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Report to the Hutt River Floodplain Management Advisory Committee
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Hutt River Floodplain Management Plan: Project Leader's Report

1. Purpose

To update the Advisory Committee on the status of investigations for the Hutt River Floodplain Management Plan (HRFMP).

2. Background

Investigations for the combined Phases 2 and 3 of the accelerated HRFMP are proceeding on track to deliver a Design Standard by June 1999. The status of investigations as reported to the Advisory Committee on 14 April 1999 was:

- Deficiency plans and typical solutions for the stopbank upgrades completed.
- Channel alignment plans for the river channel management measures completed.
- Process to select a consultant to investigate possible sites for detention reservoirs, and consider bridge raising and storm water pumping options, well underway.
- First newsletter and a summary of public responses on objectives and options presented.

An explanation of the river channel management measures, for the Design Standard, was presented to the Advisory Committee on 14 April (Report 99.137). A similar explanation of the stopbank upgrade measures, the other major component of the design standard investigations, is presented in Report 99.243 on this order paper. This report outlines the status of investigations of the HRFMP project components, and also includes further explanations on items raised at the last Advisory Committee: gravel extraction, storm water, watercourse agreements and flood event probability.

3. Proposed Workshop

Outcomes from the various investigations for the "Design Standard" will be presented to an Advisory Committee workshop, scheduled for mid June 1999. The workshop will be informal, to permit full consideration and discussion of the "Design Standard" options.

The conclusions and consensus of the workshop, on the options considered for the "Design Standard", will be reported to the Advisory Committee meeting on 28 June. From these, the Advisory Committee will recommend to the Landcare Committee its preferences for the "Design Standard".

4. Design Standard

There are five major components for the design standard investigations:

- River Channel management measures (channel alignment and bank edge protection design);
- Flood Defences (stopbank upgrade measures and other retaining structures);
- Other flood mitigation measures (dams, bridge improvements, stormwater pumping);
- Floodplain damage assessment;
- Environment effects.

These investigations are nearing completion and an overall audit and review of the process will commence during the second week of May, for completion by the first week of June 1999. The refinement of options and economic analyses will be carried out during this period. The costs and benefits of the design options considered for the Design Standard will be presented to the Advisory Committee workshop. A flow chart showing the status of investigations is attached (**Attachment 1**).

A brief summary of the status of the various investigations for the Design Standard follows.

4.1 Channel Management Measures

The work involved in these investigations was reported to the Advisory Committee meeting on 14 April (Report 99.137). Investigations are substantially complete and preliminary cost estimates are under review for accuracy and completeness.

4.2 Stopbanks Upgrade Measures

These investigations are substantially complete, the solutions developed and the preliminary cost estimates are also under review for accuracy and completeness. Report 99.243, presented later in this Order Paper, gives a full account of the investigations and their outcomes.

4.3 Other Flood Mitigation Measures

These investigations, carried out by consultants Connell Wagner Ltd, assess the costs of:

- Raising or improving seven existing bridges across the Hutt River, to provide waterway areas which will safely pass the corresponding design flows.
- Providing culverts through the railway embankments at Alicetown and Woburn. Their purpose is to drain floodwaters quickly from the ponds, which result when a stopbank breaches or overtops.
- A storm water pumping option at Black Creek.
- Detention reservoirs in the upper Hutt River catchments to reduce flood peaks.

After the last Advisory Committee meeting, it was pointed out that the reasons for investigating detention reservoirs was not clear, when the Hutt Valley is largely committed to a stopbank system. In explanation, detention reservoirs are being investigated, as they have the potential to reduce flood peaks. Providing they are cost effective, the level of protection (and corresponding cost) of the stopbank system through the Hutt Valley may be reduced. It must be noted that regardless of their viability, detention reservoirs as an improvement option would be very controversial.

Preliminary proposals for raising bridges and siting of culverts are complete; cost estimates for detention reservoirs are in progress. Preliminary cost estimates are due in the second week of May 1999.

4.4 Floodplain Damage and Risk Assessments

For each design option, measures to upgrade the system to contain the peak flood will be presented. However, there is always potential for the "protected" areas to be flooded under any design option. This may be due to the design flood being exceeded or stopbank failure. Obviously, the potential for residual damage in the floodplain decreases with increasing standard of protection. Therefore, estimates of floodplain damages for the existing system and for each improvement option are determined to assess the benefits and residual risks.

