Hydraulics Research
Wallingford

HEACHAM REVETMENT SURVEY

DRAFT

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1 INTRODUCTION

Erosion of the eastern coastline of the U.K. has been a continuous problem over the years and severe flooding has occurred in many places. This includes the Heacham beach area where in January 1978 overtopping caused considerable damage to nearby holiday and agricultural zones. It also demolished part of the North Beach sea wall. To provide adequate flood protection to the area the Anglian Water Authority (now Anglian Water) A.W. decided to construct a 1600 metre long stepped concrete sea wall running south from a similar sea wall previously constructed at Hunstanton. Construction commenced in April 1981 and was completed in 1982.

This construction stopped just north of the North Beach at Heacham where, despite the installation of additional timber groynes, the shingle ridge continued to erode rapidly. Attempts to build up and stabilise the ridge proved fruitless when in February 1983, a freak surge tide caused severe erosion. Extension of the sea wall southward was discussed but abandoned as being too expensive. It was then that the idea of installing a revetment using two different types of integrated block systems was suggested.

The agreed design called for a flexible integrated revetment system, 418 metres long, capable of withstanding a breaking wave height of 1.9 metres on a 1:2.5 slope. The length of the batter was to be 6.4 metres. Nicolon Ltd and Ardon International Ltd were contacted and the revetment was designed and constructed in June 1984.

With concrete block flexible revetments becoming more and more popular, the Ministry of Agriculture, Fisheries and Food (M.A.F.F.) were also keen to see this relatively new technology evaluated on site and awarded the A.W. a grant under the Land Drainage Act of 1976. The revetment was constructed in June 1984 at a cost of £96000. Final overall costings brought this figure up to £400 per metre run, about 25% of the cost of the stepped sea wall to the north.

In June 1985, a visit was arranged by M.A.F.F. to view the revetment and attended by representatives from M.A.F.F, A.W. and Hydraulics Research Ltd (H.R.L.). The purpose of this meeting was to inspect the revetment and discuss ways of monitoring its performance over the coming winter months. Also discussed was the possibility of recording wave conditions over each spring tide. From the position of the revetment on the ridge, it was obvious that wave run up would only occur at or near high water on a spring tide, unless water levels were lifted higher due to a surge or strong onshore winds.

H.R.L. were asked to do this monitoring and also to provide and install a pressure transducer at the site to record wave and tidal data. This report covers the period from November 1985 to March 1986 during which time the revetment was inspected and sections profiled several times.

2 DESCRIPTION OF SITE

The site at North Beach, Heacham, Norfolk (see Figure 1), comprises a natural shingle ridge overlying clay. This ridge was graded and the block mats, delivered to the site pre-assembled, were laid on top of a prepared slope consisting of a coarse aggregate sub-base overlain with a heavy duty filter fabric. The installation was originally intended to be a 50:50 mix of Armorflex and Petraflex but due to production priorities this was later amended. In the event, a total of 62 Armorflex mats 6m high and 2.1m wide were used giving a total length of 130.2m. Ardon supplied a total of 118 Petraflex panels each measuring 6.1 m high and 2.44m wide, giving a run of 287.9m.

The revetment (Plate 1) is conveniently divided into 5 sections by concrete stairways each one about 75m apart. Running from south to north, the first section is of Armorflex, the second section is 75% Armorflex and 25% Petraflex and the remaining three sections are made up of Petraflex. An existing timber breastwork at the foot of the revetment was used as toe protection and a steel channel bolted to the breastwork. This had steel hooks welded to it on which the longitudinal cabling of each block system was attached. The top of the revetment was finished by using kerbing stones as wave deflectors. These were laid over a 40mm thick concrete bed in which the cables, tied around steel bars, were embedded.

The castellated H4i/H5i Petraflex revetment system of Ardon International Ltd and the 180 Armorflex system of Nicolon Ltd were chosen for the protection. The principal difference between the two systems was that the Armorflex system used one type of block only and the Petraflex used two. The Armorflex blocks were laid in stretcher bond and were connected with one longitudinal cable while the Petraflex system had a dual orthogonal cabling system joining the blocks both laterally and longitudinally. The two block types used in the Petraflex system were identical in plan but of four and five inch thickness. These were placed alternatively in the mat to absorb wave energy and to reduce wave run-up.

The revetment is checked visually on a regular basis by A.W. and the top kerbing surveyed about every three months. They also periodically 'blind ' the blocks by laying a clayey shingle layer on their seaward face. This infilling helps to increase revetment stability and deters vandalism, although it made it much harder to determine the condition of the filter fabric and the performance of the sub base during the monitoring exercise.

Three fairly new zigzag groynes (circa 1982) front the southern end of the revetment and the foreshore is divided into sectors by timber posts placed shoulder to shoulder and driven into the beach creating compartments roughly 20m by 15m. Large boulders litter the foreshore at the northern end, and the revetment is flanked at its northern end by a concrete grouted rock revetment, and by a concrete slipway to the south.

A pressure transducer, used to monitor waves and tides, was installed at the seaward end of a groyne just to the north of the site. It was set to record for a period of five days over each spring tide at a rate of two cycles per second for a 10 minute period every 30 minutes. These wave and tidal data are shown in Chapter 4.

3 PROFILE SURVEYS

Each of the five bays making up the revetment comprises some 4500 blocks. This made it impossible to profile each bay and the decision was made to monitor monthly the centre bay (section 3) at intervals of 9m to coincide with every third kingpile at the toe.

This was amended after the first survey to include the most southerly of the five bays (section 1). It was felt that both the Petraflex (section 3) and Armorflex (section 1) needed to be checked, and in the succeeding surveys both sections were profiled at 18m intervals only, due to time constraints.

3.1 Dates of surveys

The surveys were carried out at monthly intervals covering the winter period. The dates were chosen so that the surveys were carried out just after the spring tides, the period when the revetment would have been subject to some wave action due to the higher water levels. The actual survey dates and a brief run down of conditions at the site are as follows.

Survey 1 - 4th December 1985.
Survey 2 - 16th January 1986.
Survey 3 - 12th February 1986 - The revetment had a covering of snow and ice which made the clearing of the shingle blinding very difficult. It was also obvious from the snow cover that the sea had not reached it since the snow started. The beach fronting sections 1 to 4 had been renourished to the top of the timber toe protection in places.
Survey 4 - 13th March 1986.

3.2 Methods of surveying

Profiling consisted of placing a wire on the top of the kerbing, secured on the landward side of the kerbing and carried down the revetment to l ie over a kingpile at the toe. The wire was then pulled to a standard tautness by a weight suspended at its seaward end. A specially made measuring device (see Plate 13) fitted with a two-way levelling bubble was then placed (figure 3) vertically on the southeast and southwest corner of each block on that profile and the vertical height to the wire recorded.

Anglian Water survey the kerbing and kingpiles every three months or so and tie them in to Ordnance Datum (Newlyn).

The profiled bays were monitored in exactly the same way in succeeding surveys and the results are shown in Appendix B and figures 5 to 14 inclusive.

Where possible the filter was checked visually by removing the blinding from between the blocks. The distance between the filter and the underside of the block was inspected to ascertain sag, and the sub-base checked by tapping to determine whether it had dropped relative to the filter fabric. The rest of the revetment was inspected visually to determine any obvious block deterioration, and where isolated slumping was observed the extent of the worst cases was measured by placing a straight edge across the area and recording the vertical drop relative to the locally undisturbed blocks.

The beach fronting the revetment, which tends to be mobile, was checked at each survey and any exposure of the toe protection noted (see Plate 1 6).

3.3 Analysis

(a) Tabulations

These are recorded in Appendix B as mentioned above and the sections are as shown in figure 4.

The vertical distance between the wire and the top and bottom of each block along each profile were noted similarly for each survey. The chainage down the revetment from the kerbing at the crest to the steel channel along the top of the toe protection, plus the distance down the batter of the top and bottom of each block, is also given for each profile.

Mean and standard deviations were calculated and tabulated for each profile in both sections for the surveys carried out over the last three months (Jan to Mar). The December data was not included for reasons given in Chapter 5.

(b) Plots

These are shown in cross section in figures 5 to 14. The obvious differences between the December survey and the rest are discussed in chapter 5.

4 WAVES AND TIDE LEVELS

A standard pressure transducer was employed enclosed in a waterproof capsule and mounted at the seaward end of a groyne just north of the site. It consisted of an NBA (Controls) Ltd DNW-5 pressure sensor and a cassette recorder. The sensor recorded the pressure fluctuations, in terms of half centimetres of water, in digital form onto magnetic cassette tape.

4.1 Measurement

Ten minutes of data were recorded every half hour at a digitising frequency of 2Hz. This rate of sampling would fill a tape in approximately 5.5 days, just long enough to cover each spring tide. A new tape was installed and the recording procedure restarted two or three days prior to each spring tide. Tape retrieval then occurred five or six days later. The DNW-5 was calibrated using a dead weight pressure calibrator, the results of which were automatically included in the analysis procedure.

Calibration was carried out both before deployment and after retrieval, with satisfactory agreement between the two. The range of water depths in which the instrument operated at Heacham was approximately 0-4m. It was expected that it would be sensitive to wave periods greater than about 2 or 3 seconds, depending on the water depth at the time. Wave energy at frequencies higher than about 0.5Hz would not be registered, particularly at high tide, due to the attenuation of pressure fluctuation with depth.

The data was stored in binary format involving the use of "ranges". The figures represent half centimetres of water pressure within a given 256 unit range. The particular range in question is flagged at the beginning of each sampling period.

4.2 Analysis

It is normal HRL practice to analyse data as soon as possible after retrieval, so that any instrument fault can be quickly corrected. However, in this case only a fairly simple data quality check was carried out, since contractually, analysis was not to begin until close to the end of the measurement period.

On arrival at HRL, the cassettes were scanned and portions of data plotted. This served as a quick check that everything was functioning satisfactorily during the recording period. Following this, the data was translated into formatted integer records and placed onto mainframe-compatible magnetic tape for further interpretation. At this stage the results were still in the efficient "range" format described in the last section. The second decoding phase translated to "single range" format, taking into account the calibration parameters of the instrument and its height above the bed. The data was then stored as formatted integer records which could be read directly as half centimetres of water pressure.

Each record consisted of a header, followed by 1200 integer pressures of which only 1024 were used in the analysis. The water depth was found by simple averaging of all 1200 values. At this stage, a check on the depth of water above the instrument was made. If the transducer was dry or covered by less than 20 centimetres of water, then no further analysis was carried out. The next stage was to apply tidal filtering, or removal of very low frequency energy. The average of each successive block of 512 was calculated and a simple linear fit applied to the variation of mean water level from the middle of the first block of data to the middle of the last. Spectral analysis was carried out on the first 1024 values in the record, each point firstly being reset to the difference between the measured water pressure and the "mean" depth at that instant. Error checking was limited to a visual scan of the data file and an automatic alert if the difference between successive pressure values exceeded a given value.

The computed spectrum relates to pressure fluctuations and as such could not be used directly to calculate wave height and period statistics. It was transformed into a surface elevation spectrum by means of a standard transfer function dependent upon depth and frequency. There was a small proportion of spurious apparent energy in the pressure spectrum, introduced mainly by the half centimetre discrimination of the instrument and the low sampling frequency. This tail part of the spectrum assumed much greater proportion when transformed to a surface elevation spectrum. Experience has shown that to eliminate this spurious component for this range of water depths, the derived spectrum should be curtailed at a frequency of 0.5Hz, corresponding to retention of the first sixteen of the thirty-two bands in the spectrum. Hsig and Tz parameters were then calculated by integration of the spectrum, as follows:

Significant wave height Hsig $= 4\sqrt{m_o}$

Mean wave height Tz $= (m_o/m_2)^{\frac{1}{2}}$

where $m_n \int E(f)\, f^n\, df$

E(f) = wave spectrum,

f = frequency and

n = any integer

4.3 Results

Results of the analysis of the transducer data are given in Appendix A. They are in the form of computer output, omitting the recordings when no wave or tidal activity occurred above the diaphragm. These omissions occur when a gap appears in the readings and the record numbers are not consecutive.

The data, presented in tabular form, is fairly self explanatory although the following notes may help:

Day	- day of the month
Min	- minutes within the day (eg 720 = 1200 hours)
Max	- maximum crest to trough wave height in metres recorded in that period and estimated using the equation Hmax = Hsig(logN) where N is the number of waves in the 10min record.
Hsig	- is the significant wave height (ie the approximate average height of the highest one third of the recorded waves) in metres, and defined by Hsig = $4\sqrt{m_o}$
Tz	- wave crossing period in seconds.
Rec No.	- the record number on the tape (eg 0 is the first record).
Elev	- depth of water above the bed at the recorder station, converted to metres O.D.N. Table 3 shows the reduced levels of the transducer and sea bed relative to O.D.N. at the site.

The tables given overleaf show the peak tidal heights plotted against both the significant and maximum wave height during the recording period. The predicted tidal range over the spring tides at Hunstanton during the survey period are given below.

Predicted spring tidal range at Hunstanton

Date	Tidal Range	High Water (above O.D.N.)
27.11.85 (04.12.85)	6.9 - 1.6 = 5.2m	3.15m
12.01.86 (16.01.86)	7.3 - 0.9 = 6.4m	3.55m
10.02.86 (12.02.86)	7.4 - 0.7 = 6.7m	3.65m
12.03.86 (13.03.86)	7.4 - 0.8 = 6.6m	3.65m

Note: Date in brackets denotes the day on which the survey was carried out.

OCCURRENCE CHART OF MAXIMUM HEIGHT AT PEAK TIDAL HEIGHT

Peak tidal height (m)ODN	Maximum wave height at high water (metres) 0-.25	.25--.5	.5-.75	.75-1.0	1.0-1.25	1.25-1.5	1.5-1.75	1.75 2.0	2.25 2.5	
1.0-1.25					1					1
1.25-1.5										
1.5-1.75		1								1
1.75-2.0	1									1
2.0-2.25			1		1		1			3
2.25-2.5		1	1							2
2.5-2.75		1		1						2
2.75-3.0		1	1	4	2		1			9
3.0-3.25	1	5	6	2		3	1	1		19
3.25-3.5	2	2		2		1		1	1	9
3.5-3.75	3	5	2	2	1	2	1			16
3.75-4.0	3	2	2	1	3	1				12
4.0-4.25		2	1	2						5
4.25-4.5	1									
	11	20	14	14	8	7	4	2	1	81

OCCURRENCE CHART OF MAXIMUM HEIGHT AT PEAK TIDAL HEIGHT

Peak tidal	Maximum wave height at high water (metres)						
height	0-	.25-	.5-	.75-	1.0-	1.25	
(m)ODN	.25	-.5	.75	1.0	1.25	-1.5	
0.5-0.75.							
0.75-1.0							
1.0-1.25			1				1
1.25-1.5							
1.5-1.75	1						1
1.75-2.0	1						1
2.0-2.25		1		2			3
2.25-2.5	1	1					2
2.5-2.75	1		1				2
2.75-3.0	1	2	4	2			9
3.0-3.25	5	7	2	3	2		19
3.25-3.5	2	3	1	1	1	1	9
3.5-3.75	6	4	3	2	1		16
3.75-4.0	3	4	3	2			12
4.0-4.25	2	1	2				5
4.25-4.5	1						
	24	23	17	12	4	1	

Highest recorded significant wave height: 1.498m

Highest recorded tidal height: (rel ODN) 4.256m

5 DISCUSSION OF RESULTS

5.1 General comments

This was not an ideal site to monitor as far as exposure is concerned. The revetment was high enough up the beach so that only occasionally did water levels reach the toe. Section 5.6 explains how the revetment was covered periodically with gravel (blinding) and Plate 15 gives an indication of how much blinding was washed off the revetment. On the February visit it was noted that the snow which had fallen over the previous week still covered the entire revetment and was also evident in places on the foreshore seaward of the revetment.

Monitoring proved difficult over the winter months when, although the survey team left before dawn on each occasion, it left perhaps six hours maximum to attempt a complete survey. On one occasion snow and ice made it very difficult to remove the blinding and almost impossible to inspect the filter fabric and determine the condition of the sub-base.

Finally, beach lowering was evident just north of the revetment where a concrete grouted rock revetment joins it. Here, as Plate 20 shows, where the beach meets the vertical concrete toe, the steel piles beneath are exposed.

5.2 Comparison of water levels and survey dates

Looking at the maximum wave height values in Appendix A and comparing them with mean water levels over the survey period, shows the following:

Date	Hmax	M.W.L	T.W.L
Dec 4 - Jan 16	2.382	3.288	4.7
	0.220	4.256	4.4
Jan 16 - Feb 12	2.385	3.200	4.6
	0.224	3.979	4.1
Feb 12 - Mar 13	1.321	3.435	4.2
	0.600	4.080	4.4

T.W.L (top water level) was calculated by multiplying Hmax by 0.6 and adding it to the mean water level. This is a very approximate figure but it does give an indication that only rarely during the recorded spring tides was the revetment reached. The maximum approximate tidal level plus the recorded wave height was 4.7m (A.O.D) on the 14th of January. This would have covered the bottom of the revetment to a depth of about half a metre (the base of the revetment, shown in figure 2, is at 4.32m A.O.D). It is thus only during storms with significant wave action or during surge conditions that the revetment is washed by the sea. Wave overtopping or splashing onto the revetment as the result of the waves striking the vertical toe protection, will of course occur more frequently, washing away the blinding on the lower part of the revetment.

5.3 Profile changes

As can be seen in Appendix B and figures 5 to 14, there was little change during the period January to March. The December survey however, shows a different picture. Comparison of each survey was left until the survey was complete to eliminate the risk of tailoring one survey to tie in with previous data. Despite a lot of discussion the difference between the December survey and the rest cannot be explained. It seems hardly likely however that the crest and the toe would change much, therefore it is likely that it is a surveying error on the first survey. The January to March surveys are very similar suggesting that little change had taken place during the winter months.

5.4 Slumping

It is not known how the bank was prepared to receive its facial armouring but some consolidation of at least the gravel filter was inevitable. The Armorflex, which protected the southern most section (Section 1) and 75% of Section 2 was, although undulating, fairly smooth, there being no protruding wave dissipators. Blinding filled the block holes and the filter could not be seen. The quality of the blocks was poorer than expected. The Armorflex block panels appeared to suffer less than the Petraflex from localised slumping although they did have undulations.

The Petraflex, in contrast, which covered the rest of the revetment, had a wave dissipating block in alternate spaces (see figure 7). This meant that one block was high and the next block low, giving an uneven surface. In addition to this the revetting was uneven in places and isolated local slumping was observed, almost always at or near the toe at its seaward edge. Whether this unevenness occurred during construction is not known and only long term monitoring would determine if this continues. The maximum localised slump noted was in Section 4 where the blocks, again near the toe, had indented by some 70mm allowing adjacent blocks to jam against each other. The Petraflex armouring possesses a dual orthogonal cabling system with the longitudinal cables held by metal anchors. If these were loosened in some way it could account for some slump. During the period of the survey, these areas of slump did not change a great deal. Their initial subsidence could have been caused by either leaching, although this looks unlikely (the filter cloth still looks in good condition), or consolidation or dissolving of the chalk fill. Cabling was almost invisible except for several crimped joints in the transverse polypropylene ropes which were protruding.

5.5 Underlayer

It was not possible to determine whether the sub-base had moved. In the majority of cases when the blinding was removed from between the blocks, the filter cloth was found to be sound and stretched close to the overlying blocks. There were isolated cases where the revetment blocks could not follow fully the local subsidence and a gap had formed between the underside of the blocks and the top of the filter cloth. This was most evident in Section 3 near the toe (blocks 17 and 18) and immediately to the north of the southern most kingpile. Here the filter was some 50mm below the blocks. These isolated gaps did not appear to alter during the survey period. In some cases the sub-soil had presumably consolidated and dropped, though not to the extent that it could not be felt by pressing the filter fabric down. This was done with care to avoid damaging the filter fabric.

5.6 Blinding and run-up

Periodically, Anglian Water covered the revetment with a couple of inches of gravel. Known as blinding, this is done to deter vandalism of the cables and filter cloth and to protect the revetment generally. Anglian Water tell us that the blinding needs to be replaced more frequently on the Petraflex part of the revetment. This is possibly because any wave activity on the revetment is agitated by the wave energy dissipator blocks of this system. Another factor may be that the Armorflex is situated at the southern end of the revetment and thus slightly less exposed to the north sea. The beach fronting this section is also generally higher.

Wave run-up is dependent to a large extent upon the level of the foreshore. Where the beach fronting the revetment came up to the crest of the toe protection, the blinding on the revetment remained almost intact. In areas where the foreshore was low, the blinding was washed away (see Plate 15) in some cases by about two thirds of the distance up the slope.

5.7 Toe protection

The most vulnerable area appeared to be at the toe. Not designed specifically for this type of revetting and in place before the revetment was built, the protection here consisted of round timber posts placed vertically, shoulder to shoulder (as on the foreshore) between the kingpiles, and topped with a steel channel (see figure 2). Filter fabric, double thickness in this area, was visible between the timber posts. Waves and tides carrying debris and washing through these toe piles could cause damage to the filter and lead to leaching of the sub-base. It was, during December and January, possible to inspect the filter fabric between the toe piles, which looked in reasonable condition. On subsequent visits in February and March 1986, the Anglian Water were obviously of the same opinion and the foreshore was artificially replenished.

Ten metres seaward of the revetment there are a row of timber posts running parallel with the shoreline. Filter fabric was placed against these posts on their landward side and the this area up to the toe protection filled with clayey gravel. This fill, at the end of the survey (March 1986), covered the toe to within 0.3m of the top hiding the hitherto exposed filter fabric.

6 CONCLUSIONS

(a) This was not an ideal site for determining whether this type of revetment could withstand coastal exposure for several reasons, the main one being that, because of its position, waves only reached it on occasion and the swash line was evident seaward of the revetment. It has thus probably never been tested to anywhere near its design condition.

(b) It can be seen from the profiles that very little movement had occurred in Section 1 (Armorflex) over the period January to March. Survey accuracy attempted was + or - 1mm, but with the frost and ice on occasion which may have affected the readings, movement was negligible considering that the blocks are designed to flex to some degree. The filter fabric where it could be inspected looked in reasonable condition although block quality was disappointing.

(c) It was thought that more movement might occur in Section 3 (Petraflex) because of the alternate high and low block grouping giving any wave activity an added turbulence. Although isolated slumping was observed, mostly near the toe, the section as a whole remained stable over the period January to March. This localised slump could be caused by

(i) consolidation of the sub-base and gravel filter,

(ii) leaching at the toe due either to a break in the filter fabric or inadequate overlap of the filter layers, or

(iii) the bottom layer of blocks are held rigidly in concrete and the adjacent blocks have to adjust on their landward side only.

(d) The December survey however gave readings in general higher than those observed during the other months. The reason for this has been discussed at length and although it cannot be ignored, the fact that the toe and the crest also appeared higher during this one survey, suggests that it was most probably an error in data collection and collation.

(e) The tabulated transducer data shown in Appendix A, reveals that only occasionally did the recorded spring tides reach the revetment. Wave overtopping, as the result of the waves striking the vertical toe did of course occur more frequently.

(f) Where the foreshore was up to the top of the toe, the blinding on the revetment face seemed virtually undisturbed. Where the vertical toe protection was exposed however, it looked as though the waves striking it had splashed up washing away the blinding on the lower part of the revetment. During the period of this survey, Anglian Water re-nourished the foreshore immediately fronting the revetment, covering the exposed toe. This obviously has a beneficial effect in protecting this vulnerable area and should be continued.

(g) Groynes and short timber posts bisect the foreshore and front the revetment. They hold up beach material on their north side, thus causing lowered beach levels immediately to the south, exposing the toe.

TABLES

TABLE 1 - KERBING - REDUCED LEVELS

Reduced levels along top of the kerbing on revetment crest.

Levelling points are at 40m intervals starting at the southern end.

Distance (metres)	Level (metres) rel O.D.N.
40	6.68
80	6.68
120	6.67
160	6.67
200	6.68
240	6.68
280	6.70
320	6.70
400	6.72

Levels taken and supplied by Anglian Water, Kings Lynn Division.

