

HUTT RIVER - PEER REVIEW AUDIT
AUGUST 2006

1. Introduction

Annual Peer Reviews are undertaken regarding river asset maintenance standards and procedures. The reviews are specifically related to the annual works programmes for river schemes, in both the Wairarapa and Wellington Regions.

The Peer Review process provides an audit of these maintenance standards and procedures. Samples of works are selected for an area, the sites are then visited, and an assessment made as to the performance of the structure's design, strength, durability, etc.

An out of area inspection team is selected to carry out the peer review; this is to provide an impartial and unbiased assessment. The audits also provide an opportunity for exchanging ideas and information about best practise for managing river based assets.

An inspection of the Hutt River was carried out on 7 August 2006, by staff members from the Flood Protection Department (Wairarapa).

This Audit team comprised;

Mike Longworth (Engineer Northern), Maia Kawana (Field Supervisor, Northern) Deon Reweti (Field Supervisor, Southern), Graham Reidy (Engineering Officer)

Guides for this inspection were;

Jacky Cox (Assistant Engineer), John Eyles (Engineer), Jeff Evans (Area Engineer, Wellington), Mike Jensen (Field Supervisor, Wellington)

2. Avalon Groynes

This site is located in the Avalon area (Hutt River-Left Bank), and is comprised of 4 Debris Rail Fences with Rock Heads. The end rails of these fences were destroyed due to high water velocities and bed degradation following the January 2005 flood event. Rather than replace the debris fences totally with rock, a cost effective measure was to repair the fences by re-driving the rails and re-enforcing the heads with rock. Each rock head is comprised of approx.400 tonnes of grade C rock.

Also of note was the protection of the eroded bank by using linear rock lining. Here the bank edge is left to erode until it reaches the desired design channel alignment, then rock is placed along the eroded bank, reinforcing the design edge.



Linear Rock Lining with Debris Fences and Rock heads in background.

The Reviewers agreed with the current approach, to maintain the use of existing fences and strengthening the ends with rock heads.

3. Gravel Extraction downstream Kennedy Good Bridge

The reach of river between Kennedy Good Bridge and Ava Rail Bridge is prone to aggrading due to a change in river bed grade.

This aggradation is managed through gravel extraction, but due to the quantity of material that requires extraction, a total of 320,000 m³ over the next 4 years, extraction is required below the water level. The current resource consent permits extraction in the dry only. . This is a standard condition stated on most resource consents for gravel extraction.

The challenge had been to obtain a resource consent for gravel extraction which will permit works to be carried out in the water. Consent has been lodged, and a decision is pending. Through discussions with key stakeholders, suggested consent conditions included restricted extraction periods, and a methodology which will maintain the existing meander pattern. The extraction periods are from mid November to mid December, and mid February to mid May. The extraction in the summer period may prove a problem with public complaints about discoloured water.

The reviewers discussed alternative possibilities for eliminating gravel aggradation and agreed that applying for a resource consent to work in the water was the only practical option.

4. Increase Berm flood flows at the Melling (Croquet Club) site.

This area of the river has the Croquet Club situated on the river berm, between the bank edge and stopbank. Also older established willows encroach into the design channel, narrowing the river channel at this point. The approach to improve capacity of flood flows on the berm at this site during flood events, as well as achieving desired channel design width is to;

- Start the process of removing the Croquet Club infrastructure
- Plant a new willow buffer zone
- Progressively remove older willow stock and allow the bank edge to erode to the design channel alignment.



New buffer plantings, with Croquet Club infrastructure to be removed in the background.

The reviewers commended the forward planned approach to solving this problem, rather than putting aside the problem until it becomes a major issue.

5. Hutt Car Park and Harvey Normans site.

The reviewers were shown the site of the new Harvey Norman building being constructed, and the difficulties in providing car parking access for their customers. The car parking problem only arises when their internal carpark is full and more parking is required.

Initially it was planned to build through the stopbank and onto the flood berm, which was not satisfactory as this reduced the berm capacity. After consultation between parties it was agreed to construct an access ramp built into the side of the stopbank to connect the river car park to their building.

