

Appendix C

Baseline Process Understanding

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C1 Assessment of Shoreline Dynamics

C1.1 Introduction

This Appendix outlines the baseline coastal process understanding for the SMP2 coast. This understanding has been informed by the SMP1 (Posford Duvivier, 1998), the monitoring that has been undertaken since 2002 (Cooper *et al*, 2009), relevant Coastal Defence Strategies, and other studies that have been undertaken since SMP1, including the national 'Futurecoast' study (Defra, 2002).

The General Overview C1.2 describes the large scale geology and coastal processes along the coast between the Scottish Border and the River Tyne. It is compiled from a study of peer reviewed literature, data and reports, interpreted in the context of the SMP.

The latter part of the Appendix; C1.3 provides a localised appraisal of coastal processes outlining the sediment sources, transport pathways and sinks, and the controls and sensitivities within local coastal process units. The local coastal process units are:

- Unit 1 - Scottish Border to Saltpan How
- Unit 2 - Saltpan How to Harkess Rocks (including Holy Island)
- Unit 3 - Harkess Rocks to Castle Point
- Unit 4 - Castle Point to Seaton Point
- Unit 5 - Seaton Point to Beacon Hill
- Unit 6 - Beacon Hill to Snab Point
- Unit 7 - Snab Point to Beacon Point
- Unit 8 - Beacon Point to Seaton Sluice
- Unit 7 - Seaton Sluice to River Tyne

These coastal process units have been used to help define the Policy Development Zones in the main SMP, but are not necessarily coincident with the PDZs, nor are they intended to be so.

C1.2 General Overview

Introduction

This section describes the large scale geology and coastal processes along the coast between the Scottish Border and the River Tyne. It is compiled from a study of peer reviewed literature, data and reports, interpreted in the context of the SMP.

Bedrock Geology

Carboniferous

The bedrock geology of Northumberland has a strong influence upon the coastline and can be divided into two distinctive groups. The harder Viséan Carboniferous Limestone Series (limestones and sandstones) and Namurian Millstone Grit Series (sandstones, shales, coal and limestones) formed in the Lower and Upper Carboniferous periods respectively. These series dominate the northern section of the coast between the Scottish Border and Alnmouth. The less resistant Westphalian Middle and Upper Carboniferous Coal Measures (mudstones, siltstones, sea earth and coal) formed in the Upper Carboniferous period extends from Alnmouth to beyond the River Tyne, the southern boundary of the SMP. The measures dip eastwards towards the coast and continue under the North Sea for at least 7.5km (Taylor *et al.*, 1971).

There are several local igneous intrusions that cut through the northern Carboniferous geology. The Whin Sill formed late in the Carboniferous period around 295 million years ago. This forms sea cliffs in the Farne Islands, and the castles at Bamburgh and Dunstanburgh were built upon it.

Permian

The only geology of Permian age within the region is a small outcrop of Magnesian Limestone and Penrith Sandstone at Cullercotes north of the River Tyne. There are larger deposits of associated formations to the south in County Durham.

Pleistocene Geology

Over the 2.5 million years the climate has varied between periods of relatively warmer temperate conditions and much cooler periods characterised by the cyclical advances of glaciers and ice sheets. The actions of the glaciers and ice sheets have been instrumental in shaping the modern landscape of Northumbria. The underlying geology has been repeatedly worked by incursions of ice emanating simultaneously from centres in Scotland to the north, the Cheviot Hills and from south-west Scotland. The general pattern of ice movement from the north of the Cheviot Hills was in a south-easterly direction along the present coastline, most likely the result of ice being deflected by Scandinavian ice offshore in the North Sea. Ice from the west moving through the Tyne Gap moved directly across the coast in an easterly direction.

The western ice from south-west Scotland deposited 6 to 9m of boulder clay over nearly all of Northumberland.

Coastal Geomorphology

The present form of the coastal zone is the result of the two distinctive geologies that dominate the region. The northern section is more exposed with cliffs being the dominate landform. To the south wider bays dominate a lower lying landscape with more resistant rocks forming wave-cut platforms.

Carboniferous Limestone Series/Till

The majority of the coastline between the Scottish Border and Embleton is dominated by the Carboniferous Limestone Series capped by glacial till. From the Scottish Border until Cheswick the coastal geomorphology consists of cliffs with the exception of the River Tweed estuary.

Between Beal and Holy Island is a broad sandy beach which extends for about 10km. The shelter provided by the Island and the headland at Bamburgh protect an intertidal area of sands to the north, with silts and muds to the south. A shingle ridge has developed at Castle Point.

Sand dunes exist for the majority of the coastline between Holy Island and Castle Point, 30km to the south, especially within Beadnell and Embleton Bays. At Budle Point the cliffs are formed of more resistant components of the series while to the south softer rocks are exposed as wave-cut platforms and low cliffs capped by glacial till.

Carboniferous Millstone Grit Series/Till

South of Cheswick, sand dunes separate the sea from alluvial flats behind for 5km until Beal where the Millstone Grit Series takes over as the dominant coastal geology.

From Cullernose Point to Alnmouth once again the Millstone Grit Series takes over and the coast is characterised by wave-cut platforms and low till capped cliffs for 15km.

Carboniferous Whin Sill Igneous Intrusion

The Whin Sill exists as igneous intrusions within the carboniferous formations at several locations along the coast. This forms the cliffs between Castle Point and Cullernose Point for 5km, the Farne Islands and the headland at Bamburgh which is partly responsible for the sediment accumulation around Holy Island.

Coal Measures/Till

The coal measures that dominate the geology south of Alnmouth significantly alter the coastal geomorphology. Between Alnmouth and Seaton Sluice the coast is comprised of a series of low lying bays backed by till, low cliffs or sand dunes over a distance of 55km. These bays are bounded by rocky headlands and frequently fronted by wave-cut platforms. Examples of these Bays include:

- Alnmouth Bay
- Druridge Bay
- Blyth South Beach

Small spits have formed at the mouths of the Aln, Coquet, Lyne and Wansbeck. From Seaton Sluice to the River Tyne the coastline is characterised by cliffs subject to erosion and landslip.

Impact of Colliery Waste on the Coastal Geomorphology

The coal mining activities on the Northumberland coast have had a significant impact upon coastal geomorphology. The Middle Coal Measures spread across the southern part of the region have been heavily exploited. Mining was active at Lynemouth and Cambois where colliery waste was tipped onto the foreshore supplementing the natural beach sediment stock with millions of tonnes of waste sediment. This led to reclamation of land, seaward movement of the high water mark and steeper beach profiles.

At Lynemouth the Ellington Colliery disposed of waste material at the northern end of the bay between 1934 and 1963, and at the southern end of the bay from the 1960s until 1994 when the colliery was closed. The colliery was re-opened in 1995 and a licence was granted to recommence tipping as a means of beach replenishment. This sustained an artificial foreshore forward of its natural position. A considerable amount of this material has now eroded away exposing the rock outcrop foreshore at the northern end of the bay; however some material has been retained behind the Headagee.

The coastline at Cambois Bay experienced tipping of colliery waste from 1920 until 1968 when the colliery was closed, since then this has also been subject to erosion throughout the bay.

The colliery waste rapidly breaks down into clay, silts and fine sand particles that are easily removed by wave action. The eroded material from both locations can now be seen in the offshore sea bed sediments.

Beaches

The beaches of Northumbria are mostly comprised of glacial sediments transported from offshore in the North Sea following the post glacial sea level rise.

North of Berwick-upon-Tweed small sandy beaches are located within bays on a rocky, cliffed coastline. To the south sandy beaches exist within broad open bays. An

exception is in the lee of Holy Island and in Budle Bay where silts are trapped on the foreshore.

Offshore

The offshore sediments of the North Sea are comprised of unconsolidated material deposited during the early Holocene. They are generally a combination of sands and gravels 1m typically thick and overlying glacial boulder clay on top of bedrock.

In places mud is present as a result of the reworking of glacial deposits. In addition around Lynemouth and Cambois colliery waste dumped onto the beaches now forms a component of the offshore sediments.

Gravels are present around the Farne Island as this area is affected by strong tidal currents that remove the finer particles. Also in this area the bedrock is widely exposed and the distribution of gravel is irregular.

Coastal Erosion

Coastal erosion is influenced by many factors, most obviously, and principally over the softer geologies, by the geomorphology and exposure to wave and tidal action. There is relatively little erosion of the natural coastline from either the cliffs or softer frontages.

The hard rock exposures of this series north and south of Berwick-upon-Tweed and the headlands at Bamburgh, Seahouses, Beadnell, Dunstanburgh, Cullernose Point and Rumbling Kern are resilient with the best estimates of erosion being less than 0.1m/yr. In addition the wave-cut platforms on the foreshore reduce the current erosion rates to the less resistant material behind; however these areas will be more vulnerable to the effects of sea level rise. Examples of this are found at Boulmer, Alnmouth, the Bondi and Hadston Carrs to the north of Druridge Bay and Cresswell. Sea level rise at exposed section of the coast such as headlands could increase erosion rates.

These resistant areas have allowed many of the bays to reach a high degree of stability. This causes these frontages to have similarly low rates of erosion ranging from an assessed rate of erosion of 0.1m/yr to maximum rates of 0.5m/yr. Natural and man made controls have created areas where erosion has historically been recorded as being negligible.

More vulnerable sections of the coast are at Spittal, relying on Berwick North Breakwater to inhibit erosion, to the north of Holy Island where sea level rise could lead to significant set back, and at Beadnell where there is a degree of dependence on the harbour.

Sediment Transport

Offshore Waves

There is very little information available about the offshore wave climate for the North Sea adjacent to the study area. Numerical modelling by the UK Meteorological Office was included in the first SMP with data for two sites offshore. This suggests that the most frequently occurring waves come from the north east and the 1 in 100 year significant extreme wave height is around 11m. The Newbiggin Bay Beach Recharge Scheme Report (Atkins 2005) also presents data on the offshore wave climate; this suggests that the most frequent wave direction is from the north with waves from the south west also being significant. The dominance of waves from the north promotes a

net longshore transport of material to the south, although this may be reversed during storms.

Inshore Waves

Waves generated in the North Sea are modified by sea bed bathymetry and the presence of offshore islands as they approach the coast. For SMP1 numerical modelling was used to transform the offshore wave climate to predict inshore conditions along the coast at the 20m CD contour. The most frequent waves approach from the north east with the 1 in 100 year significant extreme wave height ranging from 7.5 to 9 metres depending upon location. The Newbiggin Bay Beach Recharge Scheme included modelling of the inshore wave climate for the bay at the 4mCD contour. The most frequent wave direction in the bay is east south east, probably due to the orientation of the coastline and the 1 in 100yr significant extreme wave height is 4.5m. The difference in water depths prohibits direct comparison of these data sources however they provide a useful way of assessing the nearshore wave climate along the coast.

Tides

The tidal regime in the study area is semi-diurnal, the water level rises and falls twice each day. The tidal range increases southwards along the Northumbrian coast; the mean spring tidal range at Berwick is 4.1m while at the River Tyne it reaches 4.3m.

The tidal currents flow in a southerly direction on the flood tide and a northerly direction on the ebb. Tidal currents are generally weak with spring tides reaching 0.3 m/s while neap tides are about 0.15m/s. In the proximity of headlands and the islands tidal currents do increase on a local scale.

Along the coastline there is considered to be a flood (southerly) tidal residual, as the maximum flood flow exceeds that of the ebb flow. Therefore both the waves and tidal currents promote a net movement of material along the coast to the south.

Sediment Transport

The coastline between the Scottish Border and the River Tyne is dominated by wave action that controls the erosion, transport and deposition of beach sediments. The inshore tidal currents are weak and have only a secondary effect on the movement of sediment.

The predominant wave direction is from the north east along this coastline causing a net movement of material from north to south. Even though the coast is exposed to high wave energies the rate of longshore transport of sediment is relatively low. This can be seen through the lack of sediment accumulating against harbour structures and calculations made in the development of the first SMP. The sediment movement is essentially limited to individual bays as rock platforms and headlands provide barriers (natural groynes) to the southerly movement of sediment. Within any one bay transport depends upon:

- Orientation of the bay
- Curvature of the bay
- Protection provided by the headlands

As a result of these factors there is usually a null point at the centre of the bay where no transport occurs. To the south of this point northerly transport dominates while to the north southerly transport is dominant, therefore sediment is contained within the bay.

Holy Island provides a significant barrier to the movement of sediment southwards causing accumulation of sands and finer material in the lee of the island. This occurs as the island provides protection from northerly and north easterly waves that causes a reversal of the longshore transport to a northerly direction directly south of Holy Island.

Cross-shore transport during storms can transfer large volumes of sediment; this has been a problem at Newbiggin Bay leading to the undermining of defences. In addition this can occur due to wind transport; dunes occur along much of the coastline and act as a reservoir of beach material that is returned to the beach during offshore wind conditions. Wind transport is also responsible for transport of sand within large exposed bays such as Druridge Bay and Alnmouth Bay.

Harbour dredging does remove some sediment from the system as a portion of the material removed is sand transported into the harbours by wave action. This material is usually disposed of in licensed spoil grounds offshore, however the amount of sediment lost from the sediment budget is unknown.

Relative Sea Level Change

Initially following the last glacial period sea level rose. Over more recent times, however, there has been a relatively static or decreasing sea level, particularly in the north of the study area, as the land rebounded from the removal of the ice sheets. There remains uncertainty in this northern area associated with contemporary relative sea level change such that potentially this area is now at a cusp between relative sea level fall and rise. Over the southern section of the coast sea level is identified as rising (exacerbated in local areas by mining subsidence) in relation to the shore and it is predicted that this may be the case for the more northerly section of the coast as well in the future.

Present guidance from Defra (2006) is to make allowance for 2.5mm per year sea level rise up to 2025, 7.0mm per year from 2025 to 2055, 10.0mm per year from 2055 to 2085 and 13mm per year from 2085 to 2115.

Mining Subsidence

Subsidence of the coast and nearshore sea bed due to mining activities is an issue along some sections of the study area. Land subsidence causes waves to hit softer rocks which were out of reach before the land subsided, leading to accelerated erosion rates. Sea bed subsidence causes an increase in nearshore wave heights due to increased water depths and therefore greater erosive power. In addition the wave-cut platforms that are common on this coastline which would have caused waves to break further offshore do not provide this function, accelerating coastal erosion.

This has been a particular issue at Newbiggin Bay as a result of coal mining beneath the sea bed between 1926 and 1954. Damage has been caused to the Newbiggin promenade, private gardens and general lowering bay by 1 to 2m. This has led to increasing pressure from erosion and redistribution of sediment within the bay.

C1.3 Localised Coastal Process Understanding

Unit 1	Chainage	0km	15.5km
Scottish Border to Saltpan How			
Section 1 –Description			
General:	This unit covers cliffs north of Berwick-upon-Tweed to the Scottish Border and south until they become sand dunes.		
Physical:	<p>This unit is characterised by a line of high hard rock cliffs behind a foreshore rock scar. The rock has been formed as a series of horizontal strata which vary in their strength and resistance to erosion resulting in a series of headlands. From the Border to Needles Eye (Ch. 2.5km) the cliff has a well vegetated upper slope, a steep exposed rock cliff and a vegetated lower slope extending down to the foreshore. From the Needles Eye to Magdalene Fields (Ch. 4.5km) the cliff is deeply caved in places illustrating the varying strength between the strata. Above the cliffs the land forms a plateau of open farmland.</p> <p>Between Magdalene Fields and the North Berwick Breakwater (Ch. 8km) the cliff becomes lower with a steep profile at the shoreline and a gentler slope of boulder clay at the crest. The cliff continues to fall to the breakwater where it becomes only an accumulation of well vegetated sand.</p> <p>The River Tweed estuary splits this unit separating the cliffs to the north and south. South of the river there is a wide sandy beach between Sandstell Point (Ch. 11.5km) and Bear's Head (Ch. 13km), which is backed by a sea wall. Beyond Bear's Head the cliff line is re-established with exposed rock cliffs at the base and steep vegetated slopes above until Saltpan How (Ch. 15.5km).</p> <p>The foreshore of this unit is dominated by intertidal rock outcrops in the nearshore zone that fall away steeply to the 10m CD contour within 500m of the cliff line.</p>		
Defences ¹ and manmade features:	At Greens Haven and Fisherman's Haven there is a small breakwater to the north and several small local defences. The River Tweed estuary is protected by a breakwater that extends 750m over the rock outcrop of Innerstell Battery to the Tweedmouth Stell Battery Rocks. Within the estuary Berwick is protected by a series of sea walls that lie behind areas of mud, sand and rock scar. The beach between Sandstell Point (Ch. 11.5km) and Bear's Head (Ch. 13km) is backed by a sea wall.		

¹ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 1

Chainage

0km

15.5km

Scottish Border to Saltpan How

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
Berwick		-1.9	-1.2	0.03	1.3	2.2		4.1	2.5	CD is 2.5m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP 1 (Berwick-upon-Tweed)	2.84	3.08	3.20	3.30	3.38	3.43	3.49	3.54

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 7.26m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ²	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Scottish Border to Berwick North Breakwater	0.01-0.3									Regional coastal monitoring data
North Breakwater to Bear's Head	0.2-0.4									Regional coastal monitoring data
Bear's Head to Saltpan Rocks	0.1									Regional coastal monitoring data

Sediment

Overview: Supply into the sediment budget is limited and movement is generally in a southwards direction.

² The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Material					
Sources	External	No significant inputs		Internal	Limited erosion of cliffs within unit
Movement: The general movement of material is from north to south due to the wave climate, although the sediment supply from the cliffs in this unit is limited.		Location	Net drift (m³/yr x 1000)	Source	

Unit 1

Chainage

0km

15.5km

Scottish Border to Saltpan How

Section 3 – Geomorphology

Process description: The geomorphology of this unit is primarily hard rock cliffs behind foreshore wave-cut platforms; this is only interrupted by the River Tweed estuary that divides the cliffs to the north and south. Inside the estuary mouth there are areas of sand, mud and rock scar. South of the river there is a wide sandy beach between Sandstell Point and Bear's Head and beyond this the cliffs and rock platforms continue.

Overall description of current

processes: Coastal process are driven primarily by wave action and influenced locally by the outflow of the River Tweed. The coast is held by the hard rock cliffs and foreshore rock outcrops

sources, transport and sinks

Erosion of the cliffs is limited and supplies little sediment to the system, the main supply system working in the nearshore area. There is a relatively weak southward transport of sediment along the coastline which is constrained by the rock headlands

Patterns of change:

Future evolution (unconstrained):

Apart from the defences at Berwick the coast is effectively acting in an unconstrained manner. As such the coast would continue to erode slowly with the main natural controls still acting to determine the shape of the coast. At Berwick and the Tweed estuary the absence of the breakwater would expose the Spital frontage to increased wave energy. The Tweed would tend to flow out to the north-east with little opportunity to develop an ebb tide delta and sediment would be removed offshore by the power of the river. Sandstell Point would be eroded widening the mouth of the river.

Dependency:

Factors affecting the evolution of the frontage both internally and externally.

Control and sensitivities	Control features	Significance	Dependence	Chainage
The unit is primarily controlled by the natural defences to the north and south of Berwick. On a local scale the Berwick North Breakwater and the estuary channel are important. The breakwater stops the southward movement of sediment, shelters the whole estuary from the north-east and affects the stability of the beach.	Marshall Meadow's Point	Secondary	Variable due to sea level rise	0.5 km
	Rock platforms between Marshall Meadow's Bay and Berwick North Breakwater	Secondary	Variable due to sea level rise	1 km – 7 km
	Berwick North Breakwater	Secondary	Variable with degradation of defence	7 km
	Tweed Estuary	Secondary	Variable with tidal prism	8.5 km
	Rock platforms	Secondary	Variable due to	13 km – 15 km

	between Bear's Head Saltpan Rocks		sea level rise	
Internal interaction	External interaction			
Sea level / climate change				
For guidance on sea level rise see general information in section C1.2 of this appendix.				

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may
influence evolution
of other areas.

Unit 2

Chainage 15.5km 46km

Saltpan How to Harkess Rocks (Including Holy Island)

Section 1 – Description

- General:** This unit covers the dunes and sands formed in the Shelter of Holy Island and Holy Island itself, there are no major settlements.
- Physical:** The physical nature of this unit is dominated by presence of Holy Island and its impact of the movement of sediment. Extensive areas of dunes have developed between the set back higher ground running southwest from Saltpan Headland at the start of this unit and the shoreline that curves southeast towards Holy Island. Behind Holy Island is an area of sandy mudflats, the Fenham Flats. The Ross Black sands and dunes protect the Fenham Flats at their southerly extent (Ch. 35km). This feature is cut by tidal channels and acts more as a system of barrier islands rather than a spit. At Budle Bay (Ch. 38km to Ch. 44km) a square shaped inlet has formed as a result of the higher ground to the rear. Holy Island is comprised of both the soft dune dominated frontages of the causeway spit and western side of the island, and the harder frontages characterised by cliffs and wave-cut rock platforms on the northern, eastern and southern frontages.
- Defences³ and manmade features:** There are sluices on the North and South Low at Goswick (Ch. 21km) and Beal Point (Ch. 25km) along with low earth banks to protect the village of Goswick, Berwick-upon-Tweed Golf Course and various other individual properties. The causeway to Holy Island links Beal Point to the extended dune spit of Holy Island at the narrowest point between the island and the mainland. On Holy Island, the entrance to the bay formed by Steel End is protected by a concrete quay and slipway, and a masonry wall at Cockel Stone. In addition there is a 50m sea wall protecting an access ramp to the south of the village. Within Bundle Bay there is a rock revetment on the northern side of the bay (Ch. 39km), this is interrupted by a concrete sea walls around the outfalls of the Ross Low and two agricultural; drainage channels that are controlled by sluices. In the south west corner of the bay a blockwork wall protect the outfall of Warren Burn (Ch. 42km) that is controlled by several sluices and weirs, and rock revetments protect the B1342 north of Warren Mill (Ch. 42.5km).

³ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 2

Chainage

15.5km

46km

Saltpan How to Harkess Rocks (Including Holy Island)

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
Holy Island		-1.8	-0.9	0.13	1.3	2.4		4.2	2.2	CD is 2.4m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP 1 (Holy Island)	2.85	3.09	3.19	3.29	3.37	3.43	3.49	3.54

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north. Tidal flows are locally increased near the Island.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 7.26m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ⁴	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Saltpan Rocks to Cheswick Shiel	0.2									Regional coastal monitoring data
Cheswick Shiel to Goswick	0.5									Regional coastal monitoring data
Goswick to Beal Point	0.1-0.2									Regional coastal monitoring data
Beal Point to Ross Point	0.1									Regional coastal monitoring data
Budle Bay	0.1									Regional coastal monitoring data

⁴ The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Sediment

Holy Island	0.01-0.2									Regional coastal monitoring data
Overview: Holy island has a very significant influence of the sediment budget of this unit										
Material										
Sources	External	Limited material from cliffs to the north					Internal			
Movement: Holy Island has acted as a barrier to the movement of sediment southwards resulting in a massive accumulation of sediment in the lee of the island. Holy Island has limited the influence of waves from the south east so the coast has extend outwards towards the island aligned with the waves from the north-east. Extensive areas of fringe saltmarsh and mudflat have developed in this low energy environemnt.	Location		Net drift (m³/yr x 1000)		Source					

Unit 2

Chainage

15.5km

46km

Saltpan How to Harkess Rocks (Including Holy Island)

Section 3 – Geomorphology

Process description: Extensive areas of dunes have developed between the set back higher ground running southwest from Saltpan Headland at the start of this unit and the shoreline that curves southeast towards Holy Island, behind Holy Island is an area of sandy mudflats. The Ross Black sands and dunes protect the Fenham Flats at their southerly extent (Ch. 35km). This feature is cut by tidal channels and acts more as a system of barrier islands rather than a spit. At Budle Bay (Ch. 38km to Ch. 44km) a square shaped inlet has formed as a result of the higher ground to the rear.

Overall description of current processes: Holy Island is comprised of both the soft dune dominated frontages of the causeway spit and western side of the island, and the harder frontages characterised by cliffs and wave-cut rock platforms on the northern, eastern and southern frontages.

sources, transport and sinks

Patterns of change:

Future evolution (unconstrained):

Apart from the defence of the low lying land around Goswick and Ross Low, and the outfall of Warren Burn at Warren Mill the coast is essentially behaving in an unconstrained manner. Consequently the coast will continue to erode slowly with the natural controls maintaining the shape of the coastline. Depending upon the rate of sea level rise the Goswick and Cheswick dune systems may either become more substantial as the shoreline is forced back and the sediment supply to the dunes is increased if sea level rise is rapid or dunes may form in front of the current system and then roll back if sea level rise is more gradual. In addition the area behind the dunes would be flooded more frequently increasing the influence of the North and South Lows on the shoreline increasing the tidal prism and reinforcing the dune system by creating ebb tide deltas on which dunes could develop. This would potentially increase the area of salting in front of Beal Point affecting the balance of flows behind Holy Island. There is potential for the northern entrance to the flats to be substantially closed increasing accretion of fine sediments across the whole area and disrupting flow within the flats. Depending on the tidal prism and sediment availability flows through the eastern entrance would also change. The behaviour of the whole area behind Holy Island depends on the balance of tidal prism and sediment supply changes that hold significant uncertainty.

Not defending the area around Ross Point could result of opening up of the flats into Budle Bay and separating the barrier dunes from the mainland; the barrier islands would become more distinct but would remain. The entrance to Budle Bay would initially have an increased tidal prism reworking sediment at the southern end of Ross Links, however over the longer term would tend to close.

Around Holy Island there is little defence; the northern dune line would tend to roll back under the unconstrained scenario and the bay to the south of the island would come under increasing pressure from erosion.

Dependency:

Control and sensitivities	Control features	Significance	Dependence	Chainage
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Factors affecting the evolution of the frontage both internally and externally.

The primary control on this section of the coast is the influence exerted by Holy Island. The island protects the coastline behind from the dominant wave direction allowing sediment to accumulate. In addition with the added influence of Ross Point this also marks where the southerly sediment transport is stopped. North of Holy Island there are several rock outcrops that hold the coast forward.	Middle Skerr, Near Skerr and Far Skerr	Secondary	Variable due to sea level rise	16.5 km
	Holy Island causeway	Secondary	Variable due to sea level rise	25.5 km
	Holy Island	Primary	Variable due to sea level rise	25.5km
	Ross Point barrier island system	Primary	Variable due to sea level rise	34.5km
	Harkess Rocks	Secondary	Variable with sea level rise	46 km
Internal interaction	External interaction			
Sea level / climate change				
For guidance on sea level rise see general information in section C1.2 of this appendix.				

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may influence evolution of other areas.

Unit 3

Chainage 46km 68km

Harkess Rocks to Castle Point

Section 1 – Description

- General:** This unit covers Seahouses and North Sunderland, and the villages of Bamburgh, Beadnell and Low-Newton-by-the-Sea. In addition it includes Bamburgh and Dunstanburgh Castles.
- Physical:** The between Harkenss Rocks (Ch. 46km) and Seahouses (Ch. 51.5km) the Bamburgh and St Aidan's Dunes front the coast, they are held forward by the foreshore rock of Islestone (Ch. 48km) and narrow at Greenhill Rocks (Ch. 49km) forming a narrow band between the coastal road and the beach north of Seahouses. Around Seahouses there are wave-cut rock platforms backed by till cliffs. South of the Seahouses headland the Annstead Dunes run to Beadnell (Ch. 56km) and are fronted by a nearshore rock platform that continues to Beadnell Harbour (Ch. 58km) with a vegetated cliff then defences replacing the dunes at the rear. To the south of the harbour is Beadnell Bay, which is backed by an extensive stretch of high dunes and continues to Snook Point (Ch. 62km) where there is an accumulation of shingle against the headland. Beyond is Football Hole Bay (Ch. 62.5km) and then the headland of Newton Point (Ch. 63km), then comes Newton Haven a bay protected by natural barriers created by nearshore rock platforms. Embleton Bay (Ch. 65km to Ch. 68km) is backed by dunes and the southern limit is fixed by the rock scar of Greymare Rocks and Castle Point.
- Defences⁵ and manmade features:** At Seahouses (Ch. 52km) a variable sea wall protects properties and the road west of the western breakwater, which also has a concrete inner pier attached to it within the harbour. In addition there is the eastern breakwater and within the harbour more concrete walls and a vegetated slope reinforced with rubble. At Beadnell (Ch. 57km) a sea wall extends about the eastern frontage is protected by several lengths of sea wall and a gabions and revetments. Beadnell Harbour (Ch. 58km) is protected from the south by sea walls that extend off the headland to form a breakwater and there is an additional concrete pier within the harbour. There is concrete wall a Low-Newton-by-the-Sea protecting Low Newton farm and other buildings.

⁵ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 3

Chainage

46km

68km

Harkess Rocks to Castle Point

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
North Sunderland		-1.7	-0.8		1.3	2.4	2.8	4.1	2.1	CD is 2.4m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP (Embleton)	2.93	3.19	3.3	3.38	3.47	3.53	3.60	3.67

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 8.8m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ⁶	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Harkess Rocks to Green Hill Rocks	0.1									Regional coastal monitoring data
St Aidan's Dunes and Seahouses	0.3-0.4									Regional coastal monitoring data
Seahouses to Beadnell	0.1									Regional coastal monitoring data
Beadnell Bay	0.2-0.3									Regional coastal monitoring data
Low Newton to	0.1									Regional coastal monitoring data

⁶ The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Sediment

Embleton Bay									
Overview: Supply into the Northumbria sediment budget is limited and movemnet is generally in a southwards direction.									
Material									
Sources		External No significant inputs				Internal Limited supply from the backshore that is retained locally			
Movement: Stuides undertaken at Seahouses and Beadnell concluded that there is very little movement of sediment across the major headlands.					Location	Net drift (m³/yr x 1000)		Source	

Unit 3

Chainage

46km

68km

Harkess Rocks to Castle Point
Section 3 – Geomorphology

Process description: The whole of this unit's coast is held by its geological structure, the principle headlands are Harkess Rocks, Seahouses, Beadnell, Snook Point and Castle Point. These are reinforced by foreshore rock platforms and act to hold softer sections of the frontage in forward positions.

Overall description of current processes: There is very little transfer of sediment across these headlands and supply from the backshore is low only providing local sediment inputs that are retained locally. Supply of sediment from the nearshore area is more substantial but still low.

sources, transport and sinks The frontages between Harkess and Seahouses are square or even convex, they appear to be very sensitive to rock outcrops on the foreshore such as at Islestone Rocks suggesting no great movement of sediment across the frontages. The main process in this area is roll back with sea level rise, in addition rising sea level will reduce the influence of the rock outcrops leading to flattening of the coast. Between Seahouses and Beadnell the frontages are similar; however there is a greater curvature to the bays suggesting an oblique wave angle. Rolling back of the coast due to sea level rise is still likely to be the dominant process.

