# Report Log

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Executive Summary

The shingle beaches along the Graveney/Seasalter frontage provide vital protection to the seawall on this stretch of coastline. The monitoring and management of this asset is therefore crucial to the successful and sustainable delivery of flood and coastal erosion protection.

The condition and performance of different beach sections are currently monitored through the Strategic Regional Coastal Monitoring Programme. This report evaluates changes along the coastline from 2003-2007, comparing all surveys undertaken in this period, as this is the first Beach Management Plan (BMP) report to be produced for Management Unit 4A since the beginning of the project in 2003. The key findings are listed below;

- A net loss of 9,136m³ was observed along the frontage over the last year (June 2006 – June 2007). In total, the frontage has now lost 4,019m³ over the last four years since the monitoring project began (2003-2007). The overall trend is an increasingly erosive one, but initially accretion was occurring in 2003-2004. Since then, the accretion rate has dropped and the erosion increased to form the present-day erosion trend.

- Section 4A.3 (The Sportsman) has proved to be the most erosive area since the project began (7,016m³), and, with the exception of 2003-2004, has lost the most material each year. This is an area of concern, especially since there are no hard defences for this section of frontage. The area was identified as a weak point in the Whitstable to Faversham Creek Study, with a defence standard in 2004 of only 1:20. The retreat that has taken place in this section will have reduced this further, leading to a much higher risk of breaching.

- The most accretive section since 2003 was Seasalter Sailing Club (1,324m³). Despite this, unlike previous years, every section along the Graveney/Seasalter frontage eroded during 2006-2007. However, the error estimates for each section are often greater than, or equal to, the amount of change recorded, indicating that little significant change is taking place. Nevertheless, if beaches are already narrow, small changes can be very important. The sections at The Sportsman and Blue Anchor are particularly important as these have a low standard of service.

- Beach crest levels are on the whole are reasonably healthy, well clear of ‘action’ trigger levels defined in this study (although these don’t take the standard of defence into account). The main exceptions are in the east of MU4A. The main area of concern is in Cleve Marshes West, where the beach crest on four 2007 profiles is only just above the ‘action’ level. In addition, profiles 4a00549 and 4a00550, and 4a00590 and 4a00591 have low beach crest elevations, with the crests on the latter profiles falling sharply during the monitoring period. These areas are therefore classified as being at a much higher risk of breaching – further losses in these areas will breach the clay bund and/or expose the seawall to direct wave action at high tide.

It is important to recognise the inconsistency in short-term trends. As with many coastal areas a lot of annual variability is expected, thus drawing conclusions with increased confidence will become possible as more data is collected, with regards to annual losses, net sediment drift and erosion/accretion trends in section sub-units.
1.0 Introduction

Unit 4A, situated on the north Kent coast, extends from Faversham Creek in the west to Blue Anchor caravan park in the east, covering Graveney Marshes and Seasalter Levels (Figure 1.1). The boundaries for this 6km long shingle beach are consistent with the Isle of Grain to Dover Harbour Shoreline Management Plan (1996). The Environment Agency manages this stretch of coastline, maintaining a ‘hold the line’ policy in the short and medium-term, and a managed realignment policy in the long-term. The managed realignment policy also extends to the medium-term between Faversham Creek and The Sportsman

The location of the frontage is shown in Figure 1.2 and also includes the nearest wave buoys and tide gauges. In strategic appraisal and management terms, the frontage of Unit 4A has been divided into 5 operational sections that reflect locations of major beach structures. These sections are numbered from 4A.1 - 4A.5 and are shown in Figures 3.1 and 3.2.

As part of the Strategic Regional Coastal Monitoring Project, the beach has been surveyed three times a year since 2003 using land based GPS techniques. These consist of bi-annual profile surveys and a complete beach plan survey every year, full details of which can be found in the explanatory notes (Annex A). In addition to this, bathymetric surveys of the adjacent seabed were conducted in 2004 and 2007.

