped rubble (/0104C16) and rock revetment (/0104C01)

3.1.4 Dawdon

The frontage between Seaham Harbour's South Pier and Seaham Fleet Rock is protected by a continuation of the rock armour revetment extending southwards from the South Pier. In most places the armour is against the cliff toe, but where there is evidence of a former vertical wall, it is placed as a bund slightly seaward of the cliff. Restricted access means that the full length of the rock armour cannot be inspected, but where it can, it is in good condition.

South of the revetment between Seaham Fleet Rock and Nose's Point, the unprotected cliffs were previously fronted by a colliery spoil beach (known as Chemical Beach) but this has now been virtually completely eroded and there are an increasing number of local slumps in the backing cliffs, some of which consists of colliery waste. Debris exposed by the eroding beach should be removed routinely. The erosion appears greatest towards the south of Chemical Beach, just to the north of Nose's Point. No significant changes were observed along Chemical Beach since 2020.

Rock revetment from South Pier to Chemical Beach *(/0105C01)*



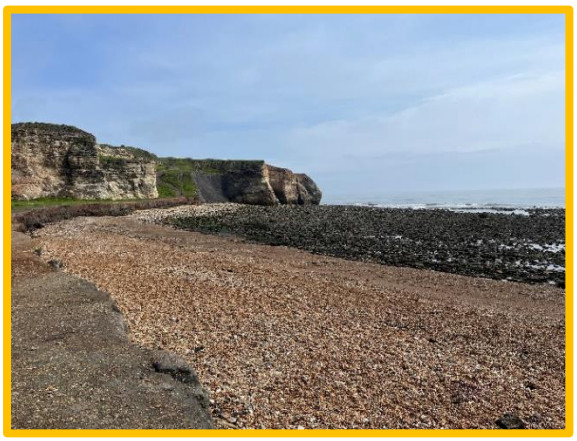
Little remaining spoil on beach (/0106C01)

3.1.5 Nose's Point and Blast Beach

At Nose's Point headland, the cliffs characteristically have caves and arches formed at their base. The headland appears relatively stable and exerts a control on both the Dawdon Chemical Beach frontage to its north and Blast Beach to the south.

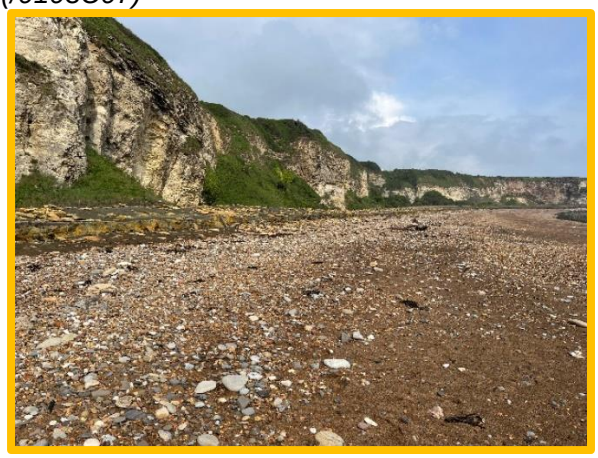
To the south of Nose's Point is the bay of Blast Beach. The near vertical cliff line at the rear of the bay has been relict for many years as it is protected by an artificial beach formed of colliery spoil. However, the colliery spoil has continued to erode and is now at the point where it has been almost totally lost at the south where it meets Chourdon Point. The remaining spoil to the North of the bay appears to have retreated further since 2020 and tension cracks suggest that further retreat is imminent.

In future, the limestone cliffs will become active again when the spoil beach has been washed-away, likely starting towards the informal steep access route at the south of the beach. At this point, formal beach access will have to be considered. The access should be monitored in the meantime.

