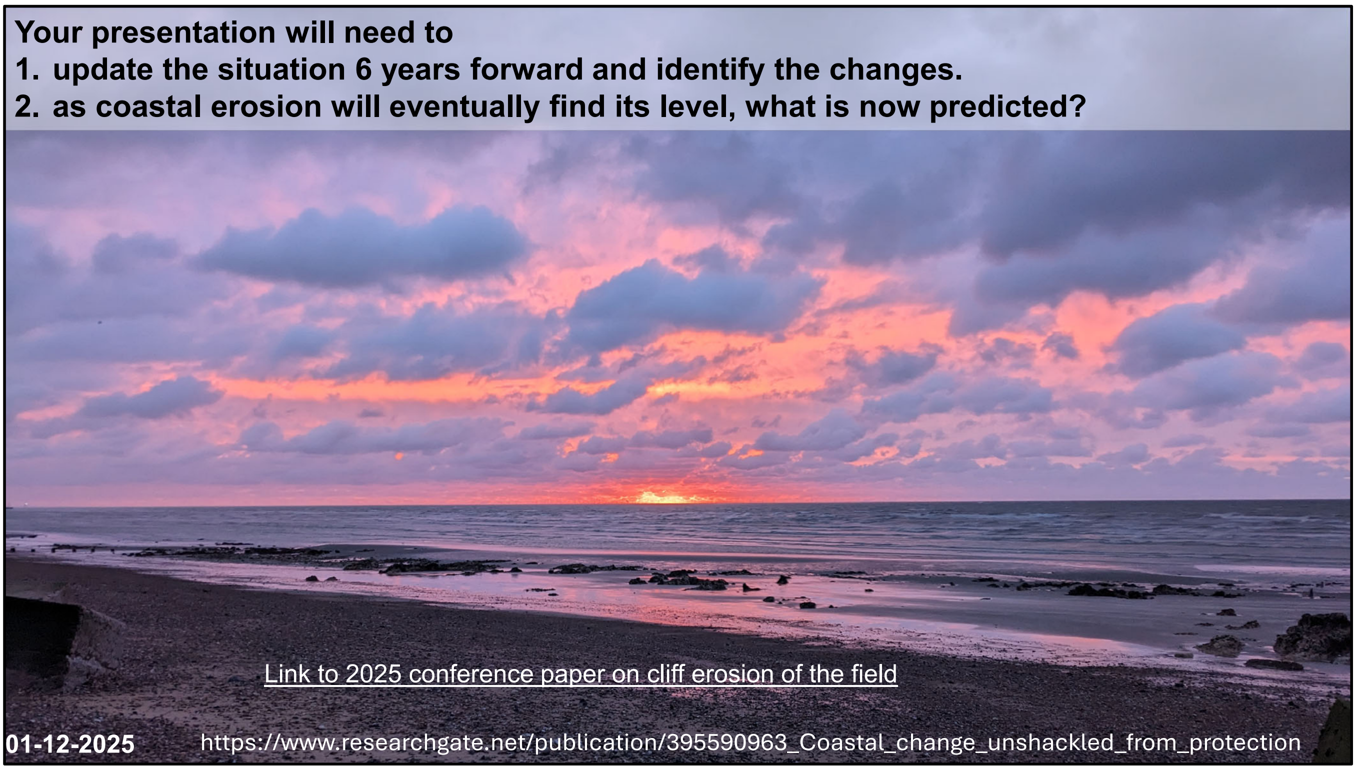
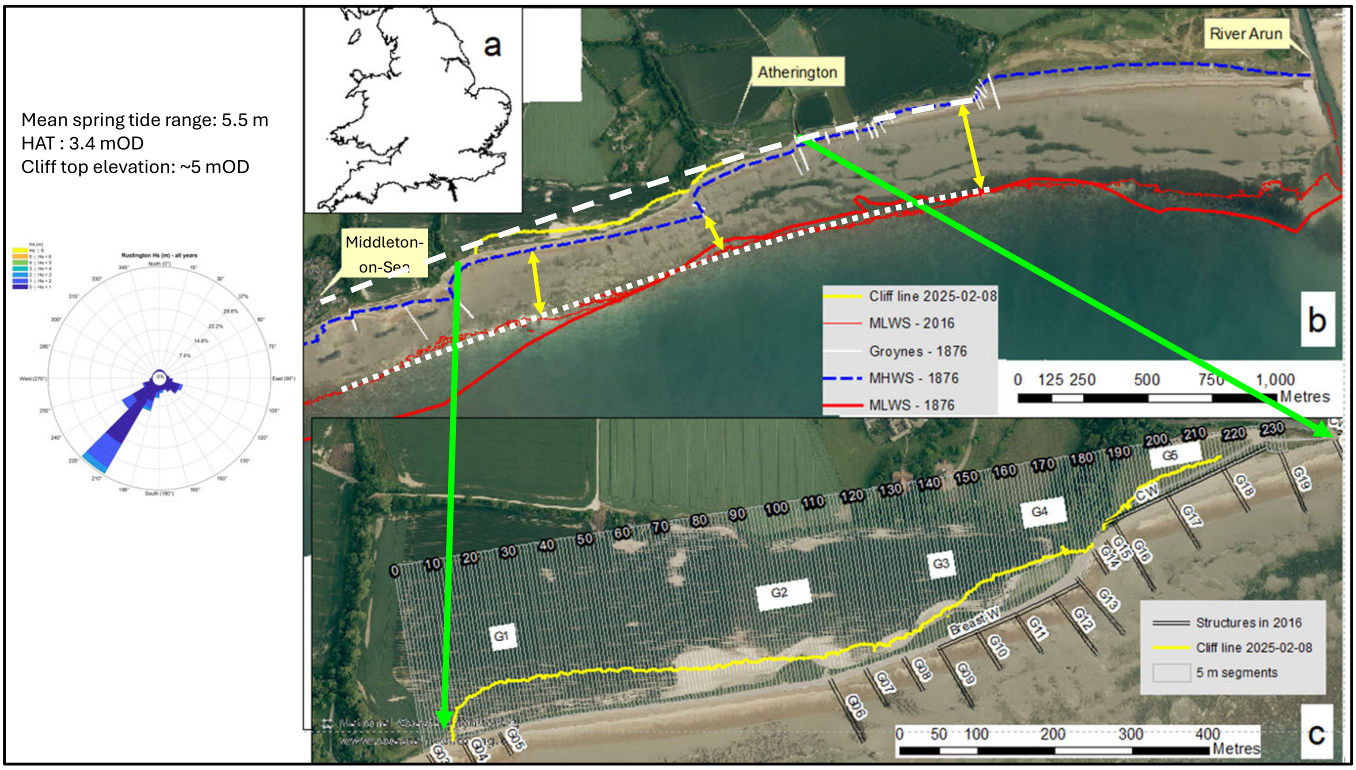


Environment Agency update to the community 01-12-2025
(PDF) Coastal change unshackled from protection
https://www.researchgate.net/publication/395590963_Coastal_change_unshackled_from_protection