TABLE 2 - KINGPILES - REDUCED LEVELS

Kingpile levels at toe of Heacham North Beach Revetment

Bay No. 1 (Armorflex)		Bay No. 3 (Petraflex)	
Kingpile No.	Level (m O.D.N.)	Kingpile No.	Level (m O.D.N.)
2	4.79	1	4.73
3	4.79	4	4.74
5	4.77	7	4.72
6	4.75	10	4.71
8	4.75	13	4.71
11	4.76	16	4.65
14	4.78	19	4.65
17	4.78	22	4.61
20	4.79	24	4.58
23	4.79		
25	4.82		

Levels taken and supplied by Anglian Water, Kings Lynn Division

TABLE 3 - PRESSURE TRANSDUCER - REDUCED LEVELS

Level to top of housing	1.178m ODN
Diaphragm below top of transducer frame	0.625m
Level of diaphragm (zero pressure)	0.553m ODN
Level of beach at transducer	-0.142m ODN

Transducer recorded at 2Hz for a 10 minute period every 30 minutes over each spring tide

1 bar = 9.90m sea water
1 mb = 0.099m

Predicted Tidal Range - Hunstanton

Visit	Date	(CD) (metres)	Range	(ODN) (metres)
* Nov 18	Nov 13	7.6-0.6	7.0	3.85-(-3.15)
Dec 4	Nov 27	6.9-1.6	5.3	3.15-(-2.15)
Jan 16	Jan 12	7.3-0.9	6.4	3.55-(-2.85)
Feb 12	Feb 10	7.4-0.7	6.7	3.65-(-3.05)
Mar 13	Mar 12	7.4-0.8	6.6	3.65-(-2.95)

* Preliminary visit to Anglian Water and to check datums of pressure transducer

Predicted Tidal Levels

	Chart Datum (metres)	Ordnance Datum (metres)
MHWS	7.3	3.55
MHWN	5.7	1.95
MLWN	2.5	-1.25
MLWS	0.9	-2.85

FIGURES

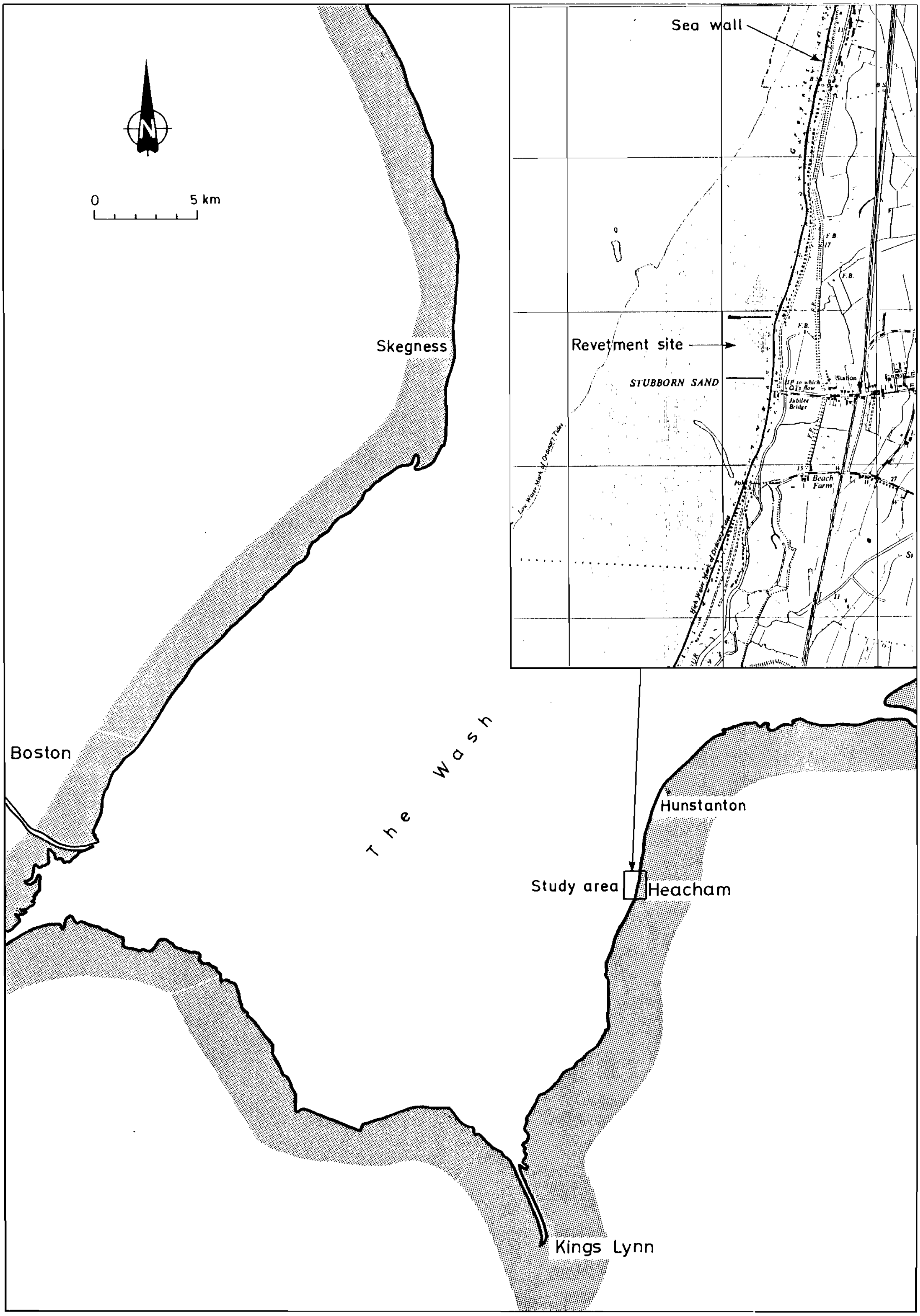


Fig 1 Location map

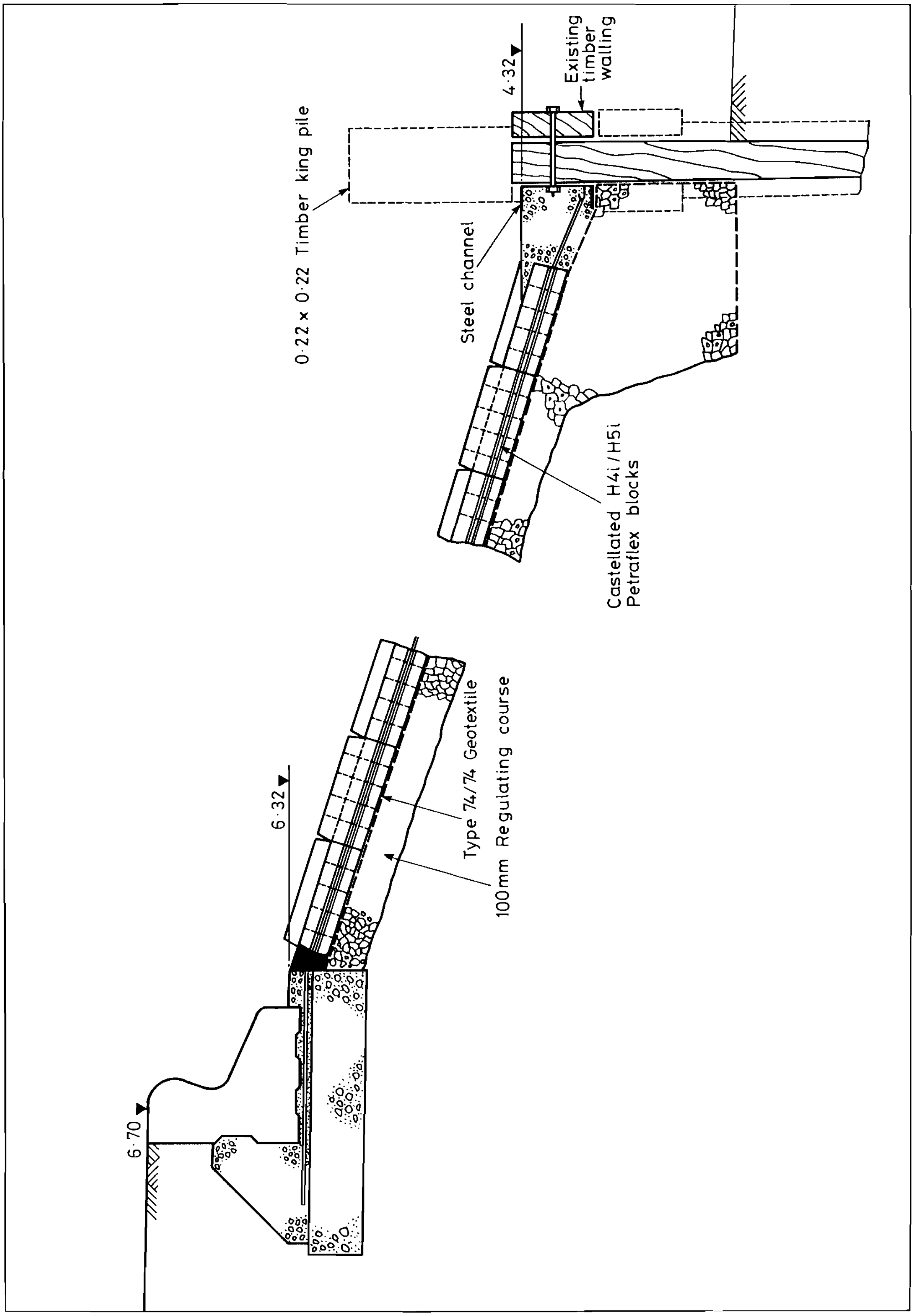


Fig 2 Typical section (Petraflex)