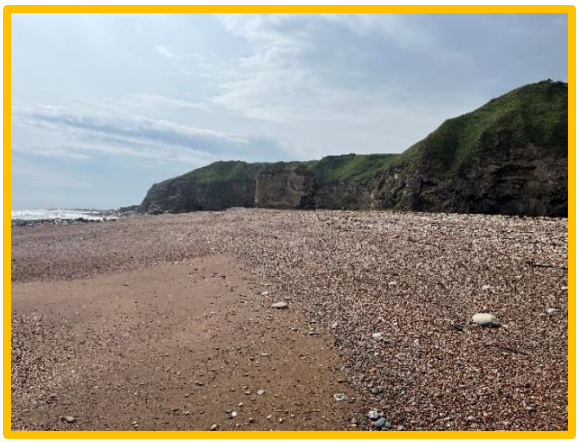


Informal access point onto Blast Beach (/0103C07)

Tension cracks in actively eroding colliery spoil (/0103C07)



Colliery spoil cliffing reducing in height from North to South (/0103C07)



Colliery spoil cliffing reducing in height from North to South (/0103C07)

3.2 Chourdon Point to Blackhall Rocks (MA 10)

3.2.1 Chourdon Point

Unlike the cliffs to the north and south, Chourdon Point (0107C02) has no protection from the colliery spoil. Therefore, similarly to Nose's Point, there are caves, overhangs and arch formations at the base of the cliffs due to the weathering and erosion process. Chourdon Point can only be inspected safely from the cliff top due to the marine covered, rocky foreshore around the headland.

3.2.2 Hawthorne Hive, Shippersea Bay and Easington Colliery

The coast between Chourdon Point in the north and Horden Point in the south (C0201C01) includes the bays of Hawthorne Hive and Shippersea. Although these bays did not directly receive colliery waste from direct tipping activities, they both accumulated significant quantities of waste from tipping areas further north. In general, this section of coastline has remained largely unchanged since the 2018 inspection, highlighted by the before and after photos below.

Residual spoil beach at Hawthorne Hive – 2020 (/0201C01)

Residual spoil beach at Hawthorne Hive – 2022 (/0201C01)

Residual spoil at Shippersea Bay – 2020 (/0201C01)

Residual spoil at Shippersea Bay – 2022 (/0201C01)

Unnamed Bay fronting Easington Colliery - 2020 (/0201C01)

Unnamed Bay fronting Easington Colliery - 2022 (/0201C01)

One particular area of concern is the section of cliffs to the north of the bay fronting Easington Colliery. Despite notable quantities of spoil waste remaining in the bay, the section of cliff between Shot Rock and Loom has continued to erode, with large slumping evident at the toe of the cliff. The exaggerated recession in this location is highlighted by the length of exposed outfall in the photos above. It is estimated that the cliff top in this location has retreated locally between 1 and 2m in the past two years. This local recession is causing a pinch point in the coastal path against some mature vegetation. If the recession continues the footpath will have to be diverted inland in the near future. The large slip through the coastal footpath, noted in the previous inspection, has now been fenced off and the footpath diverted.

In the sections of cliff which form headlands between the bays, there is typically cave and arch formation at their base, with local rockfalls occasionally occurring and slumping in the upper till layers. A notable large rock fall just north of Horden Point, in an area where there is no colliery spoil was reported in 2018 but no further activity was observed in 2022. Access from the cliff top onto Shippersea Bay was heavily overgrown and appeared unsafe.

Eroding cliff top creating pinch point in coastal path. (/0201C01)

Actively eroding section of cliff (/C0201C01)

Previous cliff failure through coastal footpath fenced off (/0201C01)

Previous cliff failure through coastal footpath. Fence to prevent access has failed (/0201C01)

3.2.3 Horden Denes

Between Horden Point and Blackhall Rocks there is a long uninterrupted length of colliery spoil beach (0201C02). This protects the backing cliffs from marine action, enabling them to become relatively stable and vegetated. The colliery waste is being continuously eroded, which is particularly noticeable in the center and north of the bay where it appears the colliery is eroding significantly faster, demonstrated by the cliffing, tension cracking and talus debris.

This erosion has caused the colliery spoil to form an approximately 2m high cliff in places, cutting off access to the foreshore. As a result, just north of Castle Eden Dene, numerous informal steps have been benched through the spoil to maintain access onto the foreshore. The steps have begun to round through marine action and should be recut in the future to maintain safe access.

