

Report 99.526

File: N/3/13/25

7 September 1999

Report to the Hutt River Floodplain Management Advisory Committee
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Hutt River Floodplain Management Plan : “Design Standard” Decision

1. Purpose

To present to the Advisory Committee the impacts and implications of community preferences and aspirations, identified through consultation on the “Design Standard” options, for long term flood protection for the Hutt Valley.

To facilitate the Advisory Committee making a recommendation to the Landcare Committee on a “Design Standard” option, and its period of implementation, following consideration of community preferences and aspirations.

2. Background

At its last meeting on 28 June the Advisory Committee considered Report 99.357 on the “Design Standard” (Options for Public Consultation). Recommendations made to and adopted by the Landcare Committee at its meeting on 8 July are contained in **Attachment 1** to this report.

The second resolution from Report 99.357 gave a mandate to consult with the community on the 2300 and 2800 cumec Risk Based “Design Standard” options. Report 99.519, the previous item on this Order Paper, presents the outcomes of the consultation.

The fourth resolution from Report 99.357 noted that the Advisory Committee had a preference for a Risk Based 2300 cumec “Design Standard”, with a requirement that all bridges and other key structures are upgraded on future replacement to the 2800 cumec standard. In this Report the impacts, arising from community preferences, are considered in relation to the “preferred” Risk Based 2300 cumec “Design Standard”.

By using the 2300 cumec Risk Based “Design Standard” as a benchmark, the implications and cost impacts of community preferences will be evident and hopefully more easily evaluated. The Advisory Committee will need to decide how best to reflect Community preferences in the final “Design Standard” option.

3. **The “Preferred” Risk Based 2300 cumec “Design Standard”**

The preferred Risk Based 2300 cumec Design Standard will upgrade stopbanks and edge protection works to a 2300 cumec standard (minimum) with the following exceptions:

- No stopbanks below Estuary Bridge.
- Belmont – edge protection works only up to 1900 cumec standard. No stopbanks.
- Bridge Road – edge protection works only up to 1900 cumec standard. No stopbanks.
- Gemstone Drive – stopbank and edge protection only up to 1900 cumec standard.

The total estimated cost of this standard is \$72.5 million.

4. **Impacts of Public Preferences on the “Preferred” Risk Based 2300 cumec “Design Standard”**

Through these discussions the preferred Risk Based 2300 cumec “Design Standard” will be abbreviated to RB2300, and where a particular flow or standard is referred to, e.g. 1900 cumec, this will be abbreviated to 1900. LTFS means the Regional Council’s Long-term Financial Strategy.

4.1 **Below Estuary Bridge**

The RB2300 makes no provision for stopbanks below Estuary Bridge. Parts of the industrial area will be inundated during floods exceeding a 1900 event. Despite efforts to contact the interested and affected parties there was no response. Accordingly, there are no issues arising from the consultation process to change the position.

Officers’ Comments

Stopbanks for this area give low economic efficiency, and would also exacerbate storm water flooding in the protected areas. The current (approximately 100 year) security is not unreasonable for small industrial areas. Flood warning and emergency procedures will avoid threats to life. The extent of the flood hazard should be identified in the District Plan so that any redevelopment will take account of the flood hazard, to minimise potential damage.

4.2 **Shandon Golf Course**

The existing stopbank in this reach is high enough to contain floods up to 1900 but may fail before reaching that level due to structural weaknesses. RB2300 provides for 2300 standard stopbanks and edge protection for this reach. Shandon Golf Club do not have any particular preference for a design standard but they prefer minimum encroachment of works into the golf course.

They also would like to have the proposed stopbank layout finalised quickly so they may incorporate it into their immediate and long term development plans for the course.

Officers' Comments

Layout of the proposed stopbank upgrade works will be designed in a way to minimise impact on the golf course. To meet the Golf Club concerns that the design of this section of the stopbank needs priority, it will be put forward for consideration in the Regional Council's LTFS.

