



SHORELINE MONITORING Annual Report 2001/02

OCTOBER 2002

Shoreline Management Partnership

Maritime Civil Engineering; Marine Science; Economics; Conservation

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SHORELINE MONITORING

Annual Report 2001-02

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1.0 INTRODUCTION

This report is the first annual report of shoreline monitoring within the administrative boundaries of the Metropolitan Borough of Sefton which was introduced following recommendations made in the Shoreline management Plans for sub-cells 11a and 11b of Cell 11 (comprising the English/Welsh Irish Sea shoreline up to Great Orme at Llandudno).

The monitoring system presented in this annual report is derived from the Shoreline Management Plan recommendations and is grant-aided by DEFRA under the Coast Protection Act 1949.

The primary objective of the monitoring is to improve the data base of information on shoreline evolution in the area and to thereby provide inputs to:

- shoreline management plan reviews (first review due in 2006);
- planned maintenance of coastal defences;
- achievement of Central Government high-level targets;
- determination of appropriate design criteria for coastal works;
- biodiversity action plans;
- implementation of the Habitats Directive;
- leisure and amenity management of the shoreline area.

The monitoring system comprises a coherent assemblage of tasks to inform those responsible for the shoreline on the behaviour of forcing and response parameters. Some historic measurements are available in suitable format to assist in the development of a time-series of data. As a consequence it is envisaged that the monitoring system establishment and the collation of relevant historical data will be carried out over the first four years of system operation in order that the complete system can provide several years data for use by the first SMP review due in 2006.

2.0 PROGRESS

The general plan of the Sefton shoreline is shown on the ortho-referenced vertical aerial survey views shown in Figures 1 and 2, taken in 1999. The approved proposal for the monitoring presented in this report is reproduced in Appendix I.

This is the first annual report of a four year initial programme of monitoring presented to and approved by DEFRA with a view to ongoing extensions/revisions as appropriate. The monitoring system comprises a series of discrete tasks (refer to section 4.5 of Appendix I) whose status is reported below:

TASK		Definition Sheet Ref.	STATUS	PRODUCT	COMMENT
1	Annual Aerial Intertidal Inspection	A	Inspection carried out in August '01 reported in June '02.	Report in hard copy and CD version using Adobe Acrobat v 5.0.	Refer to comment under item 6.
2	Annual Ground Shoreline Inspection	B	Specification development - no inspection carried out.	Specification confirmed.	Due to be carried out Autumn '02.
3	Beach Profile and Topographic Surveys	C	Surveys carried out August '01.	Report and data on CD.	Surveys to be integrated with similar work for Sandwinning in Ribble Estuary.
4	Sediment Sampling and Analysis	D	Specification development and procurement organisation.	Specification and procurement confirmed.	Sampling to be included alongside Surveys in August '02.
5	Hydrographic Beach Profile Extensions	E	Specification development and procurement organisation.	Specification and procurement confirmed.	Surveys to be integrated with Sandwinning work and land surveys - due to take place August '02.
6	Vertical Aerial Photography	F	Contract let for survey in Summer '02.	Awaited.	Potential omission of annual aerial inspection when vertical aerial survey is undertaken.
7	Marsh-edge Surveys	G	Specification development and procurement organisation. Historic data analysis.	Specification and procurement confirmed. Historic Data Analysis Report	Surveys to be commenced in August '02. Baseline report provides the context for survey data interpretation.
8	Biological Monitoring	H	Invertebrate sampling surveys investigation. Appraisal of infra-red vertical aerial survey.	Sample sites identified. Need for infra-red vertical aerial survey confirmed.	Sampling surveys to be integrated with Sandwinning work in August '02.
9	Inshore Wave, Tide and Littoral Drift Measurements	I	No work on this task.	-	Same cross-linkage with Hightown Strategy work - needs clarification.
10	Hydrographic surveys of Estuaries	J	No work on this task.	-	Liaison with EA and MDHC needs to be established.
11	Storm Typicality	K	Assessment carried out for 12 months up to July '01.	Report with tabulated results - hard copy and disc.	Need to consider some historic data generation.
12	Analysis and Reporting	-	Annual report as presented herein.	Report.	Ongoing development of format and data presentation.