Despite the protection afforded by the foreshore and spoil beach, there remains occasional local shallow slumping in the backing slopes, especially in the centre of the frontage.

Looking southwards from Horden Point (/0201C02)

Significant ongoing erosion to the colliery spoil to the North of the bay. Note – tension cracks and debris piles (/0201C02)

Informal access steps benched through the colliery spoil (/0201C02)

Minor erosion to colliery spoil to the south of the bay (/0201C02)

In many locations there is debris on the beach such as old pipes and metalwork that is being exposed as the spoil erodes. In the previous inspection numerous car wreckages were reported, these have now been removed. There are also several outfall structures located within in the frontage including a large cast iron outfall and a concrete collared outfall. Both of these structures have failed and should be either repaired or removed from the foreshore.

Failed concrete collar outfall (/0202C02)

Failed large cast iron outfall (/0202C02)

There are numerous watercourses that cross the foreshore along the frontage, it apparent that they are causing localised erosion through colliery spoil. The most significant is Castle Eden Dene, that has incised two large channels through the spoil as well as undercutting the toe of the slope behind. During the 2022 inspection, there was no flow at all in the Castle Eden Dene.

Former mouth of Castle Eden Dene eroding channel through foreshore and undercutting cliff toe. (/0202C02)

Mouth of Castle Eden Dene eroding significant channel through (/0202C02)

3.3 Blackhall Rocks to Heugh Breakwater (MA 11)

3.3.1 Blackhall Rocks and Crimdon Park Caravan Site

At Blackhall Rocks there is an extensive rocky outcrop on the foreshore, and the backing cliffs have extensive cave formations at their base. No noticeable change has occurred to the caves since the 2020 inspection.

The frontage south of Blackhall Rocks is protected by the rock scar outcrops on the foreshore. The cliffs are formed from softer material overlying a near vertical hard rock base. Numerous slumps of softer material were again noted at the toe of the cliffs during the 2022 inspection, however some of the debris piles were well vegetated suggesting they occurred some time ago. The north of the bay has additional protection in the form of residual colliery spoil on the upper beach, the cliffs in this location appear less active than further south. Rock falls from over-steepened/overhanging sections are evident locally.

The main access steps from Crimdon Dene Caravan Park remain closed due to cliff falls in two locations. As previously reported, the fence appears to have been relocated landward in the region of the slip. As the cliff is expected to continue to erode the fence should be regularly relocated as required. The lower section of the remaining access steps to the north of the caravan park is retained by wire mesh gabion baskets. These baskets are showing minor defects including deformation, bulging and several holes. The baskets should be repaired to prevent further deterioration and ensure access onto the beach is maintained.

Vast cave formation at Blackhall rocks (/0301C01)

Less active cliffs to the north, protection by the residual colliery spoil (/0301C01)

Gabion baskets retaining access ramp in poor condition (/0301C01)

Large-scale slump of softer material (/0301C01)

3.3.2 Crimdon Park Caravan Site to Crimdon Beck

From Crimdon Park Caravan Site to the southern limit of Durham County Council's jurisdiction, at the boundary with Hartlepool Borough Council at Crimdon Beck. The beck diverts to the south as it enters the beach, causing erosion of the front face of the dunes within Hartlepool Borough Council's area.

The Durham frontage here comprises of extensive dunes. The profile of the dunes remained similar to previous surveys suggesting these remain relatively inactive. The dunes are generally in a healthy condition, although a network of access tracks have been eroded through the foredunes adjacent to the caravan park access steps.

An area of stable upper beach immediately to the north of Crimdon Beck has fencing erected to safeguard nesting Little Terns. Ringed Plover, Greenshank and Common Sandpiper are also frequent at this location. At the time of the 2022 inspection, there were ongoing issues with Bird Flu affecting wildfowl and seabirds along the north east coastline. One dead gannet was observed on Crimdon Beach during the inspection.

Stable dunes at Crimdon, access paths trodden through dunes (/0301C02)

Stable dunes at Crimdon (/0301C02)

4. Comparison with Previous Assessment

The previous formal walkover inspections across the whole study frontage were undertaken in summer 2020. The frontage remains largely unchanged in overall condition grading and behaviour patterns since that time, with few major problems.

