ROYAL HASKONING

Halcrow

Cell 1 Regional Coastal Monitoring Programme
Coastal Walkover Inspections 2010

Sunderland City Council

Sunderland City Council
Final Report

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Contents

Appendices

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Abbreviations and Acronyms

Acronym / Abbreviation	Definition
CAM	Condition Assessment Manual
NFCDD	National Flood and Coastal Defence Database

Asset Condition Grades

Grade	Condition Description
1	Very Good
2	Good
3	Fair
4	Poor
5	Very Poor

Glossary of Terms

Term	Definition
Beach nourishment	Artificial process of replenishing a beach with material from another source.
Berm crest	Ridge of sand or gravel deposited by wave action on the shore just above the normal high water mark.
Breaker zone	Area in the sea where the waves break.
Coastal squeeze	The reduction in habitat area which can arise if the natural landward migration of a habitat under sea level rise is prevented by the fixing of the high water mark, e.g. a sea wall.
Downdrift	Direction of alongshore movement of beach materials.
Ebb-tide	The falling tide, part of the tidal cycle between high water and the next low water.
Fetch	Length of water over which a given wind has blown that determines the size of the waves produced.
Flood-tide	Rising tide, part of the tidal cycle between low water and the next high water.
Foreshore	Zone between the high water and low water marks, also known as the inter-tidal zone.
Geomorphology	The branch of physical geography/geology which deals with the form of the Earth, the general configuration of its surface, the distribution of the land, water, etc.
Groyne	Shore protection structure built perpendicular to the shore; designed to trap sediment.
Mean High Water (MHW)	The average of all high waters observed over a sufficiently long period.
Mean Low Water (MLW)	The average of all low waters observed over a sufficiently long period.
Mean Sea Level (MSL)	Average height of the sea surface over a 19-year period.
Offshore zone	Extends from the low water mark to a water depth of about 15 m and is permanently covered with water.
Storm surge	A rise in the sea surface on an open coast, resulting from a storm.
Swell	Waves that have travelled out of the area in which they were generated.
Tidal prism	The volume of water within the estuary between the level of high and low tide, typically taken for mean spring tides.
Tide	Periodic rising and falling of large bodies of water resulting from the gravitational attraction of the moon and sun acting on the rotating earth.
Topography	Configuration of a surface including its relief and the position of its natural and man-made features.
Transgression	The landward movement of the shoreline in response to a rise in relative sea level.
Updrift	Direction opposite to the predominant movement of longshore transport.
Wave direction	Direction from which a wave approaches.
Wave refraction	Process by which the direction of approach of a wave changes as it moves into shallow water.

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 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.

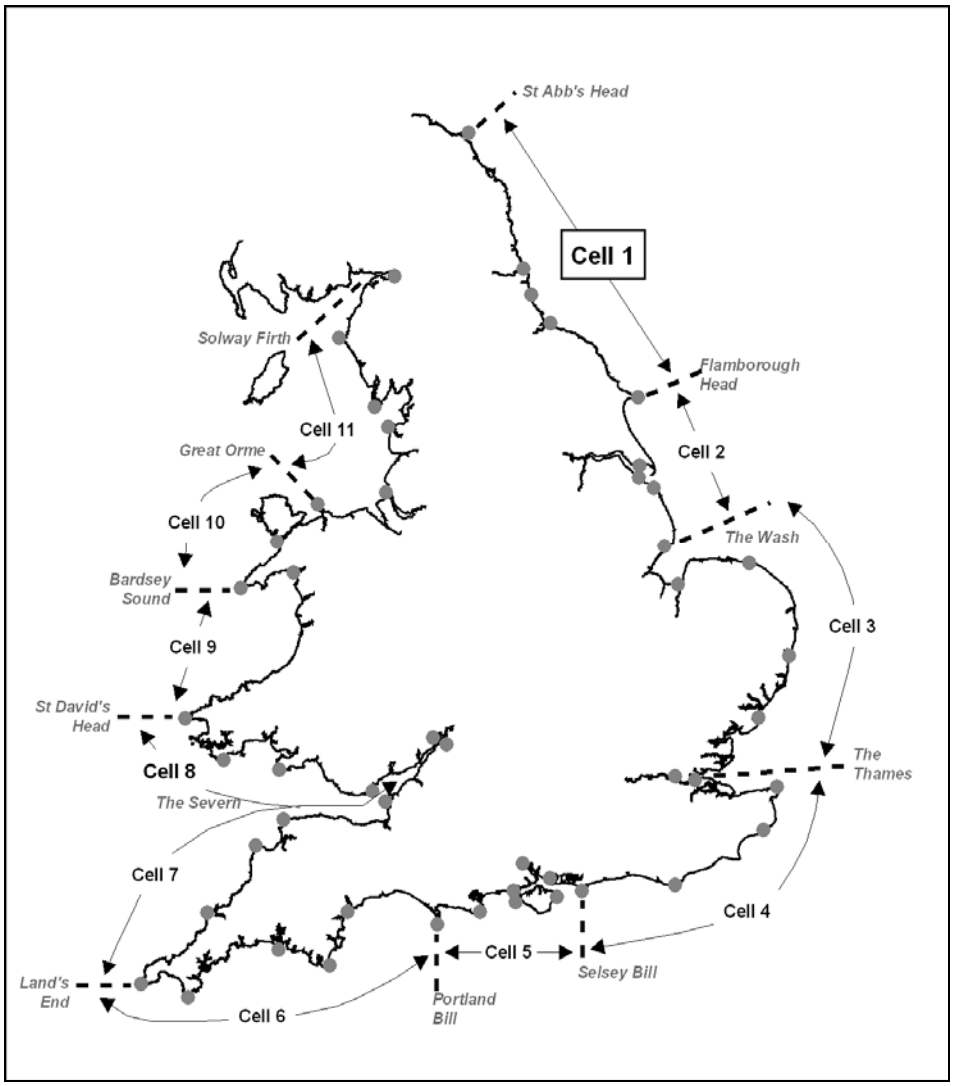


Figure 1 - Sediment Cells in England and Wales

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

The data collection, analysis and reporting is being undertaken as a partnership between 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
- walk-over surveys