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Figure No. 1



Shoreline Management Partnership
 Marine Civil Engineering, Marine Science, Economic Consultancy



COASTAL STRATEGY UNIT

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METROPOLITAN BOROUGH OF SEFTON

Title: 1990 Aerial Survey - Ainsdale to Ribble
 Map Reference: Sheet 1 of 4 Scale: 1:113,400
 Produced By: Paul Wisse Date: 09/07/2002

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SEPTEMBER 2002

Figure No. 2



Shoreline Management Partnership
Marine Civil Engineering Marine Planning Ecological Conservation



METROPOLITAN BOROUGH OF SEFTON

COASTAL STRATEGY UNIT

Title: 1999 Aerial Survey - Crosby to Formby
Map Reference: Sheet 2 of 2
Produced By: Paul Wisse

Scale: 1:82,650

Date: 02/07/2002

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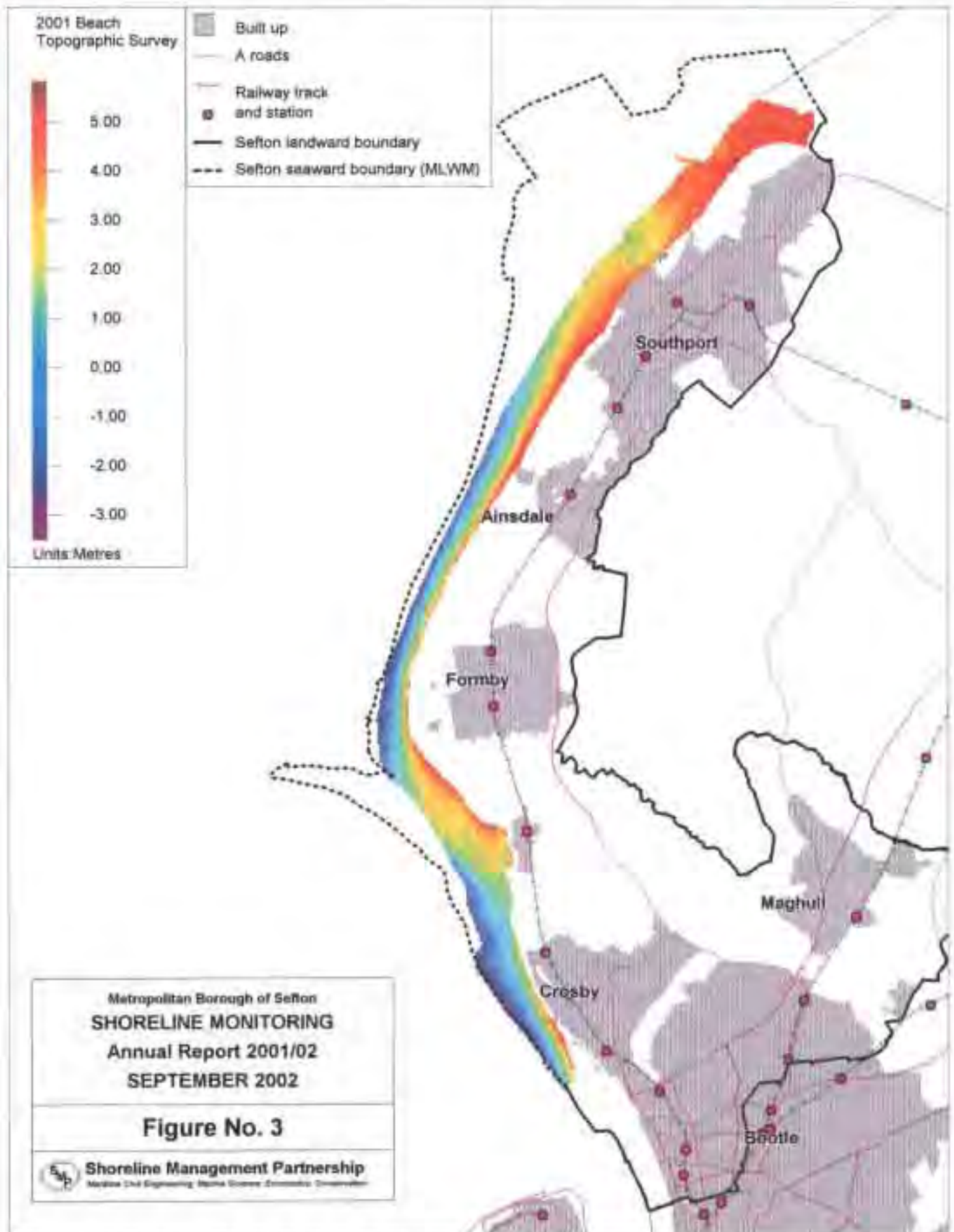
Of the twelve tasks comprising the monitoring system ten have been progressed with:

five specified and procurement arranged;
five procured.

There have been issues affecting the development of the monitoring system arising from the Public Enquiry into Sandwinning at Horse Bank offshore of Southport in the Ribble Estuary. The Enquiry considered the monitoring of the area generally and specifically for Sandwinning - the Inspector's decision included a requirement for monitoring with implications for the Coast Protection Authority. There was therefore a hiatus in monitoring system development between the Enquiry and the announcement of Inspector's decision (six months) to avoid abortive work. However the integration of the Enquiry monitoring requirements with the Authority's original programme has now been completed with an enhanced value obtained.