Seaham sea wall continues to deteriorate in condition with the number and severity of defects increasing to the south of the structure.

The colliery spoil beaches along the frontage continue to erode landwards. It appears significant retreat has occurred to the north of Blast Beach.

At Loom, the retreating cliff top is creating a pinch point with the coastal path where the path is backed by mature vegetation. The large failure through the coastal footpath, reported previously, has been fenced off and footpath diverted.

At Horden beach, erosion of the colliery spoil platform has created an approximately 2m cliff in places, cutting off access onto the foreshore. As a result, informal access steps have been benched through the spoil to maintain access. The steps have started to round through marine action.

5. Problems Encountered and Uncertainty in Analysis

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

The assets around Seaham Harbour are privately owned by the Seaham Harbour Dock Company and access to North Pier, South Pier and South Dock in particular is prohibited due to port-related activity. Due to this several structures were only inspected from a distance. It is recommended that a programme of vessel-based inspections (and if necessary underwater inspections) is undertaken by the Seaham Harbour Dock Company to inform their ongoing maintenance and capital investment regimes.

Some localised sections of the cliff were only visible from the cliff top due to inaccessible foreshores, particular around Shippersea Point and Beacon Point.

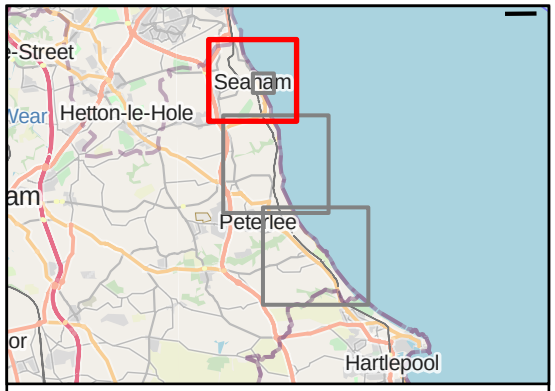
6. Conclusions and Recommended Actions

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

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

Appendices

Appendix A
Asset Location Maps



Legend

Coastal Asset location

NFCDD Asset Number

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

Title:

Figure 1 - Map 1

COASTAL ASSET LOCATIONS

Durham County Council Frontage

Report:

