

General Certificate of Education  
June 2005  
Advanced Level Examination



**GEOGRAPHY (SPECIFICATION A)  
Unit 7**

**GGA7/PM**

No additional materials are required.

**To be issued to candidates on 1 May prior to the examination.**

**Pre-release material**

**Instructions**

- This material must be kept **unmarked** for use in the forthcoming examination.
- The centre 2-page section of this booklet contains coloured photographs, which can be detached.

**Advice**

You should use the information contained in this booklet to become familiar with the aim, methods and data provided. Methods of data presentation should be considered and subsequent analysis and conclusions drawn. Enquiry related issues should be explored. You should use your own experience of fieldwork.

**Materials and resources (except for Fig P1) reproduced with permission of Slapton Ley Field Centre ([www.field-studies-council-org/slaptonley](http://www.field-studies-council-org/slaptonley))**

## TITLE OF ENQUIRY

### How do beach profiles and beach material vary at Slapton Sands, Devon?

#### AIM

The aim of this enquiry is to determine whether the beach profile and the size of the beach material change progressively along the beach and over time at Slapton Sands, Devon.

In order to complete this enquiry, a number of objectives can be identified.

- Objective 1. To determine whether the beach profiles change southwards along Slapton Sands.
- Objective 2. To determine whether beach material gets larger southwards along Slapton Sands.
- Objective 3. To determine whether the beach profile has changed in the long term (over thirty years) and whether the beach profile and material exhibit any short term (seasonal) change.

#### BACKGROUND INFORMATION

The study examines the shingle beach between Strete Gate (grid reference 834455) and Torcross (grid reference 823421) in Start Bay, Devon (**Figure P1**). The area is known as Slapton Sands and the beach (actually a bar) encloses Slapton Ley. According to the Shoreline Management Plan, 'the sediment transport system along this stretch of Start Bay is unclear. Evidence suggests that both northward and southward drift occurs. It is also likely that there is onshore/offshore exchange of sediment. Start Bay is effectively a closed sediment cell'.

Much of the coastline in Start Bay is undefended. Within the study area, there are defences at Slapton and Torcross. At the latter, there is a concrete wave return wall with rock revetment and steel piling, following upgrading from rip-rap and metal piling in 1981. A concrete mattress revetment protecting the car park at Slapton was severely damaged in January 2001. Rip-rap was installed north of Slapton Turn (829443) on the A379, following the undermining and closure of the road after a moderate easterly January storm and high tide. The rip-rap defences were removed after reconstruction of the road in 2002. In January 2003, 12 000 tons of shingle were taken from Strete Gate and placed on the beach at the site of the eroded road. The objectives of coastal management for this area are 'to protect the settlements of Beesands, Torcross and the area behind Slapton Sands; to maintain the integrity of nationally designated sites; to maintain the continuity of the South West Coast Path; to protect the A379 and to maintain bathing beach quality'.

**Figure P2a** shows a typical profile of a shingle beach, whilst **Figure P2b** shows the possible change between a winter and a summer profile.

OS map extract 1: 50000 Landranger 202

Not reproduced here due to third-party copyright constraints.