Two tasks (9 and 10) where no progress was achieved is in accordance with the project proposal for the first year (refer to Appendix I).

In addition to the proposed planned work for the first year there has been effort invested in summary data presentation - illustrations of which are provided in Figures 3 to 7 - this work will be ongoing to refine data summaries and the extraction of specific information against the monitoring project objective.

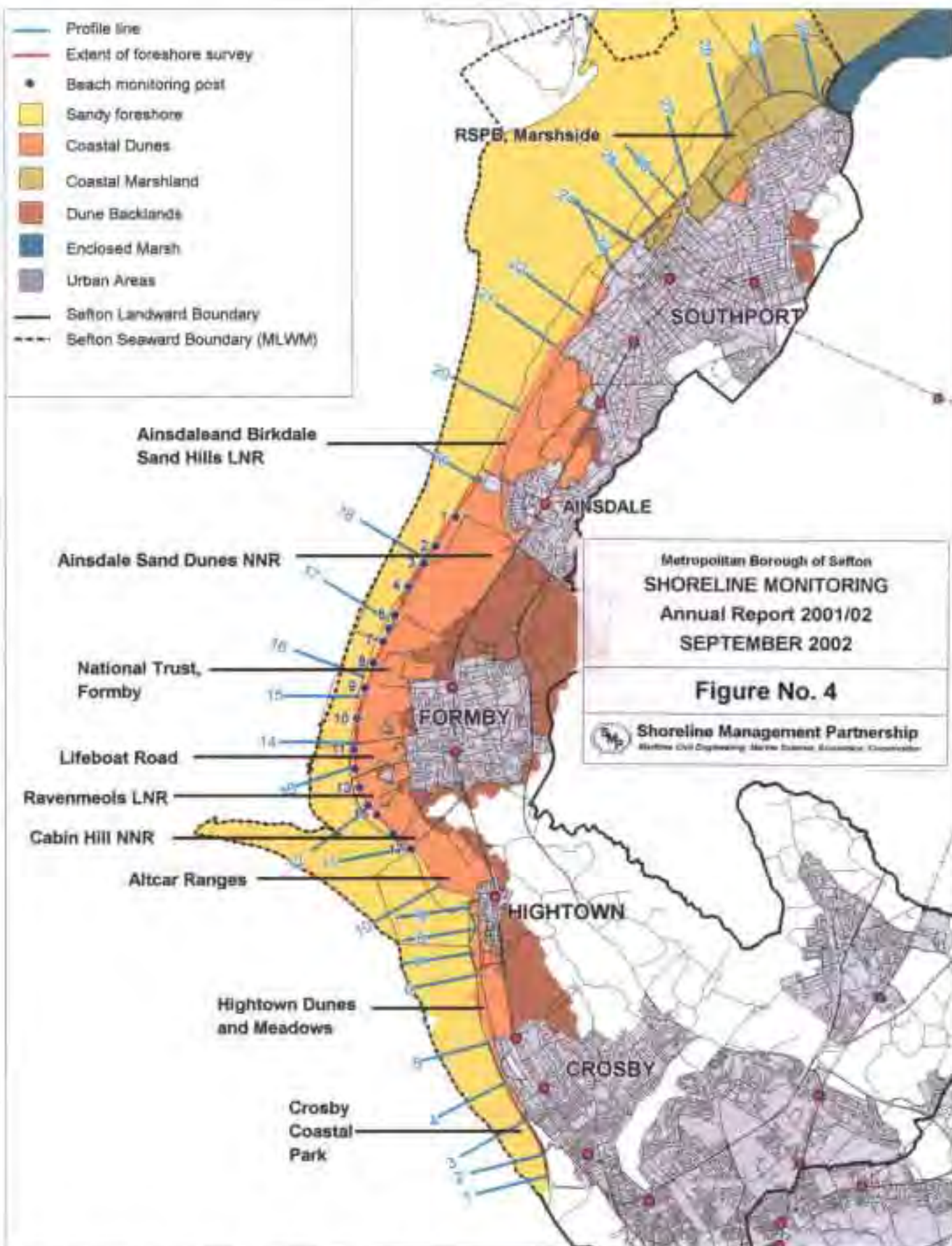


METROPOLITAN BOROUGH OF SEFTON

COASTAL STRATEGY UNIT

Title: Area of Topographic Survey 2001
Map Reference: (map ref) **Scale:** 1:125,000
Produced By: Paul Wisse **Date:** 02/07/2002