Asset Inspection Report

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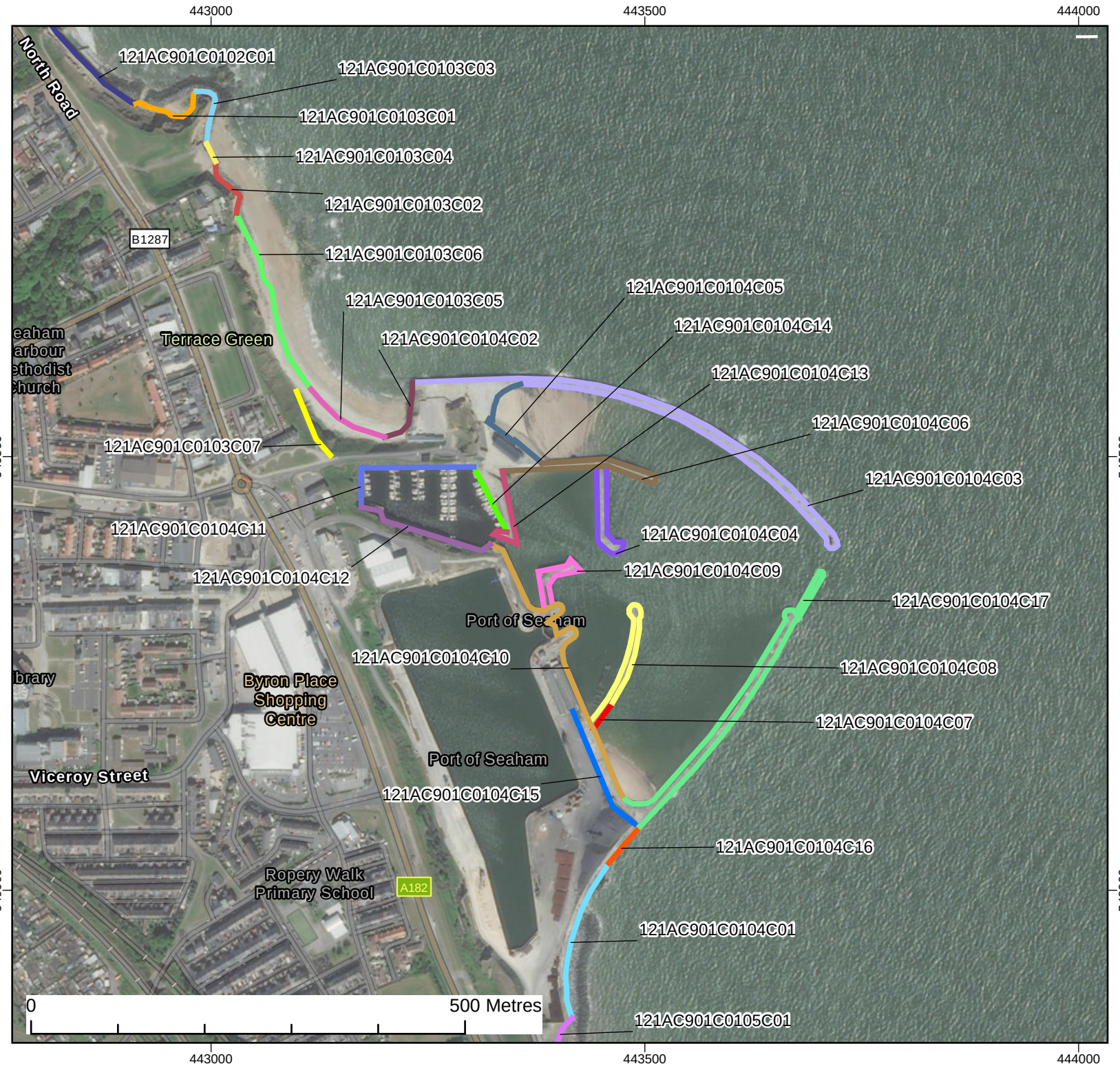
Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory



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Coastal Asset location

NFCDD Asset Number

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

Title:

Figure 1 - Map 2

COASTAL ASSET LOCATIONS

Durham County Council Frontage

Report:

Asset Inspection Report

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

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory

Legend

Coastal Asset location

NFCDD Asset Number

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

Title:

Figure 1 - Map 3

COASTAL ASSET LOCATIONS

Durham County Council Frontage

Report:

Asset Inspection Report

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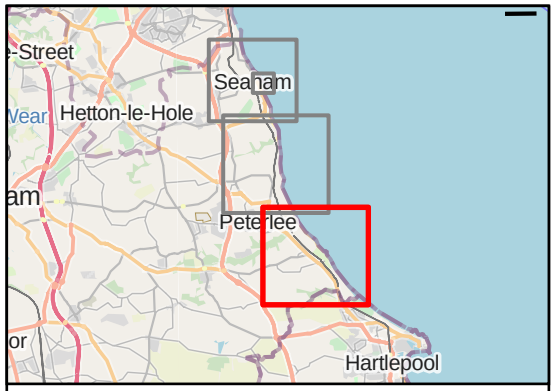
Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory



Legend

Coastal Asset location

NFCDD Asset Number

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

Title:

Figure 1 - Map 4

COASTAL ASSET LOCATIONS

Durham County Council Frontage

Report:

Asset Inspection Report

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

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory

Appendix B
Asset Condition & Recommendations

Asset Name	Description	Type	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
121AB901B0804C01	Eroding cliff to agricultural land.	Cliff	1193	31/05/2022	Royal HaskoningDHV	Small-scale but regular ongoing slumping in soft material that overlays the solid geology base. Occasional caves and arches formed at the base of the cliffs. Coastal path in close proximity to retreating cliff top. Sloping revetment adjacent to beach access steps outflanked and fill washed out.	3	>20	Continue monitoring, attention to be paid to cliff top path alignment. Review need for sloping revetment adjacent to beach access steps and refurb or remove accordingly.	Routine
121AC901C0102C01	Seaham Seawall and Prom.	Wall	1098	31/05/2022	Royal HaskoningDHV	Seawall in fair condition, deteriorating to the south. Abrasion damage evident in places. Many derelict groynes visible. Groyne piling on lower beach appears redundant (S end) poss H&S hazard. Abrasion damage at access ramp exposing reinforcement posing public safety risk. Concrete apron to the south in poor conidtion with sections missing and voiding visible beneath toe.Three individual lengths of sheet steel pile toe to main wall. Buried under beach no visual inspection.	3	11 - 20	Review need for groynes and refurb or remove redundant groyne piling. At access ramp, trim protruding reinforcement and repair abrasion damage.	urgent
121AC901C0103C01	Rock Armour protecting north face of Featherbed Rocks headland.	Rock Armour	93.5	31/05/2022	Royal HaskoningDHV	Rock armour berm/revetment extends around Featherbed Rocks. Armour in good condition. Some continued erosion of sea cliffs to south where berm is seaward of cliff toe. Some outflanking between concrete platform/cliffs to south of headland.	3	>20	Monitor.	no repairs
121AC901C0103C03	Rock Armour protecting concrete wall to base of eroding cliff. South face of Featherbed Rocks headland.	Rock Armour	78.6	31/05/2022	Royal HaskoningDHV	Rock armour revetment constructed in front of cliff toe. Ongoing slow erosion of cliff behind through weathering.	3	11 - 20	Monitor cliff behind armour	no repairs

Asset Name	Description	Type	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
121AC901C0103C04	Dawdon Dene Outfall. Rock armour protecting short length of wall with large outfall.	Rock Armour	22.6	31/05/2022	Royal HaskoningDHV	Rock armour protecting short length of wall with large outfall. Wall in fair condition, armour good. Damage to wall at S corner where returns toward eroding rock outcrop. Large cracks in wall face at N end. Exposed reinforcement in wingwall to outfall.	3	11 - 20	Monitor for outflanking. Repair cracks in crest wall.	routine
121AC901C0103C02	Rock Armour fronting concrete wall to base of eroding cliff.	Rock Armour	72.6	31/05/2022	Royal HaskoningDHV	Rock armour revetment in good condition, but erosion of cliff edge continues due to weathering. Clifftop now at fence line, fence debris observed on the cliff face in 2022.	3	>20	Remove debirs from cliff face and clifftop.	routine
121AC901C0103C06	Cliff backing Red Acre beach. Undefended over much of length, but some light protection by rock armour in north.	Cliff	223.3	31/05/2022	Royal HaskoningDHV	Partly undefended, but is a 'transition zone' from rock armour to north to undefended bay. Cliffs in south well vegetated, but with signs of continued slumping. Erosion and slumping continue in north, with sheds / fence close to edge.	3	>20	Public safety needs monitoring - access to cliff top controlled by fencing.	routine
121AC901C0103C07	Retaining wall to access ramp onto Red Acre beach.	Wall	84.1	31/05/2022	Royal HaskoningDHV	Diagonal cracking to seaward face of wall retaining access ramp/steps. Beach levels high. Minor cracking to retaining wall at toe of slope to rear of ramp. Local movement of ramp deck posing trip hazard, location of movement coincides with transition/cracks in rear wall.	3	11 - 20	Repairs to cracks. investigate cause of movement at ramp and repair accordingly.	urgent
121AC901C0103C05	High shingle/cobble beach to backing cliff	Cliff	103.9	31/05/2022	Royal HaskoningDHV	High levels of pebble beach berm protecting cliff toe. Upper beach remains high but has steepened.	2	>20		no repairs
121AC901C0104C02	Rock armour slope to rear of harbour area reclaiming land.	Rock Armour	80.7	31/05/2022	Royal HaskoningDHV	Substantial rock armour sizes and stable profile of works. Some erosion of land at root, but not worsened since 2008. Low spot adjacent to mesh storage where local erosion to the bank noted,	2	>20	Monitor.	no repairs