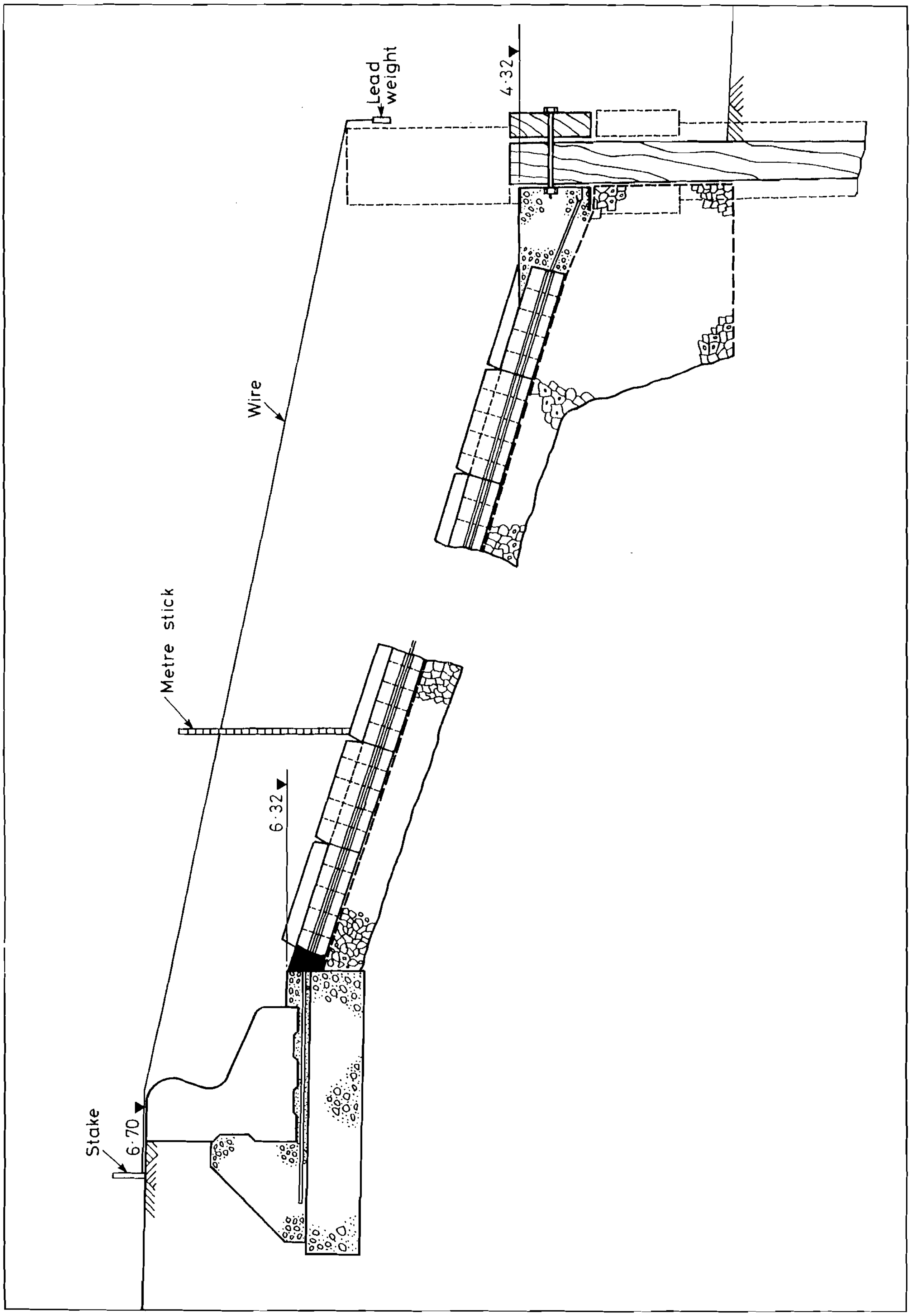


Fig 3 Survey method

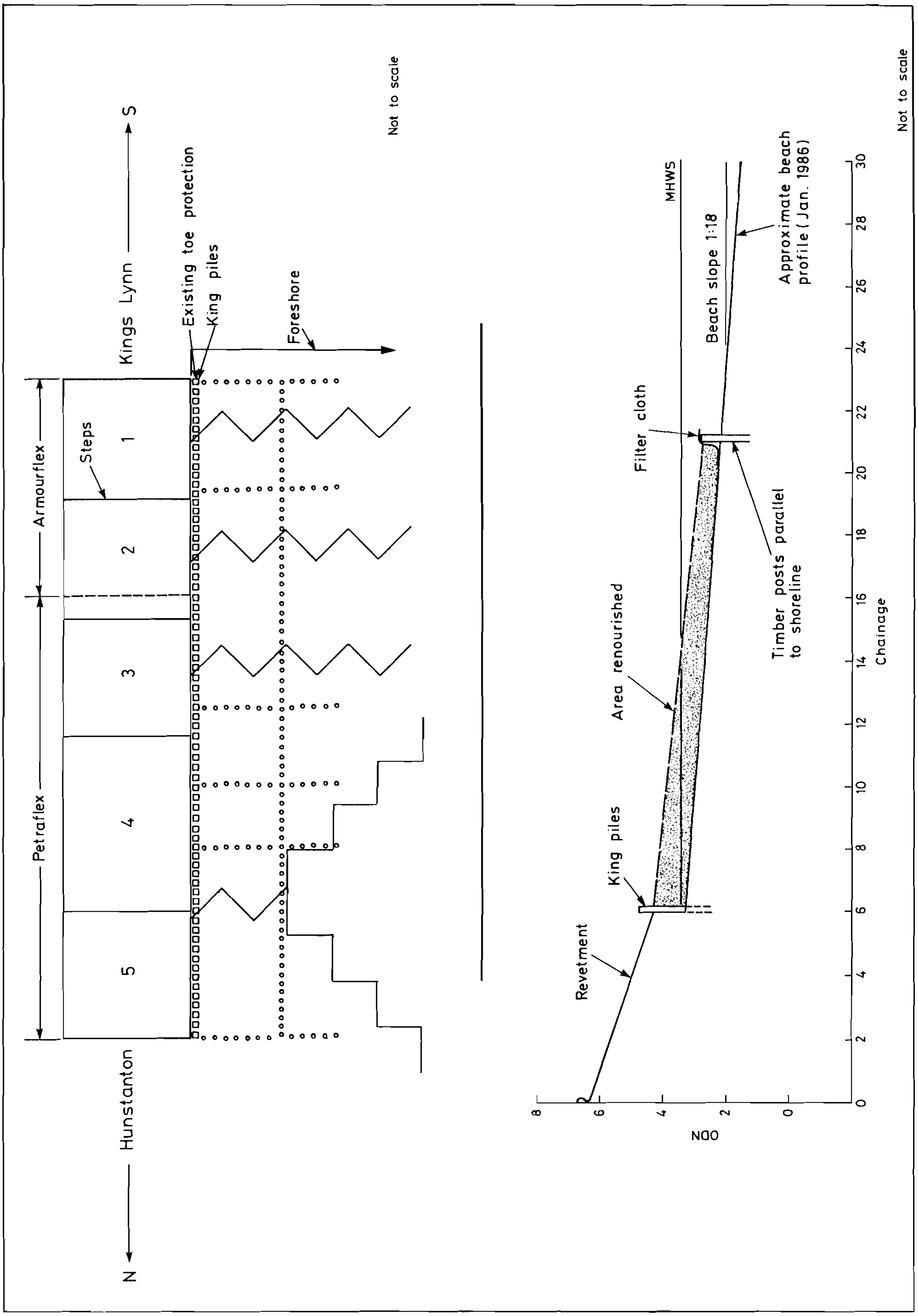


Fig 4 Sketch of site details

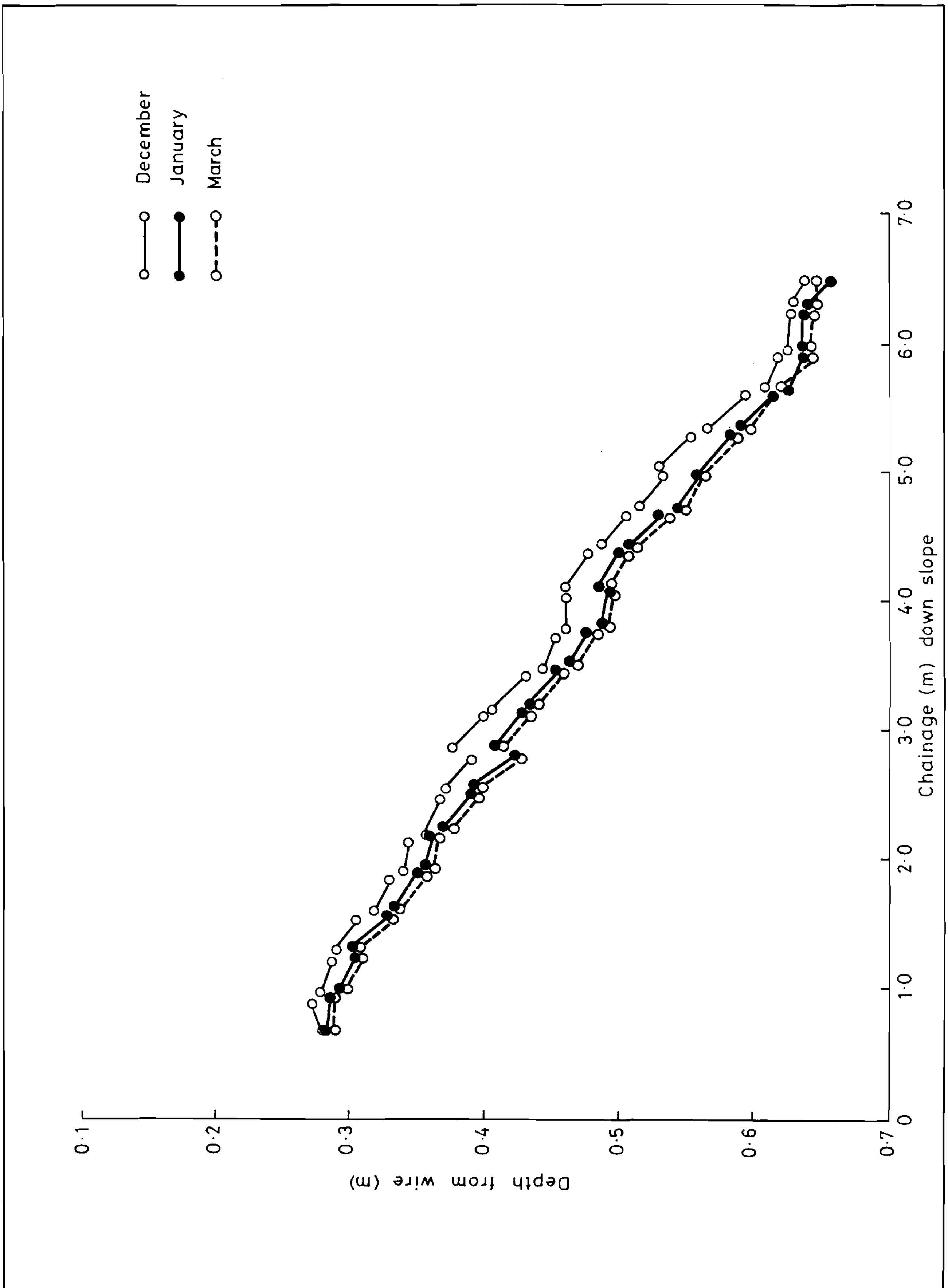


Fig 5 Section 1 - profile 1

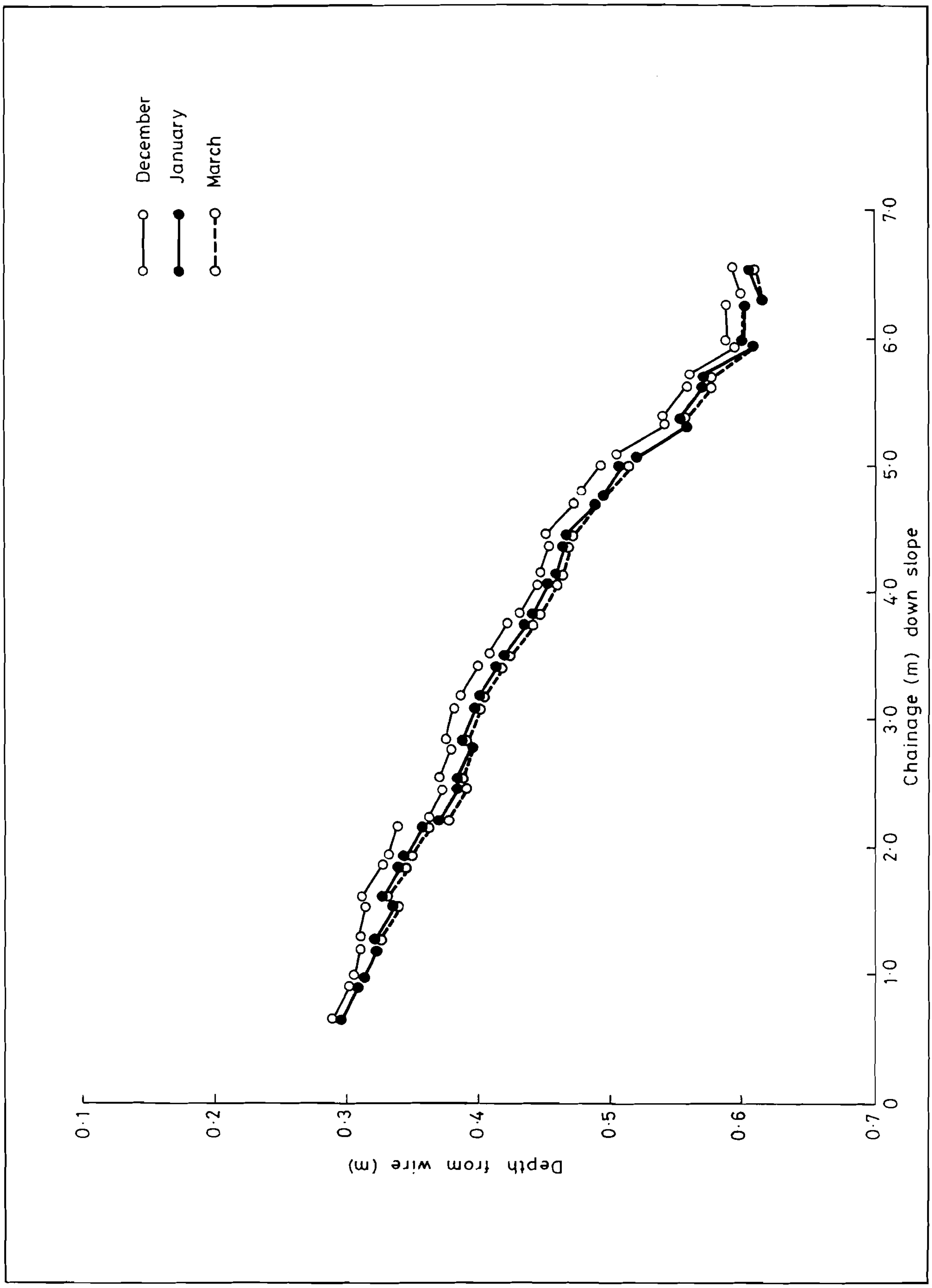


Fig 6 Section 1 - profile 2

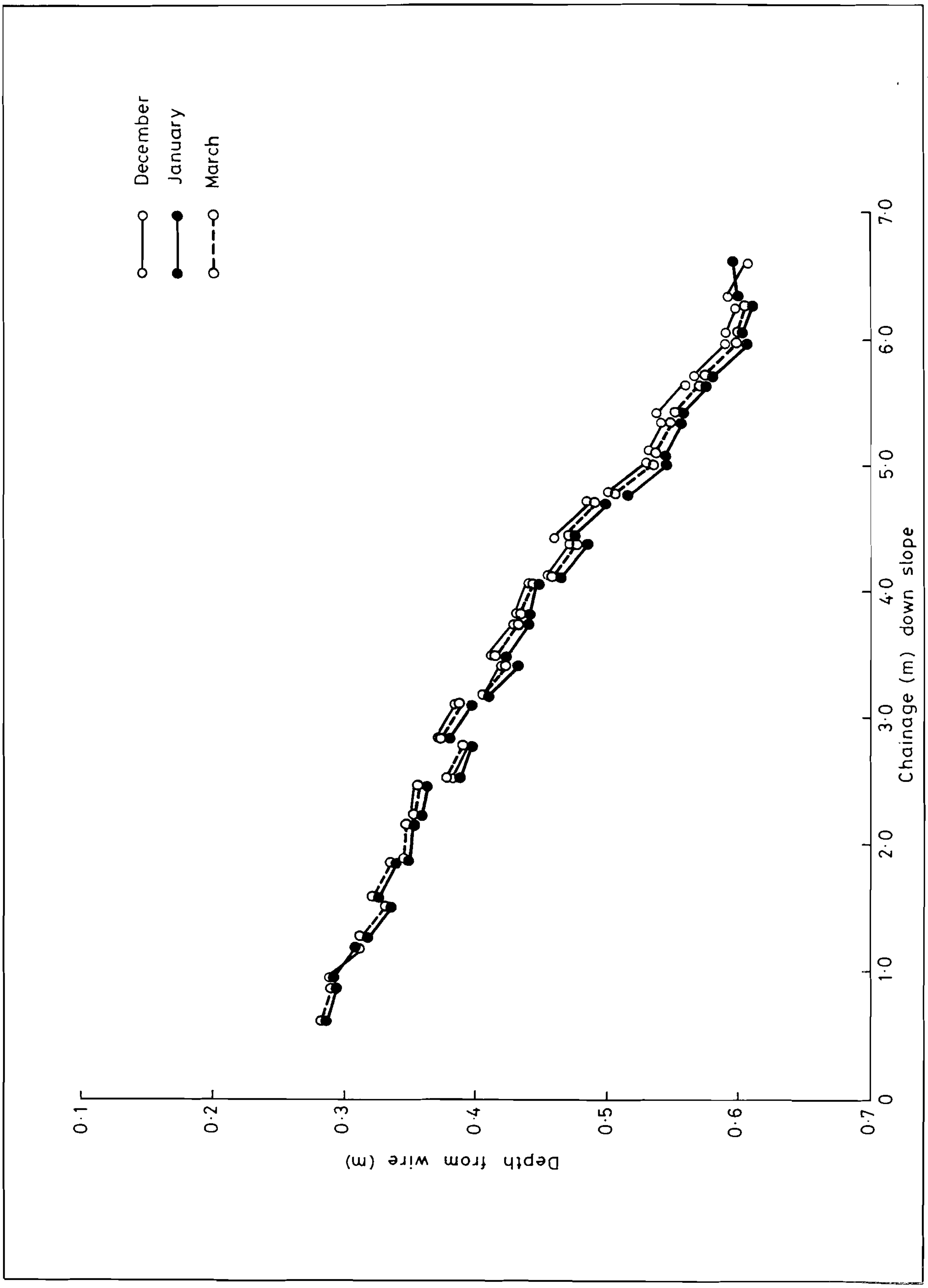


Fig 7 Section 1 - profile 3

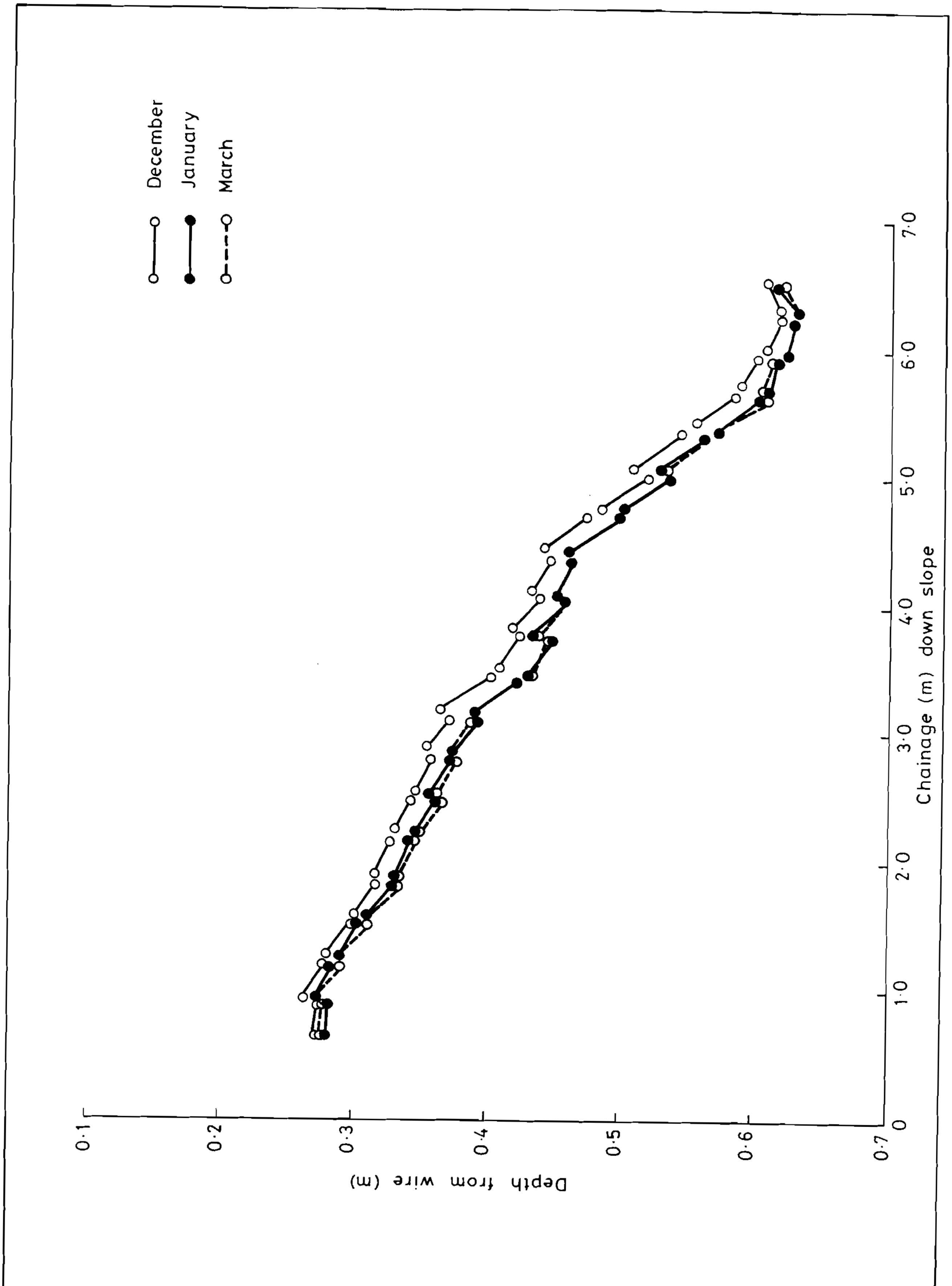


Fig 8   Section 1 - profile 4

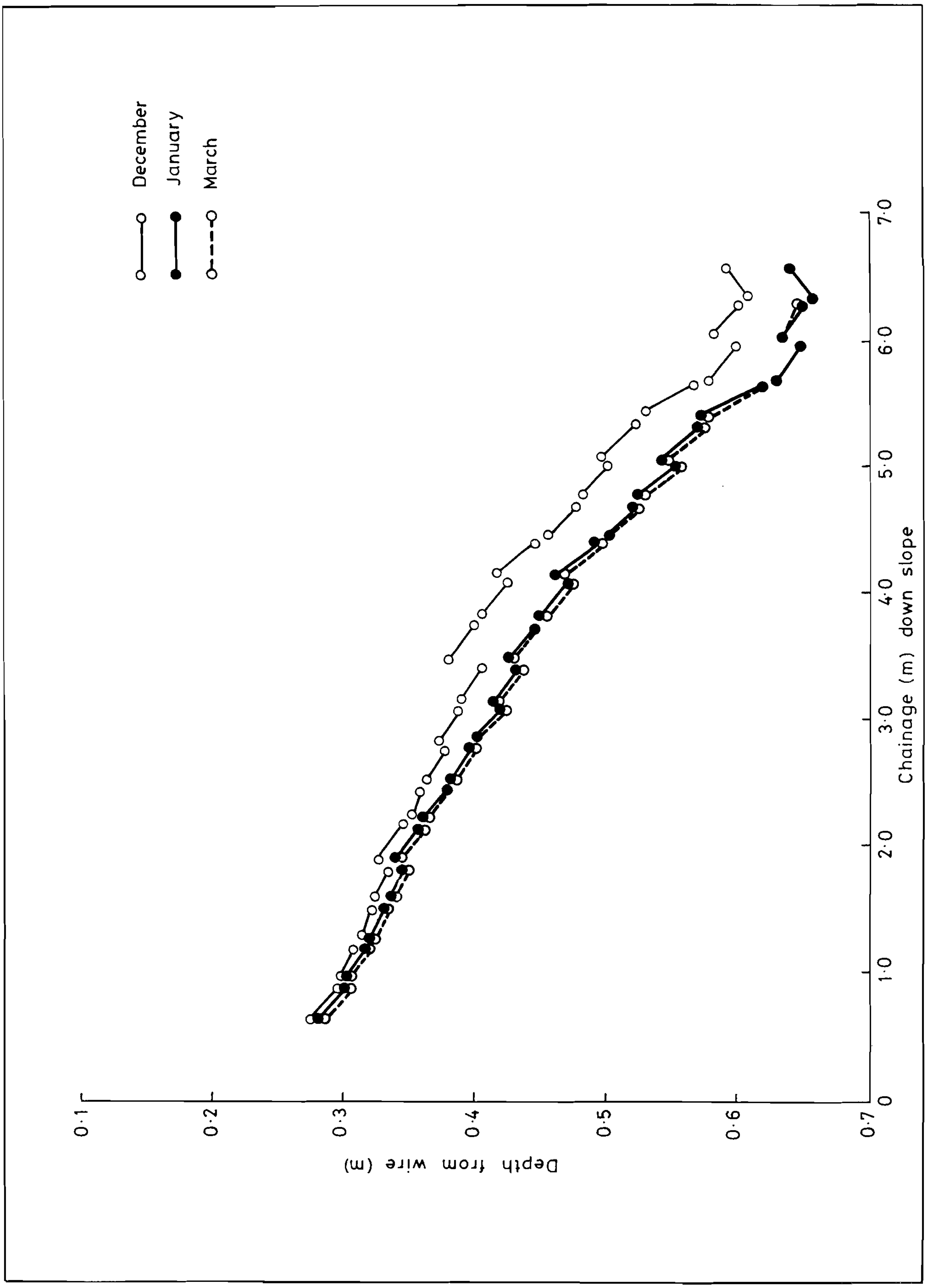


Fig 9 Section 1 - profile 5

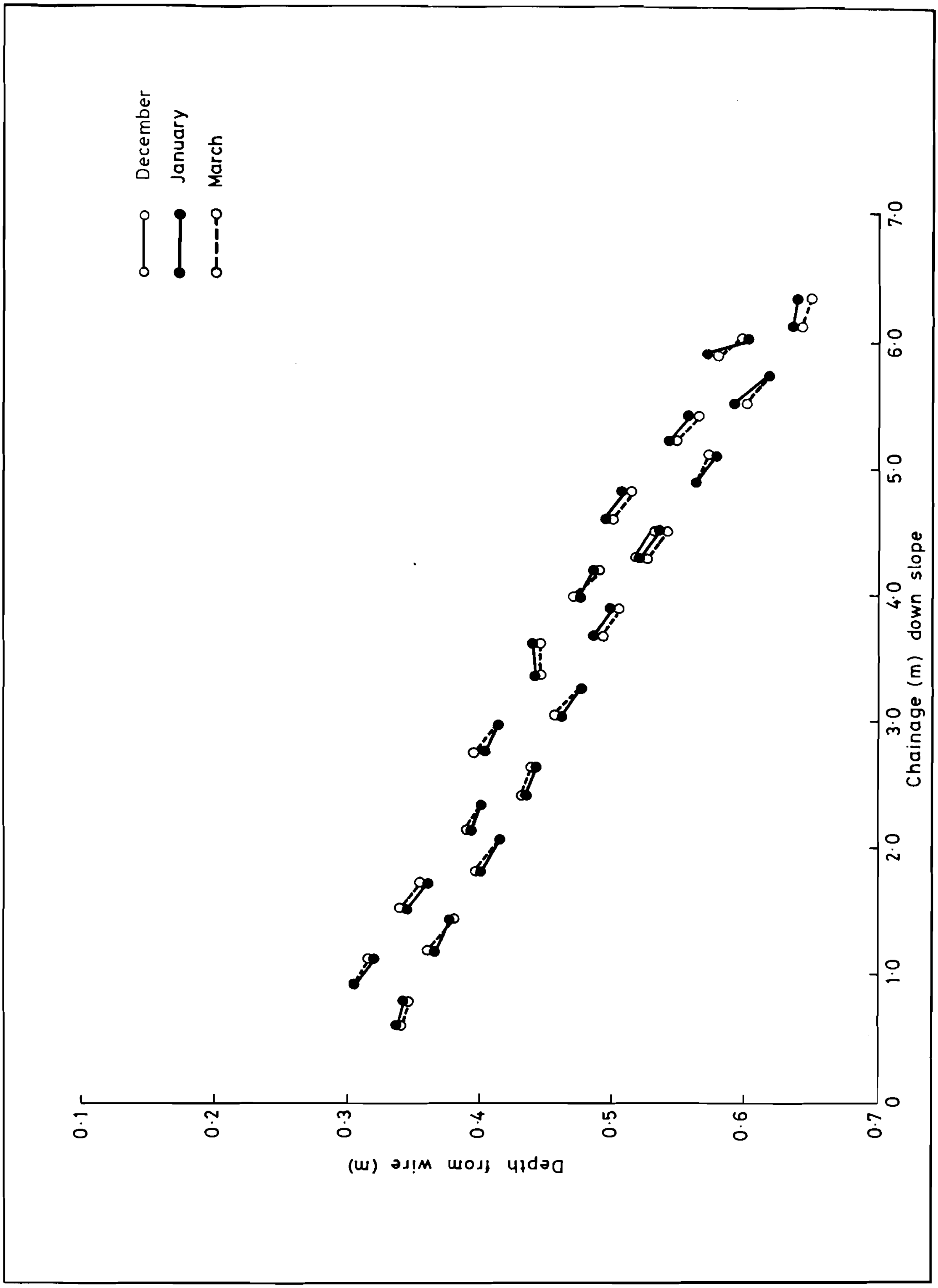


Fig 10   Section 3 - profile 1

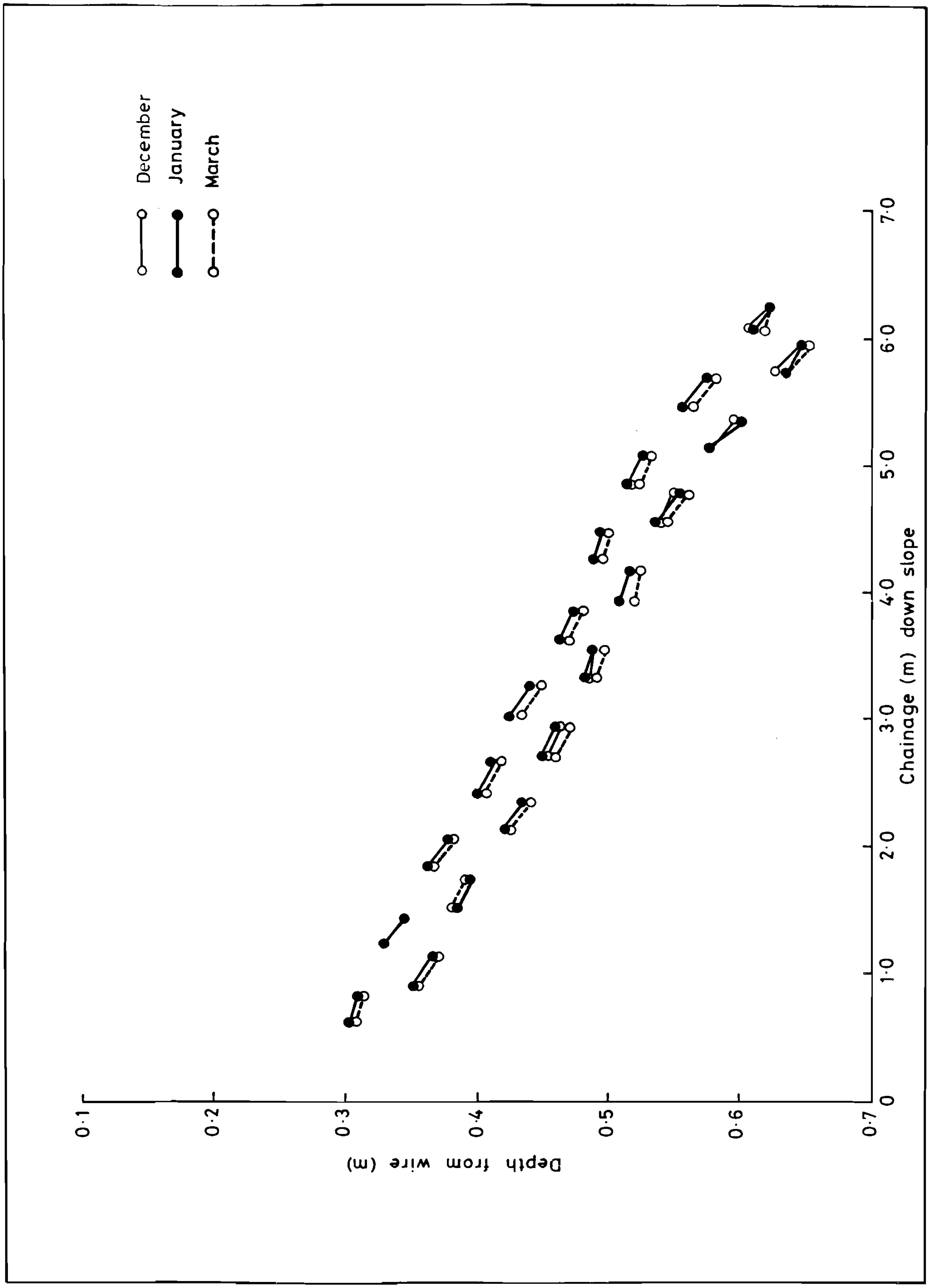


Fig 11 Section 3 - profile 2

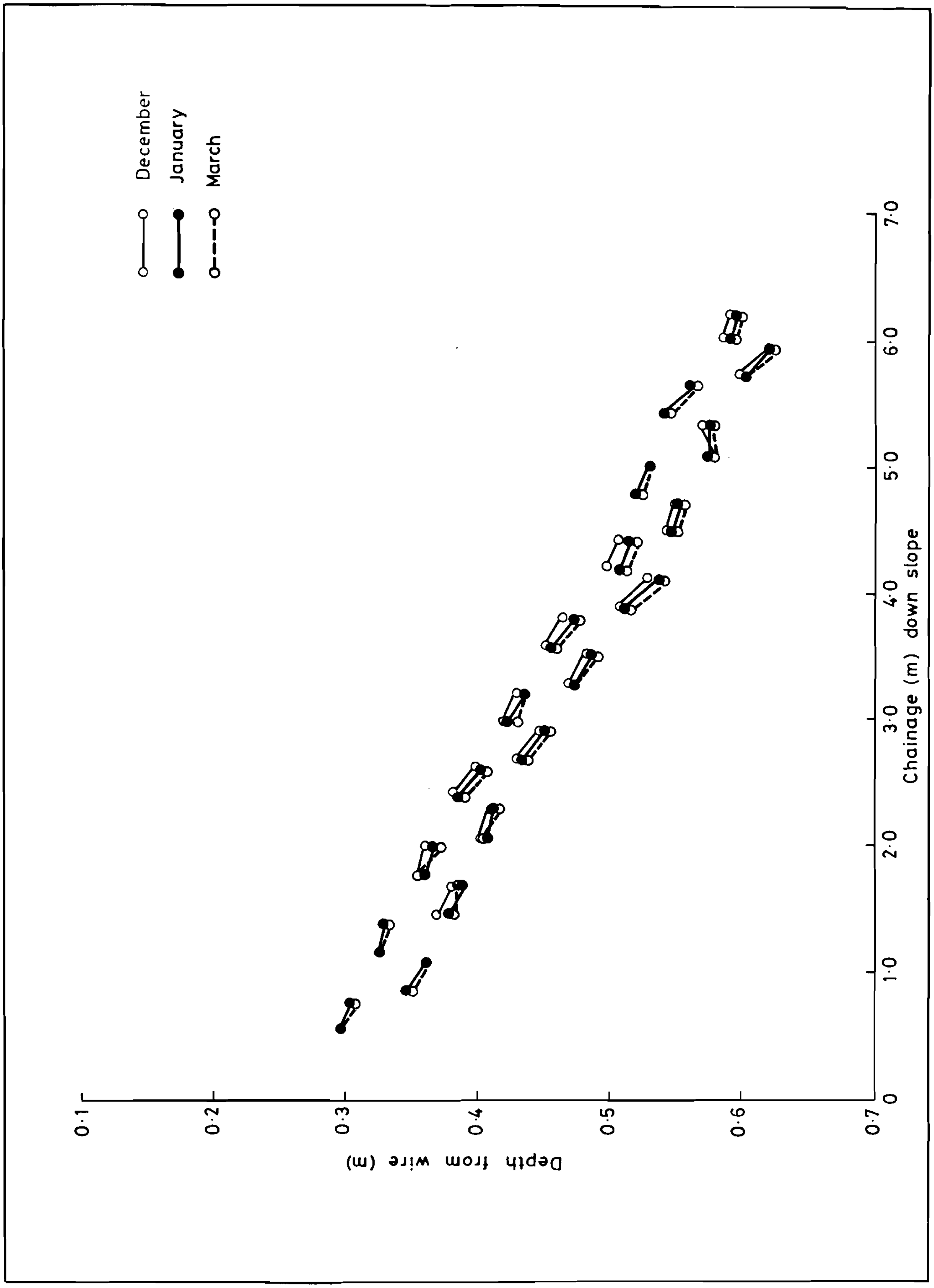


Fig 12 Section 3 - profile 3