The larger bays south of Beadnell are quite different as they are sensitive to wave direction with energy coming from both the north-east and south-east. Rock outcrops do hold the dunes forward of the general shape of the bay and with sea level rise this will lead to local erosion of these positions back to the larger bay shape.

Patterns of change: **Future evolution (unconstrained):**

Except for the structures at Beadnell Harbour where the northern end of Beadnell Bay is held forward defences have very little impact on the coast's unconstrained behaviour. Other defences only reinforce the natural controls on the frontage. The frontage as a whole is tending to erode back slowly, however in the absence of defences localised erosion rates could be faster. There is very little additional stress placed on the natural behaviour of the coastline by the existing defences so removing them would not have a significant impact.

Dependency:	Control and sensitivities	Control features	Significance	Dependence	Chainage
	The main control points for this unit are the headlands; between these are numerous rock outcrops and platforms within the bays that hold the shoreline forward locally. The harbour structures at North Sunderland also act to control the shape of the coastline.	Harkess Rocks	Secondary	Variable with sea level rise	46 km
		Islestone rock outcrop	Secondary	Variable with sea level rise	48 km

internally and
externally.

	Greenhill Rocks	Secondary	Variable with sea level rise	49.5 km
	Monks House and Shoreston Rocks	Secondary	Variable with sea level rise	50 km
	North Sunderland Harbour structures and rock platforms	Secondary	Variable with sea level rise and degradation of defences	52.5 km
	North Sunderland Point and rock platforms	Secondary	Variable with sea level rise	53.5 km
	Annstead Rocks	Secondary	Variable with sea level rise	55 km
	Beadnell Frontage rock platforms	Secondary	Variable with sea level rise	55.5 km – 57 km
	Beadnell Harbour headland and structures	Secondary	Variable with sea level rise and degradation of defences	58 km
	Burn Carrs rock platform	Secondary	Variable with sea level rise	59.5km
	Snook headland and rock platforms	Secondary	Variable with sea level rise	62 km
	Newton Point and rock platforms	Secondary	Variable with sea level rise	63 km
	Rock outcrops at Chuck Bank	Secondary	Variable with sea level rise	65 km
	Castle Point	Secondary	Variable with sea level rise	68 km
Internal interaction		External interaction		

Sea level / climate change	
For guidance on sea level rise see general information in section C1.2 of this appendix.	

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may
influence evolution
of other areas.

Unit 4

Chainage

68km

79.5km

Castle Point to Seaton Point

Section 1 – Description

General: This unit includes cliffs between the two headlands only interrupted by Craster with its harbour.

Physical: The start of the unit until Rumbling Kern (Ch. 74km) is comprised of continuous wave-cut rock platform backed by hard rock cliffs, only being interrupted by a short stretch of coastal till slope immediately south of Craster. South of Rumbling Kern until Seaton Point the backshore reduces in level to become a low till cliff but the rock platform foreshore is maintained.

Defences⁷ and manmade features: At Craster the frontage to the north of the harbour is protected by masonry sea wall at the rear of the rock platform and to the south a sea wall and then revetments protect the southern part of the village. The harbour is protected to the north and the south by breakwaters, and sea walls within the harbour. Near Rumbling Kern an isolated property (Ch. 73.5km) is protected by a concrete wall built on the rock outcrop. At Boulmer a rock revetment and concrete block protect the toe of a natural earth embankment

⁷ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 4

Chainage

68km

79.5km

Castle Point to Seaton Point

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
North Sunderland		-1.7	-0.8		1.3	2.4	2.8	4.1	2.1	CD is 2.4m below OD
Amble		-1.85	-0.75	0.30	1.25	2.35	3.1	4.2	2.0	CD is 2.65m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP 1 (Embleton)	3.08	3.19	3.3	3.38	3.47	3.53	3.60	3.67

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 8.8m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ⁸	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Craster to Boulmer	0.1-0.3									Regional coastal monitoring data
Boulmer to Seaton Point	0.2									Regional coastal monitoring data

Sediment

Overview: Supply into the sediment budget is limited and movement is generally in a southwards direction.

⁸ The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Material	Sand			
Sources	External	No significant inputs	Internal	Limited supply from the backshore that is retained locally
Movement: A study undertaken at Boulmer concluded that there is very little movement of sediment across the major headlands.		Location	Net drift (m³/yr x 1000)	Source

Unit 4

Chainage

68km

79.5km

Castle Point to Seaton Point

Section 3 – Geomorphology

Process description: The coast is held by its geological structure, the principle headlands are Castle Point, the Craster Frontage to Rumbling Kern and Longhoughton Steel that is reinforced by associated rock outcrops on the foreshore. Although there is a southerly movement of material this is a quite a low rate.

Overall description of current processes: sources, transport and sinks

Patterns of change: **Future evolution (unconstrained):**
 Apart from the defences at Craster and Boulmer the coast is acting in an entirely unconstrained manner, even at these locations the defences are only locally important. If these defences were removed erosion at these localities would occur at a faster rate and the remainder of the coast is eroding but slowly.

Dependency:	Control and sensitivities	Control features	Significance	Dependence	Chainage
Factors affecting the evolution of the frontage both internally and externally.	The whole of this unit's frontage is comprised of naturally resistant geomorphology with a series of hard rock cliffs and rock platforms that as a whole holds the coastline of adjacent units forward. Within the unit there are several features that locally hold the coastline forward to some extent. This area will become increasingly vulnerable to erosion as sea level rise submerges the rock platforms.	Castle Point	Secondary	Variable with sea level rise	68 km
		Muckle Carr	Secondary	Variable with sea level rise	70.5 km
		Cullernose Point	Secondary	Variable with sea level rise	72 km
		Rumbling Kern rock platforms	Secondary	Variable with sea level rise	74 km
		Iron Scars rock platform	Secondary	Variable with sea level rise	75 km
		Rock Platforms north of Seaton Point to Longhoughton Steel	Secondary	Variable with sea level rise	76.5 km – 79 km

	Seaton Point headland and Brandy Carrs rock platform	Secondary	Variable with sea level rise	79.5 km
Internal interaction	External interaction			
Sea level / climate change				
For guidance on sea level rise see general information in section C1.2 of this appendix.				

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may influence evolution of other areas.

Unit 5

Chainage 79.5km 97km

Seaton Point to Beacon Hill

Section 1 – Description

General:	This unit comprises wide Alnmouth Bay and smaller Foxton Bay to the north with the settlements of Alnmouth, Amble and Warkworth.
Physical:	Foxton Bay is backed by clay cliffs that are exposed and eroding in the north of the bay, the sandy beach runs to the toe of the cliffs in the north and centre of the bay while in the south there are accumulations of shingle and cobbles at the toe. Separating Foxton bay from Alnmouth bay is the wave-cut rock platform of Marden Rocks (Ch. 81km), to the south a narrow width of dunes behind a sandy beach occur that widen at the entrance to the Aln Estuary (Ch. 82.5km). To the south of the estuary the main bay dune system forms a wide lobe of material which along with the dunes to the north constrains the estuary channel. Within the estuary saltmarsh and mudflat act as a transition into farmland on higher ground. The rest of the bay to the south is characterised by a sandy beach backed by dunes until the Coquet Estuary (Ch. 91.5km) only interrupted by the rock outcrop of Birling Carrs (Ch. 88.5km). South of the estuary there are rock platforms backed by low vegetated cliffs and dune systems along the amble frontage to Ch. 96km. This is then replaced by a sandy beach backed by dunes until the rock platform and cliffs are re-established at the headland of Beacon Hill (Ch. 97km)
Defences ⁹ and manmade features:	At the northern end of Foxton Bay there is a man-made vegetated earth bank with rock armour at the toe (Ch. 80km). South of Marden Rocks there is a small groyne field on the beach with concrete blocks at the toe of the dunes. Within the Aln Estuary the dunes to the north are fronted by a concrete toe, Alnmouth itself is protected by a series of sea walls (Ch. 83km and Ch. 84km) and the vegetated bank of Church Hill is fronted by a wall (Ch. 86km). The Coquet Estuary is protected to the north by a rock armour pier with a concrete extension at the mouth and to the south by the concrete south Jetty. Within the estuary the southern bank has several sea walls protecting the buildings of Amble. To the south of the estuary mouth sea walls protect the frontage until Ch. 95km, and at Island View and Signal Cottage.

⁹ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 5

Chainage

79.5km

97km

Seaton Point to Beacon Hill

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
Amble		-1.85	-0.75	0.30	1.25	2.35	3.1	4.2	2.0	CD is 2.65m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP 1 (Amble)	2.93	3.18	3.27	3.36	3.46	3.53	3.60	3.67

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 8.8m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ¹⁰	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Foxton Bay	0.2									Regional coastal monitoring data
Alnmouth Dunes	0.1									Regional coastal monitoring data
Warkworth Dunes	0.1-0.3									Regional coastal monitoring data
Amble South	0.1									Regional coastal monitoring data
High Hauxley Dunes	0.1									Regional coastal monitoring data

Sediment

Overview: Supply into the Northumbria sediment budget is limited and movement is generally in a southwards direction.

¹⁰ The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Material					
Sources	External	No significant inputs		Internal	
Movement: A study of Alnmouth Bay modelled sediment transport and found that transport was northerly in the southern section of the of the bay and southerly in the northern section.	Location		Net drift (m³/yr x 1000)	Source	
	North of Alnmouth Bay		268		
	South of Birling Carrs		153		

Unit 5

Chainage

79.5km

97km

Seaton Point to Beacon Hill
Section 3 – Geomorphology

Process description:	This unit covers Alnmouth and Foxton Bays that sits between the headlands of Seaton Point and Beacon Hill, sediment transport modelling within Alnmouth Bay concluded that material is moved northwards to Birling Carrs in the southern section of the bay and southwards in the northern half.
Overall description of current processes:	Alnmouth Bay is strongly controlled by the headland and Coquet Island at the southern end of the bay and the Marden Rocks to the north, while Foxton bay is relatively independent to the north. The main bay is held in terms of its inland depth by the rock outcrop of Birling Carrs at its centre; the north and south sub bays defined by this feature and the estuary mouth are quite stable and in combination with nearshore sediment recirculation, relatively closed systems.
sources, transport and sinks.	<p>The overall pressure is for retreat of the various frontages due to sea level rise, however with the exception of Foxton Bay, little overall change in alignment. The backshore of Alnmouth Bay is relatively stable, influenced locally by the Aln to the north and the North Breakwater to the south. In Foxton bay there is erosion at the northern end and the bay is readjusting accordingly.</p> <p>The shoreline between Amble and Beacon Hill is protected by Coquet Island and is stable at present however this depends on the influence of local headlands.</p>
Patterns of change:	<p>Future evolution (unconstrained):</p> <p>Only at the southern end of Foxton Bay do man made structures have a significant influence on coastal processes, in their absence the bay would continue to erode backwards to a more stable alignment.</p> <p>The mouth of the Aln would move to a greater extent in the absence of the constraints just inside the estuary and Alnmouth Beach and the northern end of Buston links would erode back. The road bridge within the estuary potentially has some control over the channel, the increase in tidal prism due to realignment and sea level rise will increase the influence of the river on the open coast, and in the absence of any control at the mouth it would widen potentially forming an ebb delta.</p> <p>The central section of Alnmouth Bay would erode back while at the southern end there would be greater variation at the mouth and within the Coquet estuary. In the absence of the north breakwater there would be a significant increase in the exposure of the estuary to wave action and substantial erosion back towards the town of Amble. Defences at Pam Point and Island View anchor the coast and without them there would be much greater erosion at this point and to the south as a larger bay develops.</p>

Dependency:

Factors affecting the evolution of the frontage both internally and externally.

Control and sensitivities	Control features	Significance	Dependence	Chainage
The position of the overall bay between Seaton Point and Beacon Hill is principally controlled by these two headlands, their associated rock platforms and Coquet Island. Foxton Bay is separated from Alnmouth bay by the rock outcrop of Marden Rocks, while Birling Carrs holds the shoreline forward in the middle of Alnmouth Bay. Control is also exerted by the structures at the entrance to the Coquet Estuary.	Seaton Point headland and Brandy Carrs rock platform	Secondary	Variable with sea level rise	79.5 km
	Marden Rocks	Secondary	Variable with sea level rise	81.5 km
	Birling Carrs rock outcrop	Secondary	Variable with sea level rise	88.5
	Amble North Breakwater	Secondary	Variable with degradation of defences.	93 km
	Coquet Island	Secondary	Variable with sea level rise	96 km
	Rock platforms south of Coquet Estuary	Secondary	Variable with sea level rise.	95 km
	Beacon Hill headland and rock platform	Secondary	Variable with sea level rise.	97 km
Internal interaction	External interaction			
Sea level / climate change				
For guidance on sea level rise see general information in section C1.2 of this appendix.				

Influence:

Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may influence evolution of other areas.

Unit 6

Chainage 97km

109km

Beacon Hill to Snab Point

Section 1 – Description

General: This unit covers Druridge bay which includes Low Hauxley SSSI, Hadston Links SSSI and Cresswell Ponds SSSI.

Physical: The headland at the north of this unit is comprised of till, at Beacon Hill this is underlain by harder rockforming vegetated cliffs fronted by a rock platform, while at Bondi Carr (Ch. 98.5km) the material is softer forming dunes which, between the two there are defences at Low Hauxley (Ch. 97.5km). Druridge Bay is characterised by a sandy beach backed by soft cliffs and dunes, the beach is interrupted at Hadston Carrs by a rock platform. The southern Limit of the bay is marked by The Scars, a rock platform (Ch. 107.5km). Beyond this the frontage at Cresswell is defended behind the rock platform of Otter's Stones (Ch. 108km). South of Cresswell a vegetated cliff and then embankment back the foreshore platforms and the sandy beach at Ch. 108.5km, and at Snab Point the exposed rock cliffs are present behind the platform.

Defences¹¹ and manmade features: At Low Hauxley a concrete sea wall and rock revetment protect a collection of properties and behind Silver Carrs there is a rock armour revetment at the toe of an earth revetment. Behind Hadston Carrs (Ch. 99.5km) there is a small breakwater and at Cresswell (Ch. 108km) the frontage is defended by two revetments and a sea wall.

¹¹ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 6

Chainage

97km

109km

Beacon Hill to Snab Point

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
Amble		-1.85	-0.75	0.30	1.25	2.35	3.1	4.2	2.0	CD is 2.65m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP 1 (Amble)	2.93	3.18	3.27	3.36	3.46	3.53	3.60	3.67

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 9.03m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ¹²	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Low Hauxley	0.4									Regional coastal monitoring data
Bondi Carrs	0.5									Regional coastal monitoring data
Hadston Carrs	0.5									Regional coastal monitoring data
Druridge Bay	0.1									Regional coastal monitoring data
Snab Point	0.1									Regional coastal monitoring data

Sediment

Overview: Supply into the sediment budget is limited and movement is generally in a southwards direction.

¹² The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Material					
Sources	External	No significant inputs		Internal	Erosion behind Bondi Carrs
Movement: SMP1 suggested a net movemnet of material southwards in Drurudge Bay due to dredging of sand at eh southern end of the bay, however there has been little accumulation at Cresswell since sand winning stopped.		Location	Net drift (m³/yr x 1000)	Source	

Unit 6

Chainage

97km

109km

Beacon Hill to Snab Point
Section 3 – Geomorphology

Process description: The uniform width of the dunes and the variation in closure in closure of the various stream channels suggests that Druridge bay is net stable in terms of sediment movement contrary to the assessment of SMP1 of a net southerly drift. The main pattern of change is roll back of dunes with some loss and gain between nearshore and foreshore with periods of accretion and erosion. The headlands act only to limit the overall depth of the bay and locally influence shoreline shape. At Cresswell there is likely to be increase pressure as the foreshore rock platforms are submerged with sea level rise, leading to slow deepening of the bay and slight extension of the dune line.

Overall description of current processes: At the north of the bay there is continuing erosion behind Bondi Carrs and it is possible that mining subsidence is having an impact in this area and to the north reducing the influence of the rock outcrop and the backshore erodes, which will increase with sea level rise. Consequently the northern end of the bay has not reached a stable state and the whole section erodes back. The shape of the coast will tend to move inland and control will move to the north to the hard defences at Low Hauxley and if this fails to the headland at Beacon Hill. This will continue to be an issue of level rather than sediment supply.

Patterns of change: **Future evolution (unconstrained):** If all defences were removed Druridge Bay would behave largely as at present with roll back of the coastline. To the north there would be a set back of the coastline with loss of sediment in front of Low Hauxley. As the coast rolls back eventually there may be the possibility for a realigned coast to support a dune backshore. At Cresswell there would be loss of properties however very little influence on coastal behaviour.

Dependency:	Control and sensitivities	Control features	Significance	Dependence	Chainage
Factors affecting the evolution of the frontage both internally and externally.	Druridge Bay is primarily controlled by the two headlands of Snab Point and Beacon Hill and their associated rock platforms. In addition within the bay the beach is held forward by several other rock outcrops such as The Scars and Hadston Carrs. The influence of the rock outcrops will reduce in the future as they are submerged by sea level rise.	Beacon Hill headland and rock platform	Secondary	Variable with sea level rise.	97 km
		Bondi Carrs and Silver Carrs rock platforms	Secondary	Variable with sea level rise.	98 km
		Hadston Carrs rock platform	Secondary	Variable with sea level rise.	99.5 km
		The Scars rock platform	Secondary	Variable with sea level rise.	107.5 km
		Snab Point and rock platform.	Secondary	Variable with sea level rise.	109 km

Internal interaction	External interaction
Sea level / climate change	
For guidance on sea level rise see general information in section C1.2 of this appendix.	

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may
influence evolution
of other areas.

Unit 7

Chainage 109km 113.5km

Snab Point to Beacon Point

Section 1 – Description

General: This unit comprises Lynemouth Bay including Lynemouth, the power station, closed colliery and aluminium works.

Physical: South of Snab Point is initially steep hard rock which transforms into a well vegetated coastal slope at the start of Lynemouth Bay, both of which are fronted by wave-cut rock platforms. In the past large amounts of colliery waste was disposed of on the foreshore, since this stopped large amounts have been eroded however some material has been retained behind the Headagee (Ch. 110km). To the south of this point erosion is continuing and the coast is comprised of colliery waste. Below Lazy Hills the land rises to low vegetated cliffs fronted by a rock platform (Ch. 113km) and this continues to Beacon Point.

Defences¹³ From Ch 110.5km there are low cliffs comprised of colliery waste until they are replaced by a rock revetment in front of the power station (Ch. and 111.5km).
manmade
features:

Unit 7

Chainage 109km 113.5km

Snab Point to Beacon Point

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
Amble		-1.85	-0.75	0.30	1.25	2.35	3.1	4.2	2.0	CD is 2.65m below OD
Blyth		-1.8	-0.9	0.29	1.3	2.4	3.1	4.2	2.1	CD is 2.6m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP1 (Amble)	2.93	3.18	3.27	3.36	3.46	3.53	3.60	3.67
	SMP1 (Newbiggin)	2.97	3.24	3.35	3.43	3.54	3.61	3.69	3.76
	Newbiggin Strategy PAR		3.24		3.45	3.53	3.62		

Notes:

Currents:

	Notes
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¹³ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Av. flood		On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb		
Net residual		

Wave climate: The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 9.03m.

Accretion/erosion:

Average rates (myr ⁻¹ unless stated) ¹⁴	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Snab Point	0.1									Regional coastal monitoring data
Lynemouth Bay	0.3									Regional coastal monitoring data

Sediment

Overview: Supply into the Northumbria sediment budget is limited and movement is generally in a southwards direction.										
Material	Sand									
Sources	External	No significant inputs						Internal	Remaining colliery waste	
Movement: The coast is adopting a more swash aligned form after as the material from colliery waste tipping has been removed. This has led to roll back being the dominant process.						Location	Net drift (m³/yr x 1000)		Source	

¹⁴ The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Unit 7

Chainage

109km

113.5km

Snab Point to Beacon Point
Section 3 – Geomorphology

Process description: Within Lynemouth Bay there is the legacy of tipping of colliery spoil that supplemented the beach sediment, erosion of the artificial foreshore has occurred and the coast is regaining a more swash aligned form with roll back becoming dominant again. The position and depth of the bay is determined by the resistant headlands of Snab Point and Beacon Point. The protection for the power station in the centre of the bay will become more important, while dunes are forming to the south of this protection.

Overall description of current processes: sources, transport and sinks

Patterns of change:

Future evolution (unconstrained):

Within Lynemouth Bay there would be erosion and set back of the coast, this would threaten the power station.

Dependency:

Factors affecting the evolution of the frontage both internally and externally.

Within Lynemouth Bay there would be erosion and set back of the coast, this would threaten the power station.				
Control and sensitivities	Control features	Significance	Dependence	Chainage
The position of Lynemouth Bay is determined by the two rock headlands, these will become more exposed to erosion with sea level rise as their foreshore rock platforms are submerged exposing the cliffs to greater wave energy. The defences at the power station also act to hold the coastline forward.	Snab Point and rock platform.	Secondary	Variable with sea level rise.	109 km
	Beacon Point and rock platform.	Secondary	Variable with sea level rise.	113.5km
	Defence structures at the power station.	Secondary	Variable with degradation of defence.	112 km
Internal interaction	External interaction			
Sea level / climate change				
For guidance on sea level rise see general information in section C1.2 of this appendix.				

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may
influence evolution
of other areas.

Unit 8

Chainage 113.5km 130km

Beacon Point to Seaton Sluice

Section 1 – Description

- General:** This unit comprises the Newbiggin Headland, Newbiggin Bay, Sandy Bay, Cambois Bay and South Blyth Beach. This includes the settlements of Newbiggin-by-the-Sea, Cambois, Blyth and Seaton Sluice. In addition there are the Wansbeck and Blyth estuaries.
- Physical:** The Newbiggin headland is comprised of rock cliffs at Beacon Point and Newbiggin Point (Ch. 115km) separated by an area of softer erodable till, all of which is fronted by rock platforms. Newbiggin Bay defined by the rock platforms at Newbiggin Point and Spital Point (Ch. 117km), mining subsidence has led to loss of a substantial amount of the sandy foreshore requiring defences to protect the town. South of Spital Point, a bay stretches to Blyth East Pier (Ch. 123km) only interrupted by the Wansbeck Estuary (Ch. 119km). Between Spital Point and the Wansbeck there are actively eroding cliffs fronted by stretches of beach and rock platform. To the south of these cliffs in the shelter of the estuary a dune system has evolved, in addition there are intertidal mudflats within the estuary. To the south of the Wansbeck, Cambois Bay comprises a soft cliff that grades gradually into a dune system until it connects with Blyth Harbour. This area has also been subject to the influence of mining subsidence and tipping of colliery waste, most of the waste has been removed by erosion and the subsidence is thought to have exacerbated erosion rates. The Blyth estuary is heavily defended and controlled, with the East Pier being built on the rock platform (Ch. 124km). South of the estuary is South Blyth Beach which extends to the rock platforms at Seaton Sluice (Ch. 130km), which is backed by the dunes of Hartley Links.

Defences¹⁵
and
manmade
features:

On the northern side of Newbiggin Point there is a rock revetment protecting the base of the cliff in front of the caravan park and there are two small stretches of sea wall protecting the headland itself. From Church Point (Ch. 115.25km) sea walls protect the frontage of Newbiggin Bay until the middle of the bay near Hunkleton Stone (Ch. 116.25km); beyond this a rock armour revetment protects the frontage at the south of the bay up to the rock platform of Spital Carrs. In addition there is a rock armour breakwater that defends the beach in the northern corner of the bay (Ch. 115.25km). To the south of Spital Point there is a rock armour revetment with a concrete outfall at its centre (Ch. 117km). In front of Sandy Bay Caravan Park there is a discontinuous rock armour breakwater that extends for 561m (Ch. 118.5km). South of the Wansbeck Estuary there is a rock armour revetment protecting the toe of the vegetated coastal slope in front of a foundry. The extensive defences of the Blyth Estuary begin with a rock armour revetment at Green Skeer Rock (Ch. 122.5km) that extends for 900m, this is then replaced by a composite and then concrete sea wall at the start of the East Pier (Ch. 123km). The pier is continued by a concrete breakwater with a raised timber walkway on the top for the remaining 1450m to the lighthouse at the end. South of the west pier a brick wall protects warehouses and a marina behind (Ch. 123.5km) for 485m, this is continued by various sea walls until the outfall at Blyth Links (Ch. 126.5km) only interrupted by a gabion revetment (Ch. 126km). South of the outfall steel sheet piling forms the southern end of the beach promenade for 330m, the dunes beyond are fronted by a beach controlled by a small groyne field (Ch. 127km). At Seaton Sluice there are a variety of defences, the western side of the western entrance to Seaton Burn is protected by a composite structure comprising a timber groyne near the original masonry harbour arm with a small concrete wall and the eastern side being protected by a rock armour revetment on the original masonry structure. Within the channel a series of walls control the flow up to Seaton Sluice Bridge (Ch. 130km). The western side of the coastal frontage of Rocky Island is protected by a masonry wall on the rocky foreshore.

¹⁵ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 8

Chainage

113.5km

130km

Beacon Point to Seaton Sluice

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
Blyth		-1.8	-0.9	0.29	1.3	2.4	3.1	4.2	2.1	CD is 2.6m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP 1 (Newbiggin)	2.97	3.24	3.35	3.43	3.54	3.61	3.69	3.76
	Newbiggin Strategy PAR		3.24		3.45	3.53	3.62		

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. SMP1 defined the 1:100 year significant extreme wave height is 9.63m, while the Newbiggin inshore study modelled it as 4.5m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ¹⁶	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Newbiggin Headland	0.01									Regional coastal monitoring data
Newbiggin Bay	0.3									Regional coastal monitoring data
Spital Point and Sandy Bay	0.1-0.3									Regional coastal monitoring data
Cambois Bay	0.3-0.5									Regional coastal monitoring data
Blyth South Beach	0.1-									Regional coastal monitoring data

¹⁶ The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Sediment		0.5								
	Hartley Links	0.1								Regional coastal monitoring data
	Overview: Supply into the Northumbria sediment budget is limited and movement is generally in a southwards direction.									
	Material	Sand								
	Sources	External	No significant inputs					Internal	Sea cliff erosion in Sandy Bay and Cambois Bay	
	Movement: General net movement of sediment is from north to south however transport rates are low and movement is constrained by the headlands.					Location	Net drift (m³/yr x 1000)		Source	

Unit 8

Chainage

113.5km

130km

Beacon Point to Seaton Sluice
Section 3 – Geomorphology

Process description:	The geomorphology of this unit is comprised of three embayments (Newbiggin Bay, Sandy Bay/Cambois Bay and South Blyth Beach) of softer lithology separated by harder control points. The control points area either naturally outcropping rock at Newbiggin Headland, Spital Point and Spital Carrs in the north, and Rocky Island in the South or artificial structures at Blyth Harbour.
Overall description of current processes:	Now that the tipping of mining waste has ceased north of Newbiggin headland the coast is retreating back with the main control being the headland.
sources, transport and sinks	There is some nearshore movement of sediment crossing the headland boundary; however this bypasses Newbiggin Bay contributing to the sediment supply further south. The beach between the two points on the Newbiggin Headland is narrow suggesting combined pressure of erosion and roll back at this location, especially at the centre of the bay.

Shoreline sediment is controlled by the Church Point breakwater and the new nearshore breakwater within Newbiggin Bay; these features constrain longshore sediment feed to the south. There is very low sediment interaction around Spital Point from the north although this may increase due to sea level rise submerging the rock platform and associated erosion of the point.

Erosion of cliffs within Sandy Bay contributes to local beach sediment stocks and also accumulation in the dune system at the Wansbeck Estuary. The weir on the estuary marks a divide between fluvial and marine sediments. There is likely to be some interaction of sediment between Sandy Bay, the estuary and the northern part of Cambois Bay. Overall the Wansbeck Estuary is a weak sediment sink set back within the centre of the larger bay, there is a tendency for roll back of the shore which is seen in the erosion of the spit to the north. The main cause of local variations in erosion is the position of the river channel.

Material from cliff erosion in Cambois Bay also contributes to beach stocks or is moved offshore to become entrained in the net southerly tidal flows. Cambois Bay can be considered as a relatively self-contained unit as there are no large-scale interactions.

The large structures at Blyth Harbour combined with the natural rock platforms stop most sediment exchange between Cambois Bay and South Blyth Beach. Some marine sediment does enter the estuary due to tidal flows. On South Blyth Beach onshore/offshore transport of sediment is more prominent than any alongshore movement. Sea level rise may constrain the overall equilibrium of the bay.

Patterns of
change:

Future evolution (unconstrained):

Past deposition of mining waste north of the Newbiggin Headland and within Cambois Bay has added extra sediment to a system where natural sediment inputs are low. In addition to adding sediment to the coastal system this produced an artificially held forward shoreline in Cambois Bay. Apart from this artificial accretion of sediment, as at present the natural coast has been eroding slowly. Mining subsidence has been historically seen as a cause of increased erosion within Cambois Bay and Newbiggin Bay.

Recently the tipping of mining waste has ceased within the area and the beaches where this contributed to the sediment budget have subsequently eroded back to a more natural form. Mining subsidence is still an issue, especially in Newbiggin Bay where the defences are being threatened by increased erosion of the beach.

If all the defences were removed there would still be a large amount of control exerted by rocky outcrops at the north and south ends of the unit, and those of the Rockers, Green Skeer, Crab Law, Sow and Pigs, and Seaton Sea Rocks would become important in anchoring the frontage. However this would be far less effective than the current Blyth Harbour structures.

The hard rock controls would recede due to erosion or become submerged due to sea level rise and the softer frontages between would recede landwards. Potentially there could be breaching of dunes, changing of the position of the Blyth Estuary outfall and flooding of much of Blyth and North Blyth.

The cliffs in Sandy Bay, Cambois Bay and Newbiggin Bay would erode and the dunes and beaches in Cambois Bay and South Blyth Beach would move landwards in response to sea level rise. Where the beaches are constrained they would lower and where not the beach-dune systems would retain their function but move in position over the longer term.

Dependency:

Factors affecting
the evolution of the
frontage both
internally and
externally.

Control and sensitivities	Control features	Significance	Dependence	Chainage
Apart from the influential structures at Blyth the coast is controlled by the headlands a Newbiggin, Spital Point and Seaton Sluice. These act to divide the softer frontages between and hold the position of the coastline.	Newbiggin Headland	Secondary	Variable with sea level rise and erosion.	114km
	Spital Point	Secondary	Variable with sea level rise.	117 km
	Blyth Harbour structures and rock platforms	Secondary	Variable with sea level rise and degradation of defences	124 km

	Rocky Island and rock platforms	Secondary	Variable with sea level rise.	130.5 km
Internal interaction	External interaction			
Sea level / climate change				
For guidance on sea level rise see general information in section C1.2 of this appendix.				