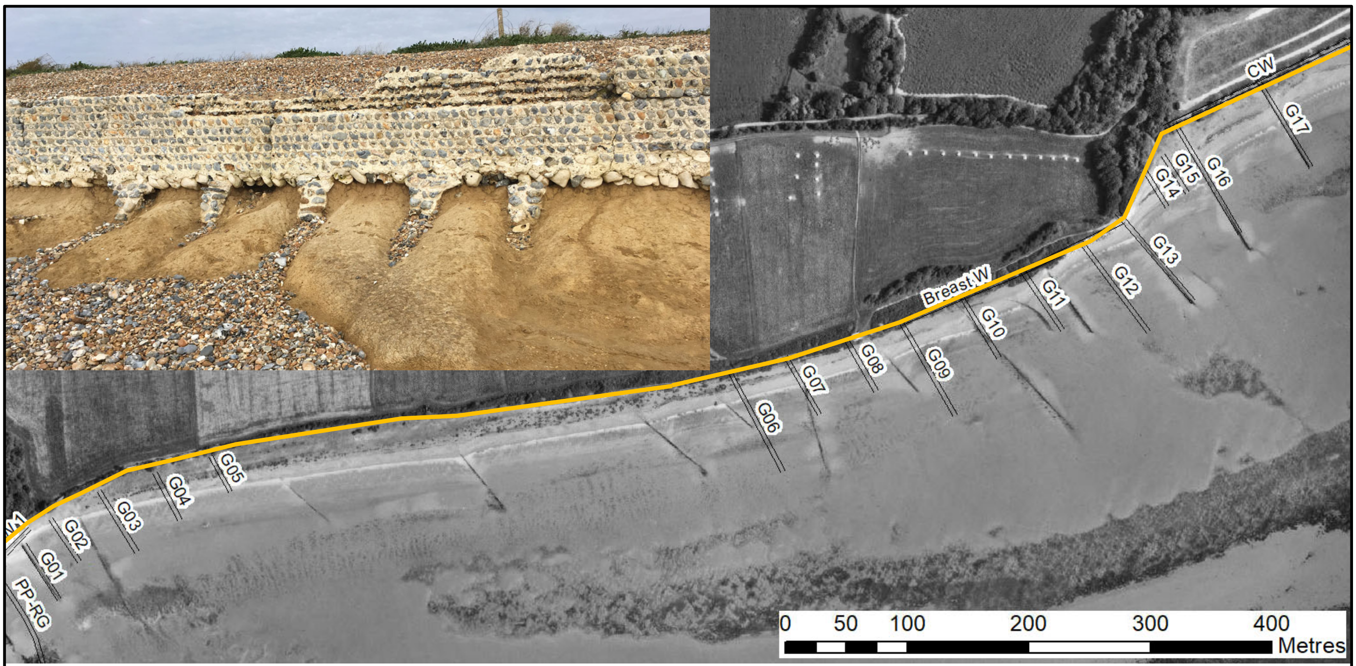


Top map shows Water Lines from historic maps. The lower water lines (red) represent more the general shape of the coastline that nature tries to achieve over the entire tidal width. The white dotted line generalises the present low water line alignment.

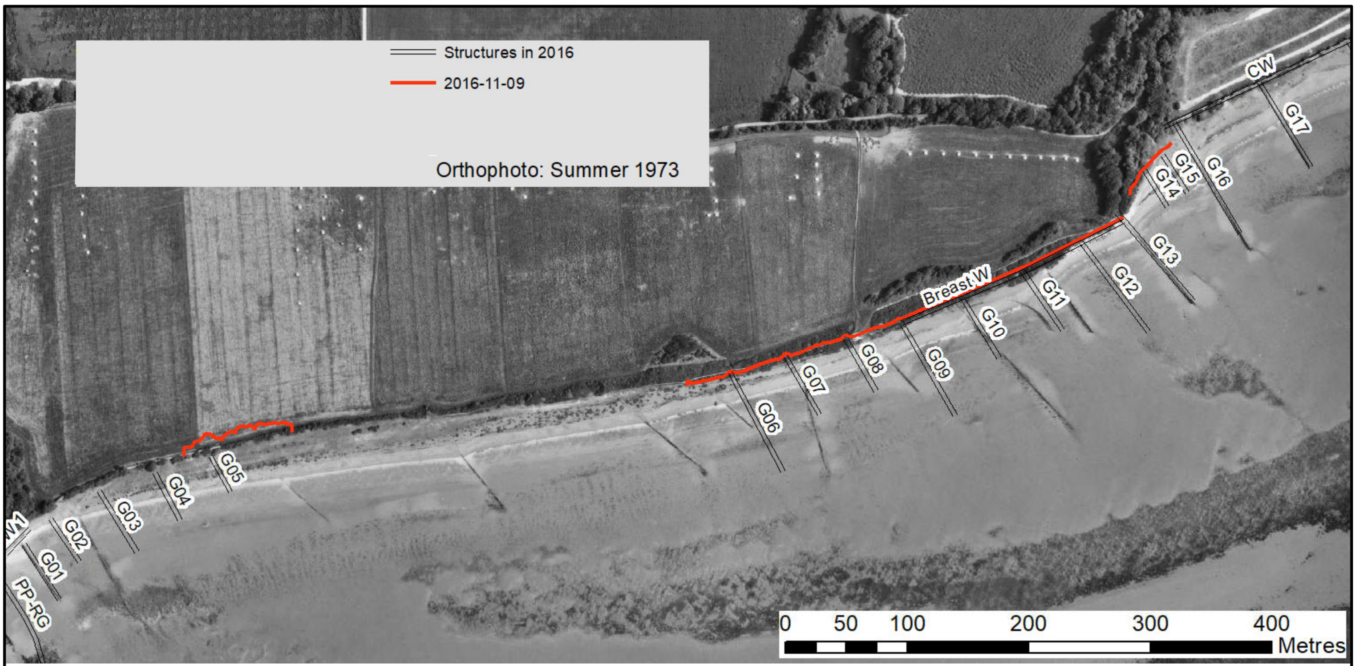
The yellow arrows show that for example in the 1870s the distance between red and blue lines is very different, indicating locations that will retreat faster if allowed to do so. In front of the dunes, the beach has widened by 10s of metres over the last 150 years to fill in the offset in the blue line that was held in the 1870s with a set of groyne that have become buried.

The white broken line is a simple offset of the white dotted line by the longest yellow arrow indicating where the high-water line might end up in the future.