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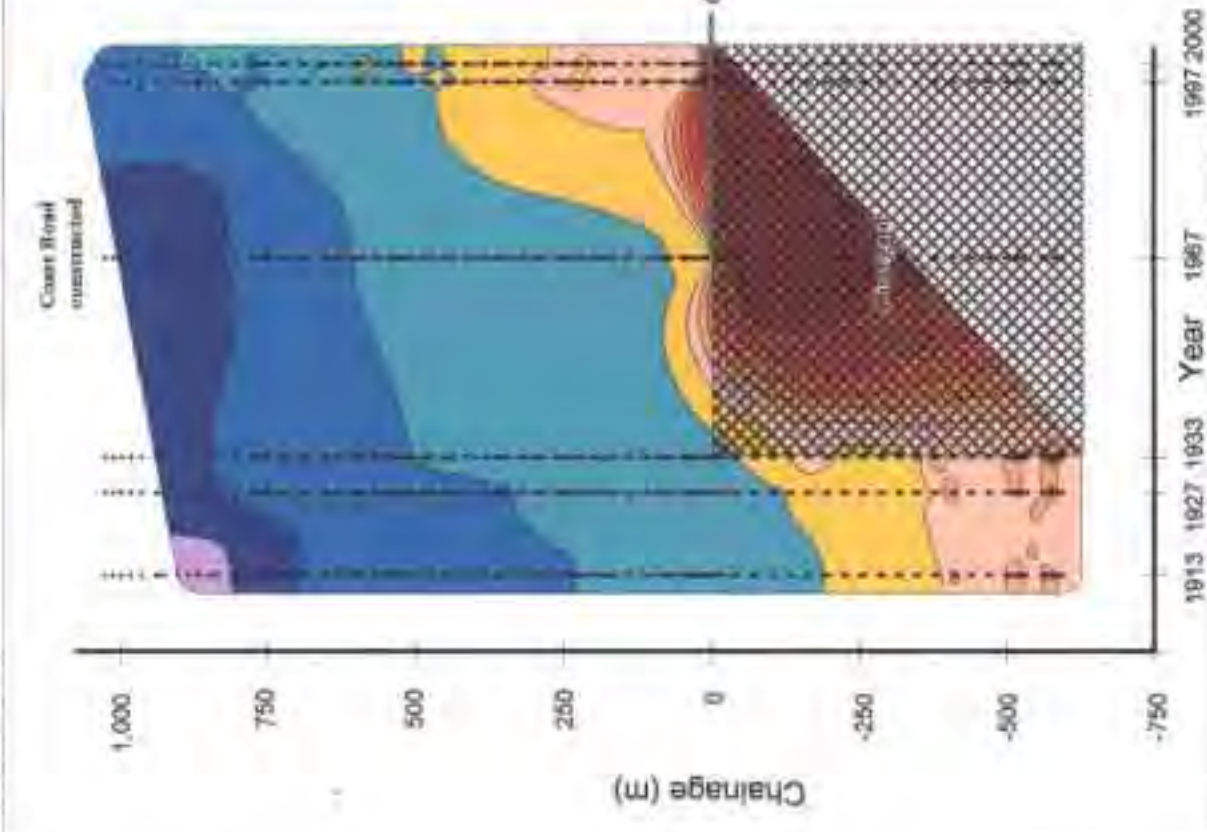
METROPOLITAN BOROUGH OF SEFTON

