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Environment Bay of Plenty
REGIONAL COUNCIL

Stormwater Strategy for the Bay of Plenty Region

Working with our communities for a better environment

Table of Contents

Glossary

AEP	Annual Exceedence Probability. A statistical term defining the probability of an event of a given size being equalled or exceeded in any year, expressed as a percentage. For example, a 5% AEP event has a 5% chance of being equalled or exceeded in any one year.
BMP	Best Management Practice. Methods (programmes, systems or structures) used to control or prevent contamination of receiving environments.
Catchment	A geographical unit within which runoff is carried under gravity by a drainage system to a common outlet or outlets.
CMA	Coastal Marine Area
CMP	Catchment Management Plan
CSC	Comprehensive Stormwater Consent. The purpose of a CSC is to consent multiple activities associated with stormwater management and discharge within urban catchments[1].
Contaminants	Includes any substance or heat that when discharged into water or onto land, changes or is likely to change the physical, chemical or biological condition of that land or water onto or into which it is discharged.
LID	Low Impact Design – "a design approach for site development that protects and incorporates natural site features into erosion and sediment control and stormwater management plans" (ARC TP124).
Modified Watercourse	A watercourse or river that has always existed in some form in the general area, however, the watercourse has been modified by engineering works to alter is original form or alignment (such as concrete or gabion lining, or channel straightening works for example).
RCEP	Bay of Plenty Regional Coastal Environment Plan
PRWLP	Proposed Bay of Plenty Regional Water and Land Plan
River	Is a continually or intermittently flowing body of freshwater and includes a stream and modified watercourse, but does not include any artificial watercourse (including irrigation canal, water supply race, electricity supply canals and farm drainage canal).
RMA	Resource Management Act, 1991**.**
Sediment	Eroded material that can include adsorbed contaminants.
SS	Stormwater Strategy

[1] In the context of these guidelines, an 'urban catchment' is considered to be a defined urban area for which a CSC is sought. The defined urban catchment may be the entire urban area from which rainfall is collected and consist of many hydrological sub-catchments. It is likely to have multiple stormwater discharge points to receiving water that are located both within and beyond it's boundaries.

Stormwater	Water that falls to the ground, runs off the surface into streams, lakes, marine areas or underground aquifers and includes the contaminants washed off surfaces by water. This water all eventually finds its way to the sea.
Stormwater Network	A system of pipes and ancillary works to collect and convey stormwater to the place of discharge.
Suspended Solids	Sediment or other solids either suspended or floating in runoff.
TA	Territorial Authority i.e. District or City Council
Watercourse	See River

Chapter 1: Introduction

1.1 Purpose of the Strategy

This Stormwater Strategy (SS) outlines the stormwater issues confronting the Bay of Plenty region. It will assist the region's Territorial Authorities (TAs) by providing a framework they can use to produce their own localised stormwater strategies and action plans. The SS promotes using the principles outlined in the document to ensure stormwater is managed consistently across the region, and ensure that the effects of stormwater discharges are dealt with adequately. It recognises the statutory responsibilities the different authorities have, and the benefits of addressing stormwater management on a comprehensive basis across the Bay of Plenty. This document also meets an objective of the Western Bay of Plenty Sub-region's SmartGrowth Strategy and Implementation Plan.

This Statement should be used as an information, reference and guidance resource by regional and local council staff and by key external stakeholders and members of the community interested in the management of stormwater.

Bay of Plenty Regional Council (Environment Bay of Plenty) has led and funded the development of this document, with input from members of the Bay of Plenty Stormwater Liaison Group. The Council seeks ongoing feedback and input with the overall development of the stormwater management objectives and options for the Bay of Plenty.

The SS is an overview document of the objectives, issues and options, for stormwater management in the Bay of Plenty. Individual TAs are expected to develop strategies and action plans that build on the SS, and apply it to the specific circumstances of the local council area. It is expected that the local and regional strategies will be complementary, and further to this, the document will provide the general basis for TA strategies, minimising duplication with the regions TAs. It will ensure that localised stormwater management outcomes are consistent and compatible region-wide.

While localised issues will need to be allowed for in any TA stormwater strategy and action plan, because of the variety of communities and receiving systems in the Bay of Plenty, TAs will not be required to create very detailed and specific localised strategy documents. The level of resources available to invest in the development of individual TA strategies and action plans is limited. A significant level of detail in this strategy document may be transferred where appropriate or referenced in TA stormwater strategies and action plans.

People of the Bay of Plenty must decide how much will be spent on future stormwater management within a number of often-conflicting factors, including:

- the nature of the problem;
- public perception of the issue;
- available resources; and
- required and/or desired outcomes, including environmental outcomes.

The aim of this SS is to define these four factors and facilitate the development of TA stormwater strategies and action plans. Meeting the stormwater management objectives contained in the SS in light of these four factors will need to be done considering other regional and local infrastructure priorities such as transport, sewage and potable water supply.

While the SS concentrates on matters associated with urban stormwater runoff and its management, if contributing areas of a given catchment contain rural activities, this may affect the quality of water discharged from the catchment. The Proposed Regional Water and Land Plan (PRWLP) specifically differentiates between stormwater and runoff from rural areas. Runoff from rural areas is not included in policies and rules or stormwater management in PRWLP and is similarly outside the consideration of this strategy.

1.2 Historical Bay of Plenty Stormwater Management

Like most regions, the Bay of Plenty's stormwater management has historically focused on efforts related to drainage and flood control. The region has an advanced drainage scheme that has been developed, generally in rural areas, for land drainage and to manage flood hazards. Significant physical resources have been invested in the land drainage, river protection and flood management schemes. The responsibility for the maintenance of these schemes overlaps between Environment Bay of Plenty and the region's TAs.

Water was traditionally seen as an urban nuisance and the emphasis was to get water off the land as quickly as possible. The main impacts to be avoided were risk to human life from flooding and damage to property and infrastructure. While this remains the priority, increasing levels of development, mean a more comprehensive approach to the management of stormwater is necessary to manage other effects of stormwater discharge.

Recently, the awareness of and concern about other effects resulting from urban stormwater discharges has lead to more comprehensive stormwater management regulation. This includes the effects of contaminants on the receiving environment.

Environment Bay of Plenty has developed a number of key documents that reflect current policy and practice in stormwater management, including regional plans and guidelines. The applicable documents are listed in the bibliography included in Appendix A. At the TA level, stormwater management is generally governed by respective Codes of Practice for Subdivision & Development.

In addition to regional council and TA documents, there are some national documents, and guidelines from other regions, that can help in the development of good stormwater management practice. Some of these are also referenced in the bibliography.

The management of sites that have their own discharge consents by virtue of their having a private stormwater system (e.g. Port of Tauranga port area, the mill at Kawerau etc) do come under the overall regional Stormwater Strategy objectives and goals, however these sites will not be considered during the development of district stormwater strategies and action plans.

1.3 Legislative Responsibilities

Under the current New Zealand legislative framework, the management of urban stormwater within the Bay of Plenty region is split between Environment Bay of Plenty and the regions TAs. Environment Bay of Plenty is responsible for the sustainable management of the natural and physical resources of the region under Section 30 of Resource Management Act. It is also responsible for authorising the discharge of stormwater throughout the region.

To help Environment Bay of Plenty in undertaking its functions and meeting its responsibilities, this strategy has been developed to promote sustainable management of stormwater within the region.

Many aspects of the implementation of this strategy rest with the TAs, where the day-to-day management of stormwater occurs. TAs manage the effects of land use and are also responsible for the management of stormwater network systems.

There are many parts of the law that influence the management of stormwater by local and regional councils. These include:

- Common Law;
- Land Drainage Act 1908;
- Soil Conservation and Rivers Control Act 1941;
- Local Government Act 2002 (and associated bylaws);
- Resource Management Act 1991;
- Building Act 1992 (and associated regulations).

When developing individual stormwater strategies and action plans, TAs may wish to consider further the legal requirements and implementation of these different pieces of legislation on their activities.

In addition to the above, both organisations have overlapping responsibilities for the management of natural hazards, including flooding.

1.4 Stormwater Discharge Responsibilities

For the purpose of considering responsibilities for managing stormwater, it is important to consider the definitions of “water”, “river” and “divert” as applied in the RMA.

1.4.1 Water

It is necessary to consider the definition of water because Section 15 of RMA regulates discharges to water. The definition of water in Section 2 of the Act is as follows:

Water –

(a) Means water in all its physical forms whether flowing or not and whether over or under the ground:

(b) Includes fresh water, coastal water and geothermal water:

(c) Does not include water in any form while in any pipe, tank or cistern.

Water therefore can be in a river, drain, artificial or modified watercourse, but not water in a pipe, tank or cistern. As discharges to piped systems are not discharges to water as defined under RMA, they are presently controlled by Territorial Authorities (TAs). Discharges to water as defined in RMA are controlled by Regional Councils. It is relevant to note that there is RMA case law which confirms that discharges of contaminants to piped systems are considered to be discharges to land in circumstances which may result that contaminant entering water. As such discharges of contaminant to piped systems come under the provisions of s.15 (1)(b) of the RMA.

1.4.2 River

It is necessary to consider the definition of river because Section 13 refers to activities in the beds of lakes and rivers. The definition of river is as follows:

River –
Means a continually or intermittently flowing body of freshwater; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply for electricity generation and farm drainage canal).

The consequence of this is that many stormwater management activities (such as piping, channelling, constructing detention ponds, excavating and clearing within watercourses) are regulated by Section 13, if they are carried out in the beds of lakes, rivers, streams or a modified watercourse. They are not regulated by Section 13 if they are carried out in an artificial watercourse. A clear understanding of what constitutes an artificial watercourse is necessary for management purposes.

1.4.3 Divert

The diversion of water requires consent pursuant to Section 14 of the RMA. However, “divert” is not specifically defined in the Act. For the purposes of outlining the responsibilities and consideration of consenting requirements, to divert water is defined as moving water from its flow path from where it would have otherwise flowed. This includes floodwaters.

1.4.4 Discussion

Issues over responsibility occur where it is unclear whether a drainage system is a modified watercourse, or an artificial watercourse. A modified watercourse is defined as a natural watercourse that has been altered in some way (for example straightened or armoured with concrete or other erosion resistant material), rather than a drain that has been constructed purely to drain land. The quality of discharges to a modified watercourse is a regional council responsibility, as in control of activities in or under or over the bed of the watercourse.

Where the watercourse is an artificial watercourse, the quality of discharge is a Regional Council responsibility, but there is no control under RMA for activities in or under or over the bed of the artificial feature. The split responsibility for controlling stormwater discharges can cause confusion amongst those who discharge stormwater. Comprehensive Stormwater Consents (CSC) will reduce this confusion, particularly if there is transfer of power to the TAs to manage all aspects of stormwater discharge within consented comprehensive catchments. Table 1.1 provides an overview of responsibilities within consented CSC areas:

Table 1.1 Responsibilities for Stormwater Activities within area covered by CSC

Activity	Responsibility for carrying out the Activity and Compliance	Responsibility for Enforcement	Comments
Discharges of stormwater from roads, streets, TLA owned land e.g. carparks, driveways etc.	TLA	TLA	Discharges will be subject to compliance with agreed management and maintenance regime set out in Catchment Management Plan (CMP). Environment Bay of Plenty will audit TLA to check compliance with the CMP.
Discharge of stormwater from residential roofs, driveways, yards, carparks.	Individual property owner.	TLA	Subject to compliance by individual landowner via Building Act (for roof water).
Discharge of stormwater from State Highways into TLA stormwater system.	Transit NZ	TLA	Discharges will be subject to compliance with agreed management and maintenance regime set out in CMP. Environment Bay of Plenty will audit to ensure compliance with CMP.
Discharge of contaminated stormwater (within the area of a CSC) authorised by existing Bay of Plenty Regional Council discharge consent.	Individual property owner.	TLA	Existing consents (presently enforced by Environment Bay of Plenty) will be enforced by TLA following transfer of responsibilities once CSC is granted.
Discharge of stormwater from commercial/industrial premises/yards, roofs, carparks, forecourts, driveways.	Individual property owner.	TLA	Discharges will be subject to compliance with industry Code of Practice/BMP as set by TLA via stormwater Bylaw or in CMP. Responsibilities to be transferred on the granting of CSC. Audit for compliance to be carried out by Bay of Plenty Regional Council.
Stormwater treatment systems and device maintenance (privately owned and operated).	Individual property owner.	TLA	
Stormwater treatment systems and device maintenance (TLA owned and operated).	TLA	TLA	Maintenance specification will be set out in the CMP.
Infrastructure maintenance e.g. stormwater drain cleaning, trash/litter removal etc.	TLA	TLA	TLA responsibility applies only to public drains and TLA operated stormwater piped systems.
Stormwater discharge authorised by existing resource consents granted by Environment Bay of Plenty	TLA	TLA	TLA responsibility applies only where discharge is to a TLA operated stormwater system. Where the discharge is from a non-TLA source to a receiving environment other than a TLA operated system then enforcement rests with Environment Bay of Plenty.

Activity	Responsibility for carrying out the Activity and Compliance	Responsibility for Enforcement	Comments
Activities in the beds of watercourses e.g. streambank protection works, channelising, constructing detention dams (covers physical works but not maintenance).	TLA	TLA	Activities in the beds of watercourses are allowable in the terms of and the extent provided for in the CSC. Any other activities in the beds of watercourses not allowed by the CSC will require resource consent from Environment Bay of Plenty.
"Bulk" earthworks (subdivision development, land contouring and other large-scale land development).	Individual property owner.	Environment Bay of Plenty	Resource consents for bulk earthworks will be required from Environment Bay of Plenty when earthworks exceed the permitted activity conditions of the Regional Land Management Plan.
Discharge of contaminated stormwater from "bulk" earthworks.	Individual property owner.	Environment Bay of Plenty	Resource consents for contaminated stormwater will be required from Environment Bay of Plenty when the earthworks exceed the permitted activity conditions of the Regional Land Management Plan. Note: Environment Bay of Plenty will process applications for earthworks and contaminated stormwater discharge as a single "project" consent.
Small-scale earthworks e.g. building site preparation.	Individual property owner.	TLA	A small-scale earthworks is defined in Section 10.5.4 of the Bay of Plenty Regional Land Management Plan.
Discharge of stormwater from small-scale earthworks.	Individual property owner.	TLA	A small-scale earthwork is defined in Section 10.5.4 of the Bay of Plenty Regional Land Management Plan.
Discharges of waste warm geothermal water to TLA reticulated stormwater system.	Individual property owner.	TLA	A small number of waste warm geothermal water discharges to piped stormwater systems in Tauranga City have been authorised by Environment Bay of Plenty consents in situations where it is impractical to discharge to re-injection. All new discharges of waste warm geothermal water are required to discharge to re-injection. Responsibility for consenting and enforcement of geothermal discharges to piped stormwater systems in Tauranga City passes to the TLA on transfer of responsibility following the granting of the CSC.

1.5 Flood Management

The responsibility for flood management in the Bay of Plenty is an issue with significant overlapping responsibilities between Environment Bay of Plenty and the district councils. In general the following applies: Environment Bay of Plenty has responsibilities for flood management for flooding hazards in the rural area and major river schemes, while the district councils are responsible for flooding issues related to runoff from urban areas.

In some situations flood management for an upstream rural catchment may need to take account of effects on a downstream urban area. These will need to be resolved on a case-by-case basis between Environment Bay of Plenty and the TA.

1.6 Environment Bay of Plenty Discharge Standard

Environment Bay of Plenty has carried over the previous discharge standard condition into the permitted activity criteria in the PRWLP. This is reiterated in the Regional Coastal Environment Plan (RCEP). It is detailed in Appendix B. This discharge standard requires the concentration of suspended solids within the water discharged to be less than 150 g/m^3. The standard is aimed at minor stormwater discharges from urbanised areas. To meet such a discharge standard, it is accepted that some form of management or treatment measure is required. Table 1.2 outlines typical suspended solids concentrations within stormwater runoff for specific land uses in the Tauranga area (from Environment Bay of Plenty Environmental Report 2001/06 March 2001)

Table 1.2 Suspended Solids Concentrations in Stormwater in the Tauranga area

Land Use	Suspended Solids (g/m^3)	
	Low flow	High Flow
Residential	5–64	52–92
Commercial	2–69	4–179
Industrial	4–56	154–600

A study by NIWA for Rotorua District Council shows similar results for residential areas, but lower results for commercial and industrial. Overall, results for both Tauranga and Rotorua fall into the low to average categories described by Williamson in the "Urban Runoff Data Book", a source book of stormwater quality information drawn from throughout the world, including New Zealand.

Table 1.3 sets out ranges of contaminant loadings from stormwater runoff for various land uses from the Auckland Regional Council TP10 Design Manual[2].

[2] Ref. Auckland Regional Council, *Stormwater management devices: Design Guidelines Manual,* ARC TP10, Second Edition, May 2003

Table 1.3 Typical Range of Contaminant Loads from Stormwater Runoff for Specific Land Uses

Contaminant Loading Ranges for Various Land Uses Figures are in kg/ha/yr except for FC (no./ha/yr)								
Land Use	**TSS**	**TP**	**TN**	**Pb (median)**	**Zn**	**Cu**	**FC**	**COD**
Road	281-723	.59-1.5	1.3-3.5	.49-1.1	.18-.45	.03-.09	1.8E+08	112-289
Commercial	242-1369	.69-.91	1.6-8.8	1.6-4.7	1.7-4.9	1.1-3.2	5.6E+09	306-1728
Residential (low)	60-340	.46-.64	3.3-4.7	.03-.09	.07-.20	.09-.27	9.3E+09	NA
Residential (high)	97-547	.54-.76	4.0-5.6	.05-.15	.11-.33	.15-.45	1.5E+10	NA
Terraced	133-755	.59-.81	4.7-6.6	.35-1.05	.17-.51	.17-.34	2.1E+10	100-566
Bush	26-146	.10-.13	1.1-2.8	.01-.03	.01-.03	.02-.03	4.0E+09	NA
Grass	80-588	.01-.25	1.2-7.1	.03-.10	.02-.17	.02-.04	1.6E+10	NA

There is only very limited data in this form for the Bay of Plenty Region. That which is available (from studies in the Rotorua area) suggests that concentrations of most contaminants and contaminant loads are generally at the lower end of the ranges reported in Table 1.3

The need for and level of treatment and/ or management depends on the effects of the discharges on the receiving environment. These effects are often associated with land uses present within each catchment. Non-structural methods of achieving the discharge standard include education, planning and regulatory initiatives and source controls. Appropriately designed structural or engineered treatment measures based on best practice (such as wetlands, detention ponds and filtration systems for example) will meet this discharge standard requirement. They may be required where land use characteristics, such as concentrated industrial areas mean that this standard will not be met. The methods available to manage stormwater are outlined generally in Section 5, and specific examples of objectives and policies that could be adopted are contained in Appendix C.

1.6.1 Other Contaminants

Stormwater contaminant discharge is not simply related to the volume of suspended solids being discharged. While roads and industrial areas have typically lower TSS concentrations than residential and other land uses, the associated contaminants are much more of a concern. Therefore, one of the main reasons for taking sediment out is to also capture attached contaminants (metals etc). The only way to address this is to have a BMP approach, and/or to have targeted standards (i.e. based on the receiving environment/water classification and on the land use) and recognising the wider range of issues than just sediment.

Imposing a blanket discharge standard across the region may not achieve sustainable management of the regions natural and physical resources, unless a more targeted standard can be applied on a site or catchment basis. However, this standard only applies to permitted activities. Consented activities require an assessment of potential runoff issues, having consideration for receiving environment conditions and identifying measures to address any contamination, flooding or erosion concerns.

1.7 Bay of Plenty Land Use/Urbanisation Trends

1.7.1 Growth in the Bay of Plenty

The Bay of Plenty region is facing increasing long-term growth pressure. This is particularly evident in the Western Bay of Plenty in areas such as Papamoa and Pyes Pa, however it can also be seen in many smaller settlements along the coast such as Te Kaha. This pressure is expected to increase as demand for coastal property increases. Similarly, there is an increased demand in other parts of the region for rural-residential lifestyle development, particularly around the Rotorua lakes as people seek to escape higher density living in the cities and towns for larger lot sizes in rural areas.

