

EA SOUTH WEST



Protecting Pentewan



Restormel
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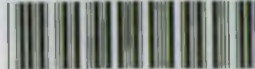


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EA - SOUTH WEST Protecting Pentewan



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Pentewan - a history of flooding

Nowadays Pentewan is a small busy holiday centre, on the south Cornish coast. But in the 19th and 20th centuries it was a bustling port and industrial centre. Evidence of this is still there - although blocked off from the sea, the old harbour is a reminder of when cargo ships visited, trading in coal, timber and china clay, and fishing vessels moored alongside the village.

There was a purpose-built narrow-gauge railway that transported goods between St Austell's china clay mines and Pentewan.

Pentewan has a long history of flooding from the Pentewan Stream, which is only two kilometres long and flows down to the disused harbour in the centre of the village. The stream drains a small wooded valley to the north of the village and becomes a mere trickle in summer.

However, on 26 November 1997, the Pentewan Stream caused a devastating flood. An intense thunderstorm dropped more than 80 mm of rain in seven hours - 30mm of which fell in just half an hour.

▲ *The Square, Pentewan*

Floodwater rose quickly so that soon the village centre was under four feet of water. About 40 families were evacuated. On the same day the nearby St Austell River also flooded, so that some Pentewan homes were flooded twice.

What caused the flooding?

The principal cause of the flooding was a small culvert running beneath houses in the Square. Debris washed downstream by floodwater also blocked the culvert, contributing to the flooding. Also, floodwater was unable to escape from the harbour as it is blocked off from the sea.



▲ *26 November 1997*



- ▲ Special low vibration equipment was used to install the sheet piles that supported the excavation for the culvert.
- ◀ Construction of the culvert. Its alignment and shape had to take account of all the underground services and obstructions in the Square.

Reducing the risk of flooding

The Environment Agency considered several options to speed the flow of water past houses in Pentewan Square. A key consideration was the possibility of damage to the many old cottages in the centre of the village if tunnelling or pipe laying was used to provide the extra flow capacity.

The chosen solution had an unusual feature - the demolition of a holiday cottage to make way for a new larger culvert. Its controlled demolition reduced the risk of other property damage and gave an extra construction access point to other works on the Pentewan Stream. The cottage was rebuilt to look exactly the same and the integrity of the Conservation Area in the centre of the village was retained.

Other works included the construction of 80 metres of stone-faced walls to protect properties next to the Pentewan Stream and a large debris screen at the entrance to the culvert.

A new spillway was built opposite the Ship Inn to carry away floodwater that collects in the road (West End) when the St Austell River floods.

Floodwater in Pentewan drains to the disused harbour, therefore it was necessary to ensure the water could flow out to the sea. Some sand was removed from the old harbour entrance channel and modifications made to the harbour gates to allow quicker flows.

Design of the scheme was mindful of the long-term aspirations to reopen the harbour as part of a wider regeneration scheme. Therefore, the scheme can cope with floods that occur at the same time as high tides that would effect harbour water levels.

A public exhibition was held in the village in summer 1999 and the scheme gained the support of the majority of residents.



▲ Installing sheet piles where the culvert enters Pentewan Harbour

Protecting Pentewan



Pentewan Stream

New stone faced flood defence walls

Landscape works to pond

New debris screen

Cove Cottage and rebuilt

1.50m dia. new culvert

Harbour

West End flood relief - new spillway to harbour

St Austell River

Construction

Demolition of the cottage began in December 2001 and the main road through the village was closed for six weeks to allow construction of the new pipeline beneath it and the cottage.

A special low vibration technique - a silent piler - was used to install sheet piles to support the main trench. The new culvert had to weave through existing utility services and avoid the old culvert that was still conveying the Pentewan Stream. These restrictions meant the culvert was constructed using different techniques along its length - sometimes pipes, sometimes a rectangular culvert that was cast in situ. The new culvert was at least 1.5 metres in diameter, replacing an irregular 0.75 metre diameter culvert.

The stone-clad floodwalls needed deep foundations to prevent water seeping through the permeable soils beneath the defence. Significant efforts were made to blend the walls into the rear gardens and an existing

pond on the stream was enlarged to include a new fringe of reeds and similar plants.



▲ Stone clad flood walls to keep the character of the village



← Fish and eels can now pass the small weir that retains the pond



▲ Debris screen and flood walls around the pond, nearing completion



4 The almost completed cottage photographed six weeks after the original was demolished



Reconstruction of the cottage was particularly complex. It had to achieve modern building regulations, yet be no larger than the original. There is no visible indication that a large culvert flows just below the ground floor. The character of the cottage was maintained by retaining the various changes of floor levels and reinstating exposed beams.

The original walling stone was reclaimed for use on both the frontage and some exposed walls inside. Every opportunity was taken to enhance the cottage for the good of the built conservation area, with a slate roof replacing old asbestos cement tiles.

During much of the construction period water levels in the harbour were lowered, and fish were removed before work began. Several unexpected migratory species were found e.g. brown trout and flounder, plus a healthy rudd population. The design of a small weir on the stream was adapted to make it easier for fish to pass over, and eel ramps were incorporated at each side.

▲ *Rebuilding the cottage above the new enlarged culvert*

Support and funding

The £1.75 million scheme was coordinated by a steering group made up of the Environment Agency, Restormel Borough Council and Cornwall County Council, with support from the Pentewan Residents Association. Funding partners were the Department for Environment, Food and Rural Affairs (DEFRA), the Environment Agency, borough and county councils. The Agency managed the implementation of the scheme.

Outline design of the scheme was by Lewin Fryer and Partners of Bradford-on-Avon and Plymouth and detailed design and construction by E Thomas Civil Engineering of Truro with Hyder Consulting of Plymouth. Contract management was by Halcrow Ltd of Exeter.

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