The present report is **Coastal Walkover Inspections 2010** and provides a summary of the main findings from the walkover inspections of Sunderland City 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

Sunderland City Council's frontage extends from The Bents in the north, to Ryhope Dene in the south. The northern section of the frontage to South Bents is made up of undefended limestone cliffs backing rock outcrops and a sand and shingle beach. North of the River Wear, the frontage is defended by 3.3km of concrete and masonry structures through Seaburn and Roker. The entrance to Sunderland Harbour lies between Roker Pier and the New South Pier. South of the Harbour entrance 4.3km of the frontage is backed by private property associated with the docks and infrastructure of the Port of Sunderland. To the south of the port boundary, there is a 1km length of defended frontage at Hendon, south of which 3km of the coastline is undefended and characterised by Magnesian Limestone cliffs capped with boulder clay.

1.2 Methodology

The walkover inspections for the Sunderland City Council frontage were undertaken on the 13th July 2010 (north of River Wear and Port of Sunderland) and 10th August 2010 (south of Port of Sunderland). The weather experienced during the inspections was dry and bright with good visibility.

The frontage has been split into a number of 'asset lengths' (Appendix A), the location and numbering of which correlates with those defined in the National Flood and Coastal Defence Database (NFCDD) which is maintained by the Environment Agency. All maritime Local Authorities that act as Coast Protection Authorities have a duty to report findings from walkover inspections into the NFCDD.

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 in accordance with the Environment Agency's Condition Assessment Manual (CAM), with estimates made of their residual life and assessments made of the urgency of any necessary repair work.

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.

In addition to this report, all detailed inspection reports and a selection of appropriate photographs have been entered into the NFCDD.

2. Overview

There have been only relatively minor changes in the condition of the built and natural defence assets along the Sunderland frontage since the previous formal inspections in December 2008.

The following findings were observed during the 2010 inspections:

- **Seaburn** – cracks are opening up between the seawall and concrete outfall structures.
- **Roker Cliff** – voids in the grouted masonry embankment identified in 2008 have expanded with further loss of fill material.
- **Port of Sunderland (north)** - a void and missing blocks were identified at the base of masonry seawall to the south of New South Pier.
- **New South Pier** – a steel panel lifted at the seaward end of the structure had exposed the former access passage in the body of pier which contained seawater.
- **North East Pier and South West Breakwater** – further deterioration of two structures which enclose the disused South Harbour and which were reported in poor to very poor condition in 2008.
- **Spur barrier to Hendon Banks Barrier** – further expansion of the length of wall affected following a loss of precast concrete coping units identified in 2008.
- **Cliffs between Hendon and Crimdon Dene** – multiple failures have occurred in the upper slope which have reduced the distance between the cliff edge and the public footpath in several locations. There has been the removal of an outfall and an access structure which were reported as failing in 2008.

3. Condition Assessment

3.1 The Bents

The frontage landward of the Whitburn Steel outcrop consists of an undefended natural grassed embankment fronted by vegetated sand dunes (right). The dunes appeared relatively stable with good vegetation cover and minimal erosion at the toe.

The promenade is fronted by concrete and masonry seawalls. The beach level in 2010 (below right) was higher than observed during the 2008 inspection (below left) and shingle was present up against the seawall. The walls are in fair condition with several longitudinal cracks and vertical cracks extending through the full visible height of the wall. Mortar is missing locally and the structures would benefit from local repointing.

3.2 Seaburn

The beach level falls to the southern end of Whitburn Sands, exposing more of the seawalls. The structure here is formed from masonry with a concrete coping. The masonry appeared in good condition with minor loss of mortar locally and evidence of infilling of previous cracking. The concrete coping was also in fair condition, with minor spalling evident throughout, particularly along the seaward edge.

Two concrete outfall structures are located immediately seaward of the seawall (one shown right). Vertical cracks were present (below left) and construction joints had opened in the outfall structures (below right) suggesting that minor settlement may have occurred. Although this did not appear to adversely effect the seawall, the structures should be monitored as any excessive movement could damage the wall behind. It would be beneficial to infill the cracks to minimise the effect of freeze-thaw action.

South of the access steps opposite Dykelands Road, the precast concrete coping takes on a curved profile with a precast concrete parapet wall replacing the steel guardrail. The concrete of the coping was extensively spalled along most of its length and patchwork repairs were evident locally (right).

The parapet wall has a stepped profile on the landward side which is used to support benches. Rust staining was present throughout although this appeared to be from the benches rather than reinforcement from the concrete (below left). The base of the wall was spalled with most significant damage occurring around the drainage holes. The bitumen surface of the promenade was also worn locally along the base of the wall and extending landward locally, most likely as a result of overtopping (below right).

3.3 Parsons Rocks

Local damage was observed to the grouted stone revetment landward of the promenade around Roker Cliff Park (right). Voids identified in the 2008 inspection (below left) appeared to have deepened in the interim with further loss of infill material. One of the voids has had a lifebelt stand installed into a concrete base although it appears that the remainder of the void was not filled during this operation (below right).

