THE WEST COAST REGIONAL COUNCIL

FRANZ JOSEF RATING DISTRICT

ASSET MANAGEMENT PLAN

October 2014

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EXECUTIVE SUMMARY

Under the Local Government Act 2002 Councils are required to develop '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 Franz Josef Rating District will be managed over their lifetime.

The Franz Josef protection works extend downstream from the State highway Bridge a distance of 450 metres on the left bank and a distance of 550 metres on the right bank.

The area protected on the left bank includes a motel complex and a private dwelling.

The area protected on the right bank includes a historic church site, Franz Josef headquarters of the Department of Conservation, the Franz Josef Township and helicopter landing sites.

Community infrastructure such as roads, power and telephone lines all derive benefit from the protection works.

This plan sets out the history of the scheme so there is a record of the major decisions, including expenditure. It identifies the objectives of the scheme, the methods of monitoring the condition of the assets and determining the annual maintenance needed to retain the service level so that both the Rating District community and the Council can review how the scheme is working.

The plan also includes the Infrastructural Asset Register which details all of the Scheme's assets and their latest valuation.

SECTION 1: DESCRIPTION

1.1 PURPOSE OF AN ASSET MANAGEMENT PLAN

This Asset Management Plan defines the objectives and performance standards of the Franz Josef Rating District scheme for which the Regional Council has the maintenance responsibility. It also provides a basis upon which the effectiveness of maintenance performance can be measured.

The asset management plan:

- Describes the history of the rating district and identifies its 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

In May 1957 the Ministry of Works advised that the government was proposing to build a new hotel at Franz Josef. The proposed construction site was approximately one kilometre downstream from the township on the right bank of the Waiho River. At the time the threat of erosion was considered remote, due to the location of the main stream.

Prior to 1957 protection works in the form of gabion (wire crates) existed on the right bank below the State Highway Bridge to provide protection for the aerodrome.

In May 1967 the Ministry of Works expressed concern at the Waiho River swinging northwards and possibly affecting the Tourist Corporation Hotel site and Airport facilities. An inspection of the area was carried out by Westland Catchment Board engineers and a proposal for protection work prepared.

In May 1968 the proposal to construct a stopbank over approximately 350 metres with heavy rock armouring was approved by Civil Aviation and the Tourist Hotel Corporation. This work was completed in November 1968 at a cost of $7,640. Repairs to the rock protection were carried out in March 1971. 1200 tonnes of rock being required to top up slumped rip rap.

As a result of the Waiho River again threatening the hotel frontage a proposal to extend the existing stopbank downstream by 500 metres was forwarded to Ministry of Transport and the Tourist Corporation for approval in May 1972.

Approval to extend the stopbank was received by the Westland Catchment Board in December 1972 and the work was completed in October 1973.

In November 1973 a flood washed out the old wire crate protection works on the north bank immediately downstream of the State Highway Bridge over a distance of 60 metres causing flooding of the Airstrip and threatening the Hotel and sewage plant.

A major flood in February 1974 swept through the Airstrip and Hotel sewage plant. The washed out section of stopbank above the Airstrip was replaced with a curved bank and hook groyne and rock stronghead at the top end. Rock spur groynes were placed along the reinstated bank.

During severe flooding in 1967/1968 the river bed at the terminal face of the Glacier rose 13 metres. This gravel has since travelled downstream causing a buildup of the riverbed below the State Highway Bridge.

A rating classification was suggested in August 1977. In August 1978 the Westland Catchment Board prepared a proposal for the Waiho River which included rockwork to protect the riverbanks from erosion, and stopbanks to prevent flooding and to keep the river in a permanent alignment. The estimate for the proposed work was $120,000. The works were designed for a 50 year return period flood (2,700m^3/s) with 1 metre freeboard.

In March 1979 severe flooding caused further damage to the stopbanks and rock protection and as a result the scheme estimate rose to $144,000.

The proposed scheme works were approved on 12th November 1979 by N.W.A.S.C.O and work began in January 1980.

