

**THE WEST COAST REGIONAL COUNCIL**

**KARAMEA RATING DISTRICT**

**ASSET MANAGEMENT PLAN**

Reviewed 2014

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## **EXECUTIVE SUMMARY**

Under the Local Government Act 2002 Councils are required to developed 'Asset Management Plans' to demonstrate that they are managing the infrastructure for which they have responsibility. The purpose of this Asset Management Plan is to describe how assets associated with the Karamea Rating District will be managed over their lifetime.

The plan lists the current scheme assets which include:

- Karamea River
  - 6.45 kilometres of stopbanking
  - 56,478 tonnes of rock in various erosion protection structures
- Oparara River
  - 1.7 kilometres of stopbanking
  - 6,762 tonnes of rock in various erosion protection structures
- Granite Creek
  - 3,480 tonnes of rock in various erosion protection structures
- Little Wanganui River
  - 1.66 kilometres of stopbanking
  - 22,349 tonnes of rock in various erosion protection structures

The total replacement value of these assets is estimated at \$3,581,317 million in 2014.

The Asset Management Plan indicates the level of protection provided by the assets, the methods of monitoring the condition of the assets and the annual maintenance needed to retain the current service level.

The average annual maintenance of the Karamea Area Rating District for the period from 1991 to 2014 has been around \$28,000. This covers the maintenance of all works that belong to the scheme.

Any increase in service potential of the works would require additional capital expenditure. Where rock is placed on an existing stopbank, to maintain the stopbank at its same service potential, that would be charged to this maintenance scheme. On the other hand if the service potential of a structure is required to be increased this would not be a charge to the maintenance scheme but classified as capital expenditure requiring additional contributions from those who wish to receive a higher level of protection over and above that identified in the asset management plan.

The scheme assets will be maintained such that they continue to provide their level of service in perpetuity. Because they are maintained in perpetuity the scheme assets will not be depreciated resulting in no requirement to fund depreciation.

## **SECTION 1: DESCRIPTION**

### **1.1 PURPOSE OF ASSET MANAGEMENT PLAN**

Asset Management Plans define the objectives and performance standards of river and drainage schemes for which the Regional Council has the maintenance responsibility and provide a basis upon which the effectiveness can be measured. This plan:

- Describes the history of the rating district and identifies it's assets.
- Describes the methods used to maintain the service level of these assets.
- Complies with the regulatory requirements of the Local Government Act 2002.

### **1.2 BACKGROUND**

As a result of the 1929 Murchison earthquake slips dammed the Karamea and Little Wanganui Rivers. The collapse of these dams caused serious damage to property and heavy loss of stock. To rehabilitate the area after the earthquake the Government financed the Karamea Flood Protection Scheme.

The Scheme included the construction of stopbanks and rock protection on the Karamea, Oparara and Little Wanganui Rivers. The work was completed about 1937, but no arrangements were made for on going maintenance of the scheme.

After a meeting between the Karamea Federated Farmers and the Westland Catchment Board in September 1967, a questionnaire was sent to ratepayers in the Karamea District to gauge interest for a rating district to finance capital and maintenance work on the three rivers in the area. Due to the lack of interest the proposal was abandoned.

In November 1973 the Karamea river overtopped the stopbanks and caused severe flooding in the area.

At the request of the Karamea Federated Farmers a further meeting was held in May 1981 which authorised the Westland Catchment board to establish a rating district based on capital value to maintain existing protection works in the Karamea District.

The Karamea area classification to maintain the existing protection works on the Little Wanganui River, Granite Creek, Karamea River and Oparara River was adopted by the Westland Catchment Board on the 28 June 1982.

The Scheme works are located within or alongside the:

- Oparara River from the Gorge downstream to North Beach road;
- Karamea River from Arapito road to the mouth;
- Granite Creek from the main highway upstream for a distance of 5 kilometres; and
- Little Wanganui River from O'Connor Creek below the main highway then upstream for a distance of 7 kilometres.

The area protected is predominantly dairy farming with some horticulture and dry stock farming. Community infrastructure such as roads, power and telephone lines all derive benefit from the scheme area.

### **1.3 DESCRIPTION OF ASSETS**

The Rating District assets consist of all those works outlined in the Infrastructural Asset Register. As at 31 December 2009, the value of the Karamea Rating District Scheme assets was \$3,581,317

### **1.4 MAINTENANCE EXPENDITURE**

Appendix II shows expenditure since 1990. The average annual expenditure on maintenance is \$28,061

The capital value of land and buildings within the confines of the scheme is \$73.6 million.

### **1.5 EXISTING STANDARDS**

A flood on 21<sup>st</sup> November 1973, which overtopped the Karamea stopbank, was recorded at 3884m<sup>3</sup>/sec at the Arapito gauging station on the Karamea River.