Asset Name	Description	Type	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
121AC901C0104C03	North Pier to Harbour. Including crest wall to river end of North Pier. Overtopping protection to pier and reclaimed land.	Wall	986.3	31/05/2022	Royal HaskoningDHV	Seaward face and crest not accessible. Inner face fair, evidence of repairs, which are holding. Some missing mortar and voids between masonry blocks. Structure is heavily overtopped at high tide.	3	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C05	Dressed masonry revetment slope in harbour.	Revetment	146.5	31/05/2022	Royal HaskoningDHV	Low vertical wall between beach and car park good. Sloping dressed masonry revetment has missing mortar betweeen blocks and vegetation growth/ dune development in gaps. Uneven profile noted in slope of revetment which may be indicative of loss of fill causing block settlement	3	>20	Grout gaps between blocks in revetment. Monitor revetment profile for movement.	routine
121AC901C0104C06	Massive masonry breakwater. Vertical sided on southern side at landward end only.	Breakwater	323.8	31/05/2022	Royal HaskoningDHV	**Access Prohibited.** Only inspected from north side due to access restrictions. North side fair, some missing grout between masonry blocks.	3	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C11	Masonry retaining wall to high ground inshore.	Wall	175	31/05/2022	Royal HaskoningDHV	Some missing grout between masonry blocks.	3	>20	Re-pointing to fill gaps.	routine
121AC901C0104C12	Masonry retaining wall to high ground inshore.	Wall	164.2	31/05/2022	Royal HaskoningDHV	Some missing grout between masonry blocks.	4	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C14	Masonry retaining wall to high ground inshore.	Wall	84.2	31/05/2022	Royal HaskoningDHV	Some missing grout between masonry blocks.	3	>20	Re-pointing to fill gaps.	routine
121AC901C0104C13	Breakwater between north dock and outer harbour.	Breakwater	132.8	31/05/2022	Royal HaskoningDHV	Some missing grout between masonry blocks.	3	>20	Re-pointing to fill gaps.	routine
121AC901C0104C04	Masonry toe on seaward side only.	Breakwater	231	31/05/2022	Royal HaskoningDHV	**Access Prohibited.** Only viewed from Marina side due to access restrictions. Appears fair overall. Some missing mortar between masory blocks.	3	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C09	Breakwater side slopes vary along length. Damage in parts. Some concrete bagwork repairs.	Breakwater	172.6	31/05/2022	Royal HaskoningDHV	**Access Prohibited.** Inspected on north face from North Dock only. Appeared in poor condition with missing blocks evident. Missing grout between blocks.	4	>20	Re-pointing to fill gaps.	routine
121AC901C0104C08	Breakwater is pierced by regular holes at high tide level.	Breakwater	277.6	31/05/2022	Royal HaskoningDHV	**Access Prohibited.**	0	>20	Detailed inspection by Seaham Harbour Dock Company.	routine