Two major floods occurred on 2nd and 3rd and again on 24th and 25th December 1979 resulting in 300 metres of the airstrip stopbank being lost. In the 24th-25th December flood a further 600 metres of bank was destroyed. The main river channel diverted to the north bank causing severe damage to Green's property and threatened the recently completed oxidation ponds.

The scheme was revised in July 1988. Works included:

(a) 1600 tonnes of rock protection on the left bank along the camping ground frontage.
(b) 600 tonnes of rock in spur groynes below the camping ground.
(c) 3600 tonnes of rock in the form of 3 retards below Canavan's Knob on the left bank.
(d) The extension of the right bank stopbank and the construction of a hook groyne and stronghead with 7,800 tonnes of rock protection.

The revised scheme works were completed in 1980.

In January and March 1982 the Waiho River was subject to major flooding. A report prepared by Soil Conservation and Rivers Control Council stated that on 11/12 March 1982 the 24 hours rainfall was 445mm.

Damage occurred to the left bank stopbank adjacent to the State Highway and the stopbank on the right bank opposite the camping ground. The aerodrome stopbank required raising and the hook groyne opposite Canavan's Knob was destroyed.

Design standards were raised to include 1 metre freeboard above the March 1982 flood. The hook groyne was not reinstated.

A report prepared by the Chief Engineer of the Westland Catchment Board suggested that the National Roads Board withdraw from the scheme and assume responsibility for the left bank section of protection works adjacent to the State Highway.

In May 1983 the Waiho River bed had less than 1.8 metres clearance from the soffit of the existing State Highway Bridge.

The scheme was reviewed in July 1983 on 16 April 1984 and the Westland Catchment Board adopted a classification for maintenance purposes. This classification was used to fund the ongoing maintenance works.

On 20/21 December 1984, the Waiho River broke through the right bank stopbank, flowed over the airstrip and along the THC Hotel frontage. A proposal to repair the flood damage and protect the Hotel and sewerage ponds was estimated at $170,000. Repairs to the flood damaged stopbank were completed in April 1985.

On 30 April 1985 a proposal to raise the Glacier access road over 300 metres and place 8800 tonnes of heavy rock protection to prevent the Waiho River from flooding into Wombat Creek was forwarded to the Commissioner of Crown Lands for consideration.

On 16 May 1985 a public meeting resolved that an area system of classification be adopted.

On 28 December 1989 approximately 180 metres of the right bank stopbank was destroyed. The Waiho River diverted through the gap in the stopbank destroying the recently completed airstrip.

As a result of continued aggradation, Westland Catchment Board engineers decided to abandon the right bank stopbank and concentrate protection works along the existing riverbank.

At a meeting on 17 May 1990 Waiho township ratepayers opted for a proposal which included the construction of a 250 metre long rock protected stopbank on the right bank extending downstream from the terrace below the Department of Conservation Headquarters and four rock deflector groynes along the toe of the terrace on the right bank below the State Highway Bridge.

On the left bank the proposal included the construction of a stopbank commencing at the State Highway Bridge and extending downstream for 300 metres to protect the Glacier Gateway Motor Lodge and Camping Ground. The stopbank would be reinforced with rockwork.

The design height of the stopbanks was determined by taking an average approach from technical reports available at that time.

The top width of 6 metres on the right bank stopbank was to allow for any future raising as determined necessary. The rock protection was to be trenched 5 metres below existing bed level to prevent slumping if scouring occurred.

The left bank stopbank and rock protection was constructed by Ferguson Bros. Industrial and the right bank stopbank and rock protection by Langridges Earthmoving. All work was completed by September 1991.

On 13 December 1995 a major flood destroyed the right bank approach to the State Highway Bridge and seriously eroded the right bank immediately below the bridge.

On 11 September 1996, the Franz Josef community confirmed its acceptance of a proposal prepared by the Regional Council to raise the left bank stopbank by one metre over 300 metres and place 2000 tonnes of rock protection. On the right bank, to construct a stopbank commencing at the State Highway Bridge and extending downstream for 280 metres and place 18,000 tonnes of rock protection. This work was completed by Ferguson Bros. Industrial in November 1996.

