SITE

Name: Sidmouth to Beer Coast

Parish: Sidmouth, Branscombe and Beer

Local Authority: East Devon

National Grid Ref: SY 130 873 - 236 896

OS Sheets: 1:50K, 192, **1:10K**, SY18 NW, NE, SI 28 NW

Locality Description: South Devon coast from Sidmouth eastwards beyond Beer with two key localities between Branscombe Mouth and Seaton.

Nature and Status of Site: Extensive coastal cliff exposures that lie within the Jurassic Coast World Heritage Site. The site is also designated as a Site of Special Scientific Interest (SSSI).

Summary of Geological / Geomorphological Interests: This site provides spectacular exposures of the Cretaceous succession comprising Gault, Upper Greensand, Cenomanian Limestone and chalk. New Red Sandstone with a capping of Upper Greensand occurs in the west; as the strata dip eastwards, this gives way to chalk with an overlay of clay-with-flints. These cliff sections provide some of the finest exposures of the Foxmould Sands and Chert Beds (of the Upper Greensand) in the South West. They are also particularly important for their exposures of basal Upper Cretaceous Cenomanian Limestone which contain very notable fossil faunas including ammonites that are scarcely known elsewhere in Britain. Part of the overlying Chalk in the vicinity of Beer village has developed an unusual shell sand facies suitable for building – the Beer Stone. The site is also important for its geomorphological features, especially the well developed landslip system at Hooken Cliffs.

Safety Considerations: Care should be taken for all cliff sections, and tide tables should be consulted prior to visits via the beach.

Educational Age Groups: Primary, Secondary, College/6th Form, University.

Parking and Access: Parking is available at Branscombe Mouth for an excellent circular route of Hooken Cliffs and Under Hooken (Location 1) which takes place approximately two and a half hours. From Branscombe Mouth follow signs for the South West Coast Path and then return along the cliff-top footpath across South Down Common. There are a number of buses which operate frequently in the area and from surrounding towns, for timetable details, visit www.traveline.org.uk. There is also an inland on-road signed cycle route between Sidmouth and Beer which could be used.

Access to the Beer to Seaton Hole section (Location 2) is via the beach at Beer (car park in the village) or via the steps leading down to Seaton Hole from Old Beer Road (street parking available). Access along the beach between these two points is extremely difficult and is not recommended.

References

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Additional references on the area are provided by Mortimore et al. (2001) and a site report is also available via: www.jncc.gov.uk

Online References:

The Jurassic Coast, Dorset and East Devon World Heritage Site, (online) at www.jurassiccoast.com

Detailed Geology: The Cretaceous succession is divisible into four units: 'Gault', 'Upper Greensand', 'Cenomanian Limestone' and 'Chalk'. The cliff section between Branscombe and Seaton provides the finest exposures of all these units except the 'Gault'. The Upper Greensand can be divided into a lower (Foxmould) unit and an upper (Chert Beds) unit. In the Beer-Seaton area the Foxmould comprises some 26m of grey-green glauconitic sands that contain large courses of calcareous concretions or 'cowstones', the later being very fossiliferous. Between the Foxmould and the overlying Chert Beds is a thin, highly glauconitic limestone crowded with *Exogyra* spp. and other bivalves. The chert itself occurs either as isolated nodules or as lenticular bends which are generally parallel to bedding. Cross-stratification, quartz grains and fossils are present within the cherts. The Chert Beds are well exposed along much of the base of Hooken Cliffs and in the vicinity of Little Beach. A bivalve fauna that is almost certainly facies controlled and dominates in the Upper Greensand is either of Albian or Cenomanian aspect. The folding of the Upper Greensand is associated with the fracturing of the Top Sandstones into which early Cenomanian chalky fissure deposits have been let down. These tend to have NNE-SSE trend.

The lowest unit of the Cenomanian Limestone succession can be separated into a lower and an upper portion. The lower unit is a coarse calcareous grit, with abundant grains and small pebbles of quartz. Large, glauconitised, cobbles of calcareous sandstone and a rich fauna of *Ceripora ramulosa* (a coral-like bryozoan) are also present in its lower levels. The upper portion, which is more widespread than the lower, is a shelly limestone, with no large cobbles, and relatively little sand content. Overlying both these sections is a hard white sandy limestone that in many places is distinctly glauconitic, which is concentrated into lenses some 10-20cm in length. The upper surface of this limestone is marked by an erosional surface that shows a thin layer of brownish phosphatised pebbles, indicating exposure on the sea floor for a considerable period of time before the overlying bed very locally developed) was deposited.

