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## **STORMWATER FLOOD PROTECTION PLAN**

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### **1. Purpose of Report**

To review the Stormwater Flood Protection Plan process that the Council adopted in 1993 and has followed since.

To outline the ramifications of the current draft LTCCP with regard to the Stormwater Flood Protection Programme funding considerations and risk management options.

### **2. Executive Summary**

In 1993 Council adopted a “Flood Protection Strategy” for the City. The key components of this strategy (now referred to as a Plan) are:

- The targeted capacity for stormwater protection of properties in the city to be a 1:50 year event.
- Clearly defined levels of service (LOS).
- A system to guide intervention and investigation triggers.
- A benefit/cost based investment and prioritisation framework for major works.
- To provide Council with a process that constitutes a defensible position in the face of legal challenge.
- A systematic methodology of progressively upgrading the network capacity to the target levels based on a Catchment Management Plan process.
- A reliable and consistent funding allocation recognising both major and local improvement needs.

During the deliberations to set the current LTCCP of 2006/07 and beyond, the Council opted to adopt a borrowing cap. To assist in achieving this cap, funding for stormwater upgrades (CX031) has been interrupted for years 2006/07 to 2008/09 recommencing at a level of \$2,450,000 per year from 2009/10.

A review of the 1993 “Flood Protection Strategy” (Plan) indicates that the objectives, methodology and outcomes of the Plan are still relevant and should be continued. However the funding for achieving these objectives can be modified to reflect the need to regularly fund localised improvements, with major or significant upgrades requiring considerable investment subjected to case by case business plans.

### **3. Recommendations**

It is recommended that the Committee:

1. *Receive the information.*
2. *Note the rationale and context of the stormwater Flood Protection Plan.*
3. *Agree that to provide a defensible position for Council and to enable future growth*
  - a. *the rationale supporting the Stormwater Flood Protection Plan process is still valid.*
  - b. *Council continue with the broad aim of flood protecting the city against 1:50 year storm events.*
  - c. *Council continue adherence to the intervention triggers and Levels of Service outlined in the plan*
4. *Recommended to Council that it adopt option 2 for funding i.e.:*
  - a. *include \$200,000 a year in the LTCCP for the next 3 years for the provision of localised flood protection works.*
  - b. *if funding is required for exceptional flood protection projects in the next 3 years, business cases will be prepared for Council consideration.*

### **4. Background**

The stormwater network protects human health, property, public safety and well-being, and makes the city viable by reducing the risk of flooding and its consequences on all aspects of the community's endeavours. Stormwater management supports a number of Council's strategies, mainly the Draft Environment Strategy, Outcome 9 "*Safer: Wellingtonians will have access to safe and reliable energy and water supplies, clean air, and waste disposal systems that protect public health and ecosystems*". The Council also manages stormwater to contribute to the achievement of community outcome: "*Wellington's long-term environmental health will be protected by well-planned and well maintained infrastructure*".

This report is concerned with the flooding associated with stormwater. The water quality and erosion issues associated with stormwater are addressed through other plans and policies and are not referred to in this report.

#### **4.1 The current Flood Protection Plan**

The current Stormwater Flood Protection Plan was adopted by Council in 1993.

The objectives of the plan were to;

- manage the stormwater network in order to protect people, property and the environment from the effects of flooding.
- support the city's development
- provide Council with an ongoing defence against nuisance claims arising from stormwater runoff into properties by:
  - developing a process and rationale to address major flooding risks in a logical, prioritised and rational manner and
  - provide funding for localised flood risk mitigation works

Throughout this report, there will be reference to “1 in x year” storms and intensities. This refers to the statistical probability of a storm of that intensity occurring, e.g:

- a very big, intense storm may only occur once in 50 years and is hence referred to as a “1 in 50 year storm”. (This equates to 35 mm of rain in an hour)
- whereas a smaller, less intense storm may occur once every 2 years, and is therefore called a “1 in 2 year storm” (This equates to 18mm of rain in an hour)

## **4.2 The Levels of Service**

The Plan accepted that universal stormwater flood protection for Wellington City under all storm events is simply not feasible, at least not at a cost acceptable to the community.