**Figure P1**

**Turn over ►**

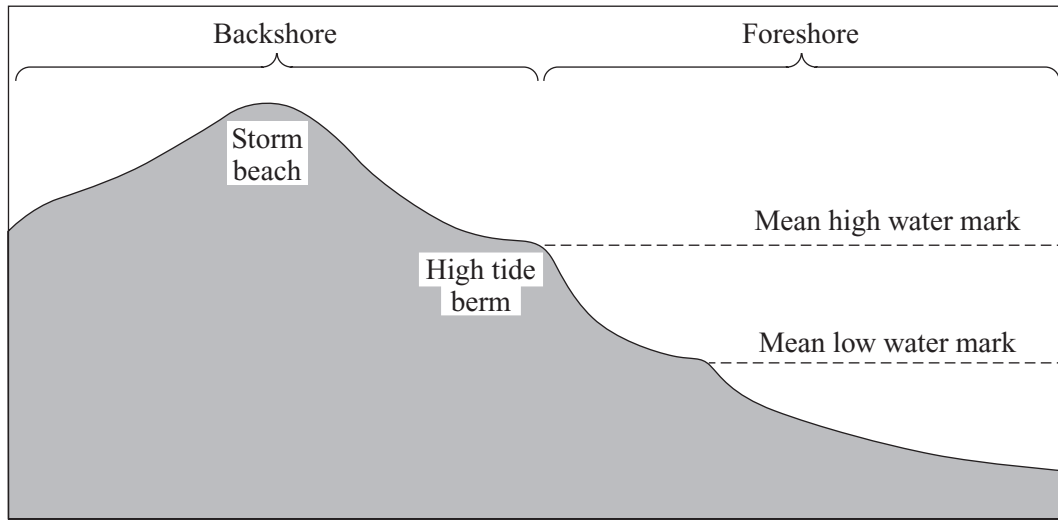


Figure P2a

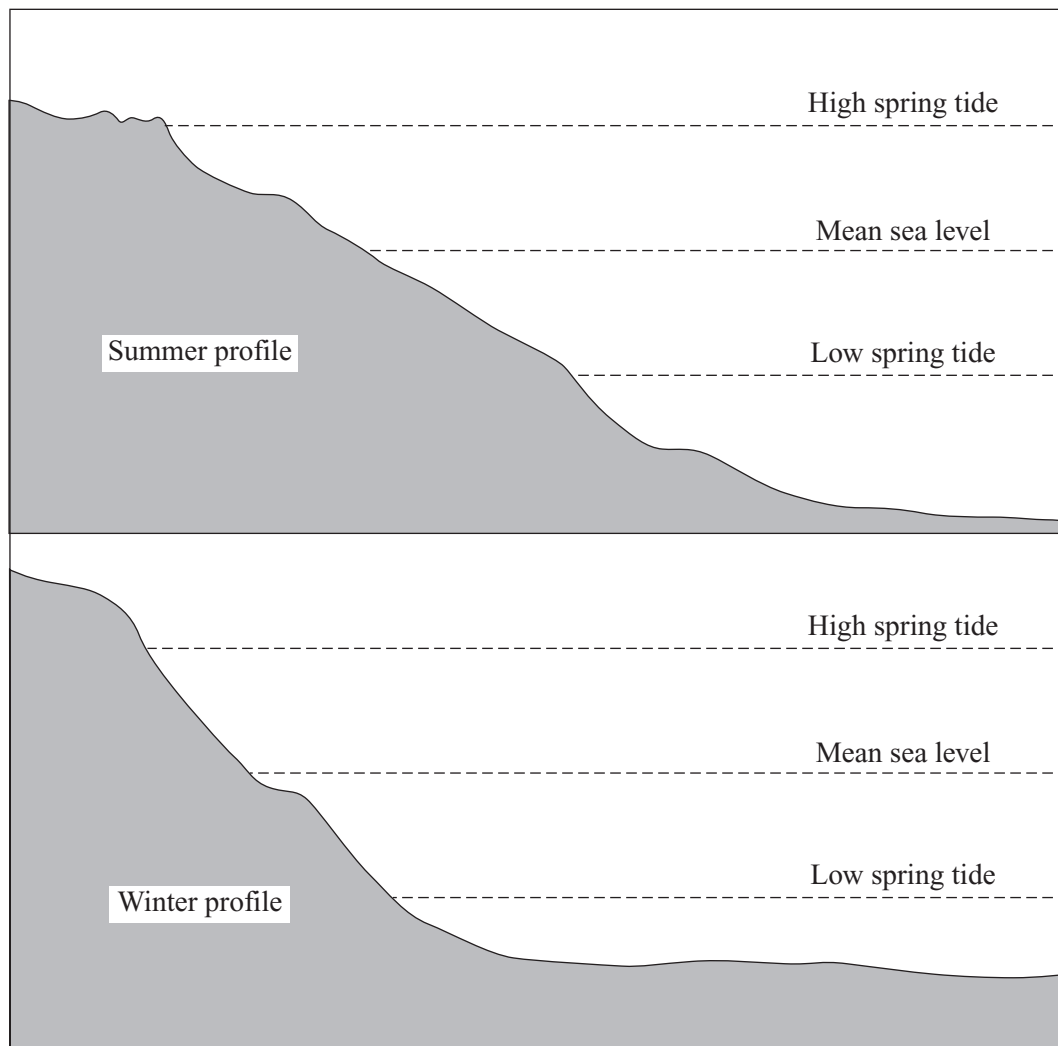
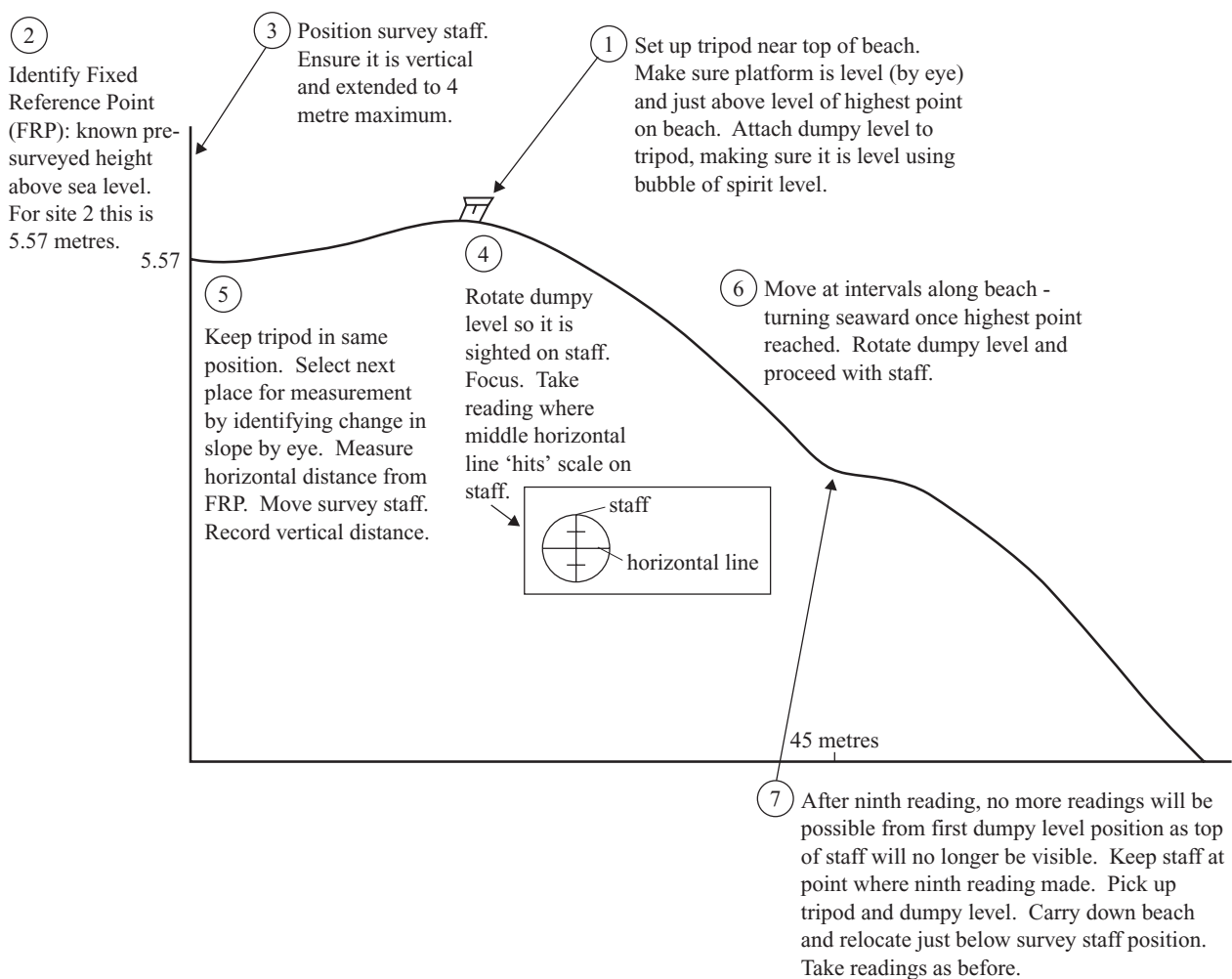


Figure P2b

## DATA COLLECTION

Six study sites were identified. The location of these are shown on **Figure P3** (in the centre of this booklet) together with photographs of the beach at three of these sites. At each of the study sites, a beach profile was determined at right angles to the sea, by using the dumpy level surveying method. This involved determining the horizontal distance from a fixed reference point (at a known height above mean sea level and marked clearly on the beach) and the vertical distance from this reference point. This was identified using a dumpy level and staff as shown in **Figure P4a**. This illustrates the process using site 2. The results of one survey in its raw, unprocessed form are shown in **Figure P4b**. **Figure P5a** shows the processed horizontal and vertical distances from the fixed reference point for all six sites for February 2003 whilst **Figure P5b** shows the data for three of the sites for August 2001.