Ali (1975) interpreted the Cenomanian Limestones as a beach deposit. All the limestones show signs of current activity, which are features of a near-shore, shallow marine situation. Inland the limestones rapidly give way to calcareous sandstones with courses of calcareous stone or nodules. Where the Cenomanian Limestone succession is better developed, the Lower Turonian is much thicker and in the vicinity of Beer Village has developed the peculiar facies known locally as the Beer Stone. The most accessible section for the Middle Chalk and lowest zones of the Upper Chalk can be seen at Beer Harbour, where one can follow an almost uninterrupted sequence of chalk from the top of

the Cenomanian Limestones to the top of the local succession on Annis' Knob. The lowest Turonian Chalk is normally without flints but displays several rhythmically bedded, nodular chalk beds and hardgrounds. The upper part of the zone contains a diagnostic Lower Turonian microfauna identical with that of other successions in south east England and northern France.

Note that the lithostratigraphic terminology of the Cretaceous succession of the area has been revised by Jarvis and Woodroof (1984).

Suggested Questions

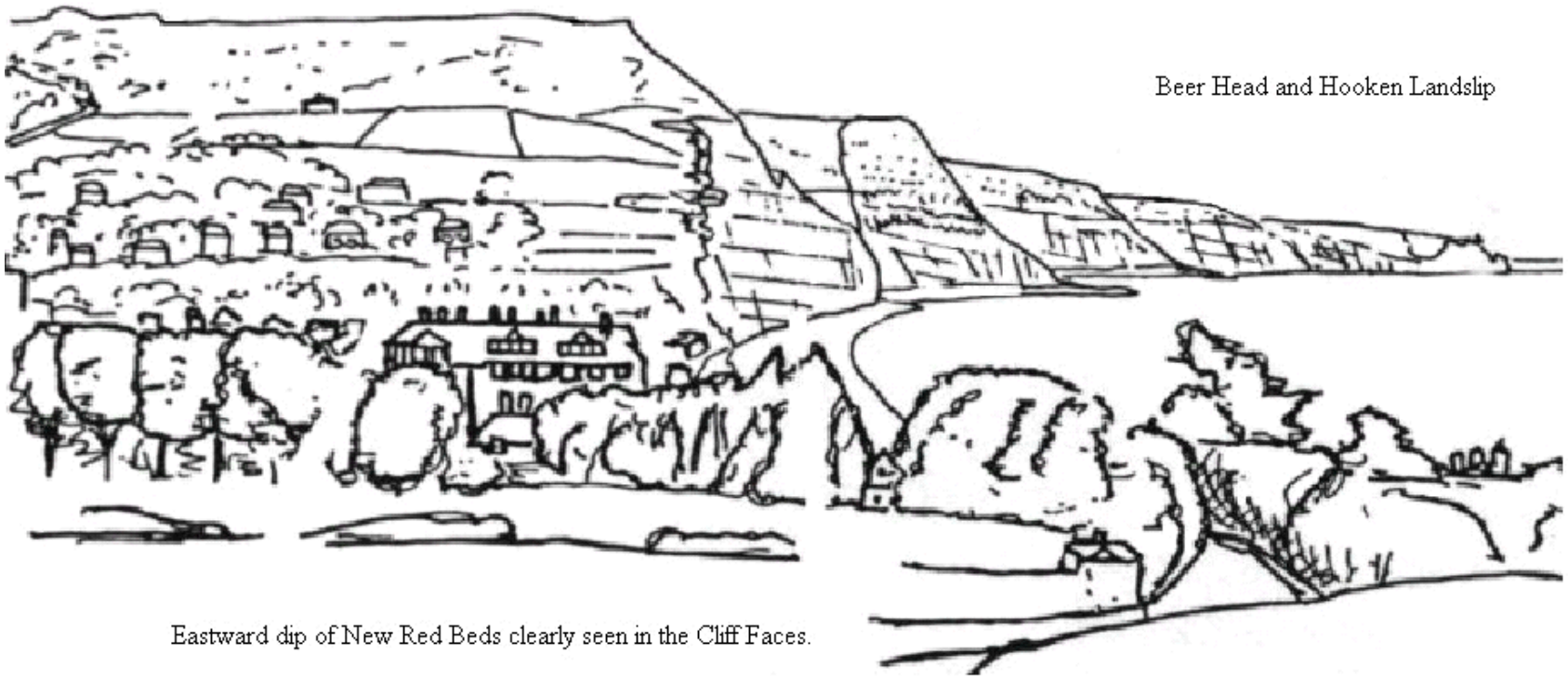
1. What types of environments do the various deposits present represent?