COASTAL STRATEGY UNIT

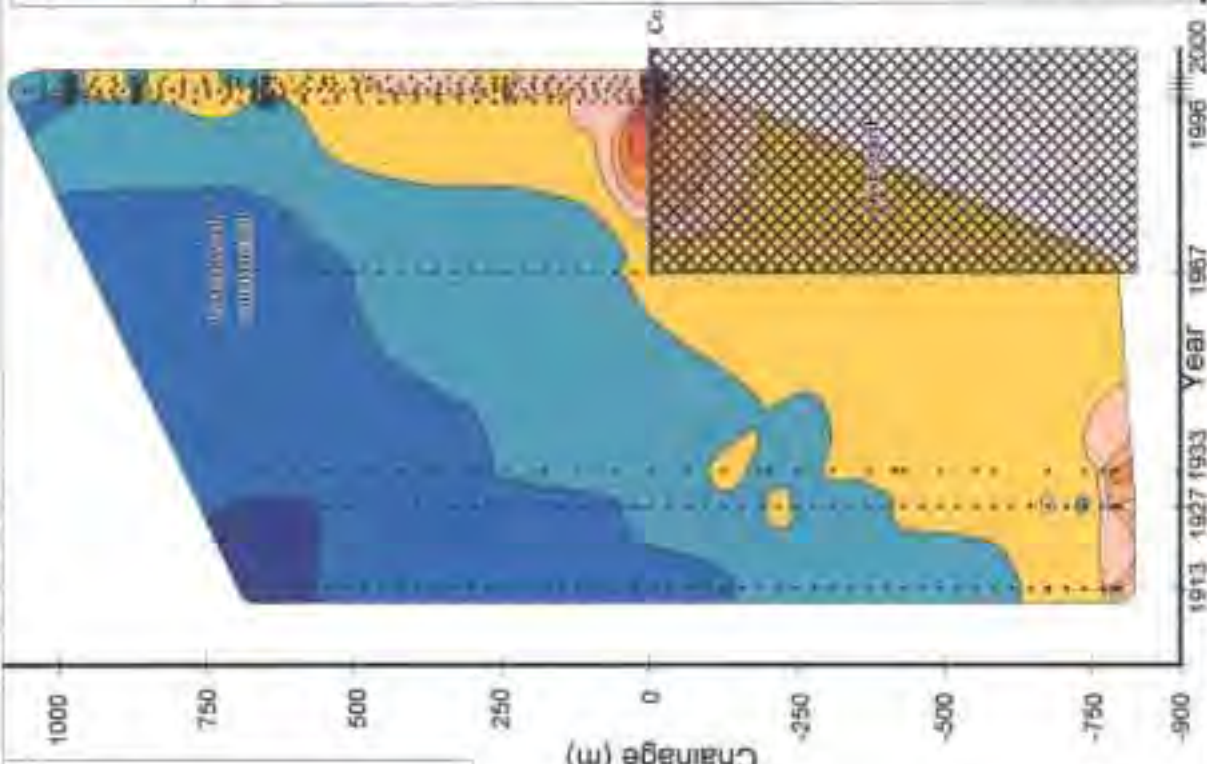
Title: (title here)
 Map Reference: (map ref) Scale: 1:108,200
 Produced By: Paul Wisse Date: 02/07/2002

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Profile Line 28



Profile Line 29



Line 28 - change is distance from start co-ordinates E. 555088.919 N 490240.370 on a bearing of 345 deg.
 Line 29 - change is distance from start co-ordinates E. 555043.268 N 491052.819 on a bearing of 345 deg.

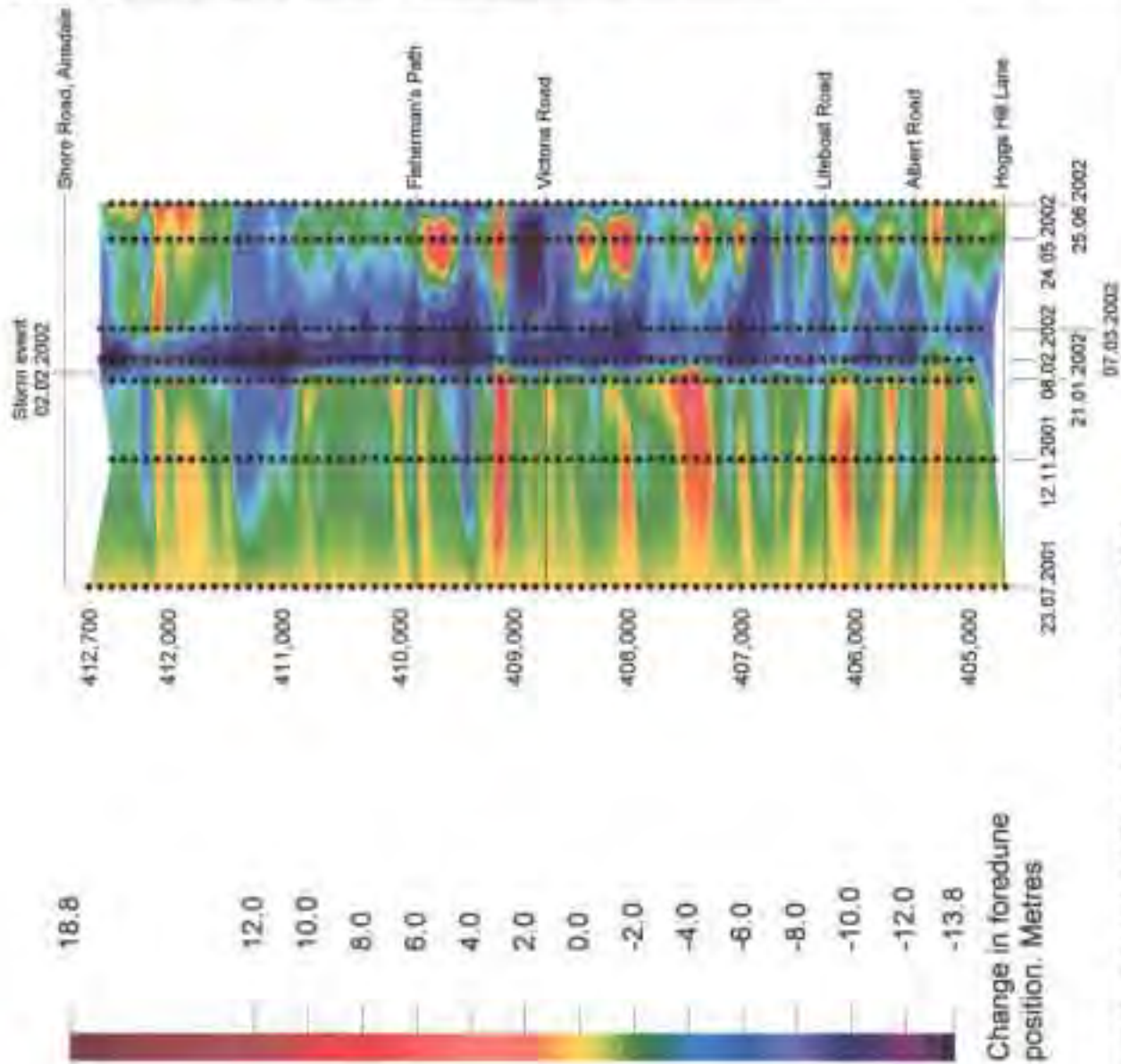
METROPOLITAN BOROUGH OF SEFTON
 Title: Profile lines 28 and 29 time series elevation
 Map Reference: [map ref]
 Produced By: Paul Wisse
 Scale:
 Date: 06/06/2008