This report covers the changes in beach topography between the 2003 spring survey and the 2007 summer Beach Management Plan (BMP) survey. No previous reports have been compiled for this unit.
1.1 **Management Unit 4a: Graveney and Seasalter**

1.1.1 **Defences**

The majority of Unit 4A is presently defended by a concrete seawall (+6.0 to +6.5m OD) built in 1954. The seawall sits on a clay bund with a blockwork apron on the seaward side. The beach consists of mixed sand and shingle, which becomes finer to the west. Timber groynes are located intermittently along the majority of the frontage, although in most cases they are in a poor state of repair and do little to affect beach movement. At The Sportsman public house, a third of the way along the frontage (where Faversham Road meets the sea in the west), there is no seawall. Defences are provided by a set back grass covered clay bund to up to +5.2m OD protected by a shingle barrier beach ridge.

At the eastern end, the defence line moves to the inland side of Faversham Road and consists of a grassed clay bund reaching +5.5m OD. At this location there are a number of houses situated in front of the defence, but these are protected to some extent by the beach. However, these properties are still at risk of flooding in the short term. In the west, the Faversham Creek area is defended against fluvial and estuarine flooding and marine outflanking by a clay embankment in fair condition that reaches a minimum height of +4.8m OD.

Much of the 1,430ha of hinterland consists of marshland at a level of +2.0m OD (below Mean High Water) stretching up to 4km inland. The Faversham to Thanet main railway line and high voltage power lines are located on the flood plain, along with a number of settlements including Goodnestone, Graveney and Waterham. In addition, the hinterland and the inter-tidal mudflats in front of the seawall have a number of national and international nature conservation designations.

In recent years only minor maintenance has been carried out to the defences. However, the seawall is noticeably settling at a couple of locations, and many of the joints are in need of renewal. At a number of points, the blockwork is starting to be broken out and could cause the apron to be undermined. The Whitstable to Faversham Creek Strategy (Canterbury City Council, 2004) predicts that a 20-year return period storm would breach the sea defences at The Sportsman.

Futurecoast (2002) predicted that for an ‘unconstrained’ scenario, there would be large-scale tidal inundation of the hinterland, altering the plan-form of the Swale estuary. The backshore area would revert to inter-tidal habitats, although due to topographical differences between the present foreshore and the present backshore, mudflat and some pioneer saltmarsh species would initially tend to dominate much of the newly created inter-tidal area.

1.1.2 **Sediment dynamics**

An important issue on this stretch of coastline is that there is little natural supply of sediment into the system. There are a couple of exceptions, namely;

- Finer sediments released from eroding cliff sections on the Isle of Sheppey and at Reculver;
- Erosion of bedrock where exposed on the lower foreshore (e.g. Seasalter Slopes);
• Fine sediment from fluvial sources; and,
• The sand that feeds onshore from sandbanks in the Thames estuary.

The shingle beaches that dominate the area are relict beaches, which have been enlarged artificially through beach renourishment. There is little contemporary feed of coarse material into the area, although most of that which currently exists on the beaches does remain within the boundaries of this process unit. Any losses must be explained by a combination of local sediment sinks and the possibility of losses to abrasion.

The potential longshore transport rates along this section of coast decrease westward (from around 1,000m³/a at Faversham Road to no more than 500m³/a at Cleve). This is partly because the shoreline orientation is closer to an equilibrium position, and partly because the foreshore levels rise to the west, resulting in reduced wave energy. Actual shingle transport rates, however, increase from east to west as a result of the varying size and condition of the controlling groyne fields. Along the Faversham Road frontage, the groynes allow some material to move west. Between Faversham Road and Faversham Creek the groyne conditions vary from adequate to poor, with unconstrained movement of shingle occurring in some areas (Isle of Grain to South Foreland SMP, 2007).

The longshore transport of coarse material ends at Castle Coote. At this point, c.1km east of Faversham Creek, the beach separates from the sea wall and extends westwards forming a mixed shingle/sand/shell spit. Recent growth of the spit is probably due to increased longshore transport as a result of the decay of groynes to the west of the spit (Isle of Grain to South Foreland SMP, 2007). Little is known about the movement of fine sediments in the area, although it has been established that finer sediments appear to be accreting in the mouth of the Swale Estuary, on the south side of the Isle of Sheppey. As this area would be lost under a managed realignment strategy, it is recommended that an historic study of the spit's evolution be carried out. Similarly, the shingle bank offshore of Faversham Road may need to be surveyed annually to establish whether this is a sediment store or sink for MU4A.