2. Describe the geological history of the district.

3. The area contains some major geomorphological features, discuss how they may have formed?

Sidmouth to Beer Coast

Diagram showing the impressive coastline south of Sidmouth



Eastward dip of New Red Beds clearly seen in the Cliff Faces.

Adapted from Perkins. J, 1973. *Geology Explained in South and East Devon*. David & Charles: Newton Abbot

LOCATION PLAN

SIDMOUTH TO BEER COAST, SSSI
SIDMOUTH/BRANSCOMBE/BEER, EAST DEVON

National Grid Ref: SY 130 873 - 235 895

Scale 1: 70,000

Site Locality

Parking and Access

- Parking available at Branscombe Mouth for circular route of Hooken cliffs and Under Hooken via the South West Coast Path and back via South Down Common.
- Beer to Seaton Hole section accessible from either end. Use car park in Beer and follow slip-way to beach or use on-street parking in Old Beer Road and follow steps leading down to Seaton Hole.
- There are a number of buses which operate frequently in the area and from surrounding towns, for timetable details, visit the traveline website.
- There is also an inland on-road signed cycle route between Sidmouth and Beer which could be used.

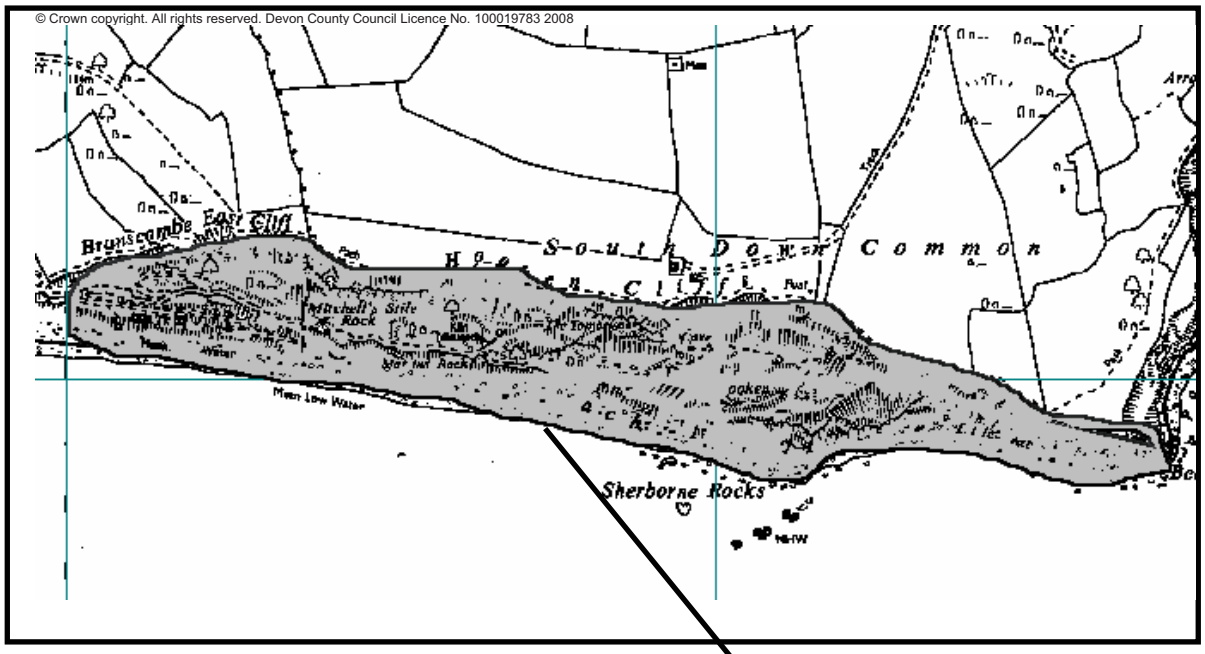
SITE PLAN

SIDMOUTH TO BEER COAST

SIDMOUTH/BRANSCOMBE, EAST DEVON

Location 1

National Grid Ref: SY 209 880 - 228 878



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East Cliff to White Cliff

Key Focal Point

Main Points of Interest:

- Good exposures of the Foxmould Sands and the Chert Beds of the Upper Greensand.
- Excellent exposure of the chalk including the Beer Head and limestone at the base of the cliffs. Small bluffs can be examined close to the footpath.
- Exposure of Foxmould to Chalk in massive slipped block below the pinnacles.
- Well developed landslip system.
- Beer Stone mines present in the cliffs.

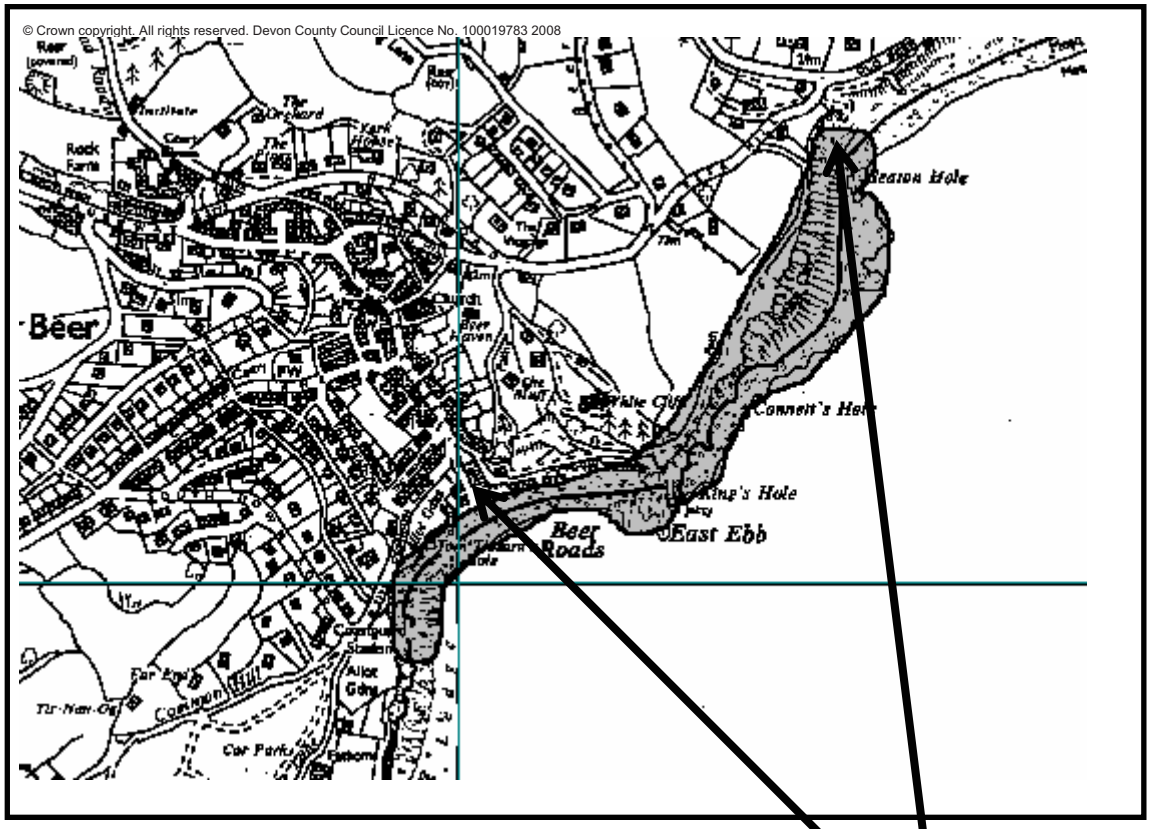
SITE PLAN

SIDMOUTH TO BEER COAST

BEER, EAST DEVON

Location 2

National Grid Ref: SY 233 892 - 236 896



Key Focal Point

Scale 1: 10,000

Main Points of Interest:

- Contains some of the most westerly major Upper Cretaceous exposures in England.
- Illustrates lateral thickness and facies variations of the Cenomanian Limestone, containing an abundant and in part rare fauna.
- Beautifully displays the Beer Stone of the basal Turonian.
- Vertical cliff exposures of the Seaton Chalk.
- Annis' Knob - best exposures of the Ramsgate Chalk Formation.