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may
influence evolution
of other areas.

Unit 9		Chainage	130km	145.5km
Seaton Sluice to River Tyne				
Section 1 – Description				
General:	This unit includes the southern frontage of Seaton Sluice, Whitley Bay and Tynemouth.			
Physical:	The south eastern frontage of Seaton Sluice is defended, then from Crag Point (Ch. 131.5km) there are steep rock cliffs fronted by wave-cut rock platforms that continue to Curry's Point (Ch.133km). The frontage between Curry's Point and Brown's Point (137.5km) which makes up Whitley Bay is defended along almost all of its length behind the beach with short sections of undefended cliff. From Brown's Point to Tynemouth North Pier there are three bays; Cullercoats Bay, Tynemouth Longsands and King Edward's Bay between harder rock headlands that have exposed rock cliffs and rock platforms. Beyond the pier to the end of the SMP area at fish quay the frontage is defended behind a mixture of sandy beach and rock platform.			
Defences ¹⁷ and manmade features:	The eastern frontage of Seaton Sluice is defended by a series of sea walls behind the foreshore rock platform and a gabion basket wall at the toe of a vegetated slope at the southern end of the frontage. At Hartley Cove there is a small stretch of sea wall (Ch. 132.25km). There is a concrete ramp to the causeway between Curry's Point (Ch.133km) and St Mary's Island and a concrete sea wall begins at the point that extends for 650m into the beginning of Whitley Bay. Within the bay the defences resume with a rock revetment on the northern bank of Brierdene Burn (Ch. 134.5km), with rock gabions and a timber jetty on the southern bank. Beyond this a concrete sea wall extends along the whole frontage to Brown's Point (Ch 137.5km), south of the point the sea wall resumes until the northern breakwater at Cullercoats Bay. Within the bay there are several stretches of sea wall and a concrete revetment, the southern end of the bay is protected by the South Pier, a masonry breakwater. Within Long Sands Bay there are initially sea walls protecting the frontage and then a concrete block revetment. At the southern end of the bay there are several types of wall protecting the frontage west of Sharpness Point (Ch. 140km). The northern section of King Edward's Bay is protected by a concrete revetment above the rock platform, the behind the beach are two sea walls. Beneath the cliffs at Tynemouth Castle (Ch. 141.25km) there are several retaining walls that continue up to the Tynemouth North Pier (Ch. 141.5km). The North Pier extends 850m from the shoreline and consists of a masonry breakwater with a concrete apron. West of the pier there is first a masonry revetment then sections of sea wall until the revetment is resumed at Ch. 114.5km until the jetty at Fish Quay (Ch. 145km)			

¹⁷ A full list of defences is provided in Task 2.1b Assessment of Coastal Defences

Unit 9

Chainage

130km

145.5km

Seaton Sluice to River Tyne

Section 2 – Baseline information (current data relevant to the frontage)

Tide and
water levels
(mODN):

	LAT	MLWS	MLWN	MSL	MHWN	MHWS	HAT	Spring range	Neap range	Correction CD/ODN
River Tyne		-1.9	-0.8	0.33	1.3	2.4	3.10	4.3	2.1	CD is 2.6m below OD

Extremes
(mODN):

	Source/method	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
	SMP 1 (River Tyne)	3.01	3.28	3.37	3.47	3.59	3.69	3.78	3.87

Notes:

Currents:

	Notes
Av. flood	On the flood the tidal stream flows from north to south, while on the ebb this is reversed and it flows south to north.
Av. ebb	
Net residual	

Wave
climate:

The dominant wave direction is from the north east although there is substantial energy from the south east. The 1:100 year significant extreme wave height is 9.63m.

Accretion /
erosion:

Average rates (myr ⁻¹ unless stated) ¹⁸	Cliff/backshore feature				Intertidal				Nearshore	
Location	general	crest	face	toe	backshore	general	MHWS	MLWS	Trend	Source
Seaton Sluice	0.2-0.4									Regional coastal monitoring data
Crag Point to St Mary's Island	0.1									Regional coastal monitoring data
St Mary's Island to Whitley Bay	0.3-0.5									Regional coastal monitoring data
Whitley Bay	0.3									Regional coastal monitoring data
Brown's Point to	0.1-									Regional coastal monitoring data

¹⁸ The rates highlighted in bold are those used when determining NAI and WPM baseline scenarios (section 4).

Sediment

North Pier	0.2									
Within River Tyne	0.1									Regional coastal monitoring data
Overview: Supply into the Northumbria sediment budget is limited and movement is generally in a southwards direction.										
Material	Sand									
Sources	External	No significant inputs					Internal	Cliff erosion and recycling of intertidal sediment during storms.		
Movement: There is limited movement of sediment within the unit due to limited supply and rock features that form partial barriers to movement. The individual bays are relatively independent of each other and cliff erosion rates are low.					Location	Net drift (m³/yr x 1000)		Source		

Unit 9

Chainage

130km

145.5km

Seaton Sluice to River Tyne
Section 3 – Geomorphology

Process description: The shape of this stretch of the coastline is maintained by the harder rock headlands and foreshore rock platforms, as well as the extensive coastal defences. There is limited sediment transport which is the result of limited supply and the rock features that act to barriers to any movement of sediment. As a result the bays are relatively independent of each other and erosion rates are relatively low reaching a maximum of 0.3m/year.

Overall description of current processes: Beaches do respond to changes in the wave climate; during storms sand is drawn down, while it is returned during calmer conditions.

sources, transport and sinks

Patterns of change: **Future evolution (unconstrained):**

Recently erosion rates of the limited sections of undefended coast have been low along with low rates of sediment transport. The processes are generally contained within the individual bays with the main headlands and certain large defences dividing these self contained units.

If the existing defences were removed it is likely that the coastline would erode and move inland from its present position, however the harder rock headlands would remain as control points, affecting the plan shape of the coastline maintaining the general pattern of headlands and bays. Removal of the Tynemouth North Pier would cause grater wave penetration into the harbour and recession of reclaimed areas in the vicinity of the quayside if the quay walls were removed.

Dependency:	Control and sensitivities	Control features	Significance	Dependence	Chainage
	This frontage is influences to the greatest extent by the headlands and associated rock platforms. However this influence generally only extends to the local area, dividing the bays. Tynemouth North Pier has the greatest influence marking a definite barrier to the southern movement of sediment.	Rocky Island and rock platforms	Secondary	Variable with sea level rise.	130.5 km
		Crag Point	Secondary	Not variable	131.5 km
		St Mary's Island and rock platforms	Secondary	Variable with sea level rise.	133 km
		Brown's Point	Secondary	Variable with sea level rise.	137.5 km

	Tynemouth North Point and Cullercoats Bay South Pier	Secondary	Variable with sea level rise and degradation of defence.	138.5 km
	Sharpness Point	Secondary	Variable with sea level rise.	140.5 km
	Tynemouth North Pier and headland	Primary	Variable with degradation of defence.	141.5 km
Internal interaction		External interaction		
?		?		
Sea level / climate change				
For guidance on sea level rise see general information in section C1.2 of this appendix.				

Influence: Sediment supply into and out of this unit is low limiting processes in adjacent units.

Factors which may influence evolution of other areas.

C2 Defence Assessment

The most recent inspection of the man-made and natural defence assets along the study area was undertaken in the summer of 2008 as part of the ongoing Northumberland Coastal Monitoring programme. The timely nature of this inspection means that the information used to inform the SMP2 policies is up-to-date.

The following tables provide the most recent outputs from the coastal asset inspections. The asset reference numbers relate to their National Flood and Coastal Defence Database (NFCDD) codes.

The assets can be viewed on the maps which follow the tables, which also use the NFCDD reference codes.

Update:

During consultation on the draft SMP, Mr Sutherland of Ross Farm kindly pointed out that asset code 121AA901A1401C25 at Cockly Knowes on the Ross peninsula needs correcting.

The asset is presently defined along its length as 'soft/natural coastal slope' in good condition.

This is correct for the northern section of this 'asset length', but the southern section comprises a formal sea defence in the form of an embankment.

This has resulted in some minor text changes to the text in relevant sections of the main report.

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
Berwick	East Hope North, Marshall Meadows Point	121AA901A0601C01	06a/00/01	soft/natural	Cliff	Cliff	Fair	99					
		121AA901A0601C02	06a/00/02	soft/natural	Cliff	Cliff	Fair	99					
	East Hope North, Marshall Meadows Bay	121AA901A0601C03	06a/00/03	soft/natural	Cliff	Cliff	Fair	99					
	East Hope North, St Johns Haven	121AA901A0601C04	06a/00/04	soft/natural	Cliff	Cliff	Good	99					
	East Hope North, Needles Eye	121AA901A0601C05	06a/00/05	hard/natural	Cliff	Cliff	Fair	99					
	East Hope North, East Hope Bay	121AA901A0601C06	06a/00/06	soft/natural	Cliff	Cliff	Fair	99					
	Berwick North, Brotherston's Bay	121AA901A0701C01	07a/00/01	soft/natural	Cliff	Cliff	Good	99					
	Berwick North, Sharpers' Head	121AA901A0701C02	07a/00/02	hard/natural	Cliff	Cliff	Fair	99					
	Berwick North, Green's Haven	121AA901A0701C03	07b/01/01	hard/natural	Cliff	Cliff	Fair	99					
		121AA901A0701C04	07b/01/02	hard/man-made	Breakwater	Breakwater	Poor	10					
		121AA901A0701C05	07b/02/01	hard/man-made	Steps	Cliff	Fair	99					
				hard/man-made	Steps	Steps	Fair	23					
		121AA901A0701C06	07b/02/02	hard/natural	Cliff	Cliff	Fair	99					
	Berwick North, Fisherman's Haven	121AA901A0701C07	07b/03/01	hard/natural	Apron	Apron	Fair	10					
		121AA901A0701C08	07b/03/02	hard/man-made	Cliff	Cliff	Fair	99					
				hard/man-made	Cliff	Steps	Fair	38					
		121AA901A0701C09	07b/03/03	hard/man-made	Sea Wall	Wall	Fair	38					
				hard/man-made	Sea Wall	Cliff	Fair	99					
		121AA901A0701C10	07b/04/01	hard/man-made	Sea Wall	Wall	Fair	23					
				hard/man-made	Sea Wall	Apron	Fair	18					
				hard/man-made	Sea Wall	Rubble mound	Poor	5					
		121AA901A0701C11	07b/04/02	hard/man-made	Steps	Steps	Fair	28					
	Berwick North, Colly Skerr	121AA901A0701C12	07b/04/03	hard/natural	Cliff	Cliff	Fair	99					
				hard/natural	Cliff	Wall	Fair	18					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
Berwick	Berwick North, Meadow Haven	121AA901A0701C13	07c/05/01	soft/natural	Dunes	Dunes	Fair	99					
				soft/natural	Dunes	Wall	Fair	28					
		121AA901A0701C14	07c/05/02	hard/man-made	Breakwater	Breakwater	Good	50					
				hard/man-made	Breakwater	Breakwater (Head)	Poor	3					
		121AA901A0701C15	07c/05/03	hard/man-made	Breakwater	Breakwater	Fair	23					
	Berwick River North, Berwick City Walls	121AA901A0801C08	08a/05/08	soft/man-made	Bund	Embankment	Good	50					
		121AA901A0801C07	08a/05/07	hard/man-made	Sea Wall	Wall	Fair	15					
				hard/man-made	Sea Wall	Slipway	Poor	3					
	Berwick River North, Berwick City Walls	121AA901A0801C06	08a/05/06	hard/man-made	Sea Wall	Sea Wall	Good	48					
		121AA901A0801C05	08a/05/05	hard/man-made	Sea Wall	Sea Wall	Fair	28					
		121AA901A0801C04	08a/05/04	hard/man-made	Revetment	Revetment	Fair	28					
		121AA901A0801C03	08a/05/03	hard/man-made	Other	Sheet Piles	Good	48					
				hard/man-made	Other	Cope	Fair	48					
				hard/man-made	Other	Dock	Good	48					
				hard/man-made	Other	Sea Wall	Good	48					
	Berwick River South, Davies Batt	121AA901A0901C04	09a/05/04	hard/man-made	Gabions	Bank	Poor	6					
				hard/man-made	Gabions	Revetment	Good	30					
	Berwick River South, Spittal Quay	121AA901A0901C05	09b/05/05	hard/man-made	Sea Wall	Wall	Fair	23					
				hard/man-made	Sea Wall	Wall	Fair	18					
		121AA901A0901C06	09b/05/06	hard/man-made	Pier	Pier	Good	48					
				hard/man-made	Pier	Rubble Mound	Fair	10					
		121AA901A0901C07	09b/05/07	hard/man-made	Other	Retaining wall	Fair	30					
				hard/man-made	Other	Toe	Poor	10					
	Berwick River South, Spittal Dunes	121AA901A0901C08	09c/05/07	soft/man-made	Dunes	Dunes	Fair	99					
	Berwick River South, Spittal Point	121AA901A0901C09	09c/06/01	hard/man-made	Sea Wall	Wall	Poor	5					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
Berwick		121AA901A0901C10	09c/07/01	hard/man-made	Sea Wall	Apron	Fair	25					
				hard/man-made	Revetment	Revetment	Fair	10					
				hard/man-made	Revetment	Armour	Fair	20					
	Berwick South, Spittal Point	121AA901A1001C01	10a/08/01	hard/man-made	Gabions	Wall	Poor	5					
				hard/man-made	Gabions	Armour	Fair	23					
	Berwick South, Spittal Promenade	121AA901A1001C02	10b/09/02	hard/man-made	Sea wall	Wall	Good	48					
				hard/man-made	Sea wall	Splash Wall	Good	48					
		121AA901A1001C03	10b/09/03	hard/man-made	Sea Wall	Sea Wall	Fair	38					
		121AA901A1001C04	10b/09/04	hard/man-made	Revetment	Revetment	Fair	25					
		121AA901A1001C05	10b/09/05	hard/natural	Cliff	Cliff	Good	99					
	Scremerston, East of Scremerston	121AA901A1101C01	11/13/01	soft/natural	Cliff	Cliff	Good	>99					
	Scremerston	121AA901A1101C02	11/13/02	hard/man-made	Other	Structure	Fair	15					
		121AA901A1101C03	11/13/03	hard/natural	Cliff	Cliff	Good	>99					
		121AA901A1101C04	11/13/04	hard/man-made	Other	Cliff	Good	99					
				hard/man-made	Other	Outfall Pipe Encasement	Poor	10					
				hard/man-made	Other	Structure	Poor	5					
				hard/man-made	Other	Outfall Slope	Fair	20					
		121AA901A1101C05	11/13/05	hard/natural	Cliff	Cliff	Good	99					
	Cheswick, The Skerrs	121AA901A1201C01	12/13/05	soft/natural	Cliff	Dunes	Good	>99					
	Cheswick, Cheswick Black Rocks	121AA901A1201C02	12/13/06	soft/natural	Dunes	Dunes	Good	99					
	Cheswick	121AA901A1201C03	12/13/07	soft/natural	Cliff	Cliffs/Dunes	Good	99					
	Goswick, Cheswick Sands	121AA901A1301C01	13/13/07	soft/natural	Dunes	Dunes	Good	99					
	Holy Island Sands, Goswick Sands	121AA901A1401C31	14a/13/07	soft/natural	Coastal Slope	Slope	Good	>99					

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Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
				soft/natural	Coastal Slope	Outfall	Fair	20					
		121AA901A1401C02	14a/13/08	soft/natural	Coastal Slope	Slope	Good	99					
	Holy Island Sands, Fenhan Flats	121AA901A1401C23	14a/16/01	soft/natural	Coastal Slope	Slope	Good	99					
	Holy Island Sands, White Hill	121AA901A1401C24	14a/16/02	soft/man-made	Coastal Slope	Slope	Good	99					
	Holy Island Sands, Cockly Knowes	121AA901A1401C25	14a/16/03	soft/natural	Coastal Slope	Slope	Good	99	See Update at start of Section C2.				
	Holy Island Sands, Ross Back Sands	121AA901A1401C06	14b/16/04	soft/natural	Dunes	Dunes	Good	99					
	Budle Bay	121AA901A1401C26	14c/16/05	soft/natural	Coastal Slope	Slope	Good	99					
		121AA901A1401C27	14c/16/06	soft/natural	Coastal Slope	Revetment	Poor	5					
		121AA901A1401C28	14c/16/07	soft/natural	Coastal Slope	Coastal Slope	Fair	5					
		121AA901A1401C29	14c/16/08	hard/man-made	Revetment	Revetment	Poor	10					
		121AA901A1401C30	14c/16/09	soft/natural	Coastal Slope	Coastal Slope	Good	50					
		121AA901A1401C22	14c/16/10	hard/man-made	Revetment	Revetment	Fair	25					
		121AA901A1401C13	14c/16/11	hard/man-made	Sea Wall	Sea Wall	Fair	30					
		121AA901A1401C14	14c/16/12	hard/man-made	Revetment	Revetment	Fair	25					
		121AA901A1401C15	14c/16/13	hard/man-made	Sea Wall	Sea Wall	Fair	30					
		121AA901A1401C16	14c/16/14	hard/man-made	Revetment	Revetment	Fair	30					
		121AA901A1401C17	14c/16/15	hard/man-made	Other	Sheet Piles	Fair	50					
	Budle Bay	121AA901A1401C18	14c/16/16	hard/man-made	Other	Sluice	Fair	50					

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Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
		121AA901A1401C19	14c/16/17	hard/man-made	Other	Sheet Piles	Fair	50					
		121AA901A1401C20	14c/16/18	hard/man-made	Revetment	Revetment	Fair	>25					
		121AA901A1401C21	14c/16/19	soft/natural	Coastal Slope	Coastal Slope	Good	99					
Berwick	Waren Mill	121AA901A1501C08	15/16/19	soft/natural	Coastal Slope	Slope	Fair	99					
		121AA901A1501C02	15/16/20	soft/man-made	Coastal Slope	Coastal Slope	Poor	2					
		121AA901A1501C03	15/16/21	hard/man-made	Revetment	Wall	Fair	50					
	Waren Mill, Chesterhill Slakes	121AA901A1501C04	15/17/01	hard/man-made	Revetment	Revetment	Fair	20					
	Waren Mill, Budle	121AA901A1501C05	15/17/02	soft/natural	Coastal Slope	Slope	Fair	99					
	Waren Mill, Newtown Hill	121AA901A1501C06	15/17/03	soft/natural	Dunes	Slope	Fair	99					
	Waren Mill, Bamburgh Moor	121AA901A1501C07	15/17/04	hard/natural	Cliff	Cliff	Good	>99					
	Bamburgh, Redbarns Links	121AA901A1601C05	16/17/05	soft/natural	Dunes	Dunes	Good	99					
		121AA901A1601C02	16/17/06	soft/natural	Dunes	Dunes	Good	99					
	Bamburgh, Greenhill Links	121AA901A1601C03	16/17/07	soft/natural	Dunes	Dunes	Good	99					
	Bamburgh, St Aidan Dunes	121AA901A1601C04	16/17/08	soft/natural	Dunes	Dunes	Good	99					
	North Sunderland, Tumblers	121AA901A1701C54	17a/17/09	hard/natural	Cliff	Cliff	Good	99					
				hard/natural	Cliff	Wall	Good	50					
	North Sunderland, Heela Hope	121AA901A1701C02	17a/18/01	hard/man-made	Sea Wall	Wall	Good	25					
				hard/man-made	Sea Wall	Apron	Good	25					
		121AA901A1701C03	17a/18/02	hard/man-made	Sea Wall	Wall	Fair	25					
				hard/man-made	Sea Wall	Apron	Fair	25					
		121AA901A1701C04	17a/18/03	hard/man-made	Sea Wall	Wall	Good	25					
				hard/man-made	Sea Wall	Apron	Good	25					

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Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
Berwick	North Sunderland, North Pier	121AA901A1701C05	17a/19/01	hard/man-made	Sea Wall	Wall	Fair	40					
		121AA901A1701C06	17a/20/01	hard/man-made	Sea Wall	Wall	Fair	20					
	North Sunderland, North Breakwater	121AA901A1701C07	17a/21/01	hard/man-made	Sea Wall	Wall	Fair	50					
		121AA901A1701C08	17a/21/02	hard/man-made	Sea Wall	Wall	Good	48					
				hard/man-made	Sea Wall	Steps	Good	48					
		121AA901A1701C09	17a/21/03	hard/man-made	Sea Wall	Wall	Fair	30					
	North Sunderland, Inner Pier	121AA901A1701C10	17a/21/04	hard/man-made	Sea Wall	Pier	Good	50					
	North Sunderland, Inner Harbour Arm	121AA901A1701C11	17a/21/05	hard/man-made	Sea Wall	Wall	Good	50					
	North Sunderland, Slipway	121AA901A1701C12	17a/21/06	hard/man-made	Sea Wall	Wall	Fair	20					
				hard/man-made	Sea Wall	Slipway	Fair	20					
	North Sunderland, Inner Harbour	121AA901A1701C13	17a/21/07	hard/man-made	Sea Wall	Wall	Fair	40					
	North Sunderland, Southern Pier	121AA901A1701C14	17a/21/08	hard/man-made	Sea Wall	Pier	Fair	30					
	North Sunderland	121AA901A1701C15	17a/22/01	hard/man-made	Sea Wall	Wall	Fair	30					
		121AA901A1701C16	17a/23/01	hard/man-made	Sea Wall	Wall	Fair	30					
		121AA901A1701C17	17a/24/01	hard/man-made	Sea Wall	Wall	Fair	30					
		121AA901A1701C18	17a/25/01	hard/man-made	Sea Wall	Wall	Good	100					
	North Sunderland, Caravan Park	121AA901A1701C19	17a/26/01	hard/man-made	Revetment	Revetment	Poor	15					
	North Sunderland, Northeast Breakwater	121AA901A1701C21	17a/27/01	hard/man-made	Breakwater	Breakwater	Fair	50					
	North Sunderland, Braidcarr Rocks	121AA901A1701C22	17a/27/02	hard/natural	Cliff	Cliff	Good	99					
	Beadnell, Annstead Links	121AA901A1701C23	17b/27/03	soft/natural	Dunes	Dunes	Fair	99					
	Beadnell, Beadnell Links	121AA901A1701C24	17b/27/04	soft/natural	Dunes	Dunes	Poor	20					
	Beadnell, Beadnell Haven	121AA901A1701C25	17c/28/01	hard/man-made	Sea Wall	Wall	Fair	20					
		121AA901A1701C26	17c/28/02	hard/natural	Cliff	Cliff	Fair	99					
		121AA901A1701C27	17c/29/01	hard/man-made	Sea Wall	Wall	Fair	40					
	Beadnell, Dell Point	121AA901A1701C28	17c/29/02	hard/natural	Cliff	Cliff	Fair	99					

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Berwick		121AA901A1701C29	17c/30/01	soft/natural	Cliff	Bank	Poor	7					
	Beadnell, Red Brae	121AA901A1701C30	17c/30/02	hard/natural	Cliff	Cliff	Fair	99					
	Beadnell	121AA901A1701C31	17c/31/01	hard/man-made	Sea Wall	Wall	Good	35					
		121AA901A1701C32	17c/31/02	soft/man-made	Coastal Slope	Slope	Poor	10					
		121AA901A1701C33	17c/31/03	hard/man-made	Sea Wall	Wall	Fair	18					
		121AA901A1701C34	17c/31/04	hard/man-made	Sea Wall	Wall	Fair	30					
		121AA901A1701C35	17c/32/01	hard/man-made	Sea Wall	Wall	Fair	10					
				hard/man-made	Sea Wall	Wall	Fair	10					
				hard/man-made	Sea Wall	Apron	Fair	10					
		121AA901A1701C36	17c/33/01	hard/man-made	Sea Wall	Wall	Poor	10					
				hard/man-made	Sea Wall	Splash Wall	Poor	10					
				hard/man-made	Sea Wall	Toe	Fair	10					
	Beadnell	121AA901A1701C37	17c/33/02	hard/man-made	Sea Wall	Sea Wall	Fair	10					
	Beadnell, Whinstone Dyke	121AA901A1701C38	17c/34/01	hard/man-made	Gabions	Cliff	Good	>99					
	Beadnell, Lady's Hole	121AA901A1701C39	17c/35/01	hard/man-made	Gabions	Gabions	Fair	12					
	Beadnell, Roan Rock	121AA901A1701C40	17c/35/02	hard/man-made	Gabions	Gabions	Fair	15					
	Beadnell, North of Beadnell Poi	121AA901A1701C41	17c/36/01	hard/man-made	Sea Wall	Gabions	Fair	15					
		121AA901A1701C42	17c/37/01	hard/man-made	Revetment	Revetment	Good	30					
	Beadnell, Ebbe's Snook	121AA901A1701C43	17c/37/02	hard/natural	Cliff	Cliff	Good	99					
		121AA901A1701C44	17c/37/03	soft/natural	Coastal Slope	Coastal Slope	Fair	50					
	Beadnell	121AA901A1701C45	17c/38/01	hard/man-made	Revetment	Revetment	Fair	10					
				hard/man-made	Revetment	Toe	Poor	5					
		121AA901A1701C46	17c/39/01	hard/man-made	Sea Wall	Wall	Fair	40					
				hard/man-made	Sea Wall	Armour	Fair	40					

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Berwick	Beadnell, Beadnell Harbour	121AA901A1701C47	17c/40/01	hard/man-made	Sea Wall	Wall	Fair	40					
				hard/man-made	Sea Wall	Deck	Good	40					
	Beadnell, Beadnell Harbour	121AA901A1701C48	17c/40/02	hard/man-made	Sea Wall	Wall	Good	50					
		121AA901A1701C49	17c/40/03	hard/man-made	Sea Wall	Wall	Fair	50					
				hard/man-made	Sea Wall	Deck	Good	50					
		121AA901A1701C50	17c/40/04	hard/man-made	Sea Wall	Wall	Good	40					
				hard/man-made	Sea Wall	Deck	Good	40					
		121AA901A1701C51	17c/40/05	hard/man-made	Sea Wall	Wall	Fair	40					
	Beadnell	121AA901A1701C52	17c/40/06	hard/man-made	Pier	Pier	Fair	40					
	Beadnell, Benthall Links	121AA901A1701C53	17c/40/07	soft/natural	Cliff	Cliff	Fair	99					
	Beadnell, Beadnell Bay	121AA901A1801C01	18/40/01	soft/natural	Dunes	Dunes	Good	99					
	Holy Island	121AA901A4901C01	H1/14/00	soft/natural	Dunes	Dunes	Fair	99					
		121AA901A4901C02	H1/14/01	soft/natural	Cliff	Cliff	Good	99					
		121AA901A4901C03	H1/14/02	hard/natural	Cliff	Cliff	Fair	99					
		121AA901A4901C04	H1/14/03	hard/natural	Foreshore	Foreshore	Fair	99					
		121AA901A4901C05	H1/14/04	hard/natural	Cliff	Cliff	Fair	99					
				hard/man-made	Sea Wall	Wall	Fair	40					
		121AA901A4901C06	H1/15/01	hard/man-made	Sea Wall	Ramp	Poor	40					
				hard/man-made	Sea Wall	Slipway	Fair	40					
	Holy Island	121AA901A4901C07	H1/15/02	hard/natural	Cliff	Cliff	Fair	99					
		121AA901A4901C08	H1/15/03	hard/man-made	Sea Wall	Wall	Fair	40					
				hard/man-made	Sea Wall	Slipway	Fair	40					
	Holy Island, Holy Island Pier	121AA901A4901C09	H1/15/04	hard/man-made	Pier	Outer Pier	Fair	40					
				hard/man-made	Pier	Inner Pier	Fair	30					
	Holy Island, The Harbour	121AA901A4901C10	H1/15/05	soft/natural	Coastal Slope	Beach	Fair	99					

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Berwick	Holy Island	121AA901A4901C11	H1/16/01	hard/natural	Embankment	Bank	Good	20					
		121AA901A4901C12	H1/16/02	hard/man-made	Sea Wall	Wall	Fair	30					
		121AA901A4901C13	H1/16/03	hard/natural	Cliff	Cliff	Good	99					
		121AA901A4901C14	H1/16/04	hard/natural	Bund	Bund	Good	50					
		121AA901A5001C01	H1/16/05	soft/natural	Cliff	Cliff	Fair	99					
		121AA901A5001C02	H2/16/06	hard/natural	Bund	Bund	Fair	50					
		121AA901A5001C03	H2/16/07	hard/natural	Cliff	Cliff	Good	99					
		121AA901A5001C04	H2/16/08	hard/natural	Bund	Bund	Good	50					
		121AA901A5001C05	H2/16/09	soft/natural	Cliff	Cliff	Fair	99					
		121AA901A5001C06	H2/16/10	soft/natural	Dunes	Dunes	Good	99					
		121AA901A5001C07	H2/16/11	hard/natural	Cliff	Cliff	Good	99					
		121AA901A5001C08	H2/16/12	soft/natural	Dunes	Dunes	Good	99					
		121AA901A5001C09	H2/16/13	soft/natural	Dunes	Dunes	Good	99					
Ainwick	Beadnell Bay, Beadnell Bay	121AA901A1901C01	19/00/01	soft/natural	Dunes	Dunes	Good	99					
	Beadnell Bay, Football Hole	121AA901A1901C02	19/00/02	soft/natural	Dunes	Dunes	Good	99					
	Embleton, High Newton	121AA901A2001C01	20/00/03	hard/natural	Coastal Slope	Coastal Slope	Good	99					
	Embleton, Low Newton by the Sea	121AA901A2001C02	20/01/01	hard/man-made	Sea Wall	Wall	Fair	30					
	Embleton, St Mary's Bay	121AA901A2001C03	20/01/02	soft/natural	Dunes	Dunes	Fair	99					
	Embleton, Embleton Bay	121AA901A2001C04	20/01/03	soft/natural	Dunes	Dunes	Fair	99					
	Embleton, Greymore Rock	121AA901A2001C05	20/01/04	soft/natural	Coastal Slope	Coastal slope	Fair	99					
	Craster, Queen Margarets Cove	121AA901A2101C01	21/01/05	hard/natural	Coastal Slope	Coastal slope	Good	99					
	Craster, Oxberry Law	121AA901A2101C02	21/01/06	hard/natural	Coastal Slope	Coastal slope	Fair	99					