A set of levels of service (LOS) was derived through consultation with the community to establish intervention guidance for investigation of flooding issues and the upgrade capacity to be provided by physical works.

These have been adopted since 1993 and are as outlined in Table 1 below. There are two aspects to note. The “trigger for upgrading” is the regularity of flooding that the property must experience before Council will investigate flood causes further and if this trigger is breached, Council may consider flood alleviation works.

The “Level of Service” is the degree of flood protection that any newly constructed works are designed to provide.

**Table 1 Flood Protection Levels of Service - Stormwater Asset Management Plan**

Key Service Areas	Performance measure	Level of Service Target		Current Performance	Means of measure
Network Capacity	Number of completed Catchment Management Plans	34 Plans in total - Single plan carried out each financial year based on highest priority first		Single plan completed per year, 10 out of 34 completed	Catchment Management Plan Programme
Network Capacity	Reduction in the % of city in Flood Risk areas	All works have been completed in those areas where the Cost Benefit ratio is more than 2.		Works carried out in 3 catchments. 19ha of flood risk area alleviated.	Catchment Management Plans and Flood Protection Programme
Network Capacity	Flooding of property Arterial roads, major community facilities - essential services	Trigger for upgrading investigation >1 in 20 years	Standard for new design 1 in 100 years	All new designs comply	Design reports and QA System
Network Capacity	Flooding of property Houses, commercial and industrial buildings, internal flooding	Trigger for upgrading investigation >1 in 10 years	Standard for new design 1 in 50 years	All new designs comply	Design reports and QA System
Network Capacity	Flooding of property Garages, sheds and unoccupied basements – internal flooding	Trigger for upgrading investigation >1 in 2 years	Standard for new design 1 in 10 years	All new designs comply	Design reports and QA System
Network Capacity	Flooding of property Roads, active recreational area, access to property – safe use denied, damage	Trigger for upgrading investigation >2 in each year	Standard for new design 1 in 5 years	All new designs comply	Design reports and QA System
Network Capacity	Flooding of property Gardens, yards, passive recreation areas, flooding >150mm deep over more than 20 square meters	Trigger for upgrading investigation >5 in each year	Standard for new design 1 in 2 years	All new designs comply	Design reports and QA System

### **4.3 The Methodology of Implementation**

#### **Catchment Management Plans (CMP's)**

The management of stormwater flooding in the city is assisted by dividing the urbanised sector of the city into 34 discrete catchments (areas).

These catchments have been prioritised for the preparation of catchment management plans (CMPS's). The focus of these CMP's has been the identification, management and mitigation of flood risks associated with events with the intensity that can be expected only once in 50 years.

CMP's are being prepared in accordance with a priority risk matrix that covers issues that have been grouped as:

- Actual flooding that has been experienced
- Environmental concerns and effects
- Credibility / reputation including growth potential
- Health and safety

The CMP process identifies the areas at risk from flooding under a target design event, evaluates the level of risk, quantifies the risks and explores options to alleviate the risks. These options normally translate into capacity upgrades of the main trunks.

These options then quantify (in dollar terms) the degree of benefits/flood alleviation and the associated costs. These figures are then translated into a benefit/cost ratio.

The results are assessed alongside other flood protection upgrade project candidates and prioritised using the Benefit/Cost (B/C) evaluation process. Projects with the highest B/C ratios are most likely to be implemented. It has been agreed with Council in the intervening years that the B/C ratio must be greater than a minimum threshold of 2.0 for the project to be considered for implementation.

#### **Hazard Maps**

Flood hazard maps are also produced from these CMP's. These are used to communicate flood risks to interested parties such as home owners, developers etc. The Council has a statutory obligation to make such information it is aware of, available to interested parties. Every PIM (property information memorandum) or LIM (land information memorandum) produced by Council includes this information.

### **4.4 Potential works**

There are two groups of potential flood protection works that result from flooding investigations:

- "Major" flood protection works are identified through the CMP process and they are designed to solve flooding problems affecting a significant number of properties.

- “Localised” flood protection works generally affect only a few properties and are often identified independently of the catchment management process.