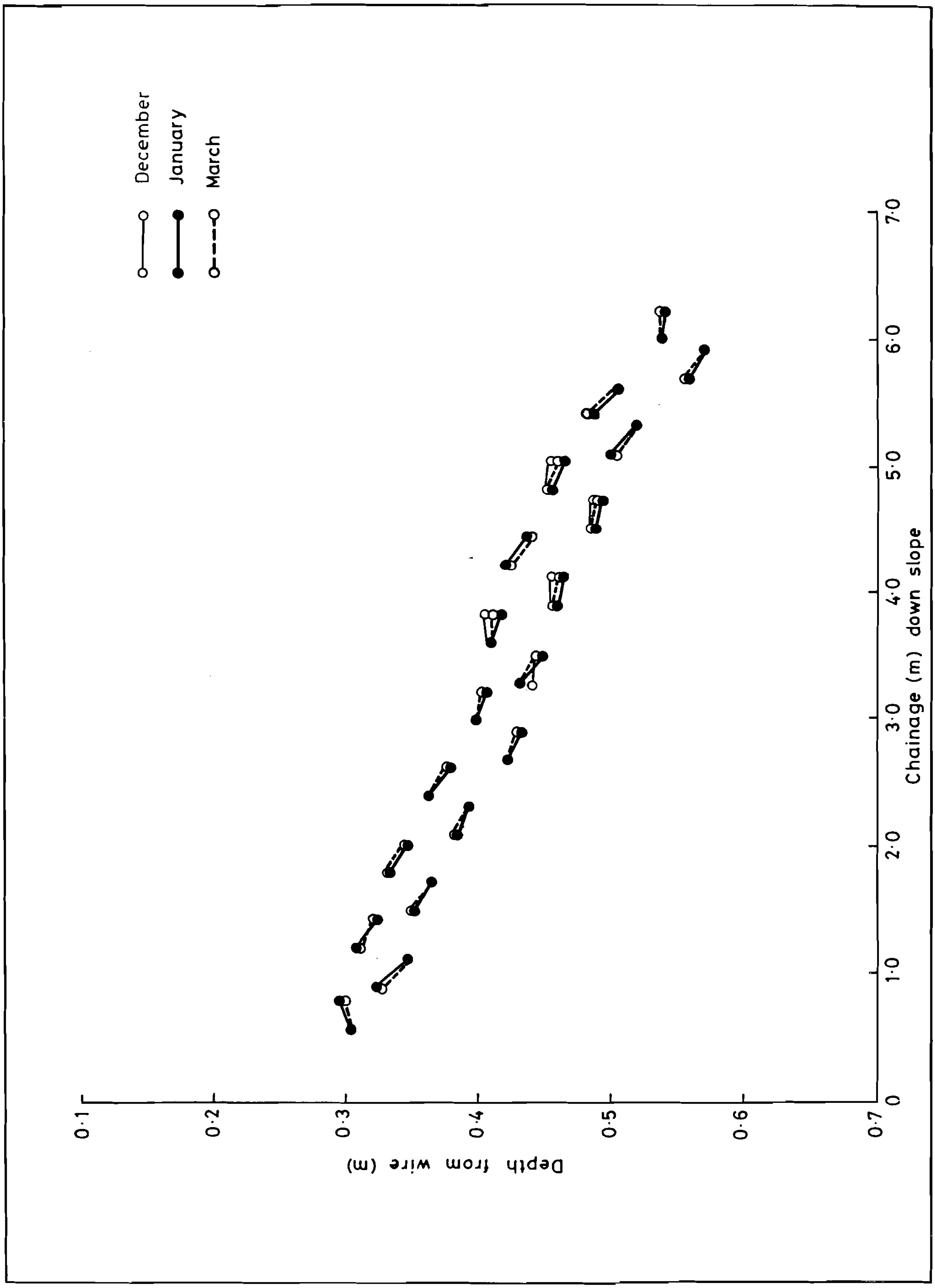


Fig 13 Section 3 - profile 4

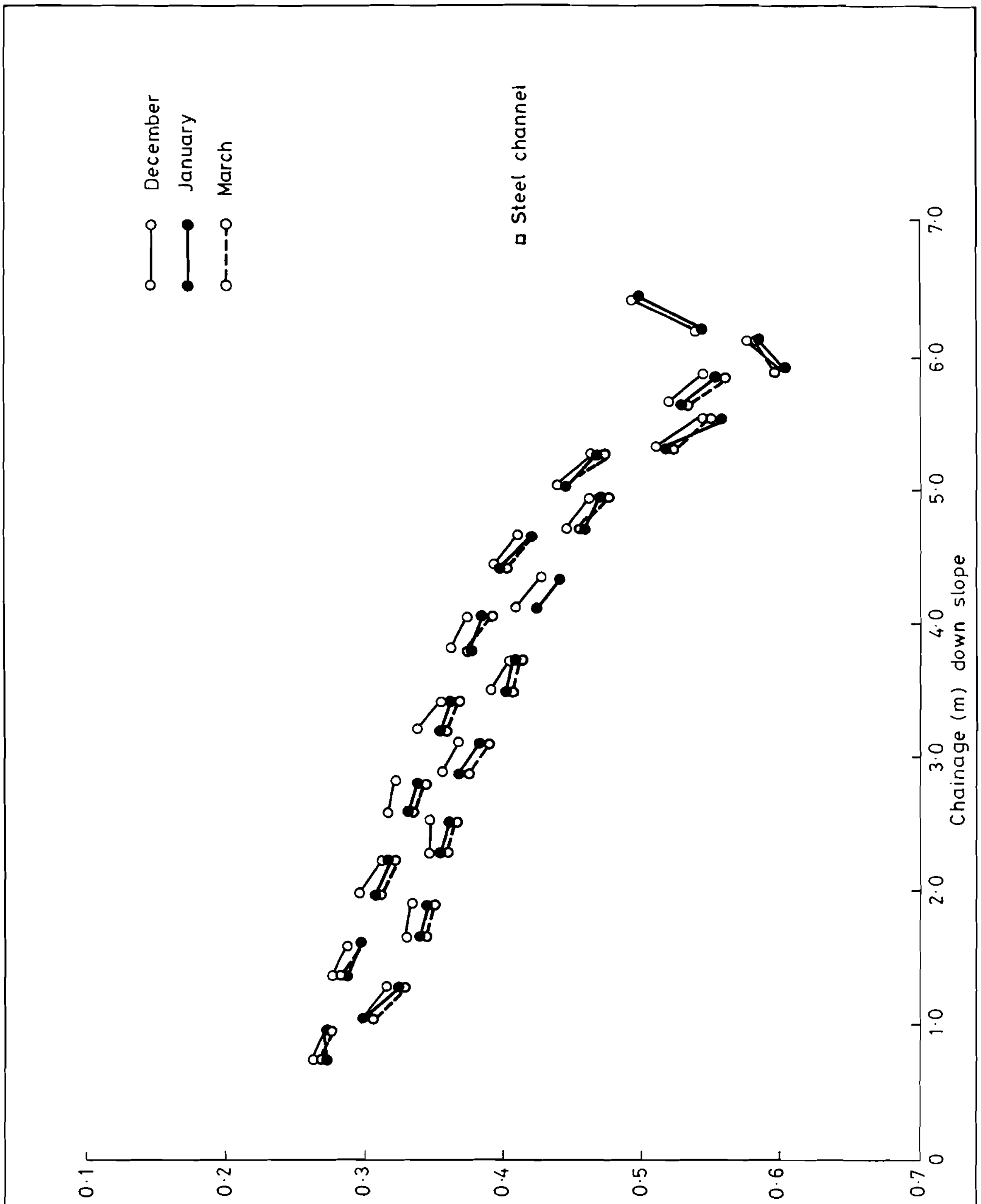
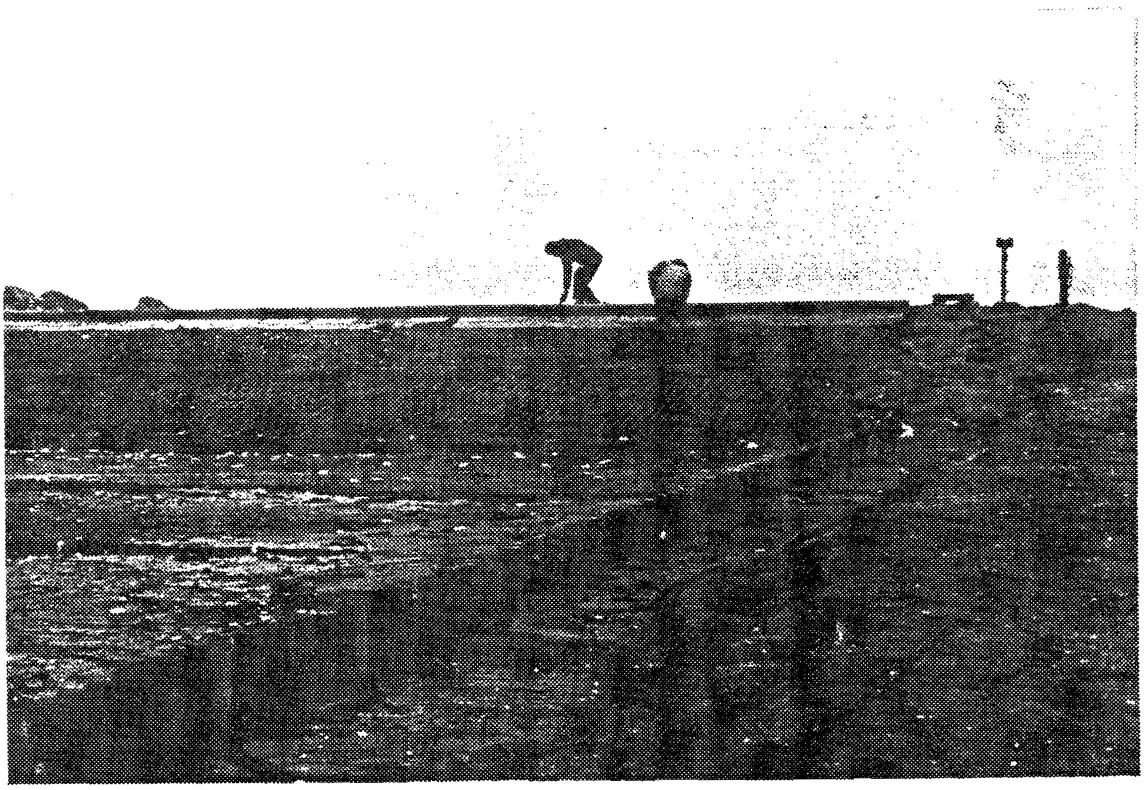


Fig 14 Section 3 - profile 5

PLATES

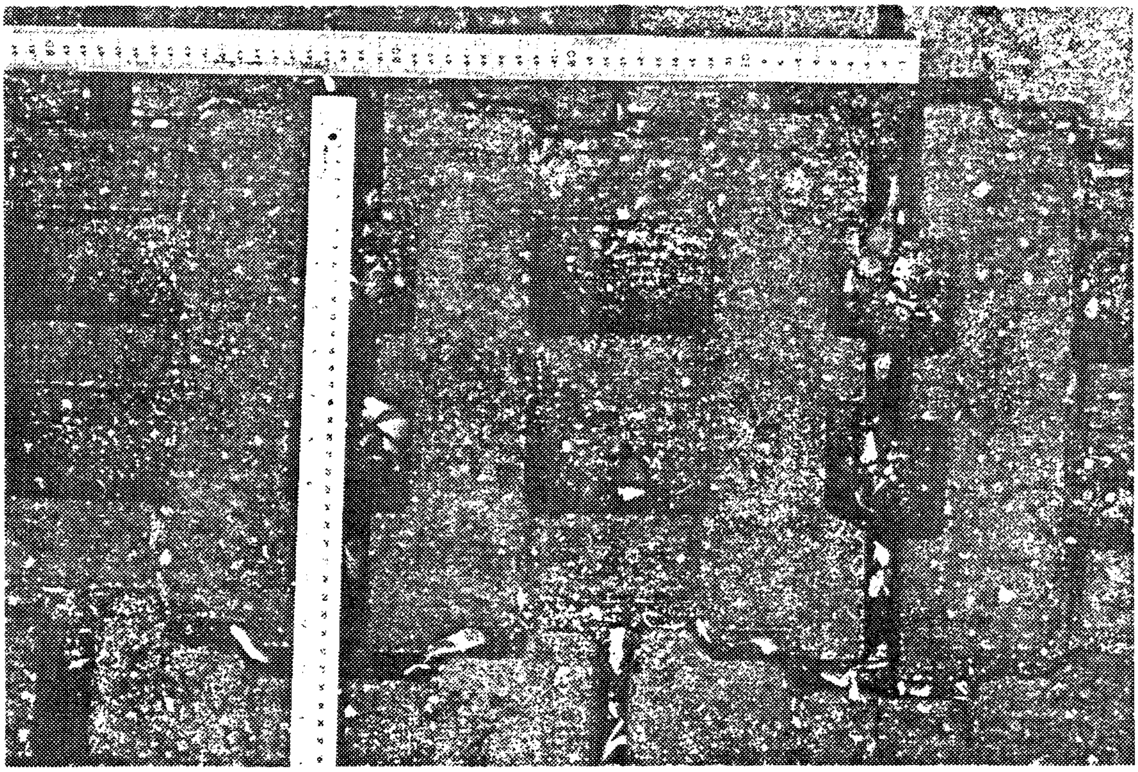
1 Revetment (February 1986).



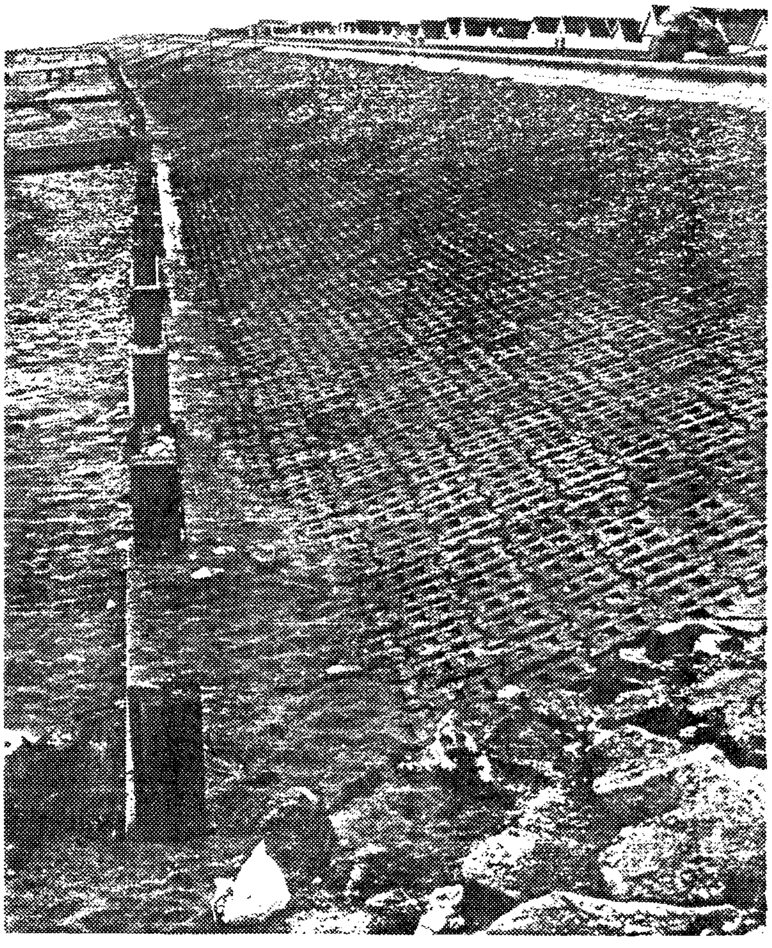
2 Revetment (southern end)

3 Revetment (northern end)

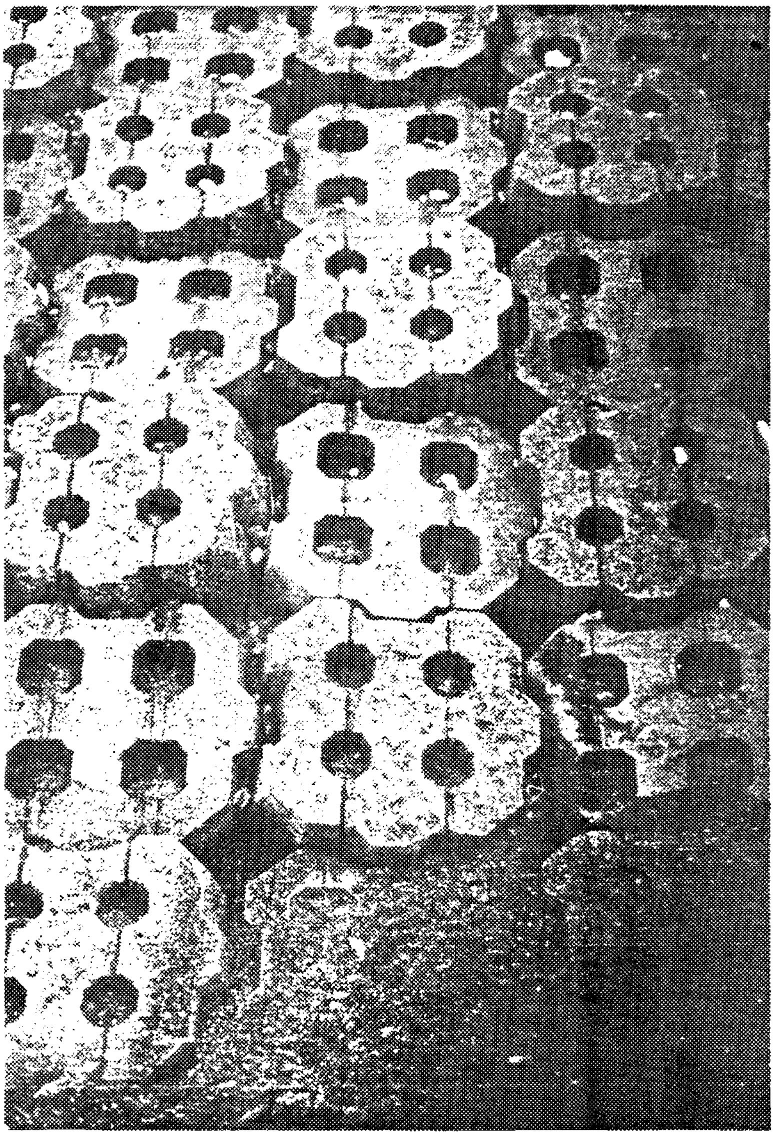
4 Armorflex mattress



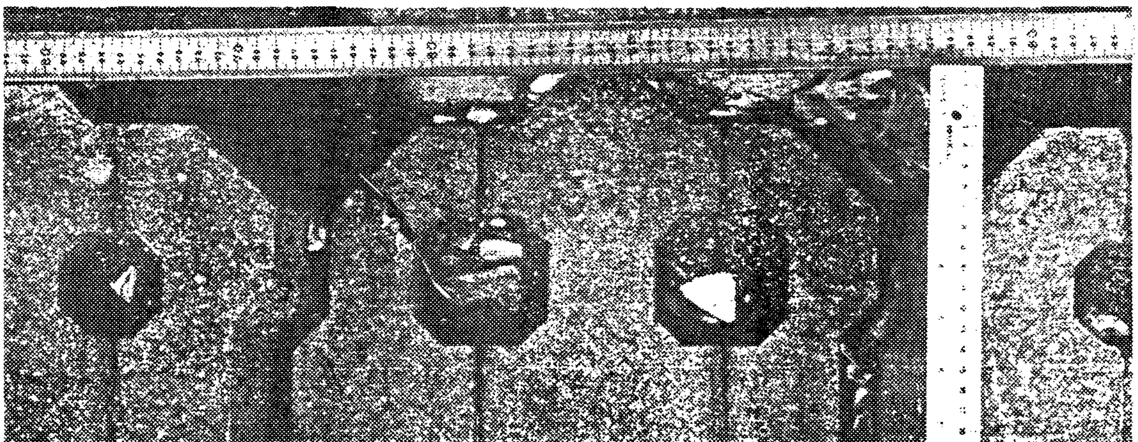
5 Armorflex block



6 Section 1 (Armorflex)

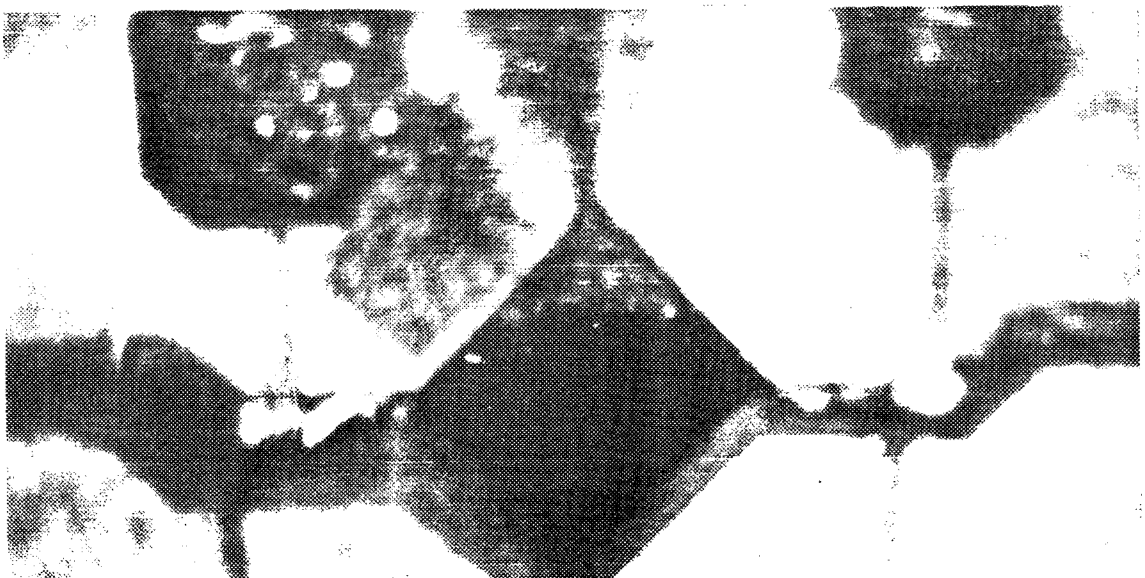


7 Petraflex mattress

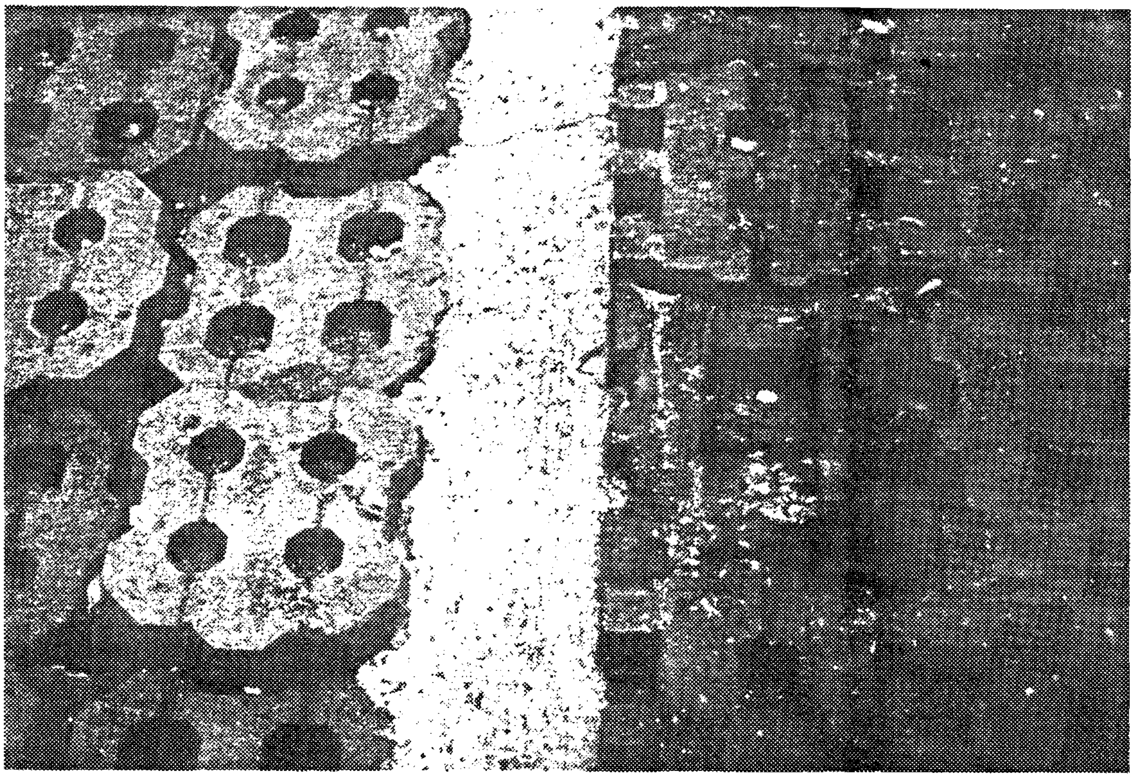


8 Petraflex block

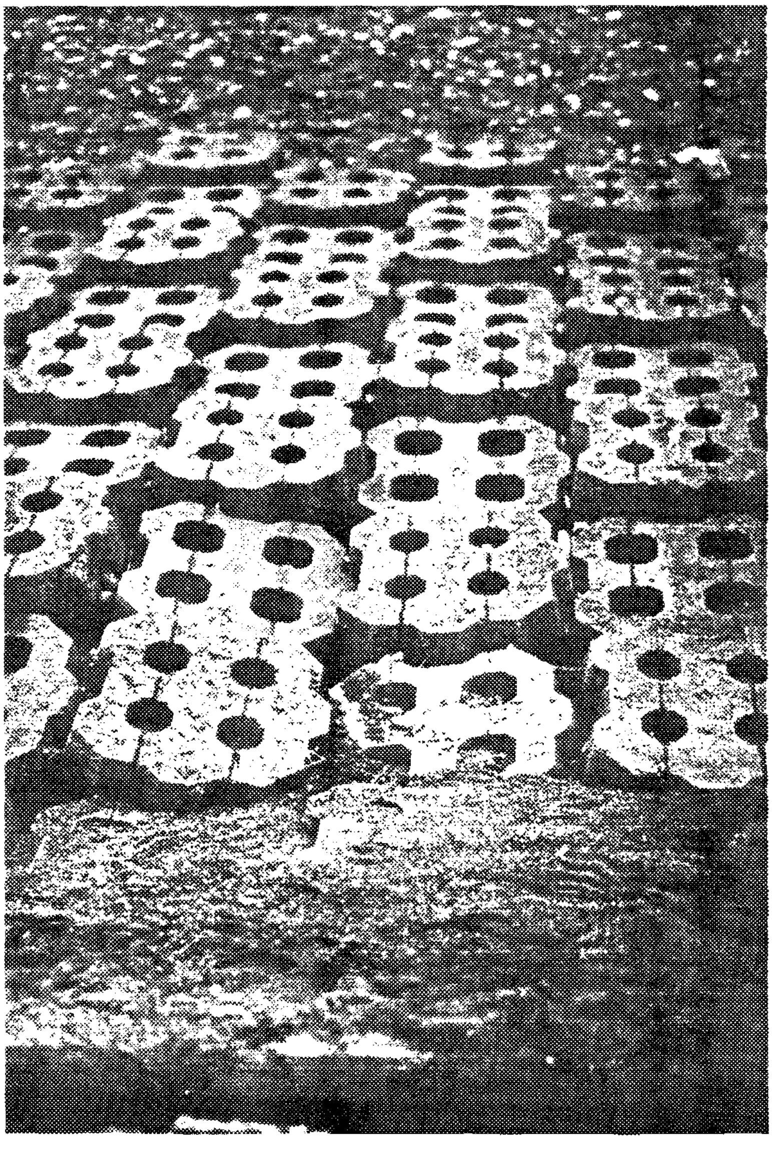
9 Section 3 (Petraflex) showing swash line