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	Craster, Craster Harbour	121AA901A2201C01	22/01/06	soft/natural	Embankment	Embankment	Fair	50					
				soft/natural	Embankment	Outfall	Fair	18					
Ainwick	Craster, Craster Harbour	121AA901A2201C02	22/01/07	hard/man-made	Sea Wall	Wall	Fair	18					
	Craster, North Harbour Arm	121AA901A2201C03	22/01/08	hard/man-made	Sea Wall	Wall	Fair	13					
	Craster, Harbour	121AA901A2201C04	22/01/09	hard/man-made	Sea Wall	Wall	Fair	28					
				hard/man-made	Sea Wall	Capping	Poor	8					
				hard/man-made	Sea Wall	Deck	Fair	8					
		121AA901A2201C05	22/01/10	hard/man-made	Sea Wall	Wall	Fair	18					
		121AA901A2201C06	22/01/11	hard/man-made	Other	Slipway	Fair	28					
				hard/man-made	Other	Edge Wall	Fair	18					
		121AA901A2201C07	22/01/12	hard/natural	Coastal Slop	Slope	Fair	99					
		121AA901A2201C08	22/01/13	hard/man-made	Sea Wall	Sea Wall	Fair	38					
				hard/man-made	Sea Wall	Crest Wall	Fair	28					
		121AA901A2201C09	22/01/14	hard/natural	Cliff	Cliff	Fair	99					
	Craster, South Harbour Arm	121AA901A2201C10	22/01/15	hard/man-made	Sea Wall	Wall	Fair	48					
				hard/man-made	Sea Wall	Deck	Fair	28					
	Craster, Harbour	121AA901A2201C11	22/01/16	hard/man-made	Sea Wall	Wall	Fair	28					
	Craster, Muckle Carr	121AA901A2201C12	22/01/17	hard/man-made	Sea Wall	Wall	Fair	38					
	Craster, Craster Harbour	121AA901A2201C13	22/01/18	hard/man-made	Revetment	Bank	Good	48					
				hard/man-made	Revetment	Revetment	Good	48					
	Craster, Muckle Carr	121AA901A2201C14	22/01/19	hard/natural	Revetment	Revetment	Fair	28					
				hard/natural	Revetment	Embankment	Fair	28					
				hard/natural	Revetment	Outfall	Fair	28					
		121AA901A2201C15	22/01/20	hard/natural	Coastal Slop	Coastal Slope	Fair	48					
				hard/natural	Coastal Slop	Revetment	Fair	38					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Craster, Black Hole	121AA901A2301C01	23/01/21	hard/natural	Cliff	Cliff	Good	99					
Alnwick	Craster, Swine Den	121AA901A2301C02	23/01/22	hard/natural	Coastal Slop	Coastal Slope	Fair	99					
		121AA901A2401C01	24/01/23	hard/natural	Cliff	Cliff	Good	99					
	Howick, Rumbling Kern	121AA901A2401C02	24/01/24	hard/man-made	Cliff	Cliff	Fair	99					
	Longhoughton, Howick Haven	121AA901A2501C01	25/01/25	hard/natural	Cliff	Dunes	Fair	99					
	Longhoughton, Longhoughton Steel	121AA901A2501C02	25/01/26	hard/natural	Coastal Slop	Cliff	Fair	99					
	Boulmer, Boulmer Steel	121AA901A2601C01	26/01/27	soft/natural	Coastal Slop	Coastal Slope	Fair	99					
	Boulmer, Berwick stone	121AA901A2601C02	26/02/01	hard/man-made	Embankment	Revetment	Fair	13					
		121AA901A2601C03	26/02/02	soft/natural	Embankment	Embankment	Fair	99					
	Boulmer, The Torrs	121AA901A2601C04	26/03/01	hard/man-made	Revetment	Revetment	Poor	10					
				hard/man-made	Revetment	Embankment	Fair	50					
		121AA901A2601C05	26/04/01	hard/man-made	Revetment	Toe	Poor	20					
	Boulmer, Boulmer Haven	121AA901A2601C06	26/04/02	soft/natural	Coastal Slop	Coastal Slope	Fair	99					
	Boulmer, Seaton Point	121AA901A2601C07	26/04/03	hard/natural	Cliff	Cliff	Fair	99					
		121AA901A2601C08	26/05/01	hard/man-made	Embankment	Embankment	Fair	99					
	Boulmer	121AA901A2601C09	26/05/02	hard/man-made	Other	Steps	Poor	15					
				hard/man-made	Other	Toe	Fair	50					
	Alnmouth	121AA901A2701C01	27/05/03	hard/man-made	Cliff	Cliff	Fair	99					
	Alnmouth, Foxton Hall	121AA901A2701C02	27/05/04	soft/natural	Coastal Slop	Coastal Slope	Fair	99					
	Alnmouth, Marden Rocks	121AA901A2701C03	27/05/05	soft/natural	Coastal Slop	Coastal Slope	Fair	99					
	Alnmouth	121AA901A2701C04	27/06/01	soft/natural	Embankment	Embankment	Good	99					
				soft/natural	Embankment	Toe	Fair	99					
Alnwick	Alnmouth, Alnmouth Bay	121AA901A2701C05	27/06/02	hard/man-made	Revetment	Groynes	Fair	10					
				hard/man-made	Revetment	Toe	Fair	20					
				hard/man-made	Revetment	Dunes	Fair	99					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
Alnmouth		121AA901A2701C06	27/06/03	soft/natural	Embankment	Gabions	Poor	5					
				soft/natural	Embankment	Blocks	Fair	40					
				soft/natural	Embankment	Embankment	Good	99					
		121AA901A2701C07	27/07/01	soft/natural	Dunes	Dunes	Poor	5					
	Alnmouth	121AA901A2701C08	27/07/02	soft/natural	Dunes	Dunes	Fair	99					
		121AA901A2801C01	28/21/01	soft/natural	Dunes	Dunes	Good	99					
		121AA901A2801C02	28/22/01	hard/man-made	Sea Wall	Wall	Fair	40					
	Alnmouth, Mouth of the River	121AA901A2801C03	28/23/01	hard/man-made	Sea Wall	Wall	Good	40					
	Alnmouth, River Estuary	121AA901A2801C04	28/24/01	hard/man-made	Sea Wall	Wall	Good	40					
		121AA901A2801C05	28/24/02	hard/man-made	Access Ramp	Ramp	Fair	40					
		121AA901A2801C06	28/24/03	hard/man-made	Sea Wall	Wall	Good	30					
		121AA901A2801C07	28/24/04	soft/natural	Embankment	Embankment	Good	50					
	Alnmouth, River Estuary	121AA901A2801C08	28/24/05	soft/natural	Embankment	Embankment	Good	50					
		121AA901A2801C09	28/24/06	soft/natural	Embankment	Embankment	Fair	15					
		121AA901A2801C10	28/25/01	hard/man-made	Sea Wall	Wall	Fair	10					
	Alnmouth, Alnmouth Estuary	121AA901A2801C11	28/26/01	soft/natural	Flood Plain	Bank	Fair	99					
		121AA901A2801C12	28/27/01	soft/natural	Flood Plain	Bank	Good	99					
	Alnmouth, Church Hill	121AA901A2801C13	28/28/01	soft/natural	Sea Wall	Wall	Fair	30					
	Warkworth, Buston Links	121AA901A2901C01	29/07/02	soft/natural	Dunes	Dunes	Fair	99					
	Warkworth, Birling Links & Warkworth Dunes	121AA901A2901C02	29/07/03	soft/natural	Dunes	Dunes	Fair	99					
Alnwick	Warkworth Harbour, North Pier	121AA901A3001C01	30/09/01	hard/man-made	Breakwater	Outer Face	Fair	30					
				hard/man-made	Breakwater	Crest	Fair	30					
				hard/man-made	Breakwater	Inner Face	Fair	50					
	Warkworth Harbour, North Pier - head	121AA901A3001C02	30/09/03	hard/man-made	Sea Wall	Inner Wall	Very Poor	10					

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Ainwick				hard/man-made	Sea Wall	Deck	Very Poor	10					
				hard/man-made	Sea Wall	Outer Wall	Bad	10					
	Warkworth Harbour, North Pier - central	121AA901A3001C03	30/09/02	hard/man-made	Breakwater	Outer Face (Outward)	Fair	30					
				hard/man-made	Breakwater	Crest	Fair	30					
				hard/man-made	Breakwater	Inner Face (Inward)	Fair	30					
				hard/man-made	Breakwater	Outer Face (Outward)	Good	20					
				hard/man-made	Breakwater	Inner Face (Inward)	Good	20					
	Warkworth Harbour, North Wave Basin	121AA901A3001C04	30/09/04	soft/natural	Dunes	Revetment	Fair	30					
	Amble, Quayside	121AA901A3001C05	30/09/05	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Capping	Fair	30					
				hard/man-made	Sea Wall	Deck	Fair	20					
		121AA901A3001C06	30/09/06	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Capping	Fair	30					
				hard/man-made	Sea Wall	Deck	Fair	20					
	Amble, South Jetty (Landward)	121AA901A3001C07	30/09/07	hard/man-made	Revetment	Revetment	Fair	5					
	Amble, Little Shore Wave Basin	121AA901A3001C08	30/09/08	soft/natural	Coastal Slop	Coastal Slope	Fair	50					
		121AA901A3001C09	30/09/09	hard/man-made	Sea Wall	Wall	Fair	30					
		121AA901A3001C10	40451	hard/man-made	Sea Wall	Sea Wall	Very Poor	<5					
	Amble, Little Shore Wave Basin	121AA901A3001C10	30/09/10	hard/man-made	Sea Wall	Capping	Poor	5					
				hard/man-made	Sea Wall	Deck	Very Poor	5					
	Amble, South Jetty	121AA901A3001C11	30/10/01	hard/man-made	Other	Jetty	Good	35					
				hard/man-made	Other	Deck	Good	35					
	Amble, South Pier Head	121AA901A3101C01	31/10/01	hard/man-made	Other	Deck	Fair	40					
				hard/man-made	Other	Inner Wall	Fair	30					
				hard/man-made	Other	Outer Wall	Fair	30					

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Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Amble, South Pier - base	121AA901A3101C02	31/10/02	hard/man-made	Other	Jetty	Fair	30					
				hard/man-made	Sea Wall	Deck	Fair	20					
				hard/man-made	Sea Wall	Inner Wall	Fair	30					
				hard/man-made	Sea Wall	Inner Toe	Poor	20					
				hard/man-made	Sea Wall	Outer Wall	Fair	30					
				hard/man-made	Sea Wall	Outer Toe	Fair	30					
	Amble	121AA901A3101C03	31/11/01	hard/man-made	Sea Wall	Sea Wall	Fair	30					
	Amble, Pan Point	121AA901A3101C04	31/11/02	hard/natural	Cliff	Cliff	Good	99					
				hard/natural	Cliff	Sea Wall	Fair	15					
	Amble	121AA901A3101C05	31/12/01	hard/man-made	Sea Wall	Sea Wall	Fair	30					
				hard/man-made	Sea Wall	Toe	Fair	15					
		121AA901A3101C06	31/12/02	hard/natural	Cliff	Cliff	Fair	99					
				hard/natural	Cliff	Cliff	Fair	25					
				hard/natural	Cliff	Revetment	Fair	20					
				hard/natural	Cliff	Wall	Fair	25					
	Amble, New Island View Wall	121AA901A3101C07	31/13/01	hard/natural	Cliff	Gabions	Fair	15					
				hard/man-made	Sea Wall	Encasement	Good	50					
Alnwick	Amble, Amble Links	121AA901A3101C08	31/13/02	hard/man-made	Cliff	dunes	Good	99					
		121AA901A3101C09	31/13/03	soft/natural	Dunes	Dunes	Fair	99					
				soft/natural	Dunes	Outfall Structure	Very Poor	5					
	Amble, Wellhaugh Point	121AA901A3101C10	31/13/04	hard/man-made	Sea Wall	Sea wall	Good	30					
				hard/man-made	Sea Wall	Revetment	Fair	30					
	Amble, Wellhaugh Point	121AA901A3101C10	31/13/04	hard/man-made	Sea Wall	Cliff	Good	30					

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	Amble	121AA901A3101C11	31/13/05	soft/natural	Cliff	Cliff	Good	99					
	High Hauxley	121AA901A3101C12	31/13/06	soft/natural	Dunes	Dunes	Good	99					
				soft/natural	Dunes	Gabions	Fair	30					
				soft/natural	Dunes	Outfall	Poor	5					
				soft/natural	Dunes	Outfall	Poor	5					
	High Hauxley, Beacon Hill	121AA901A3101C13	31/13/07	hard/natural	Cliff	Cliff	Good	99					
	Low Hauxley, Beacon Hill	121AA901A3101C14	31/13/08	hard/man-made	Revetment	Cliff	Good	50					
				hard/man-made	Revetment	Revetment	Fair	25					
				hard/man-made	Revetment	Sea Wall	Fair	25					
	Hauxley, Beacon Hill	121AA901A3201C01	32/13/09	soft/natural	Other	Coastal Slope	Fair	50					
	Low Hauxley, Hauxley Links	121AA901A3201C02	32/14/01	hard/man-made	Revetment	Revetment	Fair	15					
				hard/man-made	Revetment	Cliff	Fair	99					
		121AA901A3201C03	32/15/01	hard/man-made	Revetment	Revetment	Good	50					
				hard/man-made	Revetment	Embankment	Good	99					
		121AA901A3201C04	32/16/01	hard/man-made	Revetment	Embankment	Good	99					
				hard/man-made	Revetment	Toe	Fair	15					
		121AA901A3201C05	32/17/01	hard/man-made	Revetment	Revetment	Fair	20					
				hard/man-made	Revetment	Embankment	Good	99					
				hard/man-made	Revetment	Pier	Fair	15					
				hard/man-made	Revetment	Pier	Fair	15					
Ainwick	Low Hauxley, Hauxley Nature Reserve	121AA901A3201C06	32/17/02	soft/natural	Dunes	Dunes	Fair	99					
		121AA901A3201C07	32/18/01	soft/man-made	Cliff	Upper Cliff	Fair	99					
				soft/man-made	Cliff	Lower Cliff	Fair	99					
		121AA901A3201C08	32/18/02	soft/natural	Cliff	Upper Cliff	Fair	99					
				soft/natural	Cliff	Lower Cliff	Fair	99					
				soft/natural	Cliff	Lower Cliff	Fair	99					
	Low Hauxley, Togston Links	121AA901A3201C09	32/19/01	hard/man-made	Breakwater	Breakwater	Poor	20					
		121AA901A3201C10	32/19/02	soft/natural	Dunes	Dunes	Fair	99					

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Castle Morpeth	Druridge Bay, Hadston Carrs	121AA901A3201C11	32/20/01	hard/man-made	Dunes	Dunes	Fair	99					
		121AA901A3201C12	32/01/01	hard/man-made	Sea Wall	Culvert	Good	>20					
					Sea Wall	North wall	Good	>20					
					Sea Wall	South wall	Good	>20					
	Druridge Bay, Hadston Carrs	121AA901A3201C12	32/01/01	hard/man-made	Sea Wall	Apron	Fair	>20					
					Sea Wall	Slipway	Fair	>20					
					Sea Wall	Outfall	Fair	>20					
	Druridge Bay	121AA901A3201C13	32/02/01	hard/man-made	Revetment	Revetment	Fair	>20					
					Revetment	Cliff	Fair	>20					
	Druridge Bay, Chiburn Links	121AA901A3201C14	32/03/01	soft/natural	Dunes	Dunes	Good	>20					
				hard/man-made	Dunes	Dunes	Fair	>20					
					Dunes	Ramp	Good						
	Druridge Bay, Chiburn Links	121AA901A3201C15	32/03/02	hard/man-made	Dunes	Outfall	Good						
					Dunes	Outfall	Good						
	Druridge Bay, Blakemore	121AA901A3201C16	32/03/03	soft/natural	Dunes	Dunes	Fair	>20					

Castle Morpeth	Cresswell	121AA901A3201C17	32/04/01	hard/man-made	Revetment	Dunes	Fair	6 - 10					
					Revetment	Revetment	Poor	6 - 10					
					Outfall	Rock	Fair	6 - 10					
		121AA901A3201C18	32/05/01	hard/man-made	Sea Wall	Cliff	Fair	11 - 20					
					Sea Wall	Revetment	Fair	11 - 20					
					Sea Wall	Shore parallel low sea wall	Fair	11 - 20					
		121AA901A3201C19	32/06/01	hard/man-made	Revetment	Revetment	Fair	11 - 20					
					Revetment	Revetment	Fair	11 - 20					

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					Revetment	Shore parallel sea wall	Fair	11 - 20						
		121AA901A3201C20	32/06/02	hard/natural	Dunes	Dunes	Good	>20						
		121AA901A3201C21	32/07/01	soft/natural	Dunes	Dunes	Fair	>20						
				hard/man-made	Dunes	Outfall	Fair	11 - 20						
		121AA901A3201C22	32/08/01	hard/natural	Embankment	Cliff	Poor	>20						
	Sea Wall				Wall	Poor	<5							
	Lynemouth, Snab Point	121AA901A3301C01	33/09/01	hard/natural	Cliff	Cliff	Fair	>20						
				hard/man-made	Sea Wall	Wall	Good	>20						
	Lynemouth, Headagee	121AA901A3301C02	33/09/02	soft/natural	Cliff	Cliff	Fair	>20						
	Lynemouth	121AA901A3401C01	34/10/01	soft/man-made	Cliff	Cliff	Good	>20						
		121AA901A3401C05	34/10/02	soft/natural	Cliff	Cliff	Good	>20						
Wansbeck	Lynemouth	121AA901A3401C06	34/00/01	soft/man-made	Embankment	Embankment	Fair	11 - 20						
	Lynemouth, Lynemouth Power Station	121AA901A3401C07	34/00/02	hard/man-made	Revetment	Revetment	Very Good	>20						
	Lynemouth, Lyne Sands	121AA901A3401C08	34/00/03	hard/man-made	Embankment	Coastal Slope	Fair	11 - 20						
				hard/man-made	Embankment	Rock Armour	Good	11 - 20						
	Newbiggin Moor, Lyne Sands	121AA901A3501C01	35/00/04	soft/natural	Coastal Slope	Coastal Slope	Good	>20						
Wansbeck	Newbiggin Moor, Beacon Point	121AA901A3501C11	35/00/05	hard/man-made	Cliff	Cliff	Fair	>20						
				hard/natural	Cliff	Cliff	Fair	>20						
		121AA901A3501C03	35/01/01	hard/natural	Cliff	Cliff	Poor	>20						
	Newbiggin Moor, Whitehole Skears	121AA901A3501C04	35/01/02	soft/natural	Cliff	Vegetated Cliff	Fair	>20						
				soft/natural	Cliff	Dunes	Fair	>20						
	Newbiggin Moor, Way Foot	121AA901A3501C05	35/02/01	soft/natural	Cliff	Cliff	Poor	1 - 5						
	Newbiggin Moor, Dolls Carrs	121AA901A3501C06	35/03/01	hard/man-made	Revetment	Lower Revetment	Poor	1 - 5						
				hard/man-made	Revetment	Upper Revetment	Poor	1 - 5						

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Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
Wansbeck				hard/man-made	Revetment	Cliff	Poor	1 - 5					
		121AA901A3501C07	35/04/01	hard/natural	Cliff	Upper Cliff	Poor	>20					
				hard/natural	Cliff	Lower Cliff	Fair	>20					
	Newbiggin Moor, Newbiggin Point	121AA901A3501C08	35/05/01	hard/man-made	Sea Wall	Sea Wall	Fair	>20					
		121AA901A3501C09	35/05/02	hard/natural	Cliff	Cliff	Good	>20					
		121AA901A3501C10	35/05/03	hard/man-made	Sea Wall	Sea Wall	Very Poor	1 - 5					
				hard/man-made	Sea Wall	Revetment	Very Poor	1 - 5					
	Newbiggin, Newbiggin Point	121AA901A3601C01	36/06/01	hard/man-made	Cliff	Upper Cliff	Poor	11 - 20					
				hard/man-made	Cliff	Lower cliff	Fair	11 - 20					
				hard/man-made	Cliff	Patch Repairs	Fair	11 - 20					
	Newbiggin, Little Bay	121AA901A3601C12	36/07/01	hard/man-made	Sea Wall	Rear Bank	Very Poor	11 - 20					
				hard/man-made	Sea Wall	Promenade	Fair	11 - 20					
				hard/man-made	Sea Wall	Sea Wall	Fair	11 - 20					
				hard/man-made	Sea Wall	Toe	Poor	11 - 20					
	Newbiggin, Church Point	121AA901A3601C13	36/08/01	hard/man-made	Sea Wall	Promenade	Fair	>20					
				hard/man-made	Sea Wall	Sea Wall	Fair	>20					
	Newbiggin, Hully Rocks	121AA901A3601C14	36/09/01	hard/man-made	Breakwater	Breakwater	Fair	>20					
	Newbiggin, Church Point	121AA901A3601C15	36/09/02	hard/man-made	Revetment	Promenade	Good	>20					
				hard/man-made	Revetment	Sea Wall	Fair	>20					
				hard/man-made	Revetment	Revetment	Good	>20					
				hard/man-made	Revetment	Breakwater	Very Good	>20					
				hard/man-made	Revetment	Beach	Very Good	>20					
	Newbiggin, Newbiggin Bay	121AA901A3601C06	36/10/01	hard/man-made	Sea Wall	Promenade	Fair	>20					
				hard/man-made	Sea Wall	Sea Wall	Fair	>20					
				hard/man-made	Sea Wall	Beach	Very Good	>20					



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		121AA901A3601C07	36/11/01	hard/man-made	Sea Wall	Breakwater	Very Good	>20					
				hard/man-made	Sea Wall	Sea Wall	Fair	>20					
				hard/man-made	Sea Wall	Stepped Toe	Fair	>20					
				hard/man-made	Sea Wall	Groynes	Fair	>20					
				hard/man-made	Sea Wall	Sheet Piles	Fair	>20					
				hard/man-made	Sea Wall	Breakwater	Very Good	>20					
				hard/man-made	Sea Wall	Beach	Very Good	>20					
		121AA901A3601C08	36/12/01	hard/man-made	Revetment	Promenade	Fair	>20					
				hard/man-made	Revetment	Capping Beam	Fair	>20					
				hard/man-made	Revetment	Revetment	Fair	>20					
				hard/man-made	Revetment	Breakwater	Very Good	>20					
				hard/man-made	Revetment	Beach	Very Good	>20					
	Newbiggin, Spital Carrs	121AA901A3601C09	36/12/02	hard/natural	Cliff	Foreshore	Good	>20					
				hard/natural	Cliff	Cliff	Good	>20					

Wansbeck	Newbiggin, Spital Point	121AA901A3601C10	36/13/01	hard/natural	Cliff	Upper Cliff	Good	>20					
				hard/natural	Cliff	Lower Cliff	Fair	>20					
	Newbiggin, Black Score	121AA901A3601C11	36/14/01	hard/man-made	Revetment	Revetment	Good	>20					
				hard/man-made	Revetment	Revetment	Good	>20					
				hard/man-made	Revetment	Sea Wall	Good	>20					
	Newbiggin, Links Quarry	121AA901A3701C01	37/14/02	hard/natural	Cliff	Cliff	Poor	>20					
	Newbiggin, North Seaton Links	121AA901A3701C02	37/15/01	hard/natural	Cliff	Cliff	Fair	>20					
		121AA901A3701C03	37/16/01	hard/man-made	Breakwater	Cliff	Poor	>20					
				hard/man-made	Breakwater	Breakwater	Fair	>20					
	Wansbeck River, North Bank	121AA901A3801C01	38/16/02	soft/natural	Embankment	Embankment	Good	>20					

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				soft/natural	Embankment	Dunes	Good	>20					
	Wansbeck River, South Bank	121AA901A3801C02	38/16/03	soft/natural	Slope/Cliff	Slope/Cliff	Fair	>20					
	Cambois, Cambois Links	121AA901A3901C01	38/16/04	soft/natural	Cliff	Cliff	Fair	>20					
		121AA901A3901C05	39/17/01	hard/man-made	Revetment	Coastal Slope	Good	>20					
				hard/man-made	Revetment	Revetment	Good	>20					
		121AA901A3901C03	39/17/02	soft/natural	Cliff	Cliff	Poor	>20					
	Cambois, The Rockers	121AA901A3901C04	39/17/03	soft/natural	Cliff	Cliff	Fair	>20					
	Blyth, North Beach	121AA901A4001C01	40/18/01	hard/man-made	Revetment	Revetment	Fair	6 - 10					
				hard/man-made	Revetment	Crest	Fair	6 - 10					
	Blyth, Shinnys Gripe Lug	121AA901A4001C02	40/19/01	hard/man-made	Revetment	Upper Revetment	Fair	>20					
				hard/man-made	Revetment	Breastwork	Fair	>20					
				hard/man-made	Revetment	Lower Revetment	Fair	>20					

Wansbeck	Alcan Reclaim	121AA901A4001C03	40/20/01	hard/man-made	Sea Wall	Breastwork	Fair	6 - 10					
				hard/man-made	Sea Wall	Upper Apron	Fair	6 - 10					
				hard/man-made	Sea Wall	Lower Apron	Fair	6 - 10					
	Blyth, Crab Law	121AA901A4001C04	40/21/01	hard/man-made	Sea Wall	Crest Wall	Poor	6 - 10					
				hard/man-made	Sea Wall	Sea Wall	Fair	6 - 10					
				hard/man-made	Sea Wall	Groynes	Fair	6 - 10					
	Blyth, East Pier	121AA901A4001C05	40/22/01	hard/man-made	Breakwater	Walkway	Fair	>20					
				hard/man-made	Breakwater	Breakwater	Fair	>20					
Blyth	Blyth, West Pier	121AA901A4201C10	42/01/01	hard/man-made	Sea Wall	Crest	Poor	6 - 10					
				hard/man-made	Sea Wall	Wall	Fair	6 - 10					

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Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Blyth, South Beach	121AA901A4201C11	42/02/01	hard/man-made	Sea Wall	Footing	Fair	6 - 10					
				hard/man-made	Sea Wall	Strongbacks	Poor	6 - 10					
				hard/man-made	Sea Wall	Planks	Fair	>20					
				hard/man-made	Sea Wall	Posts	Fair	>20					
		121AA901A4201C03	42/02/02	soft/natural	Dunes	Crest	Fair	11 - 20					
				soft/natural	Dunes	Gabions	Poor	11 - 20					
		121AA901A4201C04	42/03/01	hard/man-made	Sea Wall	Planks	Fair	>20					
				hard/man-made	Sea Wall	Posts	Fair	>20					
				hard/man-made	Sea Wall	Lower sea wall	Good	>20					
	Blyth, Beach Gardens	121AA901A4201C05	42/04/01	hard/man-made	Sea Wall	Crest	Fair	>20					
				hard/man-made	Sea Wall	Sea Wall	Fair	>20					
	Blyth, Promenade	121AA901A4201C06	42/04/02	hard/man-made	Sea Wall	Crest	Fair	>20					
				hard/man-made	Sea Wall	Sea Wall	Fair	>20					

Blyth	Blyth, Blyth Links	121AA901A4201C07	42/04/03	hard/man-made	Sea Wall	Crest	Fair	>20					
				hard/man-made	Sea Wall	Sea Wall	Fair	>20					
				hard/man-made	Sea Wall	Outfall	Fair	>20					
	Blyth, Fort House	121AA901A4201C08	42/06/01	hard/man-made	Sea Wall	Capping	Fair	>20					
				hard/man-made	Sea Wall	Piles	Good	>20					
	New Hartley, Blyth Cemetery	121AA901A4301C01	43/07/01	soft/natural	Dunes	Dunes	Fair	>20					
				soft/man-made	Dunes	Groynes	Fair	>20					
	New Hartley, Hartley Links	121AA901A4301C02	43/07/02	soft/natural	Dunes	Dunes	Fair	>20					
	Seaton Sluice, Sandy Island	121AA901A4401C01	44/09/01	hard/man-made	Sea Wall	Wall	Good	>20					
		121AA901A4401C02	44/10/01	hard/man-made	Sea Wall	Groynes	Poor	1 - 5					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
				hard/man-made	Sea Wall	Infill	Very Poor	1 - 5					
				hard/man-made	Sea Wall	Wall	Poor	1 - 5					
				hard/man-made	Sea Wall	Revetment	Fair	1 - 5					
		121AA901A4401C03	44/10/02	hard/man-made	Sea Wall	Sea Wall	Fair	>20					
	Seaton Sluice, Seaton Burn	121AA901A4401C04	44/10/03	hard/man-made	Sea Wall	Wall	Poor	>20					
		121AA901A4401C05	44/10/04	hard/man-made	Sea Wall	Wall	Poor	>20					
				hard/man-made	Sea Wall	Wall	Good	>20					
		121AA901A4401C06	44/10/05	hard/man-made	Sea Wall	Wall	Poor	>20					
				hard/man-made	Sea Wall	Wall	Fair	>20					

Blyth	Seaton Sluice, Seaton Burn	121AA901A4401C07	44/10/06	hard/natural	Sea Wall	North face cliff	Fair	>20					
				hard/natural	Sea Wall	South face cliff	Fair	>20					
				hard/natural	Sea Wall	Wall	Fair	1 - 5					
				hard/natural	Sea Wall	Wall	Poor	1 - 5					
	Seaton Sluice, Rocky Island	121AA901A4401C08	44/10/07	hard/man-made	Sea Wall	Wall	Poor	>20					
				hard/man-made	Sea Wall	Wall	Good	>20					
		121AA901A4401C09	44/11/01	hard/man-made	Revetment	Revetment	Fair	>20					
				hard/man-made	Revetment	Toe Wall	Fair	>20					
		121AA901A4401C10	44/12/01	hard/man-made	Sea Wall	Crest Wall	Fair	>20					
				hard/man-made	Sea Wall	Promenade	Fair	>20					
				hard/man-made	Sea Wall	Wall	Fair	>20					



ROYAL HASKONING

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
		121AA901A4401C11	44/13/01	hard/man-made	Sea Wall	Sea Wall	Fair	>20					
		121AA901A4401C12	44/13/02	hard/natural	Cliff	Cliff	Fair	>20					
	Seaton Sluice, Collywell Bay	121AA901A4401C13	44/13/03	hard/natural	Cliff	Cliff	Fair	>20					
		121AA901A4401C14	44/14/01	hard/man-made	Sea Wall	Cliff	Good	>20					
				hard/man-made	Sea Wall	Sea Wall	Good	>20					
				hard/man-made	Sea Wall	Toe	Fair	>20					
		121AA901A4401C15	44/15/01	hard/man-made	Sea Wall	Revetment	Fair	>20					
				hard/man-made	Sea Wall	Sea Wall	Good	>20					
				hard/man-made	Sea Wall	Toe	Fair	>20					
		121AA901A4401C16	44/16/01	hard/man-made	Sea Wall	Sea Wall	Good	>20					
				hard/man-made	Sea Wall	Toe	Fair	>20					