Both types of development have the potential to affect stormwater management and receiving environment quality. The SmartGrowth Strategy, various structure plans and district-wide growth reviews are an attempt to quantify the growth pressures so adverse effects on environment can be minimised. Similarly, the mitigation works being developed for the Rotorua lakes is a means of addressing previous ad hoc development in the Rotorua lakes catchment. These measures are discussed further below.

1.7.2 SmartGrowth

The Smart Growth 50-year Strategy and Implementation Plan was published in May 2004 and is a growth strategy for the Western Bay of Plenty sub-region. The Smart Growth Strategy is a joint initiative between Environment Bay of Plenty, Western Bay of Plenty District Council (WBOPDC), Tauranga City Council (TCC) and tangata whenua.

The SmartGrowth Strategy identifies a number of methods that can be used to achieve its vision and outcomes. One such method is the implementation of a sub-regional stormwater strategy, including education, which anticipates future growth needs.

SmartGrowth provides six principles to govern stormwater management in the Western Bay of Plenty sub-region. These principles are:

(i) Stormwater is viewed as a resource

(ii) Stormwater is treated to protect the environment

(iii) Forward planning and implementation of a stormwater system with sufficient capacity to support intensified urban development

(iv) Pollution of the Tauranga Harbour is actively avoided

(v) Flood protection meets or exceeds legislative requirements

(vi) Water quality in the coastal marine area is maintained and enhanced.

SmartGrowth recognises that increased intensification may cause accelerated stormwater run-off, so infrastructural requirements for growth need to be planned for. SmartGrowth proposes careful management and assessment of effects of intensification on stormwater runoff through long-term implementation plans. Structure Plans establish a long-term vision and implementation plan for the development of new urban areas (or the intensification of existing urban areas), including defining how to manage stormwater over the longer term.

The SmartGrowth Strategy drives towards managing growth and development in a way that ensures that adverse environmental effects are minimised. The use of CSCs that embody the six principles is an effective way to manage the effects of stormwater.

1.8 Rotorua Lakes Initiatives

The Bay of Plenty region's lakes are popular for many recreational activities. In the Rotorua area they are renowned as natural assets. For many decades they have been under increasing pressure from human activities like residential settlement and farming. This pressure has taken its toll in recent years with deteriorating water quality in some of the lakes. Environment Bay of Plenty and the Rotorua District Council are working with the Te Arawa Maori Trust Board and the community to improve water quality in key lakes. This joint project is called the Rotorua Lakes Protection and Restoration Action Programme.

A major focus of the programme is the development of Action Plans for all of the lakes. Action Plans focus on ways to reduce nutrients in the lakes, as it is nutrients that are degrading quality. Some actions tackle nutrients already in the water while others focus on cutting back the amount of nitrogen and phosphorus washed overland or leaching through groundwater systems. The lakes programme takes a catchment-wide approach to the problem of degraded lake water quality, addressing it through a collaborative approach with the community. It is anticipated that the total programme of works will cost $170 million, to be funded jointly by the region, the Rotorua district and the government.

1.9 Receiving Environment Characteristics

The significant urban areas in the Bay of Plenty are generally adjacent to both freshwater (including lakes and rivers) and marine environments (including harbours, estuaries and the open coast).

Marine receiving environments, including depositional areas such as upper harbour or estuarine areas, are highly valued because they are dynamic and biologically productive with complex food webs. These areas also tend to be important at some stage in the lifecycle of many commercially important fish species. These areas have natural character and amenity values and it is considered that they directly contribute to an adjacent community's well being. They may form areas where food is gathered and may also have associated cultural values. Coastal areas attract tourism to the region and have associated economic values as well.

Lakes are also depositional areas with ecological values that may be impacted by the deposition of fine sediments and associated contaminants, including nutrients, from urban stormwater. They are also recognised as having high cultural, amenity and other community values that relate directly to the condition of lakes in the Bay of Plenty region, and in particular within the Rotorua area.

Persistent stormwater contaminants, such as heavy metals and organochlorines, accumulate in depositional areas, adversely impacting on the aquatic flora and fauna that live there.

Levels of the majority of contaminants in urban stormwater are elevated above background levels discharged from rural environments. State of the Environment monitoring by Environment Bay of Plenty shows this occurs in urban runoff in the Bay of Plenty. Generally, the levels of contaminants in urban stormwater runoff are typical or towards the lower end of the range for particular land uses (refer to Table

1.3). Even in a community such as Whakatane the commercial and industrial sector may have considerable effect on contaminant levels in the environment.

Coastal and freshwater bodies have water quality classifications as provided for within the RCEP and PRWLP. These classifications maintain or improve water quality and values through standards which discharges have to meet.

1.9.1 Comprehensive Management Plans and Consents

Environment Bay of Plenty is consenting the stormwater discharges from the region's urban areas. This is being done with Comprehensive Stormwater Consents (CSC s), sought by the TAs of the region. These consents authorise most stormwater related activities including stormwater outlets and associated structures and their discharge of urban stormwater to open water within the local councils' boundaries.

It is recommended that all development requirements or retrofitting works are identified up front and are applied for with the CSC application. This will allow comprehensive consenting to take place and the TAs to operate with autonomy within their respective districts, subject to consent requirements such as management plan approval.

Environment Bay of Plenty supports the development of individual Catchment Management Plans (CMPs) that identify issues within particular catchments so that they may be targeted in a prioritised fashion.

A catchment is defined as being the physical area upstream of a certain discharge point where runoff and stream flows discharge. In terms of a CSC, it may be appropriate to group together a number of catchments that discharge to the same overall receiving environment (for example Lake Rotorua or certain areas of Tauranga Harbour) and therefore have consistent management objectives for the receiving environment.

1.9.2 Catchment Management Plans

CMPs are the fundamental stormwater planning and management mechanism at the individual catchment level. CMPs are the link between strategic level policies as contained in this and TA stormwater strategies, and the implementation of management techniques and control measures. These management plans should form the basis of resource consent applications for the discharge of stormwater. They are a principal means by which remedial and improvement projects are identified and management policies set for the individual catchment or constituent parts thereof. It is Environment Bay of Plenty's policy to require the development of CMPs by TAs and to provide support (by way of guidance in this strategy and appendicies) to facilitate the production of these CMPs. To this end detailed guidelines have been produced (Appendix A).

The preparation of a CMP requires a detailed investigation of stormwater quality and quantity issues in a catchment, and an assessment of the environmental values of the catchment and its receiving environments. Existing and future land uses within the catchment need to be identified, as well as existing and potential stormwater quality and flooding problems. A catchment-wide and integrated approach enables the most appropriate and cost-effective solutions to be identified and implemented, under both the existing and future catchment land use scenarios.

Environment Bay of Plenty has set a catchment priority list. The Council aims to require implementation of consent applications and requirements in accordance with this prioritisation process. Those catchments identified as having higher values in the receiving environments and / or risk components within the catchment land uses will be targeted first.

1.9.3 Comprehensive Stormwater Consents

Environment Bay of Plenty supports the region's TAs obtaining Comprehensive Stormwater Consents for stormwater discharge from existing urban areas as well as areas identified for future development. A comprehensive discharge consent shifts control of these discharges from the Regional Council to the TA. The Comprehensive Stormwater Consent guidelines promote and implement the concept of integrated assessment and management of stormwater discharges. Wastewater discharges to the stormwater system, should also be included in this process. There are very few instances of such discharges across the region. For contaminated sites and high-risk industrial sites responsibilities will be considered and addressed through the comprehensive process and some sites may still require site specific stormwater consents.

A Comprehensive Stormwater Consent application process will assess stormwater discharges within a catchment and develop a framework for managing discharges such that identified catchment objectives can be met. The comprehensive consents will operate under performance standard related conditions. Developing these conditions requires environmental monitoring triggers to be included as conditions on CSCs. These triggers will need to have regard to the policy and provisions in this SS as well as those in the Proposed Regional Water and Land Plan and the Regional Coastal Environment Plan. The consent conditions will set a trigger level (examples include: sediment quality adjacent to the outfall; flooding levels; receiving water quality/clarity; etc), which will be monitored periodically and if exceeded may require action by the TA as consent holder or may trigger a Section 128 review of consent conditions.

Activities that fall below Environment Bay of Plenty permitted activity rules on a site specific basis (e.g. earthworks activities or small stormwater discharges) will need to be considered and managed by TAs on a site level as part of the CSC process.

1.10 Industry Codes of Practice

Some industry sectors have developed their own codes of practice that detail management procedures about the way general activities/operations are undertaken on their sites. This is identified as an effective source control option, and a way that the regulatory authorities can work beside industry to develop codes of practice, guidelines and environmental management plans. Industry groups should be targeted by TAs with assistance from Environment Bay of Plenty in priority order for the production of these types of guidelines, and this is noted in the Action Plan contained in Section 7.

1.11 Overlapping Issues

Other matters that are related to stormwater management require consideration in the development of a strategy in an integrated manner.

The management of surface water in the Bay of Plenty region has historically related to large drainage schemes incorporating networks of stop-banks and canals. Both the regional and district councils have responsibilities as noted in section 1.4 regarding discharges to and management of these systems.

Land use change as allowed for by resource consents obtained in accordance with District Plan requirements may have a significant effect on stormwater management matters. These include hydrology, flood risks and the generation and discharge of contaminants due to the creation of new land surfaces. Catchment and stream hydrology will be altered because of change of drainage patterns. This is likely to cause stream erosion and the creation of flood risks. Overlaps and inconsistencies occur where District and Regional policies and regulatory frameworks are not consistent. According to the Resource Management Act (section 75 (2)(c)) a District Plan shall not be inconsistent with the regional policy statement or any regional plan of its region in regard to any matter of regional significance for which the Regional Council has primary responsibility.

Chapter 2: Stormwater Strategy Vision

A vision, goals, objectives and recommended policies have been developed within this Stormwater Strategy to provide a framework for stormwater management issues to be addressed in an integrated, comprehensive and consistent manner throughout the Bay of Plenty region.

2.1 Environment Bay of Plenty Mission Statement and Community Outcome Statements

As outlined in the Environment Bay of Plenty Long Term Council Community Plan (LTCCP), the mission statement for Environment Bay of Plenty is as follows:

"Working with our communities for a better environment"

This includes:

(a) The effective and efficient management of the region's land, air, water, coastline and territorial sea, and

(b) The enhancement and conservation of the biodiversity and the physical, social and economic characteristics of the region that make it a desirable place to live in, produce in, and visit.

Environment Bay of Plenty's LTCCP, adopted 17 June 2004 sets out the community outcome statements for the Bay of Plenty community. These cover a wide range of topics, key amongst them in relation to the management of stormwater are the following:

Land

- Healthy and productive soils
- Appropriate land use

Water

- Plentiful water
- Healthy lake, river, ground and coastal waters
- Efficient water use

Hazards and Safety

- Protected and prepared communities
- Accident-free lakes, rivers and coastal waters.

2.1.1 Iwi Perspective

Environment Bay of Plenty recognises the statutory and common law role iwi plays in the management of natural and physical resources of the region, including the resources that maybe affected by poorly managed stormwater discharges.

Water provides Maori with food and spiritual resources that are directly impacted on when subjected to various degrees of pollution. Any degradation to water quality caused by stormwater discharges impacts on the mauri of water bodies and adversely affects Maori resources including taiapure, kaimoana and waahi tapu. An overall improvement in degraded water quality and maintenance of natural state water bodies is desired.

2.2 Stormwater Strategy Vision Statement

The vision for the SS is that in 10 years time, subsequent to the implementation of this strategy, the following will be achieved:

- People and communities in the Bay of Plenty region will experience fewer flooding problems.
- Contamination of the regions waterways, including their sediments, will be reduced.
- The properties and qualities of the waterways of the Bay of Plenty region will be protected and enhanced, ensuring that life can be supported, both within the waters and along the banks.
- The interests of tangata whenua will be preserved and the mauri of water will be maintained.

2.3 Overriding Stormwater Strategy Objectives

The vision statement establishes a focus for the development of the overall environmental goals or objectives and establishes a focus for the development of the stormwater strategy for the Bay of Plenty region.

The principal objective therefore for Environment Bay of Plenty and the TAs of the region, is to manage the effects of the region's stormwater runoff in an integrated manner, with regard to:

- Minimising hydrologic modification;
- Minimising contamination and the risk of contamination;
- Maintaining good water quality, enhancing degraded water quality and where unavoidable, minimising impacts;
- Mitigating the effects of flooding;
- Protecting health and safety of its people and safety of land and property;
- Maintaining healthy ecosystems and enhancing degraded ecosystems;
- Having regard to cultural values, *including protecting and enhancing the mauri of fresh and marine waters*

These goals acknowledge that the Bay of Plenty environment is complex, including people and social aspects, natural and physical resources, amenity values and cultural values.

2.4 Key Stakeholders

The key stakeholders identified for participation and input to the Stormwater Strategy include:

- Environment Bay of Plenty
- Bay of Plenty Territorial Authorities (Tauranga, Western Bay of Plenty, Rotorua, Whakatane, Kawerau, Opotiki, Taupo (part))
- Iwi groups
- Infrastructure and service providers
- Transit New Zealand
- Industry groups
- Government Departments (DOC, MfE)
- Interest and conservation groups
- Fish and Game
- Residents and Ratepayers groups

Chapter 3: Issues

3.1 Background

Changes in land use, generally from rural or forested land to the creation of an urban environment, cause a number of identified water-related problems. There are the initial temporary issues associated with the land transformation process whereby soil is exposed and sediment generation and discharge is accelerated. Following this, there are permanent issues that arise from the altered characters of ongoing stormwater discharges that differ in quantity and quality from those that occurred prior to development taking place.

3.2 Stormwater Issues

The following summarises issues that may need to be addressed in a TA strategy and action plan to ensure protection of public health and well being occurs, as well as protection and maintenance of aquatic or natural resources and protection of property. The issues noted are based on those issues contained within the Proposed Regional Water and Land Plan. In some instances the issues contained in the Proposed Plan have been broken down further into more than one issue. Other localised issues may also be identified by each local authority and aligned with their respective strategic guiding principles, such as particular stretches of coast, river or lake margins that are identified as having certain qualities that require protection.

3.2.1 Understanding the stormwater issue

Having a comprehensive appreciation for the often subtle issues that are associated with the contamination and discharge of stormwater to receiving environments is a key matter for those involved in the stormwater sector to be conscious of. These include local and regional government decision-makers, industry representatives, iwi and other stakeholders who have an interest in the management of stormwater. To develop this understanding, including comprehension of the localised or regionalised effects of stormwater in the Bay of Plenty, ongoing review of research and developments in the stormwater management field needs to occur, as well as implementing targeted monitoring programmes. In conjunction with gathering this information, programmes need to be developed to raise the awareness of the public and industry through targeted education programmes and initiatives.

3.2.2 Integrated and comprehensive management

Insufficient co-ordination between those authorities that have legislative powers, functions and duties associated with the management of stormwater may result in a variety of issues arising including effects on amenity values, aquatic habitats and stream hydrology.

The management of urban stormwater infrastructure by district councils is carried out primarily to avoid the flooding and subsequent damage of property including residences and other buildings. Full documentation of the stormwater systems and where stormwater is discharged to may be lacking. Without suitable information, inadequate pipe sizing and hazard mitigation structures in downstream areas may result.

Considering such matters as receiving environment quality may not occur during the land use consent process unless a comprehensive planning process where all issues and matters are considered takes place such as a Structure Planning process. Structure planning reduces the risk of fragmented and ad-hoc land use decisions occurring in the same catchment.

3.2.3 Loss of habitat quantity and quality

Loss of vegetation, both within the catchment in general and riparian vegetation, in particular, reduces the area of habitat and has resultant effects for instream habitat, increased stream erosion and stream profile changes, increased rain drop erosion, increase in overland flow and more flashy responses of the catchment to rainfall events.

Habitat may be lost by piping or filling of streams and wetlands, or reducing stream connectivity, leading to upper watercourse reaches that may no longer be accessible for utilisation as habitat. Increases in impervious cover through land use change can alter catchment hydrology and limit groundwater recharge. This may limit base flows in streams causing upper reaches of watercourses to become ephemeral with subsequent loss of habitat.

Stormwater outfalls into streams, lakes or marine areas can disrupt ecological assemblages in the vicinity of these points of discharge, due to the reduction in water quality, accumulation of contaminants and incidences of peak flows.

3.2.4 Point source contamination of water

This may derive from earthwork sites, wastewater overflows, landfill or sewage leachate, contaminated sites, commercial or industrial processes, quarry activities and stream bank erosion. There are a number of transport paths including direct discharge to stormwater systems and watercourses, spills and groundwater movement that can lead to contamination of stormwater and ultimately the receiving environments.

3.2.5 Non-point source contamination of water

Diffuse contamination may derive from vehicle use and emissions, wastewater leaching from septic tanks in groundwater, agricultural runoff as well as general zones of land use. For example, the potential environmental impact from industrial zones far exceeds that of residential areas. Where toxic substances exist, small amounts can have significant adverse effects in receiving waters. In general urban road transport networks are usually the largest source of stormwater contaminants, including heavy metals and hydrocarbons.

Agricultural and horticultural runoff may also be a significant cause of water quality degradation in a catchment due to runoff of pesticides, fertiliser and poorly treated waste discharges. These discharges are not specifically addressed in this SS.

Increasing the temperature of stormwater may have significant effects on aquatic values within receiving environments. Impervious areas such as roof, road and other paved surfaces absorb heat and increase the temperature of runoff to watercourses. Stormwater treatment measures such as constructed ponds and wetlands may also cause an increase in temperature of runoff entering receiving waters.

3.2.6 Flooding

This is exacerbated by the compaction of soils during the construction process, the creation of impervious surfaces and loss of vegetation at stream margins and within catchments. Flooding may pose a risk to human life as well as buildings and properties and create a public health risk. The effects and risks can increase over time in existing urban areas as a result of land use intensification. The costs of clean up and repair of both private and public assets can be significant.

3.2.7 Accelerated erosion, including channel erosion and land instability

Earthworks remove the protective vegetative cover and cause significant volumes of sediment to be eroded and discharged during this phase of development. In addition, channel erosion in a developing or developed catchment may be the single largest source of sediment delivered downstream and may threaten existing development with potential slips into streams. The stability of land may be affected when drainage paths are altered and saturation of soils may cause instability. This has the potential to threaten human safety and property.

3.2.8 Land development / Urban growth

Having a suitable level of consideration of stormwater management during the land development process may not always occur. This may lead to inappropriate consents being approved that allow significant impervious area to be created or buildings to be erected in flood-prone areas for example. Comprehensive planning and assessment processes such as Structure Planning are mechanisms to address such issues and inconsistency and cross-jurisdictional problems between the regional and district councils.

3.2.9 Altering the natural water balance

Urban development may have considerable effects on hydrological processes and therefore the natural water cycle. These include: greater runoff volumes; artificial channels increase the velocity of flood flows, increasing peaks; higher flows affect receiving environment quality including the dilution of saline zones and change in habitat structure; and reduction in infiltration.

3.2.10 Existing stormwater infrastructure

In some instances there is a lack of comprehensive information that describes the stormwater infrastructure within a given area or catchment. For example, some older urban areas have stormwater networks that may be under capacity and/or in poor condition. Some urban catchments have limited stormwater reticulation, while others are completely piped.

3.2.11 Iwi perspective and involvement

Iwi have identified the management of stormwater as a key concern regarding the overall effect on the quality of waterbodies and the associated spiritual values and subsequent effect on other matters of concern. Iwi seek a more holistic approach to stormwater management in general.

3.2.12 Community use

In addition to Iwi concerns, there are wider community issues to consider. Contamination of stormwater with pathogens or toxins has occurred in some areas, diminishing the receiving waters capacity for contact recreation and food gathering activities. In addition to this, amenity values may be impacted where passive recreation takes place in close proximity to degraded waterways.