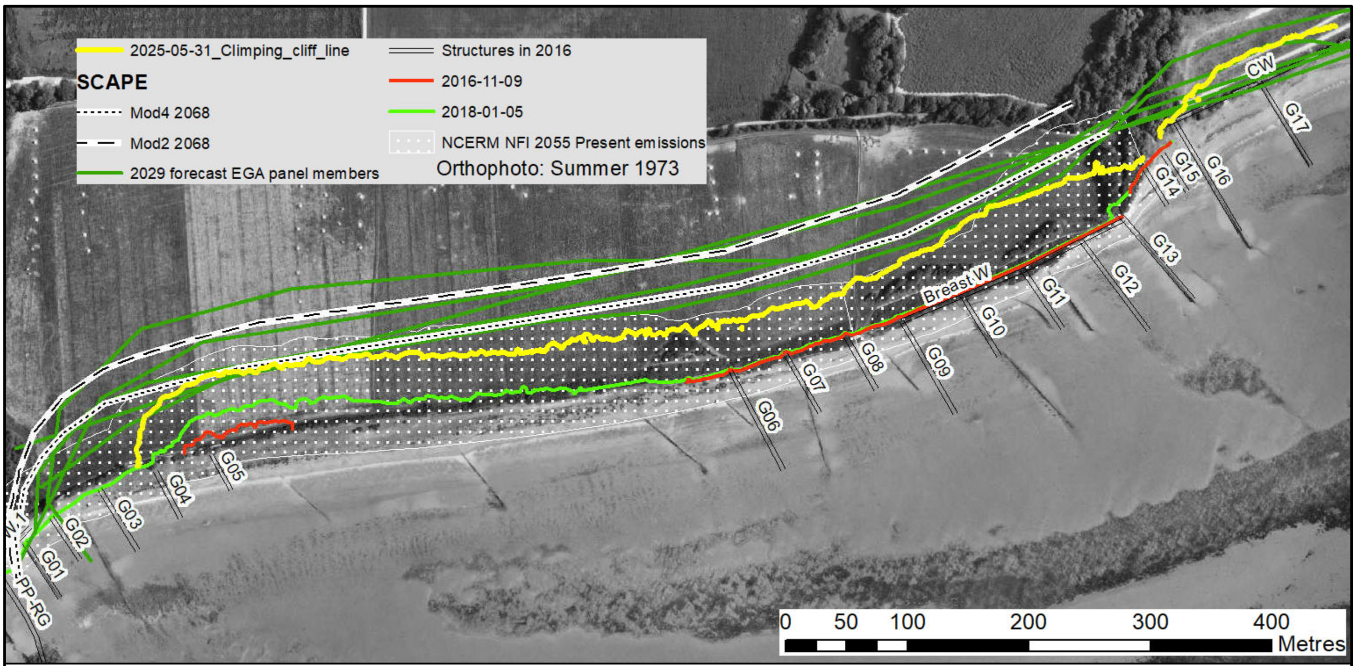
The bottom map focusses on the higher ground west of Climping Street showing profile lines that have been used for analysis and timber and concrete structures present on the coast in 2016 for spatial reference.



Black and white aerial photography from 1973 showing historic groynes with overlaid the structures in 2016, most of them build in the late 1970s.
Amber line shows the position of the flint field wall (shown on the 1876 Ordnance Survey map) that is shown at the start of the erosion in 2016 just east of Groyne G05 on the colour inset photo, suggesting that the wall was built on an already eroding landscape.

