THE REGIONAL COUNCIL

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Hutt River Floodplain Management Plan

Non-structural Measures Outcomes

Attachment 2 to Report 00.460

June 2000

Proposed Non-structural Measures

Introducing Non-structural Options

Non-structural options include regulatory and non-regulatory land use methods, and emergency management procedures and programmes.

The options come in four parts:

- Upper Catchment Measures
- River Corridor Measures
- Floodplain Measures
- Emergency Management Measures

Each part has prime outcomes covering matters which:

- are critical to managing the residual flood risk
- relate to key outcomes being sought
- are connected with flood hazard issues

How They Will be Covered

For each part, the following will be covered in general terms:

- the measure being considered
- purpose of the measure - the flood hazard effects being avoided or mitigated
- how the measure would be applied
- broad advantages and disadvantages

How to Read the Land Use Measures Tables

Land use measures are summarised in tables for each part of the land use options. They are found on pages:

- 6 – 10 for Upper Catchment Measures
- 13 – 25 for River Corridor Measures
- 30 – 39 for Floodplain Measures

Each table includes in the *first column* the broad **measures** being addressed. In the *next set of columns*, the **methods** show:

- what the measures specifically require
- where they are applied
- whether they are a regulatory action (a legal requirement) OR a non-regulatory method (voluntary action).

A **voluntary action** could be information, such as flood hazard maps, that helps land owners make decisions about protecting themselves from the flood hazard. Voluntary actions can also include monitoring or sharing information between councils. A **regulatory method** is a rule in a district plan that might, for example, restrict the way structures are built near the Hutt River.

The *last column* details broad advantages and disadvantages, but mainly for the regulatory options unless it is otherwise stated. The information in this column does not necessarily represent the entire range of advantages and disadvantages. These may be added to during Hutt River Floodplain Management Plan production and implementation phases to follow.

Non-structural Measures

Upper Catchment Measures

Prime Outcomes Sought

Land uses in the upper catchment occur in a manner which continues to:

- maintain and enhance the existing quality of the upper catchment environment;
- minimise erosion and the production of sediment, and reduce the flood peak, using practical methods and approaches.

Issues

- The upper catchment of the Hutt River is generally in good condition.
- Patterns of land use change indicate increasing exotic forestry and reversion to native cover, which has a positive effect on the flood risk.
- Existing planning regulations are generally managing sediment production and run-off in a way that also considers water availability and quality in the Hutt River.

Summary of Measures

The measures put forward at this stage only affect Wellington Regional Council (WRC) and Upper Hutt City Council (UHCC) because the upper catchment area does not involve land in Hutt City's jurisdiction.
The measures include:

- clearly worded policy on the flood hazard
- modified planning rules
- better information sharing between councils
- monitoring land uses
- promoting better land management

Recommended measures that may require a change to the Proposed District Plan are not absolutely critical. That is because upper catchment land generally appears to be managed in an acceptable way. Therefore, those measures would only be adopted if a plan change is needed to implement river corridor or floodplain measures.

Tables summarising the measures begin on page 6.

Upper Catchment Measure	Regulatory Methods	Implications of Control (positive / *negative*)
	Modifying Existing RULES in Proposed District Plan Where Appropriate	
Limit Earthworks *The earthworks provisions in the PDP presently control earthworks only on the basis of volume. The rule presently applies varying volume thresholds according to the land use zone. For example: controls for the Residential Conservation zone are more restrictive than Rural and Open Space Zones.*	Ability to restrict consecutive phases of earthworks ➔ *WRC submission on the Proposed District Plan requests this action. Limits would apply to consecutive earthworks in any 12-month period.* ➔ *Ongoing earthworks may produce far greater effects, which may not be easily controlled if consecutive phases cannot be restricted.*	▪ Allows for assessing cumulative impacts of continuous earthworks on the flood risk. ▪ Gives UHCC more leeway to consider ongoing earthworks as well as one-offs activities.
	Modifying Existing POLICY in Proposed Plan	
Include Clearly Worded Policy on Cross Boundary Issues ***Cross boundary issues*** *are issues that the district and regional council share responsibilities for.*	Policy clearly recognising: - flood hazard management responsibilities between UHCC and WRC - general effects of land uses on the flood risk ➔ *Both WRC and UHCC have responsibilities to manage the flood hazard. Although the implications of the plan remaining unchanged are not significant.*	▪ Recognises the need to manage effects of land uses on the flood risk. ▪ Recognises the shared but differing responsibilities of UHCC and WRC.

Upper Catchment Measure	Voluntary Actions	Implications of Action (positive / *negative*)
	Sharing Information and Monitoring	
Investigate Clearing Vegetation and Excavating Soil	Voluntary Action: *Liaising on approach to research AND Monitoring any plan changes* ➔ *Related methods in the Proposed District Plan indicate research is required.* ➔ *WRC submission on the Proposed District Plan requests amending the method after research has been completed.*	▪ Cumulative and one-off impacts on the flood risk can be researched. ♦ *Potential for restriction to duplicate soil conservation controls in the Proposed Regional Soil Plan. Care needed not to unnecessarily duplicate restrictions.*
Send Forestry Harvesting Notices	Voluntary Action: *Forwarding forestry harvesting notices to WRC prior to approving them* ➔ *A non-statutory arrangement.*	▪ WRC may offer comment on both cumulative and one-off flood hazard impacts.
Send Forestry Development Notices	Voluntary Action: *Same as above, but for forestry development notices* ➔ *May be few issues for WRC at establishment stage.*	▪ WRC can gain an overview of how forestry is being managed to account for flood hazard effects. ▪ As a non-statutory arrangement, it would cease by agreement when necessary.

Upper Catchment Measure	Voluntary Actions	Implications of Action (positive / *negative*)
	Sharing Information and Monitoring	
Monitor Land Use Changes	Voluntary Action: *Monitoring changing land use in the Upper Catchment* ➔ *UHCC and WRC would share this responsibility.*	▪ Monitoring land use change provides information on the likely quality of the upper catchment. ▪ Opportunity provided at an early stage to address potential problems resulting from land use change.
Monitor Rural Subdivision	Voluntary Action: *Monitoring resource consent applications for subdivision* ➔ *Rural subdivision is unlikely to produce significant quantities of sediment or cause changes to flooding in the Hutt River.*	▪ Monitoring is appropriate given the likely limited affect of subdivision on flooding and sediment production.
	Sharing Information and Advocacy	
Encouraging Best Practice	Voluntary Action: *Councils provide information on improving land use practices* ➔ *This particularly applies to forestry, which has the ability to produce significant one-off effects during the harvesting-replanting phase.*	▪ Advice can target parts of the activity which are more likely to worsen the flood hazard downstream.

Upper Catchment Measure	Methods	Implications of Action (positive / *negative*)
Consider Existing Regional Council Policy Affecting WRC Land	**Clearly Worded Policy** Producing policy that recognises the flood hazard in decisions on land use ➔ *WRC owns considerable land in the upper catchment area. Decisions regarding WRC land can impact on the flood hazard.* ➔ *Floodplain Management Plan also needs to formally recognise link between managing WRC land and the flood hazard.*	▪ Opportunity provided at an early stage to consider potential problems produced by land use change or changing ownership. ▪ Allows full range of WRC responsibilities and functions to be considered. ▪ One way that managing land use can be strengthened without requiring plan changes.
Consider Other Floodplain Management Policy	**Other Policy** Producing policy for WRC's position on managing the flood risk in the upper catchment *Policy may cover:* ▪ *Balancing current and future land uses* ▪ *Maintaining the quality of the upper catchment* ▪ *Encouraging good land management practice*	▪ Provides clear signals to UHCC, HCC (Hutt City Council), and to private land owners.