3.2.13 Low Impact design and stormwater reuse

The impact of increased impervious areas and higher rates of runoff can be offset to some degree by either the use of LID techniques and/or by storage of stormwater and its reuse. LID seeks to mimic natural stormwater runoff characteristics, reducing the off-site effects of development. Stormwater has been and is still used for domestic water supply when public water is not available. In addition there is currently a drive to utilise roof water for non-potable domestic and irrigation use as well as for use in industrial processes. Both approaches have potential benefits, but also have issues that need to be addressed for them to be implemented on a widespread basis. These include effects of ground disposal of stormwater on land stability, and protection of the quality of potable water.

3.2.14 Public sector awareness of stormwater issues

In addition to Issue 1, public awareness of environmental issues and specific understanding of how their activities impact directly or indirectly on stormwater quantity and quality is identified as an effective means of altering behaviour patterns that may lead to better environmental outcomes. Other stakeholders, including decision-makers and industry representatives, also benefit from access to quality information on which to base management decisions. The development of cleaner production practices and technologies for spill prevention and site management plans is identified as a means of raising awareness of the issue.

Chapter 4: Objectives and Policies

4.1 Introduction

Having regard to the overriding guiding principles and visions contained in Section 2, this section considers the 14 issues raised in Section 3 and details general management objectives for each issue where necessary. Potential policies are also considered, however, more examples of more detailed policies that could be adopted are provided in the Appendix C. It is noted that the issues raised have differing levels of consideration required by Environment Bay of Plenty and the District Councils. The level at which the significant responsibility lies is noted where appropriate.

It is considered that the recommended objectives and general policies should be considered for forming the basis for future stormwater management planning by individual TAs with reference to the recommendations and timeframes contained in Section 7.

The policies are aimed at enabling current best practice to be incorporated into the stormwater management direction taken by each local council. It is stressed that, since they are strategic objectives and policies, it is expected that each TA will develop them further as necessary to conform to their own particular requirements and expectations and local conditions. It is also noted that other issues, problems and constraints may affect the ability of TAs to fully meet these recommended policies.

It is noted that both Waitakere and North Shore City Councils have produced stormwater management strategies and action plans that may be useful for reference by the TAs when developing their own strategies and action plans.

The following sets out recommended general matters to consider as a guide for stormwater related planning:

- Consider stormwater management as part of total water resource management.
- Develop an integrated drainage catchment approach to urban stormwater management.
- Plan for stormwater issues (flood control, drainage, water quality) early in the land use change planning process.
- Implement a range of options and methods within catchments to bring about a progressive improvement in stormwater quality.
- Focus on efforts that get high benefits for appropriate investment levels.

- Stormwater is a resource. It should be considered as such and wherever possible, identify options for its reuse.

- Avoid contamination and treat stormwater at source. Do not rely on receiving waters for treatment.

- Manage overall hydrology and all aspects of the water cycle where possible, not just peaks.

- Actively encourage the retention and restoration of natural open watercourses in preference to piping of stormwater or existing watercourses and have regard to natural ecosystems.

- Ensure that there are sufficient measures in place, including infrastructure where appropriate, to adequately manage the effects of stormwater when issuing land use or subdivision consents.

4.2 Recommended Indicative Objectives and Policies

The 14 issues presented in Section 3 have been developed into corresponding objectives and a further objective added relating to the monitoring the implementation of a stormwater strategy and associated action plan[3].

Objective 1 Develop a better understanding of the urban stormwater problem, specifically with regard to the effects of stormwater on the community and receiving environments.

Policies

- Review general and more specific stormwater management information including flooding and stormwater contaminant levels.
- Develop targeted education packages, including presentations to politicians and senior management.
- Identify and utilise appropriate databases including GIS, ensure validity of information and update as necessary. Allow access to database as required.

Objective 2: Provide for the integrated and comprehensive management of stormwater.

Policies

- Maintain a total environmental perspective.
- Ensure involvement of all internal and external stakeholders to achieve a multi-disciplinary approach.
- Ensure that regional and territorial authority design codes and guidelines support the use of LID practices and provide examples of best practice that Council will accept.

[3] Please note that further detailed information for TA stormwater management objectives and policy development, the policies and implementation methods contained in Waitakere City Councils Stormwater Strategy and Action Plan is contained in Appendix C for consideration and reference.

- Prepare comprehensive stormwater catchment management plans for all catchments within the District and obtain comprehensive discharge consents.
- Understand the wider implications of each consent or project.

Objective 3: Restrict the loss of habitat quantity and the degradation of habitat quality.

Policies

- Retain and enhance riparian margins along existing natural streams.
- Avoid piping, channelling or otherwise modifying stream channels, including first order streams.
- Maintain sufficient water flows in streams to support aquatic life.
- Regulate water flows to estuarine areas to manage the change in salinity.
- Avoid constructing stormwater quality improvement devices 'on line' within perennial watercourses, and where there is on-line flood attenuation, ensure fish passage is provided and loss of watercourse is minimised.

Objective 4: Reduce the amount of contaminants entering stormwater from point source discharges.

Policies

- Maximise the use of appropriate stormwater quality control measures at source.
- Encourage good housekeeping systems on commercial and industrial sites.
- Encourage the development of industry specific Codes of Practice, which include environmental management procedures for stormwater at source.
- Minimise site disturbance during earthworks for new developments.
- Encourage the use of LID techniques to remove contaminants through natural processes.
- Install stormwater treatment devices for all new developments.
- Identify the options for employing the use of wetlands (including constructed wetlands) and other retention systems along stormwater drains.
- Have an enforcement programme to discourage potential polluters.

Objective 5: Reduce the amount of contaminants entering stormwater from non-point source discharges.

Policies

- Create and protect riparian buffers between stormwater sources and watercourses.
- Retrofit stormwater treatment devices in existing drainage systems.
- Identify the options for employing the use of wetlands (including constructed wetlands) and other retention systems along stormwater drains.

Objective 6: Reduce the amount of stormwater runoff generated and control the peak volumes of stormwater at source.

Policies

- Minimise the impact of new development on existing, natural runoff patterns.
- Minimise the compaction of soils during mass earthworks.
- Identify groundwater recharge areas and minimise the effects of development on these areas.
- Minimise the amount of impervious cover.
- Identify options for reducing existing impervious cover.
- Seek opportunities and encouraging the reuse of stormwater comes up later.
- Encourage works, development and practices that increase infiltration of rainfall and surface water where this does not compromise land stability.
- Increase the use of LID and retention based stormwater systems.

Objective 7: Reduce the amount of accelerated erosion, including channel erosion and land instability.

Policies

- Reduce hydrological effects of development on more frequent storm peaks.
- Promote the use of soft engineering or bioengineering solutions to address instream erosion.
- Reduce the effects of land instability on people and property.

Objective 8: Plan and provide stormwater infrastructure ahead of development to allow for future land development.

Policies

- Subdivision and development of greenfield sites should be designed and managed so as to emphasise the protection and enhancement of streams, lakes, watercourses, wetlands and the coast and the enhancement or restoration of riparian vegetation.
- Structure planning processes should be undertaken and include full consideration of matters relating to stormwater issues.
- Promote designs and stormwater management techniques (e.g. LID) that minimise the need for stormwater infrastructure, especially reticulated systems with direct discharges to streams.

Objective 9: Minimise the effect on the natural water balance when planning and providing for future development.

Policies

- Encourage development styles and stormwater management methods that mimic natural runoff patterns.
- Promote the use of stormwater methods that minimise, retain and treat direct stormwater runoff.
- Ensure that appropriate techniques are supported by design codes to provide for best management practice application.

Objective 10: Optimise the effectiveness of existing stormwater infrastructure.

Policies

- Develop and implement stormwater management action plans.
- Instigate programmes to reduce and eliminate sewer overflows.
- Monitor the effectiveness of existing stormwater treatment practices.
- Identify where stormwater systems and treatment devices are not performing.
- Identify infrastructure in poor condition.
- Identify retrofit opportunities to upgrade existing stormwater systems that have been identified as discharging to priority catchments.

Objective 11: Encourage and have regard to iwi participation in the management of resources affected by the discharge of stormwater.

Policies

- Have regard to Iwi management plans and other statutory iwi documents when developing TA stormwater strategies and action plans.

- Allow for appropriate and meaningful consultation in the development of stormwater strategies and action plans.
- Ensure relevant water quality standards in regional plans are met for areas of cultural harvesting of food.

Objective 12: Protect and enhance values of receiving environments for the benefit of the community.

Policies

- Identify high value receiving environments.
- Retain and enhance the amenity and visual character of watercourses.
- Consider appropriate water quality in areas where recreation and food gathering takes place.

Objective 13: Encourage the reuse of stormwater.

Policies

- Identify with appropriate industry groups the possible opportunities for reuse of stormwater runoff.
- Develop guidelines on domestic reuse and associated costs.
- Undertake and publicise a cost-benefit analysis on the reuse of stormwater.

Objective 14: Undertake education activities to raise the awareness of stormwater management issues with the general public and industry interests.

Policies

- Improve the understanding of the effects of stormwater derived sediments and contaminants on the ecological and amenity values of the receiving environment.
- Carry out industry specific education programmes, outlining the impact of the specific contaminants on the environment.
- Improve the understanding of costs associated with managing flooding and contamination issues, as well as the loss of property due to stream erosion as urbanisation increases.

Objective 15: Monitor the effectiveness of the implementation of the Stormwater Strategy and Action Plan.

Policies

- Undertake monitoring to allow refinements in the application of the strategy principles and action plan requirements.
- Undertake monitoring to demonstrate the result of investment in stormwater management infrastructure and management techniques.
- Continue research to better understand the condition of the environment.

- Undertake monitoring of the condition of the environment and the effectiveness of management methods.

Chapter 5: Options, Methods and Monitoring

5.1 Introduction

There are a range of approaches, methods, tools and techniques that can be used to implement the region's goals and objectives for stormwater management. It is accepted that comprehensive stormwater management requires the implementation of a range of options depending on the circumstances being addressed.

This section attempts to identify and summarise the range of stormwater management techniques available to minimise the effects of stormwater flows and contaminants on receiving systems.

The techniques are set out broadly in five key categories. However, these will need to be defined in more detail by the TAs as they see fit to meet their own objectives regarding the management of stormwater within their boundaries given the urban characteristics and resource constraints. Monitoring requirements and techniques are also broadly described.

It is noted that examples of more specific implementation methods and monitoring initiatives that could be adopted are contained in Appendix C.

5.2 Education

5.2.1 Why Educate?

Education is a fundamental component of any strategy that aims to change people's behaviour, in this case to reduce pollution of stormwater runoff that flows to our harbours and rivers. If people are made aware of a problem and how to avoid it or fix it, they are more likely to undertake preventative action. Education should be identified as a complementary process to be incorporated with any other stormwater management options identified (i.e. regulation and enforcement etc.).

Given the issue in question, it is considered particularly important for environmental education to be provided in schools in order to teach children about our environment and how to care for it. Children are then encouraged to take what they have learnt home and educate their parents, thus encouraging behaviour change in another generation. Stormwater is part of the wider water cycle and stormwater pollution is often incorporated into teaching resources on healthy water.

However, education is not just about teaching children. Stormwater education is particularly relevant for the wider community as every person has an effect on what ends up in our waterways. A successful stormwater strategy will need to target education measures at children, industries, retail and commercial businesses, and the wider community. Raising awareness through education processes should be targeted at different groups and at different levels as necessary. The scale of

implementation of education initiatives range from the regional level, to the district, catchment and ultimately at the site level.

An objective of SmartGrowth is to educate and inform the community about good land management practices in order to improve natural waterways and ultimately harbour health. While SmartGrowth focuses on the western Bay of Plenty, a coordinated educational approach across the region would go some way to achieving healthy waterways throughout the entire region.

5.2.2 Education Options

Education activities may relate to all those issues identified in Section 3, broadly encompassed as: flooding, stormwater quality, erosion and aquatic habitat improvement. Examples of such educational initiatives include:

- Develop a stormwater education strategy
- Industry and commercial education campaigns
- Development of an education centre with working examples
- Harbour/coast/stream/land care groups
- School information packs
- Public and industry focussed workshops
- Development and supply of information brochures
- Public advertising
- Regular public and industry newsletters, etc

5.2.3 Current Approaches

Environment Bay of Plenty is currently undertaking components of stormwater education in the following ways:

- Cleaner Production Programme – this is run in partnership with territorial authorities to improve businesses environmental performance. The programme reinforces stormwater priorities within the broader programme.
- Regional Guardian newspaper – can include tips on preventing stormwater pollution in the children's section.
- School educational resources – these have been developed for teachers, including Wai Ora (Healthy Water) and Rotorua Lakes. These both indirectly incorporate stormwater elements.
- National Water Education Programme – a regional council led initiative with MfE as a partner. This programme has a component on stormwater.
- Hazmobile - once a year the Hazmobile is available as a depot for the disposal of hazardous chemicals.
- Pollution Busters – a magazine-style newsletter that is distributed to over 3,000 children. One of the recent themes has been stormwater pollution.

- Promotion of Enviroschools programme at a regional level.

- At a wider environmental education level, Environment Bay of Plenty is undertaking a review of its current community education initiatives in order to identify any gaps.

Suggested actions that Environment Bay of Plenty could take to enhance stormwater environmental education provision include the following:

- Assist TAs to undertake a practical trial or 'model' stormwater pollution education exercise with industrial and commercial operators in an urban environment (e.g. Maleme Street, Tauranga).

- Develop a specific stormwater teaching resource that complements the Wai Ora teaching resource currently available through Environment Bay of Plenty.

- Develop an educational 'tool kit' for promotion to TAs to raise community awareness of issues and simple measures to make contributing benefits.

- Encourage the establishment of environment information displays at specific locations (e.g. waste treatment plants/ transfer stations/libraries).

- Particularly for the smaller councils, it may be necessary for the message to be wider than just stormwater pollution. It could be beneficial to look at wider attitudes to waste and develop educational initiatives around this.

In terms of TA stormwater education provision, the following table provides a summary of the details each council provided on the extent of formal education provision they are undertaking.

Table 5.1 Current Stormwater Education Provision by District

Territorial Authority	Stormwater Education Provision
Tauranga City Council	• Publication of promotional material, e.g. pamphlets on washing earthmoving equipment • Primary school level educational material on stormwater • Intermediate school level educational material on stormwater • Dolphins on drains initiative to remind people that the drains flush to the ocean
Rotorua District Council	• Public awareness as part of Rotorua Lakes restoration work • Fish on drains "I only drain rain" • Promotional material on pollution prevention and trade waste bylaw • Cleaner Production Programme, targeted hotels/motels, timber processors, engineering workshops successfully • Monthly newspaper adverts regarding stormwater pollution • Radio adverts 'Save our drains' • School education undertaken on an ad hoc basis by various arms of council
Western Bay of Plenty District Council	• Cleaner Production Programme, aimed at industry, targeting sectors and locations (e.g. kiwifruit industry) • Zero Waste education programme for schools
Whakatane District Council	• Little formal stormwater education provision • Enforcing trade waste bylaw with industry

Territorial Authority	Stormwater Education Provision
Kawerau District Council	No stormwater education provision
Opotiki District Council	Little stormwater education provision, mainly on ad hoc basis if problems identified.

5.2.4 Other Examples

In other regions, similar educational initiatives are being undertaken with Auckland Regional Council having a particularly comprehensive strategy.

Auckland Regional Council identified in the late 1980s that stormwater quality and its impact on the Auckland Harbours was a major issue, which would require a comprehensive approach to quantify and control. The role of public education was recognised immediately as a key tool for improving the water quality in the region. The approach was recognised as being a long-term method of changing people's attitudes and behaviour, but also as an important short-term method of encouraging the public to influence the Council members to increase expenditure on the issue of stormwater quality.

Alongside general public education, the ARC has endeavoured to improve the understanding of stormwater issues of TA officers and consultants in the various industries. This has been done through running workshops or meetings to explain programmes and to facilitate the sharing of internal knowledge.

Currently the ARC approach is multi-faceted, and people in the individual sections of the Council take responsibility for the education role. Their education initiatives are set out on the ARC website which states the following: "We actively seek to work with our communities to build capacity so that we may achieve our vision for the region. The council produces education material, delivers events and targeted education programmes for the general public, schools, businesses, rural and urban communities." The website then gives links to the following list of subjects, each of which lead to education resources, further links or references to further information. Their subjects are: Enviroschools, Big Clean Up, Schools, Learning Through Experience, Waste Education, Education Resources, and Volunteers.

One of the key issues currently being dealt with in the Auckland Region is the clean up of industrial sites. The Proposed Auckland Regional Plan: Air Land and Water (PARP:ALW) includes a schedule setting out a list of industries by type of activity, and as high, medium or low risk. Rules in the plan relate to each type of activity. The ARC is taking a two-pronged approach to working through the industries as listed. The first method is to visit the highest risk sites, carry out a site audit, and follow up with a report to the site owner setting out items for improvement. The second approach is through education by working with the industry organisations to educate them as to the potential impacts of their industry on stormwater and the greater stream and coastal environment.

At the beginning of 2005, the funding from Infrastructure Auckland was moved to Auckland Regional Holdings, and the income from that is tagged to be used on stormwater quality. The ARC has therefore restructured their stormwater team, and is using the opportunity to increase the knowledge and institutional capacity of the TAs in the area of stormwater quality management. An ARC staff member has been assigned to each of the TAs to meet monthly with them to advance the process of Integrated Catchment Management Plans and the wider issue of consenting all stormwater and wastewater network discharges. In addition, a public relations staff member has been assigned with the sole role of promoting stormwater quality to the TA Council members.

5.2.5 **Regional Options**

At present, stormwater educational initiatives seem to be being undertaken in a fragmented manner within the Bay of Plenty region with only informal discussions occurring between the region and the various TAs. There is a need for an easily understood regional message surrounding stormwater pollution and management that is consistent and sustained and which provides readily available information that the community can receive and implement. Good communication is the key to changing behaviour.

An integrated community education programme could follow these steps (taken from ARC stormwater action plan):

(i) Identify the priority audiences (business/industrial, schools, residents, council operations such as parks, golf courses, swimming pools)

(ii) Develop umbrella messages and materials for each audience

(iii) Develop umbrella branding and strategy for campaign

(iv) Manage delivery of regional messages

(v) Support TA initiatives to deliver local messages

(vi) Monitor and update programme

5.2.6 **Recommendations**

Environment Bay of Plenty can show leadership in the prevention and management of stormwater pollution by:

- undertaking a stocktake of existing educational provision and audiences being targeted
- undertaking a gap analysis (e.g. lack of specific school resource on stormwater)
- developing a regional stormwater education strategy in partnership with the TAs
- formulating a regional 'tool kit' using existing regional and local resources, and potentially source further information from the ARC or Environment Waikato
- promoting the 'tool kit' to key agencies, including the TAs, Ministry of Education, schools and specific industries)
- monitoring the implementation of this exercise.

5.3 Planning and Regulation

The RMA, Local Government Act and Building Act give authority to regional councils and TAs to promote the sustainable management of natural and physical resources, the management of natural hazards such as flooding; the regulation of discharges and the development and maintenance of stormwater management systems.

Developing a comprehensive planning and regulatory framework for the management of stormwater management may be undertaken under these legislative

provisions. These include implementation of regional and district plan provisions where necessary, as well as other various planning and legislative processes which may include transfer of powers, or expanding powers through district plan review and by-law forming procedures.

Planning and regulation measures can be implemented at the beginning of a project to avoid or minimise the adverse effects of stormwater and include:

- Land use planning: zoning strategies, structure planning, subdivision controls, hazard (flood) avoidance, and specific development performance rules.
- Discharge controls: stormwater discharge consents, pollution abatement and enforcement.
- Urban design controls: redevelopment and new developments, riparian protection/enhancement.
- Economic Instruments: penalties and incentives (developer contributions, waive consent fees, rebates for use of low impact techniques or on-site management etc).