Riverbed cross section surveys were carried out in 2006 and flood modeling based on this information was undertaken in August 2006. The analysis assessed a 50 year return period flood as 3,680 cumecs and the modeling of this flow determined that the existing right bank stopbank has a capacity less than the 50 year event. NIWA have since done more detailed modelling and the results of that are currently being finalized.

No flow data is available on the Oparara River, Granite Creek or Little Wanganui River to quantify any return flood event. However most of the works on these rivers are for erosion control only, not flood protection.

## **SECTION 2: SERVICE LEVELS**

### **2.1 GENERAL**

The sections of the stopbank built for the original Karamea protection scheme following the 1929 earthquake were built to an unknown design standard. Generally though the historic "Existing Standard" has been 900mm above the highest known flood, however, the Karamea floodbank's current service level appears to be less than a 1 in 50 year return period flood, according to survey work completed to date. Council recommends a 1 in 50 year flood (2% annual exceedance probability) protection as a minimum.

Erosion control works do not have service levels but will be maintained to the dimensions they were initially constructed to.

### **2.2 OBJECTIVES**

The objectives of the Karamea Area Rating District are:

- (a) Oparara River  
To maintain existing protection works with the aim to reduce bank erosion and flooding.
- (b) Karamea River  
To maintain existing protection works with the aim to reduce bank erosion and flooding.
- (c) Granite Creek  
To maintain existing protection works with the aim to reduce bank erosion.
- (d) Little Wanganui  
To maintain existing protection works with the aim to reduce bank protection and flooding.

### **2.3 MAINTENANCE**

The maintenance of the Karamea Scheme protection works can be broken into two zones. Stopbanking and Erosion Control Works.

#### **Stopbank Maintenance**

Stopbanks are on the right bank of the Karamea River to 1.5 km above the Karamea road bridge and on the left bank below the bridge; on the left bank of the Oparara River a stopbank extends upstream from North Beach Road for 1.7 km; and on the right bank of Little Wanganui River stopbanks extend from 1 km above the Little Wanganui Road Bridge to 4km above the bridge. Stopbanks are constructed of compacted river gravels with a grass cover.

Maintenance includes repair of any scouring, works to facilitate access, vegetation control; and repairing damage to stopbank batter slopes due to stock or vehicle accessways, by topping up of stopbanks as required to maintain stopbank capacity in terms of design.

During a flood stopbanks can be damaged by failure of a training permeable groyne such as a rock spur which can allow the full force of the river to suddenly run along a relatively unprotected stopbank, and cause scouring of stopbanks.

Overtopping of the bank can result in scouring of the back batter resulting in failure of the structure. Well established grass covered banks have been proven to be effective in resisting erosion. Piping, or flow through porous bank or foundation material washing out fines can lead to collapse. Construction of pipelines cables under stopbanks as well as holes on top of stopbanks can weaken the structure.

Stopbanks can also be damaged in an earthquake by cracking, vertical or horizontal displacement, or by liquefaction of the foundation material. The probability of seismic damage coinciding with a flood is very remote.

### **Erosion Control Works**

Erosion control works are constructed to absorb the energy of the river and to control the alignment of the flow of the rivers, protecting stopbanks and natural banks. Erosion control works are exposed to damage from flows less than the mean annual flood.

Normally maintenance includes rock top-ups to correct any slumping of rock off groynes and riprap. Rock used to form these structures needs to be of the required grading to resist the force of the river.

The meander of a river can change significantly by floods of only moderate duration. This can result in an acute angle of attack on these structures resulting in damage which is disproportional to the flood size. Erosion control works damaged by previous floods may also suffer damage disproportionately to flood size. It is very important to ensure damage to erosion protection works is undertaken swiftly.

Any additional erosion control works outside those shown in the Asset Schedule are not part of the scheme, unless the committee decide they may be included (normally after a 2 year settling period).

## **2.4 MAINTENANCE PROGRAMME**

An annual maintenance programme will be prepared each year in consultation with the liaison committee prior to adoption by the Rating District Annual Meeting and inclusion in the Council's Annual Plan or Long Term Plan.

In preparing the annual maintenance programme consideration will be given to:

- an inspection to identify works requiring immediate repair.
- works anticipated as being required given a 'normal' season.
- flexibility to meet unbudgeted damages.

An annual report will be presented to the Karamea Ratepayers outlining the maintenance works and expenditure recommended for the coming financial year.

## **2.5 DAMAGE EXPOSURE**

River control works are constructed in a very high energy environment with the purpose of resisting and absorbing some of that energy. No matter what the standard of maintenance, it is inevitable that damage will occur to structures.