4.3 **Ava Rail Bridge**

The existing bridge does not meet the 1900 standard. The preferred standard is 2800. Tranz Rail claim that the bridge was designed and constructed to the prevailing standards at the time (circa 1930) and they have no plans to reconstruct the bridge.

Officers' Comments

Upgrading of this bridge is critical to achieve design capacity for the system in the lower reaches. Extensive negotiations with Tranz Rail can be expected. Funding of the replacement bridge will be a contentious issue. Initial investigations may need to be funded by the project to expedite negotiations. This work will need priority as it is the "key" to improving a critical substandard reach of the river. Investigation of this bridge will be recommended as a high priority for LTFS consideration.

4.4 **Melling Bridge**

The existing capacity of the bridge is about 2300. The preferred capacity is 2800. Tranz Rail, Transit, Hutt City and the Regional Council (Transport and Flood Protection) all have functional responsibilities in this area with objectives that variously overlap.

Officers' Comments

An initiative for a co-ordinated approach to resolve the issues, to meet the needs of all affected parties, is underway. One outcome may be that the Regional Council has to expedite its work at Melling, ahead of its relative priority, to achieve a co-ordinated solution.

4.5 **Block Road Edge Protection**

The delay in repairing an eroded section of the river bank along Block Road was a concern for the Western Ward Committee.

Officers' Comments

Flood damage repairs are being implemented according to programme, approved after the October 1998 floods. Block Road repairs will be completed in the 1999/2000 financial year.

4.6 Hutt and Boulcott Golf Clubs

Currently there is an 800 metre long "gap" between stopbanks located in the Hutt and Boulcott golf courses; floodwaters can escape and flow towards the city in a flood exceeding a 1900 event. RB2300 provides for a 2300 standard stopbank. The Golf Clubs and adjacent residents accept the need for a stopbank. However, the clubs prefer the stopbank to be on the eastern boundary of their courses and the residents would like the bank away from houses, preferably on the western boundary, outside the golf course.

Officers' Comments

A stopbank on the western boundary, outside the golf course, is unacceptably close to the river. A bank on the eastern boundary of the golf courses has the added benefit of maintaining the area for floodwater storage. The exact location of the stopbank will be negotiated with the affected parties during the design stage.

4.7 Belmont

About 12 houses built near the river edge are at risk from flooding and erosion during a 1900 event. RB2300 provides only edge protection works for this reach to the 1900 standard. To provide a stopbank, the river would need to be re-aligned and the opposite bank edge re-established. There is general acceptance among residents that a stopbank is not viable or desirable. Their preference is for edge protection work to the preferred standard (2300) of the system rather than the 1900 standard as proposed.

Officers' Comments

The houses at risk will progressively flood above 1900 irrespective of the standard of the edge protection. The additional estimated cost of providing edge protection to 2300 standard is \$312,000. It was agreed to survey floor levels to accurately identify houses at risk of flooding at 1900 and 2300 floods. The costs to realign the river and construct a 2300 standard stopbank will also be estimated. This information will be provided to the Belmont community by November 1999. Investment in the stronger bank edge protections is possibly warranted.

4.8 Manor Park

The existing stopbank is generally to a 2300 standard. RB2300 provides for a 2300 standard which the residents have accepted.

Officers' Comments

No issues for the design standard.

4.9 Whirinaki Crescent

The existing stopbank capacity is below 1900 standard. RB2300 provides for a 2300 standard stopbank. Upper Hutt City Council (UHCC) favour a 2800 standard stopbank.

Officers' Comments

Because this area can be given good flood warning, and can be evacuated reasonably easily, Officers believe a 2300 standard is appropriate. It is accepted there can be reasonably deep ponding in the area where a flood exceeds the design capacity of the stopbank. The additional estimated cost for raising to 2800 standard is \$211,000.

4.10 Silverstream Bridge

The capacity of the existing bridge is below 1900. The preferred capacity is 2800.

Officers' Comments

UHCC are aware of the existing capacity. The preferred standard will be considered through the design process for the bridge.

4.11 Moonshine Bridge

The capacity of the existing bridge is below 2300 and it compromises the capacity of the adjacent stopbank system. The preferred bridge capacity is 2800.