River Corridor Measures

Prime Outcomes Sought

1. Land uses do not reduce the reliability of the flood defence system, which includes stopbanks, river berms and bank-edge protection works.

2. Measures minimise the threat to peoples' safety posed by floods, and are developed in a way that takes proper account of:

- fair and reasonable use of private land
- practical difficulties for Councils implementing land use measures

Issues

- A river corridor is critical for safe passage of floodwaters to the sea.

- The flood defence system must not be compromised, and land use measures need to reflect this need. Activities that are most likely to impact on flood defences include:
  - earthworks on or directly adjacent flood protection structures that affects the integrity of those structures
  - structures and earthworks which can divert flow onto flood protection structures
  - new bridges with poor flood capacity

- New land use activities in the river corridor can expose people and property to an unacceptable flood risk, and affect land and property belonging to others. Some land uses are able to mitigate adverse flood hazard effects in locations where those effects are less severe.

- Network utilities could be severely damaged during a large flood event, and measures to ensure continued operation need to be considered.

- Land use measures need to balance flood hazard recognition with:
  - reasonable land owner needs and aspirations
  - practical difficulties implementing regulatory land use measures
  - costs of continued exposure to the flood hazard

Risk Basis

A range of flood events up to the 2300 cumec standard, with a consideration of the 2800 standard.

Summary of Measures

Tables summarising the measures begin on page 13.

HABITABLE BUILDINGS - in the *RIVER CORRIDOR*

Measure	Primary River Corridor	Remaining River Corridor	Implications of Control (positive / *negative*)
• **Restrict Buildings** • **Mitigate Flood Effects** *For habitable buildings **significant redevelopment** means large extensions or rebuilding around 40 % or more of existing habitable floor area. Thresholds will depend on final redevelopment criteria.* *These measures apply **only** to existing zones that permit habitable buildings.* ***Considers one-off and cumulative effects** on:* ▪ *the flood protection system* ▪ *upstream flood levels* ▪ *flood storage* ▪ *ponding areas essential for buffering flood flows* *other structures and land*	**Methods** No new habitable buildings AND no significant redevelopment into erosion hazard areas ➔ *Controls would not prohibit building on existing properties outside of the BEA or AEA.* ➔ *Legal advice signals that such restrictions can be imposed.* ➔ *Habitable buildings cannot be safely constructed in the Alluvial Erosion Area (AEA) without extensive and substantial erosion protection. Even then the setback required to manage protection could be more than 25 m. That setback distance precludes habitable buildings in the Baserock Erosion Area (BEA).* ➔ *Garages and sheds would be allowed in the BEA and AEA.* ***OR**… (to page 14)*	**Methods** Managing the flood hazard effects to the 2300 cumec standard for new buildings and significant redevelopment ➔ *Habitable buildings can be constructed on land currently zoned for that use.* ➔ *MITIGATION OPTIONS are not limited. They may include elevating the site, raising floor levels, flood proofing, and strengthening against flow effects.* ➔ *STOPBANKING is not a sound floodplain management planning solution for greenfield areas. However, it is acknowledged as a an option for multiple lot developments. Considerations for new stopbanking includes funding, ongoing maintenance, construction standards, diversion and storage effects*	▪ Protects from effects of erosion and / or flow. ▪ Likely to be an economic benefit because of saved flood damages. ▪ Allows ancillary structures and accessory buildings in residential zones that extend into Erosion Hazard Areas. ▪ Allows for protection of houses and land outside of the BEA and AEA. ▪ Assures reliability of flood defences by controlling the siting of habitable buildings. ♦ *Loss of some land for constructing habitable buildings in the BEA and AEA.* ♦ *Potentially infringes on the existing use of existing residential properties.* ♦ *Mitigation is a potentially large cost to land owners and developers.* ♦ *May curtail aspirations to sub-divide in the Primary Corridor*

HABITABLE BUILDINGS - in the *RIVER CORRIDOR*……continued

Measure	Primary River Corridor	Implications of Control (positive / *negative*)
• **Restrict Buildings** • **Mitigate Flood Effects** *Siting habitable buildings* ***out of zone*** *would be non-complying.* ***Considers one-off and cumulative effects*** *on:* ▪ *the flood protection system* ▪ *upstream flood levels* ▪ *flood storage* ▪ *ponding areas essential for buffering flood flows* ▪ *other structures and land*	**Methods** *(from page 13)…..**OR*** Construct in existing zones within alluvial erosion areas to the 2300 cumec standard, if 1900 (developed areas) or 2300 (greenfields areas) standard erosion protection is provided ➔ *Non-complying activities would REQUIRE STRONG POLICY AND CRITERIA to guide decision-making. As non-complying activities, decisions would also be made on the basis of additional environmental issues.* ➔ *Leeway could be provided to Belmont, which is already developed, but not to Birchville because the minimum buffer area for river management (20-30 m) is already being encroached on. Constructing in EHAs in greenfield areas represents UNWISE FLOODPLAIN MANAGEMENT PLANNING. Therefore it is not appropriate to offer the same flexibility to new development at Te Marua (right bank). Ultimately each area is treated on its relative merits* ➔ *Providing erosion protection is VERY EXPENSIVE. Backing policy and criteria must be very clear on erosion protection requirements and potential expense.* ➔ *Important to QUESTION THE WORTH of allowing building leeway at Belmont in the meantime, when erosion protection will be constructed in a few years time.*	▪ Leeway allows each location to be treated on relative merits. ▪ Landowners and developers can make decisions about funding extensive erosion protection. ♦ *Providing leeway may generate a false security about the flood hazard.* ♦ *Erosion protection does not provide for flow effects. The activity creates an additional and significant hazard.* ♦ *Greater urgency to fix damaged erosion protection may stretch available resources.* ♦ *Not wise floodplain management planning in greenfield areas, because river alignment requires stronger control.* ♦ *Probably not realistic for land owners and developers to provide erosion protection, given the expense and likely stringent requirements.*

ACCESSORY BUILDINGS AND ANCILLARY STRUCTURES associated with HABITABLE BUILDINGS - in the *RIVER CORRIDOR*

Measure	River Corridor	Implications of Control (positive / *negative*)
Consider Site and Strength of • **Accessory Buildings** • **Ancillary Structures** **Associated with Habitable Buildings** ***Ancillary structures*** *include fences, posts, and the like.* ***Accessory Buildings*** *are secondary to the use of the principal building on site. Examples include a tool and garden shed, garage, glass house, swimming pool, building supporting rural uses. They do not include habitable buildings or rooms.*	**Methods** Voluntary Action: *Councils provide information to land owners in existing residential zones for a range of flood scenarios* ➔ *Strongly promotes action to manage flow and erosion effects in the Primary River Corridor.* ➔ *Information may include:* ▪ *Best practice procedures from the Building industry* ▪ *Flow and ponding information* ➔ *Land owners and developers will be encouraged to strengthen buildings, and select sites outside the erosion hazard areas where possible.*	▪ Voluntary approach justified because the locations of existing residential zones are not near current or proposed stopbanks. ▪ Promotes action where the effects of erosion and flow can be significant. ▪ May reduce opportunity for diverting flow onto other structures and land. ▪ Possible cost savings in the long run because of saved flood damages.