An assessment of maximum damage potential was derived from estimating the damage ratios and costs for three flood events as shown in Table 1, below.

**TABLE 1 – ESTIMATED DAMAGE EXPOSURE**

<b>Flood size</b>	<b>Assets Value</b>	<b>Damage Ratio</b>	<b>Damage Exposure</b>
20 year event	\$3,581,317	10%	\$358,131
100 year event	\$3,581,317	20%	\$716,263
500 year event	\$3,581,317	25%	\$895,329

The exposure to damage to the river and flood protection assets that belong to the Karamea Rating District, in a major flood event, is in vicinity of \$656,574

## **2.6 CAPITAL WORKS**

Capital works are defined as works which increase the service level of the scheme. Such works would include increasing the design standard or the area covered by a scheme and works to increase security or performance of an erosion control system or structure.

New rock, either to extend an existing line of rock rip rap, or to construct a new spur groyne, is treated as capital work. It is treated as adding to the performance of the scheme. The value of this work is added to the value of the asset and the volume of rock added recorded in the asset register for the scheme.

Where rock is identified as having been lost it is deducted from the asset value and the loss noted in the asset register.



## **SECTION 3: FUNDING**

### **3.1 MAINTENANCE**

Maintenance is funded by targeted rates, the level of rating being determined each year in the Annual Plan process. This involves:

- (a) Preparation of an annual works programme and corresponding budget, in consultation with the Rating District Liaison Committee.
- (b) Adoption of the works report and budget at the Rating District's Annual Meeting.
- (c) Adoption of the budget in the Council's Annual Plan.

### **3.2. DAMAGE REPAIRS**

Routine damage repairs are funded by a combination of:

- carrying out work as scheduled in annual works programme.
- reprioritising works identified in the annual works programme.
- use of financial reserves.

Major damage repairs would be funded by loans raised by the Council and repaid by targeted rating over a number of years.

### **3.3 FINANCIAL RESERVES**

Financial reserves are held within the rating district account to provide the following:

- meet the costs of unscheduled works.
- enable an immediate response to flood damage repairs.
- prevent major fluctuation in rating levels annually.

The level of financial reserves held in the rating account are determined by the estimated damage exposure and the likely need for unprogrammed works. The prudent reserve target for this rating scheme is \$150,000.

### **3.4 DEPRECIATION**

River control schemes are designed to be maintained in perpetuity by constantly repairing and replacing component parts which are damaged by floods or by the constant wear and tear encountered in a river environment.

The performance measure is that the infrastructure assets are maintained to meet their service levels at all times.

As there is a constant cycle of replacement of elements of the infrastructure as necessary, depreciation of the value of the assets is not appropriate and funding of depreciation is not necessary. This approach is consistent with the NZ Infrastructure Asset Valuation and Depreciation Guidelines, Section 5.4.4.

## **SECTION 4: PERFORMANCE MEASURES**

The overall performance measure is that the infrastructure assets are maintained to meet their service levels at all times.

The following procedures will be adopted to ensure the adequacy of maintenance.

### **Annually**

- (i) Following scheme inspection, produce annual works report for rating district annual meeting to include type of work to be undertaken, quantities, location and costs.
- (ii) Organise contracts for agreed scheme work, oversee contract completion and report to Council.
- (iii) Report on works undertaken during the previous financial period to the Rating District ratepayers and Council.

#### Performance Measure

No reports of stopbanks or erosion protection works requiring repairs without an agreed programme of remedial work in progress.

### **Triennially**

- (i) Re-fly aerial photographs of the Karamea Area, analysing these photographs to assess changes in river meander patterns that could impact on Rating District Assets.
- (ii) Re-measure cross section river profiles to determine whether the riverbed is stable, or aggrading, and to identify management issues or options.
- (iii) Revaluation of the asset schedule to include any additional rock placed on stopbanks and bank protection works over the three year period.
- (iv) Review this Asset Management Plan

#### Performance Measure

Report to Council and Karamea ratepayers on revaluation of assets and the Plan review.