Officers' Comments

UHCC strongly support an approach to Transit NZ by the Regional Council to upgrade this bridge. Hydraulic investigations are required and discussions with Transit will be arranged. It is likely that no modification to or replacement of the bridge will occur until Transit "four lanes" State Highway 2 over this section.

4.12 Totara Park

The existing stopbanks generally meet the 2300 standard. RB2300 provides for 2300 standard stopbanks. This standard is accepted by the community and UHCC.

Officers' Comments

No issues for the design standard.

4.13 Bridge Road

About 21 houses built near the riverbank are at risk of flooding during a 1900 event. RB2300 make no provision for a stopbank or house raising. The proposed edge protection is to a 1900 standard. Residents accept that stopbanking is not a viable option for the Bridge Road area. Their preference is that edge protections are at least equivalent in standard to that agreed for Gemstone Drive.

Officers' Comments

The houses at risk will flood above 1900 irrespective of the standard for the edge protection. The additional estimated cost for 2300 edge protection is \$371,000. This situation is similar to the houses at Belmont where the 2300 edge protections are possibly warranted. Floor levels will be surveyed to accurately identify the houses at risk. There is no apparent basis for compensation as requested by the residents, presumably for being allowed to construct their houses at this location.

4.14 Gemstone Drive

The existing stopbank upstream of Akatarawa Bridge is generally high enough to contain a 2300 flood but the protected area can get flooded during a 1900 event with water entering from below the Akatarawa Road. RB2300 provides for 1900 protection for the residential area. The community and UHCC preference is a 2300 standard.

Officers' Comments

The existing stopbank has no berm and cannot easily be secured for a design standard exceeding 1900. To improve the standard a number of properties would need to be purchased to provide a secure stopbank with a wider berm. The bank or wall along Akatarawa Road would need to be raised a further metre above the 1900 level to achieve the 2300 standard.

For both the 1900 and 2300 standards there will be access and storm water flooding problems for the community. The additional estimated cost of upgrading to 2300 standard is \$595,000 excluding land purchase costs.

4.15 Lower Valley : Stopbanks and Edge Protection Standards

The lower valley stopbank system extends from the river mouth to Pomare Bridge. The existing stopbanks below Kennedy-Good Bridge (KGB) are generally high enough to contain floods up to 1900 but they may fail before reaching that capacity due to structural weaknesses. Floodwaters can escape through the Hutt Golf Course and flow towards the city. The stopbanks from KGB to Pomare Bridge are of a high standard and can contain floods up to 2800.

RB2300 provides for stopbanks and edge protection works to a minimum 2300 standard. The community preference is for a 2300 standard or better. A number of submissions and views held that the marginal cost of 2800 over 2300 would justify selecting it. There is also a preference that the 2300 standard should not compromise the ability to upgrade the system to a higher standard in future.

Officers' Comments

Provisions in RB2300 satisfy the community preference for a minimum 2300 standard. With careful design, stopbanks can be raised in future by working on the crest and riverside face. Stopbank construction generally causes more temporarily negative effects to the environment than the edge protection works. These could be avoided by constructing the stopbanks to the higher 2800 standard with edge protection to 2300.

The available options can be summarised as:

- a. The Risk Based 2300 option (as preferred by the HRFMAC, Report 99.357, recommendation 4).
- b. A Risk Based 2300 option with stopbanks only to 2800 standard, the additional estimated cost is \$3.8 million.
- c. The Risk Based 2800 option, additional estimated cost \$9.5 million (edge protections \$5.7 million and stopbanks \$ 3.8 million).

As previously noted, the additional estimated cost of providing edge protection to 2300 standard at Belmont is \$312,000.

4.16 Upper Valley : Stopbanks and Edge Protection Standards

The upper valley stopbank system extends from Wellington Golf Club to Maoribank, and includes Totara Park and Gemstone Drive. The existing main stopbank protecting Upper Hutt is of a good standard and generally high enough to contain floods up to 2800. The exception is a small reach above the Moonshine Bridge, which causes a restriction to flow. RB2300 provides for a minimum 2300 upgrade with 2300 edge protection. UHCC prefer a uniform 2800 standard for this stopbank.