COASTAL STRATEGY UNIT
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Figure No. 6

Shoreline Management Partnership

Source: Civil Engineering, Water Services, Environment, Conservation



The graph shows the position of the foot of the dunes on different dates. This data was gathered using a Global Positioning System (GPS) and given operator and equipment limitations should only be assumed to be accurate to +/- 1 metre.

The graph shows change from the baseline survey (July 2001) with colour representing the degree of accretion or erosion between the two dates. You can see seasonal variation and spatial variation. On the vertical axis the distance between each black dot is 100m.

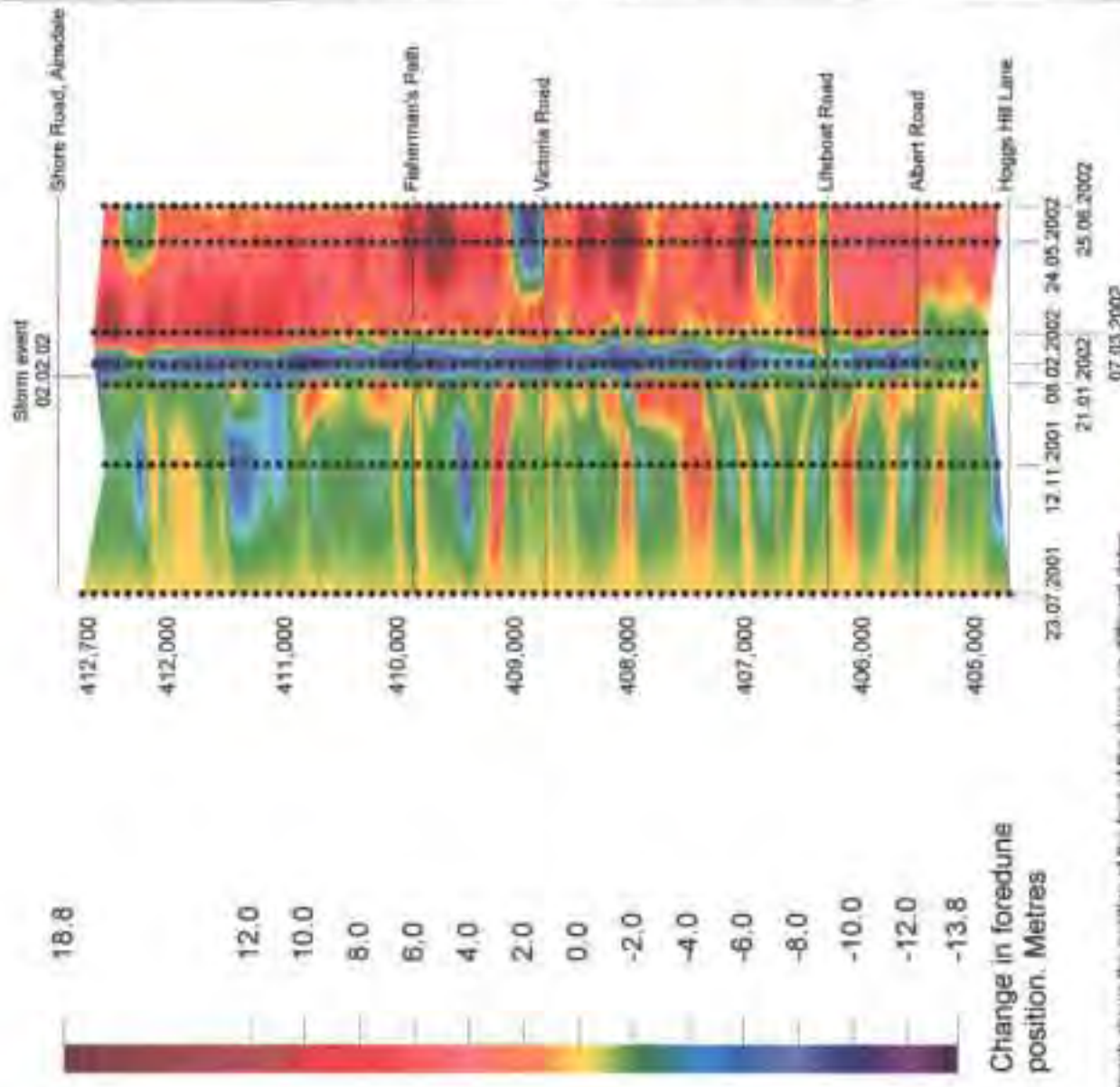


METROPOLITAN BOROUGH OF SEFTON

COASTAL STRATEGY UNIT

Title: Foredune change since baseline survey (23 July 2001)
 Map Reference: (map ref)
 Scale:
 Produced By: Paul Wiese
 Date: 09/07/2002

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The graph shows the position of the foot of the dunes on different dates. This data was gathered using a Global Positioning System (GPS) and given operator and equipment limitations should only be assumed to be accurate to +/- 1 metre.

The graph shows change from the previous survey with colour representing the degree of accretion or erosion between the two dates. You can see seasonal variation and spatial variation. On the vertical axis the distance between each black dot is 100m.



COASTAL STRATEGY UNIT	Based on the Ordnance Survey 1:2500 mapping with the permission of the controller of Her Majesty's Stationary Office Crown Copyright. Sefton Metropolitan Borough Council. License No. LA05/0041. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings.
METROPOLITAN BOROUGH OF SEFTON	<p>Title: Foredune change since previous survey</p> <p>Map Reference: (map ref) Scale:</p> <p>Produced By: Paul Wise Date: 02/07/2002</p>

3.0 REVIEW OF PROGRESS

The overall progress made during the first year is considered to be satisfactory. There were two notable external influences:

the Public Enquiry into Sandwinning at Horse Bank in the Ribble Estuary;
the Crosby Marine Lake to Formby Point Strategy Study.

The effects of the Public Enquiry are described in Section 2 above culminating in a delay to development of some elements of the monitoring system of about six months. The simple expression of time delay is not meaningful however since monitoring depends upon discrete weather and tide windows during any twelve month period. The delay incurred resulted in the loss of fieldwork for ground shoreline inspection and marsh-edge survey work and the lost opportunity to advance sediment sampling and hydrographic beach profile extensions by twelve months - otherwise the delay was minor in impact on the programme of monitoring work.

