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AUDIT OF RIVER MANAGEMENT ASSET MAINTENANCE STANDARDS

Audit **of:**	River Schemes managed by the Operations Department, Wairarapa Division of WRC
Inspected by:	Steve Murphy and Jeff Evans of the Flood Protection Group, Landcare Division
Guides:	Ian Heslop, Ranjan Cyril, Widana Gamage, Micheal Hewison and **Murray** Mackenzie of the Operations Department, Wairarapa Division
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1. Introduction

Annual peer reviews are undertaken of river asset maintenance programmes in the Wairarapa and Wellington areas. The peer reviews provide an audit of maintenance standards and procedures. The reviews are undertaken by inspections of representative sites selected by the peer reviewers. This years inspection of Wairarapa river assets visited several sites on the Upper Ruamahanga, Waipoua, and Waingawa Schemes.

2. Sites Inspected, Upper Ruamahanga Scheme

The Upper Ruamahanga Scheme covers the section of the Ruamahanga River from Mount Bruce to the Waiohine River confluence, a distance of some 58 km. This includes the reach of the river fronting the town of Masterton.

The scheme was established in 1982 and is currently under review. Phase 1 and 2 of the review have been completed and will shortly enter the public consultation phase.

An asset management plan for the scheme has also been prepared.

The maintenance budget for the scheme for the 1999-2000 year is $178,000

Sites visited on the scheme were:

- MDC landfill and cemetery site
- Pollock-Dews frontage
- Forbes frontage
- MDC oxidation ponds
- Smaile-Maori land

2.1 MDC Landfill and Cemetery Site

This site is situated on the outside of a large sweeping bend on the right bank of the Ruamahanga River, just below its confluence with the Waipoua River.

At this site the Masterton District Council cemetery and landfill were at risk from a large erosion bay which eventually extended over a length of approximately 500 metres. Initial development of this erosion resulted from the November 1994 flood with further erosion following later flood events. The social and environmental risks from this erosion are very high.

A series of rock groynes have been constructed along the line of the erosion. The first gravel core groynes were constructed for the full width of the narrow reclaimed berm. Early rock quality was inferior and required topping up. Later groynes were part width, solid, constructed of better rock, and backed by short debris fences to prevent outflanking. This appears to be a successful approach and has resulted in cost savings. There are plans to install further groynes immediately up river from the site to protect some vulnerable houses.

Wellington Regional Council and Masterton District Council, funded the work on a 50:50 basis. Major maintenance is also funded on a 50:50 basis.

The bays between the groynes have been planted with a variety of willows. While these appear to be growing well, they appeared sparse in some areas. The topmost groyne appeared to have lost some of its toe and requires topping up.

The large, but low, gravel beach opposite the site is kept clear of vegetation by regular spraying, but nevertheless is putting pressure on the repair works.

The reviewers agree with the approach taken to solve a difficult problem with a limited budget. However the following points are made:

- *Some thought should be given to thickening willow planting between the groynes to increase the stability of the site. The use of rooted hybrid willow stock should be considered.*
- *The present use of golden willow should also be reviewed due to its brittle nature and the propensity for twigs to regrow in downstream beaches.*
- *The early repair of groyne no. 1 is recommended because of the vulnerable gravel core.*
- *If extraction is not an option for the gravel beach opposite, then encouraging it to move by ripping the front edge should be considered.*

2.3 Pollock-Dews frontage

This site is also on the right bank downstream from the landfill and the erosion damage is of a similar nature to the first site visited. At this site the erosion bay threatens a low stopbank protecting rural residential properties from flood flows. A similar repair method using rock groynes has been adopted to repair the site and protect the stopbank.

Some planting had been done but has been difficult in the past due to stock damage. The large gravel beach opposite the site is undoubtedly putting further pressure on the works. The erosion bay has also strengthened the meander pattern, with the river now directed at the opposite bank below the erosion, putting pressure on an established willow line.

The erosion is extending downstream with raw bank edge evident below the present works. This erosion is being monitored closely, but as it may eventually alleviate the cause of the strong cross over, is being be allowed to continue for the present.

As with the similar problem at site 1, the reviewers agree with the approach taken. However the following points are made.

- *Now that the area is fenced, some effort should go into thickening willow planting between the groynes to increase the stability of the site. The use of rooted hybrid willow stock should be considered.*
- *If extraction is not an option for the gravel beach opposite, then encouraging it to move by ripping the front edge should be considered.*

2.4 Forbes Frontage

This site is situated on the right bank immediately upstream of the Master-ton District Council oxidation ponds, and was the site of stopbank breaches during the November 1998 flood. Surrounding farmland was inundated and the ponds put at risk.