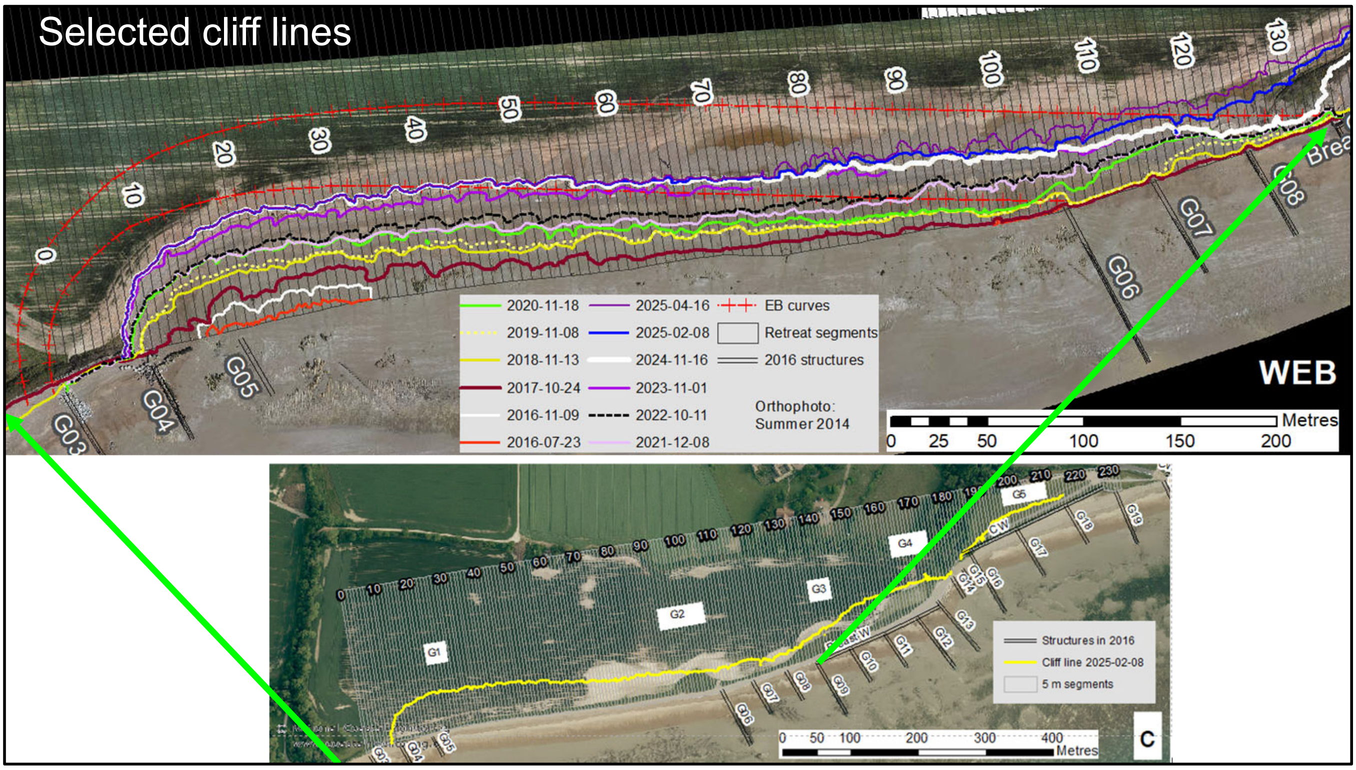


Onset of erosion behind Groyne G05

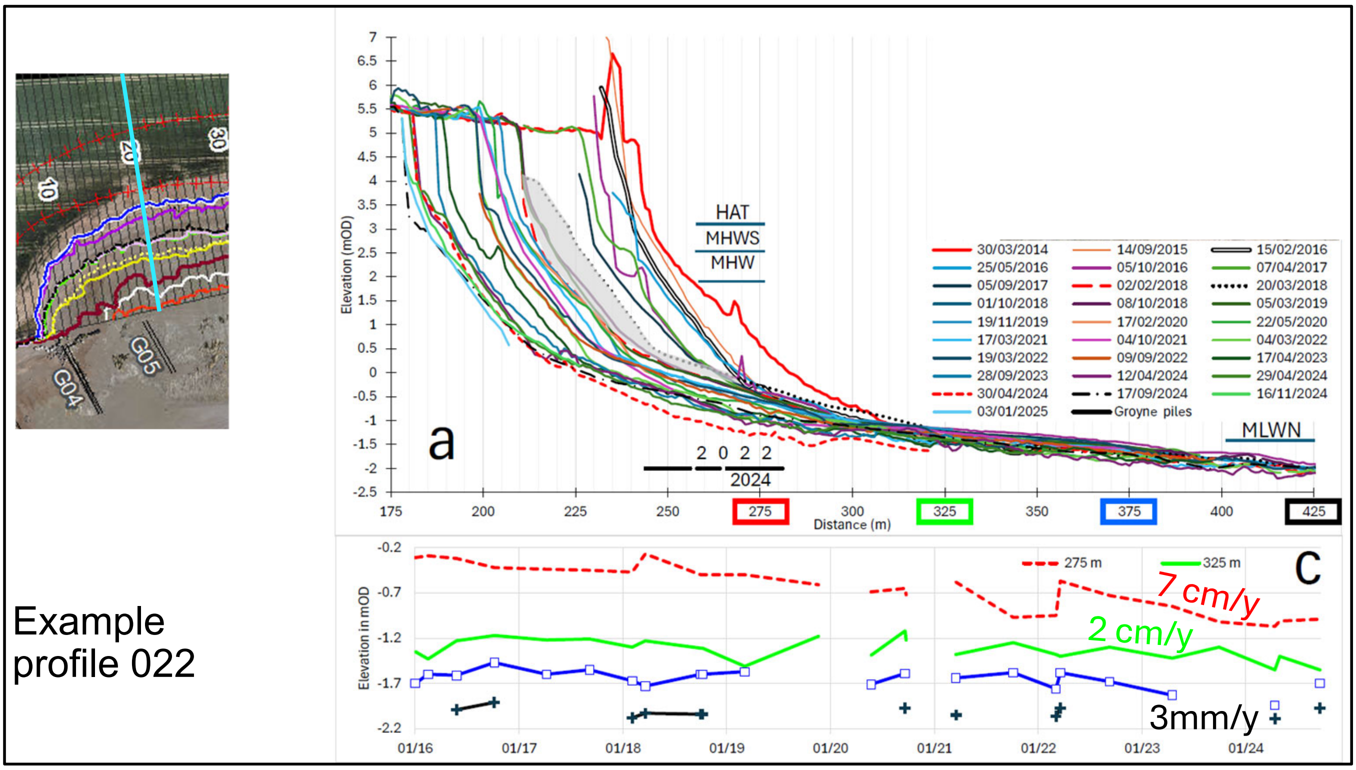


3 ½ winters to go

Progressing erosion in 2018 (green line) and the cliff line in May 2025 (yellow). White and black lines are from a simple model that used two different values for the resistance of the cliff to erosion in 2018 to estimate where the cliff line would be 40 years later in 2068. Note that the western end was manually modified with assumption that the timber groynes (01 to 05) would have failed.
Dark green lines are from February 2019 Expert Geomorphological Panel report and present individual experts estimate of where the cliff would be in 10 years, i.e. 2029. Again, the assumption was that all timber structures (groynes and breastwork would have failed within the 10 years).
White dotted area is the area that is likely to be lost by 2055 based on the National Coastal Erosion Risk Mapping [Check the long-term erosion projections for an area in England | Shoreline Management Plans]
The three sources indicate a large degree of uncertainty in the future position of the cliff line, however, comparing the yellow line (approx. 6.5 years after the Expert Geomorphological assessment) the envelope of the green lines seems the most like scenario to develop over the remaining 3.5 years, except for the western end where the maintenance of the Groyne G04 position is delaying the westward progression of the erosion.



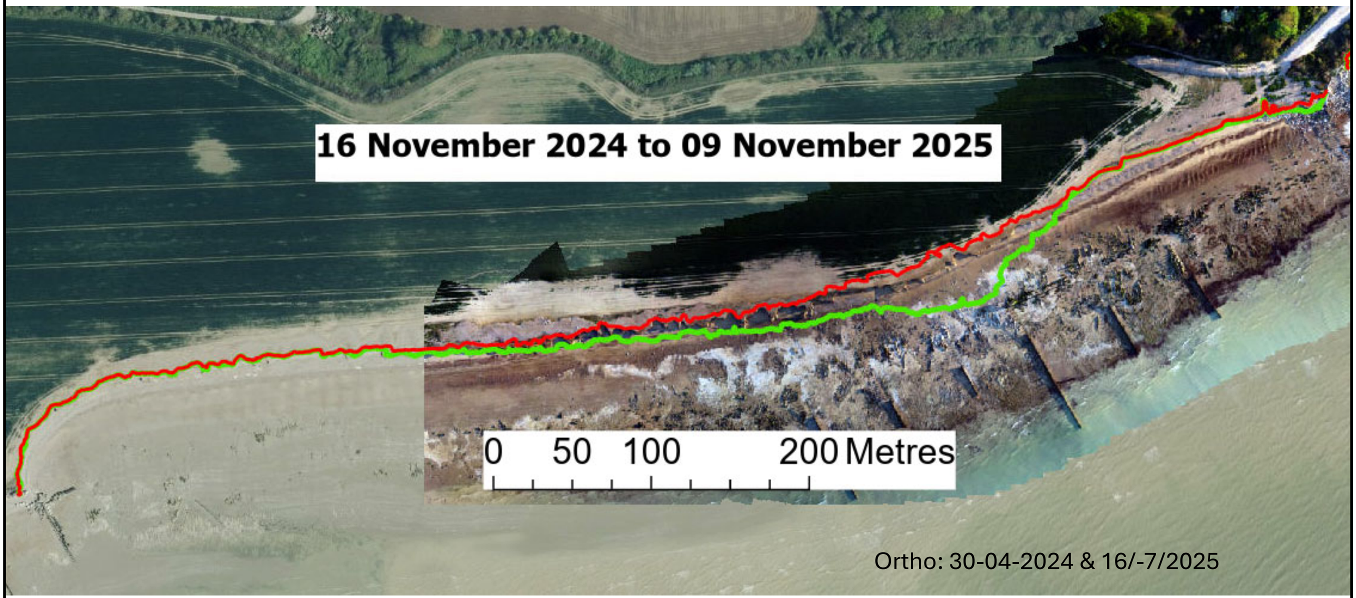
Zoomed in view of a selection of erosion lines.
The two red crossed lines represent Equilibrium Bay shapes that are a theoretical concept for a shoreline that would naturally evolve between two fixed points. For the more seaward curve the fixed points are groyne G04 and G06, and for the more landward line the fixed points are groyne G04 and G09.
The actual cliff lines show how erosion attempts to approach these theoretical lines but with the only fixed point at G04 and the movement of the end point from G06 to G09 and now G15, the cliff line adjusts to these changed ‘fixed’ point locations.