The Strategy Study includes a second stage of further studies due to commence shortly subject to DEFRA approval. These further studies include measurements of still water level between Seaforth Dock and Formby Point. Such work is clearly of interest to the monitoring project and it will be important to ensure a seamless integration of the two respective activities over the next twelve months.

4.0 TECHNICAL SPECIFICATIONS

One of the objectives for shoreline monitoring throughout Cell 11 is the uniformity of data collection across the whole cell and the achievement of best practice. At the present time there are formal monitoring programmes in place for most of the Coast protection Authorities within Cell 11 although the detail of such programmes varies significantly between Authorities.

The technical specification for aerial and ground shoreline inspections is well established across the area with application on an annual basis for:

Lancaster City Council
Metropolitan Borough of Sefton
Metropolitan Borough of Wirral

with occasional application of either ground or aerial or both historically for:

Conwy County Borough Council
Denbighshire County Council
Flintshire County Council
Barrow Borough Council
Wyre Borough Council

Vertical aerial technical specification is established on a cell-wide basis.

Saltmarsh perimeter survey specification is based on that used in Morecambe Bay by Lancaster City Council where such surveys have been ongoing now over the last four years and the specification has been evolved over this period.

Beach profile and topographic survey specifications are generally established and operated throughout the Cell 11 area based now upon the use of GPS survey techniques. There are variations in survey frequency with for instance MB Sefton taking surveys annually in Summer, whereas Lancaster City Council operate a biannual survey approach in Spring and Autumn.

The technical specification for hydrographic survey beach profile extensions is being developed by MB Sefton as part of their monitoring programme using jet-ski vehicles for the survey platform with GPS survey equipment. This specification once developed will be available for Group Members across Cell 11 where such work has not yet commenced on a regular basis.

The technical specification for sand sampling and analysis follows that developed by Lancaster City Council but is now enhanced by the duplication of samples for independent testing using laser granulometry techniques available from Liverpool University (a development emanating from the Inspector's report of the Public Enquiry).