In response to ratepayers' requests, Council staff prepared a reclassification of the Franz Josef Rating District in 2003. A new Capital Value Based Rating District was ratified in the Council's Annual Plan adopted on 19 August 2003.

1.3 DESCRIPTION OF ASSETS

The Rating District assets consist of all those works outlined in the Infrastructural Asset Register. As at 30 June 2014, the value of the Rating District assets was $ 3,301,950

1.4 MAINTENANCE EXPENDITURE

Appendix II shows expenditure since 1991. The average annual expenditure on maintenance is $46,363.

The capital value of land and buildings within the confines of the scheme is $89.5 million.

1.5 EXISTING STANDARDS

Cross-section and flood flow analysis undertaken for the Franz Josef scheme indicates that its current service potential in 2010 was capable of containing less than 2100 cumecs, which is the 2008 estimate of the 1 in 50 year return period flood with 600mm freeboard. At the time the rating district accepted there was a need to increase the level of protection afforded by the stopbanks and is was considering raising the height to be able to contain at least 2,100m^3/s.

Significant riverbed aggradation at and upstream of the bridge has occurred since a major flood event in December 2010. Following this event the State Highway bridge was raised and the stopbanks were also raised.

Council commissioned a report on the Waiho River by Robert Hall which was completed in 2012. The report also recommended more frequent cross section surveying of the river to better inform decision makers, it also highlighted areas of concern including the potential for the river to breakout into the Tatare River and a low point upstream of the State Highway Bridge that posed a threat to Franz Josef township.

In 2014 Council commissioned hydraulic modelling work to investigate design heights for the stopbanks and look at potential vulnerable areas to flooding. The report was completed by Matt Gardner who identified issues of concern for the Rating District and also analysed riverbed aggradation over time. The report showed the riverbed has been aggrading at an average of 0.2m per year, however in the last 2 years has aggraded between 1-2m in places.

It is clear that the aggradation will not abate in the immediate future. The report showed that the north side stopbank provides an excellent level of protection to the town in a theoretical 1 in 100 year flood event. The south side stopbank would overtop in a theoretical 1 in 10 year flood event.

SECTION 2: SERVICE LEVELS

2.1 Objectives

The objectives of the Franz Josef Rating District are:

(a) To reduce bank erosion and flooding on the left bank of the Waiho River between the State Highway Bridge and approximately 100 metres below the old Franz Josef Holiday Park.

(b) To reduce bank erosion and flooding on the right bank of the Waiho River from the State Highway Bridge downstream for a distance of approximately 600 metres.

2.2 Maintenance

An annual maintenance programme will be prepared each year in consultation with the committee prior to adoption by the Council for inclusion in the Annual Plan.

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

- 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 Rating District outlining the condition of the scheme assets and maintenance works and expenditure required for the coming financial year.

2.3 Maintenance Issues

Stopbanks
Stopbanks are man made structures generally running parallel to the flow of the river that are built to raise the bank level and hence increase the capacity of the river. They are usually constructed of compacted river gravels with a grass cover and do not have the strength to resist the erosive forces of a river in flood without adequate bank protection works in place.

Maintenance includes repair of any scouring, vegetation removal to facilitate access, control of stock to prevent damage to stopbank batter slopes, topping up of stopbanks as required to maintain stopbank capacity in terms of design.

Stopbanks can potentially be damaged by:

(i) Failure of a training groyne such as a rock retard which can allow the full force of the river to suddenly run along a relatively unprotected stopbank, and cause scouring of stopbanks in excess of 50 metres in length

(ii) Overtopping: Stopbanks are generally not designed to sustain overtopping. They may however be capable of sustaining minor overtopping for a short duration in flows not exceeding 100mm in depth over the top of the bank. Overtopping of durations greater than an hour may scour the back batter resulting in failure of the structure, it is therefore important to ensure there is an even and strong vegetation cover on the landward batter.

(iii) Piping: Flow through porous bank or foundation material can wash out fines leading to a collapse.

(iv) Stock and Vehicles: Can remove cover and wear ruts in surface resulting in weakness.