It would be prudent to infill the voids to minimise the risk of further expansion and the potential reduction in stability of the embankment above.

The masonry seawall backing Parson's Rocks is in good condition (below left). The masonry structure ties in with the elevated rock outcrop at its southern end. Here grouted rubble has been used to infill voids between the rock and the masonry and these repairs appeared to be performing well (below right).

The steep slopes above the promenade appeared to be relatively stable and no significant changes from the 2008 inspection were noted. Local erosion and minor slope failure has exposed geotextile material below the topsoil and vegetation at the crest to the south of the access steps from Whitburn Road.

3.4 Roker

South of Parson's Rocks, the high masonry wall with concrete coping was in generally good condition (below left) with only minor loss of mortar and spalling noted (below right). The natural cliff above appeared to be relatively stable.

The low level concrete wall fronting Marine Walk was in good condition. Minor damage has occurred to the finish of a set of access steps, exposing the concrete infill (below left). Cracking was evident in the concrete access ramp at the northern end of Marine Walk (below right). Minor shrinkage cracking in the concrete cladding has not worsened from that reported in 2008.

Open jointing and cracking was observed around the fixings of the steel guardrail sections into the masonry seawall (below, left and right). The coping stones appear to have lifted locally, opening the joint between the coping and the masonry wall. Minor pointing should be used to infill any gaps and worst affected coping stones removed and reset.

Roker Pier appeared to be in good condition above the waterline, with no significant changes from the 2008 inspection (below left). Previous local repairs to the concrete deck appear to be working well, however, several longitudinal cracks were identified which would benefit from infilling to minimise water ingress (below right).

South of Roker Pier the masonry and concrete seawall is in good condition with evidence of previous patch repairs. A construction joint appears to be widening below the top slab of the structure (below left) and minor impact damage is evident in the concrete coping (below right). The level of the fronting beach was similar to that observed in 2008.

The rock armour revetment fronting the public car park (right) is in good condition with no significant movement of armour units which maintain suitable interlock and a good profile throughout. The concrete seawall and the walls of the car park behind appeared in good condition.

3.5 Old North Pier

It is understood that The Old North Pier is not included in Sunderland City Council's revenue or capital programmes. Although located in the sheltered area between Roker Pier and the New South Pier, the Old North Pier structure will act to retain beach material to the north and act to reduce sediment passing into the navigation channel through the harbour entrance. The structure is included in the present condition assessment for reference.

The structure remains fenced off to members of the public (below left) with signs describing the structure as unsafe and therefore assessment was not possible. From the landward end, the structure appeared in similar condition to that reported in 2008 with missing concrete and masonry from both the grouted revetment forming the northern face and the masonry wall forming the southern face (below right). No significant global movement or distress was visible from the landward end.

3.6 Port of Sunderland

The frontage to the south of the mouth of the River Wear is inaccessible to members of the public as it forms the boundary of the Port of Sunderland.

The northernmost structure consists of a grouted stone revetment with a rock armour toe (below left). The revetment ties into a masonry seawall with a precast concrete recurve crest. The wall was in good condition, with minor spalling and cracking of the concrete and spalling to the surface of the concrete walkway to the rear.

South of the revetment, the seawall is backfilled with random rubble (below right). Reinforcement bars stand vertically from the top of the concrete wall and it appears these were placed to allow the continuation of a concrete boundary wall which has not been carried out. The crest level is lower around the tie in with the risk of fill material washout. This did not appear to be a problem at present as the rubble was as observed in the 2008 inspections. However, this should continue to be monitored because extensive loss of material may lead to collapse or outflanking of the seawall to the south.

The masonry and concrete seawall to the south is in good condition with only minor impact damage and spalling of the seaward edge. The concrete apron to the rear of the wall has experienced a deterioration of the surface due to overtopping. The rubble embankment landward of the seawall appeared unaffected by overtopping, with consistent profile and light vegetation coverage.

An area of sand and shingle was present between the seawall and the New South Pier with a similar amount of material to that observed in 2008.

3.6.1 New South Pier

The New South Pier appeared to be generally in good condition (below left) with only minor defects of mortar loss between masonry blocks and minor cracking to concrete elements noted. There were no signs of global movement and distress which suggest that below the waterline the foundations of the structure are functioning satisfactorily.

Repairs have previously been carried out to the deck of the pier, with insitu concrete slabs. This work was not completed and a section of deck has been prepared for an insitu concrete pour but not yet filled with concrete (below right). This does not appear to have any adverse effect on the structure although it would be prudent to infill the section to prevent water ingress into the surrounding repairs.

A former access passage runs through the centre of the structure. The openings to the passage are now covered with steel panels, however, the panel nearest the nose of the pier has been lifted by the force of the water (right). The void within the pier was observed to be full of water which oscillated with wave action. The structure appeared unaffected but this may be a potential source of problems as water passing through the body of the structure may start to wash out fine materials and hydraulic forces applied within the structure may reduce its integrity. The pier acts to shelter the harbour entrance to the north and should continue to be regularly monitored and maintained.

Minor local voids were evident in the top surface (left) near where the crest wall ties into the defences to the seawall to the south, exposing concrete infill. The voids should be infilled to prevent water ingress which may lead to deterioration of the wall. Similar repairs appeared to have been carried out previously.

A void was visible at the base of the wall, with approximately eight masonry blocks missing from the seaward face (below, left and right). It was not possible to ascertain the depth of the void as the tide prevented access. Further investigation should be carried out and an appropriate local repair carried out urgently to prevent the void expanding.