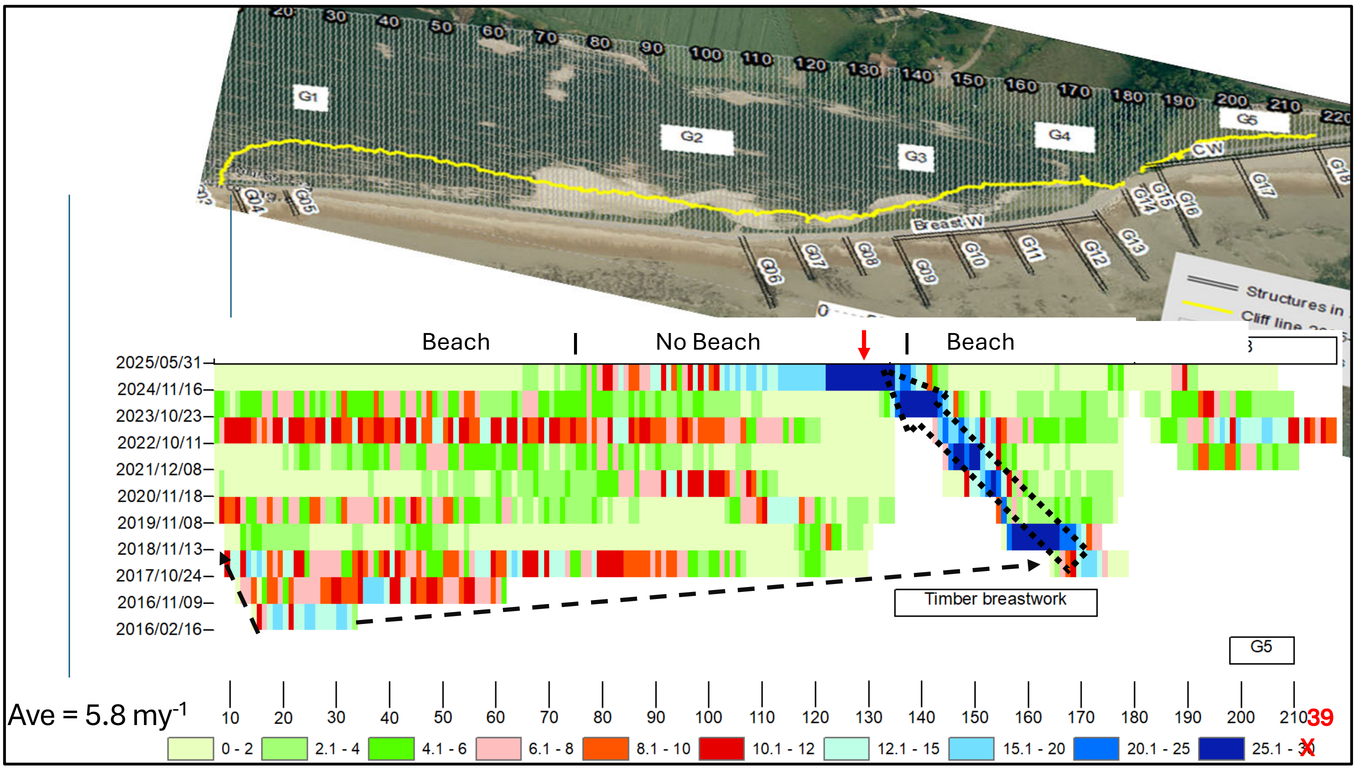
Profile line 22 shows how the cliff, beach and seaward land levels have change over 10 years. Of note is that while at the 275 m point (red) on the x-axis there is a trend of the elevation lowering by ~7 cm per year, this trend disappears to ~3 mm per year at a distance of 425 m (black).

The overall result is that the waves will lose more energy before reaching the present position of the cliff compared to in 2016 as they have to travel further over increasingly shallow ground.

Over the last winter there has been no erosion along this profile due to the presence of the beach (the largest beach is shown on 20-03-2018 by the grey area under the black dotted line.



Latest update showing change in cliff line position from November 2024 to November 2025.
Erosion is limited to the central section where the aerial photo also shows very little beach material with the white chalk showing through. On the other hand the western and eastern ends (which show a slight bay shape) show a beach in front of the cliff that has been in place all through winter 2024/25 and Summer 2025, protecting the cliff.
Beach is more likely to stay in a bay than on sections of coast that bulge seawards (hence the attempt to stabilise these locations with groynes shown on the Ordnance Survey mapping (slide 2) .

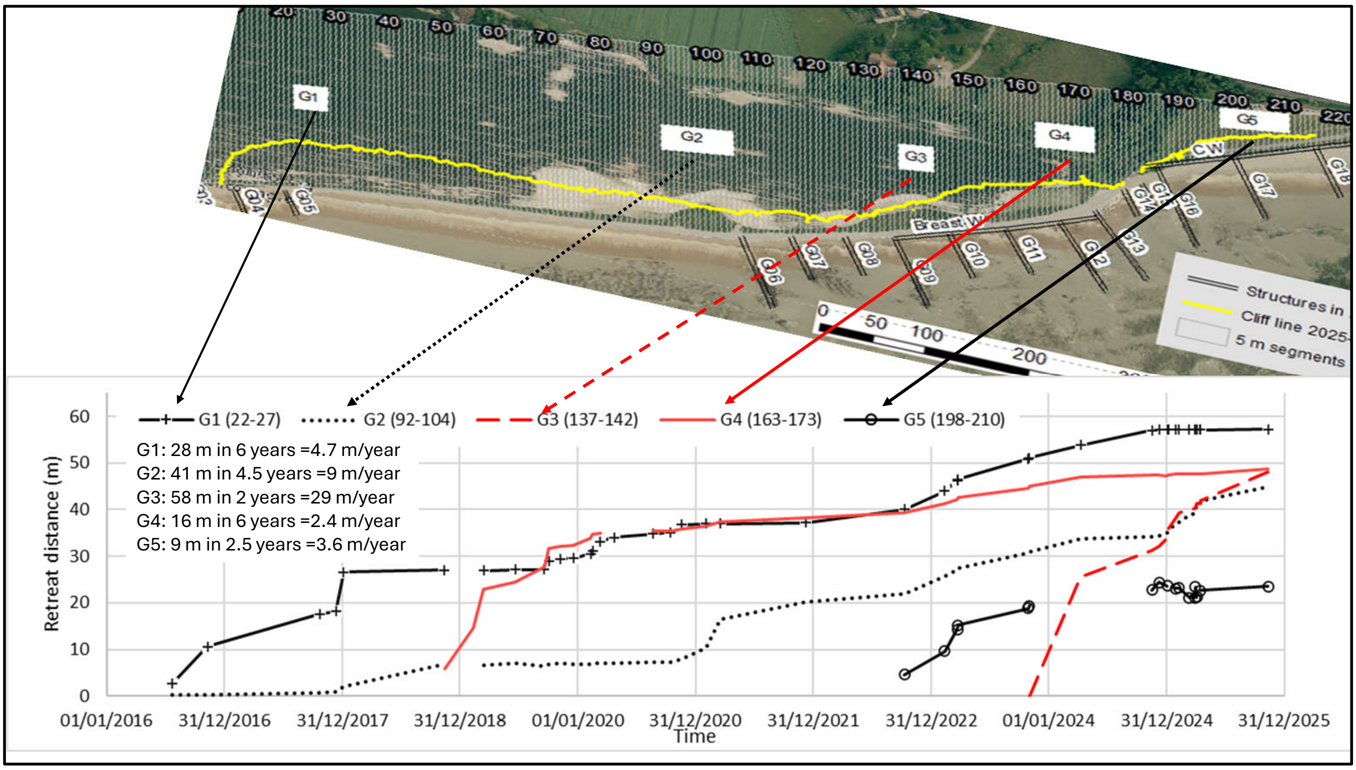


Summary of erosion over 10 years. For all the profile lines shown on the map. The average for all profiles over the entire time is 5.8 m per year. The colour legend shows in green rates approx. below the average at 2 m per year intervals. The red colours cover rates above the average up to 12 m per year and the blue ones show even higher rates up to the highest value of 39 m per year in the area of Groyne G08 over the last 12 months.