The reviewers were happy to see an agreeable outcome solved by the consultation process whereby at the end of the day everybody's expectations were met.

6. Hutt River Mouth Extraction.

A major problem with the Hutt River is aggradation of bed level at its river mouth, which reduces the cross-sectional area. Bed load carried by floods down the river mixes with the sea resulting in reduced water velocities causing deposition of material in the estuary area. To prevent the aggradation of river material in this area, dredging must be carried out. The annual extraction of approximately 45,000 cubic metres per year is required to keep the river mouth open. The resource consent for extraction is held by Flood Protection, the actual dredging is carried out by a contractor who sells the reclaimed material, and disposes of waste by product material onsite and at sea.



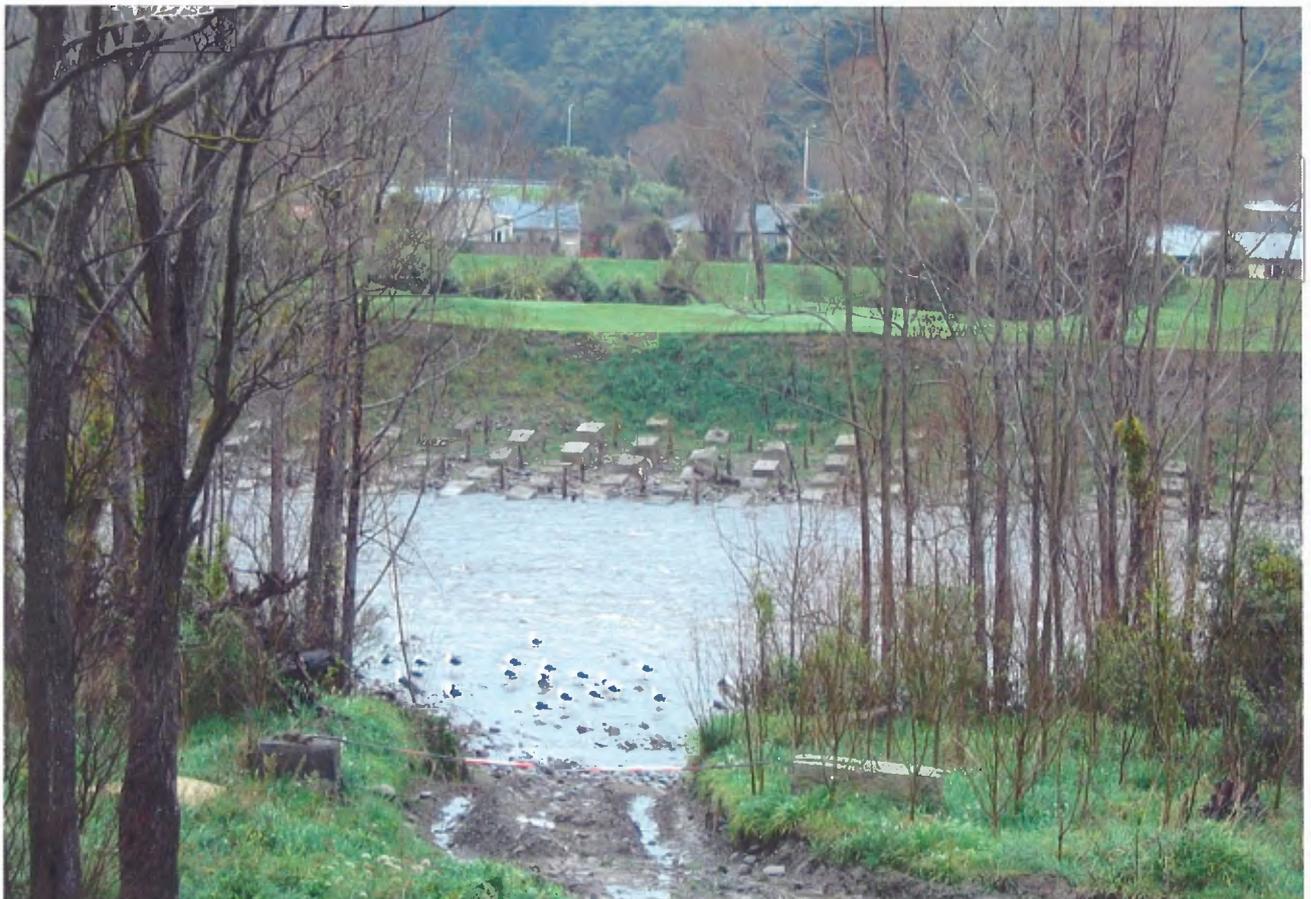
The review team had no comment to add on this operation, but were happy to see some site beautification taking place in the form of bank planting and general site tidiness.