5.4 Source Controls

Source controls are methods to control the sources of stormwater contaminants at their origin rather than attempting to treat them once the contaminants are mobilised and diluted. Source control practices for urban runoff generally involve either alterations to reduce the productions of contaminants, or minimisation of contact between contaminants and stormwater runoff. They generally relate to management practices on individual sites.

In addition to the consideration of stormwater contaminants, source control initiatives may include measures to reduce or eliminate stormwater runoff at source, reducing stormwater peak discharges and therefore reducing flooding problems downstream. Source controls may also reduce the effects of the change in salinity due to increased runoff of freshwater to marine environments.

In addition to undertaking awareness raising activities as a key component of any source control initiative, the following outlines source control options and methods:

- Maintenance and protection of stormwater drainage systems
- Stormwater minimisation and reuse
- Cleaner production, e.g. controls on roof and spouting material types
- Low impact design initiatives
- Bunding and roofing of high risk areas
- Identifying high risk household activities
- Identifying high risk vehicle-related activities
- Identifying high risk industrial and commercial activities

- Planning for Emergency Spill response where spills are likely to occur (e.g. petrol stations from fuel tankers delivering loads and filling on-site storage tanks)

5.5 Treatment Methods

Stormwater treatment and control methods, or "structural methods", are the devices or Best Management Practices (BMPs) most commonly implemented for the treatment of stormwater and to minimise the risk of flooding.

Treatment of stormwater for the removal of contaminants is achievable through a number of mechanisms including:

- Sedimentation (including flocculation)
- filtration and sorption / attachment to plant material
- gravity flotation
- biological uptake
- bacterial decay and,
- precipitation.

Detaining stormwater and regulating flows out of a detention system is undertaken to regulate flows in a catchment and reduce the magnitude and frequency of occurrence of peak flows and subsequent flooding.

The following details the design solutions often utilised:

- Pre-treatment devices such as coarse sediment traps
- Ponds/wetlands
- Extended detention and flood peak attenuation ponds
- Rain tanks for storm peak attenuation and/or stormwater re-use
- Bioretention filter strips and grass swales
- Stormwater filters including sand filters, rain gardens
- Green roofs
- Infiltration devices such as soakage trenches
- Bunding around "dirty" land uses on industrial sites (e.g. bulk storage of fuel in a tank farm)
- Stormwater separation control by use of valves (e.g. on outdoor industrial yards)
- Proprietary devices such as oil separators, continuous deflector separators and wool filters.

Maintenance of these measures, or the lack of it, can be a significant determinant in how effective these measures are at trapping contaminants or reducing peak flows and subsequent effects downstream. The maintenance requirements associated with the effective operation of stormwater devices and management practices need to be considered at the outset during the selection process for any new treatment device. Maintenance requirements for existing systems also need to be reviewed to ensure that the most appropriate and effective maintenance regimes occur to ensure that these treatment measures are performing at their maximum capacity.

Where LID and on-site approaches are used, the responsibility for maintenance will usually rest with individual landowners. In that situation, Councils need assurance that the devices will continue to function as intended. This may mean that Councils institute some form of regular inspection and/or warrant of fitness programme for such devices. Even with such measures in place, there is some risk of reduced performance, and to retain a robust stormwater management system it may be appropriate in critical areas to have additional measures in place on a catchment-wide basis.

In industrial land uses, stormwater management needs to be addressed as part of the total site environmental management. Site activities which can be covered by roofs, or where bunding can allow the collection of contaminated stormwater directly to the waste system are ideal methods, as they remove the contaminants from the stormwater system entirely. However, in some instances, yard areas and/or activities are too large to be covered. Devices used in these cases will require specific operating procedures to be followed, and regular maintenance to ensure that contamination of the stormwater discharge does not occur. Again, Councils will need to consider how they monitor and ensure the use and effectiveness of these devices.

Where existing stormwater discharges are not meeting the desired standards, such as those contained in the Proposed Regional Water and Land Plan, then retrofitting needs to be considered to upgrade the sediment trapping capacity or flow assimilation properties. It is recognised that a pragmatic approach needs be applied where retrofitting occurs as in some instances due to lack of available land or other restrictions, retrofitting may not meet the overlying standards.

In this instance, methods such as regular street sweeping and cesspit maintenance are identified as techniques to reduce the discharge of contaminants to the stormwater system and ultimately to the receiving environment.

5.6 Monitoring

Monitoring is essential to understand the effectiveness of any long-term stormwater management programme. Monitoring of the implementation of the stormwater strategy and action plans is necessary in order to identify whether the vision, as stated in Section 2.2, is being achieved. Monitoring is also essential to ensure that an adequate database is developed for decision-making purposes.

To determine these matters it will be important to monitor the following:

- The perspective of the community on the state of the environment;
- The state of the environment, including the mauri of receiving waters;
- The effects of stormwater discharges on the environment through impact and compliance monitoring;

- Progress in achieving specified environmental results;
- The effectiveness of the Environment Bay of Plenty and TA strategies in achieving their goals.

Implementation of the stormwater strategy may result in identifying gaps in the information record that currently exists. Such gaps in the information record may be filled by targeted research where appropriate.

Environment Bay of Plenty has an ongoing comprehensive State of the Environment monitoring programme. In addition to this, it is expected that TAs will develop targeted monitoring programmes. It will be appropriate for these programmes to be correlated to gain the maximum benefit from the data collected. Care will be needed to ensure that any monitoring undertaken is targeted to specific objectives, and is cost-effective.

TA monitoring programmes will generally be part of the CSC requirements, and related to long-term performance monitoring of those consents. It is likely that any monitoring plan will include threshold levels that may trigger a further specified response. Data sought will relate to the following:

- Long term local trends in receiving environment quality (particularly sediment);
- Specific high risk areas or individual sites;
- Response to pollution incidents and tracking of causes (including bathing water quality where appropriate);
- Short duration performance monitoring of specific devices, e.g. over a series of storm events.

Outcomes and responses from the monitoring may include:

- Enforcement against polluters;
- Performance upgrades for devices monitored;
- Additional targeted monitoring to isolate the cause of any adverse trend;
- Revision and update of the catchment management plan;
- Review of the CSC.

Chapter 6: Prioritised Stormwater Catchments

6.1 Stormwater Catchment Prioritisation

6.1.1 Introduction

One of the most important methods by which the integrated stormwater management objectives of this Strategy will be implemented, is by way of comprehensive stormwater catchment discharge consents (CSC). It is proposed that all areas of the region served by district council operated reticulated stormwater systems will be covered by a CSC (see Section 1.9 and Appendix A of this Strategy document for further information). In order to ensure that stormwater catchments most urgently requiring integrated management action are dealt with first and also to keep the workload manageable (both for the district councils making the applications and for the Regional Council processing the applications), it is necessary to prioritise action via a process agreed to by each of the district councils.

Within each district there are many separate stormwater catchments (e.g. in the Rotorua urban area, Rotorua District Council has identified 29 catchments). It is possible to group stormwater catchments, that have similar receiving environments and catchment characteristics, into larger units for the purpose of this exercise to minimise the number of CSCs. For example, in the Mount Maunganui-Omanu-Papamoa Beach area, approximately 34 separate stormwater catchments discharge to the ocean. For each of them the receiving environment is similar (open coast) and the catchment characteristics are similar (primarily low-medium density residential land use). For the prioritisation process with Tauranga City Council, it was agreed that the area from the Mount Beach to Papamoa that discharges to the ocean be regarded as a single stormwater catchment for the purpose of stormwater management planning and catchment stormwater discharge consenting. Similarly, groupings of catchment units into larger, more convenient units were agreed with all other district councils. Figure 6.1 shows the location of all of the agreed stormwater catchments. Figure 6.2 shows the agreed catchments in the Tauranga City area.

6.2 "Bulk" Stormwater Discharge Consents

On 1 October 2001 (10-years after the enactment of the Resource Management Act 1991), authorisation of stormwater discharges registered as existing uses at the time the Water and Soil Conservation Act 1967 was enacted, expired. Each TA in the region applied for what came to be called "bulk" stormwater discharge consents. These applications were for a single "bulk" consent for the large number of separate stormwater discharges which had until October 2001 been authorised by way of a blanket registration process (under the Water and Soil Conservation Act 1967) and the transitional provisions of the Resource Management Act 1991. Processing of these applications was put on hold (S.37 Resource Management Act 1991) until the prioritisation process had been completed, because it was proposed to include in each of the bulk consents, a condition setting out the timeframes for lodgement of

comprehensive consent applications. The "bulk" consents will eventually be superseded by the CSC s, when all CSC s in a district have been granted.

6.3 Catchment Prioritisation Methodology

To determine priorities for stormwater management planning and lodging of consent applications a "work-shopping" process was used with each TA. Although the Regional and District Councils hold much information on the receiving environments, catchment characteristics and the various values potentially threatened by stormwater it was agreed with all Councils that a quantitative approach to comparing catchments was not necessary. The work-shopping approach used relevant specialist experienced staff from the TA and the region with access to all of the published and other information available, to assign rankings on various factors set out in a set of evaluation criteria, developed for the prioritisation exercise (see Appendix D).

General principles for evaluation were discussed with the Stormwater Liaison Group and were incorporated into the eventually agreed Evaluation Criteria. These principles are:

- The key factors for determining priorities for stormwater management, management planning, action and comprehensive consenting are the environmental values of the receiving environments together with the magnitude of the catchment threats.

- Receiving environment values include both ecological and community values.

- Priority should be given to protecting and preserving highly valued receiving environments.

6.3.1 Ranking of Catchments in Tauranga City and Western Bay of Plenty District

The method used to rank catchments in Tauranga City and Western Bay of Plenty Districts is as follows:

(a) Individual stormwater catchments were grouped into stormwater management catchments based on ultimate receiving water similarities and catchment similarities. In Tauranga City, for example, Sulphur Point is included with Mt Maunganui Industrial due to its similar well flushed receiving environment and the similar industrialised and port activity nature of the stormwater catchments.

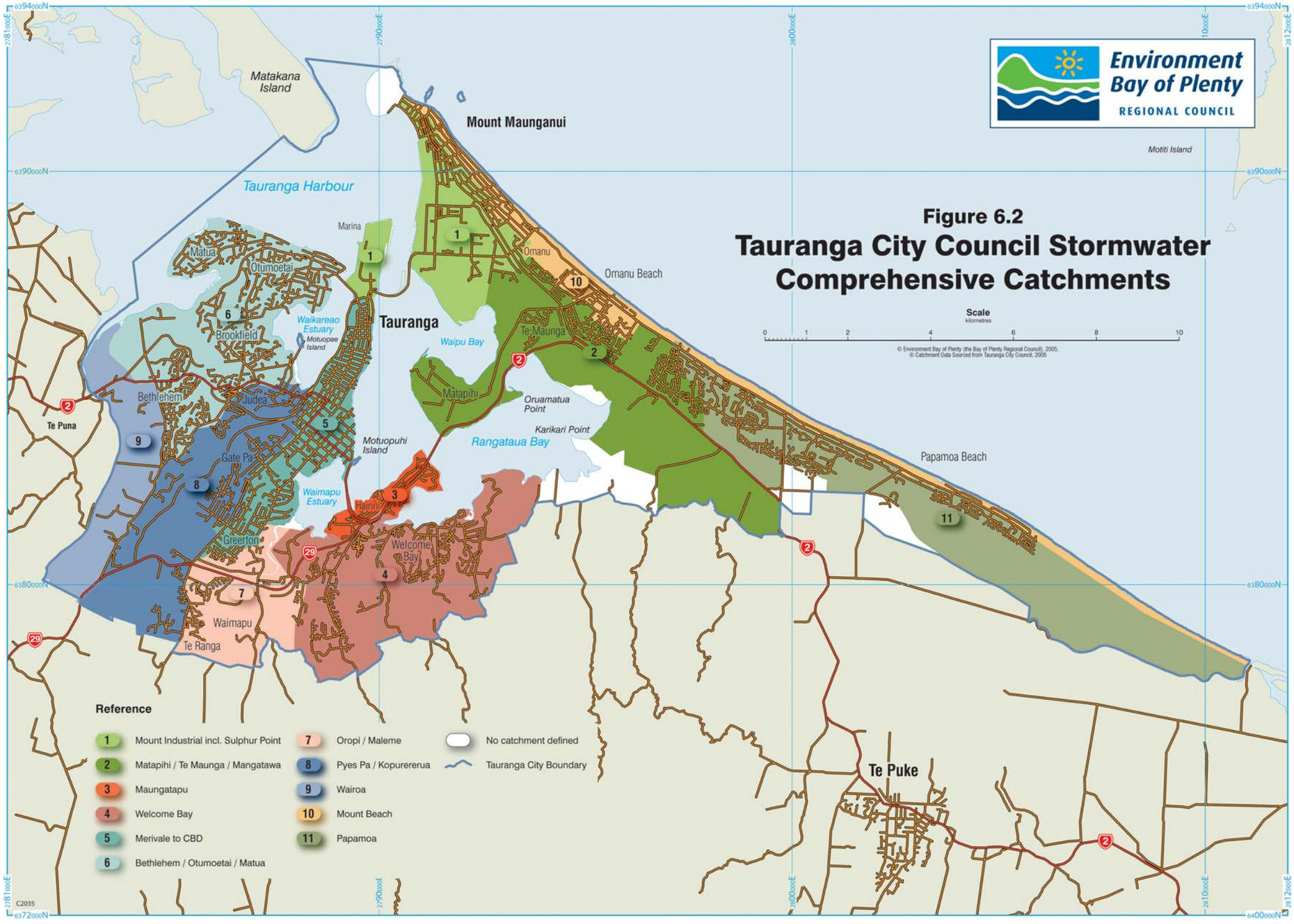
(b) Each grouped stormwater management catchment was then assessed against evaluation criteria through a workshopping/consensus approach using specialist staff from the District Council and Environment Bay of Plenty. The evaluation criteria related to:

- Catchment threats;

- Receiving environment – ecological; and

- Receiving environment – community well-being,


Figure 6.1
Agreed Stormwater Catchments
Environment Bay of Plenty
REGIONAL COUNCIL
Waihi Beach
Pios Beach/Athenree
Tanners Point
Ongare Point
Tuapiro Point
Kauri Point
Katikati
Omokoroa Peninsula
Mount Maunganui
Minden
Te Puna
Maketu/Little Waihi/Pukehina
Tauranga City
(see Figure 6.2 for more detail)
Te Puke
Paengaroa
Otamarakau
Matata
Whakatane Urban
(incl Coastlands)
Ohope/Otarawairere
Ohope
Lake Rotoiti Communities
Hamurana/Wilsons Bay
Edgecumbe
Opotiki Urban
Taneatua
Rotokawa
(including Eastgale & Airport)
Te Mahoe
Rotorua Urban
(including Ngongotaha)
Kawerau
Lake Tarawera
Lake Okareka
Reference
Murupara
Ruatahuna
Waikaremoana
28km
Rerewhakaaitu
Taupo (SH5)
56km
Taupo
23km
Rangitaiki
Napier
96km
Gisborne
64km
Opotiki
Te Kaha
Potikirua
Te Araroa
36km
Waihau Bay
Cape Runaway
Lottin Point
Bay of Plenty
Mayor Island
Volkner Rocks
Whakaari/White Island
Matakana Island
Motuhaku Island
Motiti Island
Motunau Island
Rurima Island
Moutoki Island
Moutohora Island
Okurei Point
Waihi Estuary
Kohi Point
Ohiwa Harbour
Waikawa Point
Te Kaha Point
Omaio Bay
Papatea Bay
Whangaparaoa Bay
Karewa Island
Bowentown Heads
Tauranga Harbour
Waihi
7km
Matamata
20km
Cambridge
51km
Tirau
29km
Putaruru
28km
Mamaku
Tokoroa
44km
KAIMAI RANGE
IKAWHENUA RANGE
KAHIKATEA RANGE
HUIARAU RANGE
RAUKUMARA RANGE
regional boundary
district boundaries
state highway
major road
agreed stormwater catchments
town, locality
native forest
exotic forest
horticulture
pasture and cropping
other
North
Scale
kilometres
0 5 10 20 30 40
© Environment Bay of Plenty (the Bay of Plenty Regional Council), 2002.
© Sourced from Land Information New Zealand data. CROWN COPYRIGHT RESERVED.
© Statistics NZ.
Map by Cartoteam
Data processed by GIS Team
C2034
The
Bay of Plenty
Region
Kilometres
100 0 100 200 300
North Island - New Zealand


Environment Bay of Plenty
REGIONAL COUNCIL
Figure 6.2
Tauranga City Council Stormwater Comprehensive Catchments
Scale
kilometres
0 1 2 4 6 8 10
© Environment Bay of Plenty (the Bay of Plenty Regional Council), 2005.
© Catchment Data Sourced from Tauranga City Council, 2005
Matakana Island
Mount Maunganui
Motiti Island
Tauranga Harbour
Marina
Matua
Otumoetai
Omanu
Omanu Beach
Tauranga
Waikareao Estuary
Motuopae Island
Brookfield
Te Maunga
Waipu Bay
Bethlehem
Judea
Matapihi
Oruamatua Point
Karikari Point
Te Puna
Motuopuhi Island
Rangataua Bay
Papamoa Beach
Gate Pa
Waimapu Estuary
Hairini
Greerton
Welcome Bay
Waimapu
Te Ranga
Te Puke
Reference
1 Mount Industrial incl. Sulphur Point
2 Matapihi / Te Maunga / Mangatawa
3 Maungatapu
4 Welcome Bay
5 Merivale to CBD
6 Bethlehem / Otumoetai / Matua
7 Oropi / Maleme
8 Pyes Pa / Kopurererua
9 Wairoa
10 Mount Beach
11 Papamoa
No catchment defined
Tauranga City Boundary
C2035

Each criteria was ranked as A (high), B (medium) or C (low).

(a) Tables 6.1 and 6.2 show the assessments and total scores for Tauranga City and Western Bay of Plenty District based on five points for high, three points for medium and one point for low.

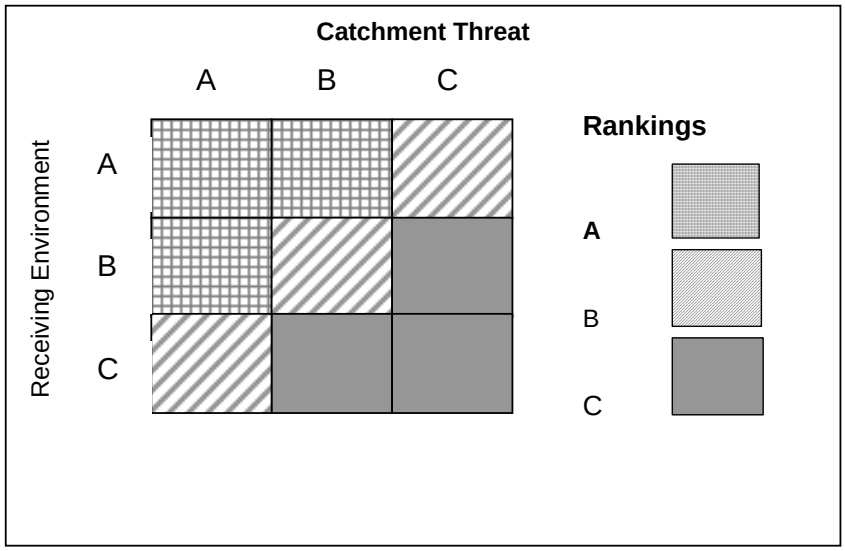
(b) A Catchment Threat ranking is derived for each stormwater management catchment based on the total scores as follows:

4-8	C
9-11	B
12+	A

(c) Similarly, a Receiving Environment ranking is derived for each stormwater management catchment, but in this case it is based on the highest ecological and Community Well-Being total scores as follows:

Marine Receiving Environment		**Freshwater Receiving Environment**	
Less than 15	C	Less than 12	C
15-21	B	12-16	B
Greater than 21	A	Greater than 16	A

(d) An overall ranking is determined using the following model:



Catchments were further separated (fine tuned ranking) for prioritisation purposes by firstly ranking them by their total catchment threats score and then separating further by ranking in order of their receiving environment score. For example, in the Tauranga City rankings, six catchments score an A priority overall ranking. After fine-tuning the rankings, the Mt Maunganui Industrial/Sulphur Point was given the highest priority ranking (A1) because it had the highest catchment threat total score (14). Merivale/CBD, Pyes Pa/Kopurererua and Papamoa ranked next equal by catchment threat score (12), so they were separated by total receiving environment

scores. Pyes Pa/Kopurererua thereby gained an A2 ranking, Papamoa an A3 ranking and Merivale/CBD an A4 ranking.