ALL REMAINING ACCESSORY BUILDINGS AND ANCILLARY STRUCTURES - in the *RIVER CORRIDOR*

Measure	River Corridor	Implications of Control (positive / *negative*)
Control Site and Strength of • **Accessory Buildings** • **Ancillary Structures** ➔*Replaces floodway activities controls in the Transitional Regional Plan. Recognises TAs prime regulatory function in managing natural hazards.* ***Permitted activity standards*** *may include:* ▪ *Setback distance from flood protection structures* ▪ *Floor area of accessory buildings* ▪ *Length and height of ancillary structures* ▪ *Exclusion from Primary River Corridor* *These restrictions also apply to* ***network utility structures****.* *Maintaining legally erected flood protection structures for the purpose of mitigating flood hazard effects would be permitted.*	**Methods** Buildings and structures permitted provided they do not produce adverse effects ➔ *Accessory buildings are not suitable in the Primary River Corridor* ➔ *Considers one-off and cumulative effects on:* ▪ *the flood protection system* ▪ *upstream flood levels* ▪ *flood storage* ▪ *ponding areas essential for buffering flood flows* ▪ *other structures and land* ➔ *Information would be provided to encourage mitigating the effects of a 2300 event, where feasible and practical. Mitigation methods include:* ▪ *strengthening buildings* ▪ *building relocatable structures* ▪ *selecting sites away from flow paths* ➔ *Excludes flood protection structures unless covered by other regional or district plan rules.*	▪ Appropriate permitted activity standards will allow structures and earthworks that are unlikely to affect flood protection structures of upstream flood levels. ▪ Controls will reduce opportunity for diverting flow onto flood protection structures, and other land. ▪ Promotes action where the effects of erosion and flow can be significant. ▪ Possible cost savings in the long run due to saved flood damages. ▪ Allows maintenance and minor extension of existing legally erected flood protection structures. ▪ Helps ensure a safe flood defence system. ▪ *Difficult to specify limits on dimensions and proximity to flood protection structures because flood conditions vary between locations.*

ALL OTHER BUILDINGS excluding ACCESSORY BUILDINGS AND ANCILLARY STRUCTURES - in the *RIVER CORRIDOR*

Measure	River Corridor	Implications of Control (positive / ***negative***)
Restrict Buildings Mitigate Flood Effects *NO commercial or industrial zoned land exists in the Primary River Corridor.* *Siting commercial / industrial land uses **out of zone** would be non-complying.*	**Methods** No building permitted in Erosion Hazard Areas *OR* New building in Erosion Hazard Areas is non-complying ➔ *NON-COMPLYING ACTIVITIES would REQUIRE STRONG POLICY AND CRITERIA to guide decision-making. As non-complying activities, decisions would also be made on the basis of additional environmental issues.* ➔ *Leeway could be provided to AEA locations immediately adjacent existing zones, but not in greenfield areas. Constructing in EHAs in greenfield areas represents UNWISE FLOODPLAIN MANAGEMENT PLANNING. Therefore it is not appropriate to offer the same flexibility in greenfield locations.* ➔ *Providing erosion protection is VERY EXPENSIVE. Backing policy and criteria must be very clear on erosion protection requirements and potential expense.*	▪ Leeway allows decisions on activities in each area to be treated on relative merits. ▪ Landowners and developers can make decisions about funding extensive erosion protection for suitable activities. ♦ *Providing leeway may generate a false security about the flood hazard.* ♦ *Erosion protection does not provide for flow effects.* ♦ *Greater urgency to fix damaged erosion protection may stretch available resources.* ♦ *Not wise floodplain management planning in greenfield areas, because river alignment requires stronger control.* ♦ *Probably not realistic for land owners and developers to provide erosion protection, given the expense and likely stringent requirements.*

ALL OTHER BUILDINGS - in the *RIVER CORRIDOR* ….. continued

Measure	River Corridor	Implications of Control (positive / *negative*)
Restrict Buildings Mitigate Flood Effects *NO commercial or industrial zoned land exists in the Primary River Corridor.* *Siting commercial / industrial land uses* ***out of zone*** *would be non-complying.* ***Considers one-off and cumulative effects*** *on:* ▪ *The flood protection system* ▪ *upstream flood levels* ▪ *flood storage* ▪ *ponding areas essential for buffering flood flows* ▪ *other structures and land*	**Methods** Meeting 2300 cumec flood standard for large new developments or significant redevelopment – where the community relies strongly on them ➔ *Constructing new buildings in areas not currently zoned for that purpose will be STRONGLY DISCOURAGED due to the flood hazard risk. Alternative sites will also be encouraged.* ➔ *Large new developments may be INCOMPATIBLE WITH VISION for the river corridor environment promoted by the Environmental Strategy.* ➔ *Structures other than ancillary structures are UNSUITABLE for the Primary River Corridor* ➔ *Land uses must not produce adverse flood hazard effects.* ➔ *Publicly ownership of land will be encouraged to more readily enable appropriate land use.*	▪ Protects from inundation, especially for key facilities. ▪ Focus on larger 'commercial / industrial – complex' type development, with strong community reliance. ▪ Risk-based approach – balances intended final use with exposure to the hazard. ▪ Encourages significant land uses to site where the flood hazard is less severe and not as frequent. ▪ Mitigation costs as a proportion of overall development costs may be low. ▪ Insurance industry in future might reward action that mitigates the flood hazard. ♦ *Commercial benefit may exist despite flood risk.* ♦ *Potential difficulties for access.* ♦ *Potentially large added cost to land owners and developers.*

ALL OTHER BUILDINGS - in the *RIVER CORRIDOR* ….. continued

Measure	River Corridor *excluding EHAs*	Implications of Control (positive / *negative*)
	Methods	*SAME ADVANTAGES AND DISADVANTAGES, although the following are emphasised for these measures*
Consider Site and Mitigating Flood Effects	Voluntary Action: *Councils provide information for a range of flood scenarios – for buildings where the community does not rely strongly on them.* ➔ *Land owners and developers will be encouraged to protect their entire building or key parts of their operation; or to site in alternative and more protected locations.* ➔ *Developments must not produce adverse flood hazard effects.* ➔ *Information would be provided to ENCOURAGE MITIGATING THE EFFECTS of a 2300 event, where feasible and practical. Mitigation methods include:* ▪ *Strengthening buildings* ▪ *Building relocatable structures* ▪ *Selecting sites away from flow paths*	▪ Advice and information allows developers and land owners to make commercial decisions based on the risks. ▪ Protects from inundation encouraged, especially for key facilities. ▪ Hazard risk can be more readily dealt with by siting in Secondary River Corridor areas or in more protected areas. ▪ Insurance industry might in future reward action that mitigates the flood hazard. ♦ *Commercial benefit may exist despite flood risk.*
Provide Erosion Protection	Constructing buildings adjacent Narrative Erosion Areas may be required to provide erosion protection	▪ Land owners and developers, and not the community, pay for risk mitigation. ♦ *Mitigation costs likely to be large.*

