

OHAU CHANNEL DIVERSION

DIVERSION WALL PROJECT

Project Name	Ohau Channel Diversion
Main Subcontractor	HEB Smithbridge Ltd
Location	Rotorua, New Zealand
Product	H Piles, Sheet Piles with Clutches
Total Tonnage	2,637 MT
Delivery Date	January 2008

INTRODUCTION

Environment Bay of Plenty was granted resource consent to build the diversion wall structure in Lake Rotoiti. The Diversion Wall is designed to stop water flowing from Lake Rotorua into the main body of Lake Rotoiti, instead diverting it down the Kaituna River via the Ohau Channel.

Most of Lake Rotoiti's problems are caused by nutrients flowing into it from Lake Rotorua. So the diversion wall will, over time, significantly improve the lake's water quality. The Ohau Channel Diversion Wall is located at the outlet of the Ohau Channel, which

links Lake Rotorua and Lake Rotoiti. It is 1275 metres long and diverts the water from Lake Rotorua, with its higher nutrient levels, directly down the Kaituna River, preventing it from degrading Lake Rotoiti's water quality.

The wall cost just under \$10 million to build and was funded by Environment Bay of Plenty and Central Government. It is expected to improve Lake Rotoiti's water quality in less than five years, with the support of lakeside sewerage reticulation projects.

ESC SCOPE OF SUPPLY

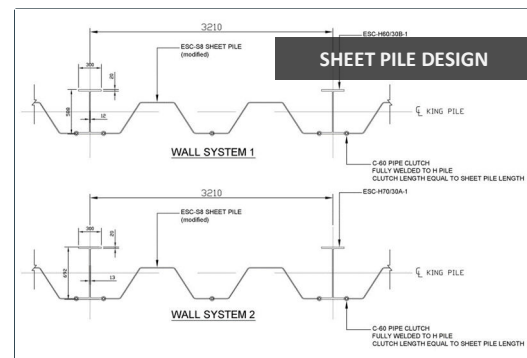
H PILES & SHEET PILES with CLUTCHES

ESC worked very closely with the Contractor (HEB Smithbridge Ltd) to provide the most practical and economical solution for this prestigious project.

The materials were all manufactured in ESC's China factory and delivered over the course of 2007. ESC constructed a custom wall system which allowed for a king post at 3.2 metre centres and infill sheet piles (3 numbers). The design was a reconfiguration of the ESC H Pile Combination series wall. All designs and calculations were carried out by ESC.

In terms of engineering, the wall was unique in that the engineer required a guaranteed zero settlement, even with NZ's high seismic activity. The H pile wall solution was therefore employed because the H piles could be driven deep through the soft lakebed mud and down

onto the bedrock. In some cases, this meant H piles over 50m in length, which had to be extended during driving until the required set was achieved.



MATERIALS READY TO SHIP



The diversion wall is driven into Rotoiti's lake bed and rises to just above lake level. It is made of large, precast interlinking concrete and steel wall segments designed to last for at least 50 years. There is a cap on top of the wall to discourage people from walking on it, for safety reasons.

The final design of the structure was based on feedback from the public at various hui (Maori Assembly) and public meetings, as well as comments received on the questionnaires, and a number of technical studies. These studies include:

- ▶ Water quality modelling
- ▶ Sediment transport modelling
- ▶ Hydrodynamic modelling of the lake
- ▶ Geotechnical investigations
- ▶ Assessment of effects on downstream water quality in the Kaituna River and Maketu Estuary
- ▶ Landscape and visual assessment
- ▶ Cultural assessment
- ▶ Ecological assessment, including effects on fish and water birds

The wall will divert water currently flowing through the channel from Lake Rotorua into Lake Rotoiti, directly down the Kaituna River. Currently, about 40 percent of this water flows into the Kaituna River, mostly in summer. The rest of the year it flows mostly into Lake Rotoiti. The diversion will prevent 180 tonnes of nitrogen and 15 tonnes of phosphorus entering the main body of Lake Rotoiti from Lake Rotorua each year through the Ohau Channel. The diversion is expected to improve Lake Rotoiti's water quality within five years, as research has shown that 70 per cent of the nutrients entering the lake come through the Ohau Channel. It is not expected to have any significant

impact on Kaituna River quality.

A 5 knot/50 metre wide channel on the western side of the diversion wall allows boat access to/from Lake Rotoiti and the Ohau Channel. This channel is between the diversion wall and the red conical buoys. An exclusion zone between the red conical buoys and the lake edge protects birdlife.

The wall was part of a number of initiatives being used to help protect and restore the lakes - from structural interventions like the wall through to land use management practices to reduce nutrients leaching from farm land.

The effect of the wall is now being closely monitored to assess its success and whether wildlife is adversely affected by it or not, including a five-year fisheries monitoring programme.



ON-SITE INSTALLATION