6.3.2 Ranking for Other Districts

For Rotorua it was agreed that the entire Rotorua City and Ngongotaha urban area (29 separate stormwater catchments) would be treated as one grouped stormwater catchment, largely because the District Council had already commenced development of a stormwater management plan on a citywide basis. Regional Council staff were agreeable to this approach on the basis that the ultimate receiving environments (the southern and south western parts of Lake Rotorua) of each catchment are similar and also because the main area within the city where water quality is under threat from contaminant discharges (the View Road area) will continue to be separately managed as a "hotspot" by separate discharge permits.

Whakatane District Council, Opotiki District Council and Kawerau District Council also took a similar approach to that taken by Rotorua District Council. In Whakatane District it was agreed that the entire Whakatane urban area would be grouped as one catchment. The remaining reticulated urban areas in the district, Matata, Ohope/Otarawairere, Edgecumbe, Taneatua, Te Mahoe and Murupara will be grouped into two separate groups for this exercise.

In Opotiki District the entire urban area of Opotiki township is to be grouped as one stormwater catchment and the rural communities served by reticulated systems will be grouped as a separate unit.

Similarly all stormwater systems from Kawerau township will be grouped as one stormwater catchment. Stormwater from the pulp and paper mills, although reticulated, is not under the control of the District Council and will therefore not be part of this process. Each mill holds a separate Regional Council discharge permit for stormwater discharge.

6.3.3 District Council Priorities

On top of the Regional Council priorities as described above, each district council will have its own priorities for completion of catchment management planning and obtaining CSCs. These priorities overlay the regional priorities and can have the effect of bringing some catchments up the priority list (or where there are good reasons the priority may drop). For example in the Western Bay of Plenty District, the Council proceeding with development catchment management plans for all of its B and C priority catchments because of a lack of detailed information on these catchments. Applications for these B and C priority catchments will be ready before the A priority catchments. Workload requirements will preclude the A priority catchment applications being lodged before June 2009, however this is not considered an unacceptably long timeframe. In Tauranga City, there is a commitment to have all applications lodged by 31 December 2010. Following the flooding events of May 2005 priorities have been reassessed to give higher priority to those catchments most adversely affected. Originally Council's priorities lay with catchments in the main urban growth areas. As a consequence the priority for the Mount Beach to Omanu catchment has been elevated. The Pyes Pa/Kopurererua catchment drops down in priority, largely because a significant part of the catchment is already subject to a "comprehensive style" stormwater discharge consent and the proposed channel works in the lower catchment will also be subject to a "comprehensive style" consent.

6.4 Agreed Priorities

Agreed priorities for lodgement of CSCs are shown in Table 6.1.

Table 6.1 Agreed Priority Dates

District	Priority	Catchment	Agreed Date for Lodging CSC
Western Bay of Plenty	-	Omokoroa Peninsula	Consent granted in 2003
	A	Waihi Beach	30 June 2009
	A	Te Puke	30 June 2009
	B	Katikati	30 June 2008
	B	Pio's Beach	30 June 2008
	B	Maketu/Little Waihi/Pukehina	30 June 2008
	C	Minden	30 June 2008
	C	Te Puna	30 June 2008
	C	Tanners Point/Tuapiro/Kauri Point/Ongare Point	30 June 2008
	C	Paengaroa	30 June 2008
Tauranga	A	Mt Maunganui Industrial and Sulphur Point	31 December 2006
	A	Pyes Pa/Kopurererua	31 December 2008
	A	Papamoa	31 October 2005
	A	Merivale/CBD	31 December 2007
	A	Bethlehem/Otumoetai	31 December 2007
	A	Welcome Bay	31 December 2008
	B	Oropi/Maleme	31 December 2006
	B	Mount Beach to Omanu	31 December 2007
	C	Maungatawa/Te Maunga/Matapihi	31 December 2010
	C	Maungatapu	31 December 2010
	C	Wairoa	31 December 2010
Rotorua	A	Rotorua Urban (including Ngongotaha)	31 December 2007
	A	Rotokawa (including Eastgate and Airport)	31 December 2007
	A	Lake Rotoiti	31 December 2007
	B	Okareka	31 December 2008
	B	Hamurana/Wilson's Bay	31 December 2008
	B	Brunswick	31 December 2008
	B	Lake Tarawera	31 December 2008
	C	-	
Whakatane	A	Whakatane Urban (including Coastlands and Gateway Drive/Hub area)	31 December 2006
	B	Matata/Ohope/Otarawairere	31 December 2007
	C	Edgecumbe/Taneatua/Te Mahoe/ Murupara	31 December 2008
Opotiki	A	-	
	B	Rural Communities (includes Waiotahi Drifts)	31 December 2006
	B	Opotiki Urban	31 December 2007
	C	-	
Kawerau	A	-	
	B	Kawerau Urban (excluding the pulp and paper mill)	30 June 2008
	C	-	

Table 6.2 Regional Council Stormwater Prioritisation – Tauranga City

	Catchment Threats					Receiving Environment – Ecological						Receiving Environment – Community Well-being						Rankings				
	Stormwater Burden	Flooding	Erosion Slippage	Developmental Change	CATCHMENT THREAT TOTAL	Importance for Fauna	Importance for flora	Sediment Deposition/Infilling/ Smothering	Ecosystem Health	Representative Nature	TOTAL RECEIVING ENVIRONMENT-ECOLOGICAL	Food gathering	Water Activities	Amenity	Economic	Cultural Values	TOTAL COMMUNITY WELL-BEING	Highest receiving environment value	Ranking Catchment Threats	Ranking Receiving Environment Values	Overall Ranking	Fine Tuned Ranking
Mount Maunganui Industrial and Sulphur Point	5	5	1	3	14	3	1	1	5	1	11	1	5	3	5	1	15	15	A	B	A	A1
Maungatawa, Te Maunga and Matapihi	3	1	1	3	8	5	5	3	3	5	21	3	1	1	1	5	11	21	C	B	C	C1
Maungatapu	1	1	3	1	6	3	3	3	3	3	15	3	3	1	1	3	11	15	C	B	C	C2
Welcome Bay	3	3	1	3	10	3	3	5	5	3	19	1	1	3	1	3	9	19	B	B	A	A6
Merivale/C.B.D.	5	3	1	3	12	5	5	3	5	1	19	1	1	5	5	5	17	19	A	B	A	A4
Bethlehem/Otumoetai	1	3	3	3	10	5	5	3	5	5	23	5	5	3	1	5	19	23	A	A	A	A5
Oropi/Maleme	3	1	1	3	8	5	5	5	5	3	23	1	1	1	1	5	9	23	C	A	B	B1
Pyes Pa/Kopurererua	3	3	1	5	12	5	5	5	5	3	23	3	1	1	1	5	11	23	A	A	A	A2
Wairoa	1	1	1	1	4	3	5	3	3	5	19	5	5	1	1	5	17	19	C	B	C	C3
Mount Beach to Omanu	1	3	1	3	8	1	1	1	1	3	7	5	5	5	5	3	23	23	C	A	B	B2
Papamoa	3	3	1	5	12	1	1	1	1	5	9	5	5	5	3	5	23	23	A	A	A	A3

Table 6.3 Regional Council Stormwater Prioritisation – Western Bay of Plenty District

	Catchment Threats					Receiving Environment – Ecological						Receiving Environment – Community Well-being						Rankings				
	Stormwater Burden	Flooding	Erosion Slippage	Developmental Change	CATCHMENT THREAT TOTAL	Importance for Fauna	Importance for flora	Sediment Deposition/Infilling/ Smothering	Ecosystem Health	Representative Nature	TOTAL RECEIVING ENVIRONMENT-ECOLOGICAL	Food gathering	Water Activities	Amenity	Economic	Cultural Values	TOTAL COMMUNITY WELL-BEING	Highest receiving environment value	Ranking Catchment Threats	Ranking Receiving Environment Values	Overall Ranking	Fine Tuned Ranking
Waihi Beach	3	5	1	5	14	2	2	2	5	2	13	3	5	5	5	3	21	21	A	B	A	A_1
Pios Beach/Athenree	1	3	1	3	8	5	5	3	5	5	23	5	5	5	3	5	23	23	C	A	B	B_2
Tanners Point, Tuapiro, Kauri Point, Ongare Point	1	1	1	1	4	4	1	1	4	4	14	3	3	3	1	2	12	14	C	C	C	C_3
Katikati	2	1	1	5	9	3	3	4	3	3	16	1	2	3	1	1	8	16	B	B	B	B_1
Te Puna	2	1	1	1	5	4	3	5	3	4	19	4	3	5	1	3	16	19	C	B	C	C_2
Minden*	1	1	3	1	6	1	2	(1)	3	3	10	1	1	1	1	1	5	10	C	B	C	C_1
Te Puke*	3	4	2	3	12	4	2	(1)	3	3	13	3	2	3	1	5	14	14	A	B	A	A_2
Paengaroa*	1	1	1	1	4	2	2	(1)	1	1	7	1	1	1	1	1	5	7	C	C	C	C_4
Maketu, Little Waihi, Pukehina	2	3	1	1	7	4	4	4	5	4	21	5	4	5	3	5	22	22	C	A	B	B_3

Key:

* Freshwater Receiving Environment

Note: In the Receiving Environment – Ecological rankings, the "sediment deposition/infilling/smothering" criterion was not scored for the freshwater receiving environments (Minden, Te Puke and Paengaroa catchments). As this could potentially affect the overall rankings, each of these catchments was given a nominal value of 1 (low), marked as (1) on the table.

Chapter 7: Recommendations and Timeframes

Recommendations, actions required, responsibilities and timeframes are provided below. These recommendations are identified as a means of achieving the overriding stormwater management vision statements included in section 2 of this strategy document. It is recognised that constraints do exist relating to finances, other local issues and priorities, as well as political frameworks.

Table 7.1 Recommendations, Actions Required and Timeframes

No.	Recommendation	Action Required	Authority Responsible	Timeframe
	Actions			
1	Environment Bay of Plenty to adopt and implement the Stormwater Strategy vision, objectives, policies and methods.	Prepare Strategy Statement and Action Plan	Environment Bay of Plenty	August 2005 & ongoing
2	Environment Bay of Plenty staff and relevant members of the Stormwater Liaison Group to present to all the district council's across the region to describe specific district 'package' requirements, costs, benefits and processes. .	Provide a presentation to each TA	Environment Bay of Plenty & TA's	By April 06
3	Each territorial authority in the Bay of Plenty region to receive the strategy and prepare their own Stormwater Strategy and action plans for its district, based on the content of the strategy (see Appendix E).	Prepare Strategy Statement and Action Plan	TAs	March 2006
4	Identify the stormwater management issues across the region and ensure that Environment Bay of Plenty and TA staff (e.g. parks and reserves, works and services, asset management, drainage, consenting and policy development etc) give adequate consideration to these issues when considering land use and subdivision consents. Have an education implementation programme to raise awareness of statutory responsibilities of staff.	Undertake review of current information systems and coordinate via stormwater liaison group updating these information channels as necessary. Instigate internal communication protocols if necessary	Environment Bay of Plenty and TAs	By July 2006
5	Implement the most appropriate options, methods and monitoring identified in Section 5. It is recognised that comprehensive stormwater management involves the implementation of a range of integrated measures to adequately address the various issues identified.	Implement Strategy Statement and Action Plan	Environment Bay of Plenty	On going
6	Continue to actively support the Stormwater Liaison Group (SWLG) as an effective vehicle for consistent stormwater management across the region.	Ensure SWLG meetings continue	Environment Bay of Plenty & TAs	On going
7	Undertake a review of Proposed Regional Water and Land Plan, the Coastal Environment Plan and changes to the Regional Policy Statement to ensure that aspects in the plans are consistent with the issues and objectives contained in this document. If they are not, consider a variation to the Plans, or changing the strategy statement.	Review plans and instigate variations or changes to the strategy as necessary.	Environment Bay of Plenty	Commence immediately

No.	Recommendation	Action Required	Authority Responsible	Timeframe
8	Identify the aspects of each Territorial Authority's District Plan and other management regimes that affect the management of stormwater within the District and identify whether they are consistent with the objectives contained in this Stormwater Strategy. This will include a review of district and regional plan provisions as well as district design standards regarding the erecting of buildings with regard to floor levels in relation to the flood plain. Consistency with regional coastal plan provisions and any coastal management strategies should be ensured.	Review relevant sections of the District Plan, building controls, bylaws and instigate variations as necessary.	Environment Bay of Plenty to work with TA's	Review by October 05. Recommendations by December 05
9	Identify areas that may be the statutory responsibility of the regional or district council but may be more suited to be managed by the other party, and consider transfer of powers if necessary (e.g. contaminated sites & discharges, discharge of groundwater from construction sites, swimming pool water or geothermal discharges to stormwater, administration of drainage networks that are considered to be a "modified watercourse" under the RMA).	Undertake review as stated and instigate variations or changes as necessary.	Environment Bay of Plenty & TA's	October 05
10	Refine state of the environment and compliance monitoring processes where necessary to obtain more specific data to develop a stronger link between stormwater quality and effects.	Review current information.	Environment Bay of Plenty	Immediately & ongoing for consents.
11	Submit to all TAs via the LTCCP and annual plan process as well as when variations to district plans occur to ensure that appropriate regard is given to the Stormwater Strategy objectives, and that the TAs Stormwater Strategy and Action Plan is being progressed as necessary (see Recommendation 3).	As stated.	Environment Bay of Plenty	As required.
12	Undertake research and evaluation of stormwater "best management practices", particularly involving new treatment and/or alternative urban design techniques. Sustainable Management Fund, Transfund and Public Good Science and Technology Fund are potential funding sources. The following web site may also be of use: www.envirofunz.org.nz. Make information and guidance available to TAs.	As stated.	Environment Bay of Plenty	Ongoing.

No.	Recommendation	Action Required	Authority Responsible	Timeframe
13	Review existing guidelines and, if necessary, develop appropriate guidelines for stormwater management and treatment measures appropriate for the conditions (soil, land use and climatic) encountered in the Bay of Plenty region. It is considered that guidelines could be effectively based on Auckland Regional Council's updated TP10 (S*tormwater Treatment Devices Guideline Manual)*. For on-site devices, the NZWERF *On-site Stormwater Management Guideline* (October 2004) is an appropriate guideline. Investigate and develop innovative and LID stormwater source control management techniques and options and incorporate into guidelines. Alternatively, the use of *the Low Impact Design Manual* developed by the ARC (TP124) could be endorsed and their use promoted for development across the region.	Develop guidelines as stated.	Environment Bay of Plenty	Review undertaken by 31 December 05.
14	Review industry codes of practices and standards and assess with regard to best practice in relation to source control, spill management and other aspects of industry practices that may affect the quantity and quality of stormwater discharges from such sites.	As stated	TAs with assistance from Environment Bay of Plenty/SWLG	30 June 2006
15	Incorporate appropriate LID designs into Council design codes in a form that is acceptable to Councils as best practice. Consider implementing demonstration projects in conjunction with developers.	As stated.	TAs with assistance from Environment Bay of Plenty	30 June 2006
16	Identify where "care" programmes could be instigated such as harbour-care, coast-care, stream-care or land-care groups. Investigate funding options..	Undertake review of existing care programmes and initiatives across NZ and identify suitable options for the Bay of Plenty Region	Environment Bay of Plenty and relevant TA	Ongoing
17	In addition to Item 16, consider identifying impacted sites that are worthy of enhancing (for example certain areas within Tauranga Harbour) and developing action plans and initiatives to clean up the area as well as cleaning up the catchment contributing discharges and contaminants. Publicise such clean-up and enhancement case studies.	As stated	TAs with Environment Bay of Plenty input	Prior to lodgement of each CSC application
18	Develop and update as necessary flood hazard registers	As stated.	TAs	Ongoing
19	Review the adequacy of the existing comprehensive network of rainfall gauges and river flow stations across the urban area of the region.	As stated.	Environment Bay of Plenty	October 2005

No.	Recommendation	Action Required	Authority Responsible	Timeframe
20	Complete preparation of a cost estimate for each task listed in this SS, and for the ongoing operation of the stormwater management programme. Prepare a financial programme and confirm that the task completion dates are compatible with that programme.	As stated.	Environment Bay of Plenty	TBA
21	Maintain a register of wastewater overflow points and monitor frequency/ water quality issue. TA's to advise overflows incidents.	As stated.	Environment Bay of Plenty & TA's	Ongoing
Education				
22	Develop an education and communication strategy which sets out objectives and effective methods for disseminating information to industry, public, stakeholders and other affected and interested parties regarding the effects of stormwater and what measures can be implemented to minimise downstream effects.	As stated.	Environment Bay of Plenty	31 December 2005
23	Develop a pollution prevention and education programme targeted towards high risk industries (such as timber treatment plants, service stations, electroplaters, chemical manufacturers, meat processing plants, car wreckers, scrap metal dealers, waste transfer stations and transfer companies etc), across the region to highlight the responsibilities of industry regarding incorporating appropriate house keeping practices to minimise the likelihood of discharges occurring as well as having appropriate procedures in place should accidents, such as spills, occur. Consider working with other organisations.	As stated, publicise process and outcomes.	Environment Bay of Plenty & TA's	Ongoing

Chapter 8: Costs and Benefits

The benefits of stormwater management are difficult to quantify financially. They are seen primarily in increased quality of marine and freshwater receiving environments. The various rivers, lakes, harbours and coasts of the Bay of Plenty have a high intrinsic value and are of importance to the people of the region. Their value can be significantly reduced by the effects urban stormwater runoff. There are also significant benefits to be gained from management of stormwater quantity, in terms of reducing the loss and damage caused by floods.

The costs of improved stormwater management and stormwater quality improvement can be significant, and the planning and funding of expenditure must therefore be addressed. This strategy has not quantified those costs, which must be worked out as part of the implementation process (see Recommendation 20). In addition, there will be a need for appropriate staff resourcing in both Environment Bay of Plenty and TAs to develop individual action plans, and then implement, monitor and enforce them. .

For Environment Bay of Plenty it will be necessary to prepare a cost estimate to undertake the tasks identified in this SS. Once this is prepared, and compared to the programme for implementation of the tasks, it may be necessary to undertake an Annual Plan or LTCCP review with respect to annual funding (amount and sources) or the proposed timing for completion of the tasks.

For the TAs, there is an ongoing annual plan of expenditure for stormwater management, which is integrated into the LTCCP process for forward planning. As part of preparing its own stormwater strategy, each TA will need to consider the staff and funding resources needed to implement that SS, and this may influence the rate at which that implementation can be accomplished.

The TA financial programmes will also need to be reviewed when catchment plans are prepared and CSCs are granted, as each of these will define works required in a catchment, the time frame needed to implement them, and the ongoing costs of operating and maintaining them.

These financial programmes will affect both capital works, and also operation. If there is to be an overall improvement in the quality of receiving environments, an increase in annual operating budgets for monitoring and for management of the increased number of treatment devices that will be put in place will be required.

