

DUBMILL POINT TO SILLOTH HARBOUR**Baseline Information**

Start co-ordinate:	307650, 545742	Finish co-ordinate:	310417, 553559
Total length:	8.3km	Defended length:	0.5km
Gabions:	0.2km	Rock Armour:	0.3km
Sand Dunes/Cliff:	7.8km		

Environmental designations:

- SSSI
- SAC
- SPA
- Ramsar
- AONB
- MCZ (Jan 2016)

Monitoring carried out:

- 18 beach profiles
- Topographic survey (dunes south of harbour)
- Coastal defence inspection

Site overview:

The frontage between Dubmill Point and Silloth harbour is a low-lying, natural frontage (Coastal Engineering UK, 2010), apart from on the north side of the point, as the shoreline moves easterly and the highway moves inland, where the heavy concrete defences give way to a short length of less robust gabion defences which then interface to the natural shoreline.

Across the natural section of frontage a wide sandy lower foreshore, interspersed with boulder beds or scars, and shingle upper beach front an extensive dune system.

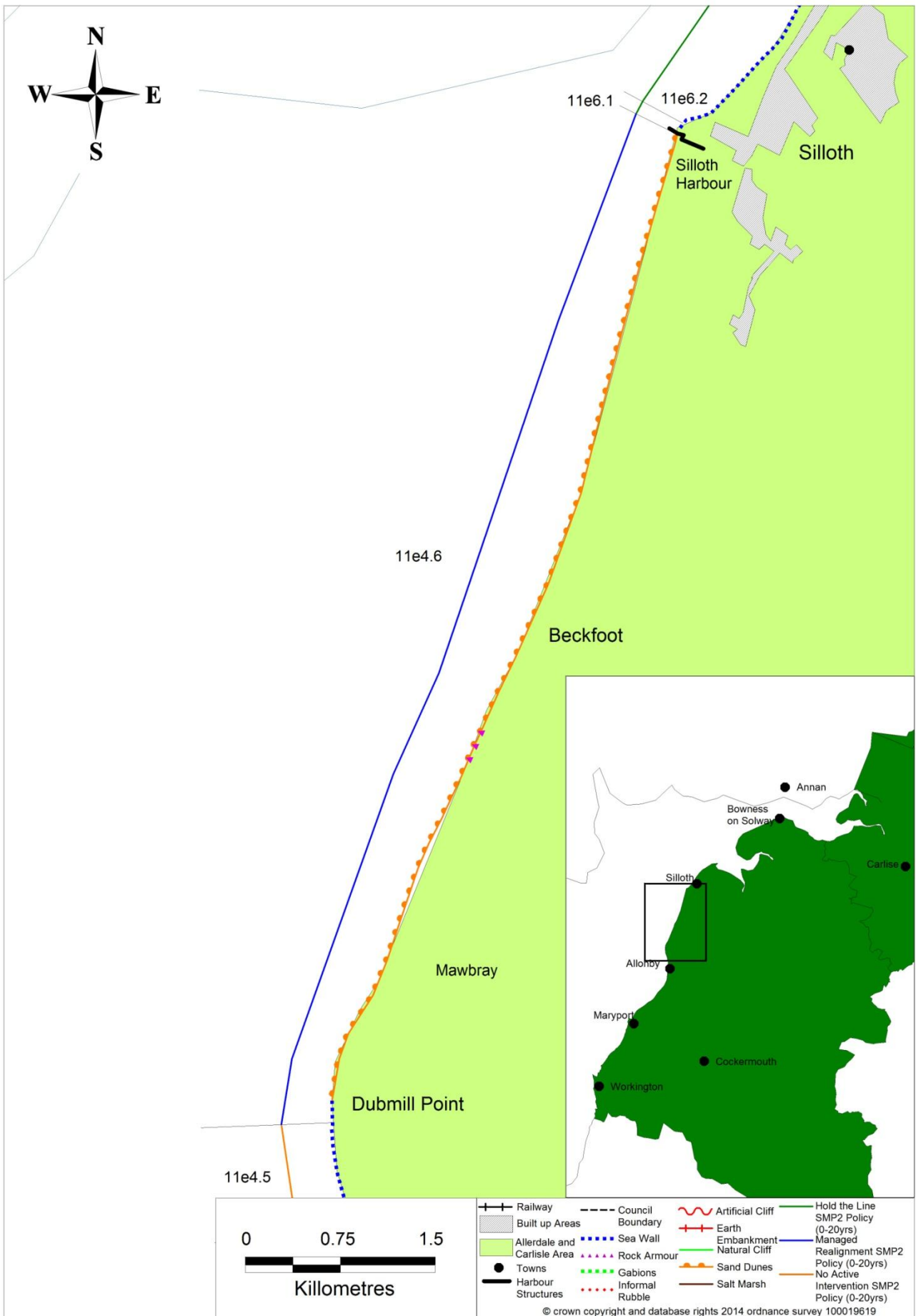
At Mawbray and Beckfoot two becks discharge onto the foreshore. The northerly drift of shingle has pushed the discharge point of these two becks further north.