#### **“Localised” works**

Projects are considered for implementation under the “localised” category with due regard to legal requirements, service level failures, the number of properties affected, the extent of stormwater nuisance and/or environmental impact. These investigations identify smaller scale works that would alleviate the flooding problem, but the scale of the works makes it uneconomic to carry out a full scale Benefit/Cost investigation.

This approach, in parallel with the catchment management plans, enables localised service level failures to be rectified within a reasonable timeframe, therefore minimising further possible damage and avoiding protracted disputes.

#### **4.5 Funding regime to date**

Since 1993, funding has been provided for flood protection. This incorporates three elements.

- (a) Maintenance of network (repairs and renewals – not discussed further in this paper)
- (b) Major upgrades (\$2,300,000 per year in mid 1990’s and increased to \$3,000,000 in 2001)
- (c) Localised upgrades (\$200,000 in mid 1990’s and increased to \$300,000 in 2001)

This regular funding provided a foundation for ongoing major capacity improvements and the ability to respond to localised issues as they arose within a reasonable timeframe.

#### **4.6 Major upgrades completed**

Examples of significant major upgrades completed in recent years are;

- Waring Taylor Street
- Harris Street/Victoria Street Tunnel
- Island Bay
- Te-Aro (partially complete)

In the previous years considerable work was carried out lining the brick stormwater pipes as well as carrying out trunk main upgrades in various parts of the city including Johnsonville and Kent Terrace.

## **Outstanding Major Flood Protection works**

Catchment Management Plans completed to date have identified the following works that are required to meet the LOS as outlined in the Plan:

FLOOD PROTECTION PROJECT (as at 1 May 2006)	ESTIMATE OF OUTSTANDING WORKS (\$)	ESTIMATE STATUS	BENEFIT COST RATIO (BC)	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Localised Flooding Projects	2,800,000	Provisional	n/a				700,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Kilbirnie - area f - Dge res	25,000	Preliminary	7.4				25,000							
Kilbirnie - area e - Salek Street	175,000	Preliminary	5.8				175,000							
Kilbirnie - area c - Pit Yule St	100,000	Preliminary	6.0				100,000							
Kilbirnie - area d - Pipe Ross St	150,000	Preliminary	6.2				150,000							
Weka / Darlington (Note 1)	672,000	+/- 20%	3.9	672,000										
Karori ( Upper) Duthie Street	2,000,000	+/- 30%	2.7				700,000	1,300,000						
Te Aro Culvert with ICB	750,000	+/- 10%	2.5	750,000										
Boulcott /Willis	600,000	+/- 20%	2.5				600,000							
Te Aro/Taranaki St (clear of ICB)	12,500,000	+/- 30%	2.5					913,000	2,273,000	2,329,000	2,380,000	2,427,000	2,178,000	
Island Bay	600,000	+/- 30%	2.5										297,000	303,000
Hunter	3,800,000	+/-30%	2.1											
<b>Sub Total</b>	<b>24,172,000</b>													
Awaiting CMP completion	2,172,000													2,172,000
Newtown Culvert	6,700,000	Preliminary	1.8											
Miramar North Culvert	6,500,000	+/- 50%	1.45											
Tory	3,000,000	Preliminary	<i>CMPs yet to be prepared for these catchments</i>											
Bowen	2,000,000	Preliminary												
Thorndon – Below Motorway	7,000,000	Preliminary												
Grafton/Rata	3,000,000	Preliminary												
Oriental Bay	1,000,000	Preliminary												
Seatoun	1,500,000	Preliminary												
Hataitai	4,000,000	Preliminary												
Remaining catchments	More than 6,000,000													
<b>Sub Total</b>	<b>40,700,000</b>													
<b>Total of projects above</b>	<b>64,872,000</b>													
<b>Funding unlikely</b>														
Kilbirnie - area B Rongotai Tacy	5,200,000	Preliminary	0.62											
Kilbirnie - area A - Evans Bay Pde	5,500,000	Preliminary	0.16											
<b>2006/07 LTCCP Budget</b>				1,422,000	-	-	2,450,000	2,513,000	2,573,000	2,629,000	2,680,000	2,727,000	2,775,000	2,775,000

Note 1 Weka Street / Darlington Road works are being done in conjunction with CX031 Stormwater renewal work of \$218,000. Total cost \$890,000



## 4.7 Outstanding Localised flood protection works

Since the LTCCP discussions in late 2005/early 2006 when the savings in the CX031 Stormwater Flood Protection budget were agreed, there have been a number of storm events when the LOS for individual properties have been breached. A number of properties across the city are facing flood risks that meet Council's trigger for upgrading that are unresolved and are under investigation.