Since the area was drained and fully defended in the late 19th century, there has been little significant change to the shoreline (Isle of Grain to South Foreland SMP, 2007). However, it has not been clear whether the shoreline is accreting in the west (Canterbury City Council, 2004) or retreating in the east (Futurecoast, 2002). This report will show how the coastline of Unit 4A has changed over the past four years, although this is not long enough to infer long-term trends.

The forcing conditions that have the greatest influence on this shoreline are those generated by weather systems acting on the North Sea. There are two different types of storm event generated from two different directions. The longer fetch from the east and northeast sector generates larger waves. However, northwesterly weather systems are associated with storm surges and higher water levels, which can have a more significant impact. This complex weather pattern creates an equally complex range of wave energy conditions driving sediment transport processes. These studies have shown that eastward and westward sediment transport rates are similar, although the dominance of wave energy from the northeast leads to a net westward drift of material. Nonetheless, MU4A is relatively sheltered (almost estuarine) and with a high foreshore, which limits wave action.
Figure 1.2: Site Location and Wave/Tide Gauges
2.0 Surveys

All topographic and bathymetric surveys are referenced to a Global Positioning System (GPS) control grid, established for this programme, and conducted according to the current Environment Agency’s National Specification, summarised in the Explanatory Notes (Annex A).

2.1 Topographic

The schedule of completed surveys since the start of the Regional Monitoring Programme is given in Table 2.1. Digital Ground Models (DGMs) of the 2007 BMP topographic survey are shown in Annex B superimposed upon the ortho-rectified aerial photographs of 2005. The method used for deriving Digital Ground Models is given in the Explanatory Notes (Annex A).

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2.2 Bathymetric

The schedule of surveys since the start of the Regional Monitoring Programme is given in Table 2.2.

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<td>05/04/2007</td>
<td>50m</td>
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3.0 Surveys

3.1 Difference Models

Now that the 2007 BMP data set has been compiled, it is possible to overlay the results of the survey with BMP data from 2006. This enables comparative volumetric analysis to be undertaken to determine change over a given period. Through the use of three dimensional ground models and ortho-rectified aerial photography, it is possible to create a visual interpretation of the volumetric change that has occurred during each analysis period. This is shown in Plate 1 (1-7), which indicates areas of net erosion or accretion (N.B. a 0.25m difference in elevation is considered as “no change”) and the location of any extraction/deposition sites.

Negative values represent erosion that has occurred during 2006/07 and positive values indicate accretion. Whilst these figures show an overall change in beach volume within each discrete section, it should be recognised that the data is based on the BMP survey, which is undertaken once each year. It is therefore only a snapshot of one moment in time, and the particular dynamics of each frontage need to be taken into account. This ensures that the information shown in the difference models represents the net change rather than capturing a particular extreme variation caused by a large event.

The following section of the report contains a narrative summarising the changes that have taken place over the past year. As part of this exercise, a hypothesis of the processes driving these changes has been created. This has been carried out for a number of locations along the frontage, with the extent and nature of the change generally depicting the boundaries of each location. In addition, the beach profiles have been cross referenced with the other profile surveys carried out on an annual basis in order to ensure that the results from the difference models are representative of net profile change. This then gives an indication of the beach variability over three time steps in each individual year.

3.2 Profile Evolution

While beach plan surveys provide a more accurate view of morphological change and beach volume levels, profiles still provide a visually more discernable impression of the beach cross section. Also, to ensure that the results from the difference models are representative of net change rather than a particular event that may have been captured by the survey, the beach profiles have been cross referenced with the other profile surveys carried out each year. This then gives an indication of the beach variability over three time steps in each individual year.

The Cross-Sectional Area (CSA) has been calculated for all beach profiles. This is calculated as the area of profile above a Master Profile (MP). In general, the lower boundary of the MP is the transition between the beach material and the foreshore. The landward boundary is either the seawall or, where a hard structure is not present, the landward extent of the stable part of the beach. The Master Profile is held constant for a given profile line and therefore the changes in CSA through time can be derived.
3.3 Unit 4A

To aid purposeful analysis the unit has been split into 5 sections as depicted in Figures 3.1 and 3.2. These reflect changes in beach configuration and/or the presence of terminal structures. Table 3.1 provides a summary of volume change within each between the 2003 and 2007 summer surveys.