SUBDIVISON - in the *RIVER CORRIDOR*

Measure	River Corridor	Implications of Control (positive / *negative*)
Restrict Subdivision	**Methods** • No subdivision for new habitable buildings in erosion hazard areas associated with existing residential zones • Discouraging subdivision where new development is intended outside existing residential, commercial or industrial zones ➔ *Minor boundary adjustments would be permitted.* ➔ *New property titles would be tagged where they would not be protected from the erosion hazard or the 2300 (greenfield areas) or 1900 (developed areas) flood events.* ➔ *Recognises the strategic direction for public land provided by the HRFMP Environmental Strategy. Land uses that detract from the vision for the Linear Park may not be suitable in the River Corridor.*	▪ Applies to Birchville and Belmont where mitigating erosion effects on new lots from the 2300 flood would be extremely difficult to achieve. ▪ Has only minor impact on realistic aspirations to subdivide for existing properties in EHAs. ▪ Provides strong policy discouraging new development in open space and rural zones. ▪ Sends a clear message to land owners that mitigating erosion and flood effects on land closer to the river edge is difficult to achieve. ▪ Allows potential land use activities to be scrutinised at an early stage. ▪ Adds highly relevant issues that would be considered for subdivision applications. ♦ *Probably curtails the scope of future development in the River Corridor*

EARTHWORKS - in the *RIVER CORRIDOR*

Measure	River Corridor	Implications of Control (positive / *negative*)
Control earthworks ➔ *Replaces floodway activities controls in the Transitional Regional Plan. Recognises TAs prime regulatory function in managing natural hazards.* ***Permitted activity standards** may include:* ▪ *setback distance from flood protection structures* ▪ *volume and height of fill* ▪ *staging considerations* ▪ *'cut to fill' limits*	**Methods** Restricting volume and dimension of filling and excavation ➔ *Considers one-off and cumulative effects on:* ▪ *flood protection system* ▪ *upstream flood levels* ▪ *flood storage* ▪ *ponding areas essential for buffering flood flows* ▪ *other structures and land* ➔ *Excludes flood protection works unless restricted by other regional or district plan rules.*	▪ Prevents flows diverting onto flood defences and other structures and land. ▪ Reduces potential for cumulative loss of storage and buffering capacity in the River Corridor ♦ *Care is required not to unnecessarily restrict earthworks needed to manage floods.* ♦ *Difficult to specify limits on dimensions and proximity to flood protection structures.*

HAZARDOUS SUBSTANCES - in the *RIVER CORRIDOR*

Measure	River Corridor	Implications of Control (positive / *negative*)
Secure Storage of Hazardous Substances	**Methods** Ensuring safe storage in a 1900 cumec event for existing uses. Voluntary Action: *Councils provide information to secure storage to a 2800 event standard.* ➔ *This applies to industrial and commercial activities ALREADY REGULATED for the use of hazardous substances.* ➔ *Users of hazardous substances are already required to handle and use hazardous substances so that they are not dispersed off-site.* ➔ *New land uses requiring substantial quantities of hazardous substances would be DISCOURAGED FROM SITING in the River Corridor.*	▪ Applies to few land owners in the river corridor. ▪ Minimises dispersal and discharge off-site. ▪ Users of hazardous substances are already required to handle and use hazardous substances so that they are not dispersed off-site. ▪ Methods may be simple, such as securing buildings and doors during a large flood event. ▪ Voluntary action encourages a higher level of environmental protection. Methods such as shutting away hazardous substance stores are likely to apply to flood events larger than the 1900 standard.

CRITICAL FACILITIES - in the *RIVER CORRIDOR.*

Measure	River Corridor	Implications of Control (positive / *negative*)
Mitigate Flood Effects and Provide Contingency Plans *Applies to healthcare facilities and emergency services* ***in existing associated zones*** *Focus for control is* ***assuring the ongoing operation*** *during and following a flood event, where community reliance is high.* ***Stronger requirements*** *for in-patient facilities than for out-patient facilities and emergency services, because there is reliance on over-night residence.* ***Resthomes*** *are included as in-patient healthcare facilities.*	**Methods** • New *in-patient healthcare facilities* to operate services in a 2800 cumec flood event • New *out-patient facilities and emergency services* to produce contingency plans to meet 2800 flood standard ➔ *Siting these facilities in the River Corridor would be STRONGLY DISCOURAGED. It is INAPPROPRIATE to expose these facilities to the flood hazard where structural protection is not provided. This is especially the case for the PRIMARY RIVER CORRIDOR where the flood hazard is extreme.* ➔ *Alternative siting would be strongly encouraged.*	▪ Provides strong policy discouraging new healthcare facilities and emergency services in unprotected areas. ▪ Strongly discourages siting in the River Corridor. ▪ Protects key facilities from inundation and erosion. ▪ Facilities with strong community reliance maintain function. ▪ Risk-based approach – balances reliance on critical facility with exposure to the hazard. ♦ *Commercial benefit can exist despite flood risk.* ♦ *Added and potentially large cost to mitigate against the flood hazard.*

CRITICAL FACILITIES - in the *RIVER CORRIDOR* ….continued.

Measure	River Corridor	Implications of Control (positive / *negative*)
Mitigate Flood Effects and Provide Contingency Plans *Applies to key network utility facilities.* *Focus for control is **assuring the ongoing operation** during and following a flood event, where community reliance is high.* *Examples of key network facilities include water and sewerage pumping facilities, major transformers and electricity sub-stations.* *Considers one-off and cumulative effects on:* ▪ *The flood protection system* ▪ *Upstream flood levels* ▪ *Flood storage* ▪ *Ponding areas essential for buffering flood flows* ▪ *Other structures and land*	**Methods** New and significantly redeveloped *key network facilities* to meet the 2800 cumec flood standard Produce contingency plans to meet 2800 flood standard for *existing key facilities* ➔ *Siting these facilities in the River Corridor should be avoided because structural protection is not provided. However siting in at-risk locations may be unavoidable.* ➔ *Alternative siting outside the River Corridor would be encouraged. Although some key network utility facilities could operate in the Secondary River Corridor in areas where the erosion hazard is not so severe.* ➔ *Information would be provided to encourage mitigating the effects of a 2300 event, where feasible and practical. Mitigation methods include:* ▪ *Strengthening buildings* ▪ *Building relocatable structures* ▪ *Selecting sites away from flow paths*	▪ Encourages alternative siting where at all possible. ▪ Protects key facilities from inundation and erosion. ▪ New and existing facilities have coverage ▪ Facilities with a strong community reliance maintain function. ▪ Risk-based approach – balances reliance on critical facility with exposure to the hazard. ♦ *Commercial benefit can exist despite flood risk.* ♦ *Added and potentially large cost to mitigate against the flood hazard.*

BRIDGE CAPACITIES - in the *RIVER CORRIDOR*

Measure	River Corridor	Implications of Control (positive / *negative*)
Improve Capacity of New Bridges Crossing Hutt River *The 2800 standard is **the 2800 cumec flow measured at Taita**. This is the same standard basis used to consider the design standard.*	**Methods** New bridges require capacity to pass a 2800 cumec flood without affecting flood defences ➔ *Water may flow around a bridge structure in a 2800 cumec event, provided there would be no adverse effects on flood defences nor other structures and land. Silverstream is one location where such a bridge could be built. Otherwise bridges would need to pass flood waters beneath their structures.* ➔ *Akatarawa Bridge (Birchville) is excluded from the 2800 cumec requirement.*	▪ Vital to ensure a safe flood defence system. ▪ Required only when bridges are replaced ▪ Consistent with design standard recommendations.

Floodplain Measures

Prime Outcomes Sought

1. Land uses balance the residual flooding risk against sustainable future development on the floodplain.

2. Land uses occur in a way that minimises adverse effects on other structures and land. Restrictions on land uses consider:

- economic effects
- fair and reasonable use of private land
- practical difficulties implementing land use measures

Issues

- Land owners are often unaware about the residual flood risk, including the potential for flooding and erosion on the floodplain for a range of flood events.

- Some parts of the floodplain are exposed to a greater risk than other areas.

