CASE STUDY - CLIFF RETREAT AT PEACEHAVEN

1. At the beginning of the 20th century the Peacehaven area was mainly open downland and fields of wheat, with a few scattered farms and cottages (see OS map of 1873, downloadable from Data page of www.geog.sussex.ac.uk/BAR). At the end of WWI the land was sold off for development, intended to become an attractive Garden City by the Sea, 'a land fit for the heroes who returned from the war'.

c.1930

2006

Charles Neville, the developer, was careful not to sell off plots too close to the cliff edge. He left a strip of land, the Promenade, about 30 m wide along the cliff top for walking and other recreation.

Unfortunately, no one reckoned on the speed of the cliff erosion. By the 1960's many more houses had been built along the Promenade, but the cliff edge was now much nearer the housing, and there were major worries about the road and services being cut. By 1973 cliff erosion had already begun to remove the front garden of one property and was threatening several other properties.

a) What do you notice about the width of the promenade in the two photographs above?

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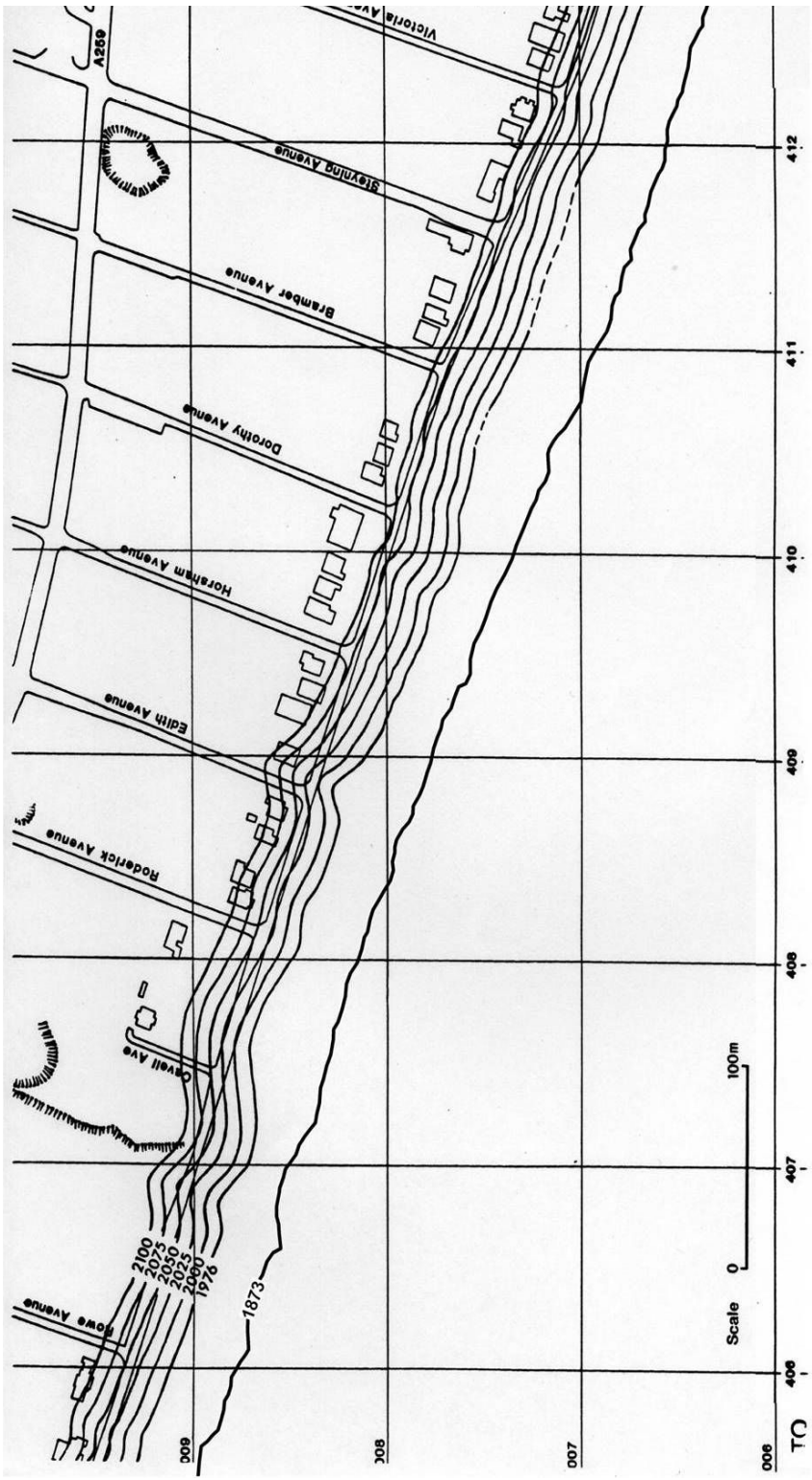
2. CLIFF RETREAT AT PEACEHAVEN BASTION IN THE ABSENCE OF SEA DEFENCES



a) Using the map showing positions of the cliff edge in different years, it is possible to calculate how much the cliff receded, and will continue to recede, on average, each year. Fill in the missing figures below (Hint: **iv** = **iii**/**i**):

i) Number of years from 1873 to 1976 = _____ years
ii) Distance that the cliff receded = _____ cm on the map
iii) Using the map scale, this distance = _____ m on the ground
iv) The average rate of cliff retreat each year = _____ m each year