North h Tyne	Blyth	Seaton Sluice, Collywell Sand	121AA901A4401C17	44/17/01	hard/man-made	Sea Wall	Sea Wall	Fair	>20					
					hard/man-made	Sea Wall	Apron (part)	Poor	>20					
		Seaton Sluice, Collywell Bay	121AA901A4401C18	44/18/01	hard/man-made	Sea Wall	Cliff	Fair	>20					
					hard/man-made	Sea Wall	Sea Wall	Good	>20					
	Blyth	Seaton Sluice, Collywell Bay	121AA901A4401C19	44/19/01	hard/man-made	Gabions	Coastal Slope	Fair	11 - 20					
					hard/man-made	Gabions	Toe Wall	Poor	11 - 20					
					hard/man-made	Gabions	Ramp	Fair	11 - 20					
					hard/man-made	Gabions	Wall	Fair	11 - 20					
	Blyth	Seaton Sluice, Crag Point	121AA901A4401C20	44/19/02	hard/natural	Cliff	Cliff	Fair	>20					
					hard/natural	Cliff	Cliff	Good	>20					
					hard/natural	Cliff	Cliff	Fair	99					
					hard/natural	Cliff	Cliff	Fair	99					
	Blyth	Hartley Bay, The Steadings	121AA901A4401C22	44/01/01	hard/natural	Cliff	Cliff	Fair	99					
					hard/natural	Cliff	Cliff	Fair	99					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Hartley Bay, Hartley	121AA901A4401C23	44/01/02	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Steps	Fair	40					
		121AA901A4401C24	44/01/03	hard/natural	Cliff	Cliff	Fair	99					
	Hartley Bay, St Mary's Island Causeway	121AA901A4401C25	44/02/01	hard/man-made	Embankment	Ramp	Fair	20					
				hard/man-made	Embankment	Embankment	Poor	5					
				hard/man-made	Embankment	Revetment	Good	>50					
	Whitley Bay, St Mary's Island	121AA901A4501C01	45/02/02	hard/natural	Sea Wall	Wall	Poor	5					
				hard/man-made	Sea Wall	Sea Wall	Good	40					
		121AA901A4501C02	45/03/01	hard/man-made	Sea Wall	Stabilisation Works	Fair	<10					
				hard/man-made	Sea Wall	Sea Wall	Fair	40					
		121AA901A4501C03	45/04/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Apron	Fair	40					

North Tyneside	Whitley Bay, Whitley Sands	121AA901A4501C04	45/05/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
		121AA901A4501C05	45/06/01	soft/natural	Cliff	Cliff	Poor	99					
				soft/natural	Cliff	Revetment	Poor	5					
				soft/natural	Cliff	Seawall	Poor	10					
		121AA901A4501C06	45/06/02	hard/man-made	Revetment	Revetment	Good	10					
				hard/man-made	Revetment	River Bank	Poor	10					
				hard/man-made	Revetment	Gabions	Good	20					
				hard/man-made	Revetment	Jetty	Fair	20					
	Whitley Bay, Whitley Links	121AA901A4501C07	45/07/01	hard/man-made	Sea Wall	Sea Wall	Good	40					
	Whitley Bay, Whitley Sands	121AA901A4501C08	45/08/01	hard/man-made	Sea Wall	Sea Wall	Poor	10					
	Whitley Bay, Spanish City	121AA901A4601C01	46/09/01	hard/man-made	Sea Wall	Sea Wall	Fair	>10					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Whitley Bay, Whitley Sands	121AA901A4601C02	46/10/01	hard/man-made	Sea Wall	Revetment	Poor	1 - 5					
				hard/man-made	Sea Wall	Slope	Fair	99					
				hard/man-made	Sea Wall	Sea Wall	Poor	5 – 10					
				hard/man-made	Sea Wall	Sea Wall	Poor	5 – 10					
				hard/man-made	Sea Wall	Northern Staircase	Poor	5 - 10					
		121AA901A4601C03	46/11/01	hard/man-made	Sea Wall	Sea Wall	Poor	20					

North Tyneside	Whitley Bay, Whitley Sands	121AA901A4601C04	46/12/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Sea Wall	Fair	40					
		121AA901A4601C05	46/13/01	hard/man-made	Sea Wall	Sea Wall	Fair	20					
				hard/man-made	Sea Wall	Sea Wall	Fair	30					
		121AA901A4601C06	46/14/01	hard/man-made	Sea Wall	Sea Wall	Fair	20					
				hard/man-made	Sea Wall	Sea Wall	Good	40					
		121AA901A4601C07	46/15/01	hard/man-made	Sea Wall	Sea Wall	Fair	20					
				hard/man-made	Sea Wall	Apron	Fair	20					
		121AA901A4601C08	46/16/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Sea Wall	Fair	40					
	Whitley Bay, Brown's Bay	121AA901A4601C09	46/16/02	hard/natural	Cliff	Cliff	Good	99					
		121AA901A4601C10	46/17/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
	Cullercoat, Brown's Bay	121AA901A4701C01	47/18/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					



ROYAL HASKONING

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Cullercoat, Brown's Point			hard/man-made	Sea Wall	Cliff	Fair	40					
				hard/man-made	Sea Wall	Wall	Fair	40					
		121AA901A4701C02	47/19/01	hard/natural	Cliff	Cliff	Fair	40					
		121AA901A4701C03	47/19/02	hard/natural	Cliff	Cliff	Fair	40					
	Cullercoat	121AA901A4701C04	47/20/01	hard/man-made	Sea Wall	Sea Wall	Good	50					
		121AA901A4701C05	47/21/01	hard/man-made	Sea Wall	Sea Wall	Good	40					
				hard/man-made	Sea Wall	Apron	Fair	40					
				hard/man-made	Sea Wall	Sea Wall	Fair	40					
		121AA901A4701C06	47/22/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Apron	Fair	30					
				hard/man-made	Sea Wall	Apron	Fair	30					

North Tyneside	Cullercoat, North Pier	121AA901A4701C07	47/23/01	hard/man-made	Breakwater	Breakwater	Fair	30					
				hard/man-made	Breakwater	Wall	Fair	30					
	Cullercoat, Cullercoats Bay (Lifeboat St.)	121AA901A4701C08	47/24/01	hard/man-made	Sea Wall	Steps	Poor	40					
				hard/man-made	Sea Wall	Wall	Fair	40					
				hard/man-made	Sea Wall	Wall	Fair	20					
				hard/man-made	Sea Wall	Wall	Fair	40					
	Cullercoat, Cullercoats Bay	121AA901A4701C09	47/24/02	hard/man-made	Sea Wall	Wall	Fair	40					
		121AA901A4701C10	47/24/03	hard/natural	Cliff	Cliff	Fair	99					
		121AA901A4701C11	47/24/04	soft/natural	Cliff	Cliff	Fair	99					
		121AA901A4701C12	47/25/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
		121AA901A4701C13	47/26/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
		121AA901A4701C14	47/27/01	hard/man-made	Revetment	Revetment	Fair	30					
				hard/man-made	Revetment	Apron	Fair	30					



ROYAL HASKONING

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Cullercoat, South Pier	121AA901A4701C15	47/28/01	hard/man-made	Revetment	Stairs	Fair	40					
				hard/man-made	Breakwater	Breakwater	Poor	15					
				hard/man-made	Breakwater	Revetment	Poor	15					
	Cullercoat, Tynemouth North Point	121AA901A4701C16	47/28/02	hard/natural	Cliff	Cliff	Fair	99					

North Tyneside	Tynemouth, Long Sands	121AA901A4701C17	47/29/01	hard/man-made	Sea Wall	Sea Wall	Poor	>10					
				hard/man-made	Sea Wall	Revetment	Fair	10					
		121AA901A4701C18	47/30/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Apron	Fair	20					
		121AA901A4701C19	47/31/01	hard/man-made	Revetment	Revetment	Fair	30					
				hard/man-made	Revetment	Splash Wall	Fair	>10					
		121AA901A4701C20	47/32/01	hard/man-made	Sea Wall	Sea Wall	Fair	>10					
		121AA901A4701C21	47/32/02	soft/natural	Dunes	Dunes	Fair	99					
		121AA901A4701C22	47/33/01	hard/man-made	Revetment	Revetment	Fair	30					
				hard/man-made	Revetment	Stairs	Fair	10					
				hard/man-made	Revetment	Wall/Platform	Good	50					
		121AA901A4701C23	47/34/01	hard/man-made	Sea Wall	Wave Deflector	Fair	40					
				hard/man-made	Sea Wall	Sea Wall	Fair	40					

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
				hard/man-made	Sea Wall	Retaining Wall	Fair	>20					
		121AA901A4701C24	47/35/01	hard/man-made	Sea Wall	Sea Wall	Fair	10					
	Tynemouth, Sharpness Point	121AA901A4701C25	47/36/01	hard/man-made	Sea Wall	Wall	Poor	5					
				hard/man-made	Sea Wall	Crest	Fair	20					
				hard/man-made	Sea Wall	Wall	Fair	20					
		121AA901A4701C26	47/36/02	hard/natural	Cliff	Cliff	Fair	99					
	Tynemouth, King Edwards Bay	121AA901A4701C27	47/37/01	hard/man-made	Revetment	Revetment	Poor	20					
				hard/man-made	Revetment	Wall	Poor	20					
				hard/man-made	Revetment	Apron	Poor	5					
		121AA901A4701C28	47/37/02	hard/man-made	Sea Wall	Sea Wall	Fair	40					

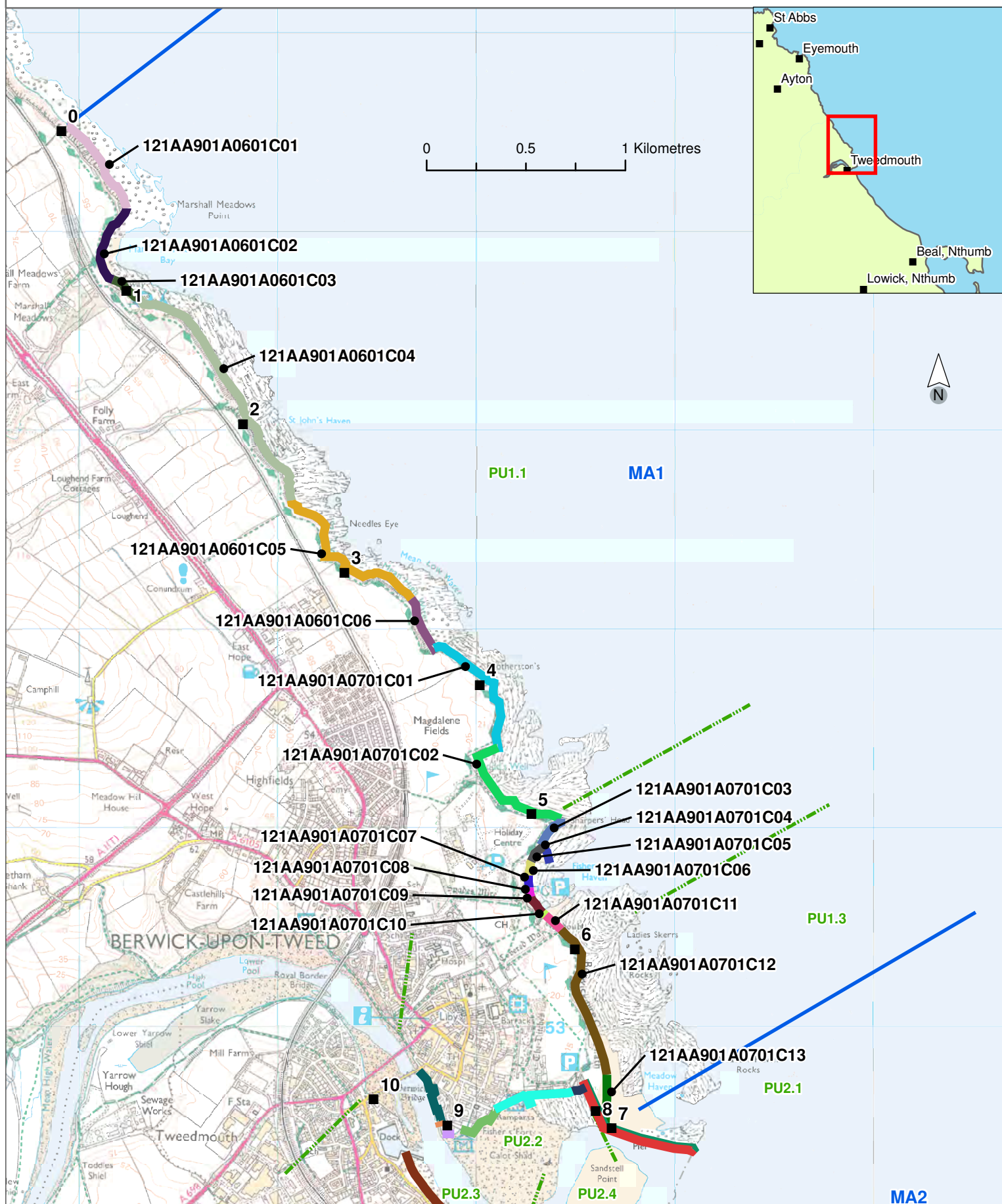
North Tyneside	Tynemouth, King Edwards Bay	121AA901A4701C29	47/38/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
		121AA901A4701C30	47/38/02	hard/natural	Cliff	Cliff	Fair	99					
	Tynemouth, Tynemouth Castle	121AA901A4701C31	47/39/01	hard/man-made	Cliff	Wall	Fair	>20					
				hard/man-made	Cliff	Toe Structure	Good	40					
	Tynemouth	121AA901A4701C32	47/39/02	hard/natural	Cliff	Wall	Fair	20					
		121AA901A4701C33	47/40/01	hard/man-made	Sea Wall	Wall	Fair	40					
				hard/man-made	Sea Wall	Apron	Fair	20					
	Tynemouth, North Pier	121AA901A4801C01	48/41/01	hard/man-made	Breakwater	Breakwater	Fair	40					
				hard/man-made	Breakwater	Aprons	Fair	40					
	Tynemouth, Priors Haven	121AA901A4801C02	48/42/01	hard/man-made	Revetment	Revetment	Good	40					
		121AA901A4801C03	48/42/02	soft/natural	Coastal Slope	Coastal Slope	Good	99					
	Tynemouth, Freestone Point	121AA901A4801C04	48/43/01	hard/man-made	Sea Wall	Sea Wall	Fair	40					
				hard/man-made	Sea Wall	Sea Wall	Fair	40					



ROYAL HASKONING

Information from Royal Haskoning Survey Summer 2008 (taken from Royal Haskoning Coastal Defence Database)									Updated Information from other sources				
Area	Location	NFCDD Asset Reference No.	Alternative Ref No.	Classification	Asset Type	Element Type	Condition	Residual Life (years)	Other Ref. No.	Defense Name	Source Title	Source Data	Residual Life (yrs)
	Tynemouth, Sandy Goit	121AA901A4801C05	48/44/01	hard/man-made	Sea Wall	Sea Wall	Fair	20					
		121AA901A4801C06	48/44/02	hard/man-made	Sea Wall	Sea Wall	Very Poor	5					
				hard/man-made	Sea Wall	Revetment	Very Poor	5					
	Tynemouth, Black Maiden	121AA901A4801C07	48/45/01	hard/man-made	Revetment	Recurved Sea Wall	Fair	40					
			48/45/01	hard/man-made	Revetment	Revetment	Fair	30					
			48/45/01	hard/man-made	Revetment	Toe	Fair	30					
	Tynemouth, The Flats	121AA901A4801C08	48/46/01	hard/man-made	Revetment	Sea Wall	Good	20					
				hard/man-made	Revetment	Revetment	Fair	20					
				hard/man-made	Revetment	Apron	Fair	20					
	Tynemouth, Mussel Scarp	121AA901A4801C09	48/47/01	hard/man-made	Revetment	Revetment	Poor	5					
	Tynemouth, Low Lights	121AA901A4801C10	48/48/01	hard/man-made	Revetment	Revetment	Poor	5					

Policy Development Zone 1 - Scottish Border to Holy Island Management Area 1 - North of Berwick (Ch 0 to 7.5)



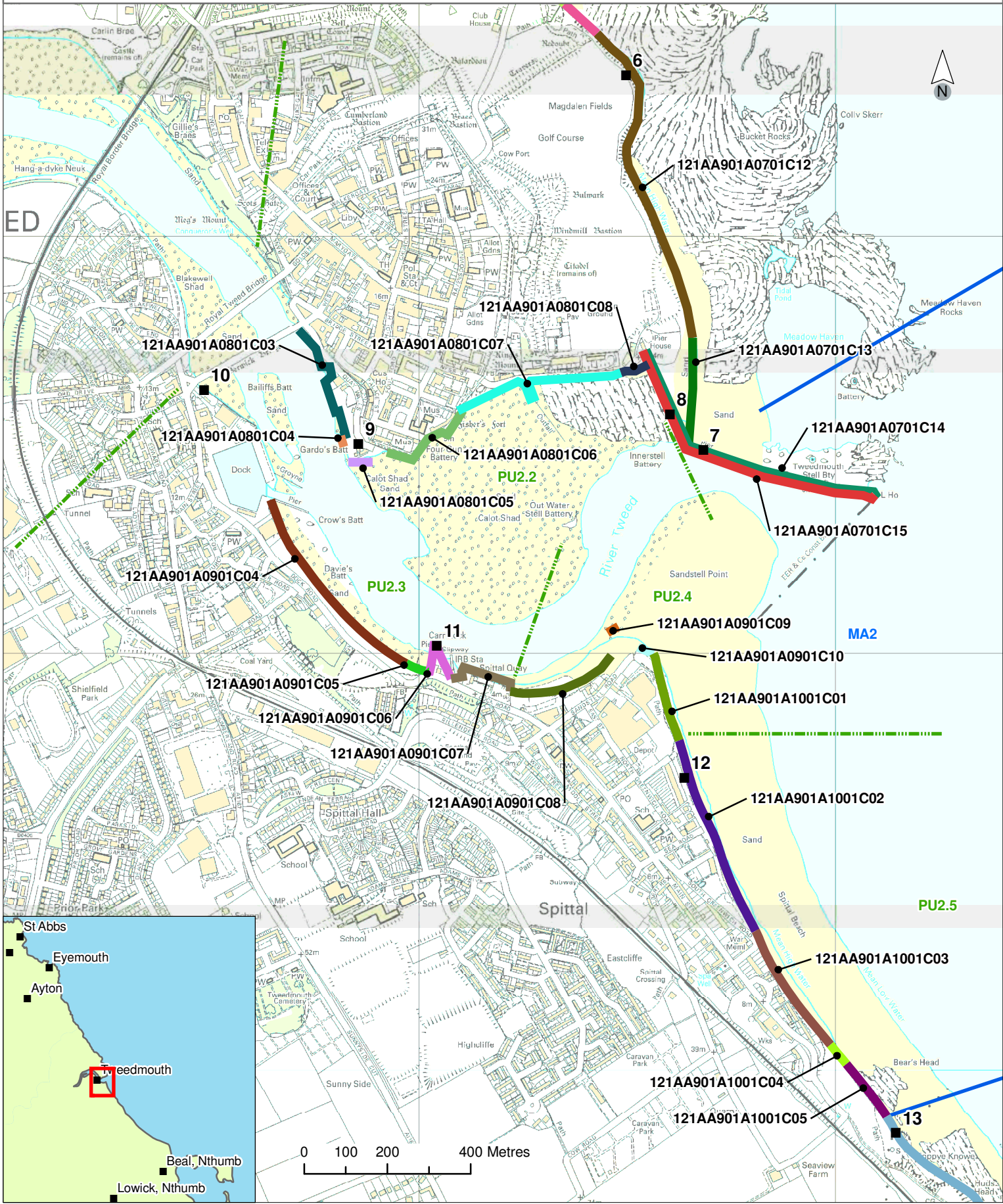
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Management Areas
Policy Units



Policy Development Zone 1 - Scottish Border to Holy Island
Management Area 2 - Tweed Estuary (Ch 7.5 to 13)



Asset Location and NFCDD Reference Number

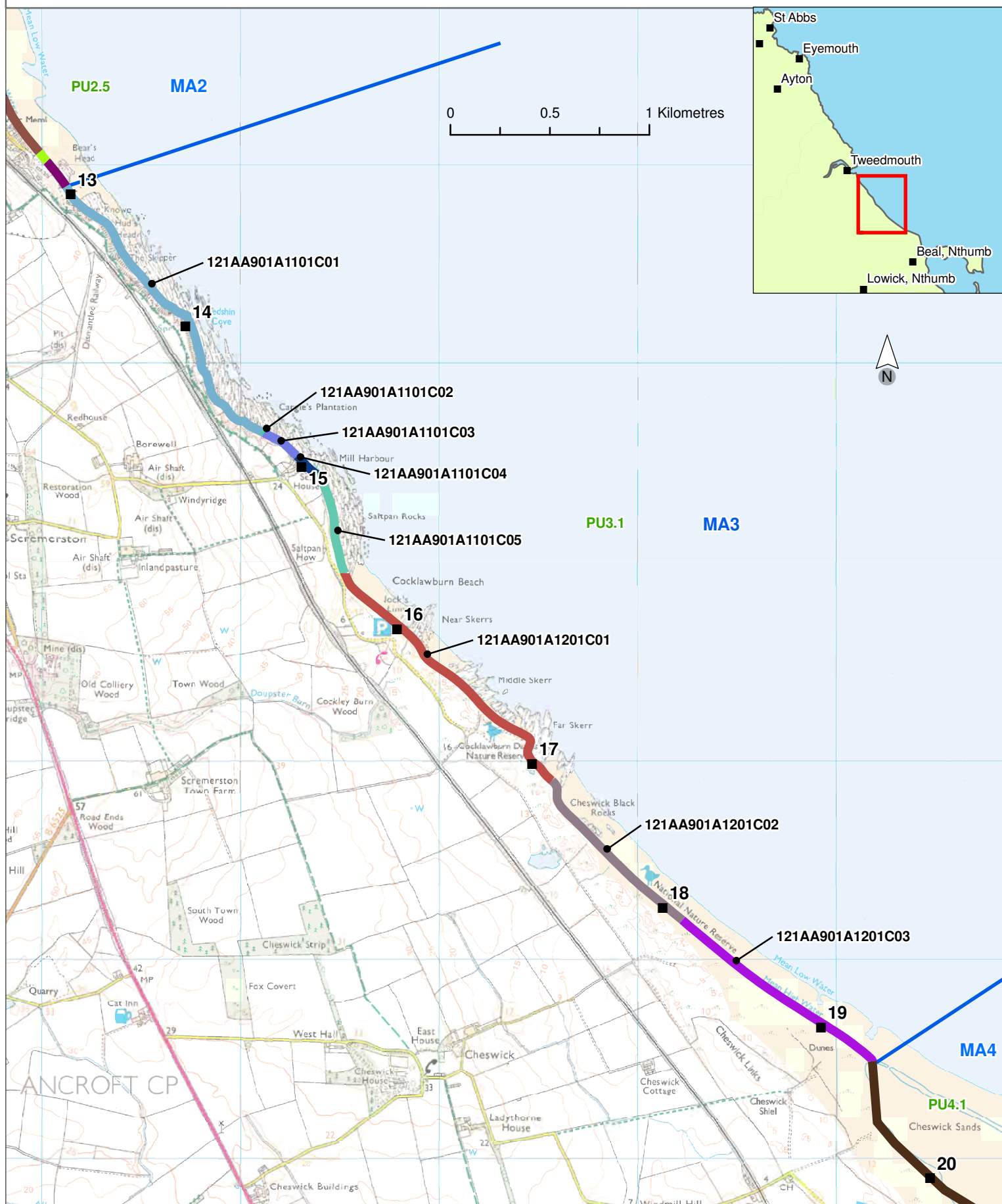
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 Management Areas

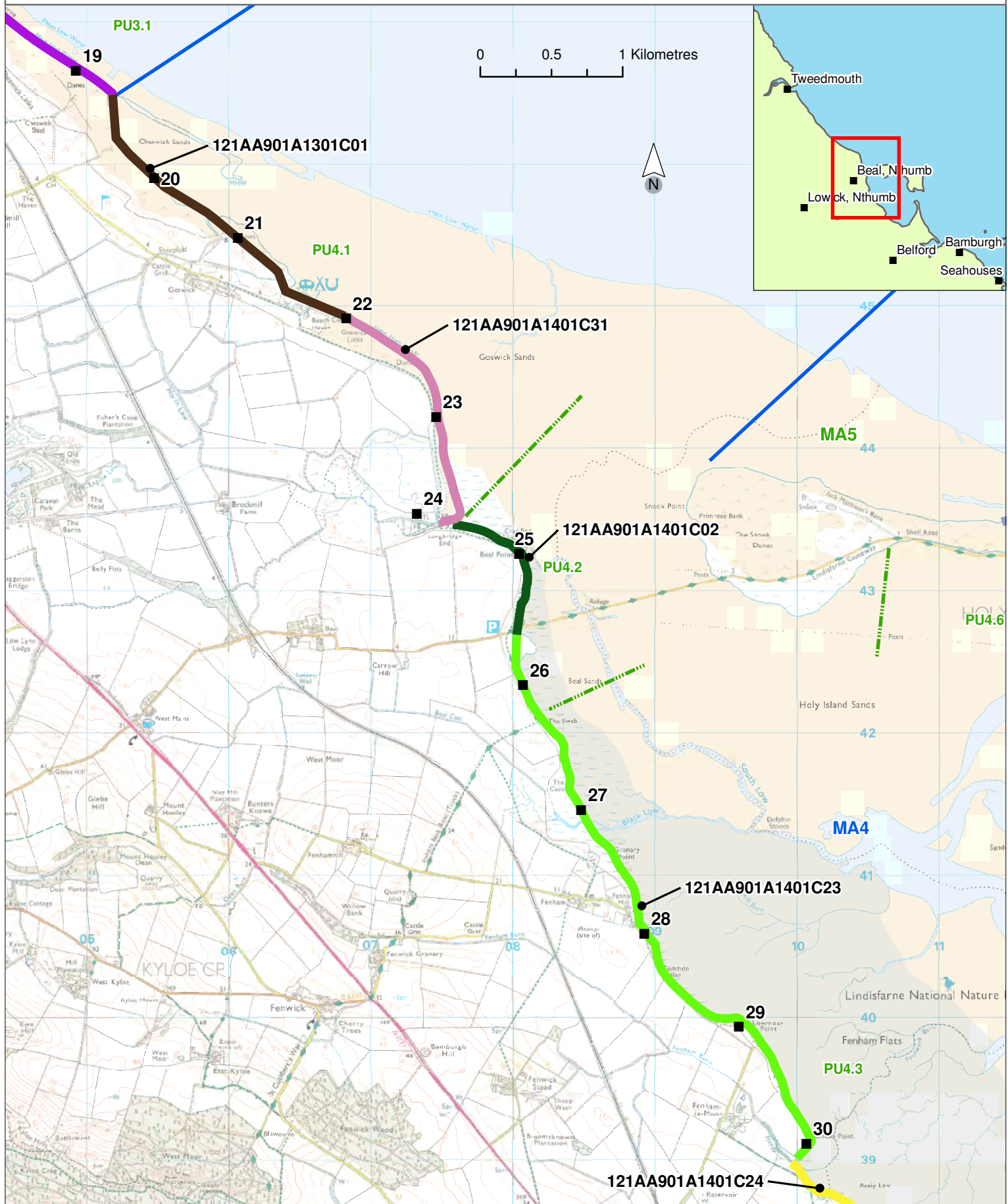
 Policy Units



Policy Development Zone 1 - Scottish Border to Holy Island
Management Area 3 - Scremerston Cliffs (Ch 13 to 19.5)



Policy Development Zone 1 - Scottish Border to Holy Island
Management Area 4 - Holy Island Hinterland (Ch 19.5 to 44.5; Map1)



**Asset Location and
NFCDD Reference Number**

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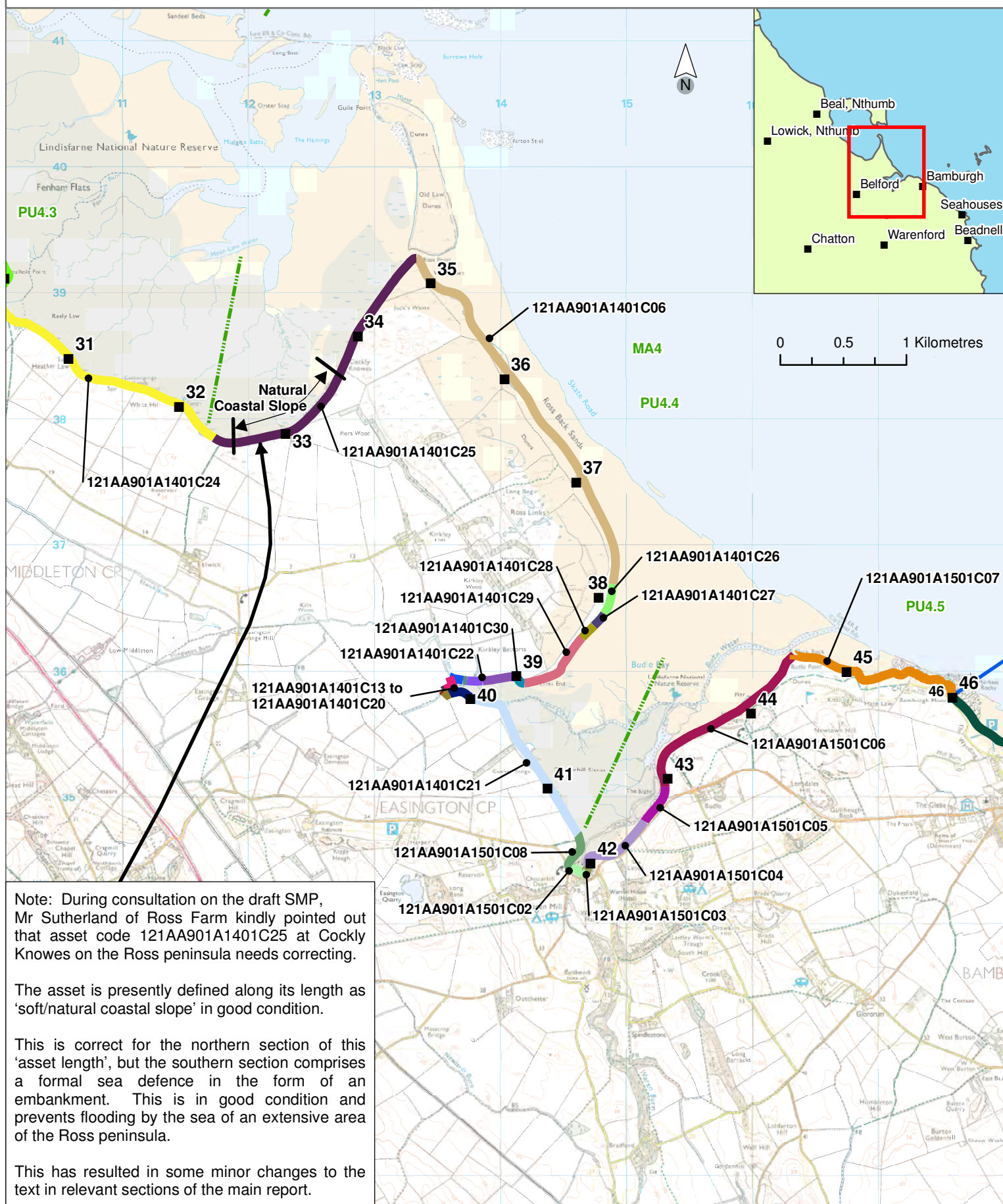
Management Areas