Above the void, work has been carried out to repair concrete slabs which have previously been lifted from the crest (steel posts used to provide edge protection during these works are still present). The construction joint between the concrete slabs and the coping stones appears to have widened (left) which could indicate the slabs are lifting once again or perhaps that the coping stones are moving seaward, possibly indicating a global movement of the structure. The 1998 inspection reported the wall to be undermined and in poor condition although it was not possible to inspect the toe due to the presence of rock armour and the high water level. The joint should be monitored to identify any further movement and inform potential remedial work.

The southern extent of the wall appeared to be cantilevered slightly due to loss of material and/or displacement of rock armour units (right). Bagwork is present as a local repair although unsupported concrete blocks appeared to have moved slightly. The structure appeared stable, however, this area is likely to be a potential weakness from which the structure could start to unravel and future monitoring is important.

The rock armour was in good condition with appropriate voids and good interlock between armour units and no significant movement or loss of material. South of the seawall, the sea defence comprises of a rock revetment (with some concrete blocks) which was in fair condition with minor displacement of material and local slumping of the crest.

The remains of a collapsed concrete groyne are still present. The groyne appeared in a similar condition to that reported in 2008, suggesting minimal loss of material. The remains did not appear to have adverse effects on the surrounding rock armour and will have a negligible effect on wave energy and sediment transport along the frontage. A degree of protection will be provided by the South Rocks outcrop.

3.6.2 South Outlet

The South Outlet is formed between the North East Pier and the South West Breakwater. As reported in 2008, the structures remain in poor and fair condition respectively and appeared to have experienced further degradation although no significant failures.




Extensive erosion was evident to the seaward face of the North East Pier, with local loss of material and void formation (above top left & right). The deck was severely abraded and evidence of chloride attack was noted (above, bottom left). Exposed reinforcement was observed throughout. The roundhead of the pier has become detached (above, bottom right) with significant material loss, leaving the exposed nose of the pier vulnerable to wave attack and reducing the level of protection to the South Outlet. Significant movement/settlement of concrete blocks has occurred in proximity to the former roundhead.

The landward face of the structure was in slightly better condition. Concrete blocks form abutment walls which are generally intact although the concrete was extensively abraded with spalling and rust staining present throughout.

The South West Breakwater has experienced further degradation of the concrete deck of the roundhead. There was evidence of undercutting and displaced masonry blocks at the seaward end of the structure at the tie in between the masonry and the concrete roundhead, particularly on the northern side (below left) although global movement of the structure was not evident. The southern side was generally in good condition although the upper section was badly abraded with exposed reinforcement (below right).

The South West Breakwater requires extensive remedial work and the North East Pier requires major refurbishment or possible replacement although the importance of maintaining the South Outlet is unlikely to be significant enough to justify the significant capital expenditure required. The size of the structures means that they will continue to provide some protection to the headland even if no remedial action or maintenance program is undertaken. Monitoring should continue, to ensure that the protection provided is sufficient for the needs of the Port and therefore a strategy should be developed for the South Outlet which incorporates the development plans of the Port.

3.6.3 Spur Barrier to Hendon Banks Barrier

This frontage is comprised of concrete seawalls with sheet piles at the toe and rock armour in places (below, left and right).

The structures appeared to be in good condition throughout. The condition of the steel sheet piles could not be ascertained due to the water level, although the visible sections appeared in fair condition with no signs of global movement or distress in the walls which may be associated with problems below the waterline. Minor cracking and surface deterioration reported in 2008 was still present and had not worsened significantly.

Surface deterioration locally associated with chloride attack has created a ‘cratered’ profile on the surface of an insitu concrete repair (below left). A widening of construction joints between the concrete apron and the concrete coping (below right) and local spalling was observed in several locations. Local patch repairs should be implemented to prevent ingress of water.

The insitu poured concrete wall with timber piles and rubble backfill, located to the north of the sewage works was generally in fair to poor condition as reported in 2008 (right). The standard of defence could be improved significantly by the addition of an upgraded rock armour revetment, similar to that fronting the sewage works.

Erosion and scour was evident at the northern extent of the seawall fronting the sewage works, potentially exacerbated by scour effect around rock armour units. Loss of masonry blocks from the apron at the base of the wall has increased since the 2008 inspection (below, left & right).

As reported in 2008, several sections of precast concrete coping are missing, exposing reinforcement and concrete backfill (right). The extent of the missing section appeared to be similar between 2008 and 2010 (below, left and right respectively) although the recent inspection noted that precast sections either side of the missing sections were cracking and appeared to be displaced.

It is understood insitu concrete repairs have previously been placed at each end of the missing section to prevent water ingress behind the adjacent coping units although this had been washed out. The adjacent pre-cast concrete units appear likely to fail in the near future unless action is taken.

Concrete exposed by the loss of the coping units appears in fair condition although monitoring should continue as the defect appears to be unravelling the structure as it expands. A more robust repair or replacement of the missing units is recommended.

At the southern extent of the seawall fronting the sewage works, erosion of the concrete was more apparent. In this location reinforcement was beginning to be exposed and the exposed tops of sheet piles corroded significantly with rust staining of the concrete. This is due to the high wave energies in this area as waves predominantly run along the wall in a southerly direction. Rock armour units have been placed and sand/shingle is retained between the seawall and breakwater.

The breakwater marking the southern extent of the Port of Sunderland has failed at the seaward end (left). The breakwater appeared in a similar condition to that reported in 2008, with no further movement apparent, suggesting that the structure was reasonably stable.

3.7 Port of Sunderland to Grangetown

South of the port boundary the concrete Hendon Seawall is generally in good condition. Where present, rock armour is also in good condition with appropriate voids and good interlock between units (below left).