Appendices

Appendix 1 Guidelines for the Development of Comprehensive Stormwater Consent Applications and Catchment Management Plans

Appendix 2 Environment Bay of Plenty Rules relating to the Discharge of Stormwater

Appendix 3 Examples of Detailed Policies, Explanations, Implementation Methods and Monitoring

Appendix 4 Evaluation Criteria used in Prioritisation of Catchments

Appendix 5 Guidelines for the Development of Territorial Authority Stormwater Strategy and Action Plans

Appendix A – Guidelines for the Development of Comprehensive Stormwater Consent Applications and Catchment Management Plans

Executive Summary

These guidelines outline Environment Bay of Plenty's suggested approach to applying for resource consents for the discharge of urban stormwater along with other activities identified through the Catchment Management Planning process that require consents. The guidelines are directly applicable to the needs of the Territorial Authorities within the Bay of Plenty region who are involved in the management of stormwater.

Urban stormwater reticulation systems are constructed to provide benefits to communities in terms of protection of property, flood control and for health and safety purposes. However, stormwater runoff from urban areas has the potential to adversely affect the water quality and habitats of receiving waters, stability of stream channels, and cause flooding of downstream properties.

The primary aim of these guidelines is to set out the issues, planning concepts, technical methods and other matters that need to be considered in the preparation of urban stormwater discharge consent applications and any accompanying Catchment Management Plans.

In particular, these guidelines identify a process that includes:

- The identification of stormwater management issues at the catchment level;
- An assessment of the 'actual' and 'potential' effects of stormwater on receiving environments;
- The identification and consideration of a range of options and techniques for the management of stormwater;
- A logical progression for determining preferred stormwater management solutions to the issues identified;
- Identifying consent requirements, other than those required for the discharge of stormwater, and applying for these consent requirements based on a preliminary-design level of information; and
- The establishment of Catchment Management Plans that detail the various stormwater management initiatives and controls to be implemented in the catchments identified.

Environment Bay of Plenty Stormwater Strategy

The stormwater management strategies for the Bay of Plenty Region are contained in the Environment Bay of Plenty Stormwater Strategy (SS). The strategy outlines the issues facing stormwater managers in the region, and includes methods to effectively manage these issues given the wide range of often conflicting constraints that stormwater managers operate within.

Catchment-based Approach to Stormwater Management

There is a need to manage urban catchment activities to minimise the risk to public health and safety and effects on the environment. The crucial factor in stormwater management is integrating land-use, stormwater, and infrastructure management. The stormwater management approach that Environment Bay of Plenty promotes through these guidelines is aimed at the catchment level and obtaining resource consents for individual or multiple

catchments. It applies a variety of management tools to address stormwater management issues and achieve defined stormwater management objectives.

Stormwater Catchment Management Planning

For stormwater management activities to the effective, it is important that they are guided by strategies or plans. A 'Catchment Management Plan' is the basic planning and management tool for stormwater at the individual catchment level. It links strategic level policies and the implementation of stormwater management initiatives and controls.

Catchment Management Planning is the key theme in these guidelines. The establishment and implementation of a Catchment Management Plan is a fundamental part of the urban stormwater discharge consent process. It is required for all consents that authorise multiple discharges of stormwater from urban catchments. It is also the principal way that which remedial and improvement programmes are to be established and stormwater management objectives set for the catchments identified. It is an important source of information for long-term asset management planning and financial programming.

Issues for Consideration in Consent Applications and Catchment Management Plans

The matters listed in these guidelines that should be considered with all consent applications fall within the four general categories of:

- General Information and Catchment Land Use;
- Water Quantity;
- Water Quality; and,
- Receiving Environment.

Applying for wide ranging consents is encouraged. This minimises duplication of effort and provides certainty to the TA and Regional Council of the works required to manage stormwater on a catchment by catchment basis. It is likely that detailed design information will not be available at this early stage, however preliminary design may be appropriate to base decisions on, subject to further consultation and detailed design if necessary in the future.

These guidelines are not a prescriptive list of items that must accompany every consent application. They present a range of issues that may be present in a catchment, and identify the type of information that should be considered in understanding and resolving those issues. The actual information to accompany an application is determined following identification of the specific catchment issues and is particularly aimed at resolving those issues.

Implementing these guidelines will ensure that a consistent approach is taken in the preparation of urban stormwater discharge consent applications and in addressing urban stormwater issues across the Bay of Plenty Region.

1 Introduction

The aim of these guidelines is to set out for the region's territorial authorities, those matters that require consideration before seeking consents for catchment stormwater discharges. The objectives of the guidelines are:

(i) Streamlining consent processing by outlining in detail to applicants the type and level of information required to support the applications so that the time and expenses incurred throughout the consent processing phase are minimised for all parties involved;

(ii) To provide certainty to the applicants by encouraging comprehensive consenting by approving resource consents with supporting Catchment Management Plans (CMPs) that give the applicant the understanding that works and installations will be able to be constructed in the future with minimal further regulatory processing costs;

(iii) To provide Environment Bay of Plenty with the assurance that the catchment threats will be managed to protect property and receiving environment values; and,

(iv) To ensure that iwi, the public and other potentially affected parties are able to have the opportunity to take part in an open and meaningful consultation process with regard to any specific aspects on the applications that may affect them.

These guidelines outline Environment Bay of Plenty's suggested approach to applying for resource consents for the discharge of urban stormwater and associated consents. These guidelines are complementary to the Environment Bay of Plenty Stormwater Strategy (SS) that has been prepared to identify the stormwater management issues facing the region. The strategy also sets out, among other things, the regulatory framework for stormwater management across the Bay of Plenty and outlines regional and local responsibilities. The strategy is detailed further below.

Whilst these guidelines are primarily directed towards the needs of the Territorial Authorities (TA's), the principles also apply to other utility organisations and sites that have their own separate stormwater systems. Implementing these guidelines will ensure a consistent approach is taken when addressing urban stormwater issues during the preparation of urban stormwater discharge consent applications in the Bay of Plenty Region.

In particular, these guidelines:

- Detail application requirements for the management of both the existing and potential catchment resources that Environment Bay of Plenty consider need to be addressed.

- Detail existing and potential issues relating to the management of stormwater that may be present in a catchment and methods of identifying such issues.

- Identify issues that need to be addressed for the future management of the catchment. This can include financing, implementation and monitoring the achievement of objectives.

- Require that a range of options and techniques for the management of stormwater within the catchment be considered in achieving the objectives identified.

- Require a logical progression for identifying the preferred option for the management of the collection and discharge of stormwater from the identified catchment.

- Identify the information that should be included in any application for resource consent for the comprehensive discharge of stormwater and associated works for the subject catchment.

1.1 Bay of Plenty Stormwater Strategy

The Stormwater Strategy outlines the stormwater issues for the Bay of Plenty region. It assists the regions TA's by providing a framework from which to devise their own localised stormwater strategies and action plans. The strategy promotes application of the outlined principles to ensure that stormwater is managed consistently across the region, and that the effects of stormwater discharges are dealt with adequately. The strategy recognises the various statutory responsibilities the regional and local authorities have, as well as the benefits of addressing stormwater management on a comprehensive basis across the Bay of Plenty.

1.2 Statutory Framework

1.2.1 Policy and Planning Provisions

Regional Council Functions, Duties and Responsibilities

A key function of Regional Councils under section 30 of the Resource Management Act (RMA) is – "the establishment, implementation and review of objectives, policies, and methods to achieve the integrated management of the natural and physical resources of the region." These objectives, policies and methods are set out in the Bay of Plenty Regional Policy Statement (RPS). The RPS recognises that urban stormwater runoff is a significant resource management issue and that urban stormwater can be a significant point source discharge of contaminants.

To manage the effects of the discharge of stormwater in an effective and integrated manner, Environment Bay of Plenty supports a catchment-based approach for existing urban areas, and for areas that may be urbanised in the future.

1.3 Territorial Authorities

TA functions under section 31 of the RMA include:

"The establishment, implementation and review of objectives, policies, and methods to achieve integrated management of the effects of the use, development and protection of land and associated natural and physical resources of the district;

The control of any actual or potential effects of the use, development, or protection of land, including for the purpose of the avoidance or mitigation of natural hazards and the prevention or mitigation of any adverse effects of the storage, use, disposal, or transportation of hazardous substances on land;

The control of subdivision of land."

Under sections 124 to 129 of the Local Government Act 2002, TAs are required to carry out a water and sanitary services assessment. In particular, Section 126 requires that:

(1) An assessment of water services must contain the following information

a) a description of the means by which –

iii) stormwater is disposed of within the district, including the extent to which drainage works are provided within the district by the territorial authority and any other person; …

There is no statutory requirement, therefore, for TAs to provide public stormwater drainage works but in practice the service is provided as a 'public good'. All discharge activities relating to stormwater drainage are subject to the provisions of the RMA and the relevant regional policy and planning instruments.

1.4 Comprehensive Stormwater Consents

These guidelines assist in the preparation of applications for Comprehensive Stormwater Consents (CSC). A CSC enables a consent and catchment management planning process for multiple stormwater discharges in urban catchments[4]. The process provides the framework for integrating the management of resources: land, ecological, biological, water, infrastructure, human and economic resources at the catchment level. Environment Bay of Plenty encourages the preparation of CSC applications as an aid to effective and efficient management where multiple urban stormwater discharges require consent.

Urban catchment activities need to be managed to minimise the disruption to natural systems (including native flora and fauna), the benefits they provide, and the risk to public health and safety. The crucial factor in stormwater management is integrating land-use, stormwater, and infrastructure management at the catchment level. A CSC should be viewed as a process that achieves this integration through catchment management planning and the use of the different approaches and tools available, including:

- Planning;
- Education;
- Regulation;
- Implementation;
- Monitoring; and,
- Enforcement.

These methods of implementing stormwater management initiatives are outlined in more detail in the strategy.

[4] In the context of these guidelines, an 'urban catchment' is considered to be a defined urban area for which a CSC is sought. The defined urban catchment may be the entire urban area from which rainfall is collected and consist of many hydrological sub-catchments. It is likely to have multiple stormwater discharge points to receiving water that are located both within and beyond it's boundaries.

Establishing a consistent management approach is important for stormwater management in the foreseeable future, for its ability to adapt if circumstances and/or assumptions about the future were to change significantly. It is important that a CSC enables a catchment management planning process that ensures this flexibility and evolution of the process is taken into account and open to improvement if the circumstances warrant it. A CSC will therefore be granted on the basis that CMPs are established and implemented as a condition of consent and are reviewed and updated on a defined basis.

Historically stormwater management has focused on flooding issues. Today stormwater quality and receiving environment effects are being better understood. A CMP should set out the relevant issues for a catchment and then develop and/or use existing appropriate tools to plan and manage the variety of stormwater issues present. These relate to 'water quantity', 'water quality' and 'receiving environment' issues.

1.5 What a CSC Authorises

Environment Bay of Plenty approval of a CSC authorises all stormwater related activities for the entire catchment or group of catchments for which the application was made.

It is expected that catchment management planning will identify a number of stormwater management measures necessary to allow development while providing protection from a number of likely effects. Such effects include flooding, stream channel erosion and effects on aquatic values within the receiving environment from scouring and accumulation of toxic contaminants. The CMP and the CSC application should identify specific works and activities required for stormwater management within the catchment. Examples are identified in the following table.

Table 1.1 Examples of Stormwater Related Activities to be considered for Inclusion in Comprehensive Stormwater Consents

Activity	Examples
Discharges	• Stormwater from roofs, driveways, yards, carparks, • Stormwater from roads, streets, highways • Contaminated stormwater from commercial and industrial premises • Contaminated stormwater from small scale earthworks sites • Stormwater discharges authorised by existing consents. • Existing stormwater discharges covered by permitted activity rules.
Maintenance Activities	• Maintenance of stormwater treatment devices and systems • Maintenance of stormwater infrastructure • Repairs to structures, reinstatement of flood damaged works or structures • Litter/debris removal
Stormwater related Activities in the Beds of Rivers, Lakes, Watercourses and in the Coastal Marine Area.	• Outfall structures • Treatment devices/swales • Piping of watercourses/artificial lining, widening and channelling • Debris deflectors • Diversions • Detention structures and dams • Floodgates, pump stations • Stopbanks • Vegetation removal • Vegetation planting • Pipeline crossings of streams/watercourses • Flood ways/secondary flow paths • Weirs/measurement stations • Mitigation works in streams and watercourses • Earthworks associated with installation of stormwater infrastructure including detention dams, swale construction, protection works, mitigation works, flood ways

Environment Bay of Plenty promotes undertaking preliminary design for such installations that will provide a level of information sufficient to make a decision on its appropriateness given the local circumstances. There may be constraints to achieving this, however, Environment Bay of Plenty strongly encourages that all necessary consents are applied for. This will reduce duplication in the future and, providing the consents are obtained, allow the TAs to undertake their role with reduced involvement from the regional council.

One important aspect of allowing CSC applications to include a number of other consents related to the overall catchment management, is to give the TA the certainty that development may progress within the catchment under certain restrictions, while not being impeded by ongoing time consuming consenting

procedures. However, there will still need to be a robust and thorough assessment process undertaken by Environment Bay of Plenty prior to construction of individual work to consider the potential effects of those works, including the effect on any potentially affected party. This may require further consultation with affected parties when detailed design occurs, if works (for example to construct a stormwater detention dam) are based on preliminary design only.

It should be noted that a CSC does not authorise either:

- bulk earthworks for subdivisional development and land contouring and associated sediment contaminated discharge that does not comply with the rules for permitted activities specified in relevant Regional Plans; or

- discharges from industries and/or activities specifically excluded from each CSC.

1.6 Catchment Prioritisation

Environment Bay of Plenty and the relevant TAs have undertaken the prioritisation of catchments across the Region. This prioritisation is detailed in the Environment Bay of Plenty SS, which includes ranking of the catchments that require assessments and CMPs to be developed to support the CSC applications.

Refer to Section 6 in the strategy

2 Catchment-Wide Approach to Stormwater Management

2.1 Introduction

The approach that Environment Bay of Plenty promotes for catchment-wide stormwater management in urban catchments is set out below:

2.1.1 Values

Identify the catchment and receiving environment values, including those that should be protected and enhanced. Catchment values have been considered on a summary basis during the prioritisation process, however, further detailed investigation into such values may be needed;

2.1.2 Issues

Identify actual and potential stormwater management issues (further details are contained in the strategy) such as:

- Flooding
- Land stability
- Pollution from urban stormwater and other contaminant sources
- Industrial sites
- Hazardous substances management
- Contaminated site and high risk facility management
- Urban development
- Effects of stormwater runoff on receiving environments;

Historical records will provide guidance on many of these matters.

Objectives: Set stormwater management objectives for the catchment that relate to the catchment and receiving environment values, and identified stormwater management issues;

Options: Present alternative stormwater management options and describe their consequences in terms of providing catchment-based management solutions to the issues identified, and achieving the set stormwater management objectives;

Methods: Propose the preferred means for addressing stormwater management issues and implementing the preferred stormwater management solutions. Include the principal reasons for adopting the approach and the environmental results anticipated;

Implementation: Implement the various catchment-based stormwater management initiatives and controls, as detailed in the CMP;

Monitoring: Following implementation of the various catchment-based stormwater management initiatives and controls, carry out monitoring to confirm that the anticipated environmental benefits are realised.

2.2 Cumulative Impacts

Many stormwater effects are only significant when considered cumulatively. Small contributions of contaminants or gradual increases in flow through development may not be noticeable on a day-to-day basis. Over time these small increases in flow or contaminants collectively combine to give a noticeable and significant effect. The need to consider effects collectively necessitates the catchment-based approach, and requires potential urban development scenarios to consider the maximum credible development of a whole catchment.

3 Scope of Comprehensive Stormwater Consent

3.1 Scope of consent

A CSC authorises the discharge of stormwater for the entire urban catchment as well as other activities identified as necessary through the Catchment management planning process. This may include consents pursuant to sections 9, 12, 13, 14 and 15 of the RMA. Section 1.5 of these guidelines notes that should other activities be identified that require consents, then it is encouraged that these activities also be included with the overall CSC application. In addition, the checklist contained in Annex 1 should be completed for each CSC application and all likely consents identified.

3.2 Term of Consent

The CSC will be granted for a maximum period of up to 35 years, unless circumstances are such to warrant lesser terms. Understanding of stormwater management issues has dramatically changed over the past 35 years and our knowledge of the effects of stormwater discharges and how management of these discharges may be improved will continue to increase. Where the effects of stormwater on the receiving environment are not fully understood, or the proposed stormwater management solutions are only able to partially mitigate the effects, it is likely that consents will be granted for a shorter duration. Longer term consents may be granted with review conditions that allow reviews to take place on a 5 or 10 yearly basis depending on the catchment circumstances.

The consent will only authorise the discharge of stormwater relative to the proposed development scenario and intensity detailed in the application. Changes to such variables throughout the term of consent are likely to require a change to the existing consent, or a new consent.

3.3 Flooding Issues

Stormwater reticulation systems in conjunction with urban land-use can adversely affect flood potential by:

(i) Limiting the rate at which stormwater leaves a catchment (i.e. depending on the reticulation pipe sizes and the presence of obstructions to natural stormwater flow paths);

(ii) Increasing the rate of stormwater discharge to downstream catchments (i.e. by collecting, aggregating and discharging stormwater).

In many cases it is difficult to separate the natural ponding of stormwater in urban areas from effects of stormwater reticulation. For example, to what extent is urban ponding a result of decisions about reticulation pipe sizes and locations, and to what extent is it natural phenomena resulting from a combination of rainfall and topography? Further to this, in some instances ponding is the direct result of the deliberate design of the stormwater system to reduce peak flows down stream during high intensity rainfall events.

In terms of the CSC process, the matters that Environment Bay of Plenty seeks to control are those relating to points 1 and 2 above. These are considered to be the direct potential effects of the discharge of urban stormwater in terms of catchment flooding. Specific information is therefore required to enable an appropriate assessment of these effects, as detailed in section 7 of these guidelines.

The effects of 'natural' ponding on urban properties will not be directly controlled via CSCs. However, due to the grey area between 'natural' ponding, and ponding exacerbated by decisions about pipe sizes and locations, Environment Bay of Plenty will require information about the extent of existing flooding problems in urban catchments (i.e. where is flooding a regular problem within urban catchments?).

3.4 Stormwater Contamination

The passage of stormwater runoff over impervious surfaces to watercourses, aquifers or the marine environment provides an effective pathway for contaminants to be entrained and discharged to receiving waters. Accumulation of these contaminants (primarily sediment, heavy metals, nutrients, pathogens and hydrocarbons) in deposition zones can cause the concentrations of the contaminants to reach levels that are toxic to freshwater and marine life (acute effects). Chronic long-term effects may occur where the build up of contaminants in deposition zones is detrimental to animals that live in the sediment which provide the basis of the biotic assemblage within an estuarine or freshwater system.

It is for this reason, that stormwater quality measures are incorporated as integral components of any Catchment Management Planning process, where there are activities within the catchment identified as contaminant contributors (industry and highly utilised roads for example) and receiving environment resources that require protection (surface water contact recreation, stock watering, amenity values, fish spawning areas etc).

For the CSC process, Environment Bay of Plenty proposes that stormwater quality or contamination issues should be considered to the following level of detail for existing and future development scenarios in urban areas.

(i) Identification of catchment land use and undertake mass loading calculations for the discharge of contaminants (based on Table 1, Environment Bay of Plenty SS);

(ii) Identify down stream and receiving environment resources that may be affected by any ongoing discharge of contaminants; and

(iii) Assess if methods need to be employed to address ongoing contaminant discharge.

This is addressed in further detail in Section 5.4

3.5 Wastewater Issues

Stormwater reticulation systems provide a conduit for a wide range of contaminants, including those derived from wastewater sources (e.g. human pathogens, oxygen demanding substances and heavy metals derived from wastewater system overflows and illegal wastewater system connections to the stormwater system). Wastewater discharges are reportedly not a common occurrence in the Bay of Plenty, however, such contaminants can significantly impact upon catchments and receiving environments. A key approach of these guidelines is the identification of catchment-based issues to be evaluated and resolved. It is important, therefore, that wastewater related contaminant sources are identified, their effect on catchment and receiving environment values assessed, and an appropriate management approach developed through the CSC and Catchment Management Planning process.

It is expected that the identification of wastewater issues will identify the extent that wastewater contributes contaminants to the catchment, and whether further specific wastewater investigation and assessment is required.