10 Petraflex section showing filter fabric

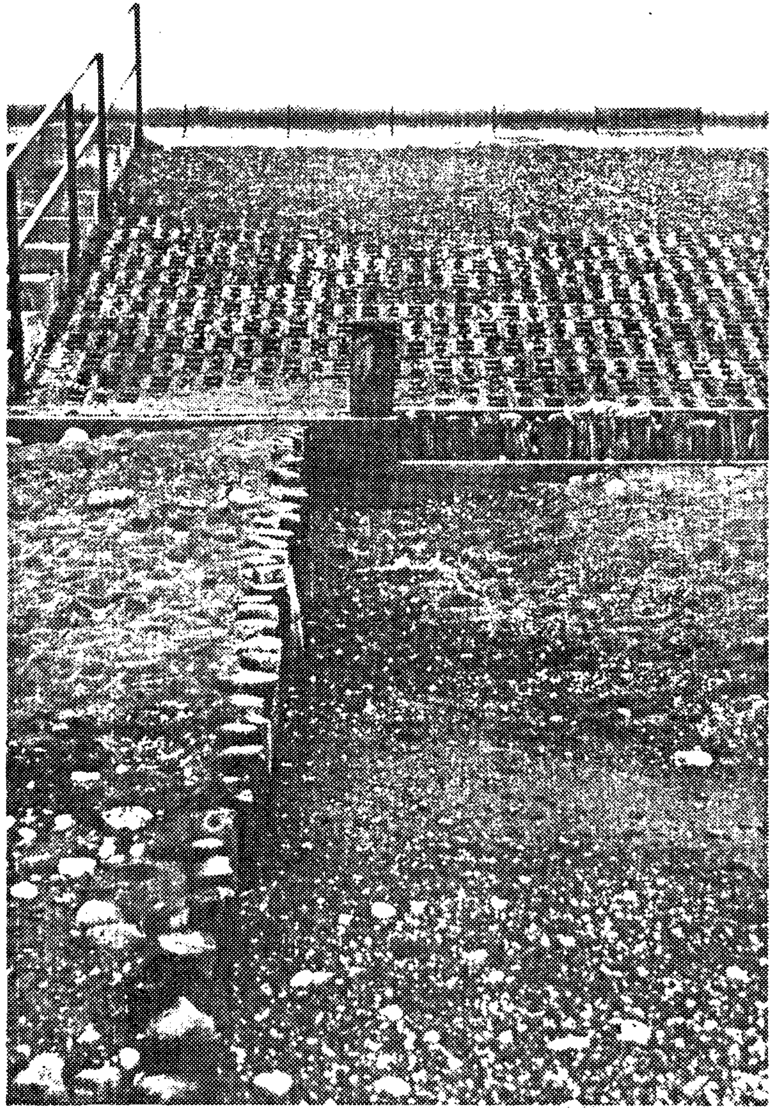


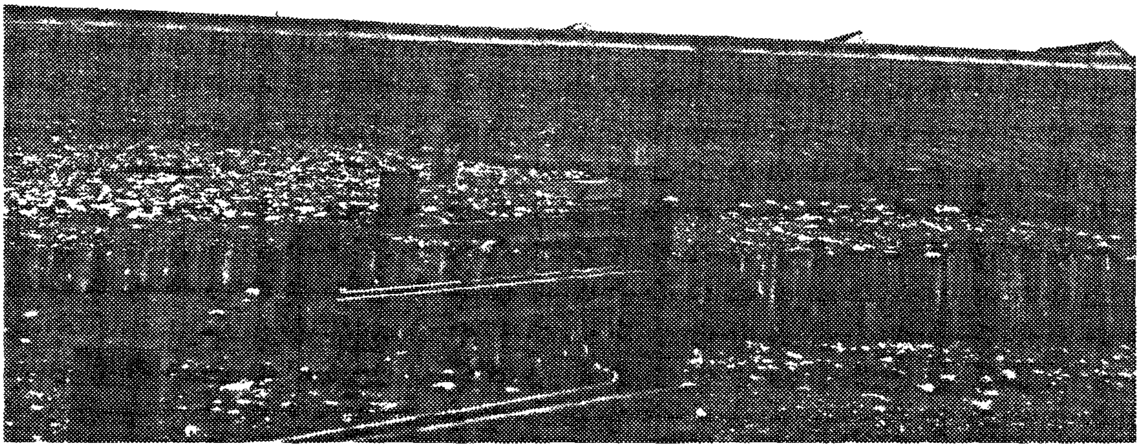
11 Armorflex/Petraflex interchange



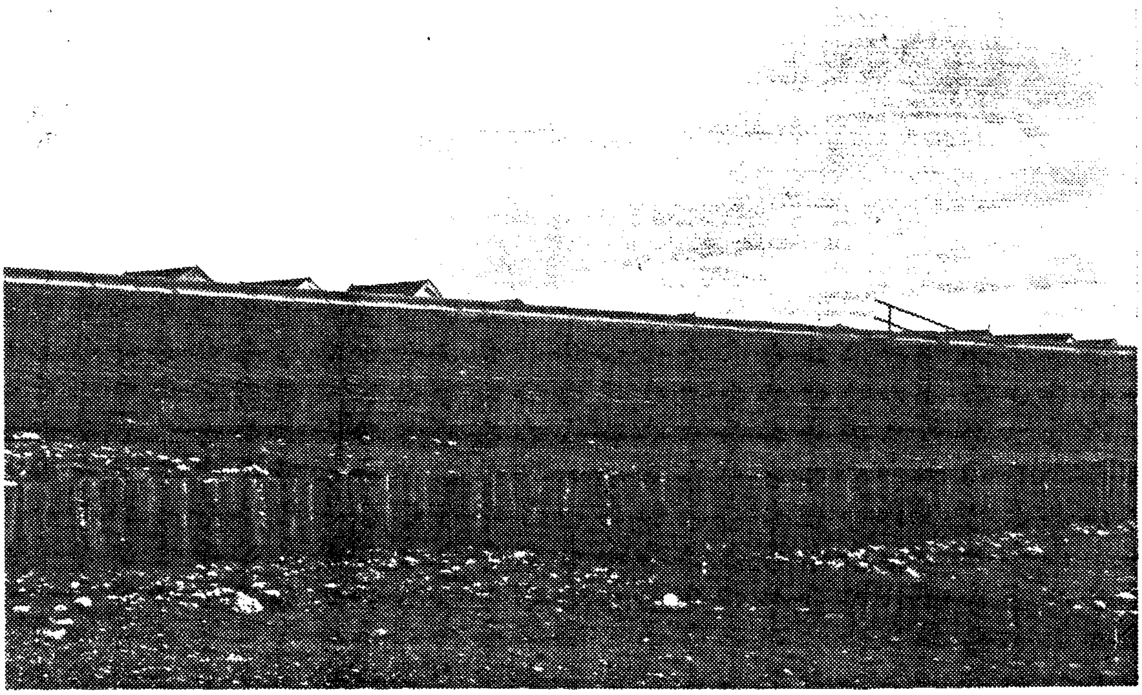
12 Local slump


13 Profile monitoring (Section 1)

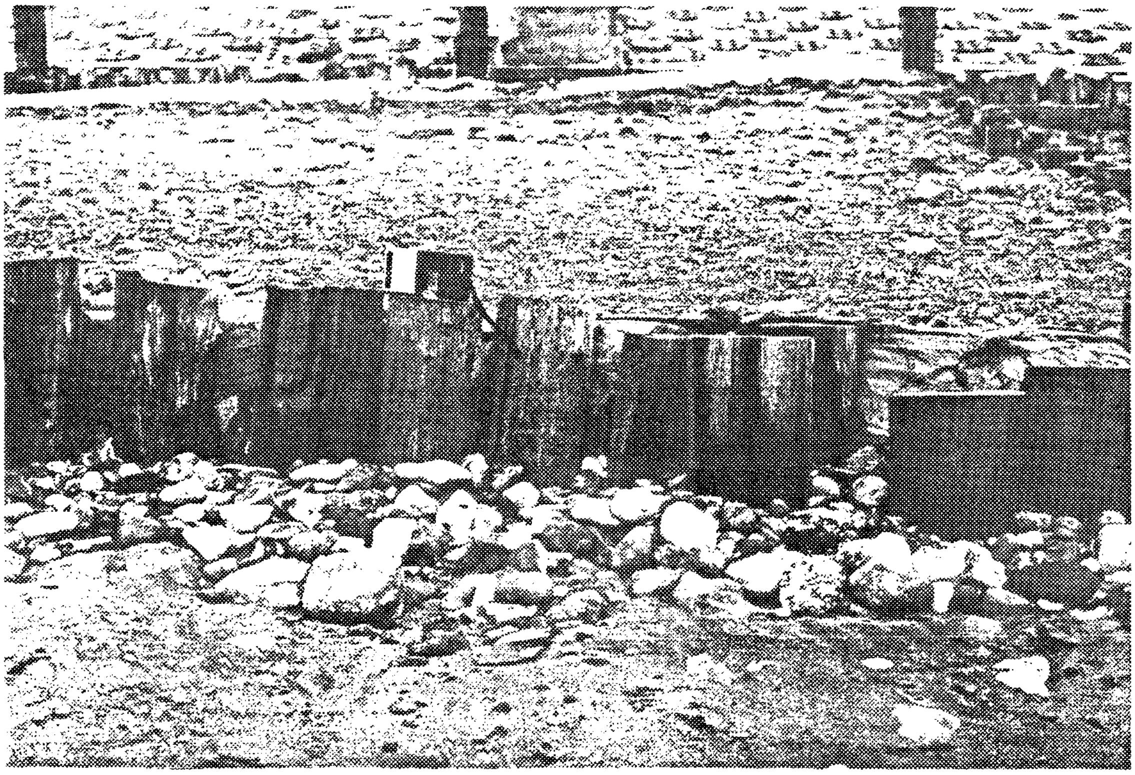

14 Downdrift erosion



15 Blinding washed away where foreshore is lowered due to downdrift erosion at the groyne

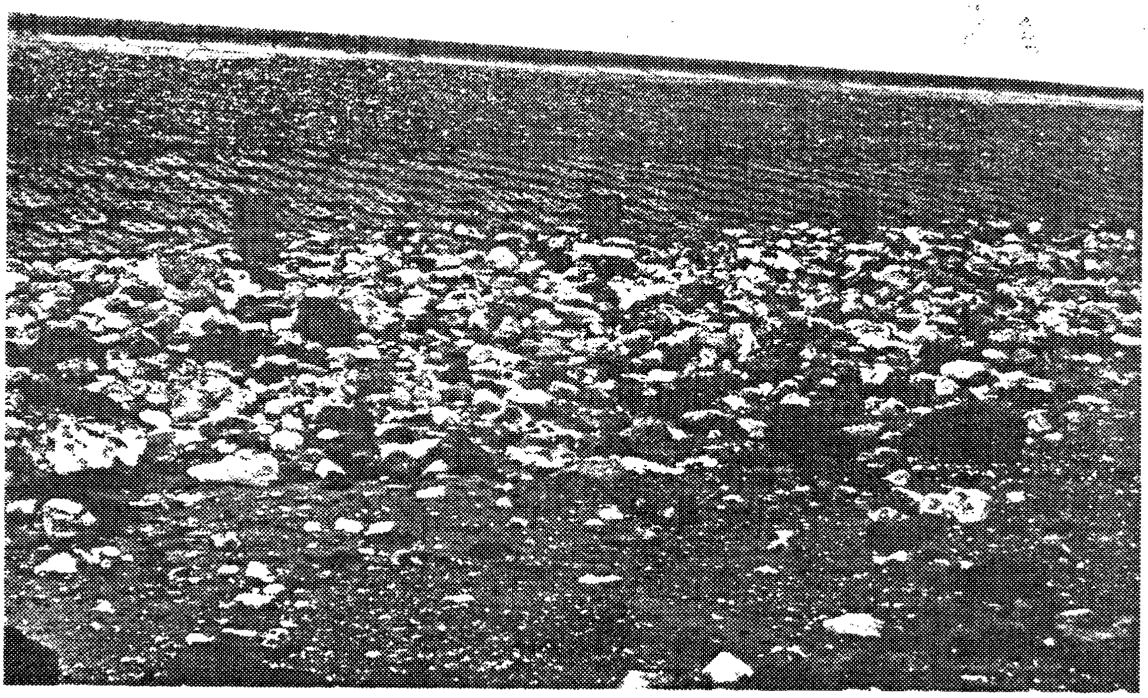


16 Before foreshore replenishment

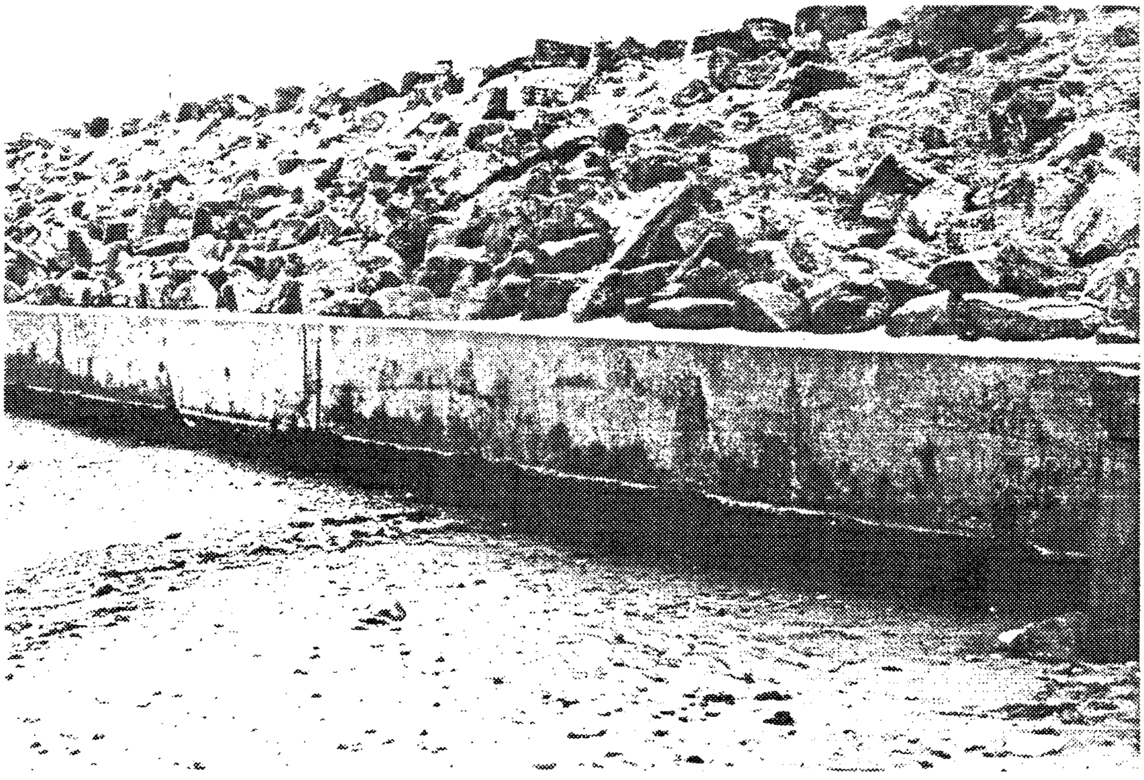


17 Foreshore replenished

18 Foreshore replenishment showing
filter fabric to deter leaching



19 Cobbles on foreshore at the northern end of the revetment



20 Northern end of revetment showing beach lowering fronting the concrete grouted rock

APPENDICES

APPENDIX A

Transducer Data

NOVEMBER 1985

DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
1	1050	0.465	0.287	3.105	15	1.003
1	1080	0.906	0.557	3.006	16	1.719
1	1110	0.992	0.609	2.987	17	2.285
1	1140	1.215	0.747	3.008	18	2.681
1	1170	1.196	0.734	2.989	19	2.940
1	1200	1.264	0.777	3.021	20	2.957
1	1230	1.195	0.733	2.961	21	2.852
1	1260	1.139	0.700	3.034	22	2.592
1	1290	1.082	0.666	3.064	23	2.230
1	1320	1.080	0.667	3.148	24	1.789
1	1350	0.901	0.557	3.197	25	1.294
1	1380	0.364	0.227	3.530	26	0.773
2	330	0.534	0.332	3.412	39	0.973
2	360	1.119	0.695	3.377	40	1.617
2	390	1.318	0.817	3.302	41	2.203
2	420	1.382	0.858	3.351	42	2.622
2	450	1.533	0.954	3.413	43	2.929
2	480	1.465	0.914	3.521	44	3.018
2	510	1.457	0.909	3.509	45	2.987
2	540	1.504	0.937	3.485	46	2.809
2	570	1.293	0.805	3.426	47	2.532
2	600	1.245	0.773	3.363	48	2.167
2	630	1.057	0.656	3.322	49	1.763
2	660	0.836	0.520	3.394	50	1.266
2	1050	0.389	0.241	3.248	63	0.991
2	1080	0.802	0.494	3.066	64	1.648
2	1110	0.875	0.539	3.072	65	2.208
2	1140	0.982	0.618	3.346	66	2.668
2	1170	1.027	0.636	3.258	67	2.958
2	1200	0.982	0.608	3.263	68	3.097
2	1230	0.907	0.562	3.265	69	3.028
2	1260	1.005	0.623	3.290	70	2.829
2	1290	0.865	0.535	3.233	71	2.507
2	1320	0.774	0.478	3.146	72	2.101
2	1350	0.663	0.407	2.990	73	1.653
2	1380	0.477	0.294	3.078	74	1.149
3	390	0.195	0.123	3.825	89	0.757
3	420	0.408	0.252	3.127	90	1.345
3	450	0.506	0.314	3.367	91	1.825
3	480	0.553	0.344	3.413	92	2.153
3	510	0.565	0.353	3.510	93	2.342
3	540	0.574	0.356	3.304	94	2.368
3	570	0.530	0.330	3.427	95	2.268
3	600	0.482	0.300	3.465	96	2.047
3	630	0.451	0.278	3.120	97	1.764
3	660	0.356	0.220	3.122	98	1.377
3	690	0.179	0.113	4.034	99	0.917
3	1140	0.207	0.134	5.114	114	1.208
3	1170	0.267	0.172	4.825	115	1.676
3	1200	0.297	0.190	4.698	116	2.020
3	1230	0.319	0.205	4.788	117	2.246

NOVEMBER 1985

DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
3	1260	0.310	0.198	4.380	118	2.297
3	1290	0.282	0.178	3.885	119	2.218
3	1320	0.261	0.168	4.764	120	2.000
3	1350	0.187	0.120	4.748	121	1.695
3	1380	0.168	0.107	4.588	122	1.332
3	1410	0.110	0.071	5.174	123	0.911
4	480	0.126	0.079	3.685	140	1.105
4	510	0.153	0.095	3.352	141	1.423
4	540	0.189	0.117	3.106	142	1.607
4	570	0.264	0.160	2.623	143	1.662
4	600	0.325	0.197	2.549	144	1.599
4	630	0.326	0.197	2.524	145	1.458
4	660	0.314	0.190	2.511	146	1.230
4	690	0.174	0.106	2.753	147	0.943
4	1170	0.094	0.060	4.286	163	1.037
4	1200	0.101	0.064	3.917	164	1.416
4	1230	0.125	0.079	4.114	165	1.716
4	1260	0.143	0.090	3.658	166	1.893
4	1290	0.154	0.097	3.907	167	1.947
4	1320	0.155	0.096	3.286	168	1.867
4	1350	0.121	0.075	3.530	169	1.695
4	1380	0.101	0.063	3.417	170	1.422
4	1410	0.106	0.065	3.043	171	1.128
5	0	0.072	0.045	3.818	172	0.779
5	570	0.845	0.525	3.361	191	0.937
5	600	0.942	0.585	3.343	192	0.976
5	630	1.040	0.649	3.518	193	1.040
5	660	1.017	0.634	3.490	194	1.056
5	690	0.993	0.620	3.566	195	1.022
5	720	0.838	0.523	3.508	196	0.916
5	1140	0.810	0.503	3.373	210	0.989
5	1170	1.118	0.696	3.424	211	1.338
5	1200	1.226	0.766	3.581	212	1.568
5	1230	1.349	0.840	3.445	213	1.883
5	1290	1.577	0.986	3.585	215	2.105
5	1320	1.565	0.976	3.501	216	2.144
5	1350	1.574	0.984	3.580	217	2.130
5	1380	1.563	0.979	3.668	218	2.087
5	1410	1.562	0.979	3.699	219	1.998
6	0	1.330	0.830	3.510	220	1.908
6	30	1.428	0.890	3.462	221	1.937
6	60	1.387	0.865	3.483	222	1.921
6	90	1.435	0.898	3.603	223	1.941
6	120	1.312	0.817	3.434	224	1.885
6	150	1.317	0.821	3.464	225	1.710
6	180	1.158	0.722	3.526	226	1.376
6	210	0.689	0.429	3.434	227	1.000
6	510	0.606	0.376	3.327	237	1.016
6	540	0.997	0.618	3.270	238	1.398
6	570	0.983	0.610	3.341	239	1.702
6	600	1.136	0.704	3.304	240	1.993
6	630	1.104	0.683	3.223	241	2.174
6	660	1.214	0.751	3.239	242	2.239
6	690	1.190	0.738	3.328	243	2.233
6	720	1.208	0.749	3.312	244	2.121
6	750	1.158	0.720	3.392	245	2.009