Providing the Moonshine Bridge is upgraded, the existing main stopbank will effectively contain both the 2300 and 2800 flow.

Officers' Comments

The three options available for the main stopbank are:

- a. The Risk Based 2300 option (as preferred by the HRFMAC, Report 99.357, recommendation 4).
- b. A Risk Based 2300 option with stopbanks only to 2800 standard, the additional estimated cost is \$230,000.
- c. The Risk Based 2800 option, additional estimated cost \$3 million (edge protections \$1.3 million, stopbanks \$0.23 million and Moonshine Bridge \$1.47 million).

As noted previously community requests for “modifications” to RB2300 at Whirinaki Crescent, Bridge Road and Gemstone Drive respectively cost an estimated \$211,000, \$371,000 and \$595,000. They are not included in the preceding figures.

4.17 Earthquake Risk

The issues raised by the Institute of Geological and Nuclear Sciences (IGNS) in their submission of 23 August are:

- An earthquake resulting from movement on the Wellington or Wairarapa faults has the potential to cause catastrophic damage to development on the Hutt River floodplains.

- Movement on the Wairarapa fault is not expected, movement on the Wellington fault is likely and has a return period of approximately 600 years, last movement 400 years ago.
- Decision makers should be aware of the potential consequences of a major earthquake and should consider the relative risks of all natural hazards when they allocate resources for risk reduction.
- Risk managers should be aware of the consequences of fault movement in design and in preparing emergency management procedures.
- IGNS believe they have the tools to model fault movement and earthquake behaviour on the Hutt River floodplains and accordingly provide further information.

Officers' Comments

Awareness of the potential consequences from a large earthquake is essential both for decision makers and risk managers. The opportunity to obtain better information on earthquake behaviour, which will enable better management and emergency procedures, will be taken further with IGNS.

5. Implementation Period for the Works

Arising from consultation, the Community expressed a strong preference for an implementation period for the works of between 20–25 years, with a corresponding annual spend on Hutt River flood protection of approximately \$3–4 million per year.

The process used by the Regional Council to develop its funding policy and fiscal allocation is through its Long-term Financial Strategy (LTFS). Preparation of the LTFS for the ten years 2000–2010 will commence in October 1999, to take effect from 1 July 2000. Scope for the Advisory Committee to put forward its view on the rate of implementation of works is contained within the recommendations of this report.

6. Summary

This summary attempts to put into perspective the key issues to facilitate bringing to a conclusion the “Design Standard” decision.

Localised Issues

If all of the localised or ‘hot spot’ issues raised by the community were accepted, the total cost of them would be approximately \$1.5 million – the merits of each obviously need to be discussed and debated, to achieve a fair and equitable solution for all parties. However in overall terms their respective impact is not likely to change the direction of the project.

The issue which has the greatest community implications and impact on costs, is the standard (2300 or 2800 cumecs) that is provided by the main stopbanks which extend:

- From Wellington Golf Club to Maoribank on the left bank in Upper Hutt.
- From Estuary Bridge to Kennedy Good Bridge on the left bank, and from Estuary Bridge to Melling on the right bank, in Lower Hutt.

The Risk Based 2300 cumec “Design Standard”

The Risk Based 2300 cumec “Design Standard” (with a return period of approximately 400 years), and in the context of the current situation, is a highly acceptable and appropriate standard. The key issue is whether it will provide an adequate ‘buffer’ against climate change and return period variation over the economic/design life of the scheme. While the latter is for planning purposes taken as forty years, in practise the period is very much longer. It is worth remembering we still have key components of the original 1901–1905 construction in operation in the current system.

Climate Change

The economic life of the current upgrade proposed (RB2300) happens to approximately correspond with the NIWA ‘35 year’ climate scenario, which, if it eventuated, would halve the return period from ‘400 year’ to ‘200 year’.