(v) Construction: Construction of pipelines cables under stopbanks as well as holes on top of stopbanks can weaken the structure. Drainage channels should not be located at the toe of stopbanks.

(vi) Earthquake: Stopbanks can be damaged in the event of an earthquake by cracking vertical or horizontal displacement, or by liquefaction of the foundation material.

Erosion Control Works

Erosion control works consist of rock placed in continuous riprap, spur groynes, stub groynes, strongheads, hook groynes, and in river training retards. Erosion control and river training structures are built to provide protection to stopbanks and natural bush from the rivers erosive forces during floods by training the river into a stable pattern or reduce velocities along stopbanks using stub rock groynes.

Only limited river training is carried out by way of channel improvements by diversion or extraction of river gravels. This is generally accepted as only having a limited and temporary influence on the channel hydraulics (performance).

Erosion control structures are constructed to absorb the energy of the river, to control the alignment of the flow of the rivers, and subsequently give the required protection to stopbanks and natural banks. Because of this they are the areas with the major exposure to damage.

The meander of a river can change significantly by floods of only moderate duration. This can result in an acute angle of attack of protection structures resulting in damage which is disproportional to the flood discharge. Likewise erosion control works already weakened from previous floods may sustain damage disproportionate to the flood discharge.

It is very important to ensure damage to bank protection structures is undertaken swiftly and to ensure:

- Rock training walls are kept to the required height to lessen failure.
- Any slumping of rock off strongpoints, spur groynes and rip rap are topped up.
- Rock is of a durable nature, angular and of the correct grading size.

2.4 Damage Exposure

River control works are constructed in a very high energy environment with the purpose of resisting and absorbing some of that energy. It is considered that no matter what the standard of maintenance carried, 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 and is in vicinity of $600,000

Flood Size	Value	Damage Ratio	Damage Exposure
20 Year	$3,301,950	10%	$330,195
100 Year	$3,301,950	20%	$660,390
500 Year	$3,301,950	20%	$660,390

2.5 Maintenance

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

- Preparation of an annual works programme and corresponding budget.
- Consultation with Rating District.
- Adoption of draft programme and budget by Council.
- Adoption of final Annual Plan by Council.

2.6 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.

2.7 Financial Reserves

Financial reserves are held within each rating districts 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 each rating account is determined by the assessment of risk damage and the need for unprogrammed works.

2.8 Depreciation

Rating District schemes are designed to be maintained in perpetuity by constantly repairing and replacing component parts which are damaged by the constant wear and tear.

Because there is a constant cycle of replacement of elements of the infrastructure, 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 the rating district members 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) Re-measure cross section river profiles to determine whether the riverbed is stable, or aggrading, and to identify management issues or options.
(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 Franz Josef Area, analysing these photographs to assess changes in river meander patterns that could impact on Rating District Assets.
(ii) Revaluation of the asset schedule to include any additional rock placed on stopbanks and bank protection works over the three year period.
(iii) Review this Asset Management Plan

Performance Measure
Report to Council and Franz Josef 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.
FLOOD CARRYING CAPACITY	The ability of a river to carry flood flows within its bed without exceeding its banks.
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.
HOOK GROYNE	A "Hook – shaped" rock armored stopbank, used to divert flows by impounding water to use as a buffer against flood flows.
INFRASTRUCTURE	Those built structures necessary for operating and supplying utilities and services to the community. Eg. telecommunications lines, roads and bridges, electricity lines, water, drainage and sewerage systems, rail links, seaports and airports.
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 1991

1991	1992	1993	1994	1995	1996	1997	1998
179,093	5,398	5,550	139,960	2,085	6,271	307,865	1,390

1999	2000	2001	2002	2003	2004	2005	2006
4,766	1,423	857	34,775	2,822	1,708	136,790	748

2007	2008	2009	2010	2011	2012	2013	2014
498	8,176	78,729	23,486	26,288	178,989	69,522	0

Total Expenditure	$ 1,217,189
Average Expenditure	$ 50,716
Average Expenditure as a % of Asset Value	1.53%

As at 30 June 2014, the value of the Franz Josef Rating District Scheme assets was $3,301,950