NOVEMBER 1985

DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
6	780	1.006	0.622	3.223	246	1.790
12	930	0.685	0.419	2.869	10	1.287
12	960	0.975	0.602	3.185	11	2.220
12	990	1.227	0.759	3.229	12	2.989
12	1020	1.259	0.782	3.360	13	3.556
12	1050	1.237	0.771	3.458	14	3.865
12	1080	1.155	0.722	3.590	15	3.862
12	1110	1.046	0.632	3.475	16	3.615
12	1140	1.095	0.680	3.341	17	3.159
12	1170	0.988	0.609	3.144	18	2.591
12	1200	0.820	0.504	3.033	19	1.901
12	1230	0.456	0.282	3.232	20	1.167
13	210	0.330	0.204	3.138	34	1.078
13	240	0.819	0.504	3.029	35	2.052
13	270	1.011	0.623	3.115	36	2.914
13	300	1.151	0.708	3.051	37	3.577
13	330	1.087	0.672	3.196	38	4.012
13	360	0.959	0.597	3.448	39	4.107
13	390	0.961	0.593	3.156	40	3.932
13	420	0.941	0.580	3.118	41	3.517
13	450	0.942	0.579	3.032	42	2.970
13	480	0.894	0.551	3.074	43	2.305
13	510	0.636	0.391	2.961	44	1.577
13	540	0.263	0.163	3.398	45	0.830
13	990	0.299	0.185	3.199	60	1.769
13	1020	0.577	0.358	3.283	61	2.697
13	1050	0.535	0.337	3.828	62	3.429
13	1080	0.491	0.311	4.087	63	3.900
13	1110	0.541	0.341	3.837	64	4.042
13	1140	0.466	0.296	4.200	65	3.878
13	1170	0.346	0.218	3.912	66	3.464
13	1200	0.316	0.197	3.499	67	2.905
13	1230	0.232	0.141	2.736	68	2.207
13	1260	0.187	0.114	2.755	69	1.448
14	270	0.140	0.088	3.706	84	1.392
14	300	0.264	0.165	3.624	85	2.376
14	330	0.377	0.235	3.484	86	3.158
14	360	0.368	0.230	3.505	87	3.731
14	390	0.348	0.216	3.358	88	4.013
14	420	0.317	0.198	3.581	89	3.974
14	450	0.265	0.165	3.538	90	3.685
14	480	0.188	0.117	3.337	91	3.192
14	510	0.136	0.085	3.503	92	2.575
14	540	0.084	0.053	4.101	93	1.863
14	570	0.055	0.035	4.619	94	1.112
14	1020	0.045	0.029	4.345	109	1.110
14	1050	0.085	0.053	3.478	110	2.072
14	1080	0.146	0.091	3.430	111	2.916
14	1110	0.173	0.107	3.117	112	3.503
14	1140	0.180	0.112	3.376	113	3.827
14	1170	0.154	0.095	3.293	114	3.826
14	1200	0.150	0.091	2.820	115	3.549
14	1230	0.130	0.079	2.835	116	3.076
14	1260	0.097	0.060	3.024	117	2.461
14	1290	0.068	0.042	2.715	118	1.745
14	1320	0.036	0.022	3.045	119	0.991

NOVEMBER 1985

	DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
186	15	300	0.048	0.029	2.644	133	0.812
187	15	330	0.152	0.092	2.482	134	1.770
188	15	360	0.326	0.199	2.706	135	2.618
189	15	390	0.397	0.244	3.053	136	3.290
190	15	420	0.418	0.259	3.259	137	3.731
191	15	450	0.417	0.260	3.548	138	3.880
192	15	480	0.366	0.229	3.570	139	3.739
193	15	510	0.280	0.175	3.639	140	3.381
194	15	540	0.213	0.132	3.477	141	2.853
195	15	570	0.148	0.092	3.372	142	2.223
196	15	600	0.091	0.056	3.192	143	1.519
197	15	630	0.056	0.035	3.237	144	0.779
198							
199	15	1080	0.797	0.487	2.859	159	1.499
200	15	1110	1.039	0.639	3.030	160	2.315
201	15	1140	1.113	0.689	2.845	161	2.957
202	15	1170	1.250	0.768	3.004	162	3.365
203	15	1200	1.266	0.777	2.953	163	3.531
204	15	1230	1.214	0.746	2.997	164	3.400
205	15	1260	1.178	0.723	2.947	165	3.045
206	15	1290	1.017	0.624	2.967	166	2.499
207	15	1320	0.941	0.578	2.980	167	1.835
208	15	1350	0.372	0.230	3.208	168	1.097
209							
210	16	360	0.141	0.088	3.592	183	0.759
211	16	390	0.425	0.256	2.428	184	1.572
212	16	420	0.498	0.302	2.574	185	2.291
213	16	450	0.567	0.344	2.665	186	2.823
214	16	480	0.497	0.303	2.707	187	3.135
215	16	510	0.385	0.234	2.670	188	3.226
216	16	540	0.371	0.225	2.645	189	3.066
217	16	570	0.317	0.191	2.486	190	2.734
218	16	600	0.248	0.149	2.457	191	2.262
219	16	630	0.203	0.122	2.317	192	1.680
220	16	660	0.096	0.058	2.434	193	1.038
221							
222	16	1110	0.092	0.056	2.630	208	1.080
223	16	1140	0.215	0.130	2.476	209	1.832
224	16	1170	0.268	0.162	2.595	210	2.442
225	16	1200	0.314	0.191	2.647	211	2.844
226	16	1230	0.509	0.307	2.449	212	3.020
227	16	1260	0.537	0.324	2.462	213	2.972
228	16	1290	0.489	0.295	2.440	214	2.727
229	16	1320	0.486	0.292	2.410	215	2.356
230	16	1350	0.482	0.290	2.410	216	1.899
231	16	1380	0.338	0.203	2.353	217	1.382
232	16	1410	0.149	0.090	2.511	218	0.818
233							
234	17	420	0.124	0.075	2.435	233	1.533
235	17	450	0.204	0.123	2.350	234	2.212
236	17	480	0.291	0.176	2.598	235	2.732
237	17	510	0.313	0.191	2.815	236	3.069
238	17	540	0.271	0.166	2.953	237	3.208
239	17	570	0.306	0.187	2.794	238	3.120
240	17	600	0.313	0.190	2.631	239	2.880
241	17	630	0.304	0.183	2.442	240	2.513
242	17	660	0.376	0.228	2.597	241	2.059
243	17	690	0.334	0.202	2.533	242	1.520
244	17	720	0.166	0.101	2.629	243	0.957
245							
246	25	900	0.414	0.254	3.032	10	1.255
247	25	930	0.526	0.326	3.241	11	1.883

NOVEMBER 1985

DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
25	960	0.639	0.397	3.374	12	2.354
25	990	0.679	0.423	3.423	13	2.677
25	1020	0.660	0.411	3.428	14	2.796
25	1050	0.610	0.380	3.508	15	2.748
25	1080	0.737	0.453	3.038	16	2.520
25	1110	0.636	0.391	3.022	17	2.162
25	1140	0.468	0.287	2.973	18	1.709
25	1170	0.251	0.155	3.120	19	1.169
26	150	0.225	0.138	2.979	33	0.827
26	180	0.610	0.372	2.750	34	1.559
26	210	0.717	0.438	2.823	35	2.225
26	240	0.863	0.528	2.881	36	2.719
26	270	0.872	0.535	2.914	37	3.039
26	300	0.834	0.512	2.985	38	3.142
26	330	0.839	0.517	3.054	39	3.033
26	360	0.813	0.500	3.057	40	2.747
26	390	0.754	0.464	3.058	41	2.346
26	420	0.681	0.418	2.949	42	1.865
26	450	0.541	0.331	2.850	43	1.327
26	480	0.237	0.147	3.327	44	0.757
26	930	0.555	0.338	2.771	59	1.449
26	960	0.655	0.401	2.891	60	2.077
26	990	0.886	0.541	2.781	61	2.553
26	1020	0.921	0.563	2.828	62	2.854
26	1050	0.871	0.534	2.966	63	2.968
26	1080	0.909	0.558	2.989	64	2.864
26	1110	0.823	0.506	2.985	65	2.605
26	1140	0.809	0.496	2.923	66	2.215
26	1170	0.730	0.447	2.909	67	1.746
26	1200	0.545	0.334	2.876	68	1.198
27	210	0.428	0.260	2.716	83	1.184
27	240	0.690	0.420	2.737	84	1.916
27	270	0.858	0.525	2.875	85	2.472
27	300	0.872	0.536	2.971	86	2.841
27	330	0.720	0.444	3.088	87	3.038
27	360	0.614	0.376	2.899	88	2.967
27	390	0.535	0.328	2.924	89	2.711
27	420	0.437	0.266	2.732	90	2.315
27	450	0.537	0.325	2.511	91	1.822
27	480	0.582	0.354	2.679	92	1.261
27	960	0.502	0.305	2.679	108	1.210
27	990	0.641	0.391	2.738	109	1.873
27	1020	0.802	0.490	2.874	110	2.365
27	1050	0.832	0.510	2.939	111	2.682
27	1080	0.825	0.505	2.892	112	2.811
27	1110	0.783	0.480	2.909	113	2.707
27	1140	0.738	0.452	2.882	114	2.447
27	1170	0.724	0.442	2.823	115	2.062
27	1200	0.680	0.415	2.794	116	1.582
27	1230	0.426	0.261	2.839	117	1.049
28	240	0.517	0.318	3.104	132	1.053
28	270	0.966	0.596	3.158	133	1.800
28	300	1.307	0.809	3.250	134	2.370
28	330	1.209	0.748	3.227	135	2.798
28	360	1.430	0.887	3.306	136	3.027
28	390	1.324	0.821	3.302	137	3.056
28	420	1.540	0.953	3.257	138	2.865

NOVEMBER 1985

	DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
310	28	450	1.238	0.767	3.254	139	2.563
311	28	480	1.213	0.753	3.365	140	2.131
312	28	510	1.056	0.655	3.335	141	1.615
313	28	540	0.550	0.343	3.450	142	1.036
314							
315	28	990	0.388	0.239	3.115	157	1.517
316	28	1020	0.469	0.292	3.423	158	2.205
317	28	1050	0.612	0.382	3.548	159	2.727
318	28	1080	0.637	0.391	3.019	160	3.054
319	28	1110	0.665	0.407	2.885	161	3.163
320	28	1140	0.531	0.327	3.068	162	3.042
321	28	1170	0.426	0.263	3.128	163	2.733
322	28	1200	0.354	0.217	2.958	164	2.301
323	28	1230	0.266	0.163	3.007	165	1.779
324	28	1260	0.187	0.114	2.786	166	1.195
325							
326	29	270	0.086	0.054	3.692	181	0.931
327	29	300	0.196	0.120	2.815	182	1.663
328	29	330	0.297	0.182	3.041	183	2.255
329	29	360	0.346	0.213	3.113	184	2.709
330	29	390	0.322	0.201	3.460	185	2.944
331	29	420	0.318	0.196	3.132	186	2.980
332	29	450	0.272	0.169	3.288	187	2.817
333	29	480	0.227	0.140	3.211	188	2.489
334	29	510	0.162	0.100	3.289	189	2.044
335	29	540	0.124	0.076	3.036	190	1.506
336	29	570	0.074	0.046	3.497	191	0.918
337							

DECEMBER 1985

DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
10	970	0.270	0.168	3.555	15	3.192
10	1000	0.258	0.161	3.603	16	3.240
10	1030	0.225	0.141	3.589	17	3.058
10	1060	0.174	0.110	3.933	18	2.709
10	1090	0.117	0.075	4.529	19	2.211
10	1120	0.075	0.047	3.805	20	1.611
10	1150	0.047	0.030	4.445	21	0.935
11	130	0.073	0.046	3.846	35	0.910
11	160	0.160	0.097	2.697	36	1.754
11	190	0.248	0.152	3.013	37	2.504
11	220	0.300	0.137	3.449	38	3.073
11	250	0.324	0.202	3.497	39	3.441
11	280	0.313	0.195	3.398	40	3.547
11	310	0.260	0.163	3.061	41	3.418
11	340	0.219	0.135	3.227	42	3.116
11	370	0.161	0.099	3.356	43	2.660
11	400	0.103	0.064	3.154	44	2.095
11	430	0.065	0.040	3.389	45	1.447
11	460	0.056	0.036	4.766	46	0.763
11	910	0.089	0.056	3.547	61	1.620
11	940	0.142	0.088	3.265	62	2.429
11	970	0.196	0.122	3.425	63	3.068
11	1000	0.197	0.123	3.592	64	3.464
11	1030	0.187	0.118	3.879	65	3.626
11	1060	0.157	0.098	3.565	66	3.516
11	1090	0.126	0.079	3.639	67	3.211
11	1120	0.124	0.076	2.954	68	2.759
11	1150	0.077	0.048	3.364	69	2.173
11	1180	0.063	0.039	3.048	70	1.500
11	1210	0.059	0.038	5.468	71	0.790
12	190	0.061	0.037	2.596	85	1.073
12	220	0.203	0.121	2.232	86	1.965
12	250	0.274	0.165	2.429	87	2.724
12	280	0.304	0.184	2.473	88	3.272
12	310	0.338	0.204	2.491	89	3.600
12	340	0.466	0.280	2.338	90	3.643
12	370	0.331	0.199	2.355	91	3.447
12	400	0.256	0.154	2.382	92	3.080
12	430	0.155	0.093	2.349	93	2.556
12	460	0.108	0.064	2.259	94	1.950
12	490	0.059	0.035	2.446	95	1.261
12	910	0.139	0.091	5.689	109	0.770
12	940	0.287	0.173	2.401	110	1.735
12	970	0.525	0.316	2.377	111	2.599
12	1000	0.745	0.448	2.381	112	3.316
12	1030	0.901	0.543	2.438	113	3.792
12	1060	0.744	0.449	2.474	114	3.970
12	1090	0.672	0.406	2.466	115	3.887
12	1120	0.638	0.414	2.429	116	3.588
12	1150	0.603	0.363	2.384	117	3.123
12	1180	0.490	0.294	2.287	118	2.543
12	1210	0.415	0.249	2.286	119	1.861

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DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
12	1240	0.179	0.107	2.314	120	1.130
13	280	0.323	0.196	2.653	136	1.247
13	310	0.563	0.341	2.590	137	2.103
13	340	0.845	0.514	2.671	138	2.754
13	370	0.814	0.492	2.529	139	3.201
13	400	0.794	0.461	2.574	140	3.459
13	430	0.864	0.523	2.557	141	3.444
13	460	0.735	0.446	2.585	142	3.226
13	490	0.684	0.414	2.580	143	2.854
13	520	0.527	0.319	2.533	144	2.323
13	550	0.343	0.207	2.493	145	1.675
13	580	0.147	0.089	2.497	146	0.965
13	940	0.062	0.038	2.690	158	0.876
13	970	0.107	0.065	2.456	159	1.813
13	1000	0.148	0.091	2.791	160	2.711
13	1030	0.175	0.107	2.929	161	3.462
13	1060	0.337	0.203	2.410	162	3.997
13	1090	0.364	0.219	2.388	163	4.256
13	1120	0.324	0.195	2.389	164	4.232
13	1150	0.339	0.203	2.263	165	3.957
13	1180	0.244	0.146	2.312	166	3.529
13	1210	0.182	0.109	2.332	167	2.953
13	1240	0.146	0.088	2.325	168	2.277
13	1270	0.132	0.079	2.257	169	1.543
13	1300	0.058	0.035	2.455	170	0.808
14	310	0.074	0.045	2.603	185	1.039
14	340	0.183	0.110	2.332	186	1.915
14	370	0.270	0.163	2.463	187	2.654
14	400	0.314	0.189	2.434	188	3.203
14	430	0.356	0.214	2.383	189	3.509
14	460	0.462	0.277	2.276	190	3.582
14	490	0.486	0.292	2.361	191	3.393
14	520	0.358	0.215	2.341	192	3.026
14	550	0.195	0.117	2.279	193	2.487
14	580	0.109	0.065	2.319	194	1.806
14	610	0.039	0.024	2.798	195	1.050
14	1030	0.119	0.072	2.552	209	1.389
14	1060	0.230	0.139	2.489	210	2.260
14	1090	0.210	0.129	3.118	211	2.965
14	1120	0.268	0.164	2.960	212	3.487
14	1150	0.247	0.153	3.251	213	3.757
14	1180	0.469	0.281	2.332	214	3.723
14	1210	0.311	0.186	2.472	215	3.468
14	1240	0.292	0.175	2.357	216	3.028
14	1270	0.238	0.143	2.332	217	2.468
14	1300	0.290	0.174	2.283	218	1.800
14	1330	0.167	0.100	2.311	219	1.107
15	370	0.436	0.263	2.397	235	1.444
15	400	0.647	0.392	2.596	236	2.226
15	430	0.677	0.410	2.577	237	2.875
15	460	0.673	0.408	2.556	238	3.287
15	490	0.879	0.536	2.461	239	3.507
15	520	0.654	0.395	2.496	240	3.444
15	550	0.610	0.367	2.388	241	3.213
15	580	0.634	0.381	2.382	242	2.784
15	610	0.428	0.257	2.374	243	2.223
15	640	0.489	0.294	2.385	244	1.587
15	670	0.203	0.123	2.608	245	0.897

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DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
10	1010	0.548	0.333	2.710	8	1.244
10	1040	0.583	0.354	2.615	9	2.003
10	1070	0.648	0.393	2.629	10	2.595
10	1100	0.689	0.418	2.612	11	2.931
10	1130	0.677	0.412	2.705	12	3.080
10	1160	0.664	0.402	2.547	13	2.993
10	1190	0.611	0.371	2.618	14	2.719
10	1220	0.597	0.362	2.562	15	2.295
10	1250	0.500	0.303	2.601	16	1.756
10	1280	0.345	0.209	2.575	17	1.165
11	230	0.253	0.154	2.233	30	0.819
11	260	0.489	0.296	2.567	31	1.689
11	290	0.563	0.341	2.586	32	2.492
11	320	0.763	0.463	2.648	33	3.144
11	350	0.964	0.585	2.640	34	3.595
11	380	1.010	0.612	2.573	35	3.833
11	410	0.966	0.585	2.561	36	3.826
11	440	0.908	0.551	2.607	37	3.636
11	470	1.003	0.608	2.626	38	3.298
11	500	1.021	0.623	2.765	39	2.871
11	530	0.762	0.463	2.681	40	2.329
11	560	0.652	0.396	2.681	41	1.740
11	590	0.524	0.322	3.033	42	1.089
11	1010	0.538	0.330	2.886	56	1.208
11	1040	0.714	0.436	2.785	57	2.087
11	1070	0.860	0.526	2.850	58	2.816
11	1100	0.915	0.559	2.811	59	3.401
11	1130	1.030	0.630	2.977	60	3.749
11	1160	1.049	0.643	2.954	61	3.806
11	1190	1.128	0.693	2.987	62	3.644
11	1220	1.139	0.702	3.078	63	3.272
11	1250	0.987	0.609	3.140	64	2.756
11	1280	1.047	0.649	3.263	65	2.126
11	1310	0.855	0.528	3.197	66	1.406
12	320	0.313	0.195	3.501	81	0.781
12	350	0.993	0.614	3.225	82	1.658
12	380	1.191	0.736	3.208	83	2.426
12	410	1.198	0.736	3.009	84	2.993
12	440	1.242	0.761	2.934	85	3.375
12	470	1.353	0.831	2.983	86	3.511
12	500	1.393	0.854	2.938	87	3.476
12	530	1.413	0.873	3.130	88	3.220
12	560	1.340	0.829	3.215	89	2.815
12	590	1.355	0.842	3.389	90	2.268
12	620	1.050	0.651	3.276	91	1.643
12	650	0.455	0.284	3.547	92	1.011
12	1040	0.588	0.364	3.209	105	1.161
12	1070	1.184	0.736	3.403	106	2.020
12	1100	1.293	0.799	3.263	107	2.805
12	1130	1.156	0.714	3.186	108	3.390
12	1160	1.049	0.646	3.082	109	3.830

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DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
12	1190	1.482	0.908	2.893	110	3.979
12	1220	1.006	0.617	2.921	111	3.866
12	1250	0.990	0.605	2.845	112	3.583
12	1280	0.923	0.564	2.836	113	3.151
12	1310	0.917	0.560	2.795	114	2.602
12	1340	0.633	0.386	2.820	115	1.940
12	1370	0.457	0.278	2.767	116	1.248
13	410	0.849	0.522	3.029	132	1.552
13	440	0.890	0.545	2.920	133	2.286
13	470	0.994	0.609	2.917	134	2.829
13	500	0.897	0.549	2.888	135	3.130
13	530	0.984	0.604	2.934	136	3.261
13	560	0.829	0.510	3.051	137	3.155
13	590	0.982	0.607	3.191	138	2.894
13	620	0.806	0.495	3.030	139	2.444
13	650	0.753	0.463	3.015	140	1.837
13	680	0.374	0.230	2.993	141	1.123
13	1130	0.652	0.399	2.876	156	1.330
13	1160	0.766	0.470	2.924	157	2.057
13	1190	0.854	0.521	2.777	158	2.624
13	1220	1.153	0.704	2.779	159	2.990
13	1250	1.276	0.779	2.810	160	3.179
13	1280	1.444	0.891	3.126	161	3.110
13	1310	1.818	1.139	3.663	162	2.898
13	1340	1.546	0.970	3.742	163	2.370
13	1370	1.350	0.844	3.569	164	1.884
13	1400	0.860	0.533	3.261	165	1.252
14	410	0.454	0.284	3.562	180	0.864
14	440	1.337	0.834	3.483	181	1.680
14	470	1.386	0.864	3.493	182	2.328
14	500	1.611	1.004	3.470	183	2.859
14	530	1.573	0.973	3.209	184	3.127
14	560	1.693	1.052	3.389	185	3.158
14	590	1.621	1.008	3.396	186	3.027
14	620	1.630	1.015	3.476	187	2.742
14	650	1.560	0.974	3.529	188	2.376
14	680	1.449	0.904	3.533	189	1.921
14	710	1.150	0.718	3.524	190	1.421
14	740	0.578	0.362	3.649	191	0.928
14	1130	0.923	0.577	3.624	204	1.120
14	1160	1.559	0.982	3.881	205	1.820
14	1190	1.948	1.226	3.846	206	2.444
14	1220	2.173	1.369	3.880	207	2.900
14	1250	0.000	0.000	0.000	208	0.000
14	1280	2.382	1.498	3.821	209	3.288
14	1310	2.197	1.381	3.800	210	3.144
14	1340	2.070	1.299	3.725	211	2.986
14	1370	2.074	1.308	3.936	212	2.720
14	1400	1.988	1.251	3.828	213	2.371
14	1430	1.704	1.071	3.816	214	1.979
15	20	1.196	0.749	3.674	215	1.476
15	50	0.630	0.395	3.715	216	0.945
15	470	0.391	0.243	3.283	230	1.014
15	500	0.737	0.434	2.999	231	1.675
15	530	0.788	0.486	3.154	232	2.207
15	560	0.860	0.532	3.200	233	2.559
15	590	0.883	0.547	3.237	234	2.691

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DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
15	620	0.741	0.458	3.228	235	2.650
15	650	0.000	0.000	0.000	236	0.000
15	680	0.629	0.387	3.074	237	2.126
15	710	0.550	0.336	2.860	238	1.698
15	740	0.466	0.284	2.821	239	1.177
27	1000	0.252	0.151	2.349	7	1.126
27	1030	0.453	0.273	2.411	8	1.992
27	1060	0.673	0.408	2.574	9	2.720
27	1090	0.743	0.452	2.666	10	3.274
27	1120	0.750	0.456	2.647	11	3.621
27	1150	0.922	0.563	2.815	12	3.697
27	1180	1.056	0.650	3.047	13	3.528
27	1210	0.993	0.611	3.049	14	3.152
27	1240	1.035	0.637	3.041	15	2.652
27	1270	0.980	0.603	3.066	16	2.063
27	1300	0.732	0.452	3.137	17	1.422
27	1330	0.263	0.164	3.372	18	0.767
28	340	0.497	0.303	2.738	33	1.401
28	370	0.514	0.315	2.953	34	2.126
28	400	0.698	0.428	2.963	35	2.659
28	430	0.599	0.367	2.897	36	2.987
28	460	0.635	0.387	2.739	37	3.082
28	490	0.616	0.374	2.593	38	2.930
28	520	0.565	0.342	2.597	39	2.587
28	550	0.373	0.226	2.593	40	2.116
28	580	0.272	0.165	2.632	41	1.548
28	610	0.135	0.083	2.824	42	0.912
28	1060	0.144	0.088	2.817	57	1.272
28	1090	0.207	0.127	2.888	58	1.989
28	1120	0.321	0.195	2.743	59	2.556
28	1150	0.299	0.182	2.798	60	2.915
28	1180	0.338	0.206	2.762	61	3.049
28	1210	0.271	0.165	2.652	62	2.926
28	1240	0.212	0.128	2.607	63	2.594
28	1270	0.196	0.118	2.433	64	2.125
28	1300	0.150	0.090	2.283	65	1.552
28	1330	0.112	0.067	2.399	66	0.887
29	400	0.184	0.112	2.623	83	1.271
29	430	0.197	0.122	3.362	84	1.959
29	460	0.304	0.189	3.502	85	2.406
29	490	0.372	0.233	3.664	86	2.626
29	520	0.353	0.221	3.636	87	2.618
29	550	0.274	0.170	3.335	88	2.357
29	580	0.201	0.125	3.328	89	1.948
29	610	0.148	0.091	2.990	90	1.391
29	1090	0.118	0.074	3.678	106	0.861
29	1120	0.252	0.157	3.520	107	1.678
29	1150	0.420	0.263	3.678	108	2.343
29	1180	0.543	0.345	4.232	109	2.818
29	1210	0.468	0.299	4.471	110	3.066
29	1240	0.486	0.312	4.636	111	3.021
29	1270	0.421	0.270	4.655	112	2.737
29	1300	0.327	0.207	4.136	113	2.282
29	1330	0.226	0.142	3.792	114	1.700
29	1360	0.163	0.103	3.910	115	1.055
30	430	0.405	0.254	3.751	132	1.445