- People and property can be exposed to an unacceptable flood risk when new land uses occur in relatively unprotected parts of the floodplain.

- Critical facilities, including health care facilities, emergency services, and network utilities are vulnerable to effects of large flood events.

- Hazardous substances can be dispersed in flood events, worsening flooding consequences for the environment and the community.

- Developing land use measures needs to weigh the flood hazard risk against a level of risk exposure acceptable to the community.

- Land use measures need to balance flood hazard recognition with:
  - reasonable land owner needs and aspirations
  - practical difficulties for Councils implementing regulatory land use measures
  - costs of continued exposure to the flood hazard.

- Voluntary actions are likely to be more appropriate for moderate to highly protected floodplain areas because the residual risk is low.

- Relevant, recent and technically reliable flood hazard information needs to be available to land owners, enabling sound decisions on appropriate flood mitigation options.

- Selected floodplain areas will remain vulnerable to flooding while structural works are being completed. Land use measures need to cover those vulnerable floodplain areas in a balanced and appropriate way.

Risk Basis

A range of flood events up to the 2300 and 2800 cumec standard.

The risk basis for the floodplain uses *Geographic Flood Risk Areas* as a flood hazard risk indicator. The floodplain is divided into areas of residual risk based on the proposed stopbank protection level. They include:

- higher risk areas (no stopbank protection)
- moderate risk areas (proposed 2300 stopbank protection)
- lower risk areas (proposed 2800 stopbank protection)

As an example, Belmont is classed as a higher risk area because stopbank protection is not proposed. Alternatively, Maoribank is a lower risk area because it will receive 2800 cumec stopbank protection.

Higher Risk Areas	Moderate Risk Areas	Lower Risk Areas
Belmont Bridge Road – Birchville Lower Stokes Valley Silverstream+ Te Marua+ *(right bank)* Seaview	Gemstone Drive – Birchville Totara Park Whirinaki Cres. – Heretaunga Manor Park	Maoribank – Whakatikei Moonshine Taita-Wingate Naenae Avalon Boulcott Hutt City – Woburn Moera Alicetown Petone

+ Silverstream and Te Marua are part of the Secondary River Corridor

Summary of Measures

Tables summarising the measures begin on page 30.

HABITABLE BUILDINGS - on the *FLOODPLAIN*

Measure	Higher Risk Areas	Lower and Moderate Risk Areas	Implications of Control (positive / *negative*)
Mitigate Flood Effects ***Mitigating flood effects*** *includes preventing water entering buildings above floor levels, and strengthening buildings and foundations where appropriate, at a given flood standard.* ***Building higher*** *is probably the cheapest and most practical form of mitigation.* ***Property titles*** *in flood prone areas* ***would be tagged*** *for new buildings and significant extensions where they were yet to be provided with proposed structural protection from the erosion or flooding.*	**Methods** Managing the flood hazard effects to the 1900 cumec standard for new buildings and significant redevelopment ➔ *Elevating to the 1900 standard upon redevelopment results in the following average floor level increases for existing dwellings:* ▪ *Belmont 0.44 m* ▪ *Bridge Rd 0.58 m* Voluntary Action: *Landowners strongly encouraged to mitigate effects up to the 2300 event standard*	**Methods** Voluntary Action: *Councils provide information for a range of flood scenarios* ➔ *Information includes the location, behaviour and suggested responses to:* ▪ *flow paths* ▪ *ponding areas* ▪ *breach setback areas* ➔ *Regulation is probably not required for BREACH SETBACK AREAS given the low risk of breaching and limited development potential for these areas. However, landowners and developers should be advised of the risks. A* ***BREACH SETBACK AREA*** *includes all land within 50 or 100m of the landward side of a stopbank. It is an area of high flow velocities following breaches.*	▪ Controls exposure of new development to a flow and depth hazard. ▪ Reduces structural damages – which can be costly to repair. ▪ Likely economic benefit in terms of saved damages. ▪ Net amenity effects of building higher including shading, noise, visual and lifestyle effects may be minor to moderate at the 1900 standard. ▪ Avoids regulating habitable land uses in protected areas – instead promoting voluntary actions. ♦ *Substantial elevation may have adverse amenity effects at the 2300 standard.* ♦ *Cost to land owners and developers.*

ACCESSORY BUILDINGS AND ANCILLARY STRUCTURES - on the *FLOODPLAIN*

Measure	Higher Risk Areas	Implications of Control (positive / *negative*)
Consider Site and Strength of • **Accessory Buildings** • **Ancillary Structures** **Associated with Developed Areas** ***Ancillary structures*** *include fences, posts, and the like.* ***Accessory Buildings*** *are secondary to the use of the principal building on site. Examples include a tool and garden shed, garage, glass house, swimming pool, building supporting rural uses. They do not include habitable buildings or rooms.*	**Methods** Voluntary Action: *Councils provide information to land owners for a range of flood scenarios.* ➔ *Promotes action to manage flow effects.* ➔ *Information may include:* ▪ *best practice procedures from the Building industry* ▪ *flow path and ponding information* ▪ *ways to minimise debris during flood events* ➔*Land owners and developers will be strongly encouraged to strengthen buildings, build relocatable structures, and select sites away from flow paths where possible.*	▪ Voluntary approach justified because the locations of existing residential zones are not near current or proposed stopbanks. ▪ Promotes action where the effects of flow can be significant. ▪ May reduce opportunity for diverting flow onto other structures and land. ▪ Possible cost savings in the long run resulting from saved flood damages.

ALL OTHER BUILDINGS excluding ACCESSORY BUILDINGS AND ANCILLARY STRUCTURES - on the *FLOODPLAIN*

Measure	Higher Risk Areas	Lower and Moderate Risk Areas	Implications of Control (positive / *negative*)
Mitigate Flood Effects ➔ *NO commercial or industrial zoned land exists in the Higher Risk Floodplain Areas* ➔ *Siting Commercial / Industrial land **uses out of zone** would be non-complying.*	**Methods** Meeting 1900 cumec flood standard for large new developments or significant redevelopment – where the community relies strongly on them ➔ *Constructing new buildings in areas not currently zoned for that purpose will be STRONGLY DISCOURAGED due to the flood hazard risk.* ➔ *Land uses must not create adverse flood hazard effects.*	**Methods** Voluntary Action: *Councils provide information for a range of flood scenarios* ➔ *Land owners and developers will be encouraged to protect their entire building or key parts of their operation.*	▪ Protects from inundation, especially for key facilities. ▪ Focus on larger 'commercial / industrial – complex' type development, with strong community reliance. ▪ Risk-based approach – balances intended final use with exposure to the hazard. ▪ Encourages significant land uses to site where the flood hazard is less severe and not as frequent. ▪ Mitigation Costs of as a proportion of overall development costs may be low. ▪ Insurance industry in future might reward action that mitigates the flood hazard. ♦ *Commercial benefit may exist despite flood risk.* ♦ *Potential difficulties for access.* ♦ *Potentially large added cost to land owners and developers.*