Policy Units



Policy Development Zone 1 - Scottish Border to Holy Island

Management Area 4 - Holy Island Hinterland (Ch 19.5 to 44.5; Map2)



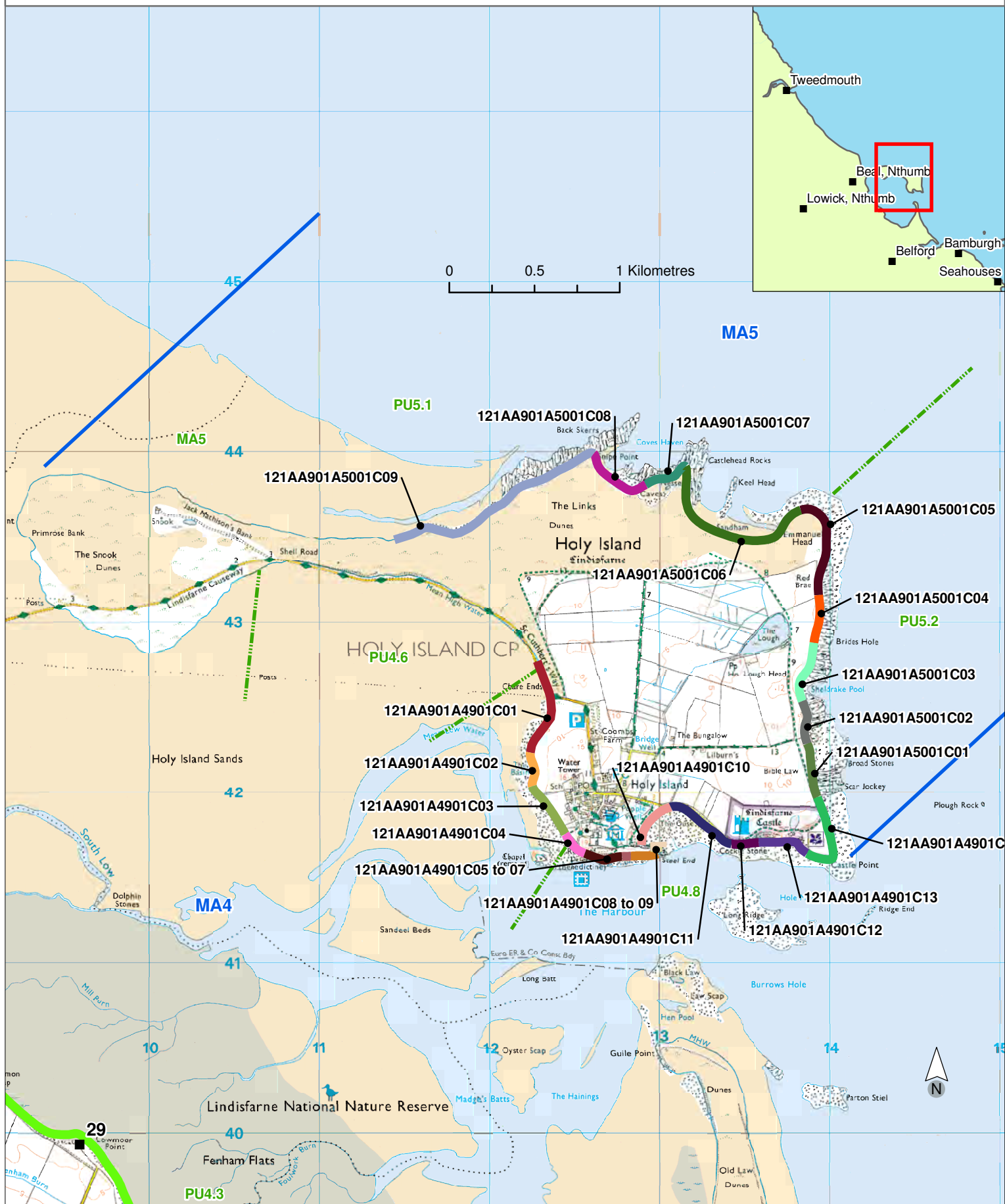
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— Management Areas
- - - Policy Units



Policy Development Zone 1 - Scottish Border to Holy Island
Management Area 5 - Holy Island North and East



**Asset Location and
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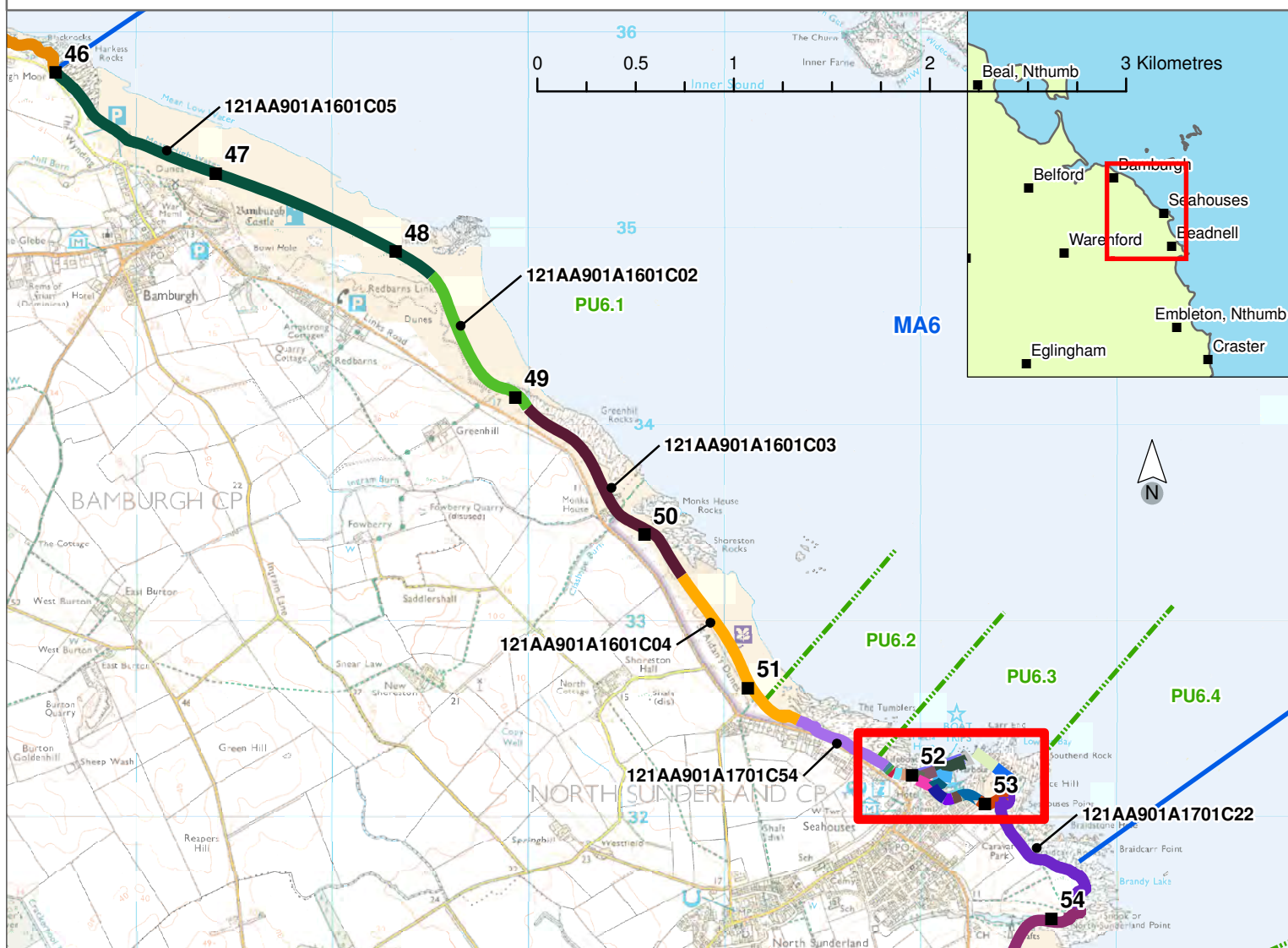
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— Management Areas

Policy Units



Policy Development Zone 2 - Bamburgh to Boulmer Management Area 6 - Budle Bay to Seahouses (Ch 46 to 53.5)



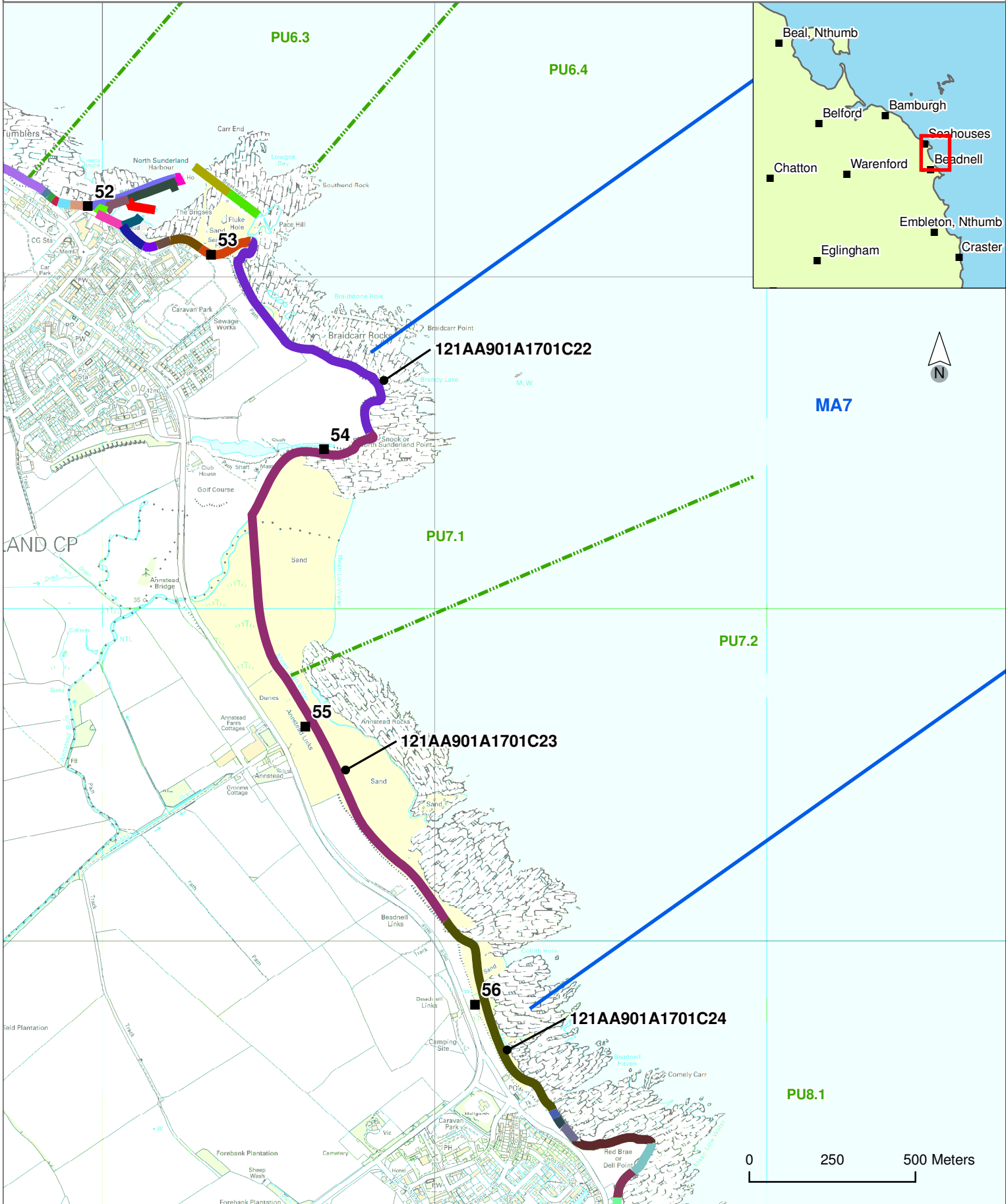
Asset Location and NFCDD Reference Number

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Management Areas
Policy Units



Policy Development Zone 2 - Bamburgh to Boulmer
Management Area 7 - Seahouses to Beadnell (Ch 53.5 to 56)



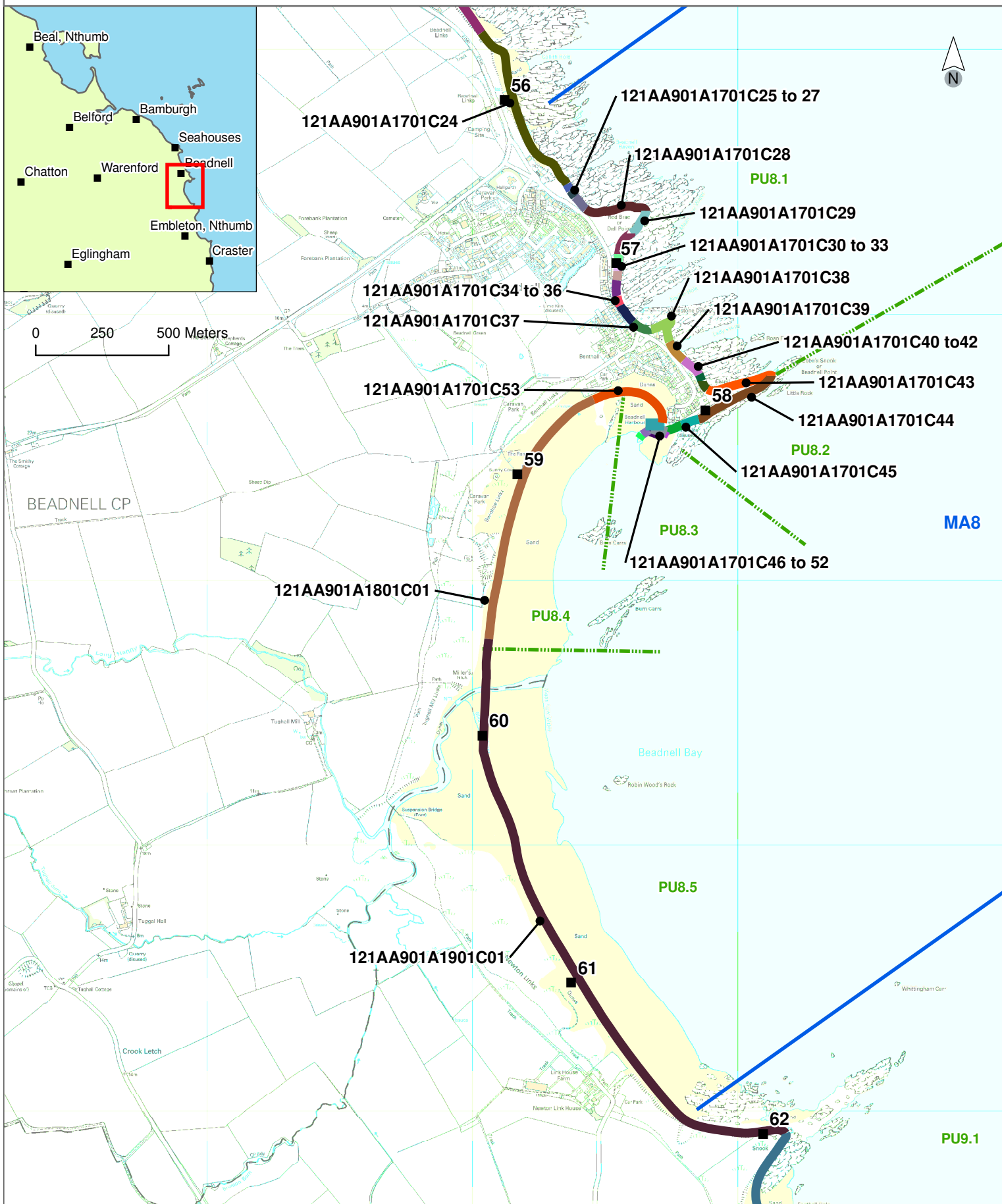
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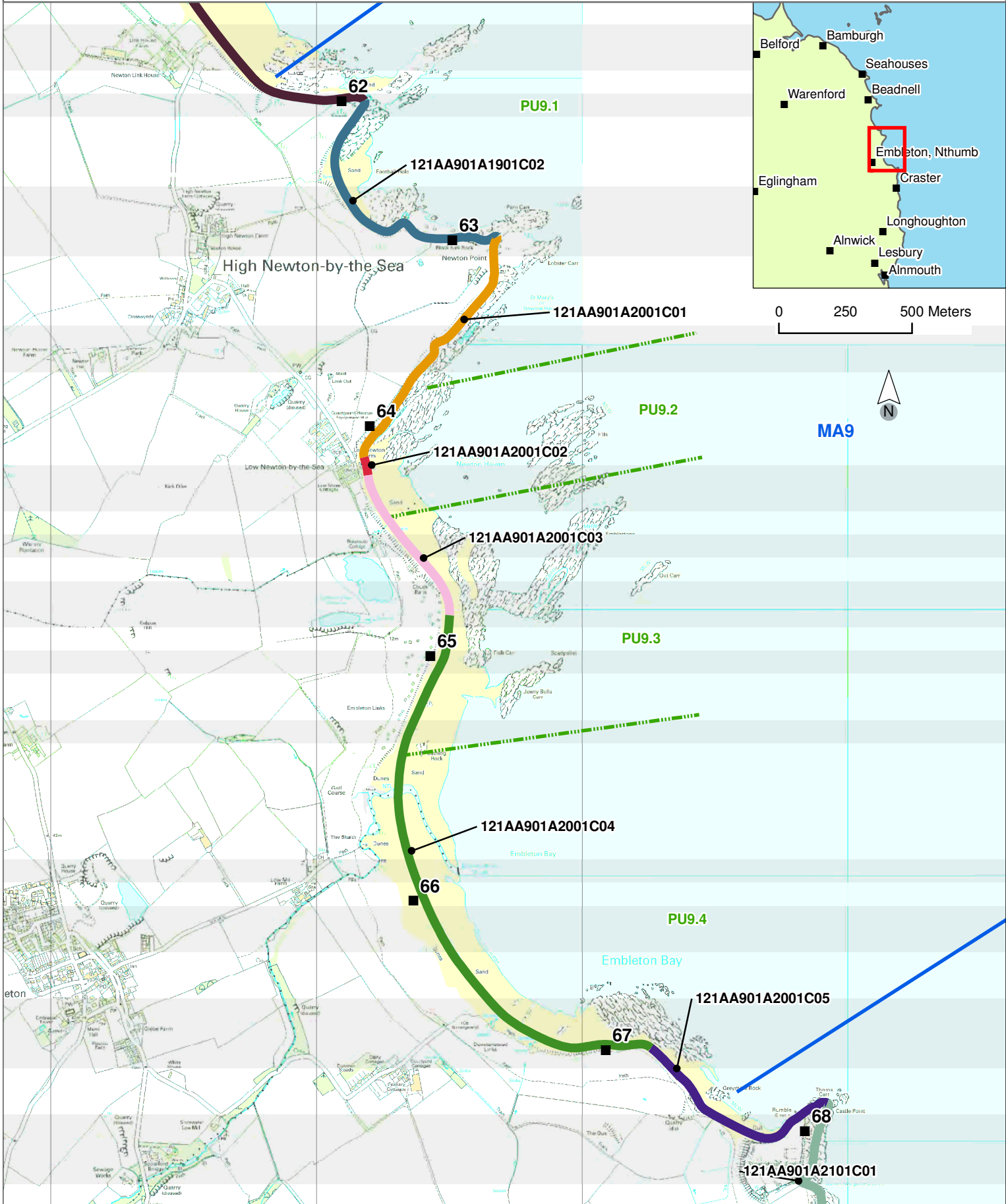
Management Areas
Policy Units



Policy Development Zone 2 - Bamburgh to Boulmer Management Area 8 - Beadnell and Beadnell Bay (Ch 56 to 62)



Policy Development Zone 2 - Bamburgh to Boulmer
Management Area 9 - Embleton Bay (Ch 62 to 68)



Asset Location and
NFCDD Reference Number

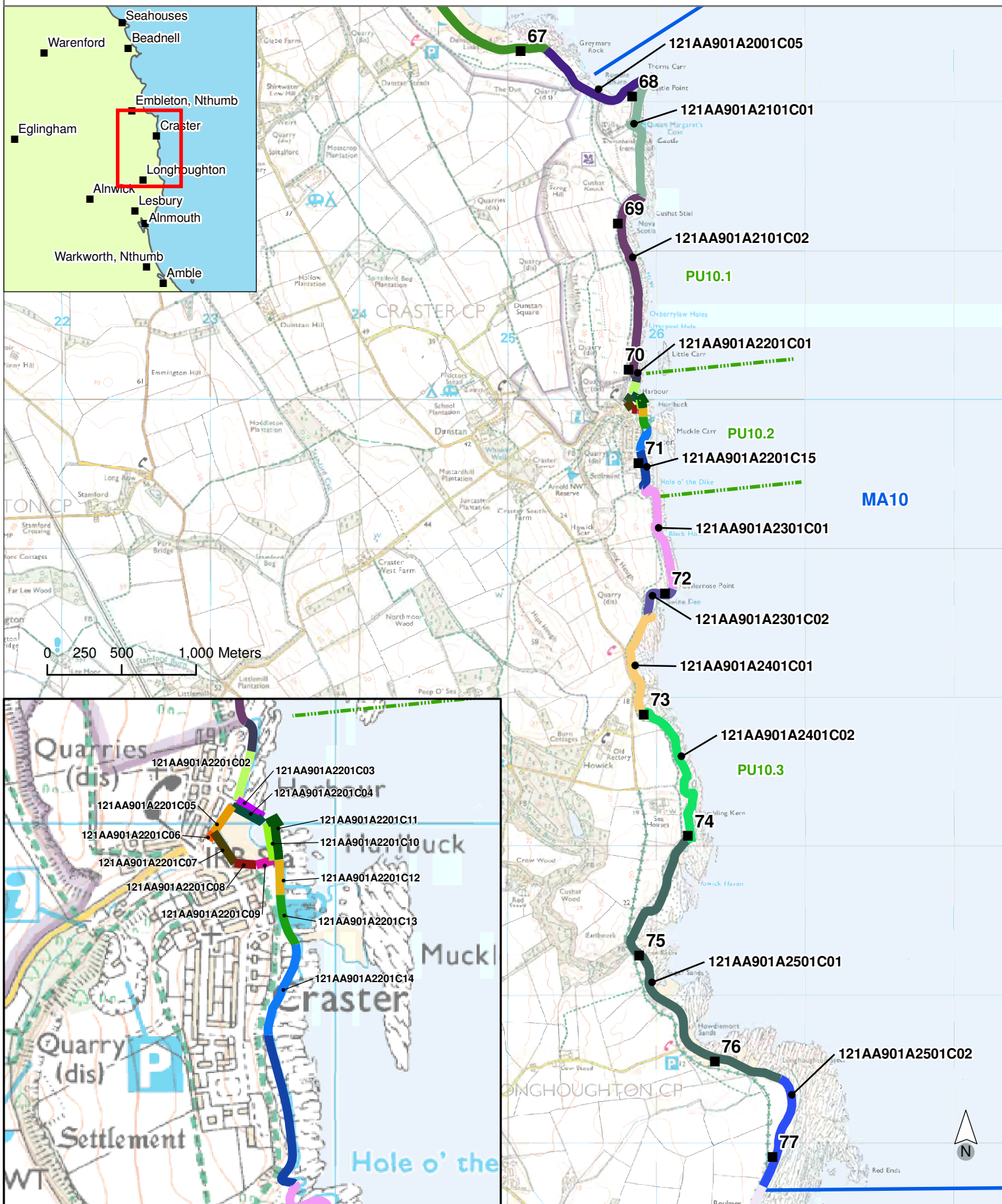
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Management Areas
Policy Units

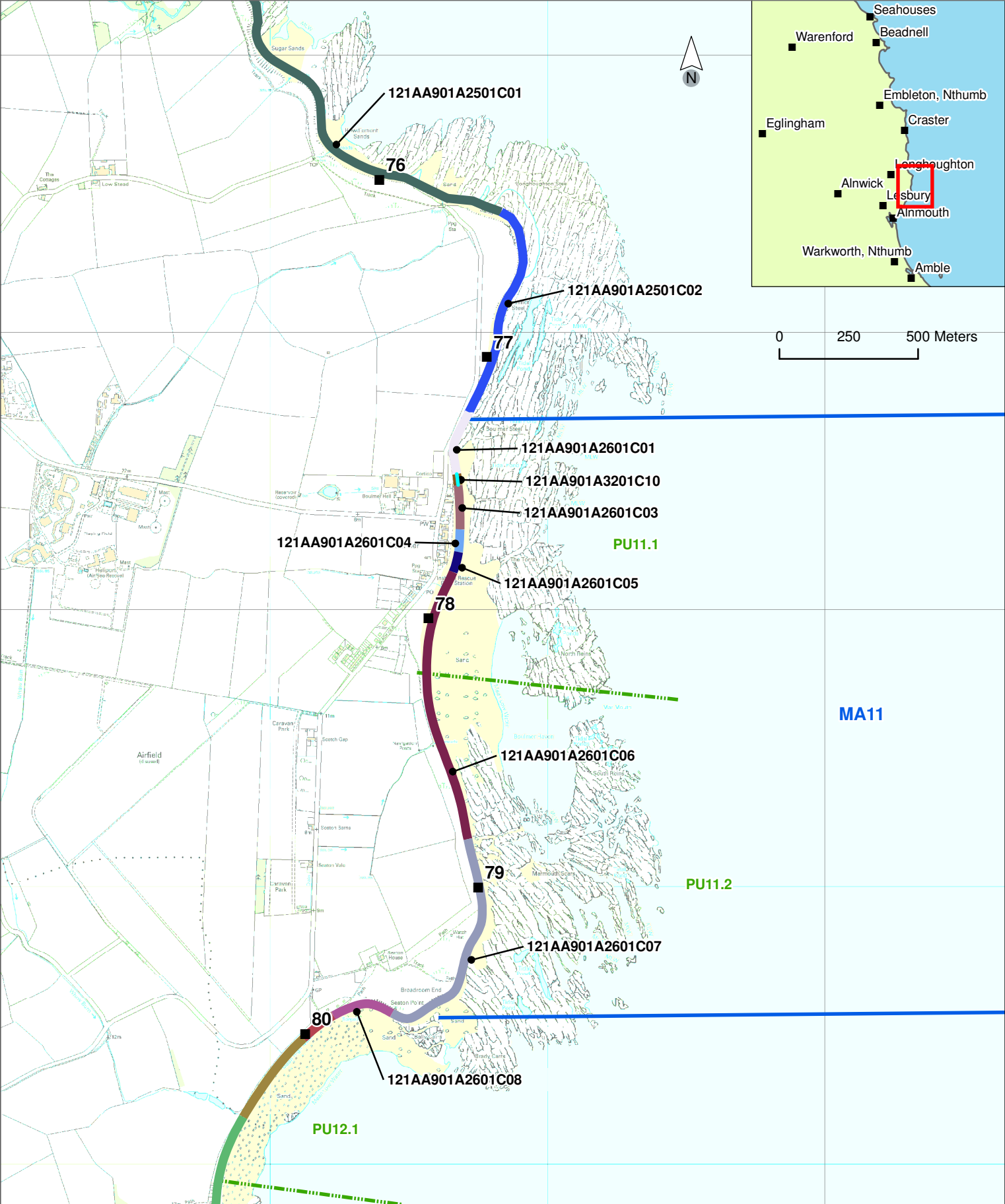


Policy Development Zone 2 - Bamburgh to Boulmer

Management Area 10 - Castle Rock to Boulmer (Ch 68 to 77)



Policy Development Zone 2 - Bamburgh to Boulmer
Management Area 11 - Boulmer to Seaton Point (Ch 77 to 79.5)



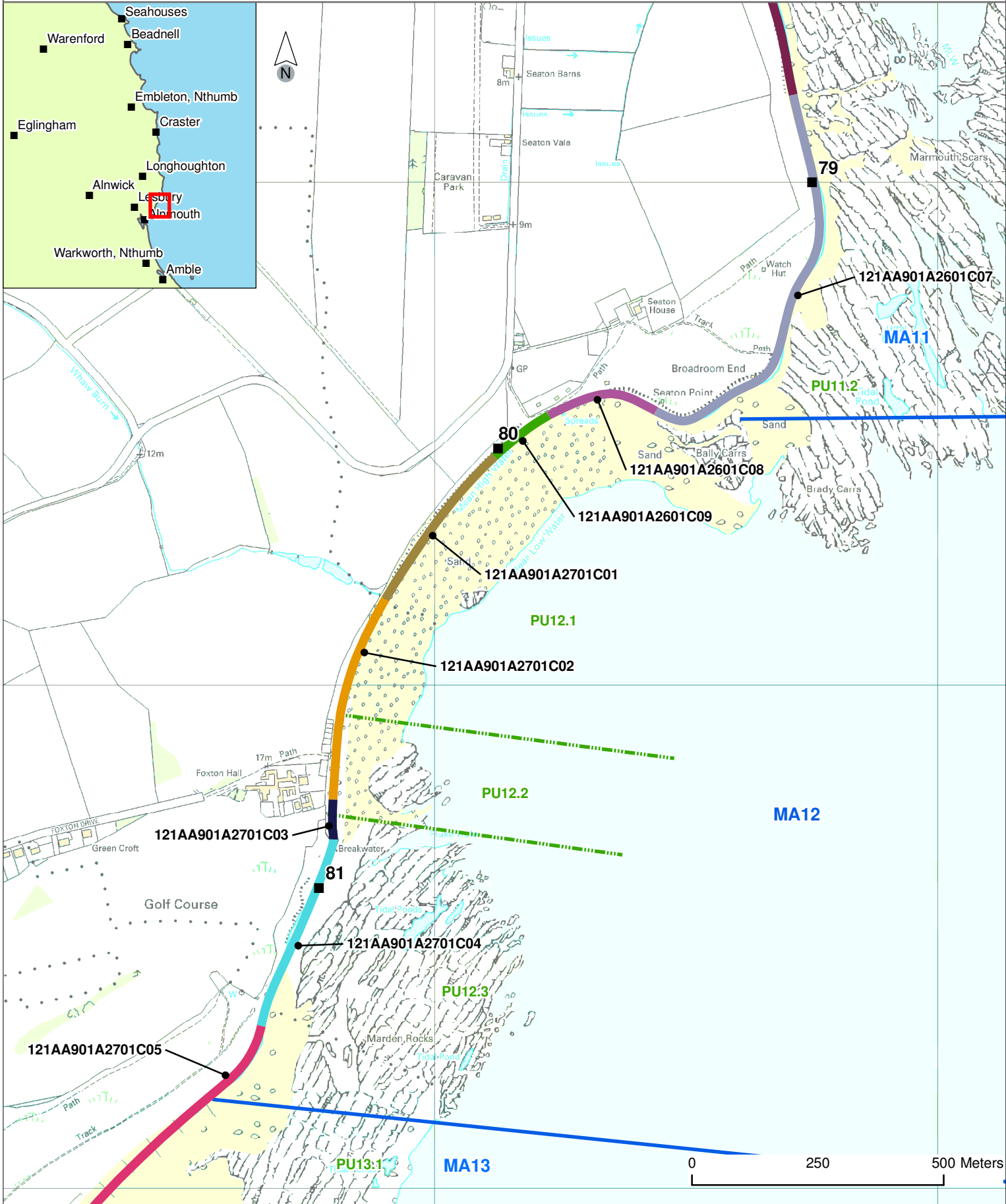
Asset Location and
NFCDD Reference Number