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	DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
186	30	460	0.678	0.427	3.870	133	2.139
187	30	490	0.929	0.586	3.924	134	2.644
188	30	520	1.035	0.659	4.337	135	2.913
189	30	550	0.949	0.607	4.496	136	2.955
190	30	580	0.995	0.638	4.638	137	2.744
191	30	610	0.785	0.501	4.467	138	2.370
192	30	640	0.642	0.414	4.884	139	1.897
193	30	670	0.478	0.306	4.632	140	1.360
194	30	700	0.255	0.166	5.284	141	0.763
195							
196	30	1120	0.621	0.385	3.394	155	1.246
197	30	1150	1.017	0.640	3.869	156	2.047
198	30	1180	1.458	0.919	3.879	157	2.724
199	30	1210	1.646	1.043	4.123	158	3.222
200	30	1240	1.672	1.079	4.911	159	3.528
201	30	1270	1.615	1.043	4.984	160	3.533
202	30	1300	1.631	1.053	4.961	161	3.303
203	30	1330	1.382	0.887	4.665	162	2.892
204	30	1360	1.139	0.730	4.586	163	2.372
205	30	1390	0.812	0.519	4.457	164	1.775
206	30	1420	0.514	0.327	4.205	165	1.135
207							
208	31	460	0.425	0.269	4.047	181	1.115
209	31	490	0.963	0.610	4.133	182	1.863
210	31	520	1.259	0.800	4.263	183	2.402
211	31	550	1.400	0.895	4.484	184	2.805
212	31	580	1.502	0.966	4.778	185	2.983
213	31	610	1.370	0.882	4.797	186	2.896
214	31	640	1.275	0.821	4.806	187	2.606
215	31	670	1.016	0.659	5.155	188	2.158
216	31	700	0.698	0.452	5.015	189	1.569
217	31	730	0.361	0.234	5.104	190	0.903
218							
219	31	1150	0.274	0.176	4.581	204	0.753
220	31	1180	0.745	0.467	3.673	205	1.502
221	31	1210	1.141	0.722	4.048	206	2.208
222	31	1240	1.502	0.957	4.352	207	2.740
223	31	1270	1.518	0.973	4.616	208	3.105
224	31	1300	1.759	1.139	5.087	209	3.258
225							
226	31	1360	1.430	0.923	4.920	211	2.903
227	31	1390	1.282	0.824	4.742	212	2.477
228	31	1420	0.972	0.628	4.985	213	1.985

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DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
1	10	0.727	0.464	4.426	214	1.412
1	40	0.356	0.232	5.376	215	0.812
1	490	0.590	0.369	3.625	230	1.132
1	520	1.075	0.674	3.663	231	1.878
1	550	1.404	0.884	3.879	232	2.452
1	580	1.641	1.039	4.075	233	2.845
1	610	1.799	1.148	4.407	234	3.072
1	640	1.728	1.100	4.329	235	3.067
1	670	1.768	1.121	4.164	236	2.902
1	700	1.554	0.990	4.341	237	2.582
1	730	1.300	0.827	4.279	238	2.159
1	760	1.039	0.657	4.065	239	1.669
1	790	0.637	0.403	4.007	240	1.130
10	995	0.064	0.039	3.119	11	0.887
10	1025	0.142	0.086	2.602	12	1.808
10	1055	0.207	0.126	2.797	13	2.661
10	1085	0.268	0.164	2.843	14	3.334
10	1115	0.250	0.155	3.329	15	3.785
10	1145	0.244	0.151	3.349	16	3.949
10	1175	0.215	0.134	3.565	17	3.819
10	1205	0.178	0.111	3.325	18	3.448
10	1235	0.137	0.085	3.177	19	2.922
10	1265	0.112	0.069	3.097	20	2.279
10	1295	0.073	0.045	3.109	21	1.569
11	335	0.067	0.041	2.773	37	1.164
11	365	0.170	0.103	2.646	38	2.042
11	395	0.287	0.176	2.951	39	2.775
11	425	0.324	0.201	3.314	40	3.278
11	455	0.273	0.171	3.584	41	3.533
11	485	0.296	0.185	3.618	42	3.517
11	515	0.229	0.143	3.583	43	3.248
11	545	0.168	0.104	3.254	44	2.808
11	575	0.125	0.078	3.372	45	2.224
11	605	0.081	0.050	3.284	46	1.543
11	1055	0.149	0.091	2.720	61	1.713
11	1085	0.270	0.165	2.734	62	2.598
11	1115	0.398	0.244	3.004	63	3.317
11	1145	0.392	0.243	3.286	64	3.818
11	1175	0.365	0.228	3.560	65	4.056
11	1205	0.360	0.224	3.429	66	3.979
11	1235	0.296	0.184	3.349	67	3.658
11	1265	0.247	0.153	3.393	68	3.163
11	1295	0.159	0.098	3.256	69	2.554
11	1325	0.113	0.070	3.038	70	1.849
11	1355	0.074	0.046	3.387	71	1.119
12	365	0.098	0.061	3.345	86	0.968
12	395	0.186	0.114	2.831	87	1.838
12	425	0.297	0.183	3.013	88	2.570
12	455	0.445	0.277	3.376	89	3.098
12	485	0.366	0.229	3.571	90	3.378

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DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
12	515	0.427	0.267	3.633	91	3.402
12	545	0.333	0.208	3.533	92	3.172
12	575	0.227	0.142	3.565	93	2.753
12	605	0.183	0.115	3.617	94	2.206
12	635	0.115	0.071	3.476	95	1.563
12	1085	0.140	0.086	2.835	110	1.491
12	1115	0.271	0.166	2.830	111	2.364
12	1145	0.471	0.290	3.039	112	3.063
12	1175	0.403	0.250	3.293	113	3.579
12	1205	0.461	0.287	3.493	114	3.863
12	1235	0.439	0.274	3.566	115	3.843
12	1265	0.375	0.236	3.749	116	3.574
12	1295	0.340	0.215	3.942	117	3.097
12	1325	0.239	0.149	3.498	118	2.505
12	1355	0.160	0.099	3.284	119	1.812
12	1385	0.099	0.062	3.609	120	1.094
13	425	0.186	0.115	3.172	136	1.409
13	455	0.336	0.208	3.241	137	2.152
13	485	0.524	0.326	3.359	138	2.712
13	515	0.593	0.373	3.824	139	3.057
13	545	0.546	0.344	3.953	140	3.173
13	575	0.500	0.315	3.863	141	3.025
13	605	0.397	0.251	3.971	142	2.671
13	635	0.277	0.175	3.902	143	2.171
13	665	0.212	0.134	4.007	144	1.565
13	695	0.135	0.086	4.279	145	0.894
13	1115	0.361	0.224	3.378	159	1.527
13	1145	0.622	0.388	3.528	160	2.345
13	1175	0.984	0.616	3.621	161	3.008
13	1205	1.034	0.650	3.814	162	3.485
13	1235	1.023	0.659	4.877	163	3.736
13	1265	0.985	0.631	4.612	164	3.693
13	1295	0.907	0.586	4.964	165	3.445
13	1325	0.704	0.448	4.324	166	3.004
13	1355	0.559	0.358	4.563	167	2.445
13	1385	0.416	0.269	5.119	168	1.820
13	1415	0.253	0.164	5.057	169	1.190
14	455	0.404	0.253	3.593	185	1.493
14	485	0.618	0.390	3.966	186	2.118
14	515	0.746	0.467	3.683	187	2.571
14	545	0.967	0.610	3.978	188	2.825
14	575	0.839	0.533	4.249	189	2.867
14	605	0.801	0.509	4.220	190	2.683
14	635	0.620	0.399	4.774	191	2.332
14	665	0.544	0.353	5.183	192	1.857
14	695	0.389	0.250	4.781	193	1.282
14	1145	0.244	0.157	4.922	208	0.869
14	1175	0.533	0.340	4.489	209	1.584
14	1205	0.832	0.533	4.591	210	2.188
14	1235	1.230	0.780	4.157	211	2.652
14	1265	1.206	0.775	4.741	212	2.914
14	1295	1.034	0.670	5.121	213	2.955
14	1325	0.920	0.594	4.932	214	2.749
14	1355	0.777	0.506	5.340	215	2.365
14	1385	0.564	0.371	5.866	216	1.864
14	1415	0.362	0.234	5.128	217	1.313

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	DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
124	15	485	0.200	0.129	4.826	234	0.838
125	15	515	0.402	0.256	4.314	235	1.374
126	15	545	0.444	0.283	4.328	236	1.762
127	15	575	0.575	0.371	4.874	237	1.999
128	15	605	0.583	0.377	5.016	238	2.083
129	15	635	0.467	0.301	4.953	239	1.981
130	15	665	0.407	0.263	4.920	240	1.740
131	15	695	0.340	0.221	5.022	241	1.375
132	15	725	0.199	0.131	5.829	242	0.938
133							
134	24	960	0.107	0.066	3.445	7	0.913
135	24	990	0.227	0.140	3.089	8	1.753
136	24	1020	0.378	0.234	3.218	9	2.502
137	24	1050	0.470	0.293	3.487	10	3.059
138	24	1080	0.433	0.274	4.092	11	3.398
139	24	1110	0.411	0.260	4.074	12	3.477
140	24	1140	0.356	0.225	4.088	13	3.290
141	24	1170	0.335	0.210	3.789	14	2.910
142	24	1200	0.255	0.160	3.646	15	2.370
143	24	1230	0.172	0.107	3.454	16	1.748
144	24	1260	0.097	0.061	3.767	17	1.066
145							
146	25	270	0.133	0.084	3.814	32	0.872
147	25	300	0.278	0.172	3.263	33	1.790
148	25	330	0.463	0.286	3.199	34	2.573
149	25	360	0.566	0.352	3.403	35	3.155
150	25	390	0.542	0.343	3.996	36	3.494
151	25	420	0.544	0.342	3.832	37	3.556
152	25	450	0.465	0.294	3.989	38	3.338
153	25	480	0.415	0.262	3.913	39	2.924
154	25	510	0.264	0.165	3.621	40	2.374
155	25	540	0.195	0.122	3.595	41	1.722
156	25	570	0.118	0.074	4.024	42	1.027
157							
158	25	1020	0.277	0.171	3.046	57	1.794
159	25	1050	0.549	0.338	3.050	58	2.612
160	25	1080	0.713	0.442	3.276	59	3.243
161	25	1110	0.623	0.389	3.513	60	3.662
162	25	1140	0.671	0.421	3.691	61	3.798
163	25	1170	0.571	0.360	3.906	62	3.631
164	25	1200	0.469	0.297	4.141	63	3.260
165	25	1230	0.399	0.250	3.659	64	2.700
166	25	1260	0.265	0.167	3.840	65	2.050
167	25	1290	0.169	0.106	3.934	66	1.337
168							
169	26	330	0.268	0.167	3.496	82	1.465
170	26	360	0.530	0.330	3.501	83	2.377
171	26	390	0.826	0.514	3.422	84	3.064
172	26	420	0.723	0.457	3.972	85	3.519
173	26	450	0.709	0.452	4.394	86	3.696
174	26	480	0.733	0.470	4.624	87	3.556
175	26	510	0.596	0.377	4.020	88	3.172
176	26	540	0.416	0.263	3.983	89	2.605
177	26	570	0.301	0.194	4.853	90	1.930
178	26	600	0.145	0.093	4.815	91	1.203
179							
180	26	1050	0.385	0.237	3.094	106	1.785
181	26	1080	0.701	0.434	3.274	107	2.694
182	26	1110	1.023	0.640	3.593	108	3.409
183	26	1140	0.932	0.586	3.782	109	3.906
184	26	1170	0.971	0.605	3.447	110	4.080
185	26	1200	0.916	0.574	3.692	111	3.958

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	DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
186	26	1230	0.733	0.465	4.202	112	3.534
187	26	1260	0.665	0.420	4.003	113	2.965
188	26	1290	0.466	0.299	4.581	114	2.271
189	26	1320	0.277	0.177	4.345	115	1.530
190							
191	27	360	0.268	0.165	3.128	131	1.455
192	27	390	0.507	0.314	3.257	132	2.418
193	27	420	0.857	0.533	3.414	133	3.151
194	27	450	0.885	0.558	3.920	134	3.661
195	27	480	0.817	0.518	4.142	135	3.884
196	27	510	0.891	0.567	4.308	136	3.778
197	27	540	0.680	0.433	4.342	137	3.422
198	27	570	0.566	0.358	4.048	138	2.861
199	27	600	0.403	0.259	4.642	139	2.196
200	27	630	0.238	0.152	4.571	140	1.449
201							
202	27	1110	1.042	0.652	3.639	156	2.654
203	27	1140	1.321	0.829	3.766	157	3.435

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DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
10	980	0.097	0.059	2.559	11	1.476
10	1010	0.121	0.073	2.593	12	2.278
10	1040	0.202	0.122	2.550	13	2.923
10	1070	0.178	0.110	3.172	14	3.350
10	1100	0.153	0.095	3.341	15	3.525
10	1130	0.159	0.098	3.092	16	3.410
10	1160	0.128	0.079	3.154	17	3.059
10	1190	0.089	0.055	3.003	18	2.540
10	1220	0.060	0.037	3.129	19	1.899
10	1250	0.033	0.021	3.111	20	1.192
11	290	0.040	0.025	3.354	36	1.015
11	320	0.095	0.059	3.352	37	1.874
11	350	0.127	0.079	3.364	38	2.587
11	380	0.173	0.108	3.691	39	3.071
11	410	0.146	0.092	3.961	40	3.310
11	440	0.135	0.085	3.723	41	3.274
11	470	0.113	0.070	3.426	42	3.003
11	500	0.079	0.050	3.715	43	2.561
11	530	0.057	0.035	3.384	44	1.978
11	560	0.036	0.022	3.382	45	1.305
11	1010	0.051	0.032	2.908	60	1.380
11	1040	0.084	0.052	2.961	61	2.275
11	1070	0.155	0.095	3.051	62	2.974
11	1100	0.152	0.094	3.152	63	3.465
11	1130	0.135	0.083	3.253	64	3.700
11	1160	0.149	0.092	2.988	65	3.616
11	1190	0.182	0.110	2.682	66	3.292
11	1220	0.144	0.088	2.941	67	2.773
11	1250	0.154	0.094	2.983	68	2.136
11	1280	0.109	0.067	2.921	69	1.418
12	320	0.074	0.045	2.781	85	0.939
12	350	0.145	0.089	2.870	86	1.809
12	380	0.229	0.141	3.112	87	2.530
12	410	0.284	0.176	3.393	88	3.034
12	440	0.224	0.141	3.761	89	3.282
12	470	0.212	0.132	3.446	90	3.269
12	500	0.151	0.095	3.608	91	2.995
12	530	0.122	0.076	3.440	92	2.534
12	560	0.094	0.058	3.161	93	1.940
12	590	0.055	0.034	3.154	94	1.255
12	1040	0.080	0.049	2.750	109	1.265
12	1070	0.166	0.101	2.834	110	2.182
12	1100	0.311	0.191	3.037	111	2.907
12	1130	0.290	0.180	3.443	112	3.427
12	1160	0.313	0.196	3.662	113	3.687
12	1190	0.289	0.181	3.667	114	3.623
12	1220	0.277	0.174	3.806	115	3.308
12	1250	0.203	0.127	3.701	116	2.794
12	1280	0.130	0.081	3.326	117	2.160
12	1310	0.097	0.060	3.190	118	1.446

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	DY	MIN	HMAX (m)	HSIG (m)	TZ (sec)	RECNO	ELEVN ODN (m)
62	13	350	0.067	0.041	2.943	134	0.825
63	13	380	0.145	0.089	2.877	135	1.681
64	13	410	0.185	0.113	2.755	136	2.394
65	13	440	0.263	0.162	3.223	137	2.895
66	13	470	0.231	0.144	3.463	138	3.141
67	13	500	0.217	0.135	3.510	139	3.139
68	13	530	0.174	0.108	3.232	140	2.882
69	13	560	0.132	0.082	3.441	141	2.449
70	13	590	0.087	0.054	3.366	142	1.880
71	13	620	0.052	0.032	3.345	143	1.219

APPENDIX B

Tabulation of Survey Profiles

Heacham Revetment Survey - Section 1. Profile 1. (Armorflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	standard deviation
1	0.68	0.280	0.282	0.280	0.285	0.282	0.0025
	0.94	0.271	0.284	0.279	0.285	0.283	0.0032
2	0.99	0.279	0.292	0.288	0.294	0.291	0.0031
	1.25	0.287	0.304	0.301	0.307	0.304	0.0030
3	1.31	0.289	0.301	0.297	0.303	0.300	0.0031
	1.56	0.305	0.328	0.324	0.331	0.328	0.0035
4	1.62	0.318	0.333	0.330	0.336	0.333	0.0030
	1.87	0.330	0.349	0.346	0.355	0.350	0.0046
5	1.92	0.339	0.354	0.351	0.360	0.355	0.0046
	2.17	0.342	0.360	0.356	0.364	0.360	0.0040
6	2.23	0.357	0.369	0.369	0.374	0.371	0.0029
	2.49	0.368	0.388	0.383	0.391	0.387	0.0040
7	2.54	0.370	0.389	0.388	0.387	0.387	0.0040
	2.79	0.386	0.423	0.417	0.427	0.422	0.0050
8	2.85	0.375	0.407	0.401	0.413	0.407	0.0060
	3.11	0.402	0.428	0.426	0.433	0.429	0.0036
9	3.15	0.405	0.429	0.428	0.436	0.431	0.0044
	3.41	0.430	0.452	0.449	0.455	0.452	0.0030
10	3.46	0.442	0.461	0.458	0.467	0.462	0.0046
	3.72	0.455	0.475	0.477	0.481	0.478	0.0031
11	3.76	0.460	0.485	0.483	0.491	0.486	0.0042
	4.02	0.460	0.485	0.483	0.491	0.490	0.0046
12	4.08	0.460	0.486	0.483	0.491	0.487	0.0051
	4.35	0.479	0.499	0.496	0.503	0.499	0.0035
13	4.38	0.485	0.507	0.504	0.510	0.507	0.0030
	4.65	0.506	0.529	0.531	0.536	0.532	0.0036
14	4.69	0.515	0.543	0.538	0.547	0.543	0.0045
	4.95	0.534	0.558	0.554	0.559	0.557	0.0026
15	5.00	0.530	0.558	0.559	0.563	0.560	0.0026
	5.26	0.555	0.582	0.584	0.586	0.584	0.0020
16	5.30	0.565	0.588	0.587	0.594	0.590	0.0038
	5.57	0.595	0.614	0.613	0.616	0.614	0.0015
17	5.62	0.610	0.625	0.617	0.620	0.621	0.0040
	5.87	0.620	0.637	0.637	0.641	0.638	0.0023
18	5.93	0.625	0.635	0.635	0.640	0.637	0.0029
	6.19	0.628	0.637	0.637	0.641	0.638	0.0023
19	6.24	0.629	0.638	0.641	0.644	0.641	0.0030
	6.44	0.640	0.655	0.648	0.646	0.650	0.0047
	6.60			0.580	0.582	on steel channel at the toe	

Kingpile No. 2 7.04m (crest to toe)

Mean and standard deviation taken from the Jan, Feb and March data.

Heacham Revetment Survey - Section 1. Profile 2. (Armorflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	standard deviation
1	0.67	0.291	0.293	0.291	0.296	0.293	0.0025
	0.93	0.300	0.305	0.301	0.305	0.304	0.0023
2	0.98	0.303	0.310	0.307	0.310	0.309	0.0017
	1.23	0.309	0.320	0.320	0.320	0.320	0.0000
3	1.29	0.308	0.320	0.319	0.320	0.320	0.0006
	1.55	0.313	0.333	0.332	0.335	0.333	0.0015
4	1.61	0.310	0.324	0.322	0.326	0.324	0.0020
	1.87	0.327	0.337	0.340	0.341	0.339	0.0021
5	1.92	0.330	0.341	0.340	0.344	0.342	0.0021
	2.18	0.343	0.355	0.355	0.357	0.356	0.0012
6	2.22	0.360	0.368	0.368	0.374	0.370	0.0035
	2.47	0.371	0.382	0.380	0.386	0.383	0.0031
7	2.53	0.370	0.381	0.381	0.384	0.382	0.0017
	2.80	0.379	0.391	0.388	0.391	0.390	0.0017
8	2.84	0.375	0.387	0.385	0.390	0.387	0.0025
	3.11	0.380	0.397	0.393	0.398	0.396	0.0026
9	3.16	0.384	0.399	0.397	0.402	0.399	0.0025
	3.42	0.399	0.413	0.410	0.415	0.413	0.0025
10	3.46	0.404	0.419	0.417	0.421	0.419	0.0020
	3.74	0.423	0.435	0.434	0.439	0.436	0.0026
11	3.78	0.428	0.440	0.438	0.442	0.440	0.0020
	4.04	0.445	0.453	0.456	0.457	0.455	0.0021
12	4.08	0.445	0.458	0.456	0.457	0.459	0.0031
	4.35	0.454	0.465	0.465	0.467	0.466	0.0012
13	4.41	0.449	0.465	0.462	0.470	0.466	0.0040
	4.67	0.472	0.487	0.485	0.490	0.487	0.0025
14	4.71	0.475	0.491	0.489	0.493	0.491	0.0020
	4.97	0.494	0.508	0.507	0.511	0.509	0.0021
15	5.02	0.501	0.516	0.512	0.517	0.515	0.0022
	5.28	0.541	0.554	0.550	0.555	0.553	0.0026
16	5.32	0.539	0.553	0.550	0.555	0.553	0.0025
	5.59	0.558	0.570	0.568	0.573	0.570	0.0025
17	5.64	0.559	0.570	0.570	0.573	0.571	0.0017
	5.90	0.596	0.605	0.606	0.607	0.606	0.0010
18	5.93	0.588	0.600	0.599	0.599	0.599	0.0006
	6.20	0.586	0.600	0.599	0.599	0.599	0.0006
19	6.25	0.598	0.611	0.613	0.613	0.612	0.0012
	6.50	0.592	0.603	0.601	0.604	0.603	0.0015
	6.72			0.554	0.553	on steel channel at the toe.	

Kingpile No. 8   7.05m (crest to toe)

Mean and standard deviation taken from the Jan, Feb and March data.