SIDMOUTH TO BEER COAST

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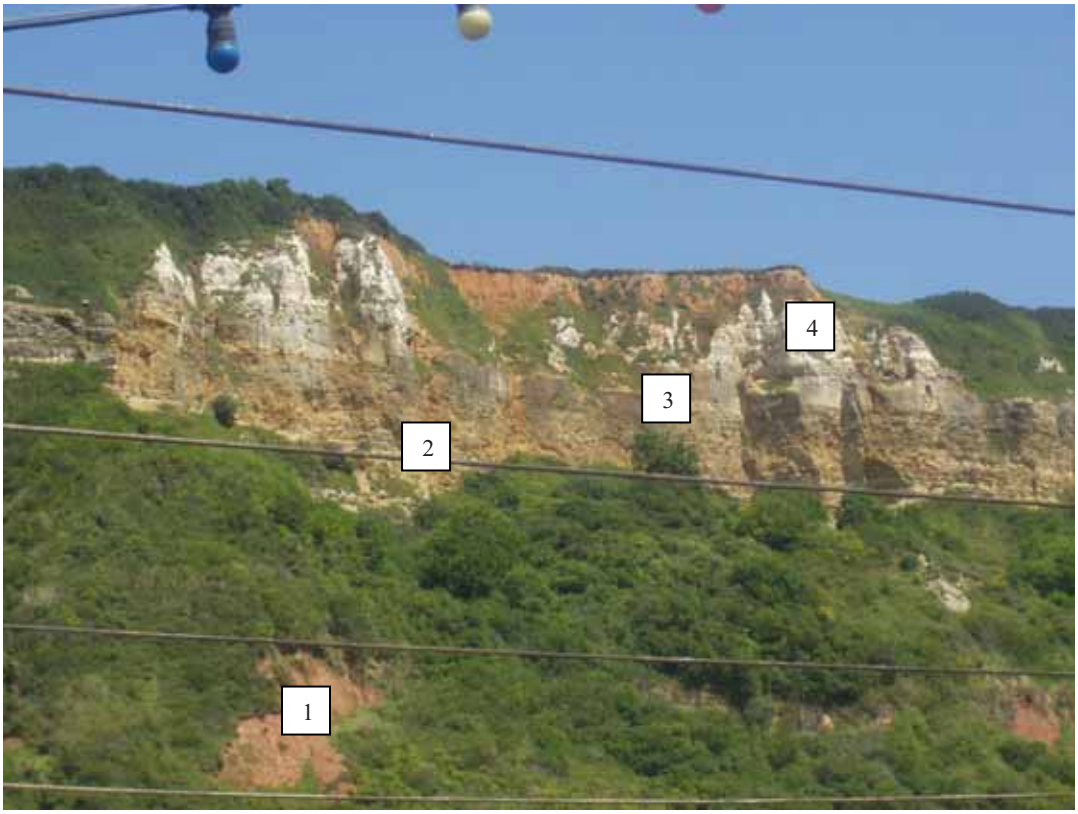
Beer Head viewed form the sea – Note flint bands in the 'Upper Chalk' which dominates the cliffs.



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Berry Cliff, West of Branscombe (viewed from the sea) showing the general succession: Mercia Mudstone group [1], 'Upper Greensand' [2], 'Cenomanian Limestone' [3], 'Chalk' [4]

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Seaton Hole viewed from the sea. Note Mercia Mudstone Group (Triassic) to the right downfaulted against Cretaceous to left. Platform represents coastal defence works

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Cliffs at Seaton Hole showing: ‘Upper Greensand’ [2], ‘Cenomanian Limestone’ [3], ‘Chalk’ [4].

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Two views of Little Beach, W of Beer Head and E of Branscombe showing: 'Upper Greensand' [2], 'Cenomanian Limestone' [3], 'Chalk' [4].
Note blocks of nodular Middle Chalk in foreground.

View of the Hooken landslip from the beach E of Branscombe. Note wide‘valley’ to the left of the landslipped block and pinnacles of chalk on the upper part of the block.