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Management Areas
Policy Units



Policy Development Zone 3 - Seaton Point to Beacon Hill
Management Area 12 - Foxhole Bay (Ch 79.5 to 81.5)



Asset Location and
NFCDD Reference Number

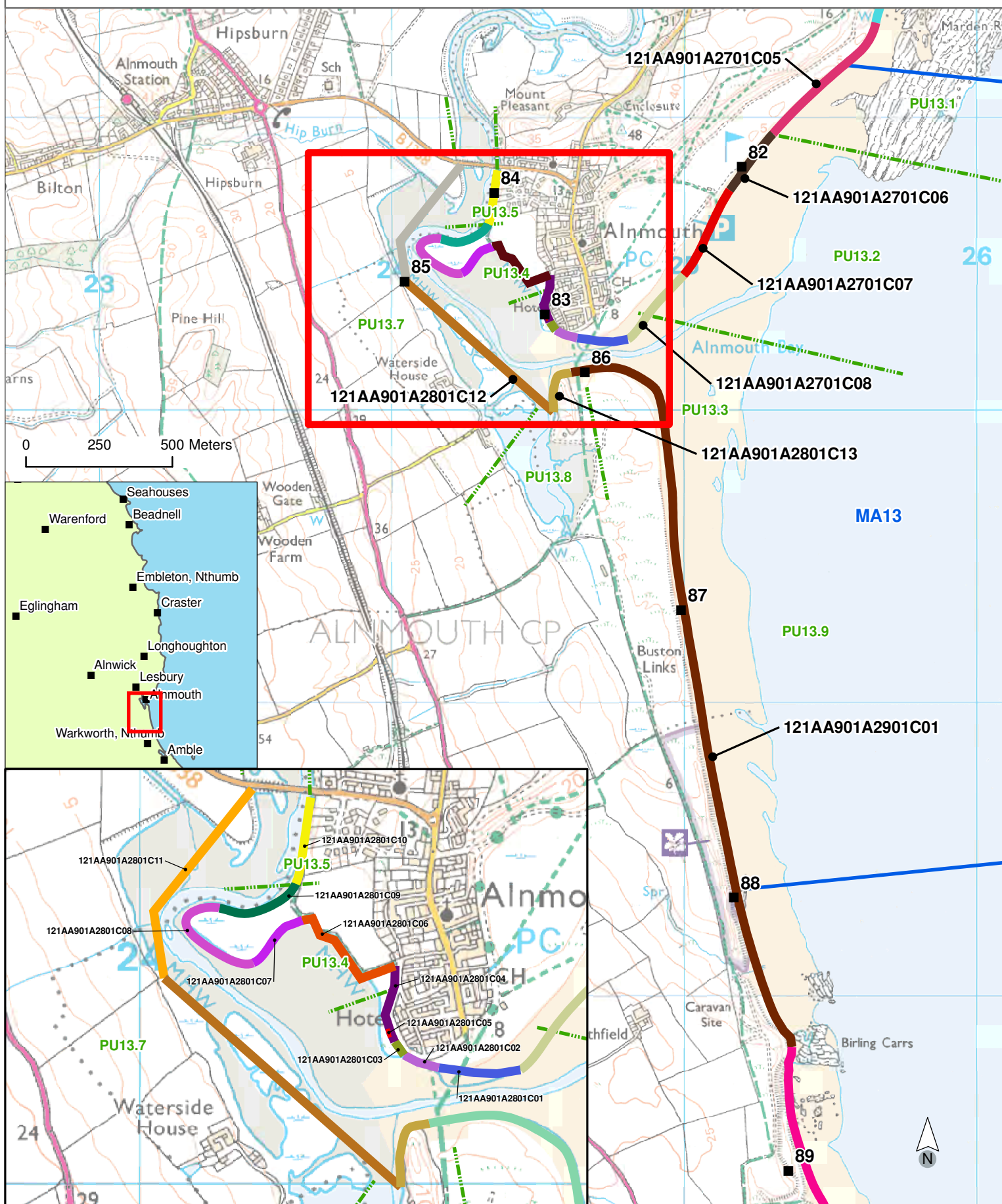
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Management Areas

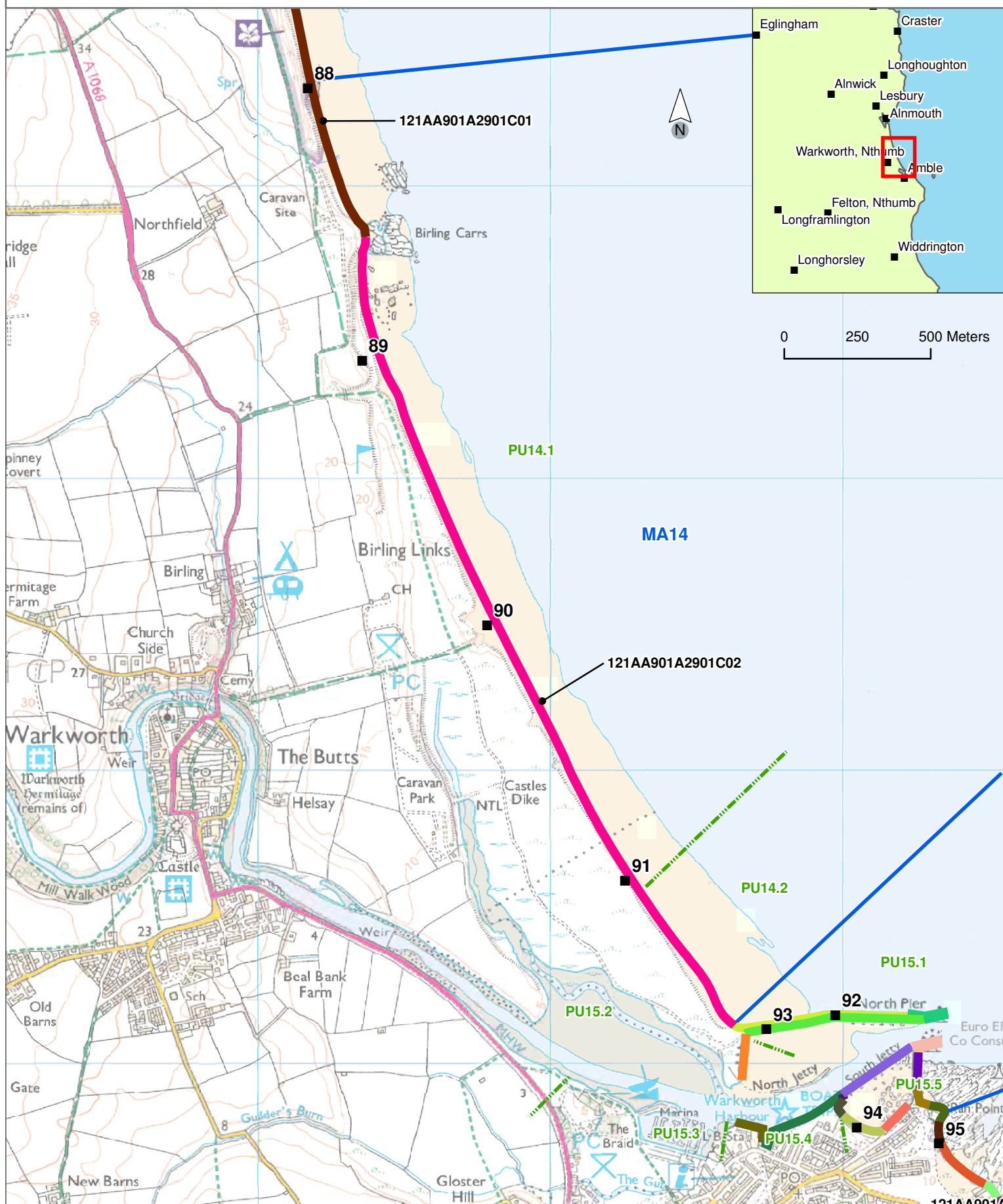
Policy Units



Policy Development Zone 3 - Seaton Point to Beacon Hill
Management Area 13 - Alnmouth Bay (Ch 81.5 to 85.5)



Policy Development Zone 3 - Seaton Point to Beacon Hill
Management Area 14 - Birling Links (Ch 85.5 to 92)



**Asset Location and
NFCDD Reference Number**

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 Management Areas

 Policy Units



Policy Development Zone 3 - Seaton Point to Beacon Hill Management Area 15 - Amble (Ch 92 to 94.5)



Asset Location and
NFCDD Reference Number

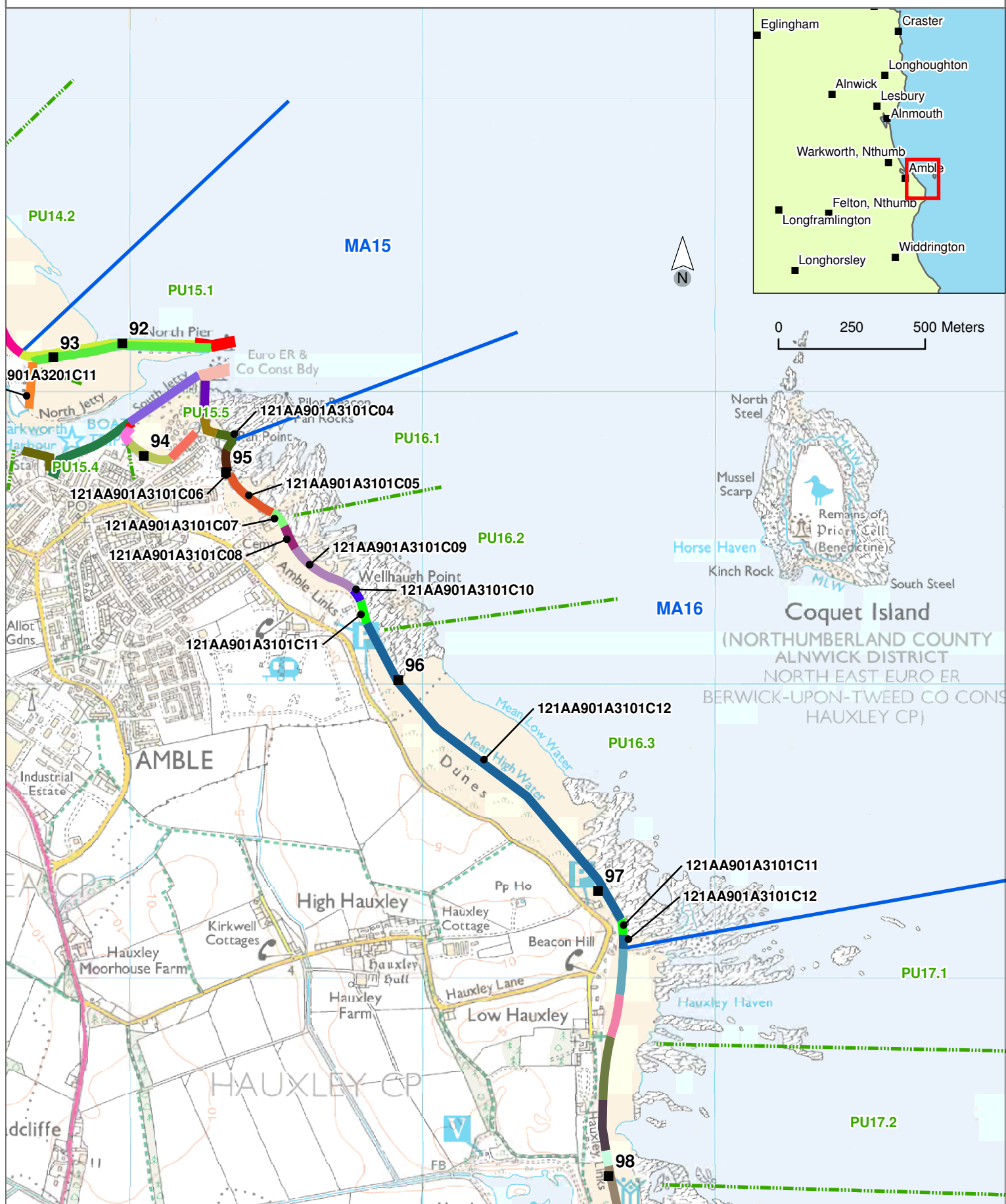
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Management Areas

Policy Units



Policy Development Zone 3 - Seaton Point to Beacon Hill
Management Area 16 - South Amble (Ch 94.5 to 97)



**Asset Location and
NFCDD Reference Number**

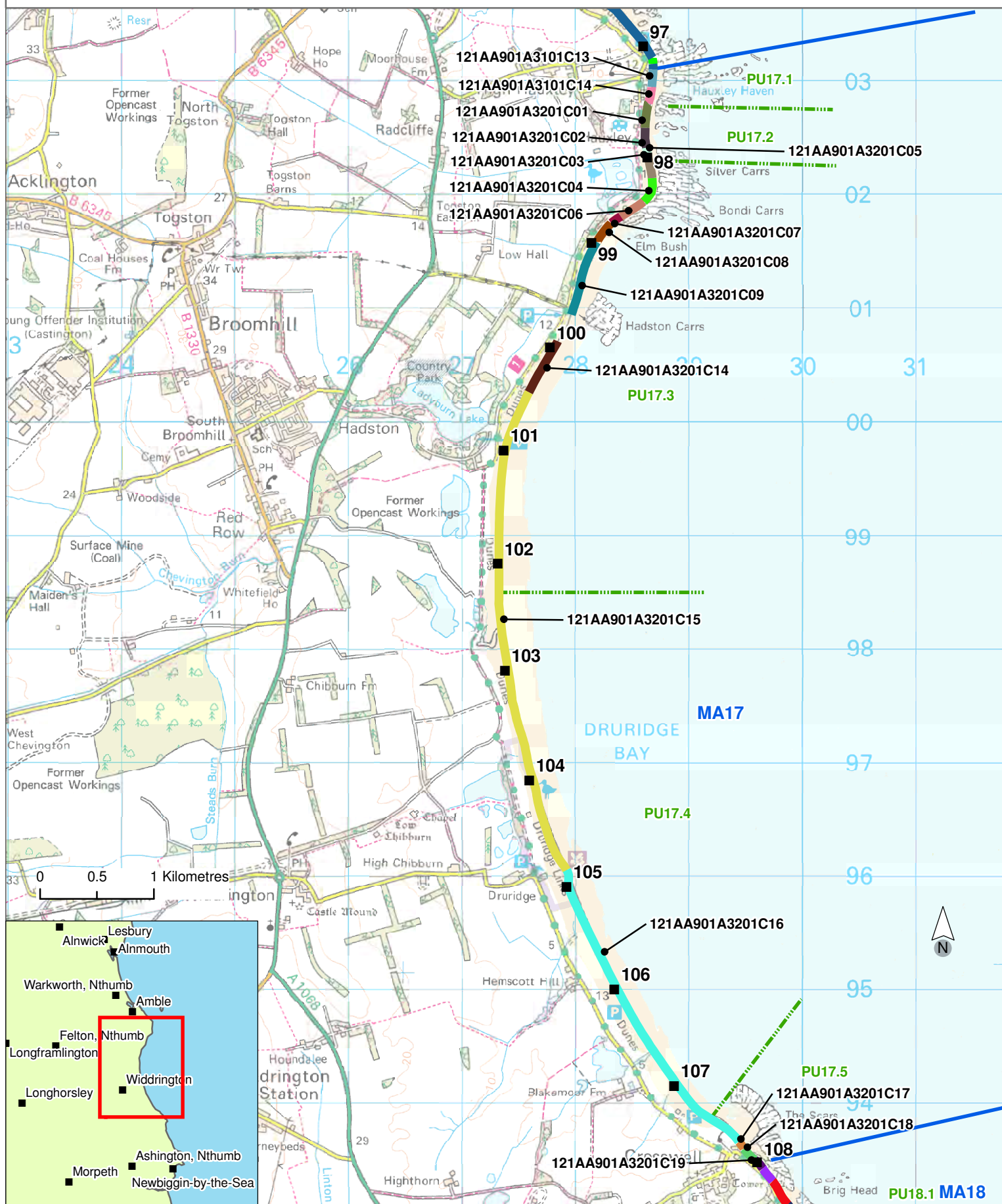
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— Management Areas

— Policy Units



Policy Development Zone 4 - Seaton Point to Beacon Hill
Management Area 17 - Beacon Hill to Creswell (Ch 97 to 108)



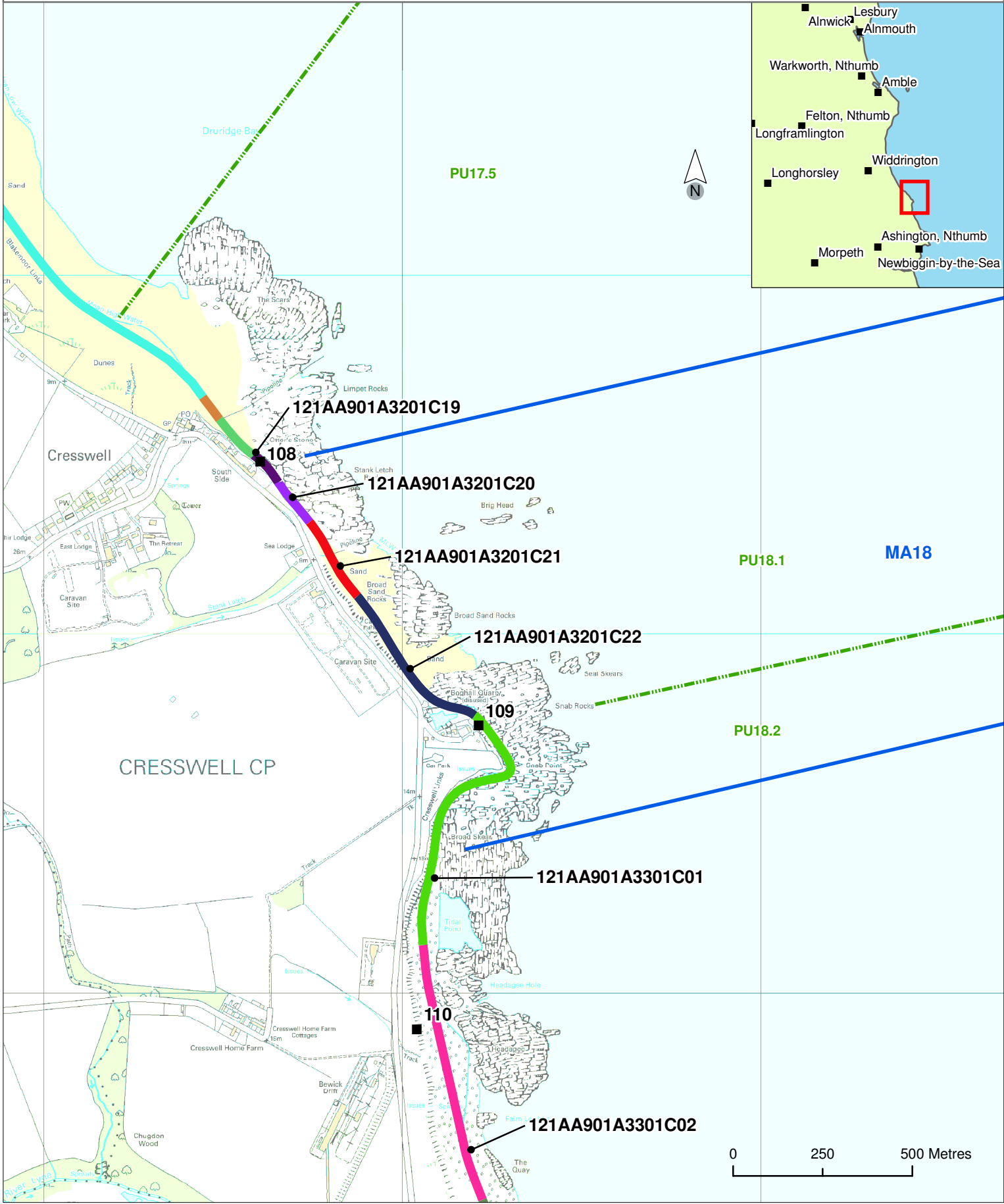
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— Management Areas
 — Policy Units



Policy Development Zone 4 - Seaton Point to Beacon Hill
Management Area 18 - Snab Point (Ch 108 to 109.5)



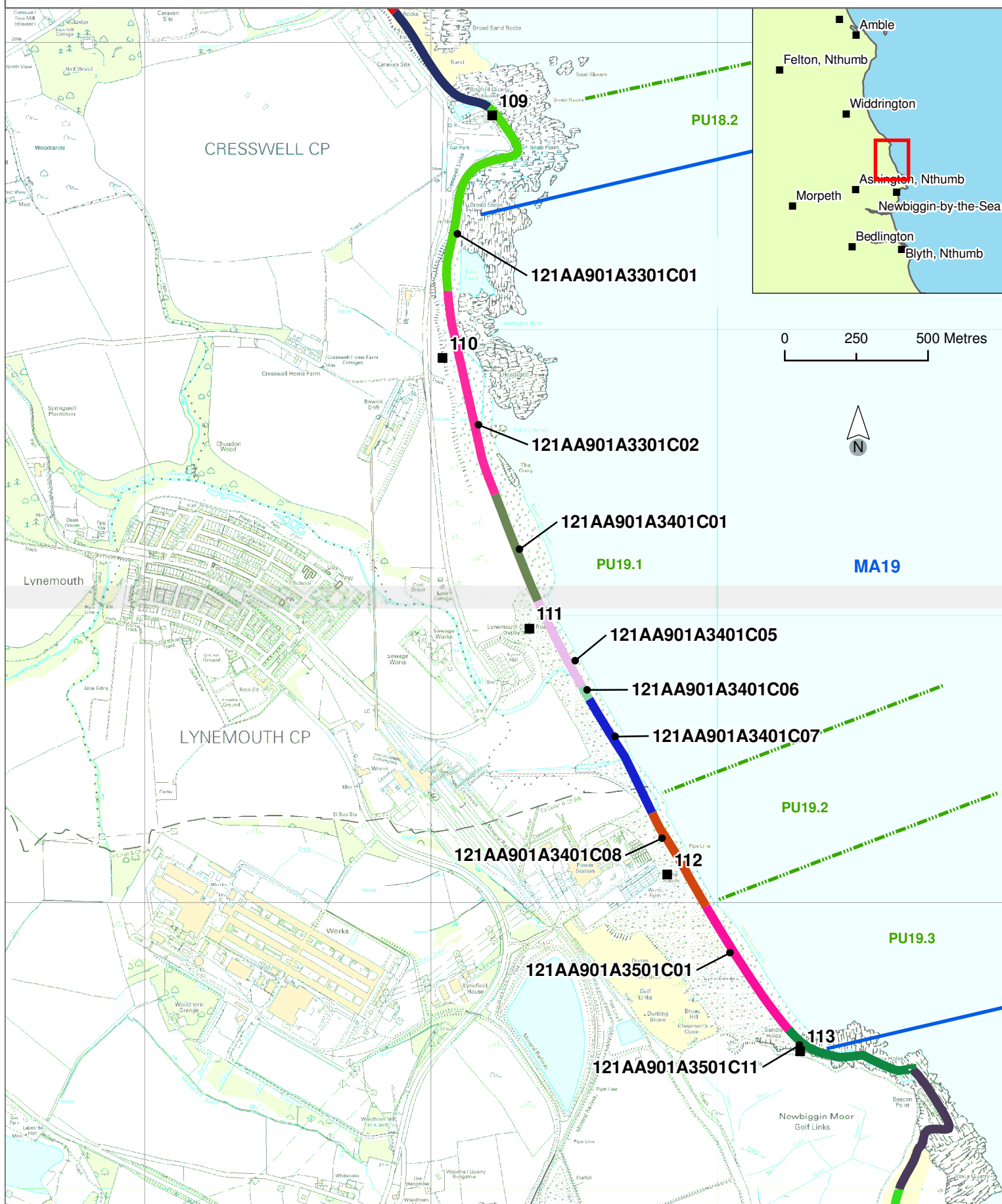
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Management Areas
Policy Units



Policy Development Zone 4 - Seaton Point to Beacon Hill Management Area 19 - Lynemouth Bay (Ch 109.5 to 113)



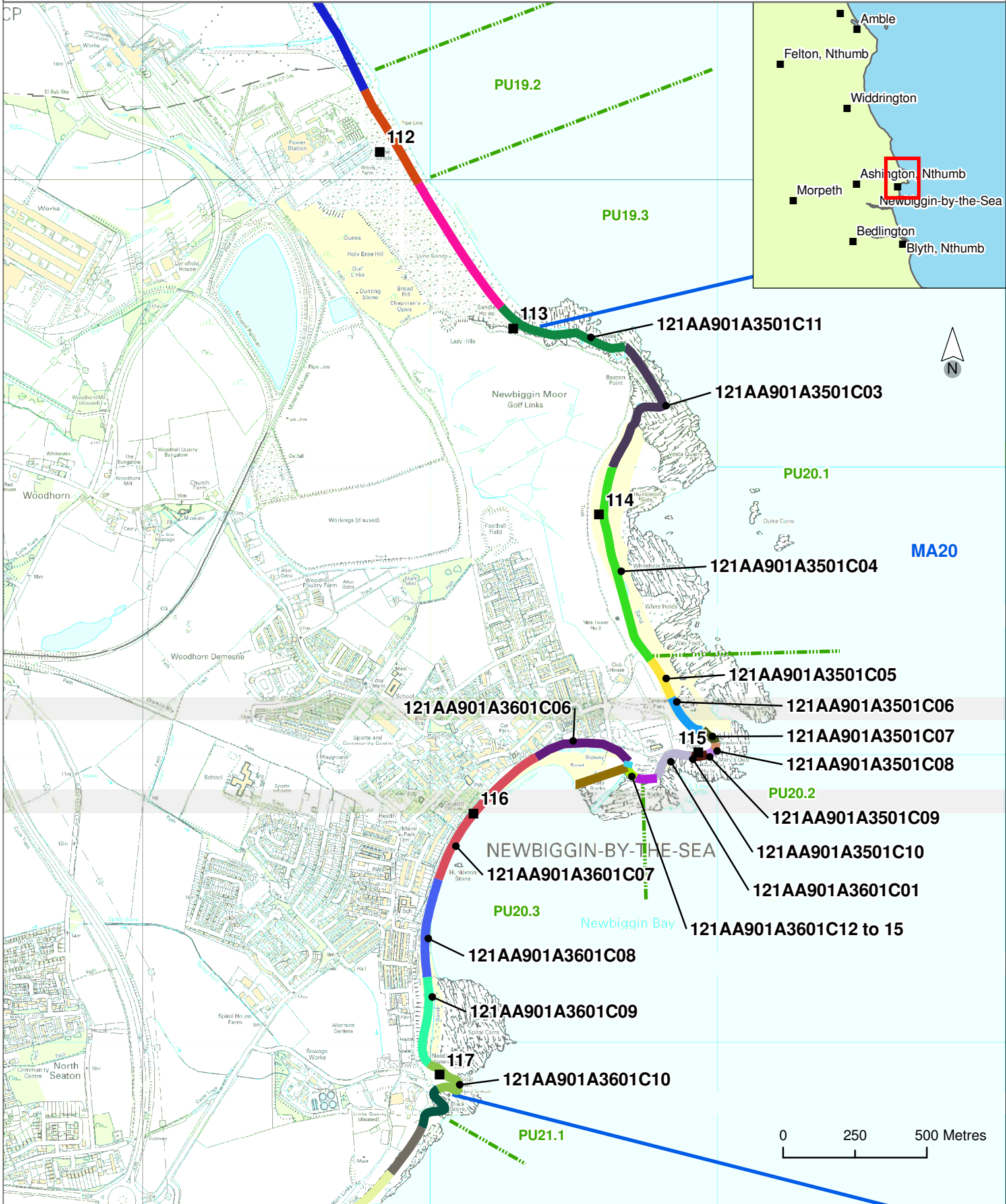
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- Management Areas
- Policy Units



Policy Development Zone 5 - Beadon Hill to Seaton Sluice
Management Area 20 - Newbiggin (Ch 113 to 117)