With the funding currently proposed in the LTCCP, these events could not be alleviated for at least 3-4 years. Unresolved issues increase the risk of claims and may result in some properties becoming uninsurable. As a consequence, officers have agreed that this situation would be brought before Council.

As at May 2006 the following projects are prioritised for funding under the "localised" flood protection category.

**Table 2: Schedule of pending localised flood protection works**

<b>Project</b>	<b>Description</b>	<b>Cost (\$)</b>
Atlanta Grove	Internal flooding of house due to poor control of stormwater in an adjacent catchment	60,000
Monorgan Road Strathmore	Flooding of suburban street affecting 3 properties and access to adjacent properties	75,000
Elena Place, Tawa	Possible upgrade from Elena Place to Porirua Stream to upsize stormwater drain and resolve repeated flooding around two properties	200,000

At a funding rate of \$200,000 a year, the wait time for any individual problems would be 2 years.

## 5. Discussion

### 5.1 Legal/Community issues/risks

The community has expectations that Council takes measures to mitigate all flooding risks.

Although there is no explicit obligation for local authorities to provide stormwater services, there is an implied obligation. This implied obligation is derived from various provisions in the Health Act, the LGA, other legislation and case law. The Council does have an obligation as a property owner to ensure that stormwater is not channelled into neighbouring properties.

Therefore it is as a TLA that the Council has an obligation to provide a degree of flood protection and to abide by the levels of service agreed with the community. There is much discussion regarding the Councils obligations regarding stormwater protection of

individual properties. Council's "defensible" position has been in terms of having a funded on-going flood risk reduction programme and a robust process to determine the works carried out under that programme.

## **5.2 Other TLAs approach**

The performance measures and levels of service in our neighbouring TLA's differ from WCC in terms of the method by which the flood mitigation is realised and the triggers that are employed.

Hutt City Council's flood protection standard for residential houses specifies a "total system" whereby, although the level of protection is also a 50 year return period, the piped system only provides for a 2 year event with the remainder being provided by overland flow paths.

Porirua City Council does not have a comparable performance measure. They measure the number of flooding incidents per year with the intention of reducing the risk. No numbers or triggers have been agreed.

North Shore City have a design standard that seeks to provide protection from flooding in a 1 in a 100 year event. This is through a combination of piped systems, overland flow paths and streams.

Auckland City has a target of protecting residential buildings from flooding in a 50 year storm in line with the Building Act.

## **5.3 Review of parameters**

### **Levels of service**

One of the aspects of flood protection that has been considered in an efficiency review is the possibility of lowering the design standard. However the Building Act specifies that a 50 year level of protection is to be provided for dwellings. Complying with this by offering an overland flow component (such as in Hutt City) is not usually practical in Wellington due to topography and previous development. Even if this was possible in small areas of the city, it has not been recommended as:

- the associated lowering of standards to individual property owners is obviously not desirable when taking the number and content of the current flooding complaints into consideration.
- the resultant increase in silt is not considered to provide a long term sustainable option.

During the review of the Council's Stormwater AMP in 2004/5, the reviewer expressed the opinion that Council's levels of service were toward the lower end of the continuum. Although this may be true, it demonstrates compliance with statutory minimum service

levels but does not mean that the rest of the Country has necessarily adopted a higher level of service.

### **Triggers for intervention**

There are many instances where the public request a resolution to a flooding problem that is not severe or regular enough to reach our agreed triggers for intervention. In these cases, the property owner is advised of the agreed triggers and the fact that the Council will not carry out works to alleviate their flooding situation. This is not always accepted, but a review of the intervention levels would, in all likelihood result in a request for additional funding.