Sealant is missing from construction joints locally (below right). Minor spalling was evident around drainage holes with exposed reinforcement.

Erosion of the concrete was observed locally, with geogrid reinforcement becoming exposed (below left). This is most prevalent in close proximity to the rock armour units (below right) suggesting erosion exacerbated by scour. The defects did not appear to affect the structural integrity of the seawall.

Steel sheet piles were visible at the toe of the wall along the majority of the length. The piles displayed surface corrosion throughout (below left) and loss of section locally (below right). Corrosion appeared worst around bolt holes. The access ramp opposite Sea Beach Road showed the most extensive corrosion of the sheet piles and also exposure of reinforcement bars within the concrete.

3.8 Hendon Seawall to Ryhope Dene

Signage is present at the end of the promenade at the southern extent of Hendon Beach, warning members of public about the restricted access to the foreshore (left). The only formal access points are Hendon Beach and Ryhope Dene. Additional hazards included on warning signs include large breaking waves, tides and unstable cliffs.

The frontage comprises of Magnesian Limestone cliffs overlain by softer glacial till (below left). Local failure of upper cliff slopes is common along this frontage and appears to generally occur due to erosion by wind blown spray and weathering as opposed to mechanical action at the base of the cliffs (below right). Evidence of tunnelling by sand martins was also observed in the soft material.

Several slope failures occurred in close proximity to the cliff top footpath, with Halliwell Banks particularly affected (below left). Signs are present to warn members of the public that the cliffs are unstable and that there is no footpath along the cliff top (below right). However, the track appeared to be well worn and on the day of inspection, several people were observed using the footpath. Recent slope failures could potentially be obscured by long grass and the proximity of the retreating cliff edge to the footpath is an ongoing public health and safety concern.

Around local hard points such as Salterfen Rocks and Pincushion, cave formation, arches and small stacks are present. Cliff faces were sheer and undercut/overhanging in some areas (left). Large rock failures were observed locally although these appeared to be historic due to weathered appearance of the exposed surfaces.

Between the headlands formed by Salterfen Rocks and Pincushion, the frontage is not protected by a rocky foreshore and the slope failures were more extensive (right & below, left & right). Several failures appear to be more recent as exposed faces appeared clean. Vertical cracks were visible, identifying areas which may fail in the near future.

The southernmost extent of the Sunderland frontage is the steep-sided Crimdon Dene. Crimdon Beck was dry on the day of inspection and no evidence of erosion was present over the foreshore.

4. Comparison with Previous Assessment

The previous formal assessment across the whole study frontage was undertaken in November and December 2008.

The most significant change appears to have been the removal of two failing structures along the undefended Ryhope frontage (below).

The outfall pipe at the southern outfall is still present and now spans between the cliff and the remains of the concrete structure. Northumbrian Water Limited have fixed a banner to the pipe ("DANGEROUS STRUCTURE KEEP CLEAR") (below , left and right).

The condition of the hard defences along the frontage appears to be very similar to the 2008 inspections with no significant deterioration or improvement to the majority of the assets although several assets around parts of the Port of Sunderland remain in poor condition.

The most significant deteriorations in condition identified are the void in the base of the seawall and the further deterioration of the seawall adjacent to the missing coping units within the Port of Sunderland.

Less significant changes have also been identified at Roker Cliff Park (growth of voids in the revetment) and the Port of Sunderland (general deterioration of North East Pier and South West Breakwater at South Outlet).

5. Problems Encountered and Uncertainty in Analysis

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

The Port of Sunderland frontage is not accessible to members of the public and access was arranged with the cooperation of the port authorities.

6. Conclusions and Recommended Actions

The void identified at the base of the seawall within the Port of Sunderland should be repaired as a matter of urgency to avoid further damage to the asset. The missing precast concrete coping units in the seawall at the southern extent of the Port should be replaced with similar units or a robust repair implemented to prevent the unravelling of the structure over time.

Several assets, particularly around parts of the Port of Sunderland, remain in need of refurbishment and/or maintenance.

There is also the need for actions with respect to public safety, especially in areas where cliffs are susceptible to local collapse in close proximity to a ‘former’ cliff top footpath from Hendon to Ryhope Dene.

It is highly recommended that continued monitoring is undertaken for all assets, with specific recommendations for individual assets given in the table below:

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AB901B0602C01	Whitburn Sands	Undefended	Low	31/12/2012	Continue active monitoring	-
121AB901B0603C01	Whitburn Sands	Wall	Low	31/12/2012	Improve condition through maintenance	Remove vegetation & infill cracks.
121AB901B0603C02	Whitburn Sands	Wall	Low	31/12/2012	Improve condition through maintenance	Replace missing mortar at masonry/concrete joint.
121AB901B0603C03	Whitburn Sands	Wall	Low	31/12/2012	Improve condition through maintenance	Repoint. Replace missing mortar at masonry/concrete joint.
121AB901B0604C01	Whitburn Sands	Wall	Low	31/12/2012	Continue active monitoring	-
121AB901B0604C02	Parson's Rocks	Wall	Low	31/12/2012	Improve condition through maintenance	Repoint masonry wall.
121AB901B0605C01	Roker	Wall	Low	31/12/2012	Continue active monitoring	-
121AB901B0605C02	Roker	Wall	Low	31/12/2012	Improve condition through maintenance	Infill cracks between seawall and concrete outfall structures.
121AB901B0702C05	Roker	Wall	Low	31/12/2012	Improve condition through maintenance	Minor repointing to masonry wall around connection with steel guardrail.
121AB901B0702C04	Roker Pier	Pier	Medium	31/12/2012	Improve condition through maintenance	Minor repointing. Repairs to deck surface.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AB90 1B0702C 01	Roker	Wall	Low	31/12/2012	Continue active monitoring	Infill cracks in concrete wall.
121AB90 1B0702C 02	Roker	Wall	Low	31/12/2012	Continue active monitoring	-
121AB90 1B0702C 03	Roker	North Pier	-	-	Notify third party and seek action	Not included in coastal revenue or capital programmes
121AB90 1B0703C 03	Port of Sunderland	Wall	Low	31/12/2012	Continue active monitoring	-
121AB90 1B0703C 02	Port of Sunderland	Wall	Low	31/12/2012	Continue active monitoring	Patch repairs to spalling of concrete apron.
121AB90 1B0703C 01	Port of Sunderland	New South Pier	Low	31/12/2012	Improve condition through maintenance	Complete concrete repair.
121AB90 1B0801C 03	Port of Sunderland	Wall	High	31/12/2010	Include in capital programme	Infill void at base of wall. Monitor for potential lifting of deck slabs/seaward movement of coping. Fill joint.
121AB90 1B0801C 02	Port of Sunderland	Wall	Low	31/12/2010	Continue active monitoring	-
121AB90 1B0801C 01	Port of Sunderland	Groyne	Low	31/12/2012	Confirm asset as redundant	Concrete groyne has collapsed – negligible effect on frontage.
121AB90 1B0801C 06	Port of Sunderland	Revetment	Medium	31/12/2012	Improve condition through maintenance	Increase volume of armour or redistribute around exposed walls/piles.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AB901B0801C05	Port of Sunderland	Revetment	Medium	31/12/2012	Improve condition through maintenance	Provide rock armour to undefended frontage.
121AB901B0801C07	Port of Sunderland	Breakwater	High	31/12/2012	Continue active monitoring / include in capital programme (?)	Large scale remedial work to/replacement of derelict breakwater.
121AB901B0801C04	North East Pier	Pier	High	31/12/2012	Continue active monitoring / include in capital programme (?)	Full survey of structure. Large scale remedial works or replacement.
121AB901B0801C08	South Outlet	Revetment	Low	31/12/2012	Continue active monitoring	-
121AB901B0802C07	South Outlet	Revetment	Low	31/12/2012	Continue active monitoring	-
121AB901B0802C06	South Outlet	Revetment	Low	31/12/2012	Continue active monitoring	-
121AB901B0802C05	South West Breakwater	Breakwater	Medium	31/12/2012	Continue active monitoring / include in capital programme (?)	Full survey of structure. Local repair works to north face and upper level of south face.
121AB901B0802C04	Spur Barrier	Wall	Low	31/12/2012	Improve condition through maintenance	Routine maintenance
121AB901B0802C03	Port of Sunderland	Wall	Medium	31/12/2012	Improve condition through maintenance	Patch repairs to concrete seawall. Add rock armour revetment or similar to protect concrete seawall at Hendon Foreshore Barrier.
121AB901B0802C02	Port of Sunderland	Wall	Low	31/12/2012	Continue active monitoring	Routine maintenance