New rock armour defences were constructed by Cumbria CC between Mawbray and Beckfoot in 2013, to protect the shoreline from erosion and prevent loss of the B5300 coastal road.

The Current (SMP2) Policy:

- **Dubmill Point to Silloth:** Managed Realignment in the short term (0-20yrs), Managed Realignment in medium term (20-50yrs) and long term (50-100yrs).

The plan overleaf summaries the above information graphically:



Summary of behaviour

Due to the shelter from the coastline to the south and from the Isle of Man this section of shoreline is predominantly only exposed to waves from a narrow sector generated across the Irish Sea between the Isle of Man and the southern shoreline of Scotland (240-265° WCB). These do however strike the shoreline obliquely and in combination with the tidal influences from the Swatchway channel, induce continuing northward transport of sediments.

The shoreline in the southern half of this section is straight but moves to seaward towards the north where the shoreline meets the fixed position of Silloth harbour. The harbour acts as a barrier to sediment moving north out of this section, however material can be washed into the Swatchway channel and continue northwards.

The following key points arise from analysis of the contemporary monitoring data:

Offshore Wave Climate:

Historic wave data from the Met Office (St Bees):

- Approximately 70% of waves are < 1 metres high and approximately 1.5% of waves are > 3 metre high.

Wind Climate:

Historic wind data from the Met Office (St Bees) identifies:

- 40-45% of winds are greater than 9 metres per second (Force 5 and above) & 45% of wind comes from offshore directions (SW to N)

Sea Levels:

- Maximum tide level recorded at Workington in the last 20 years = +5.76 (m ODN) in February 1997, which equates to approximately a 1 in 50 return period; and
- The following predicted extreme tide levels apply (m ODN):

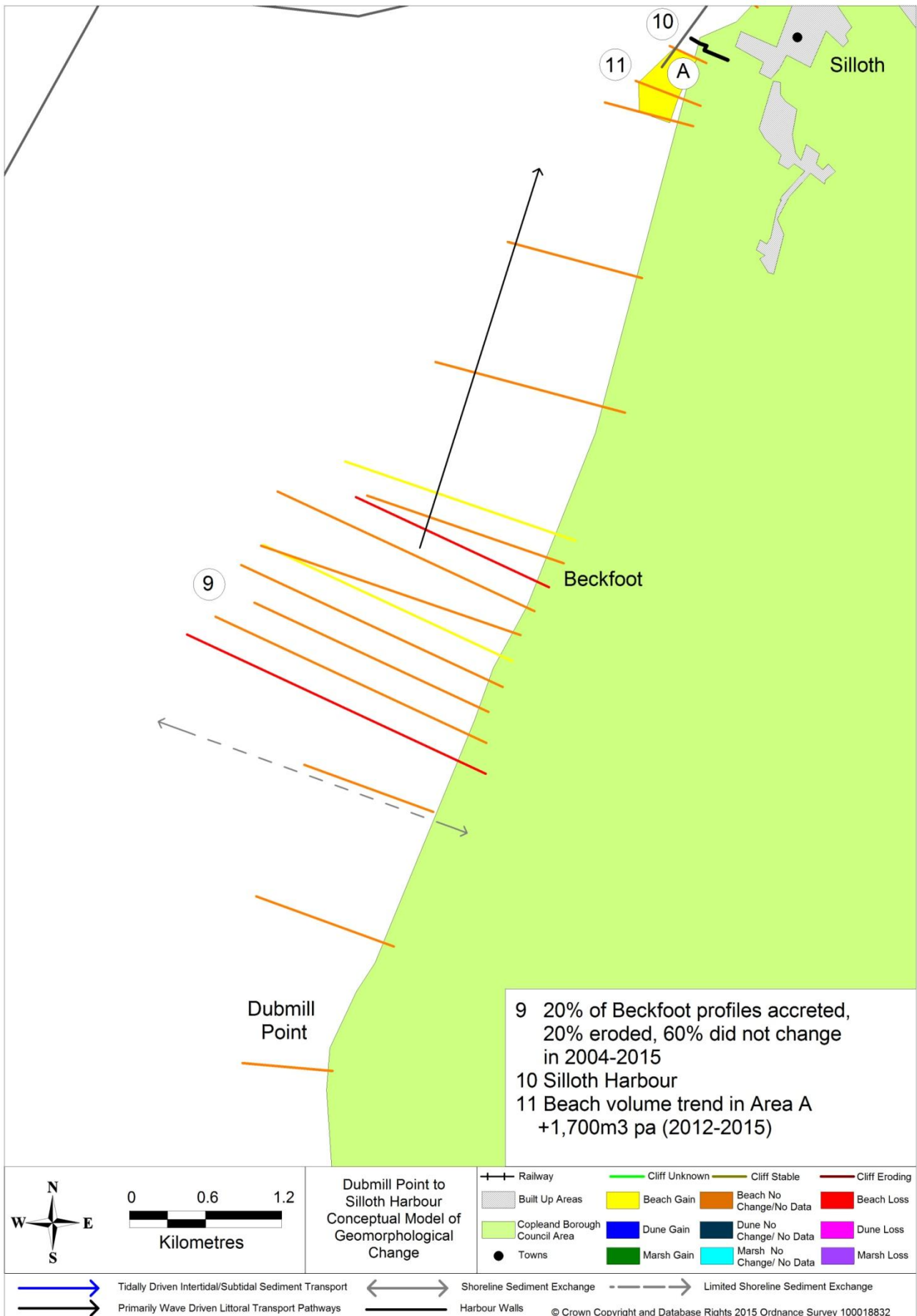
Return Period (years)	Workington	Beckfoot	Silloth
10	5.49	5.91	6.03
100	5.84	6.34	6.48
1000	6.18	6.80	6.98