A ‘200 year’ return period is probably at the lower acceptable level for cities the size of Upper and Lower Hutt, and the exposures that exist for them. If the return period were to remain stationary, the Risk Based 2300 cumec Design Standard is considered to be acceptable and appropriate.

The Risk Based 2800 cumec “Design Standard”

The Risk Based 2800 cumec “Design Standard” has a current return period in the order of several thousands of years and obviously provides a much higher ‘buffer’ against climate change and return period variation. The 2800 standard is appropriate where loss of life, in the event of overtop of a lesser standard scheme, is likely – that is the higher standard can prevent the overtop. Provided emergency management procedures are of the highest quality (i.e. household and community action plans are always in place), are kept current and stay in the forefront of Community priorities, then loss of life is unlikely if overtopping of a 2300 scheme were to occur.

IGNS Submission

There is also the issue raised by IGNS on how much resource should be allocated to risk reduction for one hazard, in relation to the risk of another, i.e. flood and earthquake. In response to that, the justification for either the 2300 or 2800 standard is that they are both economically viable, and approximately equally so, over a forty year design life. Officers do not believe this should affect the decision.

2300/2800 Cost Difference

With respect to overall estimated costs, the difference between the Risk Based 2300 and 2800 “Design Standards” is \$12.5 million. The Risk Based 2800 cumec is a significant 17.2 percent increase over the ‘benchmark’ Risk Based 2300 cumec “Design Standard”. Yet a number of submissions and views hold that the sum is small in relative terms, that the additional impact on rates is low and that we should look to the interests of future generations. Large parts of the current system we have inherited are to a standard that will last at least the next forty years. Also, the proposed works will in part be paid for by the generations that will receive the benefit.

Is “mix and match” another option?

A variation on the 2300/2800 dilemma is, as noted above, to construct edge protections to the 2300 standard and stopbanks to the 2800 standard. The additional cost over the ‘benchmark’ 2300 then is \$4.03 million. If a decision were ultimately taken to upgrade the stopbanks to the 2800 standard, this alternative would halve the environmental disruption associated with two long phases of construction, through the CBD of Lower Hutt, and adjacent to houses and development. It could give protection from the 2800 flood, in that it would probably ‘hold out’ a short sharp 2800 event, but overall would have a much lower level of security because of the strength of the edge protections.

Other Impacts on Rates

Issues beyond the ability and willingness of the community to pay for this project also come into play. For example:

- the overall debt and rate levels of the Regional Council, as it balances the fiscal needs of all its functional responsibilities.
- the other major capital projects being promoted by the respective city councils.

which add to the community rate burden and must all be considered.

With the provisos noted above, both the Risk Based 2300 and 2800 standards offer a very good level of protection. In the end the decision between the two standards is probably a subjective and political one, guided overall by an “intuitive” technical base.

7. Communication Opportunities

The outcomes and recommendations of this meeting, and any subsequent adoption of recommendations by the Landcare Committee, will be covered through press releases, newsletters and newspaper features. Individual or group submitters and convenors of meeting groups will receive notification by letter of the recommendations of the Advisory Committee and subsequent Landcare Committee decisions. Where the preferences of particular interest groups or affected parties are not met, appropriate consultation will be arranged.

8. Recommendations

That the Hutt River Floodplain Management Advisory Committee recommend to the Landcare Committee:

- (1) *That the Risk Refined 2300 cumec “Design Standard”, with a requirement that all bridges and other key structures are upgraded on replacement to the 2800 cumec standard, be adopted for the long term flood protection for the Hutt Valley.*

or

That the Risk Refined 2300 cumec “Design Standard”, with a requirement that all bridges and other key structures are upgraded on replacement to the 2800 cumec standard, be adopted for long-term flood protection for the Hutt Valley, but with modifications as resolved by the Advisory Committee.

- (2) *A timeframe (or alternatively an average annual spend) for implementation of the capital works comprising the recommended “Design Standard”.*

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Attachment 1 : Report 99.357 : Resolutions of 28 June Advisory Committee meeting