To reduce the risk of further breaches, the misaligned river channel was straightened by forming a cut through a large gravel beach. A new stopbank was built in a retreated position. In order to hold the new alignment, a series of gravel spur groynes have been constructed, and an ongoing willow planting programme is in progress to reclaim the former channel. A temporary gravel bund has been constructed to protect these works while they become established and are able to provide the permanent protection. Some erosion to the temporary bund was evident.

The new stopbank is grazed by the landowner and was in very good condition.

The reviewers were impressed with the well thought out and speedy solution to a difficult problem. The need to quickly establish a buffer zone of willows is recognised. The erosion to the temporary bund will need to be closely monitored and attended to if there is the risk of the river returning to the former channel before the new willow plantings are able to do their job.

2.5 Oxidation Ponds

The Masterton District Council sewerage oxidation ponds are situated immediately adjacent to a 90 degree bend in the Ruamahanga river. The social, economic, and environmental consequences of erosion at this site are very high.

As the river swings around the bend and runs down the south side of the ponds, the active channel approached to within 20 metres of the pond bunding, and some erosion or slumping of the bank edge occurred. WRC reacted quickly and four rock groynes have been constructed at the erosion point. This extra protection, in combination with the existing willow planting, is working well. The entire river frontage through this reach is well vegetated with willows and is providing excellent protection at present, although there was some evidence of die back and stunting in parts. Layering of front line willows has been carried out with excellent results. The gravel beach opposite the site was cut as part of the works.

A policy of maintaining a planted berm width of 30 metres has been adopted. Further groynes will be constructed if necessary to maintain this standard.

The reviewers agree with the methods used to repair this sensitive site. The policy of maintaining a minimum berm width is commended. The present layering programme should continue in an effort to further thicken the protection andpossibly avoid the need for more hard edge works. A close eye should be kept on the health of the willow stand along this vital reach.
The beach opposite should be monitoredfor build up and any vegetation controlled.

2.6 Te Whiti Maori Land

The problem at this site was the developing risk of a permanent course change in the river alignment. This course change threatened private land and the adjacent public road.

The river was encouraged into the preferred alignment by appropriate extraction of gravel. To limit overland flows a low longitudinal bund with integral spur groynes was constructed from the extracted gravel. This low bund limits the amount of overland flow, and together with willow planting, is encouraging a build up of the area from deposited silt. The river appears well established in the preferred alignment, but considerably more planting is required to consolidate the situation.

The reviewers were impressed with the simple solution to a potentially costly problem. The urgent completion ofplanting is encouraged to complement the work to date. Plantings appear vulnerable to damage from adjacent farm *stock, and adequate protection is essential.*

3.0 Waipoua Scheme

The Waipoua River Scheme covers the section of the Waipoua River from the Mikimiki bridge to the Ruamahanga River confluence, a distance of some 18 km. This includes the reach of the river through the urban area of Masterton.

The scheme was established in 1954 and is currently under review. Phase 1 and 2 of the review have been completed and will shortly enter the public consultation phase.

An asset management plan for the scheme has also been prepared.

The maintenance budget for the scheme for the 1999-2000 year is $46,000

Site visits were limited to the urban section of the scheme. Works inspected included the 3 bed control weirs, rail iron retaining wall, and adjacent stopbank.

3.1 Grade Control Weirs

The urban section of the Waipoua River has been considerably straightened and confined by stopbanks. Overall gradient and velocities have increased and it has been necessary to build bed control structures. These structures stabilise the bed, and help to prevent bank edge erosion and scour.

The former rail iron and timber structures have recently been replaced by rock ramps. These are an improvement from the aesthetic, environmental and safety aspect. All three weirs appeared to be in good condition, although it was suspected that the lower weir above the Columbo Bridge required some topping up.

The repair to the left bank below the bottom weir following the November 94 flood appears in excellent condition, with good growth by the cabled willows.

The lower weir should be checkedfor level against the original design and topped up with suitable rock if necessary.

3.2 Rail Iron and Concrete Pole Wall

This work is on the right bank above the Columbo Street bridge. The works consist of driven rail irons supporting a vertical wall of used concrete lighting poles. The wall is approximately 2 metres high with a 1 to 1 batter of large river stone above that. The work was carried out to protect the MDC sewer which runs in the narrow berm.