These assessments are carried out using computer models developed during Phase 1 of the Hutt River Floodplain Management Plan and were recently improved. The tasks involved were:

- Simulating a range of floods in the river.
- Simulating stopbank overflows and breaches.
- Estimating flood levels and potential flood damages on the floodplain.

The estimated damages are then "weighted" against the probability, or chance, of them occurring. The sum of these weightings is called "annualised damages". These correspond to a hypothetical sum of money which could be put in the bank each year to cover potential flood damage. Alternatively they form the basis to determine the sum of money which *could* be spent on capital works to reduce the potential flood damage.

The above investigations, carried out by WRC Engineer Richard Minson, are near to complete and preliminary damage estimates are available for the existing and each design option.

4.5 Assessment of Environmental Effects

The environmental effects for each design option will be compared with maintaining the status quo. For each design option the effects on the landscape, ecology, recreation, social and cultural values will be considered. The investigations are being managed by WRC Planner Alison Newell, and are about 75 percent complete; preliminary report due late May 1999.

4.6 Options Evaluation

The evaluation of options starts in the second week of May for completion by the first week of June 1999. It will involve:

- Investigation processes and outcomes to be reviewed by an independent consultant;
- Refinement of cost and benefit estimates;
- Rationalising and balancing the various components of each design option;
- A comparison of costs and benefits;
- Financial modelling to assess total debt, debt servicing costs and potential rate increases.

Investigations will be completed for the mid June Advisory Committee workshop.

5. Consultation Process

Copies of the first newsletter were made available to the Advisory Committee at the last meeting. The newsletter was also sent to:

- Special interest groups (34)
- Ratepayer associations (8)
- Community Boards (5)
- Libraries (6)
- Residents potentially affected by improvement works (371)
- Commercial enterprises potentially affected (55)
- Others (278)

The first newsletter requested public comment on objectives for developing the HRFMP, and on improvement options. Feedback from the consultation process and recommendations are detailed in Reports 99.230 and 99.231 in this Order Paper.

A second newsletter is to be published in early June 1999. This newsletter will, along with other information, contain details on the process for developing the Design Standard. The draft will be available at the Advisory Committee workshop in mid June 1999.

6. Non-structural Options

The aim of these investigations is to identify those non-structural measures that can be adopted to minimise the impacts of flooding. Opus International were appointed in April to review and report on approaches and practices in other countries. The Flood Protection Group will collate and assess current New Zealand practice.

Work to define the river corridor has also commenced. Management proposals for land within the river corridor will be considered under these investigations.

The target date for completion of non-structural options is June 2000.

7. Other Matters raised at the last Advisory Committee Meeting

Advisory Committee members raised a number of topical matters at the last Advisory Committee meeting. Some explanation is given below.

7.1 Gravel Extraction

There is a perception among ratepayers that an apparent gravel build up in the riverbed is increasing the flood risk and compromising public safety.

Gravel extraction has been a river management tool since the turn of the century. Extraction was uncontrolled and over-excavation led to regular bank edge failures. From the mid 1970s extraction was gradually reduced until, over the last 15 years, there has been very little extraction other than to construct river works. The build-up of riverbed gravel was encouraged during this recent period to reduce erosion risk.

Gravel extraction is now only considered where excessive deposits occur and other management techniques are not effective. The preferred approach is to allow the bed load to pass through the system. Currently it is recommended that 10,000m^3 of gravel be extracted each year downstream of the Melling Bridge. Recently obtained operational Resource Consents allow localised high gravel beaches to be managed in various ways, e.g. excavating, blading and ripping.

The Regional Council regularly surveys the river channel and uses the profiles to monitor gravel levels and assess channel capacity. A full river survey and analysis was completed in August 1998. This showed, for the lower river from Taita Rock to the Mouth, that there is now a good balance between the water carrying capacity of the river and erosion risk. Above Taita Rock, the bed of the river is, on average, still lowering and has yet to achieve an acceptable balance. The outcome of this study is contained in Report 98.457, presented to the Advisory Committee in September 1998. A further survey of 50 selected cross-sections, to ascertain gravel movement during the October 1998 floods, is now complete. The analysis will be reported at the Advisory Committee meeting when it becomes available.