Asset Location and
NFCDD Reference Number

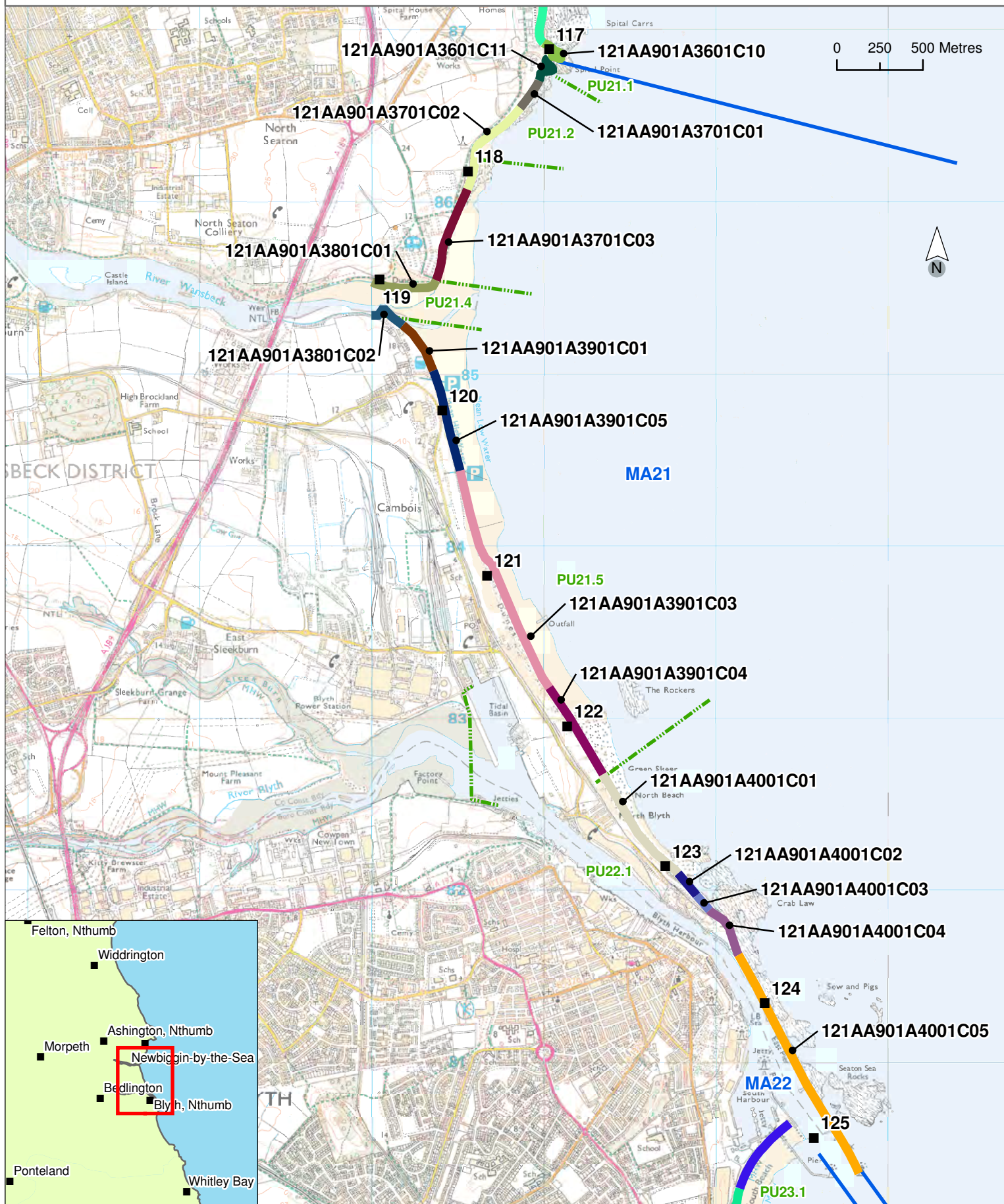
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Management Areas

Policy Units



Policy Development Zone 5 - Beadon Hill to Seaton Sluice Management Area 21 - Spital Point to Blyth East Pier (Ch 117 to 125)



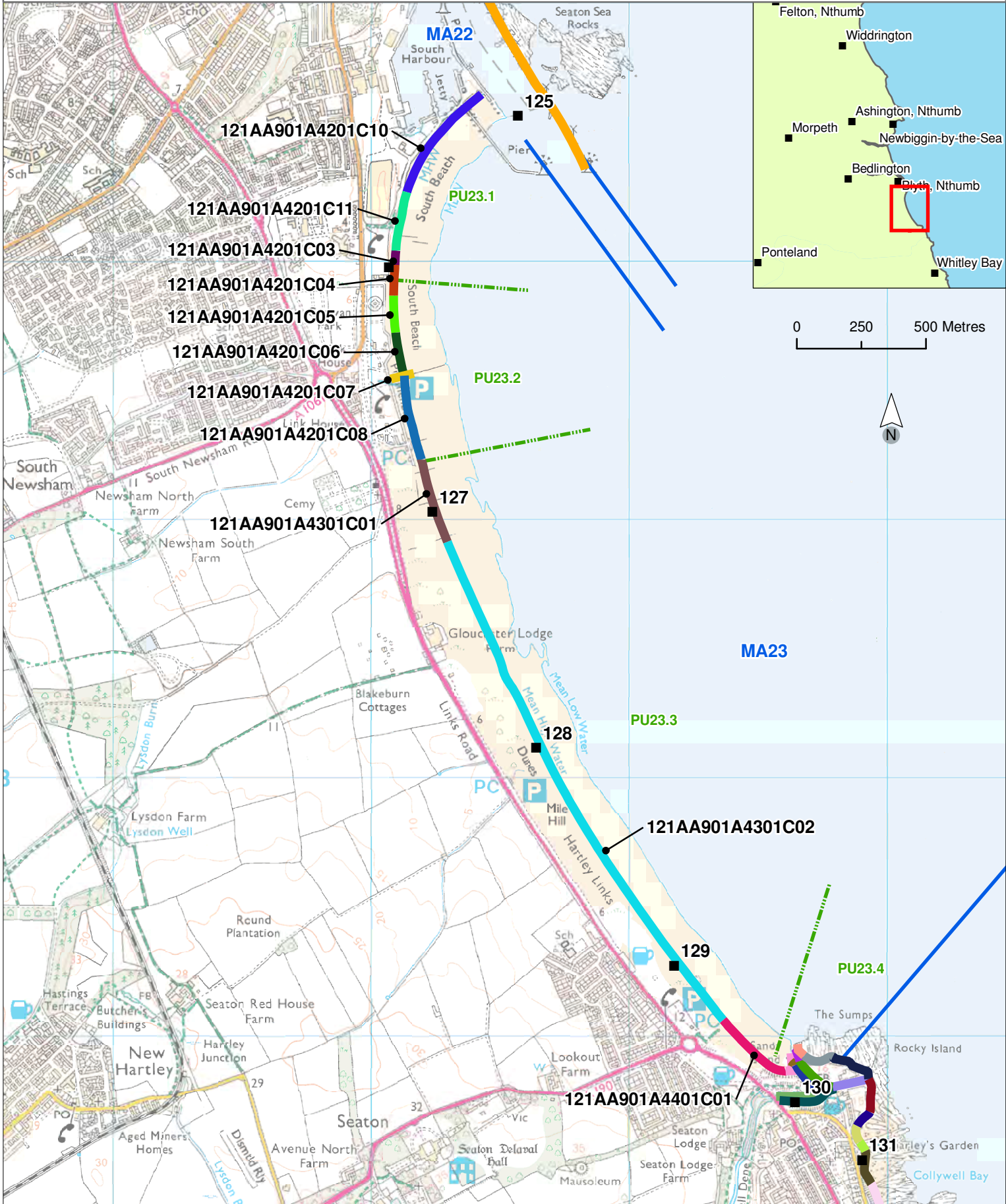
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NFCDD Reference Number**

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— Management Areas
- - - Policy Units



Policy Development Zone 5 - Beadon Hill to Seaton Sluice
Management Area 23 - Blyth West Pier to Seaton Sluice (Ch 125 to 130)



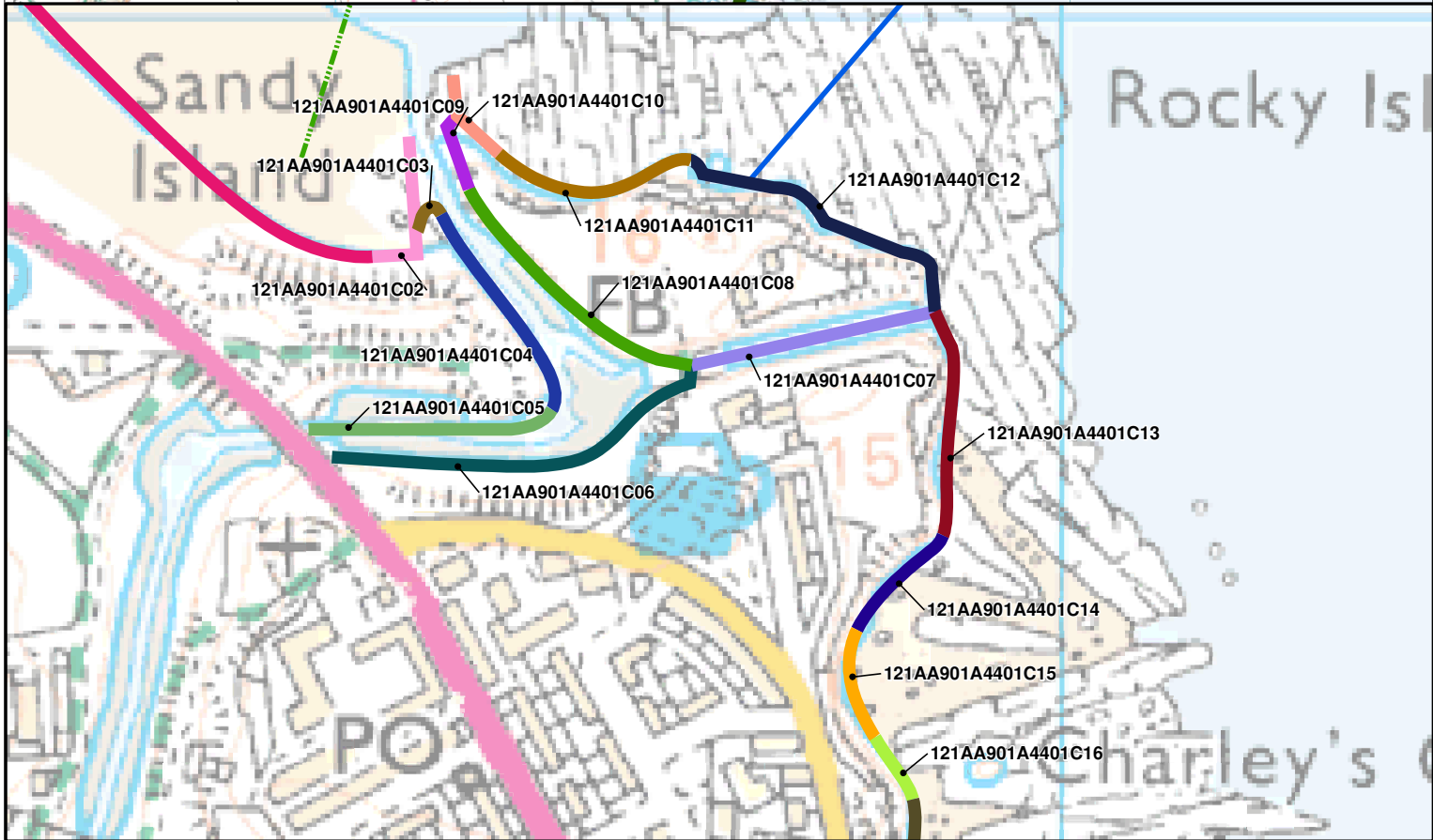
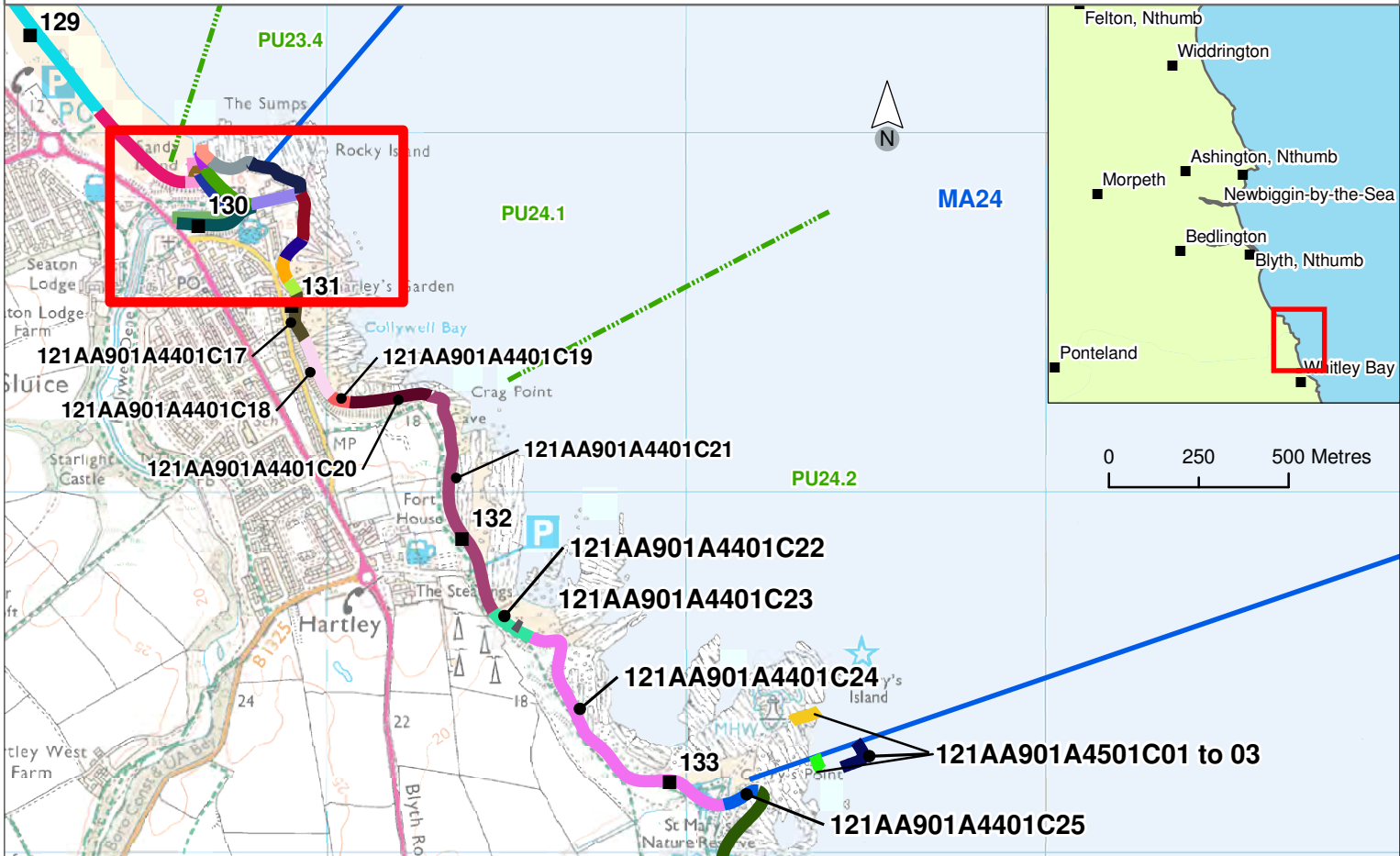
Asset Location and
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Management Areas
Policy Units



Policy Development Zone 6 - Seaton Sluice to River Tyne
Management Area 24 - Seaton Sluice to Curry's Point (Ch 130 to 133)



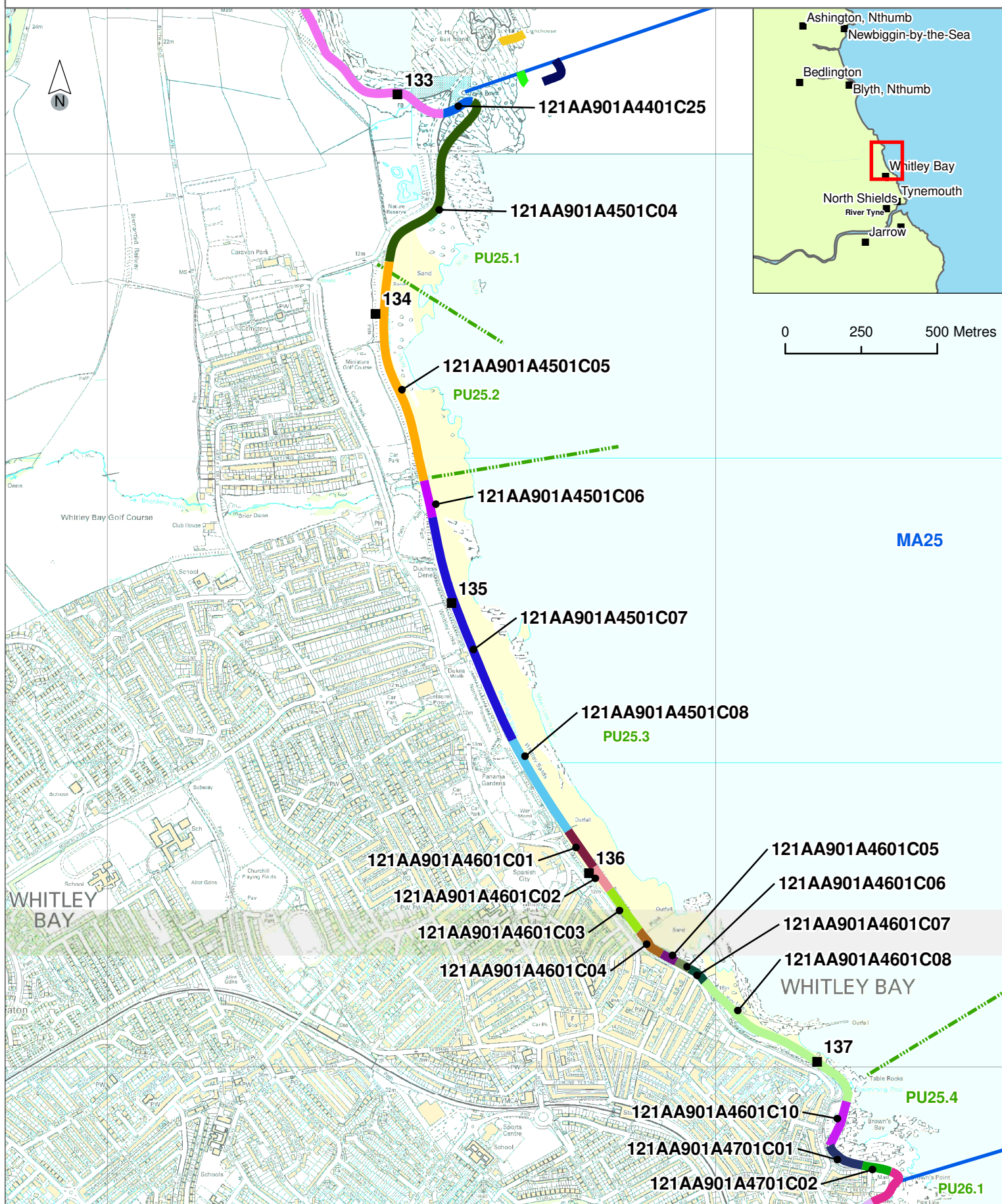
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NFCDD Reference Number

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Management Areas
Policy Units



Policy Development Zone 6 - Seaton Sluice to River Tyne
Management Area 25 - Curry's Point to Brown's Point (Ch 133 to 137.5)



**Asset Location and
NFCDD Reference Number**

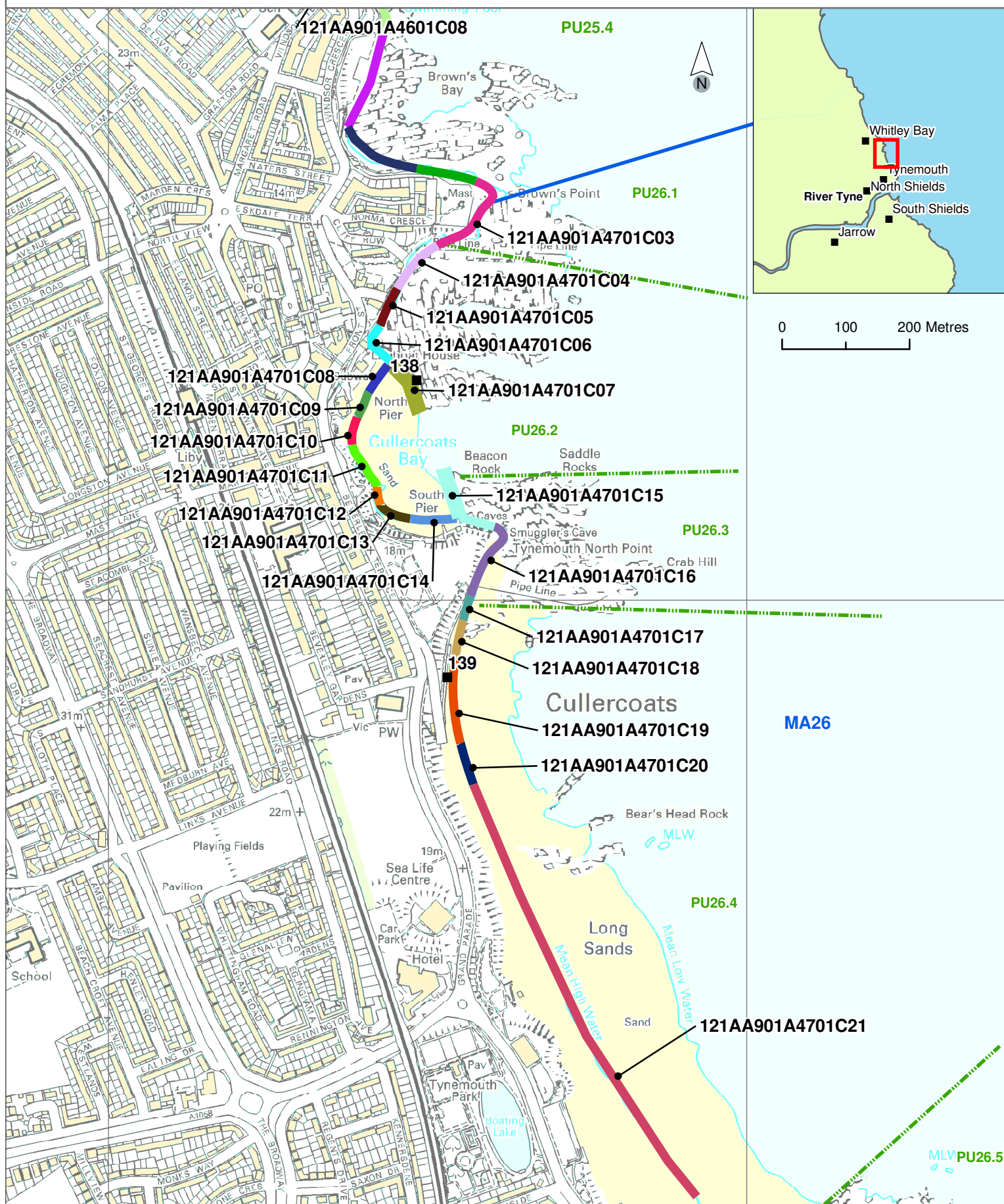
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— Management Areas

Policy Units



Policy Development Zone 6 - Seaton Sluice to River Tyne
Management Area 26 - Brown's Point to Tynemouth North Pier (Ch 137.5 to 143)



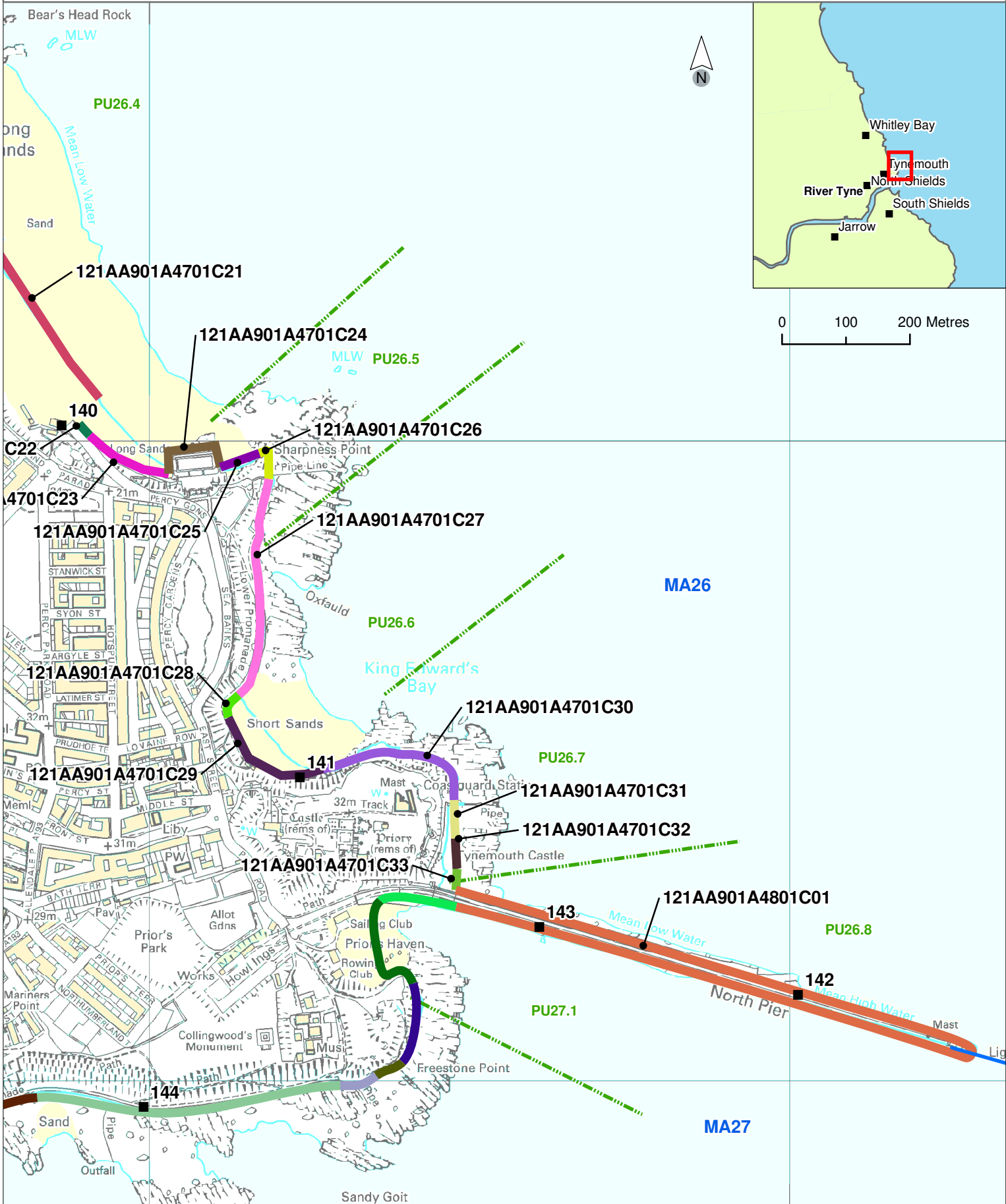
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— Management Areas

 Policy Units

Policy Development Zone 6 - Seaton Sluice to River Tyne
Management Area 26 - Brown's Point to Tynemouth North Pier (Ch 137.5 to 143)



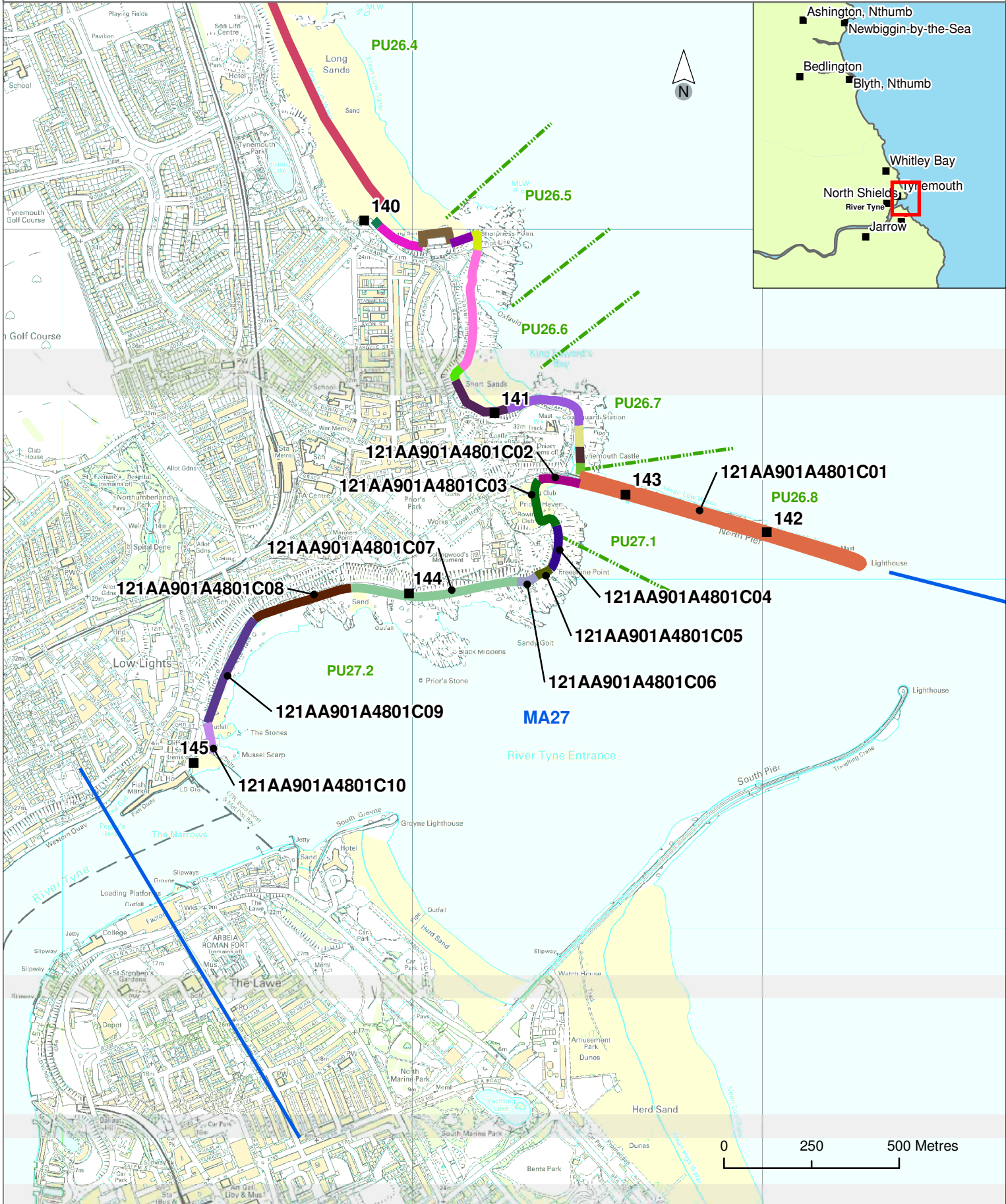
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Management Areas
Policy Units



Policy Development Zone 6 - Seaton Sluice to River Tyne
Management Area 27 - Tynemouth North Pier to Fish Quay (Ch 143 to 145.3)



Asset Location and
NFCDD Reference Number

121AA901A0701C12

Management Areas
Policy Units