Asset Name	Description	Type	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
121AC901C0104C07	Breakwater is pierced by regular holes at high tide level.	Breakwater	37.5	31/05/2022	Royal HaskoningDHV	**Access Prohibited.**	0	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C10	Breakwater between seaham south harbour and outer breakwater.	Wall	412.9	31/05/2022	Royal HaskoningDHV	**Access Prohibited.** Appeared fair but only viewed from distance.	3	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C15	Breakwater between seaham south harbour and outer breakwater.	Wall	150.6	31/05/2022	Royal HaskoningDHV	**Access prohibited.** Appeared fair but only viewed from distance.	3	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C17	South Pier to Harbour acting as protection to internal frontages.	Breakwater	746.7	31/05/2022	Royal HaskoningDHV	**Access prohibited.** Only inspected from cliff due to access restrictions.	3	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C16	Root of South Pier with a recurved splash wall set back from main wall. Protection against overtopping into South Dock.	Wall - Seaham	55.4	31/05/2022	Royal HaskoningDHV	**Access prohibited.** Only inspected from cliff due to access restrictions. Fronted by areas where rubble has been tipped on seaward side.	3	>20	Detailed inspection by Seaham Harbour Dock Company.	routine
121AC901C0104C01	Root of South Pier with recurved splash wall set back from main wall. Protection against overtopping into South Dock. Rock armour protection to wall.	Wall - Seaham	190.7	31/05/2022	Royal HaskoningDHV	**Access prohibited**. Only viewed from cliff due to access restrictions to port. Rock armour revetment appears to still be in good condition.	2	>20	2-yearly inspections.	routine
121AC901C0105C01	Rock Armour protecting eroding cliff to South of harbour within Dock Co. property. Derelict industrial land above.	Rock Armour	575	31/05/2022	Royal HaskoningDHV	**Access Prohibited.** Rock armour in good condition. In the north armour is against the toe, further south there is also a bund set forward of cliffs at former wall remanents. Cliffs to rear are protected but still evidence of surface movement and slow erosion.	2	>20	2-yearly inspections. Monitor for outflanking at S end.	no repairs
121AC901C0106C01	Chemical Beach - Colliery spoil slope protecting cliffs.	Cliff	366.9	31/05/2022	Royal HaskoningDHV	Colliery waste has now gone. Slowly eroding near vertical cliffs with little vegetation and occasional slumps in upper till.	3	>20	Clear-up of debris as spoil erodes. Monitor rate of cliff recession.	routine
121AC901C0107C01	Blast Beach - Spoil beach fronting now relict cliffs.	Cliff	1513	31/05/2022	Royal HaskoningDHV	Cliffing in colliery waste as it erodes back. Some local slumps and cracking in backing cliff. Coliery waste becoming narrow, esp at ends of bay. Erosion edge close to rear of pill box on beach at S of access steps.	3	>20	Monitor rate of erosion of colliery spoil and the rate of cliff recession.	no repairs
121AC901C0107C02	Chourdon Point - Hard rock cliff with overlying till.	Cliff	327.8	31/05/2022	Royal HaskoningDHV	Weathering of rock platform and slow erosion of cliffs, forming caves and arches. Unstable sections with caves and arches. Rockfalls at 'point' have left notable overhangs.	3	>20	2-yearly inspections.	no repairs

Asset Name	Description	Type	Length	Inspection Date	Inspector	Comments	Overall Condition	Residual Life	Recommendations	Urgency
121AC901C0201C01	Chourdon Point to Horden Point. Undefended Cliff / Scarp and bays with eroding colliery spoil.	Cliff	3489	13/06/2022	Royal HaskoningDHV	Generally localised slumping in softer material with arch/cave formation in base of harder rock. In some of the bays there is eroding colliery waste protecting the cliffs although in some locations only a narrow band remains. Large slip failure through coastal footpath and field boundary now fenced off.	3	>20	Monitor rate of erosion of colliery spoil and the rate of cliff recession. Reinstate fence around previously reported slippage	routine
121AC901C0201C02	Horden Point to Blackhalls Rock. Colliery spoil protecting backing cliffs.	Cliff	4913	13/06/2022	Royal HaskoningDHV	Long uninterupted length of eroding colliery spoil beach backed by cliffs. Occassional slumps in cliffs but good protection afforded by spoil beach except at headlands. Cliff in eroding beach about 2m high N of Blackhall, beach ridge at S end. Informal steps benched into spoil to maintain access to foreshore. Several failed outfalls.	3	>20	Monitor rate of erosion of colliery spoil and the rate of cliff recession. Repair or remove outfalls.	routine
121AC901C0301C01	Blackhalls Rocks to Crimdon Caravan Park. Undefended Cliff / Scarp	Cliff	1846	13/06/2022	Royal HaskoningDHV	Slumps in upper till evident along numerous sections, most active to the south fronting the caravan park. Main steps path to beach closed due to cliff falls. Gabion baskets retaining remaining access steps to the north of caravan park have minor defects.	3	>20	Monitor erosion of cliff. Repair gabion baskets at remaining access steps.	Routine
121AC901C0301C02	Undefended dunes fronted by sandy beach - south of Crimdon Caravan Park	Dunes	1056	13/06/2022	Royal HaskoningDHV	Dunes and beach in front of and protecting cliffs. Dunes appear relatively stable and well vegetated. Network of access tracks eroded through foredunes.	2	>20	Monitor changes to dunes.	no repairs