ALL OTHER BUILDINGS - on the *FLOODPLAIN* ….. continued

Measure	River Corridor *excluding EHAs*	Implications of Control (positive / *negative*)
Consider Site and Mitigating Flood Effects	**Methods** Voluntary Action: *Councils provide information for a range of flood scenarios – for buildings where the community does not rely strongly on them.* ➔ *Land owners and developers will be encouraged to protect their entire building or key parts of their operation; or to site in protected locations.* ➔ *Developments must not produce adverse flood hazard effects.* ➔ *Information would be provided to ENCOURAGE MITIGATING THE EFFECTS of a 2300 event, where feasible and practical. Mitigation methods include:* ▪ *Strengthening buildings* ▪ *Building relocatable structures* ▪ *Selecting sites away from flow paths*	*SAME ADVANTAGES AND DISADVANTAGES, although the following are emphasised for these measures* ▪ Advice and information allows developers and land owners to make commercial decisions based on the risks. ▪ Protects from inundation encouraged, especially for key facilities. ▪ Hazard risk can be more readily dealt with by siting in protected areas. ▪ Insurance industry might in future reward action that mitigates the flood hazard. ♦ *Commercial benefit may exist despite flood risk.*
Provide Erosion Protection	Constructing buildings adjacent Narrative Erosion Areas may be required to provide erosion protection	▪ Land owners and developers, and not the community, pay for risk mitigation. ♦ *Mitigation costs likely to be large.*

SUBDIVISON - on the *FLOODPLAIN*

Measure	Higher Risk Areas	Implications of Control (positive / *negative*)
Restrict Subdivision	**Methods** Discouraging subdivision where new development is intended outside existing residential, commercial or industrial zones ➔ *Minor boundary adjustments would be permitted.* ➔ *Intended subdivision will be strongly discouraged where the resulting uses expose people and assets to an increased flood hazard level.* ➔ *New property titles would be tagged where they would not be protected from the 2300 (greenfield areas) or 1900 (developed areas) flood hazard.*	▪ Provides strong policy discouraging subdivision for any purpose which increase exposure to the flood hazard. ▪ Unlikely to have marked effect on subdivision aspirations in Higher Risk Floodplain Areas because those areas are already zoned for residential uses. ▪ Allows potential land use activities to be scrutinised at an early stage. ▪ Adds highly relevant issues that would be considered for subdivision applications.

EARTHWORKS - on the *FLOODPLAIN*

Measure	Higher Risk Areas	Implications of Control (positive / *negative*)
Control earthworks ***Permitted activity standards*** *may include:* ▪ *volume and height of fill* ▪ *setback distances from other land and structures* ▪ *staging considerations* ▪ *'cut to fill' limits*	**Methods** Restricting volume and dimension of filling and excavation in identified flow paths ➔ *Considers effects on:* ▪ *flood protection system* ▪ *upstream flood levels* ▪ *flood storage* ▪ *other land and structures*	▪ Prevents flows diverting onto flood defences and other structures and land. ♦ *Care is required not to unnecessarily restrict earthworks needed to manage floods.* ♦ *Difficult to specify limits on dimensions and volume, and proximity to other land and structures.*

HAZARDOUS SUBSTANCES - on the *FLOODPLAIN*

Measure	Higher Risk Areas	Implications of Control (positive / *negative*)
Secure Storage of Hazardous Substances	**Methods** Ensuring safe storage in a 1900 cumec event for existing uses. Voluntary Action: *Councils provide information to secure storage to a 2800 event standard.* ➔ *This applies to industrial and commercial activities ALREADY REGULATED for the use of hazardous substances.* ➔ *Users of hazardous substances are already required to handle and use hazardous substances so that they are not dispersed off-site.*	▪ Minimises dispersal and discharge off-site. ▪ Methods may be simple, such as securing doors during a large flood event. ▪ Voluntary action encourages a higher level of environmental protection. Methods such as shutting away hazardous substance stores are likely to apply to flood events larger than the 1900 standard.

CRITICAL FACILITIES - on the *FLOODPLAIN*.

Measure	Higher Risk Areas	Lower and Moderate Risk Areas	Implications of Control (positive / *negative*)
Mitigate Flood Effects Provide Contingency Plans *Applies to healthcare facilities and emergency services* ***in existing associated zones*** *Focus for control is* ***assuring the ongoing operation*** *during and following a flood event, where community reliance is high.* ***Stronger requirements*** *for in-patient facilities than for out-patient facilities and emergency services, because there is reliance on over-night residence.* ***Resthomes*** *are included as in-patient healthcare facilities.*	**Methods** • New *in-patient healthcare facilities* to operate services in a 2800 cumec flood event • New *out-patient facilities and emergency services* to produce contingency plans to meet 2800 flood standard ➔ *Siting these facilities in Higher Risk Floodplain Areas would be STRONGLY DISCOURAGED. It is INAPPROPRIATE to expose these facilities where structural protection is not provided. Alternative siting would be strongly encouraged.*	**Methods** Existing and new *in-patient healthcare facilities* produce contingency plans to meet the 2800 flood standard with breaches Voluntary Action: *Councils provide emergency services and out-patient healthcare services information for a range of flood scenarios. Both are encouraged to produce contingency plans.*	▪ Provides strong policy discouraging new healthcare facilities and emergency services in unprotected areas. ▪ Strongly encourages alternative siting where at all possible. ▪ Protects key facilities from inundation and erosion. ▪ Facilities with a strong community reliance maintain function. ▪ Risk-based approach – balances reliance on critical facility with exposure to the hazard. ♦ *Commercial benefit can exist despite flood risk.* ♦ *Added and potentially large cost to mitigate against the flood hazard.*

CRITICAL FACILITIES - on the *FLOODPLAIN* ….continued.

Measure	Higher Risk Areas	Lower and Moderate Risk Areas	Implications of Control (positive / *negative*)
Mitigate Flood Effects Provide Contingency Plans *Applies to* ***Key Network Facilities*** ➔ *Focus for control is* ***assuring the ongoing operation*** *during and following a flood event, where community reliance is high.* ➔ *Examples of key network facilities include water and sewerage pumping facilities, major transformers and electricity sub-stations.*	**Methods** New and significantly redeveloped *key network facilities* to meet the 2800 cumec flood standard ➔ *Siting these facilities in HIGH RISK AREAS SHOULD BE AVOIDED because structural protection is not provided. However siting in at-risk locations may be unavoidable.* ➔ *Alternative siting would be encouraged.*	**Methods** Produce contingency plans to meet the 2300 flood standard with breaches for *existing key network facilities* Voluntary Action: *Councils provide information for a range of flood scenarios*	▪ Encourages alternative siting where at all possible. ▪ Protects key facilities from inundation. ▪ New and existing facilities with a strong community reliance maintain function. ▪ Risk-based approach – balances reliance on critical facility with exposure to the hazard. ♦ *Commercial benefit can exist despite flood risk.* ♦ *Added and potentially large cost to mitigate against the flood hazard.*

OTHER ACTIVITIES – in the *RIVER CORRIDOR* and on the *FLOODPLAIN*

Measure	Floodplain and River Corridor
OTHER USES	**Methods** Permitted ➔ *Subject to compliance with other planning rules.*

Emergency Management Measures

Prime Outcomes Sought

1. Emergency management will be to a standard that, within reason, enables the community to provide for its own safety and well-being in a flood event.

2. The community will be adequately informed so they:

- understand the level of risk and possible consequences of a flood event
- ready themselves for flood events
- ensure their safety during events
- enhance their recovery from a flood event

Issues

- The community wants to know more about the flood hazard. Many in the community are unaware of the risks and consequences of flooding.

- Community preparedness surveys for the Hutt Valley suggest that level of preparedness is relatively good.

- For some people in the community, limited awareness and understanding about the flood hazard is generally reflected in a lower level of community preparedness.

Risk Basis

A range of flood events up to and beyond the design standard flood event.