**Figure P4a**

Turn over ►

<b>SITE 2</b>				
<b>Month: 2 February Year: 2003</b>				
<b>Reference Point Height: 5.57 metres</b>				
<b>Distance (m)</b>	<b>Reading 1<sup>st</sup> Position (m)</b>	<b>Reading 2<sup>nd</sup> Position (m)</b>	<b>Reading 3<sup>rd</sup> Position (m)</b>	<b>Elevation (m)</b>
0	1.62			5.57
1	1.35			5.84
10	0.845			6.345
15.7	0.615			6.575
19	1.435			5.755
24	2.295			4.895
30	2.45			4.74
39	2.965			4.225
45	3.46	0.62		3.73
53		1.69		2.66
57		1.895		2.455
60		1.76		2.59
70		3.5	0.61	0.85
77			1.43	0.03
86			2.55	-1.09

**Figure P4b**

**DISCARD PAGE**

**Turn over ►**

**DISCARD PAGE**



**DISCARD PAGE**

**Turn over ►**

**DISCARD PAGE**

<b>SITE</b>	<b>1</b>		<b>4</b>		<b>6</b>	
<b>Reference Point</b>	<b>5.59</b>		<b>5.97</b>		<b>5.2</b>	
	Horizontal Distance	Vertical Distance	Horizontal Distance	Vertical Distance	Horizontal Distance	Vertical Distance
	0	5.59	0	5.97	0	5.2
	13	5.73	18.2	6.18	8	4.22
	21	6.08	18.71	5.83	14	3.64
	30	6.36	24.6	4.64	19	3.37
	44.2	6.2	30	4.08	23	3.26
	51.5	4.3	40.9	3.34	30	3.01
	60	4.15	49	3.25	34.2	2.48
	64.5	4.09	54	2.85	36.7	2.53
	71	3.22	57	2.54	40	1.48
	81	3.73	59	2.6	42.3	0.89
	90	2.82	72	0.22	55	-0.89
	94	3.62				
	102	1.73				
	112	0.2				

All units  
in metres

**Figure P5b**

Turn over ►

Samples of beach material were taken at each of the six sites in September 2003, by a 'two-handed grab' of beach material one metre seaward of the most recent high tide berm. The sample was then sieved and weighed to determine the proportions of material of different sizes. The mean and standard deviation were subsequently calculated.

The phi categories and the interpretation of the standard deviation figures are given in **Figures P6a** and **P6b**, whilst the results of this survey are shown in **Figure P7a**. **Figure P7b** shows the results of a similar survey undertaken in May 2003.

**Size categories of beach material in Start Bay, Devon**

<b>Phi (<math>\Phi</math>)</b>	<b>Particle size diameter (mm)</b>	<b>Size category (Wentworth Grade)</b>
-6.0	64.0	<b>Cobbles</b> 60.0 mm
-5.5 -5.0 -4.5	44.8 32.0 22.4	<b>Coarse gravel</b> 20.0 mm
-4.0 -3.5 -3.0	16.0 11.2 8.0	<b>Medium gravel</b> 6.0 mm
-2.5 -2.0 -1.5 -1.0	5.6 4.0 2.8 2.0	<b>Fine gravel</b> 2.0 mm
-0.5 0.0 0.5	1.4 1.0 0.71	<b>Coarse sand</b> 0.6 mm
1.0 1.5 2.0	0.5 0.355 0.25	<b>Medium sand</b> 0.2 mm
2.5 3.0 3.5 4.0	0.18 0.125 0.090 0.063	<b>Fine sand</b> 0.06 mm

**Figure P6a**

**Descriptive terms for sorting of beach material  
in Start Bay, Devon, using standard deviation**

<b>Standard deviation value</b>	<b>Degree of sorting</b>
< 0.35	Very well sorted
0.35 – 0.49	Well sorted
0.50 – 0.69	Moderately well sorted
0.70 – 0.99	Moderately sorted
1.00 – 1.99	Poorly sorted
2.00 – 4.00	Very poorly sorted
> 4.00	Extremely poorly sorted