Overall, this unit exhibited a net loss of 9,136m³ in 2006/07. In contrast, the unit gained 4,674m³ between the 2003/2004 surveys and 1,402m³ during 2004/05, followed by a loss of 959m³ in 2005/06. However, the estimated error for each section is often greater than or nearly as great as the actual change, which suggests that very little significant change is taking place.

Table 3.1: Unit 4A - Summary of Erosion/Accretion for 2003-2007

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<td>41,994m²</td>
<td>± 1,258.82m³</td>
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<td>49,533m²</td>
<td>± 1,485.99m³</td>
<td>-482m³</td>
<td>3,856m³</td>
<td>-954m³</td>
<td>-1,925m³</td>
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<tr>
<td>Total</td>
<td></td>
<td>253,799m²</td>
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<td>4,674m³</td>
<td>1,402m³</td>
<td>-959</td>
<td>-9,136m³</td>
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Error estimates are calculated as the survey area multiplied by a ±30mm error margin. Although unlikely, the error of combined surveys can be up to double this figure.

Detailed analysis for each section is provided on the following pages.
Figure 3.1: Unit 4A beach analysis sections (West)
Figure 3.2: Unit 4A Beach analysis sections (East)
3.3.1 Section 4A.1 (Cleve Marshes West)
This section stretches 900m west from Castle Coote spit. Between 2003 and 2004, this section gained 975m³, confined to two locations; one at the western end of Cell 2 and one at the eastern end of Cell 3. The first location has accreted every year that the coastline has been monitored, as illustrated in Figure 3.3. The profile has advanced seaward by a maximum of 7m since 2003, with the greatest advance in 2004-2005. However, over the past year (2006-2007) the profile has not advanced as much as in previous years.

![Figure 3.3: Profile 4a00553](image)

However, the latter location has lost material since 2004, with rates of erosion increasing each year. An area of accretion has developed stretching west along the head of the beach in Cell 3 and part of Cell 2 from 2005 onwards. In addition, areas of sediment loss have developed west of the accretion area in Cell 2 (since 2005), as well as in Cell 4 (since 2006). The area of accretion in Cell 2 has also expanded into Cell 1. Overall, this section gained 51m³ in 2004-2005 and 1463m³ in 2005-2006, but lost 1783m³ in 2006-2007.

3.3.2 Section 4A.2 (Cleve Marshes East)
This stretch of coastline extends from Section 4A.1 to 150m before the seawall terminates at the bund in front of The Sportsman. This section has alternated between net accretion (2003-2004, 2005-2006) and net erosion (2004-2005, 2006-2007) during the monitoring period, although the magnitude of change has decreased since 2003.

There have been no major areas of erosion or accretion in this section over the whole monitoring period, apart from a couple of very small zones of accretion in
Cell 5. The only other exception is an area of erosion in the far east of Cell 7, which is part of a larger area of erosion in Section 4A.3, and will be covered in the analysis of that section. It is also worth noting that Cell 6 is the only cell in 2006-2007 that accreted, although the 17m³ increase in beach material is insignificant compared to the area of the cell or the management unit as a whole. Nevertheless, all the profiles in this section show little change over the four years of monitoring.

3.3.3 Section 4A.3 (The Sportsman)

This section includes the area of coastline from Section 4A.2 to the small pond near the sailing club, behind Faversham Road. Since 2004, and in total over the whole monitoring period, this section has lost the most amount of material, with 7,016m³ removed since 2003. The most erosive area is the 340m section west of the beach huts in front of The Sportsman. Since 2003, the beach crest along much of this frontage has consistently retreated, especially in Cell 8. The profile that has seen the most significant retreat, compared to the rest of the frontage, is profile 4c00600, immediately west of the beach huts, where the crest has retreated 9m, and beach levels dropped by 1m, since 2003 (Figure 3.4).