The technical specification for biological monitoring in respect of invertebrate sampling is the same as that used for monitoring of sandwinning operations over the last ten years.

The technical specification for storm typicality analysis has been developed with HR Wallingford over the last two years building on their continually updated database of local offshore wind and wave fields.

The objective of uniformity of data collection is better focussed on matters of accuracy for each data type leaving issues of frequency and density of collection to individual Authorities in recognition of the wide variation in shoreline situations applying across the Cell 11 area.

The objective of achieving 'best-practice' is most conveniently undertaken by information exchange accomplished in part by the production and circulation of annual reports such as that presented here.

5.0 HISTORICAL DATA ASSIMILATION

The preparation of a Shoreline Management Plan involves the collection and collation of historical data on shoreline evolution to provide a basis for the development of shoreline management policy. Most of these data are of hard copy format rendering them difficult to handle efficiently by computer. It is therefore important to invest resources in the digitisation and conversion as appropriate of historic data sets that are of key importance to the ongoing development of understanding of shoreline evolution in the area.

Over the year it has been possible to identify some key data sets of such importance:

- vertical aerial surveys;
- beach profiles;
- historical charts.

The vertical aerial surveys are presently available in negative and photographic print with view overlaps sufficient for photogrammetric analysis. These data need to be scanned in digitally and then processed to produce geo-referenced images to allow quantitative analysis of bank and channel changes.

The development of saltmarsh areas historically since the mid 1970's has been examined from available data including studies and vertical aerial surveys to produce the baseline report included as Appendix VI.

The beach profiles extend over twenty years and these data need to receive a quality assurance check and then digitisation with appropriate re-referencing to link with present profile locations and orientations. In digitised form these data can then be used to assist in the understanding of trends and cycles of beach behaviour providing essential input to the understanding of shoreline evolution.

The historical charts are mainly located at the estuaries forming either end of the Sefton frontage. The Ribble Estuary has recently received extensive attention under the EMPHASYS research project involving an analysis of historical charts. This is a benchmark piece of work in the area replacing previous work whose credibility was often questioned due to the analysis approach taken. However the recent work summarised in Appendices II, III, IV and V can be seen to be rigorous and the results therefore received with a greater confidence. This work played a key role in the Public Enquiry referred to elsewhere in this report. Unfortunately there is, as yet, no similar suite of reports for the approaches to the River Mersey and around Formby Point where morphological changes are known to have been significant in recent times. The disposal of dredging arisings from Liverpool Port approach channels in the Jordans Spit area is believed to be beneficial for the beaches around Formby Point and north-eastwards to Southport making historical chart interpretations of key importance here.

6.0 RECOMMENDATIONS

1. To accept the annual monitoring report as presented herein and to circulate to all Group Members in Cell 11 for consideration and feedback.
2. To obtain a reconciliation of further studies for the Crosby Marine Lake to Formby Point Strategy Study to the monitoring system over the next reporting period.
3. To develop liaison with Environment Agency and Mersey Docks & Harbour Co. regarding hydrographic surveys.
4. To backdate storm typicality work over a five year period to produce a typical year for comparison of each year's monitoring.
5. To discuss with English Nature the most appropriate means of carrying out shoreline vegetation surveys along the duned frontage to assist in interpretation of survey data.
6. To carry out a 'one-off' infra-red vertical aerial survey of the Sefton coastal strip.
7. To prepare a costed proposal for digitising of historical key data sets - vertical aerial surveys and beach profiles.
8. To discuss with Professor Pye the application of EMPHASYS research-type work to the Formby Point Mersey Estuary approaches area in respect of monitoring objectives.
9. To implement the relevant recommendations of the Saltmarsh report (Appendix VI) linked to the recommendations above:
 - (i) To establish a joint monitoring regime with English Nature to identify a baseline for favourable conditions and the protocols for ongoing monitoring. This will avoid duplication of effort and ensure maximum use of available data.
 - (ii) To monitor the Ribble estuary as a single entity rather than separate elements identified by local boundaries.
 - (iii) To collate further historic data as it becomes available.
 - (iv) To monitor the main low water channels of the Ribble to detect meander tendencies and to link such changes with saltmarsh behaviour over time.

7.0 CONCLUSIONS

The first twelve months of monitoring of the Sefton shoreline have shown good progress set against project objectives. The enaction of the project has provided a contextual framework within which the Authority's response to external influences is now much improved providing better value from the resources invested. The monitoring system development is ongoing with a retained target of full implementation by the end of the second year.

The monitoring system provides sound factual evidence for the confirmation or modification of Shoreline Management Plan policies - thereby providing a greater confidence for the public in this approach to the stewardship of its interests in the littoral zone.

Dr. P.C. Barber
24th October 2002