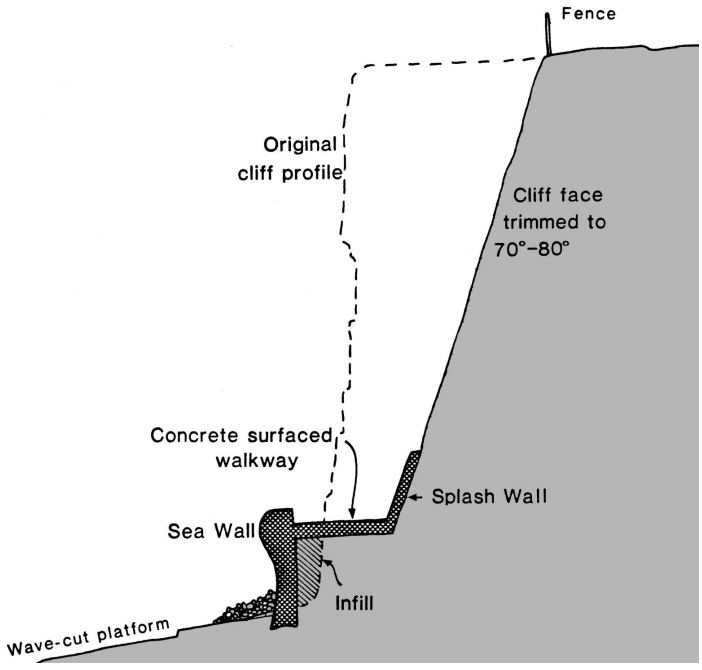
Of course the cliffs did not erode back continuously at such a steady rate - there were major cliff falls every few years followed by periods when the cliff base was protected by the fallen debris and nothing happened until all the broken rock was eroded and transported away.

University of Sussex researchers have measured rates of cliff retreat along the entire chalk coast using old and modern maps. You can look at their work at the Journal of Maps website (www.journalofmaps.com – registration is free, search for "Sussex"). How do your results compare with theirs? Where are chalk cliffs in Sussex eroding most rapidly?

3. SEA DEFENCES AT PEACEHAVEN

In 1975 Lewes District Council authorised work to begin building a sea wall under the cliffs in the central and eastern part of Peacehaven to protect the houses most at risk from the eroding cliff:

Sea wall design at Peacehaven



a) What are the advantages of the design?

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b) What are the disadvantages?

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The sea wall was completed in 1977. Since then 3 more sections of wall have been built, at ever increasing cost, so now the whole of Peacehaven is protected.

COSTS OF PROTECTION

Phase	Length	Year completed	Cost	Cost per km
1 (1975-77)	900 m	1977	£0.9 million[1]	£1 million
2 (1978-80)	550 m	1980	£1.1 million[2]	£2 million
3 (1981-83	700 m	1983	£1.7 million	£2.4 million
4 (1996-98)	280 m	1998	£1.4 million	£5 million

[1] included provision of an access road and [2] included two sets of steps.

The cost per km of sea wall rose fivefold by the end of the work, but it must be remembered that house values also rose considerably during that time.

COST/BENEFIT ANALYSIS

When deciding whether to spend large amounts of public money, Councils have to justify their costs by stating, and if possible quantifying, the benefits that would occur. They try to show that the benefits are at least equal to the costs.

The costs of the sea wall are shown above, but there may be other less quantifiable environmental costs. The benefits include the value of the houses that have been protected, the value of the South Coast Road running through Peacehaven, and services such as water and electricity, which might have been severed by cliff erosion. In 1976 the average price of a house was about £12000, and the cost of supplying services about £500 per house. The 1977 part of the wall only protected about 25 houses directly. It

might have been cheaper just to let the cliff retreat and give compensation to the owners, but there were other considerations.

4. WHAT ARE THE EFFECTS ON THE ENVIRONMENT?

Look at the photo of Friars Bay, immediately east of Peacehaven and its sea defences.

Peacehaven

Friars Bay, East Sussex

a) What do you notice about its shape compared to the cliffs at Peacehaven?

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b) Can you suggest why Friars Bay is so different from the cliffs at Peacehaven?

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c) What is its likely future?

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This project is part-financed by the European Regional Development Fund (ERDF).

5. ROLE PLAY ABOUT WHETHER BUILDING SEA WALLS IS WORTHWHILE

There are often many issues associated with large expensive coastal protection schemes. If a **PLANNING COMMITTEE** cannot decide if a scheme should go ahead, there may be a **PUBLIC INQUIRY**. In either case, all interested people are invited to discuss all aspects of the scheme.

There is an Inspector or Chairman of the Council, who keeps order, makes sure everyone has their say, in order, and eventually makes the final decision as to whether it should go ahead or not. Otherwise the final decision is made by vote by council members. There are obviously people who support the scheme for various different reasons and those who oppose it.

a) Imagine the year is 1974 and approval is being sought for coastal defences at Peacehaven. You will need to appoint an Inspector or Chairman of your inquiry.
Work in small groups, each assigned one of the following roles:
Discuss your arguments and be ready to put your case at the inquiry, when asked by the Inspector.

Supporters to include:

- Technical Officers from Lewes District Council
- Consultants (who work for construction companies who may be awarded the contract)
- Representatives of the utilities companies (water, gas and electricity)
- Representative householders whose houses will be saved and greatly gain in value
- Estate agents
- Any other interested parties (e.g. people who want to gain better access to the beach).

Opposers to include:

- Other consultants who favour different ways of protecting the cliffs
- Representatives of environmental organisations (concerned about disturbance to birds nesting on the cliffs, damage to the shore platform etc.)
- Representatives of householders who live elsewhere in the area and will pay increased taxes but not benefit directly from the scheme
- Academics who fear the coast to the east will suffer
- People living elsewhere on coast who feel their coastal protection scheme should have priority
- Any other interested parties.

Carry out the Inquiry under the direction of the Inspector/Chairman.
Then vote on the issue.

b) Write a short report summarising the arguments and explaining the decision as to whether the cliffs should or should not be protected.

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