Reviewing Existing Measures – A Background

Gaps and Opportunities Identified

The three Councils current emergency management measures for flooding have been identified. Those measures are categorised according to the ***four R's*** of emergency management:

- **Reduction of Risk**
- **Readiness**
- **Response**
- **Recovery**[1]

Gaps in the current suite of measures, and opportunities to enhance those measures were identified in officer workshops held at UHCC and HCC.

General Findings from Workshop Sessions

These are the general findings that came from the officer workshop questions. Findings for specific programmes and procedures are located in the tables on pages 40 - 45.

- Emergency management measures must be able to cope with flooding events up to and beyond the design standard.

- The current suite of emergency management measures is fairly comprehensive, although there are opportunities to improve existing programmes and procedures.

- [1] **Reduction of Risk** covers all measures taken to reduce a hazard, or to reduce the effects of a hazard when it occurs. These measures can be structural such as flood defences, or non-structural such as elevated floor levels in flood prone areas.
- **Readiness** measures are the actions taken before an emergency to prepare and plan for responding to the event. Readiness strategies include plan writing, operating warning systems, practising response procedures and educating the community about how to prepare.
- **Response** strategies are the things that are done when the emergency event occurs. These could include evacuation, providing emergency advice, having call-out procedures, and operating a headquarters.
- The **Recovery** phase follows on from response and includes strategies to deal with long term physical, economic, and social recovery. Recovery measures return community life to an accepted level of normality.

- Most opportunities are associated with *Reduction of Risk* and *Recovery*, which could be due to recent changes in the scope of emergency management in New Zealand.

- It is likely that enhancing certain existing programmes and procedures will require additional funding. The details of those measures, including timing and funding requirements are yet to be determined.

- A number of programmes and procedures could be amended on a regular basis through the recurring review of current measures.

- Information given to the community must be simple, visual and correct.

- Implementing emergency management measures must recognise recommended structural works may take up to 40 years to complete.

- Advice and information can be modified to highlight differences in the risk and likely flooding consequences across flood prone areas.

- Emergency management measures for flooding must incorporate the impacts of other hazards on the flood hazard, such as climate change, land movement, earthquakes and technological hazards (for example: release of hazardous substances).

- The impacts of combined hazard events need to be clearly understood by emergency managers and the community.

- The community needs to understand the differences between river and stormwater flooding. There may be different programmes and procedures applying to each type of flooding event.

- Flood warning procedures need to be clearly documented.

- The Hutt River physically divides the community from their places of work, residence or education. This division causes problems for people separated from their families and homes during flood events.

- Improved links between the media and emergency managers are necessary to ensure the community basic and accurate information during and following flood events.

- The Councils and emergency services need a co-ordinated approach to emergency management.

- Evacuating large populate parts of the floodplain may be impossible in a large flood event.

How to Read the Tables for Emergency Management

Existing procedures and programmes, and gaps and opportunities are summarised in tables beginning on page 40.

The *first column* provides the strategy. The *second column* identifies the tasks that are ongoing or in the progress of being completed. Those tasks shaded in grey are the opportunities to enhance existing procedures and programmes. The *third column* covers the councils responsible for each measure.

The following acronyms define Council departments responsible for different emergency management programmes and procedures:

HCC	HCC Emergency Management Section
HCC – AM	HCC Asset Management Group
HCC – CS	HCC Customer Services Group
UHCC	UHCC Emergency Management Section
UHCC – OPS	UHCC Operations Department
UHCC – RS	UHCC Regulatory Services Department
WRC – EM	WRC Emergency Management Department
WRC – FP	WRC Flood Protection Department

Summary of Measures

REDUCTION OF RISK

Strategy	Tasks required to complete each strategy. Shaded: Requires action Black: Ongoing or improvement in progress	Action to be completed by which Councils
Non Structural Hazard Mitigation Measures	Complete flood modelling (river and storm water)	WRC-FP, HCC, UHCC
	Complete flood mapping (river and storm water)	WRC-FP HCC, UHCC
	Study effects of other hazards on river flooding. e.g. climate change, stormwater flooding, tsunami, earthquake, landslides.	WRC-FP UHCC, HCC
	Investigate other hazards caused by flooding, such as industrial hazards.	HCC, UHCC
	Provide simple, accessible and visually appealing flood hazard to the Councils.	WRC-FP
	Pass flood hazard information to members of the community.	HCC (EM, AM, CS), UHCC (EM, OPS, RS) WRC (EM, FP)
	Assess costs of damages against the benefits of protection.	WRC-FP
	Assess wider economic impacts.	HCC, UHCC
	Assess environmental and social impacts.	WRC-FP

Strategy	Tasks required to complete each strategy. **Shaded: Requires action** **Black: Ongoing or improvement in progress**	Action to be completed by which Councils
	Make submissions on notified resource consents.	HCC (EM, AM), UHCC (EM, RS), WRC-FP WRC-EM
	Provide input to district and regional plans.	HCC (EM, AM), UHCC (EM, OPS), WRC-FP WRC-EM
	Maintain communication and liaison between councils.	HCC, UHCC, WRC (EM, FP)
Structural Mitigation Works	Provide structural flood protection construction and maintenance.	WRC-FP
	Provide stormwater mitigation works.	HCC, UHCC
Disaster Insurance	Maintain insurance for continuation of Council function in a flooding event.	HCC, UHCC, WRC-EM, WRC-FP

READINESS

Strategy	Tasks required to complete each strategy. **Shaded: Requires action** **Black: Ongoing or improvement in progress**	Action to be completed by which Councils
Community Education and Information	Provide programmes for education providers.	HCC, UHCC
	Provide response training for the wider community.	HCC, UHCC
	Distribute preparedness information using print, brochures, radio, and yellow pages.	HCC, UHCC, WRC-EM
	Distribute information using other methods e.g. internet, other visual methods.	HCC, UHCC, WRC-EM
	Provide specific information to higher risk geographic areas. WRC-FP would provide this information to local Councils, who then pass it to the community.	HCC, UHCC, WRC-FP
	Provide additional advice to at risk demographic groups.	HCC, UHCC, WRC-EM
	Provide ongoing preparedness information to businesses.	HCC, UHCC, WRC-FP
Warning Systems, Processes and Procedures	Operate community siren alerting systems for higher risk geographic areas.	HCC, UHCC
	Provide siren activation procedures.	HCC, UHCC
	Produce procedures for distributing weather warnings.	HCC, UHCC, WRC (EM, FP)
	Produce flood monitoring and alert procedures.	WRC (FP, EM), HCC, UHCC

Strategy	Tasks required to complete each strategy. **Shaded: Requires action** **Black: Ongoing or improvement in progress**	Action to be completed by which Councils
Planning	Maintain current mutual aid agreements.	HCC, UHCC, WRC-EM
	Provide a comprehensive evacuation plan.	HCC, UHCC
	Produce a comprehensive flooding response plan/flood procedures manual. These cover response, evacuation, and callout procedures.	HCC, UHCC, WRC-FP
	Produce comprehensive corporate/council emergency plans.	HCC, UHCC, WRC
	Have operative callout procedures for staff, contractors and voluntary organisations.	HCC, UHCC
	Organise planning through the forum of the Emergency Services Co-ordination Committee.	HCC, UHCC, WRC-EM
Exercises	Hold exercises for emergency agencies and staff involving headquarters staff, emergency services, other essential services.	HCC, UHCC, WRC (EM, FP)
	Hold exercises for community response.	HCC, UHCC
Infrastructure for Emergencies	Maintain emergency communications systems and resources. Resources may include resource databases and stores e.g. sandbags (not sand).	HCC, UHCC, WRC (EM, FP)

