greater WELLINGTON
REGIONAL COUNCIL

Report **06.253**
Date 8 June 2006
File N/03/80/02

Committee **Landcare**
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Mangaroa River flood hazard assessment

1. Purpose

To advise the Committee of the findings of the Mangaroa River Flood Hazard Assessment (FHA) and to advise the Committee that it is proposed to forward a copy of the Summary Report to the Upper Hutt City Council.

2. Significance of the decision

The matters for decision in this report **do not** trigger the significance policy of the Council or otherwise trigger section 76(3)(b) of the Local Government Act 2002.

3. Background

A flood hazard assessment for the Mangaroa River has been part of the programme of capital-funded, floodplain investigations that commenced in 1995. However, the re-prioritisation and increased scope of the Waitohu Stream Study meant that the Mangaroa River FHA investigations did not commence until 2004/05.

The Mangaroa River floodplain was identified in the early 1990's as an area where further development was likely, with the subdivision of rural properties into smaller rural-residential type allotments. This was similar to the development potential that was recognised for the lower Wainuiomata River floodplain, for which an FHA was completed in 2000.

The Mangaroa investigations commenced with a report on the *Flood Hydrology of the Mangaroa River*, prepared by the Council's Resource Investigations Department following the successful completion of the Waiwhetu Stream hydrology report a year earlier. The opportunity was also taken to add a LiDAR survey of the Mangaroa Valley to the already commissioned joint GWRC-HCC survey for the Lower Hutt Valley, with the ensuing digital elevation model enabling a two dimensional hydraulic model to be considered for the Mangaroa River floodplain.

A two-year investigation programme was proposed for the Mangaroa River flood hazard assessment, in light of the experience gained from earlier studies where the one-year time frame had proved to be too tight. All four tenders received for the project proposed a combined one dimensional-two dimensional hydraulic model, justifying the decision to obtain the LiDAR data for the Mangaroa Valley. Sinclair Knight Merz Ltd (SKM) was awarded the contract in March 2005.

4. Floodplain Characteristics

The Mangaroa River and floodplain can be broadly divided into three physically distinct sections.

The bulbous head of the floodplain comprises a cluster of relatively small headwater catchments. Modifications in the flatter reaches of these tributaries, coupled with access culverts and bridges, present flooding problems.

The middle section comprises a relatively narrow floodplain to just downstream of the Whitemans Valley Road Bridge (near Katherine Mansfield Drive) and the channel is quite shallow and mobile through this section.

The lower section of the river is entrenched with a separate, narrower and lower floodplain developing from upstream of the Mangaroa Hill Road Bridge. In the lower parts of this section the river cuts down into rock outcrops, with a short section of gorge before the confluence with the Hutt River.

The Black Creek tributary, which drains the expansive swampy area behind Katherine Mansfield Drive, joins the Mangaroa River in the upper part of this lower section. Interestingly, this is the only major tributary that joins the Mangaroa River on its left bank, compared with the dozen major right bank tributaries.

5. Flood Hazard Investigations

The project was discussed with the Upper Hutt City Council (UHCC) at the scoping stage so that the investigations could be matched to their needs in relation to the provisions of the UHCC District Plan and the likely future trends in the development of the floodplain. These discussions also helped determine the upstream extent of the study, to ensure that all areas where they had concerns about flooding would be modelled.

Approximately 170 channel cross-sections were surveyed to develop the one-dimensional hydraulic model for the main river channel. Initial runs with this model identified areas where additional ground survey was needed to improve the detail associated with significant overflows from the main channel. In particular, the lower portion of the Black Creek channel (and the Wallaceville Hill Road embankment across the floodplain) was surveyed to improve the modelling of the overflow into the swamp area and its subsequent effect on flood storage.

The design flood range was from the 5-year through to the 100-year return period event, plus an extreme event of 1.5 times the 100-year discharge. Sensitivity scenarios considered the potential effects of channel sedimentation (at critical

locations and points of change in grade) plus partial bridge and culvert blockages. The sensitivity analysis was used to develop the appropriate freeboard to be applied to the raw model results

A river channel morphology and catchment geology investigation was also included in the project to assess areas of erosion hazard associated with flooding in the Mangaroa River. Composite geological maps were used together with the results of the hydraulic model to determine areas of constraint on the river morphology and locate areas of significant erosion risk. Building set-back recommendations were determined for the various erosion risk areas and an "erosion hazard corridor" was developed.

6. Flood Hazard Results

The results of the flood hazard investigations have shown that while regular inundation of parts of the floodplain can be expected, the hydraulic model only identified four significant areas of flooding that affect dwellings. These are:

- Upper Mangaroa, near the intersection of Russells Road and Whitemans Valley Road.
- The main channel breakout point downstream of the Mangaroa River and Huia Stream confluence.
- Upstream of the Mangaroa Hill Road Bridge.
- The Residential Area properties on Maymorn Road, near the confluence of the Mangaroa River and Collins Stream.

The Summary Report includes combined flood and erosion hazard maps, showing the potential extent of flooding in a 100-year return period event (with freeboard included) together with the erosion hazard corridor. Another set of maps included in the report shows the areas where building floor level controls should be applied in relation to the 50 and 100 year flood hazards.

The Executive Summary from the consultants' Summary Report outlines the principal findings and recommendations of their investigations and a copy of the Executive Summary is attached as an appendix to this report.

7. Use of the Flood Hazard Information

It is intended that the Mangaroa river flood hazard information be used for planning purposes to ensure that any future development in the valley takes account of the flood and erosion hazards. As such, it is expected that the primary use of the information will be by the UHCC.

The consultants were required to consider the provisions of the UHCC District Plan with a view to recommending appropriate planning controls for future development on the floodplain of the Mangaroa River, and for possible inclusion in the District Plan. These recommendations are included in the Summary Report and will need to be discussed with UHCC officers. The Flood Protection Department of GWRC therefore intends to continue working with the UHCC to

ensure that the information from this flood hazard assessment can be used effectively in whatever way the UHCC wants to apply it.

The areas of existing development that are at risk from flooding will also need to be addressed in the discussions with the UHCC and, potentially, with the affected landowners.

8. Communications

Following discussions with the UHCC, it may be appropriate to make the findings and recommendations of the FHA public, which could be by way of an article in the local community newspaper. GWRC Strategic Communications staff would then be able to assist with the preparation of a joint press release.

If the UHCC wishes to further consult with the community, in relation to the identified flood hazard, then the Flood Protection Department would expect to participate fully in assisting with that consultation.

The Mangaroa River is one of 12 catchments in the Region identified as having a high ecological value and is accordingly included in the GWRC *Streams Alive* programme that provides landowners with financial assistance for streamside planting projects. One of the guiding principles for this programme is that any planting project must not create a flood management problem, so the Land Management Officer (Biodiversity) will be advised of the results of this FHA so that the flooding and erosion hazards can be taken into account for any future streamside planting programmes.

9. Recommendations

That the Committee:

1. ***Receives** the report.*

2. ***Notes** the findings and recommendations of the Mangaroa River Flood Hazard Assessment*

3. ***Supports** the forwarding of the Mangaroa River Flood Hazard Assessment Summary Report to the Upper Hutt City Council.*

Report prepared by:	Report approved by:	Report approved by
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Attachment 1: Executive Summary