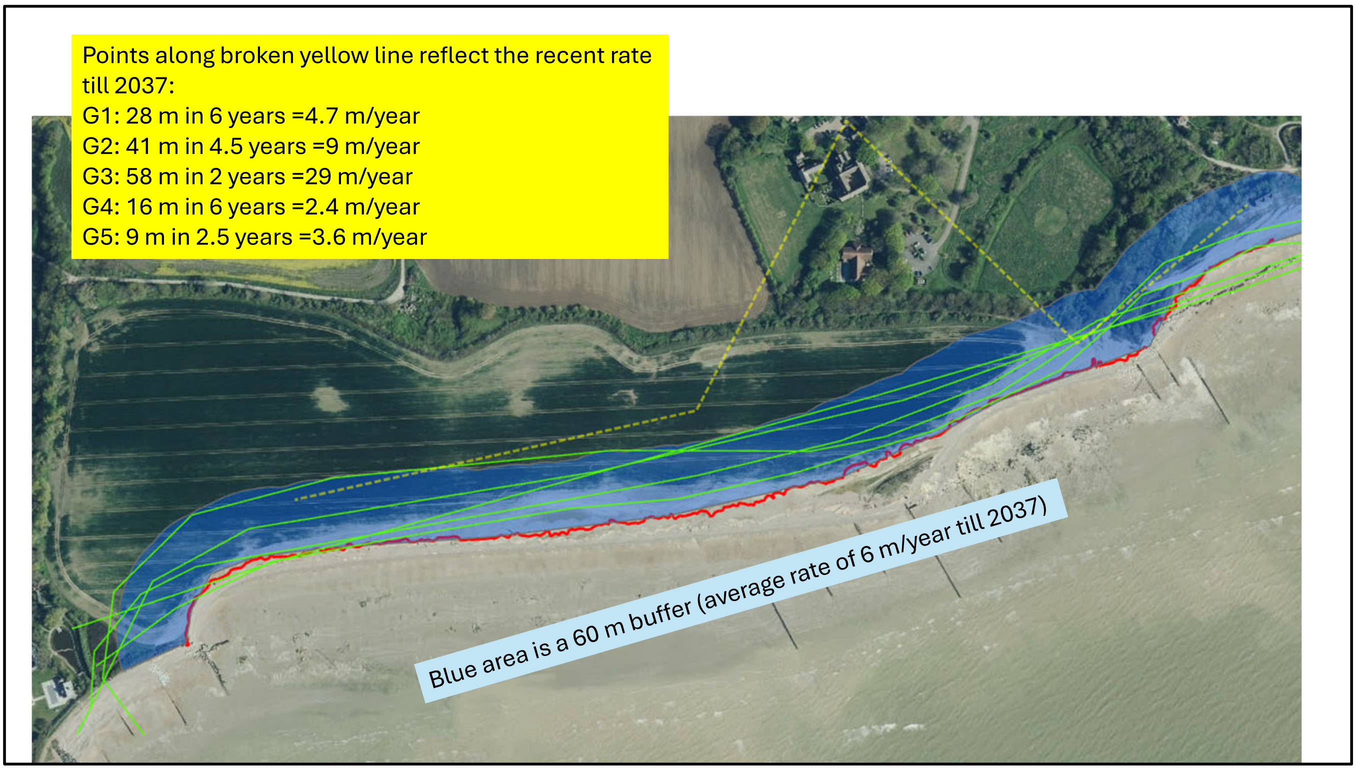
Generally, high erosion rates in the blue range only occur in the first year of erosion (as the breastwork failed from east to west the erosion started in different years (black dotted broad arrow).

There are also years with higher (reddish colours in the same row) and lower erosion rates (greenish colours in the same row).

As in the previous slide over the last 12 months, there was a beach present at the western and eastern ends with no beach in the middle (labels above the diagram), resulting in the very different rates of erosion.



A different way to look at how erosion rates are changing is by looking at the position o the cliff line in relation to where it was in 2015 (y-axis) at 5 different locations (G1 to G5).
Different sections started at different times (time on the x-axis) showing rapid erosion for example for G4 (solid red) in 2019 which then slows down and the rapid erosion of G3 (red broken line) that started in late 2023.
The table in the graph shows the average rate of retreat for the five different locations for the length of time.

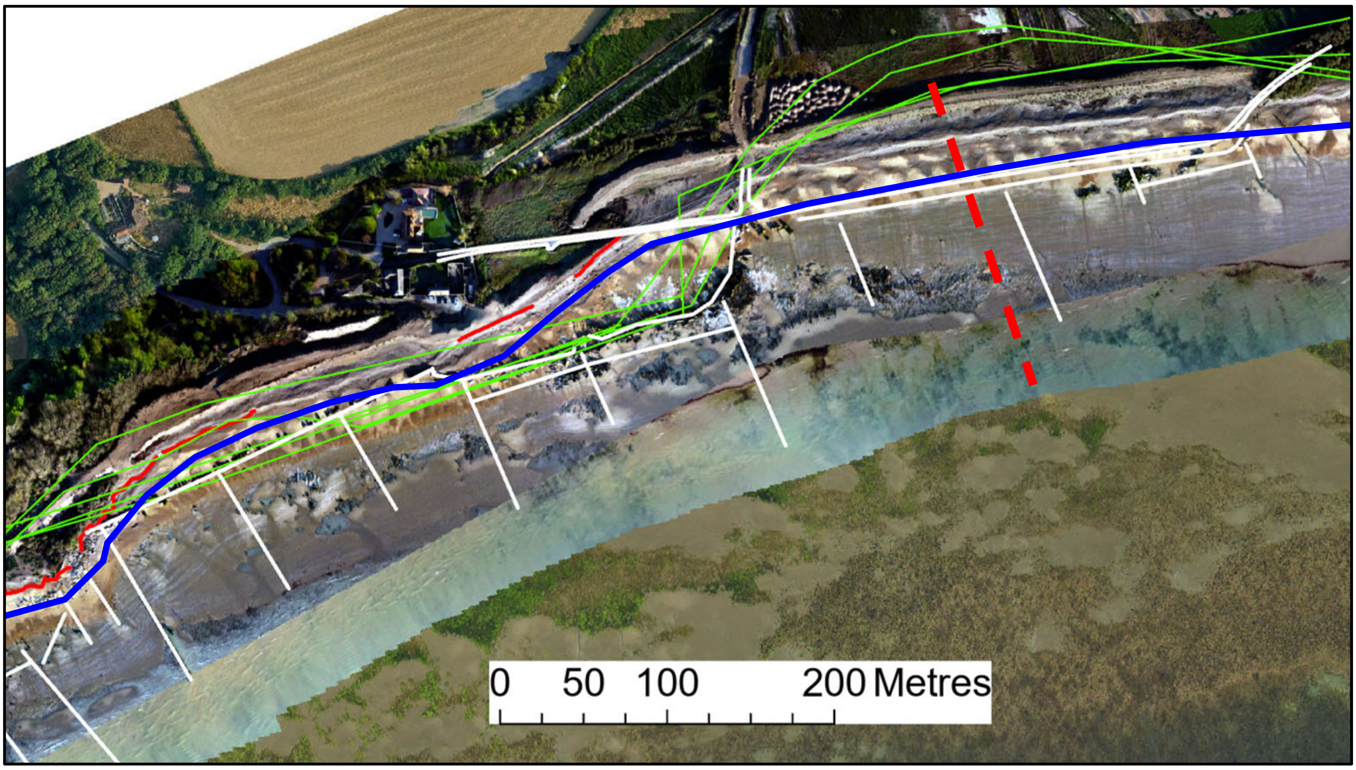


The table is the same as in the previous slide and the values have been extrapolated for 10 years resulting in the broken yellow line. This is a very crude approach as it would produce a completely unrealistic coastal bay towards Bailiffs' Court.