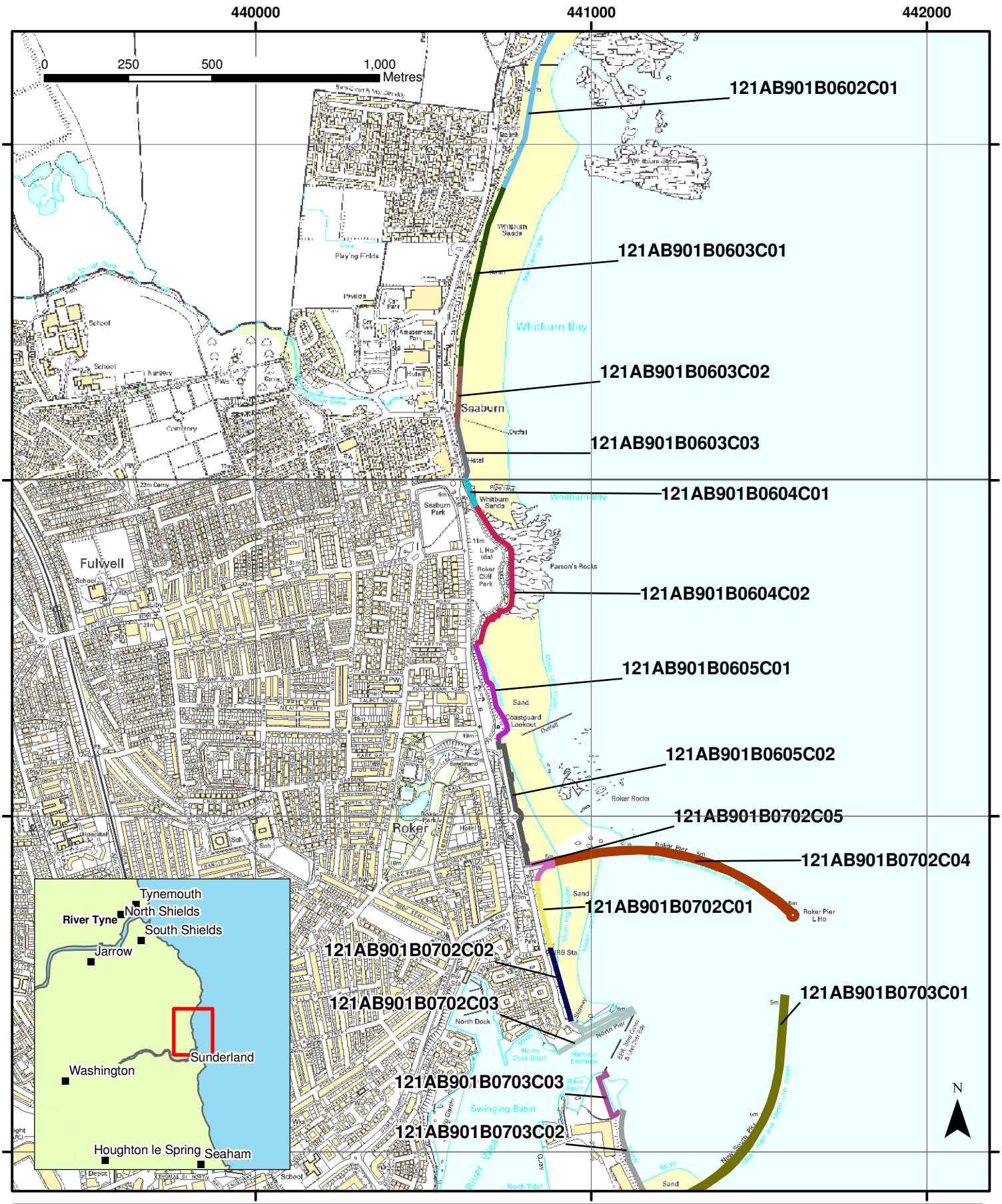
Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AB90 1B0802C 01	Hendon	Wall	Medium	31/12/2011	Include in capital programme	Replace missing concrete coping sections.
121AB90 1B0803C 02	Hendon	Wall	Low	31/12/2012	Improve condition through maintenance	Full survey of breakwater structure. Remedial work to remove failed seaward end of breakwater and make good exposed structure. Routine maintenance elsewhere.
121AB90 1B0803C 01	Grangetown	Cliff / scarp	Low	-	Continue active monitoring	Realign footpath landward when cliffs fail. Additional signage/access restrictions where possible.
121AB90 1B0804C 03	Grangetown	Cliff / scarp	Low	-	Continue active monitoring	Realign footpath landward when cliffs fail. Additional signage/access restrictions where possible.
121AB90 1B0804C 02	Ryhope	Cliff / scarp	Low	-	Continue active monitoring	Realign footpath landward when cliffs fail. Additional signage/access restrictions where possible.

***** The priority level encompasses the asset condition, residual life and weighting of the asset in addition to the nature, scale and cost of remedial work required. A guide to each of the priority levels is provided below:

Priority	Description
Low	Routine maintenance or local repairs
Medium	More significant survey and/or extensive maintenance work
High	Urgent investigation and/or extensive repair works. Potential replacement of asset elements or asset as a whole

Appendices

Appendix A
Asset Locations



Legend

Asset location

NFCDD Asset Number

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

Figure 1 - Map 1 Sunderland City Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:15,000 at A4

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Drawn by:	TC	Date: 24/05/2010
Checked by:	MD	Date: 28/05/2010
Approved by:	NC	Date: 28/05/2010

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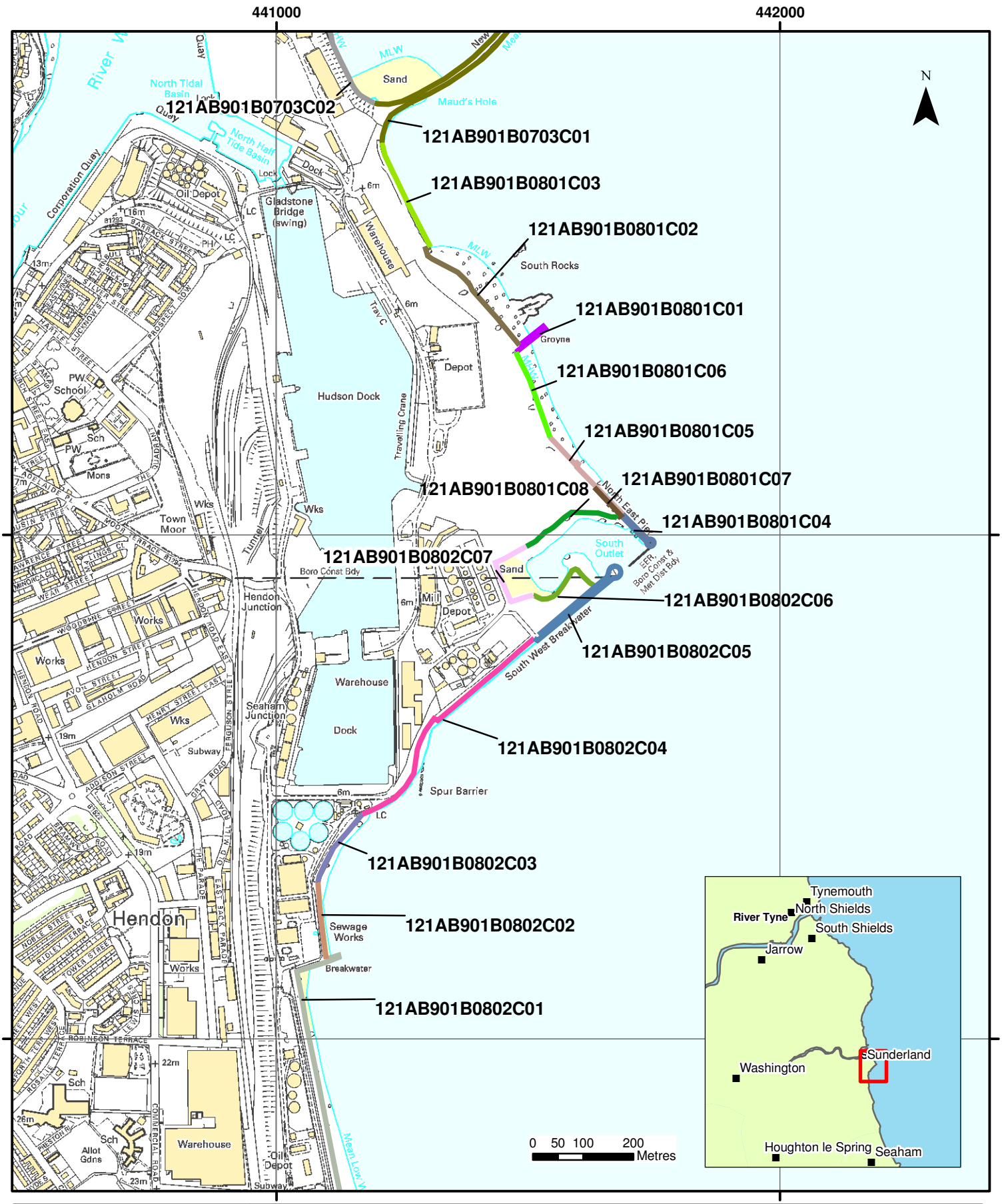