**Figure P6b**

Turn over ►

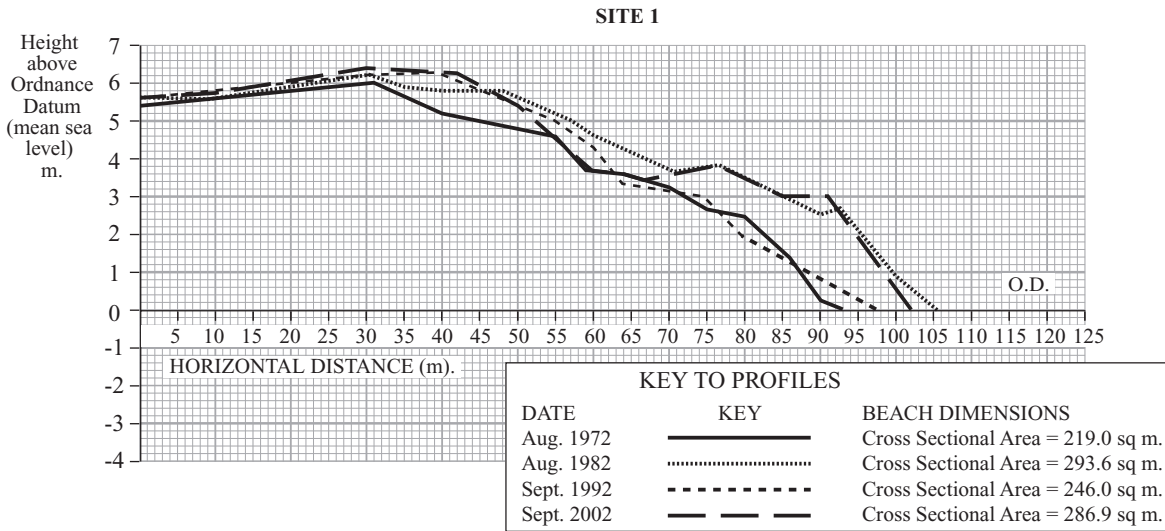
phi size	Site 1		Site 2		Site 3		Site 4		Site 5		Site 6	
	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)
-5.0	0	0	0	0	0	0	0	0	0	0	0	0
-4.0	20.91	1.1	0	0	35.8	4.6	0	0	36.8	3.8	78.1	6.5
-3.0	60.52	3.1	43	2.8	137.2	17.7	349.1	45.3	467.33	48.6	800.84	66.7
-2.0	1779.13	91.8	1384.2	91	580.6	74.8	422	54.7	458.26	47.6	311.8	26
-1.0	77.25	4	94	6.2	11	1.4	0	0	0	0	10.05	0.8
0	0	0	0	0	10	1.3	0	0	0	0	0	0
1.0	0	0	0	0	1.3	0.2	0	0	0	0	0	0
2.0	0	0	0	0	0	0	0	0	0	0	0	0
Mean phi size	-2.506		-2.483		-2.612		-2.726		-3.281		-3.394	
Standard deviation	0.169		0.146		0.246		0.303		0.251		0.212	