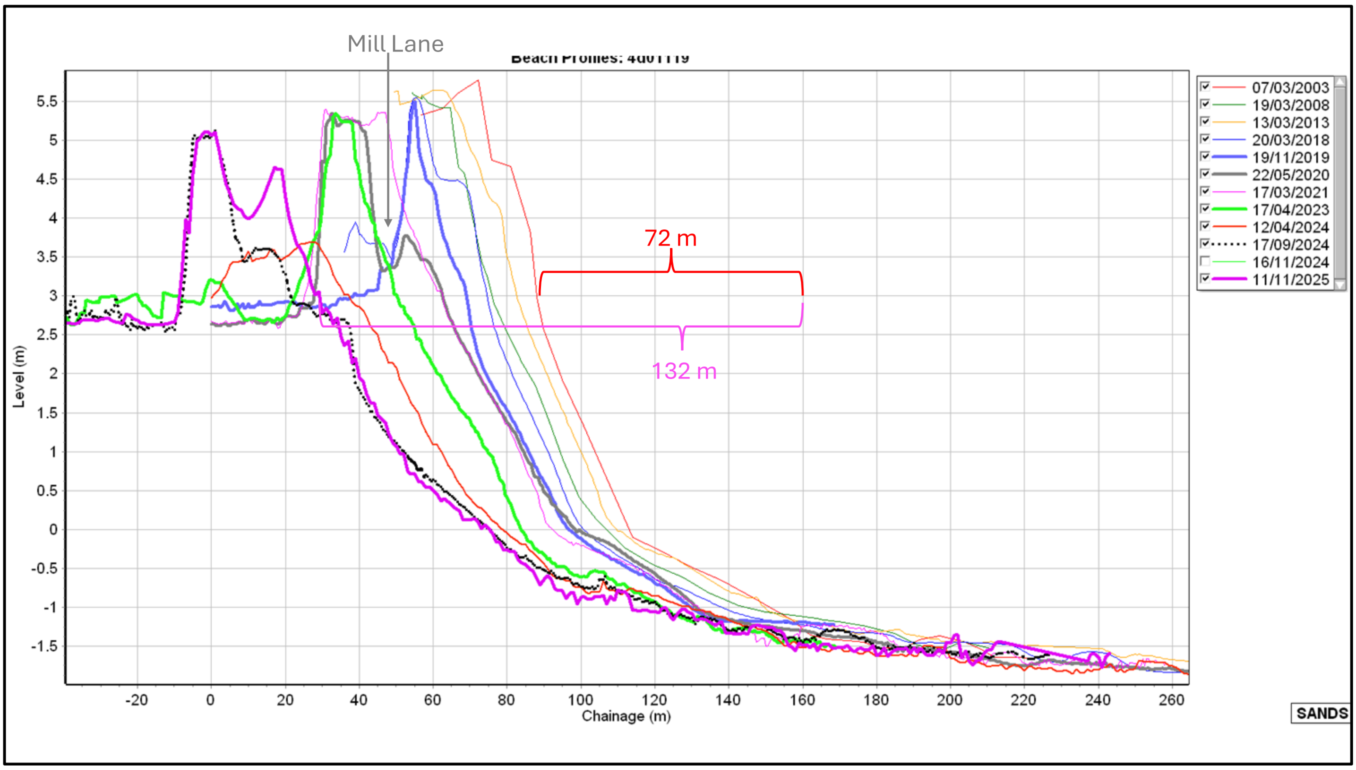
The green lines are the expert panel lines for in 2028 and the blue band is 60 m wide, reflecting the approximate average rate or retreat over the last 10 years along the entire stretch.

As has been demonstrated, erosion is slowing down as waves are losing more energy having to travel further to reach the cliff and the developing bay shape is more likely to retain a beach in front of the cliff in the future fed by beach material that comes in from the west and that is locally produced through the erosion of the Chalk and the flint in it.

As the blue band approximately corresponds with the furthest landward green line, there is some confidence that this is a likely range the coastline will reach within the next 10 years.



Along the car park, the land levels drop eastwards leading to the beach moving landwards replacing the retreat of the higher ground cliff.
The green expert lines were drawn very close together along the car park wall as it was in place at the time of the panel in January 2019. At that point only the top of the wall was visible which suggest a substantial concrete wall. As it turned out, this was just the top and so the wall failed much faster than assumed.
As a consequence, the coastline (blue bold line) has started to smooth out with a slight bulge still being maintained around the last standing section of the car park wall west of Climping Street.
Behind Mill Lane, the green lines are more curved than the present alignment because the assumption was that no further work (like recycling from the Arun) would be carried out and when there is less beach material available the beach would roll back further due to more frequent overwashing.
The red broken line is a profile line for which data is shown on the next slide.