4 Stakeholders and Affected Parties

In development of a CSC application, it is necessary to identify those parties who may be affected by the management of stormwater in the identified catchment.

Stakeholders have a vital role to play in determining the specific values and objectives that apply to the catchment being considered. General guidance to determine values is available from the results of the catchment prioritisation process as well as a number of district and regional statutory planning documents; these include the Regional Policy Statement, the Bay of Plenty Regional Coastal Environment Plan, the Bay of Plenty Regional Air Plan and the Proposed Regional Water and Land Plan.

Environment Bay of Plenty, as a stakeholder, also has specific interest in the values considered for a catchment. Further to the information contained in the catchment prioritisation process, Environment Bay of Plenty is willing to assist in further determination of values for a specific catchment in conjunction with other stakeholders.

It is important to identify the potentially adversely affected parties early on in the process of developing a CMP and identify what activities may be necessary in order to ensure that consultation is undertaken with appropriate parties through the process of developing the CSCs and other consent applications. Roles and responsibilities of those involved in stormwater management shall be considered in developing a long-term management strategy for any particular catchment. The roles and responsibilities of individual stakeholders will vary locally.

5 Issue Identification

5.1 General

When preparing CSC applications, it is necessary to identify all issues and concerns related to the management of stormwater within the specific urban catchments. The nature, location, extent and severity of the issues will vary between catchments and over time with changing levels of development and land-use.

It is critical that catchment specific issues are clearly determined so that reasonable objectives and management solutions are developed during the CSC and Catchment Management Planning process. Identification of catchment-based issues requires careful review and analysis of available documentation, discussions with key stakeholders and affected parties, and land-use and receiving environment assessments.

For greenfield catchments earmarked for development, the overall goal of the CSC is protection or enhancement of existing values in the receiving environment. There are often natural stream channels that have aquatic resource values or potential values that should be protected (or enhanced where appropriate). Protection of stream channels cannot be achieved unless stormwater is controlled close to source. Therefore the focus should be toward on-site stormwater management considerations as opposed to consideration to only off-site catchment wide approaches. Low impact or conservative design developments will be encouraged as will off-line stormwater treatment measures.

For developed catchments, the overall goal of stormwater management should be to improve existing values within the receiving systems. There will be potential for improvement in such catchments, however, it is acknowledged that the same level of improvement is not expected when compared to greenfield catchments.

5.2 Overview of Urban Stormwater Management Issues

In accordance with the RMA and the RPS, the management of the adverse effects of urban stormwater runoff across the region is the responsibility of Environment Bay of Plenty and the TAs. In addition to the details covered in the strategy, the following discussion provides an overview of the potential adverse effects that may arise from the discharge of stormwater from urbanised catchments.

The traditional approach to stormwater management has been to consider stormwater on an individual site basis, not accounting for wider management issues. Consequently, individual site analysis has not traditionally considered downstream impacts on a chronic or cumulative basis. The negative effects of this 'piecemeal' approach can include:

- Depending on location, it only partially solves flooding issues, e.g. it may solve flooding issues in an upper part of a catchment but may increase flooding issues downstream, by discharging flows downstream more quickly;
- Issues related to aquatic resource protection or enhancement cannot be considered or are ineffectual;
- Significant capital and operation/maintenance expenditure may be incurred on numerous individual stormwater facilities;
- Remedial structural solutions may cost more than implementing integrated site management measures in the first instance.

On the other hand, catchment management approaches give clear goals for the overall programme and should result in the following benefits:

- Consideration, from a holistic perspective, of how natural resource systems are to be protected or enhanced;
- Setting priorities for a long-term integrated approach to resource and public protection;
- Encouraging public and stakeholder participation so that all parties contribute to catchment-based stormwater management solutions;
- Integrating all appropriate tools and resources into a co-ordinated, cost-effective, co-operative approach (e.g. low impact designs, risk management, pollution prevention programmes, stormwater treatment, receiving environment protection and enhancement);
- Determining the funding sources for the implementation of stormwater management solutions, monitoring, and maintenance;
- Identifying opportunities for preventative non-structural source controls (such as education initiatives, management systems and policy directions) in addition to structural controls (such as primary, secondary and tertiary treatment technologies) to better manage the effects of urban stormwater,
- Designing comprehensive systems for the long term needs of communities.

The following sections outline stormwater management issues that should be considered when determining the specific issues present in urban catchments.

5.3 Stormwater Quantity Issues

5.3.1 Land-use Activities and the Effects on the Quantity of Stormwater Discharged

Impervious surfaces created as a result of urban development such as roofs, driveways and carparks intercept rainfall and prevent infiltration directly to ground. The resultant runoff flows at much higher rates and in larger quantities than corresponding 'natural' or 'undeveloped' catchments and alters the hydrological regime of the catchment. Reduced infiltration reduces recharge of groundwater aquifers and subsequent supply of base-flow to streams.

The effects of the alterations to the hydrological cycle may include:

- Increased flooding hazard - through the increased rate and volume of runoff from impervious surfaces, flood elevations can be increased;
- Increased stream bank erosion - through increased peak flows and more frequent high flows causing instability of stream banks;
- Increased erosion on land and in the vicinity of stormwater outlets through the concentration of flows;
- Diminished receiving environment health and diversity - brought about by alterations in the hydrological regime, such as reduced minimum flow rates reducing aquatic ecosystem viability, habitat availability and downstream sedimentation effects;

- Reduced ground water resource and stream base-flows.

5.3.2 Values Potentially Affected by Changes to the Hydrological Regime

Risks of flooding on people, property and the environment – Increased runoff increases the risk of flooding in urban catchments and will impose a greater risk to human safety, property and the environment.

Ecological and Habitat Values – Increased uncontrolled runoff will result in increased erosion. Increases in streambank erosion can be grouped as 'instream' (channel widening and undercutting of streambanks) and 'out of stream' (slumping as a result of sheet flows and saturation of sloping land). Increased erosion on land may also occur from changes to the hydrological regime. All types of erosion raise sediment loads within watercourses, potentially smothering aquatic flora and fauna, while instream erosion may result in the removal or modification of suitable habitat for aquatic flora and fauna. Reduced low flows also potentially affect aquatic resources.

Amenity Values - The public's use and enjoyment of natural waterbodies may be adversely affected by the physical changes brought about from flooding, erosion and sedimentation. The resultant degradation can potentially affect recreational use and the aesthetic qualities of the waterbody.

Tangata Whenua Values - The significance of discharges to Tangata Whenua is that the contamination or degradation of water has the effect of diminishing the 'Mauri' or life force of receiving waters.

Public Use – During periods of low flows the water resource available to downstream water abstraction users can be degraded through the assimilative capacity of the receiving water being reduced.

5.3.3 Values Potentially Affected by Works to Manage the Effects of Flooding

The receiving waters of urban catchments may be modified by piping and/or the construction of engineered channels for scour protection to improve drainage efficiency and reduce localised flood flows. These modifications can alter the ecological and habitat values of receiving waters by introducing barriers to instream fish migration, and by reducing or fragmenting suitable stream habitat. They will also potentially affect other values such as those detailed in section 5.3.2. The loss of these values can often be avoided or mitigated through the careful design of stormwater management facilities.

5.4 Stormwater Quality Issues

5.4.1 Land-use Activities and the Effects on the Quality of Stormwater Discharged

Many urban land uses can generate contaminants that enter stormwater reticulation systems and discharge to receiving waters. These include:

- Transportation, storage, use and disposal of toxic and hazardous substances;
- Vehicle use and emissions;
- Earthworks during construction and urban development;
- Poor industrial and commercial site management practices;

- Poor domestic, commercial and industrial waste disposal practices;
- Runoff from roads, car parks, roofs and other paved surfaces.

Typical contaminants found in urban runoff include:

- Sediment;
- Metals (including zinc, copper, and lead);
- Oils and grease;
- Oxygen demanding substances (decomposition of organic debris);
- Nutrients (predominantly nitrogen and phosphorus);
- Pathogens (human and animal wastes);
- Litter;
- Others (e.g. pesticides, herbicides, waste paint, solvent and oils).

The resultant effects of contaminated stormwater entering receiving waters can include:

- Reduction in dissolved oxygen levels;
- Bacterial/pathological contamination of bathing waters and shellfish resources;
- A range of thermal impacts resulting from runoff discharges at elevated temperature levels;
- Smothering of bottom dwelling animals;
- Acute and chronic toxic impacts on sensitive species;
- Eutrophication;
- Aesthetic degradation;
- Scouring of habitats associated with increased flows.

5.4.2 Values Potentially Affected by Contaminated Stormwater Entering Receiving Waters

Ecological and Habitat Values - Stormwater contaminants attached to particulates tend to settle out in 'depositional areas' where the turbulence and energy in the water column is insufficient to keep sediments mobile. Accumulated contaminants in some of the receiving waters in the region are at levels where adverse effects on aquatic flora and fauna may be observed.

Amenity Values - The public's use and enjoyment of natural water bodies may be adversely affected due to the physiochemical changes brought about by contaminated stormwater entering these water bodies. The resultant degradation of water quality can potentially affect recreational use and the aesthetic qualities of the water body.

Tangata **Whenua Values** - The significance of discharges to Tangata Whenua relate to the contamination and degradation of water that has the effect of diminishing the 'Mauri' or life force of receiving waters.

Public Health/Use – Stormwater contamination has potential public health risks for contact recreation activities, drinking water supplies, and fish consumption. The development of conveyance infrastructure may pose sale issues for the surrounding community.

6 Catchment Management Planning

To achieve comprehensive and integrated stormwater management it is important that stormwater management activities are guided by strategies or plans. A CMP is the basic planning and management tool for stormwater at the individual catchment level. It provides the link between the strategic level policies and the implementation of stormwater management initiatives and controls. A CMP is required for all CSCs. It is the principal means by which remedial and improvement programmes are to be established and stormwater management objectives set.

A CMP should only be as detailed as necessary for the specific situation. While the following guidelines list the issues and matters that need to be considered, a number of catchments will not require an extensive investigation into all aspects noted. The nature of the catchment and receiving environment should reflect in the level of detail contained in any CMP. For catchments that include significant potential sources of contaminants or high levels of imperviousness and/or with highly valued receiving systems then more detailed CMP to support a discharge consent application should be developed. More straightforward CMPs are expected where catchment and receiving system conditions are less complicated.

CMPs will assist TAs in recognising the stormwater related impacts of land-use activities within urban catchments, and to develop 'best practice' management strategies and programmes to address those impacts at the catchment level.

The level of detail required for consent activities, other than the discharge, over and above the CSC that is identified as necessary is contained in Annex 1. It is expected that a preliminary design level of information will be reflected in these applications, and consideration of any likely effects and potentially affected parties and any consultation entered into as a result. As consultation with affected parties will be required for the overall CSC, consultation requirements may be streamlined by considering all affected parties up front. Environment Bay of Plenty may request, via conditions of consent, that further consultation take place as design of any stormwater treatment measure proceeds and the potential effects are defined in detail.

6.1 Risk Management

Risk management is based on assessing the risk or likelihood of losing significant values of receiving environments due to the impacts of urban stormwater. Stormwater flows (quantity) and stormwater pollution (quality) pose a threat to environmental, tangata whenua, amenity, and public health/use values. The risk of those values being impaired or lost depends on two factors:

- The scale or severity of the stormwater threat; and
- The sensitivity of the receiving environment to that threat.

The process of identifying catchment-specific stormwater management issues should therefore be risk-based to assist the development and prioritisation of appropriate stormwater management objectives at the catchment level.

6.2 Stormwater Management Objectives

Having identified and assessed the issues relating to stormwater management, under existing and likely future conditions within the catchment, consideration should be given to the measures required to achieve these environmental

outcomes. Environmental outcomes are described as the Stormwater Management objectives, within the identified catchment.

When assessing any application for a resource consent, Section 104 of the RMA outlines the matters to be considered by Environment Bay of Plenty, subject to the provisions in Part II of the RMA, while having regard to any relevant objectives, policies and rules in any relevant policy statements and plans. Furthermore, Environment Bay of Plenty may only grant a resource consent for the discharge of stormwater in accordance with the provisions of Section 105, 107 and 108 of the RMA.

In setting objectives relating to resource management issues within a catchment regard needs to be had to the relevant statutory requirements and policy provisions in the relevant policy documents and plans. Reference should be made to the Regional Policy Statement, the Bay of Plenty Regional Coastal Environment Plan, the Bay of Plenty Regional Air Plan and the Proposed Regional Water and Land Plan. These requirements and provisions set out the framework from which any objectives for the management of the stormwater system should be developed.

In setting objectives for the management of stormwater within a catchment, matters other than resource management issues need to be considered. These might include the TA's asset management planning issues such as the day-to-day management functions and the costs of constructing new or upgrading existing infrastructure as well as ongoing maintenance costs. These should form part of the objective setting process for the management of stormwater within the catchment.

6.3 Option Analysis

Options for achieving stormwater management objectives should consider the range of point source and non-point source discharges within urban catchments. This will help develop stormwater management solutions that promote the integrated management of natural and physical resources. It is important that stakeholders and affected parties are actively encouraged to participate during this stage of the planning process.

The consideration of stormwater management options requires a wide range of traditional and non-traditional stormwater management practices to be identified and evaluated. Environment Bay of Plenty considers that CMPs are broad planning instruments that may include a range of initiatives and controls to manage the effects of catchment discharges. Therefore initiatives and controls considered for inclusion in CMPs should not be restricted to traditional 'structural' practices to fix or mitigate stormwater effects, but include longer term solutions such as land-use policy and planning controls, non-structural source initiatives and controls, and the application of the broad range of available primary, secondary, and tertiary treatment technologies. By considering this range of initiatives and controls, innovative and integrated catchment specific solutions can be developed.

The scope of practices recommended must be practical and effective. Method 8.3.1(c)(xvi) of the Regional Policy Statement states that district councils are encouraged to "have regard to the maintenance and enhancement of water quality in considering resource consent applications and in district plans". This should include the use of longer-term tools in the suite of practices that are recommended to meet the adopted Stormwater Management objectives.

In terms of determining 'options', section 2 of the RMA provides a definition of 'Best Practicable Option', i.e.

"Best Practicable Option … means the best method for preventing or minimizing the adverse effects on the environment having regard, among other things, to

(a) *the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and*

(b) *the financial implications, and the effects on the environment, of that option compared with other options; and*

(c) *the current state of technical knowledge and the likelihood that the option can be successfully* applied."

6.4 Implementing Initiatives and Controls

The implementation of 'best practice' stormwater management solutions is a critical consideration for Environment Bay of Plenty and the TAs. When issuing a CSC, Environment Bay of Plenty requires certainty that the catchment-specific stormwater management issues are addressed, and the stormwater management objectives met.

An implementation programme, detailing the timing or at least the staging for the various stormwater management initiatives and controls to be implemented within the catchment, should therefore be developed as part of the Catchment Management Planning process.

However, it is understood that in many cases this may not be possible because of the lack of specific information. There may even be situations where there is insufficient data to enable any robust decisions to be made on the scale or magnitude of the perceived issues, let alone on the best stormwater management solutions to be implemented. In such cases a CMP should be prepared regardless. Although there will be limited initial information, the planning process should concentrate on providing:

- An assessment of the existing information gaps;
- A plan of action to improve available information to facilitate future review of the CMP;
- An assessment of the likely stormwater management issues and the likely range of possible solutions;
- An assessment of the risk associated with the likely issues and problems within the catchment; and
- A timetable for the programme of investigation needed to complete the CMP in accordance with these guidelines.

As more data becomes available, or the stormwater priorities for the catchment change, the CMP can be updated and reviewed and where works are identified, further consent applications and supporting information lodged. Each urban catchment should be considered in its entirety with sub-catchments used to characterise the issues (i.e. each sub-catchment and its various land uses is likely to present significantly different issues).

7 Matters to be Included In CSCs and CMPs

The matters listed below must be included in CSC applications lodged with Environment Bay of Plenty. Information to be submitted can be classified in four broad categories; general information, water quantity, water quality, and aquatic ecosystems.

Applications for CSCs should include an Assessment of Environmental Effects (AEE) with consideration of all the matters detailed in the Fourth Schedule of the RMA. The scale and complexity of the AEE should also be in proportion to the receiving environment sensitivity, the scale of discharge effects and the complexity of the issues. These guidelines are provided as an indication of the issues that may be present in a catchment and the work Environment Bay of Plenty considers necessary to adequately analyse and comprehensively plan for their management. However, any given catchment may require additional investigation to understand and resolve specific issues.

It may not be necessary in every case to provide a detailed analysis and management options associated with the Water Quantity, Water Quality and Aquatic Ecosystem sections. However, it is important to provide information for each of the topics and explain why it may not be appropriate to go into greater detail on any individual aspects. It is expected that water quantity and quality will be addressed in each CSC. The inclusion of aquatic ecosystem objectives and requirements will depend on the individual catchment that a CSC is being applied for.

7.1 General Information

Information requirements include the following:

7.1.1 Inputs

- Identification of the Stormwater Management objectives to assist in managing the effects of the discharge of stormwater in the catchment taking into account any relevant statutory requirements and policy directions.
- Outline of regulatory framework and policy directions. Consideration should be given to the Regional Policy Statement, Proposed Regional Water and Land Plan, Bay of Plenty Regional Coastal Environment Plan and the appropriate Environment Bay of Plenty technical publications.
- The limits of the catchment for which CSC is sought.
- Map references of the overall catchment discharge points including each pipe outlet that discharges to “land” or “water” as defined by the Resource Management Act.
- An aerial photograph of the catchment, if available.
- Maps or plans of the catchment showing the following information:
    - Catchment boundaries and principal subcatchments,
    - Catchment topography, particularly receiving water locations,
    - Pipe and ‘open drain’ discharge points to receiving waters,

- Reticulation infrastructure, including the main pipe systems, open drain systems, and any wastewater system overflow points, including existing consents (public and private),

- Existing information on secondary flow paths,

- Existing land-use based on existing District Plan zoning,

- Soil and geological information.

- A description of groundwater / surface water interaction in the catchment, where relevant.

- An inventory and map showing the location of:

  - Significant natural resources (e.g. green network features and natural receiving waters), including an identification of vegetation and species habitat for both aquatic and terrestrial systems is required. As a guideline, reference should be made to the classifications and values that are outlined in the statutory and relevant planning documents,

  - Key industrial sites and their potential hazard,

  - Sites of cultural, historical, archaeological and geological significance.

- A description of all existing water-related consents in the catchment (assistance will be required from Environment Bay of Plenty to obtain this information).

- Identification of any geological, topographical or any other constraints that may influence or limit stormwater management options.

- Identification of stakeholders and parties affected by the management of stormwater in the catchment, any consultation undertaken and the results of that consultation.

- A description of the receiving environments. Relevant data should be compiled (e.g. photographs, maps) describing the receiving waters in the catchment. The character of each receiving water should be described, including such details as size, flow characteristics, general water quality characteristics, stream channel modifications, and ecosystem health, i.e. habitat quality and the abundance and diversity of biological communities present.

- An assessment of the extent to which the existing land-use within the catchment is developed to capacity against District Plan zonings.

- An assessment of the likely development scenarios of the catchment, using a projection period greater than or equal to the sought consent duration. In determining the likely future development scenarios, an estimate must be made of the likely area of impervious surfaces to be created in the catchment, and the anticipated future land uses which may lead to an increase in the quantity of runoff volumes and the concentration of contaminants entering receiving waters. Likely development scenarios for a catchment should be determined by analysis of the statutory and relevant planning documents that relate to the catchment.

7.1.2 **Outputs**

- The options and proposed management solutions to catchment-based issues should be assessed against the identified stormwater management objectives, as well as the provisions of the statutory and relevant planning documents to determine the appropriate stormwater management approach.

- Identification of the catchment / receiving environment values, stormwater management issues, and stormwater management objectives. Emphasis should be placed on identifying and evaluating 'best practice' solutions to managing priority stormwater risks.