Legend

Asset location

NFCDD Asset Number

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

Figure 1 - Map 2 Sunderland City Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:15,000 at A4

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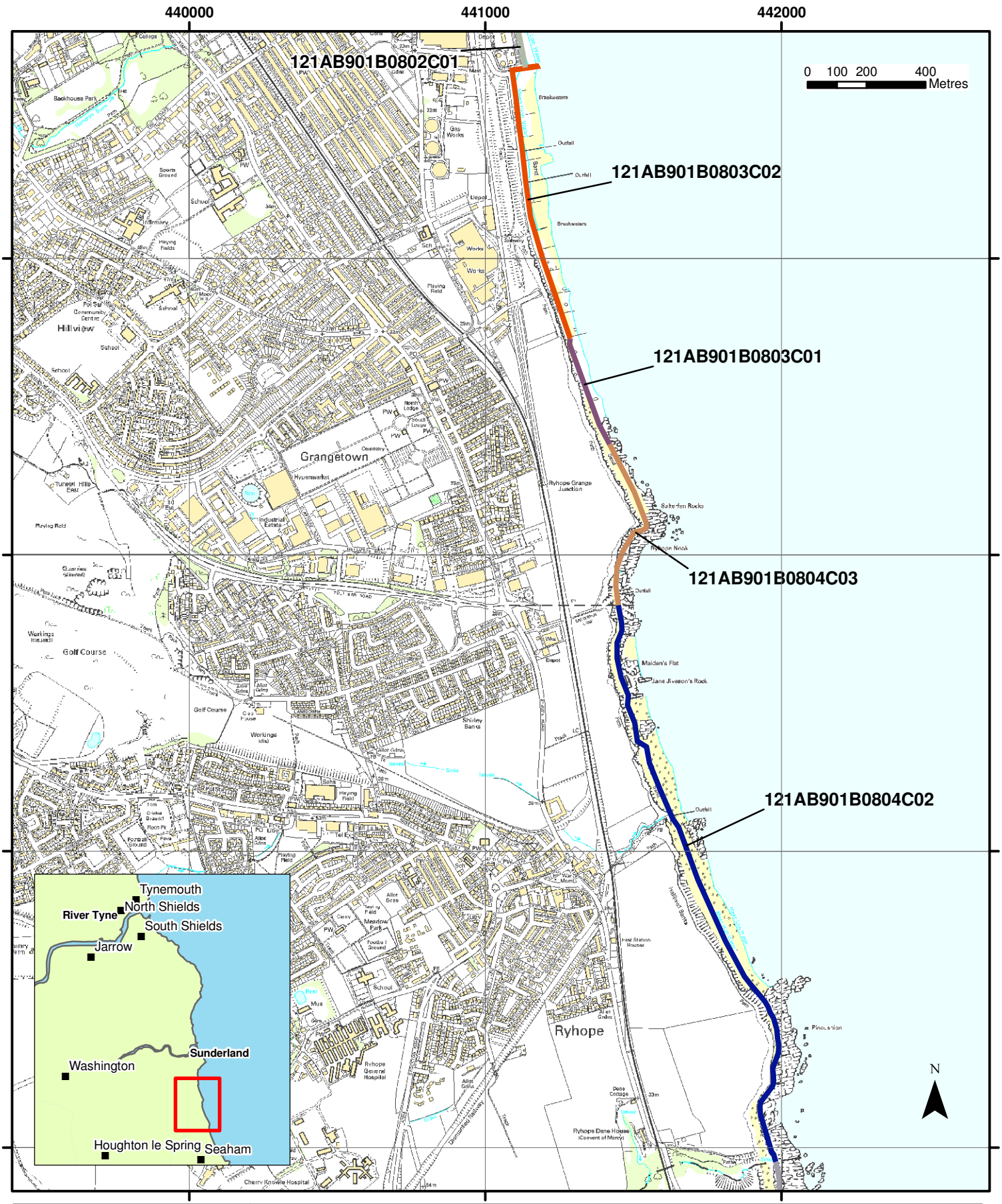

Legend

Asset location

NFCDD Asset Number

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

Figure 1 - Map 3 Sunderland City Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:15,000 at A4

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