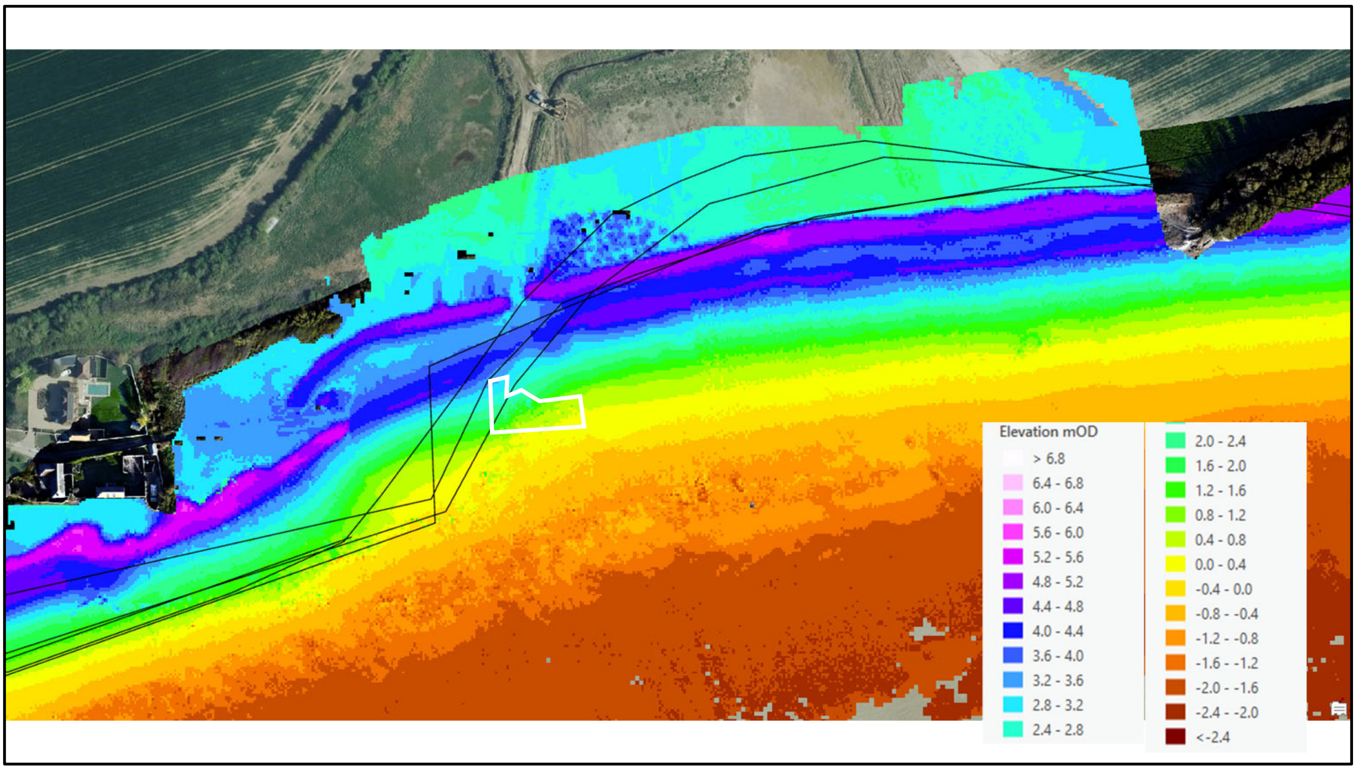


Elevations along the profile line in the previous slide showing how the beach has rolled back landwards (towards the left). The position of Mill Lane is shown for reference by the arrow.
The first line is based on a survey in 2003 showing the managed beach which results in a much steeper seaward slope than in 2024/25.
Over time the beach reduced in size exposing more of the stone masonry-fronted embankment that stands out in blue line from November 2019.
The beach was overwashed and rolled back during storm Ciara and was quickly re-established before the May 2020 survey. The black line below about 2.5 m elevation is representing the underlying clay surface rather than a beach and that clay surface eroded over time leading yet again to a narrow shingle ridge in April 2023.
Further loss of shingle from the front meant that the very high water levels in April 2024 overwashed the beach again (thin red line on 12/04/2024 just after the event) which was then rebuild as shown in the September 2024 survey (black dotted line).
Since the black dotted line, a beach has accumulated in front through natural processes as shown in the purple line for November 2025 providing a buffer for further retreat of the clay that is still quite close under the beach and exposed now an again.
Analog to the profile at the far western end there is little change in elevation

beyond ~200 m on this profile which means that the distance the waves have to travel is increasing, leading to more energy being lost and thus a reduction in energy moving beach material.

Future works to be carried out once stop-orders for Bread Lane and Climping Street have been approved are to create a continuous shingle bund across Bread Lane by placing shingle at the red square to link the two yellow highlighted bunds.
It will also allow pushing the existing yellow bund behind the former eastern carpark against the property boundary and thus smoothing the coastline and making it more resilient than in the present position.

At the moment, the tank trap blocks at the southern end of Bread Lane (white outline) provide some protection in front of the gap in the bund behind. However, (next slide)

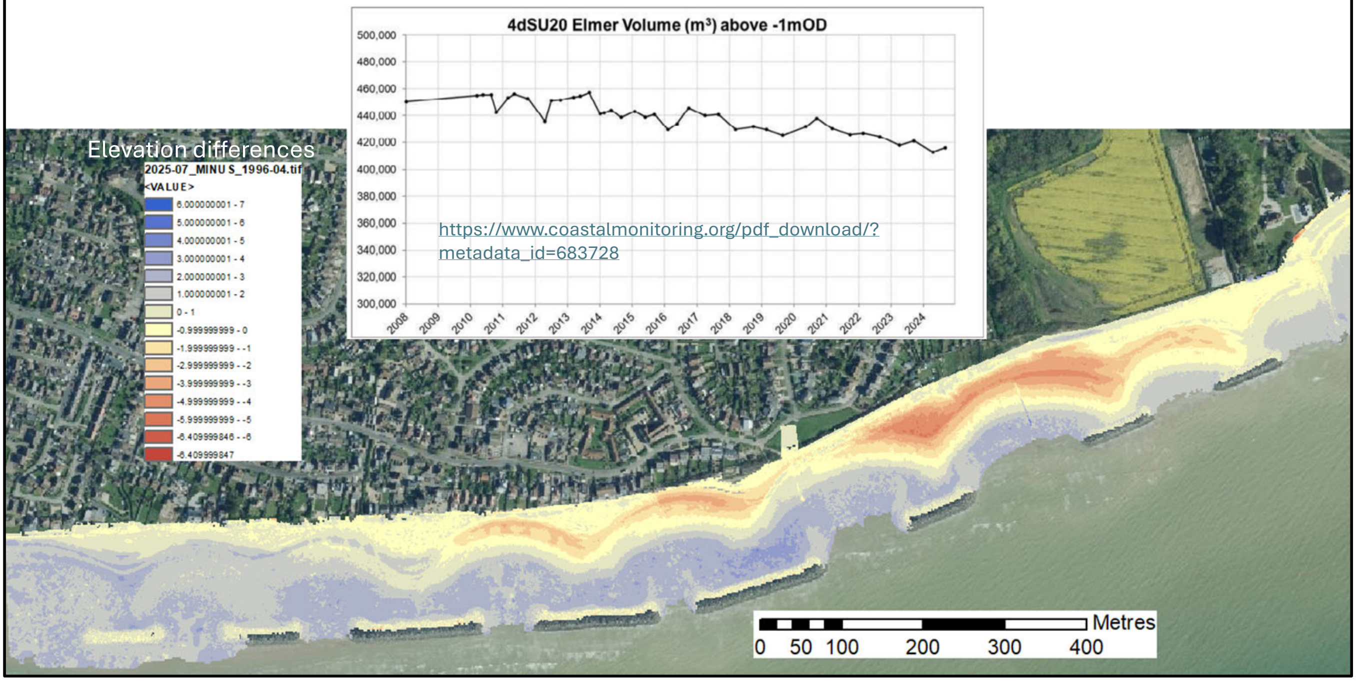


Elevation of the land at low tide surveyed on 11 November 2025 through the Regional Coastal Monitoring Programme ([National Network of Regional Coastal Monitoring Programmes - Help Guide]())

One can see that the natural beach ridge (the more seaward dark blue/purple band) is lower behind the tank trap blocks (e.g. a small section with lighter blue colour below 4 m OD). Under high spring tide water levels this can allow wave overtopping to occur when the effect of the tank trap blocks is reduced because of their position lower in the intertidal.

The blocks should therefore be removed once the bund has been infilled across the bottom of Bread Lane.

Slide on the question of impact of the Elmer scheme



The Elmer scheme was constructed in 1993/4 and included the import of 200,000 m³ of shingle to be placed behind the nearshore rock breakwaters (aka rock islands).
If the Elmer scheme would stop shingle from the west, the beaches within Elmer and to the west would need to grow in size.
However, the latest coastal monitoring report from 2024 tracks the volume from the western breakwater to Poole Place groyne since 2008. The volume diagram from the report is shown and identifies a continuous loss in the order of 40,000 m³. (https://www.coastalmonitoring.org/pdf_download/?metadata_id=683728).
The maps shows the change in beach elevation landwards of the breakwaters from 1996 (when the scheme had lost its initial volume by readjusting its shape). Blue are gains that are consistent over the length of the sandy lower foreshore and some gains at the western end, however, the yellow and red shows losses of the upper beach in the centre and eastern areas.
The Elmer scheme therefore has NOT **deprived** the Climping frontage of shingle, in fact, it has actually **benefited** the Climping frontage!