The work is in good condition, although it is understood there were considerable problems with underscour immediately following construction. The situation appears stable at present, and in fact wilding willows have established along the toe of the wall.

The work in question is in good condition and appears well maintained. However, in the reviewer's experience, hard edge works such as this rail/pole wall are very susceptible to failure by underscour and will require ongoing maintenance unless the bed is vet-y stable. A measure of stability appears to have been achieved in this situation but there is still a degree of risk in a *large event.*

The wilding willows growing at the base are probably doing more good than harm at present, but do pose a risk to wall stability and channel impediment as they grow and will eventually need removal.

3.3 Right Bank Stopbank

A casual inspection was made of the right bank stopbank during the visit to the area. This appeared in good condition as to shape but was generally covered in woody growth and trees making a true assessment difficult.

The reviewers would like to see a gradual programme of tree and growth removal and a return to a mown grass stopbank, This will lessen the risk ofsurface damage by windthrow and uprooting in a flood event, andprevent root piping. It will also markedly improve condition assessment in times of flood.

4.0 Waingawa River Scheme

The Waingawa Scheme covers the section of the Waingawa River from the Atiwhakatu Stream to the Ruamahanga River confluence, a distance of some 17 km.

The scheme was established in 1992. This scheme defined the channel width and position and provided for the establishment of vegetative buffer zones as the principal means of protection. A five year review was carried out in 1997.

An asset management plan for the scheme area has also been prepared

Maintenance budget for the scheme area for the 1999-2000 year is $174,000

Sites visited on the scheme were:

- Payne Ruddick stopbank
- Hyde Frontage

4.1 Payne Ruddick Stopbank

This stopbank was constructed in 1993 and protects the town of Master-ton and surrounding farmland from overflows from the Waingawa River.

The stopbank is grazed by the local landowner and was in very good condition. A small stormwater drain passed through the stopbank at this point. The flapgate operated freely and the outlet was clean and free of debris. It is checked on a regular basis.

The stopbank at this location was in good condition and appeared well caredfor. No grazing damage was evident.

4.2 Hydes Frontage

The immediate impression on arriving at this site was of a steep, aggressive, difficult to manage river, actively attacking both its banks in numerous locations. The channel at this location appeared over wide with numerous braids and strong meander pattern.

The present management approach is a combination of

- Establishing appropriate buffer zones bordering the river by negotiation with the adjacent landowners.
- Correcting any serious mis-alignment by crossblading
- An extensive beach spraying programme to encourage gravel movement.
- Construction of gravel snub groynes at vulnerable spots.

Several of these gravel snub groynes were inspected at this site. They are relatively simple and inexpensive to install and while sacrificial, appear to perform well in providing protection to vulnerable areas. Planting of the groynes with suitable willow species may help to increase their life and the level of protection they provide.

Reviewers Comment:
Given the nature of the Waingawa River, the ongoing management of the river is expected to remain a challenging task.

Planted buffer zones to isolate the river from productive land and to narrow the channel width are recognised by Wairarapa staff as an urgent requirement. The innovative use of gravel spur groynes to protect vulnerable areas and provide quiet areas for planting is commended.

A programme of strategic beach ripping to encourage gravel movement and a preferred channel alignment should be considered.

4.0 Summary

Due to the short time available the reviewers were only able to visit a few sites in each scheme. This provided an overview only.

A series of large floods over the past 6 years have taken their toll on all schemes in the district. Schemes on the steep western rivers (ie Waingawa) appear to have suffered more than most and will require skilled management to foster their recovery.

Impressions of the Ruamahanga Scheme were that in general existing assets were being adequately maintained to ensure their continued effectiveness, and where erosion through flood damage has occurred, it has been adequately repaired.

The urban reach of the Waipoua appeared well maintained. Flood Protection assets were in good condition apart from the concern about vegetation on the stopbank.

The Waingawa site visit reinforced the urgent need to correct an overwidth channel and the lack of planted buffer zones. This is reflected in the scheme document and is clearly recognised by Wairarapa Operations staff as a priority in managing this difficult river. The Waingawa scheme is still in its infancy at 8 years old, but some good progress has been made towards scheme aims. The next scheme review in 2002 will serve as a good check on further progress and the adequacy of the current regime.

Steve Murphy
Operations Engineer
Flood Protection (Operations)
NZCE REA (Civil)

Jeff Evans
Area Engineer, Wellington
Flood Protection (Operations