![](image)

**Figure 3.4: Profile 4a00600**

This is an area of concern, especially since there are no hard defences for this section of frontage. The area was identified as a weak point in the Whitstable to Faversham Creek Study, with a defence standard in 2004 of only 1:20. The retreat that has taken place will have reduced this further, leading to a much higher risk of breaching.

This section of coastline is only protected by a clay bund located between the beach huts and The Sportsman public house. This leaves the beach huts undefended, although the profiles in front of the huts are not showing consistent
erosion or accretion patterns. There is an area of continuous accretion (since 2003) around the central groyne in Cell 11, although this isn’t picked up by any of the profiles as they don’t cover this area of the beach.

Elsewhere in Section 4A.3, there are other localised areas of loss and gain that have occurred over the past four years. Between 2004 and 2005, the lower beach face west of the beach huts eroded. It is likely that this is due to profile reorientation, as this pattern was not repeated in subsequent years. In addition, there was an area of accretion immediately to the east of the beach huts in 2003-2004, which had diminished in size by 2005, and did not occur again the following year. There is also an area of erosion that has occurred for the past two years, 50m east of the aforementioned accretion area. This area has grown since 2005 and now extends over one-and-a-third groyne bays.

3.3.4 Section 4A.4 (Seasalter Sailing Club)

Spanning the 800m central section of Faversham Road, in front of the sailing club, this stretch of coastline is characterised by a mixed pattern of accretion and erosion. However, the magnitude of the changes is not great enough to suggest large changes in beach morphology. It can therefore be implied that this section of beach is relatively stable, in comparison to other parts of MU4c. The area that has experienced the greatest amount of erosion is in Cell 25, where a zone of scattered erosion has spread and coalesced since 2004. Overall, this section is trending towards an increase in erosion; 2003-2004 saw a gain of 2,151m³, and this has gradually decreased until 2006-2007, when the section lost 1,706m³.

![Figure 3.5: Profile 4a00675](image-url)
3.3.5 Section 4A.5 (Blue Anchor)

This section covers the 800m eastern section of Faversham Road up to Blue Anchor caravan park. As with the previous section, there has been little change along much of the beach face. However, there are a couple of exceptions. In 2004-2005, a significant area of accretion developed along the foreshore at the toe of the beach in the west of Section 4A.5, which contributed to the greatest annual gain of material during the monitoring period (3,856m³). However, the following year there were only low magnitude, changes to the beach level (both accretion and erosion), and these were on the beach face not the foreshore. Therefore, the major change in 2004-2005 is probably due to foreshore realignment supplying more sediment to the beach face.

The only other major change that has occurred during the monitoring period is at the eastern end of MU4A. In 2003-2004, there was an area of accretion along approximately 70m of the beach face towards the eastern end of the groyne bay. Along the western edge of the bay, an area of erosion developed along the groyne. However, by 2004-2005, the accretion area had given way to a smaller area of erosion, and an area of accretion had replaced the erosion along the groyne. Over the subsequent years, all accretion is replaced by erosion within this groyne bay, and the erosion zone increases in area. The change in beach behaviour affects profiles 4a00672, 4a00674 and 4a00675; the latter of these is shown in Figure 3.5.

3.4 Long Term Summary

From 2003-2007, the overall trend along the frontage of MU4A was an erosive one. By 2007, 4,019m³ had been removed, as illustrated in Tables 3.1 and 3.2.

In 2003-2004, 4,674m³ of beach material was gained along the Graveney / Seasalter frontage. The area of greatest erosion occurs in Section 4A.4, where 2,151m³ was accreted. Overall, only Section 4A.5 loses material (482m³). During 2004-2005, the amount of accretion fell to 1,402m³, largely due to an increase in erosion in Section 4A.3. the area of greatest sediment gain was Section 4A.5 (3,856m³). In total, two out of the three sections eroded, whilst the other three accreted.

In contrast to previous years, 2005-2006 was the first year of the monitoring programme that MU4A lost material overall (959m³). The number of sections material was removed was the same as 2004-2005, and the amount of erosion was lower. However, the amount of material gained was also lower, hence the overall loss of sediment. The erosion trend was continued in 2006-2007, when the frontage 9,136m³ was removed. All sections lost material, and only one cell saw an increase in beach material (Cell 6, 17m³). The greatest amount of erosion occurred in Section 4A.3, where 3,398m³ of sediment was removed.