## **5.4 Environmental issues/Climate change**

With the widely accepted effects of climate change it is expected that rainfall events will be more extreme than in the past and therefore the city's stormwater network will be placed under increased pressure.

The Council's Urban Development Strategy aims to increase densification along the growth spine. This will no doubt increase the percentage of paved areas and the intensity of stormwater runoff thus further increasing the risk for flooding. Council has the option of waiting until the resultant flooding problems manifest themselves and then address the problem, or be more proactive, determine the future requirements and continue working towards the alleviation in a timely manner.

Environmental standards are always increasing and in the near future it is envisaged that stormwater will not be permitted to be discharged directly into waterways and stormwater systems without some form of treatment.

The current design standards state that houses are to be protected from a rain event that has a probability of occurring once in 50 years. With the probable increase in rain intensity due to global warming, this current intensity may only be equal to a 1 in 30 year in the future. That does mean that the infrastructure constructed today may not have the desired capacity in say, 100 years time. Council has incorporated some "future proofing" into current design requirements, and this will be monitored. A comforting fact is that currently many of our stormwater culverts only have a 1 in 2 or 1 in 5 year capacity, and even if they only have a 1 in 30 year capacity in the future the overall situation will be considerably better than it is now.

Any "future proofing" carried out at this stage usually means an increase of pipe size. As the actual pipe cost of installing a major stormwater pipe is a small percentage of the total construction cost (the majority being the excavation, services, labour etc), the marginal cost associated with a pipe size increase is minimal and is accommodated within current budgets.

## Options for future approach/funding

The funding proposal for Flood Protection in the current draft LTCCP is as per table 3 below.

**Table 3 CX031 Stormwater flood protection upgrade budget**

Budget Source	Forecast				Proposed						
	2005/06	2006/07	2007/08	2008/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000
2005/06 Annual Plan	2,956	2,990	2,305	3,284	3,284	3,284	3,284	3,284	Not included		
2006/07 LTCCP		1,422	0	0	2,450	2,513	2,573	2,629	2,680	2,727	2,775
Difference		1,568	2,305	3,284	834	771	711	655			

Comparison of the flood protection budget proposed in the draft 2006/07 – 2015/16 LTCCP with that published in the 2005/06 Annual Plan indicates a budget reduction of \$10,100,000 over seven years starting in 2006/07.

The 2006/07 LTCCP currently does not allow for any localised flood protection works to be implemented before 2009/10. This could result in breaches of service levels being unmitigated for up to four years.

The options to manage issues arising from the current programme of stormwater flood protection works are discussed below.

		<b>Risks</b>	<b>Benefits</b>	<b>Comment</b>
<b>OPTION 1</b>				
1 (Local)	Funding as per current LTCCP (decrease/removal for next 3 years)	The lack of funding for localised flooding issues for 3 years will cause individual and community dissatisfaction. Small risk of Council's "defensible position" being threatened. Increased risk of claims against Council for creating stormwater nuisance and not mitigating that nuisance	Has Council wide funding benefits.	May need to address local flooding issues through the renewal project for next 3 years. This is a short term solution, frowned on by Audit NZ that will impact on the lifecycle costs in the future.
1 (Major)		Slower progress on major flood protection works for 3 years may have some longer term risks.	Has Council wide funding benefits.	Unless universal LOS reduction is agreed this can only be a temporary approach.
<b>OPTION 2</b>				
2 (Local)	Re-instate some funding for localised flood mitigation works as follows: 2006/7: \$200,000 2007/8: \$200,000 2008/9: \$200,000	Impact on Council's borrowing cap.	The highest priority smaller works can continue and more reliable implementation planning.	This is an expedient method of addressing the issue but there is a funding consequential trade off required.
2 (Major)	Major flood protection projects to be considered by Council on a case by case basis.	Funding cap issue. Will inject a degree of uncertainty in the long term objectives and slow down ongoing investigation works.	Robust assessment for major expenditure. Progress could be made on city upgrades.	This is a return to the pre 1993 practice. A slowing of the programme will assist with a considered review of all plans for 2009/10 and beyond.
<b>OPTION 3</b>				
3 (Local)	No increase in funding. Council consider funding of individual localised flood mitigation projects on a case by case basis.	A slower ability to respond to emerging issues	Robust assessment for expenditure.	The scale of these works cannot justify the demands for a full B/C process in each case.
3 (Major)	Major flood protection projects to be considered by Council on a case by case basis.	Funding cap issue. Will inject a degree of uncertainty in the long term objectives and slow down ongoing investigation works	Robust assessment for major expenditure. Progress could be made on city upgrades.	This is a return to the pre 1993 practice. A slowing of the programme will assist with a considered review of all plans for 2009/10 and beyond.