7. Manor Park Golf Club – Block Work and Groyne protection.

One of the methods of bank protection along the river bank adjacent to the Manor Park Golf Club is the use of concrete blocks placed in a grid pattern, and also the use of concrete blocks in groynes with rock heads. These works are more cost effective than the standard type rock groynes.

The structure involves the placing of a 3 tonne concrete block on a prepared batter slope. The blocks are set-out in a grid pattern and interlinked with wire ropes through pre-cast holes in each block. Willow poles are planted in rows between the blocks. The grid pattern creates a roughness along the bank edge resulting in reducing water velocities and the deposition of bed material. It is a proven method and has been used before at other sites in the Hutt River.

Two concrete block groynes were constructed at the upstream end of the grid pattern structure. Approximately 90 blocks were placed in a groyne shape and protected at the head with rock.



Newly erected Block Grid Pattern and Willow pole structure.

The reviewers were impressed with the use of linked concrete blocks in this type of structure.

8. Totara Park Fence Failure

Along the right bank of the Hutt River upstream of the Totara Park Bridge an old longitudinal debris fence has failed along its entire length. The main cause of failure is degradation of the river bed which has undermined some of the shorter 4.5 metre length rails, driven along the fence line. This undermining has resulted in the erosion of willows trees and bank edge from behind the fence.

The works have been temporarily repaired by pushing gravels onto the failed structure. An investigation into why the riverbed is degrading through this reach is programmed to take place this financial year.



Photo showing undermined fence, and eroded bank edge.

The reviewers noted that this reach of river is degrading and an option would be to place rock stub groynes along the bank edge where the most damage is occurring. This area would need to be monitored and Rock stub groynes may need to be placed annually as ongoing damage occurs

9. Elbow Park Longitudinal Fence.

Elbow Park is an area where bed degradation is also occurring. Here, at Maoribank corner, there is a natural rock outcrop in the river channel which acts as a natural bed control and helps to maintain upstream river bed levels.

A Longitudinal gabion basket and driven rail iron Fence has been erected along both the right and left banks. This fence is very successful in providing stability to the bank edge although failure through degradation has occurred in some places.



Longitudinal fence with no undermining.

Two methods of repairs which have been used to fix this fence where failure has occurred are;

- Line the base of the gabion basket fence with Rock; this is suitable where the fence hasn't failed but is undermining.



Longitudinal fence with rock placed along base.

- Where the fence has failed completely, remove all damage i.e. mesh, rails, fill material and erect rail and rope fence and backfill with rock.



Longitudinal fence with rock backfill.

The reviewers had nothing to add to the methods of repair already tried as these seem to be effective. A suggestion the reviewers had, would be to consider these methods downstream at the Totara Park site.

10. Summary

The reviewers impressions of the Hutt River maintenance are that the assets were very well maintained and protective works not performing to expectation were acknowledged and future proofing carried out.

Not only are design improvements constantly being made to bank protection works, but carrying out works based on the design channel alignment , will ensure that all future works are to a planned regime.

In brief the reviewers recommend the scheme managers maintain their focus on;

- Maintaining channel to the design alignment.
- Continue the awareness of keeping flood berms clear of unwanted structures or vegetation.
- Keep improving on existing and experimenting with different types of bank protection methods, to enhance the toolbox available to maintain rivers to their design course.

Report prepared August 2006 by;

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