Probably as a result of a lack of sediment sources, the long-term trend at Graveney and Seasalter is one of recession, as demonstrated by the overall volume change from 2003-2007 (-4,019m³). However, as shown in Table 3.1, the error estimates are often almost as great, if not greater than the measured change in each section. This suggests that changes in beach volume may not be as great as they might first appear. In order to establish how much sediment is moving, and where it is moving to, the Castle Coote spit should be studied, as mentioned previously in this report.
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4.0 Wave Climate

Wave data is recorded by an Etrometa step gauge situated on the old pier head. A detailed analysis of the wave climate for July 2006 to June 2007 is given in Annex D.
5.0 Storm events

Although storm events occurred from 2003-2007, they were not considered significant enough to require post-storm surveys. Details can be found in the annex.
6.0 Performance Overview

6.1 Critical Beach conditions

The beach crest level compared to designated ‘action’ and ‘emergency’ levels are illustrated in Figure 6.5. The action and emergency levels are often set from levels established during capital works e.g. seawall construction or beach replenishment. However, these levels have not been set for MU4A, as no record of beach replenishment exists, and the seawall was built in 1954. Therefore, the ‘action’ level was taken as being between Mean High Water Springs (MHWS) and Mean High Water Neaps (MHWN), and the ‘emergency’ level set at MHWN and below. Nevertheless, this measure doesn’t take the standard of defence behind the beach. For example, at Cleve there is a sea wall which may be undermined by falling beach crest levels. However, at The Sportsman there is only a clay bund, and at Faversham Road only a high beach crest to defend against flooding. Therefore, at these locations small changes are more significant than where there are defences with a greater design standard.

![Figure 6.1: Profile 4a00571](image)

There are a number of profiles that are of concern, predominantly in the east of MU4A. The main area of concern is in Section 4A.2 (Cleave Marshes West), where the beach crest on four 2007 profiles is below 3m, only just above the ‘action’ level (2.66m). Specifically, all these profiles (4a00569 – 4a00576) fall within Cell 5, with additional beach crests on profiles in Cell 6 at only 3m. Profile 4a00571 is shown in Figure 6.1 for illustration. In general, there has been a slight increase in the height of the beach crest, and the beach face as a whole, between 2003 and 2007. However, the magnitude of the accretion is small; indeed, since 2003 this cell has alternated between accretion and erosion, and
over the past year lost material (135m³). Therefore, it is recommended that this profile should continue to be monitored carefully, as further losses of material could expose the seawall to direct wave action at high tide.

The second area that is giving cause for concern covers profiles 4a00549 and 4a00550. The beach crests are also at or below 3m, and have lost material since 2003. These profiles located in an area of erosion that has been present since 2005. However, the pattern of erosion and accretion appears to be cyclical. Profile 4a00550 gained material from 2003-2004, then lost material from 2003-2006, and is now accreting again. It would appear that these profiles are stable, although four-years of data is not enough on which to base definitive conclusions. They should therefore be re-assessed after 5 and 10 years of data has been collected.

The final area that has low beach crest levels is found on profiles 4a00590 and 4a00591. This area (shown in Figure 6.2) is characterised by cliffing of the upper beach face, which also extends further to the east, and has affected both profiles. In 2003, the plateau at top of the beach covered the lower part of the seawall apron (Figures 6.3 & 6.4). However, over subsequent years material has been lost from the cliffed sections, and the crest levels dropped to a level below the toe of the apron by 2007. The profile levels have consistently dropped over the four years, apart from the plateau on profile 4a00591, which increased in height as the cliff moved landward prior to the loss of the cliffed section. Again, this is a similar situation to that outlined in Section 3.3.3, falling within the same beach analysis section. As mentioned previously, the area was identified as a weak point in the Whitstable to Faversham Creek Study, with a defence standard in 2004 of only 1:20. The retreat that has taken place will have reduced this further, leading to a much higher risk of breaching.