7.2 Stormwater

Feedback from the Public Consultation programme, and a question in public participation at the last Advisory Committee meeting, raised concerns about tributary and stormwater flooding. Because the community does not differentiate between storm water, tributary or Hutt River flooding, mitigation of the wider risks and sources of flooding within the floodplain is an objective of the HRFMP. However, the HRFMP will deal directly with the consequences of flooding only from the Hutt River.

There are several urban streams and hundreds of stormwater pipes discharging to the Hutt River. There can be flooding in urban areas due to inadequacies in the existing reticulation systems or due to backwater effects when the Hutt River is in flood.

Although it is very unlikely that the peaks of extreme flood events in tributaries and the Hutt River will coincide, major flood events can occur in either system when the other is in moderate flood. Conditions that cause these floods will not change, even after the Hutt River flood protection system is improved.

The tributary and storm water flooding in the Hutt Valley are separately addressed by the Regional Council and respective Territorial Authorities. Flood levels in the Hutt River, under various flooding conditions, have been estimated through the HRFMP work and are available for the analysis of storm water and tributaries flooding.

7.3 Administration of Watercourses Agreement

The *Administration of Watercourses* agreement was set up in 1977 following the 20 December 1976 flood event which caused major damage in many of the tributary streams in the Hutt Valley. A post flood review showed that damages could have been substantially reduced had some maintenance of minor watercourses been undertaken and appropriate controls placed on development over, or adjacent to, the streams.

Accordingly, the watercourses agreement ensures that timely and often minor expenditure in maintaining a stream, along with reasonable controls on new development, will produce significant benefits for quite large areas of the community.

In Lower Hutt, the Regional Council maintains the Waiwhetu (up to Waddington Drive), Stokes Valley (up to Tui Glen) and Korokoro Streams, under the agreement. Hutt City Council maintains Black Creek and Awamutu Stream. Costs are generally shared 50:50 except for the Waiwhetu Stream which is fully funded by the Regional Council.

In Upper Hutt, the Regional Council maintains the Akatarawa and Mangaroa Rivers, Collins Stream and Pinehaven Stream (up to the Reserve), a small section of the Heretaunga Drain and Hulls Creek. Costs are shared either 50:50 or 67:33 with the Upper Hutt City Council.

Generally all other watercourses within urban areas are considered to be storm water drains and are the responsibility of the appropriate City Council. The Regional Council administers rural streams.

7.4 Probabilities of Flooding, Risk

The probability, or chance, of a major flood event occurring in any given year is a key factor when the community decides how much it should invest in flood protection. The probabilities of various events are also used in estimating expected costs and benefits of flood protection schemes. The Advisory Committee, when considering costs and benefits of design options for the Design Standard, will require a clear understanding of the probability concept. **Attachment 2** from "*Living with the River*" (1996) gives a simple explanation of the probability of flooding.

"Risk" assessment identifies or quantifies the combined probability of an event occurring and the consequences of it happening. Residual risk is a subset of this concept.

A verbal explanation on probability, risk and residual risk will be given to the Advisory Committee at this meeting.

8. Construction

8.1 Nash Street

The construction of river edge protection works at Nash Street is progressing well and about 50 percent complete. The target completion date is the end of June 1999.

8.2 Flood Damage Repairs

Work on the repair of flood damage sites is progressing well. Work completed to date includes the Stokes Valley training bank, Mary Huse Grove, Elbow Park, and the majority of the miscellaneous and minor repairs. Delivery of flood damage rock is well underway. Work has started on the interim repair of the Boulcott stopbank and the Wellington Golf Club rockline reinstatement. Planning and design are underway for repairs at Owen Street, Manor Park Golf Course and Bridge Road. The progress on individual items is shown in **Attachment 3**.

9. Recommendation

That the Hutt River Floodplain Management Advisory Committee receive this report and note its contents

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Attachment 1 : Status of Design Standard Investigations
Attachment 2 : Terms Used to Describe Flooding
Attachment 3 : Hutt River 28 October 1998 Flood Repairs Progress Chart