Option 2, the inclusion of \$200,000 per year for localised flood protection works, is included in the recommendations as it is an expedient method of addressing the issue. However it is acknowledged that there is a funding consideration trade off required as this will impact on the Council's borrowing cap.

Should Council decide to adopt Option 1 (status quo – no increase in funding) the options open to officers are:

- To put up an individual business case for every occurrence when the LOS has been breached and works are recommended.
- To use renewal funding for the works - a practice that will be frowned on by Audit NZ.
- To do nothing until 2009/10 when funding recommences.

## **6. Conclusion**

Modern communities expect to be served by robust and reliable core infrastructure. All of the Council's recently agreed strategies and related outcomes are based on the fundamental assumption that basic protection from health risks is provided. This contributes to the well being experienced by the city, the citizens and visitors alike.

Wellington city, by virtue of being the Capital city, has a leadership responsibility. The levels of service the city aspires to, although not excessive, are never the less, leading our neighbours.

Regarding flood mitigation, the city can adopt a philosophy of reacting to unacceptable flooding, or be proactive and have a future focused plan that aims to reduce the full risk of flooding.

The original rationale of the Flood Protection Plan as instigated in 1993 remains valid. The process is logical, has a long term goal and has sufficient flexibility to ensure that changes to our risk profile and future challenges such as climate change can be incorporated. The process and resultant works programme provides the city with a defensible position in the face of legal challenge.

Although adherence to the process will never provide individual property owners with the service they may individually demand, the process provides a balanced and fair expenditure of city funds.

Therefore it is proposed that Council continues to systematically implement Flood Protection improvements on the basis of;

- The trigger levels and levels of service as detailed in the current flood protection plans.
- The Catchment Management Plans continue to be prepared in accordance with the risk matrix in the Asset Management Plan.

- The works programme be prioritised according to the B/C ratio (highest ratio first) and that no works with a B/C of less than 2 be considered without specific Council approval.
- Localised mitigation funded regularly (\$200,000 per year)
- Major projects submitted for Councillor approval on a case by case basis.

Contact Officer: *Maria Archer, Manager Infrastructure Planning*

## **Supporting Information**

### **1) Strategic Fit / Strategic Outcome**

*This aligns with environmental activity 4.6.2 Stormwater Management, that protects the city from flooding. Flood protection works are prioritised across the city to meet service level standards outlined in the Stormwater Asset Management Plan.*

### **2) LTCCP/Annual Plan reference and long term financial impact**

*Project CX031 (Stormwater Flood Protection Upgrades). An increase in the LTCCP budget for this project will have an impact on the Council's desired borrowing cap.*

### **3) Treaty of Waitangi considerations**

*No Treaty of Waitangi implications were identified.*

### **4) Decision-Making**

*This is a significant decision as it reconfirms Council's Stormwater Flood Protection objectives and processes.*

### **5) Consultation**

#### **a) General Consultation**

*Consultation on the proposed funding decrease is currently being carried out through the LTCCP process. At the time of paper preparation, no official submissions had been received regarding this project.*

#### **b) Consultation with Maori**

*Not applicable for this paper.*

### **6) Legal Implications**

*An ongoing programme for flood protection works is considered to be necessary to protect Council from litigation.*

### **7) Consistency with existing policy**

*This report recommends certain measures that are consistent with the approved asset management plan.*