![Figure 6.2: Location of Profiles 4a00590 and 4a00591](image-url)
Figure 6.3: Profile 4a00590

Figure 6.4: Profile 4a00591
Figure 6.5: Comparison of beach and action levels
6.2 Sediment Budget

It is difficult to reach any conclusions with a high degree of confidence given the relatively short-term trends produced over a four-year monitoring period. According to the Isle of Grain to South Foreland SMP (2007), the potential alongshore transport rate decreases westward (from 1,000m³/a at Faversham Road to 500m³/a at Cleve). As mentioned in the Introduction, it is due to changes in the shoreline orientation (closer to an equilibrium position) and rising lower foreshore levels in the west.

The SMP also points out that actual shingle transport rates increase from east to west as a result of the varying size and condition of the controlling groyne fields. At Seasalter, the groynes are relatively small (compared to Whitstable), allowing material to move west. Between Faversham Road and Faversham Creek the condition of the groynes varies from adequate to poor, which allows unconstrained shingle movement until the spit at Castle Coote, where longshore transport terminates at Castle Coote. Because groynes are continuing to fail, the patterns of transport in MU4A can be erratic. For example, prior to the start of the monitoring programme in 2003, a large groyne at the west end of the sportsman failed (in 2001), and very quickly the trend switched from accretion to erosion.

Overall, the average annual loss rate for MU4A is 1,005m³/a since 2003. However, for the first two years of the monitoring programme, the frontage was accreting material. The change to an erosive system occurred at the same time as the defence works that were carried out at Whitstable, west of Seasalter. The works are also updrift of MU4A, so any changes to sediment there will affect the supply to the frontage. In 2005-2006, new groynes were constructed and 75,000m³ of sediment were added to Unit 4B at Whitstable, east of Unit 4A.

The new groins are not thought to be causing the erosion trend at Seasalter – if this were the case, then the section of beach at Preston Parade (in MU4B), between the works and MU4A would be affected first, and this section has not experienced a sharp increase in erosion. However, anecdotal evidence suggests that the Environment Agency has replenished the beach at the water-ski club near Blue Anchor. This was carried out every couple of years, but doesn’t appear to have continued since the monitoring programme began in 2003. It is likely that this may be the cause of the erosion trend, rather than the beach works in MU4B.
7.0 Conclusion

This area of coastline fronting Graveney and Seasalter lost 9,136m³ over the last year, increasing the total loss over the course of the monitoring project (2003-2007) to 4,019m³. Blue Anchor (Section 4A.5) experienced the greatest annual gain in sediment, accreting 3,856m³ in 2004-2005. However, The Sportsman (Section 4A.3) posted the biggest annual loss of 3,398m³ in 2006-2007. This section has consistently lost the most material for the past three years. Overall, the trend along the whole frontage is an erosive one, with all sections losing material in 2006/2007, contrasting with only one erosive section in 2003-2004. However, the estimated error for each section is often greater than or nearly as great as the actual change, which suggests that little significant change is taking place.

In general, beach levels are well above the ‘action’ trigger level, although parts of Cleve Marshes (East and West) and The Sportsman are at or just above the ‘action’ trigger level. The area at Cleve Marshes East appears to be relatively stable, although the beach crests in the other areas are dropping, especially at The Sportsman. This highlights a need for careful monitoring at these locations, although as mentioned previously, this measure doesn’t take the standard of defence behind the beach ie small changes in areas with a lower standard of defence (eg The Sportsman) are more significant than areas with a higher standard of defence.

Several storms exceeded the storm threshold over the past four years. However, none were thought significant enough to require post-storm surveys.

It is important to recognise the inconsistency in short-term trends. As with many coastal areas a lot of annual variability is expected, thus drawing conclusions with increased confidence will become possible as more data is collected, with regards annual losses, net sediment drift and erosion/accretion trends in section sub-units.

Scheduled future monitoring includes profile surveys in Autumn 2007 and Spring 2008, and in addition post-storm surveys may be carried out if any event is deemed to have significantly affected the frontage. An interim report will be issued on completion of the spring profile survey, with the next BMP report scheduled to be issued after completion of the Summer 2008 beach plan survey. All historic monitoring data is accessible online (www.channelcoast.org), and future surveys will be available after satisfying quality assurance procedures.
Profile Location Diagrams