## **APPENDIX I - DEFINITION OF TERMS**

AGGRADATION	The deposition of bed material resulting in the raising of the river bed level and a reduction in the flood carrying capacity.
EROSION	Processes of wearing away of the land surface by natural agents and the transport of the material that results.
EROSION CONTROL WORKS	Works designed to protect stopbanks or natural banks from erosion to maintain channel stability or to reduce the deposition of sediment into the lower reaches of a river reducing the effective depth of flow.
FLOODPLAIN	The area of land adjacent to a river over which floodwater has historically or could potentially flow. The fan which has been built up in geological time by the river.
GROYNES	Embankments or structures built either at right angles or at an acute angle to the river flow designed to reduce water velocity adjacent to a stopbank or terrace. Groynes may be permeable or impermeable and constructed normally of rock.
MAINTENANCE	Work required to keep the existing flood protection works in good repair, and includes spraying of stopbanks for weed control, topping up of earthwork for stopbanks and rock replacement.
MEAN ANNUAL FLOOD	The average value of the highest flood recorded in each year of records. Mean Annual Flood has a return period of 2.3 years.
RIPRAP	A line of continuous rock along the edge of a riverbank, or any other man-made structure e.g. a stopbank or deflector.
SPUR	A short rock structure built generally at right angles to the riverbank, designed to deflect flows away from an eroding section.
STOPBANK	Compacted earth structures generally parallel to the river channel designed to increase the depth of water and hence capacity without overflow.

## APPENDIX II - EXPENDITURE SINCE 1990

### Works Expenditure

<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
12,417	2,637	2,419	6,534	76,599	16,500	19,892	3,027
<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
192,010	5,505	20,158	2,022	24,509	898	1,097	11,665
<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
10,437	124,354	69,734	16,200	26,235	102,64	10,920	17,700

Total Expenditure \$ 673,469

Average Expenditure \$ 28,061

Average Expenditure as a % of Asset Value 4.1%

As at 30 July 2014, the value of the Karamea Rating District Scheme assets was \$3,581,317

## The Karamea Rating District Meeting Procedures & Information Sheet

1. The Regional Council's Karamea Special Rating District was formed in 1982. Assets of the scheme include:
  - Karamea River stopbanks and erosion control works
  - Oparara River (left bank) stopbank and erosion control works
  - Little Wanganui River (right bank) stopbank and erosion control works
  - Granite Creek erosion control works
2. The Karamea Rating District is traditionally a 'maintenance scheme', meaning that capital works are generally not funded by the scheme, however variations to this principle may be considered from time to time by the Liaison committee and recommendations made to Annual Meeting and to Council accordingly. The Asset Management Plan for the Karamea Rating District states:

*"Any increase in service potential of the works would require additional capital expenditure. Where rock is placed on an existing stopbank, to maintain the stopbank at its same service potential, that would be charged to this maintenance scheme. On the other hand, if the service potential of a structure is required to be increased this would not be a charge to the maintenance scheme but classified as capital expenditure requiring additional contributions from those who wish to receive a higher level of protection over and above that identified in the asset management plan."*

3. All Karamea Special Rating Area ratepayers are entitled to vote at the Karamea Rating District Annual Meeting. The Annual Rating District meeting is nominally chaired by one of the Buller Constituency elected members of the Regional Council. The Council CEO or their delegate, the Council engineer, and secretarial support staff also normally attend the Annual Meeting.
4. Prior to each Annual Meeting, the Council will circulate minutes from the previous meeting, a financial report, a works report, and a proposed rate strike. These matters are debated at the meeting and the resulting motions passed at the meeting become recommendations that are then put to Council for adoption.
5. Council is responsible under the Local Government Act and Soil Conservation and Rivers Control Act to maintain flood protection assets in a responsible and sustainable manner. It is possible that the Council could over-ride a recommendation of the Rating District if, in its judgement, the recommendation is not in the interests of the Council or does not reflect sustainable asset management principles.
6. At the Annual Meeting, the ratepayers normally elect a committee and a spokesperson. That committee has the purpose of liaising with the Council engineer regarding river works comprising the Karamea Rating District, during the course of the year.
7. The liaison committee (normally via the spokesman) contacts the Council river engineer, as required, to advise them of any maintenance needed for the works that are part of the rating scheme. The engineer generally visits Karamea to oversee maintenance works, and will often visit after a major flood event to assess damage. They will also conduct an annual inspection, normally in July of each year. The spokesman will invite other committee members to attend inspections. It is expected that the spokesman will communicate regularly with members of the liaison committee.
8. The Spokesman may also be asked to oversee more minor works, or to carry out a final inspection of works carried out by a contractor for the scheme, to confirm to the council engineer that the works have been carried out properly and to an acceptable standard, prior to the council paying for the works. This can save travel and staff time costs, saving the rating district money.
9. The rating district covers the cost of all physical works carried out to maintain the scheme assets, plus the costs of engineering staff visits. Other costs include investigations, asset management plan reviews, river cross section surveys, seeking resource consents for proposed works, or any other administrative tasks carried out on behalf of the Rating District.
10. Council engineering staff will normally tender for any substantive works agreed as being needed by the Annual Meeting, and will oversee these works (except where the spokesman takes on this role) and arrange payment on completion. Council also makes and collect rates and undertakes other administration roles on behalf of the Karamea ratepayers.