Figure P7a

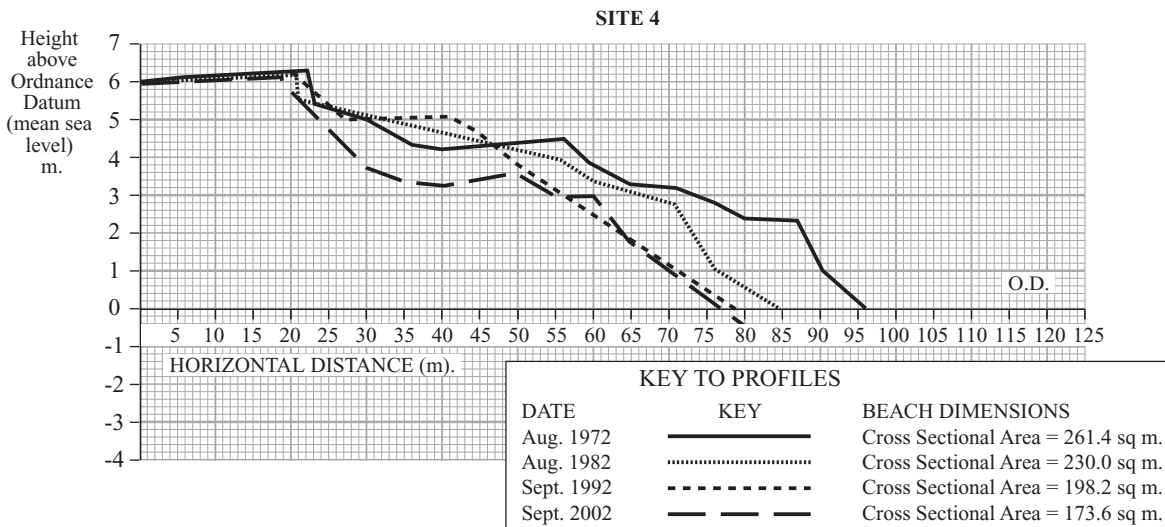
phi size	Site 1		Site 2		Site 3		Site 4		Site 5		Site 6	
	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)	Weight (g)	Frequency (%)
-5.0	0	0	0	0	0	0	0	0	0	0	0	0
-4.0	0	0	0	0	7.5	0.7	68.7	7	63.1	11.1	133.3	21.6
-3.0	4.4	0.3	23	1.2	125.4	12.5	580.2	59.5	132.4	23.3	292.1	47.3
-2.0	187.9	13.1	1030.9	54.8	852.7	85.2	326.1	33.4	24.2	4.3	786.5	30.2
-1.0	1244.9	86.5	827.8	44	15.4	1.5	0	0	182.2	32	5.1	0.8
0	0.5	0	0.4	0	0	0	0	0	165.5	29.1	0	0
1.0	0.5	0	0	0	0	0	0	0	1.6	0.3	0.1	0
2.0	0.5	0	0	0	0	0	0	0	0	0	0.1	0
Mean phi size	-1.567		-2.286		-2.562		-3.368		-1.772		-2.727	
Standard deviation	0.137		0.265		0.165		0.178		0.522		0.19	

Figure P7b

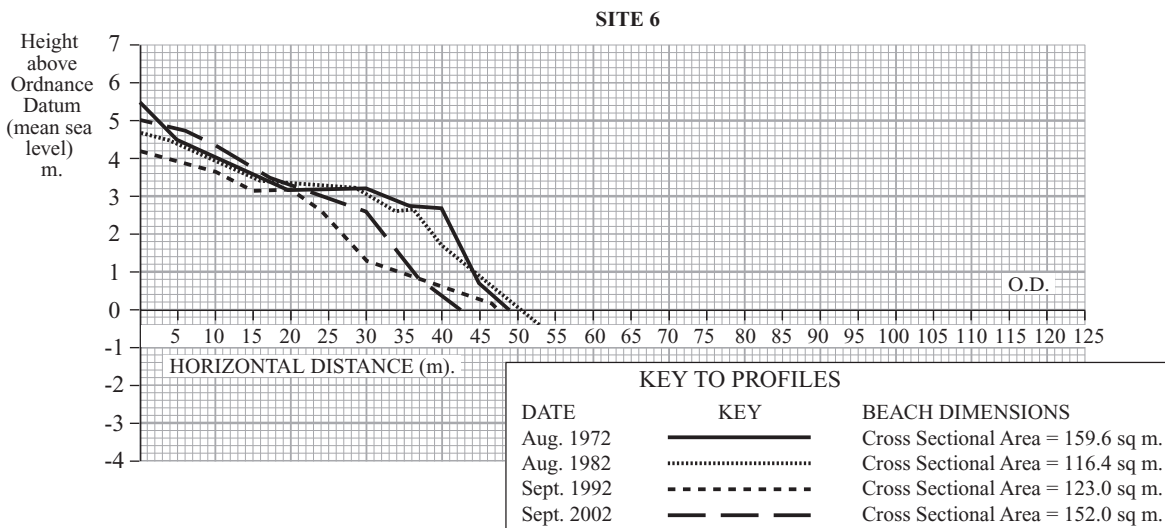
Secondary beach profile data from the second year of each decade between 1972 and 2002 was obtained for three of the sites and is presented in **Figures P8a, P8b** and **P8c**. This was surveyed in the same way as the 2001 and 2003 data presented earlier in this booklet.



**Figure P8a**



**Figure P8b**



**Figure P8c**

**NO TEXT APPEARS ON THIS PAGE**

ACKNOWLEDGEMENT OF COPYRIGHT-HOLDERS AND PUBLISHERS

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright owners have been unsuccessful and the AQA will be happy to rectify any omissions of acknowledgements in future if notified.

Copyright © 2005 AQA and its licensors. All rights reserved.