Heacham Revetment Survey - Section 1. Profile 3. (Armorflex)

Block No.	Chainage -metres-	Depth relative to wire -metres-				mean	standard deviation
		Dec	Jan	Feb	Mar		
1	0.68	0.279	0.283	0.276	0.280	0.280	0.0035
	0.94	0.292	0.290	0.290	0.289	0.290	0.0006
2	0.99	0.287	0.290	0.293	0.290	0.291	0.0017
	1.26	0.310	0.306	0.308	0.305	0.306	0.0015
3	1.30	0.312	0.313	0.312	0.308	0.311	0.0026
	1.56	0.330	0.330	0.330	0.327	0.329	0.0017
4	1.61	0.324	0.323	0.321	0.319	0.321	0.0020
	1.87	0.336	0.336	0.337	0.331	0.335	0.0032
5	1.91	0.343	0.345	0.344	0.339	0.343	0.0032
	2.18	0.349	0.348	0.349	0.344	0.347	0.0026
6	2.23	0.349	0.354	0.348	0.346	0.349	0.0042
	2.49	0.355	0.359	0.357	0.353	0.356	0.0031
7	2.54	0.382	0.385	0.380	0.376	0.380	0.0050
	2.79	0.391	0.395	0.394	0.388	0.392	0.0038
8	2.84	0.371	0.376	0.374	0.371	0.374	0.0025
	3.12	0.386	0.392	0.390	0.385	0.389	0.0036
9	3.16	0.405	0.406	0.407	0.402	0.405	0.0026
	3.42	0.420	0.429	0.424	0.421	0.425	0.0040
10	3.47	0.412	0.420	0.420	0.411	0.417	0.0052
	3.75	0.430	0.438	0.435	0.433	0.435	0.0025
11	3.78	0.428	0.439	0.436	0.433	0.436	0.0030
	4.05	0.441	0.445	0.449	0.442	0.445	0.0035
12	4.09	0.453	0.461	0.462	0.457	0.460	0.0026
	4.35	0.472	0.483	0.479	0.475	0.479	0.0040
13	4.40	0.460	0.472	0.473	0.467	0.471	0.0032
	4.67	0.485	0.498	0.494	0.489	0.494	0.0045
14	4.71	0.500	0.511	0.509	0.504	0.508	0.0042
	4.97	0.528	0.543	0.538	0.534	0.538	0.0045
15	5.01	0.529	0.540	0.538	0.534	0.537	0.0031
	5.28	0.541	0.554	0.555	0.546	0.552	0.0049
16	5.33	0.536	0.553	0.555	0.549	0.552	0.0031
	5.59	0.558	0.573	0.571	0.570	0.571	0.0015
17	5.64	0.564	0.579	0.579	0.573	0.577	0.0035
	5.91	0.589	0.604	0.608	0.596	0.603	0.0061
18	5.94	0.589	0.600	0.607	0.597	0.601	0.0051
	6.21	0.595	0.608	0.609	0.604	0.607	0.0032
19	6.26	0.590	0.598	0.606	0.598	0.601	0.0046
	6.54	-	0.594	0.604	0.593	0.597	0.0061
	6.74			0.561	0.561 on steel channel at the toe		

Kingpile No. 14 7.05m (crest to toe)

Mean and standard deviation taken from the Jan, Feb and March data.

Heacham Revetment Survey - Section 1. Profile 4. (Armorflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	standard deviation
1	0.68	0.271	0.278	0.275	0.275	0.276	0.0017
	0.93	0.273	0.279	0.278	0.278	0.278	0.0006
2	0.98	0.262	0.271	0.270	0.272	0.271	0.0010
	1.24	0.279	0.282	0.285	0.290	0.286	0.0040
3	1.30	0.276	0.288	0.280	0.289	0.286	0.0049
	1.56	0.296	0.301	0.307	0.310	0.306	0.0046
4	1.60	0.296	0.308	0.305	0.309	0.307	0.0021
	1.86	0.315	0.329	0.327	0.331	0.329	0.0020
5	1.90	0.314	0.331	0.328	0.335	0.331	0.0035
	2.18	0.325	0.341	0.340	0.343	0.341	0.0015
6	2.22	0.328	0.345	0.341	0.347	0.344	0.0031
	2.49	0.340	0.361	0.360	0.364	0.362	0.0021
7	2.53	0.345	0.356	0.357	0.361	0.358	0.0026
	2.80	0.355	0.372	0.369	0.374	0.372	0.0025
8	2.84	0.351	0.371	0.368	0.371	0.370	0.0017
	3.10	0.369	0.391	0.384	0.387	0.387	0.0035
9	3.16	0.364	0.387	0.383	0.388	0.386	0.0032
	3.42	0.399	0.422	0.414	0.421	0.419	0.0044
10	3.46	0.404	0.426	0.421	0.428	0.425	0.0036
	3.73	0.420	0.445	0.438	0.444	0.442	0.0038
11	3.77	0.416	0.435	0.429	0.437	0.434	0.0042
	4.03	0.435	0.456	0.449	0.455	0.453	0.0038
12	4.08	0.430	0.451	0.447	0.451	0.450	0.0023
	4.34	0.441	0.460	0.455	0.461	0.459	0.0032
13	4.40	0.436	0.458	0.453	0.458	0.456	0.0029
	4.67	0.472	0.495	0.493	0.497	0.495	0.0020
14	4.71	0.478	0.498	0.494	0.498	0.497	0.0023
	4.97	0.515	0.535	0.532	0.534	0.534	0.0015
15	5.02	0.505	0.526	0.523	0.529	0.526	0.0030
	5.28	0.541	0.559	0.558	0.561	0.559	0.0015
16	5.32	0.547	0.570	0.566	0.569	0.568	0.0021
	5.59	0.584	0.601	0.599	0.608	0.603	0.0047
17	5.62	0.584	0.605	0.598	0.601	0.601	0.0035
	5.88	0.596	0.613	0.608	0.610	0.610	0.0025
18	5.93	0.601	0.620	0.617	0.619	0.619	0.0015
	6.20	0.612	0.625	0.620	0.627	0.624	0.0036
19	6.24	0.614	0.627	0.621	0.627	0.625	0.0035
	6.49	0.602	0.615	0.613	0.616	0.615	0.0015
	6.71			0.560	0.559	on steel channel at the toe.	

Kingpile No. 20 7.02m (crest to toe)

Mean and standard deviation taken from the Jan, Feb and March data.

Heacham Revetment Survey - Section 1. Profile 5. (Armorflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	standard deviation
1	0.71	0.274	0.280	0.279	0.283	0.281	0.0021
	0.96	0.294	0.299	0.296	0.302	0.299	0.0030
2	1.01	0.295	0.300	0.294	0.301	0.298	0.0038
	1.27	0.307	0.316	0.307	0.319	0.314	0.0062
3	1.31	0.312	0.316	0.312	0.322	0.317	0.0050
	1.58	0.319	0.330	0.322	0.332	0.328	0.0053
4	1.63	0.320	0.333	0.324	0.337	0.331	0.0067
	1.90	0.331	0.345	0.340	0.349	0.345	0.0045
5	1.95	0.325	0.339	0.331	0.344	0.338	0.0066
	2.21	0.345	0.358	0.348	0.363	0.356	0.0076
6	2.25	0.343	0.359	0.350	0.364	0.358	0.0071
	2.52	0.359	0.377	0.369	0.379	0.375	0.0053
7	2.56	0.360	0.382	0.370	0.385	0.379	0.0079
	2.83	0.374	0.397	0.388	0.400	0.395	0.0062
8	2.88	0.371	0.399	0.390	0.401	0.397	0.0059
	3.14	0.387	0.419	0.406	0.422	0.416	0.0085
9	3.18	0.388	0.414	0.405	0.419	0.413	0.0071
	3.45	0.402	0.432	0.420	0.436	0.429	0.0083
10	3.50	0.376	0.426	0.415	0.428	0.423	0.0070
	3.76	0.399	0.447	0.437	0.448	0.444	0.0060
11	3.81	0.402	0.450	0.442	0.456	0.449	0.0070
	4.08	0.422	0.472	0.458	0.474	0.468	0.0087
12	4.13	0.415	0.462	0.455	0.469	0.462	0.0070
	4.40	0.444	0.492	0.481	0.497	0.490	0.0082
13	4.43	0.452	0.500	0.490	0.501	0.497	0.0061
	4.70	0.475	0.523	0.518	0.528	0.523	0.0050
14	4.75	0.479	0.524	0.515	0.528	0.522	0.0067
	5.01	0.498	0.553	0.544	0.554	0.550	0.0055
15	5.06	0.495	0.543	0.538	0.548	0.543	0.0050
	5.32	0.520	0.571	0.564	0.575	0.570	0.0056
16	5.38	0.523	0.572	0.567	0.576	0.572	0.0045
	5.64	0.565	0.617	0.610	0.619	0.615	0.0047
17	5.67	0.576	0.628	0.619	0.626	0.624	0.0047
	5.94	0.596	0.645	0.635	0.647	0.642	0.0064
18	6.00	0.579	0.632	0.627	0.631	0.630	0.0026
	6.27	0.598	0.649	0.639	0.647	0.645	0.0053
19	6.30	0.605	-	0.652	0.656	0.645	0.0028
	6.53	0.588	-	0.635	0.639	0.637	0.0028
	6.70			0.590	0.592	on steel channel at the toe.	

Kingpile No. 25 7.11m (crest to toe)

Mean and standard deviation taken from the Jan, Feb and March data.

Heacham Revetment Survey - Section 3. Profile 1. (Petraflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	st dev
1	0.65	0.335	0.339	0.337	0.340	0.338	0.0022
	0.85	0.338	0.344	0.342	0.345	0.342	0.0031
2	0.97	0.305	0.306	0.305	0.306	0.306	0.0006
	1.18	0.316	0.319	0.317	0.319	0.318	0.0002
3	1.24	0.363	0.362	0.363	0.360	0.362	0.0008
	1.48	0.378	0.379	0.375	0.379	0.378	0.0019
4	1.56	0.337	0.344	0.341	0.341	0.341	0.0029
	1.78	0.361	0.363	0.357	0.360	0.360	0.0025
5	1.84	0.395	0.399	0.397	0.397	0.397	0.0016
	2.08	0.416	0.416	0.415	0.415	0.416	0.0006
6	2.15	0.392	0.392	0.392	0.390	0.392	0.0010
	2.37	0.400	0.400	0.400	0.401	0.400	0.0005
7	2.43	0.435	0.434	0.431	0.432	0.433	0.0018
	2.66	0.441	0.442	0.440	0.438	0.440	0.0017
8	2.76	0.397	0.400	0.403	0.397	0.399	0.0029
	2.98	0.413	0.415	0.414	0.414	0.414	0.0008
9	3.05	0.465	0.461	0.461	0.459	0.462	0.0025
	3.27	0.479	0.476	0.477	0.476	0.477	0.0014
10	3.35	0.442	0.444	0.441	0.444	0.443	0.0015
	3.58	0.442	0.441	0.447	0.446	0.444	0.0029
11	3.65	0.489	0.487	0.489	0.492	0.489	0.0021
	3.87	0.500	0.500	0.503	0.504	0.502	0.0021
12	3.96	0.474	0.474	0.472	0.471	0.473	0.0015
	4.16	0.493	0.486	0.489	0.485	0.488	0.0036
13	4.24	0.523	0.521	0.526	0.521	0.523	0.0024
	4.47	0.541	0.537	0.538	0.536	0.538	0.0022
14	4.55	0.496	0.496	0.499	0.496	0.497	0.0015
	4.76	0.509	0.512	0.514	0.507	0.511	0.0031
15	4.83	0.557	0.563	0.563	0.563	0.562	0.0030
	5.06	0.571	0.576	0.576	0.574	0.574	0.0024
16	5.14	0.544	0.545	0.546	0.543	0.545	0.0013
	5.35	0.557	0.557	0.563	0.560	0.559	0.0029
17	5.43	0.593	0.593	0.598	0.593	0.594	0.0025
	5.65	0.617	0.618	0.617	0.617	0.617	0.0005
18	5.74	0.571	0.573	0.579	0.577	0.575	0.0037
	5.95	0.602	0.602	0.598	0.598	0.600	0.0023
19	6.02	0.635	0.636	0.637	0.641	0.637	0.0026
	6.25	0.641	0.640	0.644	0.648	0.643	0.0036
20	6.35	0.603	0.599	0.609	0.605	0.604	0.0042
	6.65	0.546	0.547	0.545	0.546	on steel channel at the toe	

Kingpile No. 1 7.02m (crest to toe)

Mean and standard deviation taken from Dec, Jan, Feb and March data

Heacham Revetment Survey - Section 3. Profile 2. (Petraflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	st dev
1	0.62	0.305	0.303	0.306	0.308	0.306	0.0021
	0.85	0.310	0.311	0.312	0.313	0.312	0.0013
2	0.92	0.353	0.352	0.355	0.355	0.354	0.0015
	1.15	0.369	0.369	0.368	0.370	0.369	0.0008
3	1.23	0.334	0.333	0.331	0.330	0.332	0.0018
	1.44	0.344	0.346	0.346	0.345	0.345	0.0010
4	1.51	0.381	0.382	0.381	0.383	0.382	0.0010
	1.75	0.388	0.393	0.392	0.394	0.392	0.0026
5	1.83	0.362	0.364	0.364	0.366	0.364	0.0016
	2.05	0.377	0.381	0.380	0.382	0.380	0.0022
6	2.11	0.420	0.422	0.422	0.424	0.422	0.0016
	2.34	0.438	0.435	0.435	0.441	0.437	0.0029
7	2.42	0.396	0.400	0.403	0.406	0.401	0.0038
	2.65	0.411	0.412	0.417	0.418	0.415	0.0035
8	2.70	0.457	0.451	0.457	0.459	0.456	0.0035
	2.94	0.466	0.461	0.466	0.470	0.466	0.0037
9	3.02	0.431	0.426	0.433	0.433	0.431	0.0029
	3.24	0.441	0.441	0.445	0.447	0.444	0.0030
10	3.32	0.485	0.483	0.489	0.491	0.487	0.0037
	3.53	0.496	0.489	0.496	0.496	0.494	0.0035
11	3.62	0.464	0.465	0.471	0.471	0.468	0.0038
	3.84	0.478	0.476	0.480	0.481	0.479	0.0022
12	3.91	0.516	0.509	0.516	0.520	0.515	0.0046
	4.14	0.519	0.518	0.522	0.525	0.521	0.0032
13	4.22	0.489	0.491	0.496	0.494	0.493	0.0031
	4.43	0.496	0.494	0.499	0.499	0.497	0.0025
14	4.51	0.541	0.537	0.545	0.545	0.542	0.0038
	4.74	0.555	0.556	0.561	0.561	0.558	0.0032
15	4.82	0.517	0.516	0.521	0.523	0.519	0.0033
	5.03	0.529	0.528	0.533	0.533	0.531	0.0026
16	5.11	0.578	0.579	0.578	0.576	0.578	0.0057
	5.32	0.596	0.601	0.604	0.604	0.601	0.0038
17	5.41	0.559	0.557	0.558	0.563	0.559	0.0026
	5.64	0.573	0.576	0.581	0.581	0.578	0.0057
18	5.68	0.629	0.635	0.635	0.635	0.634	0.0030
	5.91	0.646	0.645	0.648	0.652	0.648	0.0035
19	6.00	0.610	0.611	0.617	0.617	0.614	0.0038
	6.22	0.622	0.621	0.621	0.621	0.621	0.0005
20	6.29	0.657	0.657	0.658	0.658	0.658	0.0006
	6.62	0.547	0.545	0.548	0.548	on steel channel at the toe	

Kingpile No. 7 6.94m (crest to toe)

Mean and standard deviation taken from Dec, Jan, Feb and March data

Heacham Revetment Survey - Section 3. Profile 3. (Petraflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	st dev
1	0.61	0.291	0.290	0.291	0.290	0.291	0.0006
	0.83	0.301	0.299	0.298	0.301	0.300	0.0015
2	0.90	0.341	0.342	0.341	0.344	0.342	0.0014
	1.14	0.354	0.356	0.354	0.357	0.355	0.0015
3	1.21	0.320	0.321	0.320	0.321	0.321	0.0006
	1.44	0.326	0.325	0.329	0.327	0.327	0.0017
4	1.51	0.363	0.374	0.371	0.376	0.371	0.0057
	1.74	0.372	0.385	0.382	0.382	0.380	0.0057
5	1.81	0.347	0.355	0.346	0.351	0.350	0.0041
	2.04	0.353	0.363	0.360	0.367	0.361	0.0059
6	2.11	0.394	0.402	0.396	0.400	0.398	0.0037
	2.34	0.403	0.409	0.408	0.413	0.408	0.0041
7	2.41	0.373	0.381	0.377	0.383	0.379	0.0044
	2.63	0.395	0.400	0.392	0.401	0.397	0.0042
8	2.70	0.421	0.431	0.428	0.434	0.429	0.0056
	2.93	0.441	0.448	0.447	0.450	0.447	0.0039
9	3.00	0.410	0.420	0.416	0.427	0.418	0.0071
	3.23	0.422	0.432	0.429	0.433	0.429	0.0050
10	3.30	0.463	0.471	0.466	0.471	0.468	0.0040
	3.53	0.476	0.486	0.480	0.487	0.482	0.0052
11	3.60	0.446	0.455	0.456	0.458	0.454	0.0053
	3.82	0.457	0.471	0.469	0.475	0.468	0.0078
12	3.89	0.500	0.511	0.506	0.514	0.508	0.0061
	4.12	0.521	0.536	0.533	0.540	0.533	0.0082
13	4.19	0.492	0.506	0.505	0.512	0.504	0.0084
	4.41	0.501	0.514	0.512	0.520	0.512	0.0079
14	4.48	0.539	0.548	0.546	0.551	0.546	0.0051
	4.71	0.550	0.552	0.549	0.556	0.546	0.0031
15	4.78	0.517	0.519	0.518	0.521	0.519	0.0017
	5.01	0.529	0.528	0.526	0.530	0.528	0.0017
16	5.08	0.578	0.576	0.574	0.580	0.577	0.0026
	5.32	0.569	0.576	0.571	0.577	0.573	0.0039
17	5.40	0.539	0.541	0.539	0.545	0.541	0.0028
	5.62	0.563	0.564	0.561	0.563	0.563	0.0013
18	5.69	0.595	0.603	0.602	0.603	0.601	0.0039
	5.91	0.622	0.623	0.621	0.625	0.623	0.0017
19	5.98	0.585	0.593	0.591	0.594	0.591	0.0040
	6.18	0.593	0.597	0.596	0.599	0.596	0.0025
20	6.25	0.638	0.639	0.642	0.640	0.640	0.0017
	6.60	0.541	0.540	0.541	0.543	on steel channel at the toe	

Kingpile No. 13   6.94m (crest to toe)

Mean and standard deviation taken from Dec, Jan, Feb and March data

This profile is on a line with the third groyne from the south

Heacham Revetment Survey - Section 3. Profile 4. (Petraflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	st dev
1	0.59	0.300	0.300	0.305	0.300	0.301	0.0030
	0.82	0.293	0.291	0.296	0.294	0.294	0.0025
2	0.90	0.323	0.320	0.324	0.323	0.323	0.0017
	1.13	0.341	0.341	0.344	0.342	0.342	0.0019
3	1.21	0.306	0.304	0.305	0.306	0.305	0.0012
	1.44	0.319	0.320	0.321	0.317	0.319	0.0017
4	1.51	0.351	0.350	0.355	0.349	0.352	0.0031
	1.73	0.361	0.361	0.366	0.361	0.363	0.0030
5	1.81	0.329	0.330	0.334	0.328	0.331	0.0031
	2.04	0.342	0.343	0.344	0.341	0.343	0.0017
6	2.10	0.379	0.381	0.383	0.379	0.381	0.0023
	2.33	0.389	0.391	0.389	0.391	0.390	0.0012
7	2.41	0.355	0.360	0.365	0.360	0.360	0.0045
	2.63	0.374	0.375	0.379	0.374	0.376	0.0029
8	2.69	0.416	0.419	0.421	0.421	0.419	0.0024
	2.91	0.428	0.430	0.432	0.426	0.429	0.0026
9	3.00	0.398	0.396	0.399	0.396	0.398	0.0019
	3.22	0.403	0.404	0.409	0.401	0.404	0.0042
10	3.29	0.438	0.435	0.441	0.435	0.437	0.0036
	3.51	0.444	0.446	0.450	0.441	0.446	0.0042
11	3.60	0.407	0.406	0.414	0.407	0.409	0.0042
	3.83	0.405	0.414	0.416	0.410	0.412	0.0052
12	3.89	0.454	0.456	0.460	0.455	0.457	0.0031
	4.12	0.456	0.461	0.465	0.460	0.461	0.0041
13	4.20	0.419	0.420	0.421	0.422	0.421	0.0013
	4.43	0.436	0.436	0.442	0.438	0.438	0.0033
14	4.49	0.484	0.486	0.486	0.483	0.485	0.0017
	4.72	0.486	0.492	0.493	0.489	0.485	0.0015
15	4.81	0.447	0.453	0.454	0.449	0.451	0.0037
	5.03	0.454	0.462	0.461	0.459	0.459	0.0045
16	5.08	0.500	0.508	0.504	0.503	0.504	0.0037
	5.32	0.520	0.522	0.521	0.519	0.521	0.0013
17	5.41	0.483	0.485	0.486	0.484	0.485	0.0015
	5.62	0.504	0.506	0.506	0.504	0.505	0.0012
18	5.67	0.555	0.558	0.557	0.556	0.557	0.0013
	5.91	0.571	0.571	0.570	0.570	0.571	0.0006
19	5.98	0.534	0.536	0.536	0.536	0.536	0.0010
	6.21	0.535	0.538	0.537	0.537	0.537	0.0013
20	6.26	0.591	0.587	0.580	0.584	0.585	0.0050
	6.58	0.465	0.466	0.464	0.465	on steel channel at the toe	

Kingpile No.19 6.64m (crest to toe)

Mean and standard deviation taken from Dec, Jan, Feb and March data

Heacham Revetment Survey - Section 3. Profile 5. (Petraflex)

Block No.	Chainage -metres-	Depth relative to wire -metres- Dec	Jan	Feb	Mar	mean	st dev
1	0.73	0.264	0.268	0.265	0.267	0.266	0.0018
	0.95	0.272	0.270	0.271	0.271	0.272	0.0013
2	1.03	0.299	0.299	0.300	0.303	0.300	0.00
	1.26	0.319	0.324	0.323	0.325	0.323	0.0026
3	1.35	0.280	0.281	0.284	0.285	0.283	0.0024
	1.57	0.288	0.294	0.296	0.294	0.293	0.0035
4	1.63	0.333	0.339	0.340	0.341	0.338	0.0036
	1.85	0.335	0.344	0.348	0.347	0.344	0.0059
5	1.94	0.295	0.307	0.312	0.310	0.306	0.0076
	2.17	0.314	0.316	0.320	0.318	0.317	0.0026
6	2.23	0.348	0.354	0.356	0.356	0.353	0.0043
	2.46	0.347	0.361	0.365	0.362	0.359	0.0080
7	2.54	0.316	0.330	0.334	0.332	0.328	0.0082
	2.77	0.323	0.337	0.340	0.340	0.335	0.0081
8	2.84	0.356	0.366	0.371	0.372	0.366	0.0073
	3.07	0.368	0.381	0.384	0.387	0.380	0.0084
9	3.14	0.338	0.353	0.355	0.355	0.350	0.0082
	3.37	0.358	0.360	0.364	0.365	0.362	0.0029
10	3.43	0.390	0.400	0.403	0.402	0.399	0.0060
	3.66	0.407	0.408	0.411	0.409	0.409	0.0017
11	3.74	0.363	0.373	0.371	0.371	0.370	0.0044
	3.98	0.374	0.383	0.386	0.388	0.382	0.0081
12	4.03	0.410	0.422	0.424	0.422	0.420	0.0064
	4.26	0.429	0.439	0.440	0.438	0.437	0.0051
13	4.34	0.393	0.400	0.403	0.398	0.399	0.0042
	4.57	0.412	0.418	0.420	0.418	0.417	0.0035
14	4.62	0.449	0.457	0.455	0.456	0.454	0.0036
	4.86	0.464	0.470	0.473	0.473	0.470	0.0042
15	4.94	0.439	0.444	0.444	0.443	0.443	0.0024
	5.16	0.464	0.466	0.469	0.469	0.467	0.0025
16	5.22	0.510	0.516	0.517	0.520	0.516	0.0042
	5.44	0.550	0.555	0.552	0.549	0.552	0.0027
17	5.53	0.520	0.528	0.531	0.531	0.528	0.0052
	5.74	0.551	0.553	0.558	0.557	0.555	0.0033
18	5.79	0.595	0.600	0.591	0.595	0.595	0.0037
	6.02	0.575	0.583	0.583	0.581	0.581	0.0038
19	6.10	0.532	0.538	0.536	0.539	0.536	0.0031
	6.33	0.492	0.498	0.497	0.497	0.496	0.0027
20	6.41	0.530	0.532	0.531	0.533	0.532	0.0013
	6.74	0.409	0.414	0.409	0.410	on steel channel at the toe	

Kingpile No. 24 6.82m (crest to toe)

Mean and standard deviation taken from Dec, Jan, Feb and March data.