RESPONSE

Strategy	Tasks required to complete each strategy. **Shaded: Requires action** **Black: Ongoing or improvement in progress**	Action to be completed by which Councils
Response Procedures	Activate flood response plans as an event escalates.	HCC, UHCC, WRC-FP
	Call out staff and contractors.	HCC, UHCC, WRC-FP
	Activate evacuation plans as necessary.	HCC, UHCC
	Activate emergency operations centres / flood base as necessary.	HCC, UHCC, WRC (EM, FP)
	Co-ordinate Lifelines response.	WRC-EM
	Co-ordinate event if regional civil defence declaration is required	WRC-EM
Emergency Warnings and Information	Provide river monitoring information and alerts.	WRC-FP
	Pass on weather warnings	WRC-EM, WRC-FP, HCC, UHCC
	Activate community siren alerting systems	HCC, UHCC
	Provide co-ordinated advice to the Media	HCC, UHCC, WRC (FP, EM)
	Provide advice to at risk groups	HCC, UHCC
	Operate crisis call centres	HCC, UHCC
	Provide internet information to the community	HCC, UHCC, WRC

RECOVERY

Strategy	Tasks required to complete each strategy. **Shaded: Requires action** **Black: Ongoing or improvement in progress**	Action to be completed by which Councils
Recovery Procedures	Activate recovery plans and regional recovery guidelines	HCC, UHCC, WRC-EM
	Provide for the long term housing of evacuees	HCC, UHCC, WRC-EM
	Track evacuees if removed from the floodplain	HCC, UHCC, WRC-EM
	Activate welfare plans	HCC, UHCC
	Review district plan measures with a focus on redevelopment issues	HCC, UHCC
Financial Recovery	Access government assistance through Ministry for Emergency Management	HCC, UHCC, WRC-EM
	Administer mayoral relief funds	HCC, UHCC

Appendix 1:

Workshop Questions – 10 April Workshop

Workshop Objectives

- Inform the Advisory Committee and other workshop participants of the range of non-structural measures including land use and emergency management measures.

- Obtain guidance from the Advisory Committee on the information to present to the community.

Workshop Questions

We would like your guidance on our proposals.

1. For the following areas we are advocating:

    - **The Upper Catchment:** A mix of:
        - clearly worded policy on the flood hazard;
        - modified planning rules;
        - better information sharing between councils;
        - monitoring land uses;
        - promoting better land management.

    - **The River Corridor:** First - the flood defence system must not be compromised; and second, striking a balance between the flood hazard risk and restricting land uses.

    - **The Floodplain:** A stronger level of control for land uses in higher risk areas, and a primary focus on voluntary approaches elsewhere.

- **Emergency Management:** Recognising gaps in existing programmes and procedures and identifying future opportunities to enhance them.

2. Are you comfortable with the extent and pitch of information presented today to go out to the community ?

3. Would you suggest changes, additions and / or omissions to that information ?

Appendix 2:

Why We Are Looking At Non-structural Measures - Background From 10 April Workshop

Dealing with Residual Risk

The added chance of failure or overtopping during a flood is known as the ***residual risk***. In other words the residual risk is the extra or 'left over' risk once the structural measures, such as stopbanks and river edge protection, are in place.

The residual flooding risk means that damages to land and property can occur even though structural measures are present. Structural measures do not protect us from the entire flood hazard risk because they can erode, or be breached or overtopped in larger flood events.

Non-structural measures are floodplain management planning tools that mainly deal with the residual flood hazard risk. These tools:

- keep people and development away from flood waters
- limit the impacts of the flood
- help the community cope with the impacts of flooding

Ensuring Future Development is Sustainable

The population of the Hutt Valley is predicted to increase by about 3,000 over the next 40 years[2]. There is also a very low amount of undeveloped land on the floodplain.
These two factors suggest rises in potential future flood damages should be quite limited and probably ***sustainable at a community level***. In other words rises in damage costs would be affordable to the community.

Holding rises in potential flood damages to a sustainable level is central to wise floodplain management planning. That means future development should not lead to large and unsustainable rises in damages on flood prone land.

[2] *Demographic Trends and Projections for the Wellington Region 1981 – 2021;* Monitoring and Evaluation Research Ltd, 1998.
NOTE: Population projections for the period 2001 to 2021 were subsequently doubled to attain a projection out to 2041. Projections show an increase in population from 107,900 to 110,900 for the Hutt valley.

The focus for developing land use measures then moves away from seeking general benefits for the wider community. Instead, the focus shifts towards benefits individual land owners and their families can gain.

Land Uses and Emergency Management

Managing Land Uses

Wise management of land use benefits all residential, commercial and industrial land owners.

Effective land use measures can encourage alternative approaches that may:

- produce an economic benefit
- improve safety
- reduce adverse effects on the wider community.

Helping People

A high level of community safety and well-being is needed during and following any flood event. That is the starting point for considering emergency management measures.

We can enhance a range of emergency management programmes and to raise community confidence and safety. Measures include:

- reduction of flood risk
- readiness before an event
- response during an event, and recovery following one

Emergency management measures help to reduce flood damages, which is how it fits in with land use measures.

Remember - We Are Not Alone !

A shift to more sustainable flood hazard management approaches is strongly supported by evidence from around New Zealand and the rest of the World. Sustainability is being achieved by using non-structural measures. Studies completed by WRC Flood Protection and Opus International Consultants in 1999 provide evidence.

Let's Not Forget the Policy Backing

The Resource Management Act 1991 (RMA) requires Councils to promote the sustainable management of natural and physical resources in our environment.

The RMA requires the preparation of a regional policy statement, a well as regional and district plans. A regional policy statement presents an overview of resource management issues for the region, and provides policy and measures to achieve integrated environmental management.

The Regional Policy Statement for Wellington Region provides a policy backdrop for managing natural hazards. Key policy covers:

- Providing sufficient information to guide decision-making.
- Considering the range of matters related to the flood hazard, including event probability, potential consequences, mitigation measures and alternative measures, and statutory responsibilities.
- Recognising risk to existing development and promoting risk reduction measures.
- Explicitly recognising and providing for risk to new activities.
- Encouraging community preparation by providing information and advice.

Certain objectives of the HRFMP, relate to non-structural measures, managing residual risk, and encouraging sustainability.

- *Solutions for floodplain management which balance benefits and costs to the community are put in place.*

- *Selected measures account for a level of residual risk, which is acknowledged and accepted by the community.*

- *Selected measures are affordable to the community.*

- *Clear advice and accurate information about responsibilities and risks of flooding are provided to the community.*

- *Sufficient information on the flood hazard is provided to enable agencies and the wider community to improve preparedness for their response to flooding and its adverse effects.*

Developing non-structural options has already been accepted as a key Hutt River Floodplain Management Plan (HRFMP) component.

Tying Together with Structural Measures

Non-structural measures should fit in with the recommended structural measures.

The challenge lies in determining:

- the balance between land use and emergency management measures
- the extent of these measures - how far we go

The Outcome: A Long Term Vision

The long term vision is to create a community that is more resilient to flooding. The aim is to develop long-term sustainable solutions that manage residual risk on a catchment-wide basis.

The long-term vision is not ‘pie in the sky’, although it needs to be one that the community can relate to and accept.

Ultimately a level of non-structural measures is needed that provides for a reliable flood defence system, and balances residual risk with land owner needs and aspirations.

Appendix 3:
Process Pathway Following 10 April Workshop

This flow chart summarises continued development and eventual implementation of non-structural measures.