Foreshore & Shoreline Changes:

- Beckfoot profiles showing erosion at south end but accretion towards north end;
- Evidence of rip channel movement at Beckfoot;
- Some material trapped on south side of Silloth harbour but beach behaviour cyclical here;
- Trend in beach volume change on south side of Silloth harbour of +1,700m³ per annum, equivalent to a trend in change of average beach height of **+11mm pa** across the area monitored, based on 2012-2015 data;
- Overall profile change at Beckfoot: 20% – accretion, 20% – erosion, 60
- 4% – no change; and
- Overall profile change South of Silloth Harbour: 0% – accretion, 0% – erosion, 100% – no change.

This behaviour is illustrated graphically on the plan overleaf.

Note: Where profile change is shown for individual profiles on the pictorial summaries, beach gain or loss is identified, where the magnitude of change in cross sectional area is greater than 2%. Where the magnitude of change is less than or equal to 2% this is denoted as no change. Beach volume trends < 1,000 m³ in magnitude are identified as no change.



Risk Assessment

The primary risks arising from the behaviour of coastal forcing processes (wind, waves and tides) and the reaction of the shoreline (beach and cliff changes, artificial defence conditions) across this frontage are:

- Overtopping of artificial defences causing flooding of the hinterland;
- Breaching of artificial coastal defences, causing erosion of the shoreline;
- Erosion of dunes; and
- Wind blown sand nuisance to people and property.

The primary consequences of this behaviour are:

- Damage to and/or loss of property and infrastructure;
- Damage to environmental habitats; and
- Potential impact on AONB.

The table below shows the overall risk rating(s) that apply within this section of frontage. Overall risk is defined from the probability of conditions/behaviour occurring and the consequences the conditions/behaviour would have.

Dubmill Point to Silloth Harbour Overall Risk Rating					
Policy Unit (11e)	Section of Frontage	Exposure	Probability Index	Consequence Index	Overall Risk Rating
5.1	Dubmill Point to Silloth	High	Low	Medium	Low

Current Behaviour

Analysis of the monitoring data collected in 2015 provides the following key points:

Offshore Wave Climate:

- No new data available for analysis.

Wind Climate:

- No new data available for analysis.

Sea Levels:

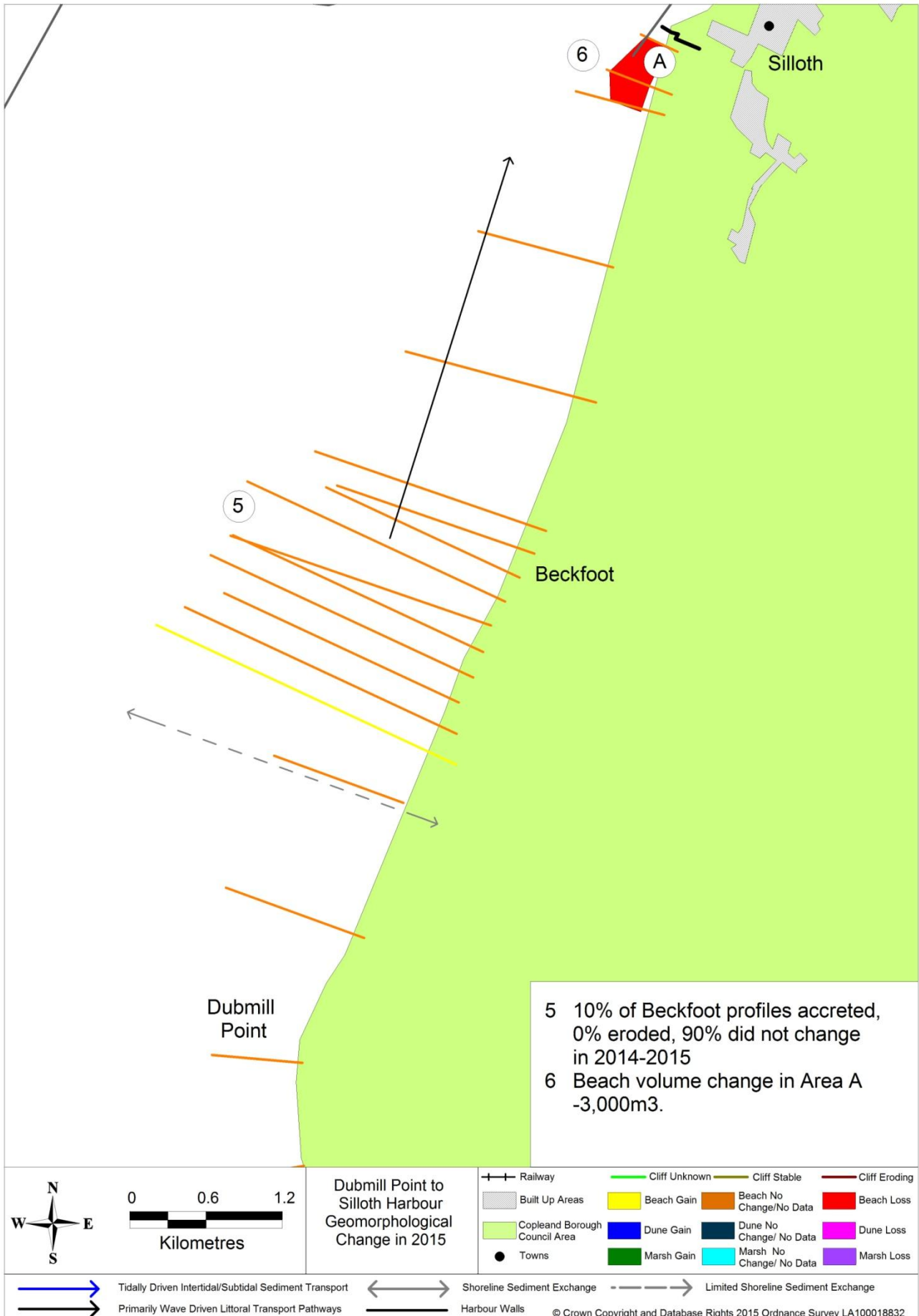
- Maximum tide level recorded on Workington tide gauge = +5.164 (m ODN) on 22nd February 2015, equivalent to a level that would be expected to be exceeded once every 1 to 2 years.

Beach Changes:

- Generally the Beckfoot frontage exhibited no change;
- Beach volume decrease of 3,000m³ south of Silloth Harbour from 2014 to 2015, equivalent to a change in average beach height of **-21mm** across the area of beach monitored;
- Profile change at Beckfoot: 10% – accretion, 0% – erosion, 90% – no change; and
- Profile change south of Silloth Harbour: 0% – accretion, 0% – erosion, 100% – no change.

Note: Where profile change is shown for individual profiles on the pictorial summaries, beach gain or loss is identified, where the magnitude of change in cross sectional area is greater than 2%. Where the magnitude of change is less than or equal to 2% this is denoted as no change. Beach volume gains/losses < 1,000 m³ in magnitude are identified as no change.

The plot overleaf summarises the results from the monitoring data analysis for this section in 2015.



Uncertainties & Issues

The following uncertainties have arisen from the data monitoring programme and analysis of the data collected:

- Quantities of sediment arriving on the beach from offshore;
- Wave conditions occurring directly in front of shore currently unknown; and
- Dune erosion/accretion rates.

Future Management Actions

The following monitoring and management actions are recommended:

- Continue current monitoring regime;
- Improve additional remote sensing e.g. LiDAR;
- On-going monitoring of condition of artificial defence structures; and
- Carry out remedial works to maintain integrity of defences, as required.

Linkage(s) to Decision Making

The monitoring provides information to support:

- Implementation of SMP2 policies, particularly; identification of timing for future capital works or capital maintenance works for artificial defences;
- Continued maintenance and operation of coastal highway; and
- Decision making process in relation to development planning control.