- Preparation of a Catchment Management Plan (CMP). The proposed stormwater management approach that details recommended 'best practice' stormwater management initiatives and controls to be implemented in order to achieve the determined stormwater management objectives. These should include a variety of land-use policy and planning controls (e.g. impervious area limits), non-structural source initiatives and controls, and the various primary, secondary and tertiary treatment technologies available for application, including:

  - Recommendations, where appropriate, for changes to the provisions of statutory and relevant planning documents (e.g. District Plan, Asset Management Plan, design standards for urban development and other municipal works) to achieve the planning consistency required to meet the stormwater management objectives and implement the preferred stormwater management solutions;

  - Identification of performance standards that will apply for both quality and quantity (this may be a reference to TA Codes of Practice, or to national / industry standards or guidelines);

  - A prioritised schedule of the stormwater management initiatives and controls to be implemented and noting any further resource consents required and whether they have been applied for;

  - A methodology to ensure certainty of the implementation and timing of stormwater management initiatives and controls;

  - An 'operations and maintenance plan' including inspection procedures for stormwater management initiatives and controls;

  - A 'monitoring strategy' to assess whether CMP implementation is achieving the stated stormwater management goals and objectives;

  - A schedule of the management procedures to ensure adherence to the CMP across functional areas of the TA, and the other agencies responsible for stormwater management;

  - Any educational initiatives (existing and planned);

  - Any other initiatives, incentives or disincentives to encourage improved environmental outcomes (e.g. stream restoration programmes, subsidies, development fee rebates),

  - Any financial or resourcing requirements for the effective implementation of the CMP.

- Preparation of an assessment of the environmental effects (AEE) for the proposed stormwater management regime and associated discharges. The receiving environments will include all receiving waters in the catchment and downstream coastal waters.

7.2 Stormwater Quantity

Information requirements include the following:

7.2.1 Inputs

- Stormwater runoff calculations for the catchment under existing and likely future development conditions. Runoff calculations should use methods that are appropriate for the Bay of Plenty region. That determination shall be based on analysis and verification of information provided from gauged catchments within the Bay of Plenty, or use design guidelines prepared by Environment Bay of Plenty and/or by the TA.

- Identification of the existing stormwater reticulation system, and the capacity of each section. Also identify where parts of the reticulation system do not meet the TA design standard.

- An inventory and map of historic flood damage sites, and an estimation / account of the frequency and severity of the flood damage. Areas where flooding has historically occurred downstream of stormwater discharge points should also be identified.

- An inventory and map of existing and potential future erosion and sedimentation sites within the catchment and receiving environment. Erosion sites should include both terrestrial and stream channel erosion.

- An assessment of existing and potential future base-flow fluctuations in receiving waters and their effects on habitat quality, the abundance and diversity of biological communities present, and any downstream water abstraction uses.

- An assessment of groundwater levels and groundwater / surface water interaction in the catchment. This should include consideration of discharges to groundwater and the implications for water abstraction uses.

7.2.2 Outputs

- A risk assessment of high velocity flows and receiving water base-flow fluctuations which pose key threats to receiving environment values.

- Identification and consideration of alternative stormwater management solutions to address existing and future stormwater quantity issues, including:

  - Urban land-use development in relation to increased runoff volumes and receiving water capacity,

  - Stormwater reticulation capacity,

  - Secondary flow paths,

  - Potential to use low impact design techniques,

- Velocity controls to manage erosion potential and habitat values in receiving waters,

- Flow controls to reduce the volume of runoff discharged to surface waters, and the magnitude of base flow fluctuations in receiving waters,

- Streambank erosion protection,

- Preservation and enhancement of natural stream channels and other types of receiving waters,

- Stormwater management structures in receiving waters, and

- Monitoring programmes.

The options and proposed management solutions to stormwater quantity issues should be assessed against the identified stormwater management objectives, as well as the provisions of the statutory and relevant planning documents to determine the appropriate stormwater management approach.

7.3 Stormwater Quality

Information requirements include the following:

- An inventory of existing water and sediment quality data that exists in the catchment.

- Land use activities in the catchment and their potential to generate contaminants under the present and likely development scenarios should be analysed. Unit loadings shall be used to determine the expected magnitudes of long-term contaminant levels. At a minimum, calculate loads from total suspended solids, indicative heavy metals, total petroleum hydrocarbons (TPH), total nitrogen, and total phosphorus. This should include an estimation of the proportion of impervious area cover and identification of high-risk hazardous facilities which have the potential to discharge contaminants into the waterbodies of the catchment.

- Identification of catchment 'hot spots' from the land uses and unit contaminant loadings.

- Identification of specific site activities with a high contamination risk.

- A methodology to review contaminant loadings and identify new contaminant sources over the consent period.

- Identification of existing formal and informal sewage overflow points and data showing the frequency, volume and duration of existing sewage overflows and the net infiltration/exfiltration rates of the sewerage system.

- Alternatives analysis to address existing and future water quality problems including:

  - stormwater quality management structures,

  - source control efforts including impervious surface considerations,

  - pollution prevention,

- identification of illegal or inappropriate connections, and
- erosion and sediment control on small sites.

Once the objectives of the management of stormwater in the catchment have been determined and options and methods available to achieve the objectives identified defined and an assessment should be made of the effectiveness of the options identified in terms of satisfying water quality goals or objectives.

It is noted that there may be opportunities to combine stormwater quality and quantity measures into multi-purpose devices and therefore reduce overall costs.

7.4 Receiving Environment Considerations

Aquatic ecosystem considerations are closely linked with both water quantity and quality considerations. An example of this is the water quantity issue of stream channel erosion. The total volume, peak rate of discharge, frequency of discharge, and duration of discharge have a significant impact on the physical structure of a stream, and are therefore a component of aquatic ecosystem analysis. This assessment should be undertaken in accordance with the scale of the activity and the nature of the proposed discharge. This should include:

- An assessment of the streams within the catchment including:
  - identification of all perennial streams,
  - an evaluation of the stream's potential for channel erosion or sediment deposition,
  - stream side vegetation type and density,
  - stream morphology discussion (channel shape, meander, etc.), and
  - assessment of the low flow regime.
- An assessment of aquatic health within the streams including:
  - fisheries diversity and abundance,
  - abundance and diversity of macroinvertebrates,
  - estimated percent cover of periphyton or macrophytes,
  - documentation of any fish kills,
  - barriers to fish passage, and
  - presence of nuisance algae, vegetation.
- An assessment of aquatic health within the downstream (estuarine/coastal) receiving environment.
- Identification of receiving environments or parts of receiving environments that are degraded. This may require assistance from Environment Bay of Plenty.
- Identification of opportunities to improve the quality of receiving environments, including but not limited to measures identified under sections 7.2 and 7.3.

Annex 1 – Checklist for CSC Associated Consent Activities

Environment Bay of Plenty seeks to streamline the overall consenting process for stormwater management. An overall "Project Consent" incorporating all necessary activities for each catchment is to be considered on its merits and approved as appropriate. The objective of the CSC is to consent as many stormwater management activities within the catchment as is practicable.

The following sets out a number of points to consider when completing the CMP and associated CSC application. This is for the express purpose of identifying any and all works and other activities that may need to be consented within the CSC.

(i) What, if any physical works have been identified in the Catchment Management Plan supporting the CSC application?

(ii) Do any of these works require dam and/or diversion consents (Section 14)?

(iii) Are there any outfalls to be constructed?

(iv) Are these outfalls contained in a watercourse or lake (Section 13)?

(v) Are any outfalls within the Coastal Marine Area that require coastal disturbance and/or occupation consents (Section 12)?

(vi) Are there any works that may affect wetlands, streams or lakes or coastal margins, either requiring construction or modification of these features?

(vii) Are there any earthworks required for the construction of stormwater treatment devices (Section 9)?

(viii) Are these land disturbing works in excess of the criteria that trigger the need for resource consents, and will these works lead to a temporary discharge of sediment (Section 15)?

(ix) During the investigation into the CSC application, were there any maintenance activities identified that may require resource consent from Environment Bay of Plenty (e.g. streamworks, discharge of contaminants to land etc)?

This information should be incorporated into the CMP documentation and an indicative methodology identified. This will allow consenting officers the ability to undertake an initial assessment of each activity and consider whether a consent, combined with the CSC can be approved for the activities interrelated with the CSC. It is recommended that when consultation with potentially affected parties takes place, that all potential works are detailed and discussed. In addition, any potential effects need consideration.

Level of Supporting Information

The following sets out a number of matters to consider and include in information supporting consent applications required to meet the outcomes of the CMP. The level of detail supplied should reflect the nature of the proposal and the likely scale of effects. The following lists provide a summary of the matters that should be considered for each consent. Further information and guidance in this regard can be obtained from the consent applications contained on the Environment Bay of Plenty web site (www.envbop.govt.nz).

Section 9 – Land Disturbing Activities (and associated s.15 discharge activities)

- The nature and scale of the activity (dimensions, purpose, performance materials to be used, etc) and a description of the site.
- Timing and duration of the activity.
- Preliminary construction methodology including design plans if appropriate.
- Receiving environment description, as contained in CMP.
- Assessment of effects given the likely sediment generation, the values identified in the receiving environment and the measures utilized on site to minimise sediment generation and discharge.
- The identification of potentially affected parties and any consultation undertaken.

Section 12 – Works and Structures within the Coastal Marine Area

- Type of permit sought (disturbing foreshore, structures, occupation etc).
- The nature and scale of the activity (dimensions, purpose, materials to be used, etc) and a description of the site.
- Timing and duration of the activity.
- Preliminary construction methodology including design plans if appropriate.
- Receiving environment description, as contained in CMP, including recreational, ecological, wildlife, landscape and cultural aspects.
- Assessment of effects (water quality, visual, effects of marine life, cultural effects) given the construction activities, the values identified in the receiving environment and the measures utilised on site to minimise construction effects and any ongoing potential for effects.
- The identification of potentially affected parties and any consultation undertaken.

Section 13 – Works in a Watercourse, Modification of Wetlands, Structures in a Waterbody

- Timing and duration of the works.
- Description of the proposed activity (dimensions, purpose, materials to be used, etc) and a description of the site.

- Preliminary design plans, including cross sections of the watercourse where appropriate and preliminary design details and calculations.

- Construction methodology.

- Receiving environment description, as contained in CMP.

- Assessment of effects – actual or potential effects that the proposed operation/activity could have on the environment including:

- construction effects,

- effects on watercourse hydrology and hydraulics,

- fish passage (construction and operation phases),

- potentially affected parties and any consultation undertaken.

Section 14 – Dam/Diversion of Surface Water

- Timing and duration of the works.

- Description of the proposed activity (dimensions, purpose, materials to be used, etc) and a description of the site where the damming/diversion is to occur.

- Preliminary design plans, including cross sections of the watercourse where appropriate and preliminary design details and calculations.

- Construction methodology.

- Receiving environment description, as contained in CMP.

- Assessment of effects – actual or potential effects that the proposed operation/activity could have on the environment including: construction effects, effects on watercourse hydrology and hydraulics, fish passage, downstream users.

- Potentially affected parties and any consultation undertaken.

Annex 2 – Suggested CMP Format

To help streamline preparation and evaluation of CMPs, the following draft Table of Contents is provided:

1.0 Introduction

- 1.1 Scope
- 1.2 Objective
- 1.3 Legislative Background
- 1.4 Consultation

2.0 Description of Extent of Catchment

- 2.1 Study Area (Tabulate discharge locations with detail, flow, location etc)
- 2.2 Geology and Soil
- 2.3 Land Use

3.0 **Existing Information**

- 3.1 Hydrological Modelling
- 3.2 Assessment of Flows by Guidelines
- 3.3 Determination of 1% AEP Flood Levels
- 3.4 Existing Consents within the Catchment(s)

4.0 Identification of Stormwater Management Issues

- 4.1 Stormwater Quantity
  - 4.1.1 Flood Hazard Maps
  - 4.1.2 Secondary Flow Paths
  - 4.1.3 Development within 1% AEP Area
  - 4.1.4 Streambank Erosion
  - 4.1.5 Methods for Improvement
- 4.2 Stormwater Quality
  - 4.2.1 Current Stormwater Quality Management
  - 4.2.2 Potential Sources of Contamination
  - 4.2.3 Stormwater Treatment Requirements
  - 4.2.4 Methods for Improvement

5.0 **Assessment of Environmental Effects**

- 5.1 Identification of Resources within the Catchment and Receiving Waters
- 5.2 Summary of Potential Threats to Resource Values
- 5.3 Recommended Methods to Protect Catchment Resources

6.0 **Recommendations**

- 6.1 Combined Quantity and Quality Measures
- 6.2 Capital Works (Refer to Project Data Sheets contained in Annex 2. Tabulate physical works with reference number, location size, performance (flows, volumes etc), cost, and timing.)
- 6.3 Resource Consent Requirements (Tabulate all consents to be covered under the umbrella of the CSC. Include relevant supporting data and itemise in Table of Works)

6.4 Other Recommended Methods (education strategies, source control etc)

6.5 Monitoring Procedures and Performance Review (including frequency of review and update of CMP)

Appendix Project Datasheets (see example on following page)

Example Project Summary Sheet

Date: XX/XX/2003	***Catchment:*** Famous Landmark	***District:***	Western Bay of Plenty

Project Address: No.1 Downthe Street.

Project Description: Source control/pipe upgrade/stabilisation works/stormwater detention etc

Site plan/map

Problem Description: Existing catchpits block frequently.

Solution Required: Replace existing catchpits with splay pits.

CMP Y/N:	Y
CMP Works Item No:	X
Capital Estimate	$10,000
Maintenance Estimate	-
Estimate Accuracy:	Conceptual
Project Confidence:	Reliable
Solution Confidence:	Limited

These individual projects need a ranking process to be developed whereby the catchment threats are ranked in relation to the frequency of any effects occurring (flooding of property, flooding of buildings, stream bank erosion, impact on aquatic values etc), and the severity of the occurrence (minor health and safety risk to significant health and safety risk, both for people and property as well as aquatic resources).

Comments:

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Appendix B – Environment Bay of Plenty Rules relating to the Discharge of Stormwater

[Not included in this version of the Strategy as appeals still being resolved.]

Appendix C – Examples of Detailed Policies, Explanations, Implementation Methods and Monitoring

1 Introduction

This Appendix is based on detailed information contained within the *Waitakere City Comprehensive Urban Stormwater Management Strategy and Action Plan*, and is largely reproduced in a form that would provide a useful basis for any subsequent Territorial Authority Stormwater Strategies.

Each of the stormwater issues identified in Section 3 of the Stormwater Strategy has been addressed via management objectives, policies and implementation methods. Some of the stormwater issues included below are in addition to those provided in Waitakere City's strategy document, and are those that are applicable to the Bay of Plenty. Suggestions for monitoring to evaluate the effectiveness of implementing the stated policies are also incorporated.

1.1 Issues, Objectives, Policies, Explanations and Implementation Methods

The issues drawn from Section 3.2 of the Environment Bay of Plenty Stormwater Strategy are:

- Understanding the stormwater issue;
- An integrated and comprehensive management to stormwater;
- Loss of habitat quality and quantity;
- Point-source contamination of water;
- Non-point source contamination of water;
- Flooding;
- Accelerated erosion, including channel erosion and land instability;
- Land development potential;
- Altering the natural water balance;
- Existing stormwater infrastructure;
- Iwi perspective and involvement;
- Loss of community use of water resources;
- Stormwater reuse; and
- Stormwater sector awareness of stormwater issues

These issues are reiterated below, but with a more localised basis that may be developed further by the Bay of Plenty's City and District Councils

2 Understanding the Stormwater Issue

2.1 Objective 1

Develop a better understanding of the urban stormwater problem, specifically with regard to the effects of stormwater on the community and receiving environments.

2.2 Policies

(a) Review general and more specific stormwater management information including flooding and stormwater contaminant levels.

(b) Develop targeted education packages, including presentations to politicians and senior management.

(c) Identify education and enforcement liaison groups across the Region to ensure the consistent application of enforcement measures where appropriate.

2.3 Explanation

A comprehensive understanding of stormwater issues as well as understanding the consequences of selecting certain management initiatives will lead to more effective decisions occurring regarding the investment in stormwater infrastructure or imposing stormwater management initiatives on certain land users.

2.4 Implementation Methods

(a) Promote stormwater management issues and techniques when undertaking education activities.

(b) Develop targeted education packages, including presentations to politicians and senior management.

(c) Undertake a comprehensive review of relevant local information sources and identify obvious breaches in the information record. Highlight, via an investigation strategy document or similar, a series of investigations required to complete the information record. Discuss these breaches in the information record via the Stormwater Liaison Group network to identify methods of filling gaps.

(d) Review state of the environment monitoring programmes and reassess any of your own data gathering priorities, having regard to the overall environmental goals of the stormwater strategy.

(e) Develop and facilitate an education and enforcement liaison group across the district councils of the region and develop methods to ensure a consistent message is promoted to industry and the public across the region. Via this process, ensure the consistent application of enforcement measures where appropriate.

(f) Prepare public information material and publicise as widely as possible.

(g) Develop best-practice industry guidelines to promote the implementation of more effective stormwater management techniques.

3 The Need for an Integrated Management Approach to Stormwater

3.1 Objective 2

Provide for the integrated and comprehensive management of stormwater to address all aspects of stormwater management in the District.

3.2 Policies

(h) Prepare comprehensive Catchment Management Plans for each catchment in the District and obtain comprehensive discharge consents.

(i) Ensure involvement of external stakeholders, including Environment Bay of Plenty, iwi, landowners, developers and other industry representatives and the local community.

(j) Ensure involvement of all internal stakeholders as part of stormwater management process, including parks and reserves, planning, roading, consenting works and services and other relevant departments.

(k) Recognise and draw on the range of skills that contribute to stormwater management, including hydrology, engineering, ecology, water quality science, policy and planning.

(l) Highlight stormwater issues and promote better community understanding of the problems and solutions.

3.3 Explanation

(a) There is more to stormwater management than simply addressing flooding and the movement of water through a catchment. Ecological, recreational, amenity, landscape and cultural issues must be addressed even-handedly. Experts in disciplines other than engineering have much to contribute to stormwater management and can facilitate outcomes that also meet a range of other Council objectives relating to the protection of the ecological values, enhancement of landscape and amenity values and increased public access to natural areas. In addition, other disciplines also control Council land and activities that affect stormwater management performance. A fully integrated approach to managing stormwater from a multi-disciplinary perspective may be required depending on the circumstances of the District. However, measures are still required to ensure the diverse areas of expertise throughout the Council continue their involvement in sustainable stormwater management.

3.4 Implementation Methods

(a) Implement comprehensive monitoring and use the information for further stormwater catchment management planning.

(b) Prepare Catchment Management Plans that consider both the stormwater and wastewater system if wastewater discharges are an issue.

(c) Develop an incentives programme to promote improved stormwater management in new development. Such incentives could include reduced development contributions and transferable development rights.

(d) Work with iwi, recognising that iwi have a unique role as kaitiaki of natural resources, and provide opportunities to give effect to this role.

(e) Obtain comprehensive discharge consents according to the prioritisation of stormwater management units, with consents to be applied for as noted in sections 6 and 7 of the strategy and in line with the Comprehensive Stormwater Discharge consent guidelines.

(f) Amend this Stormwater Strategy to reflect any new proposed Regional Plan.

(g) Work with adjacent Districts' and Environment Bay of Plenty to manage catchments with shared responsibility or receiving environments.

(h) Work with iwi to develop integrated solutions for stormwater management that ensure the protection of the mauri of freshwater and marine resources.

(i) Hold regular internal workshops on stormwater management issues.

(j) In conjunction with Environment Bay of Plenty, apply sustainable stormwater management guidelines to all new subdivisions and developments, and incorporate these into the Council Code of Practice.

(k) Amend and update all sections of the Code of Practice to incorporate integrated stormwater management solutions.

(l) Ensure stormwater management is internally integrated with consenting, wastewater, parks and roading.

(m) Ensure Call Centre and customer services procedures are updated on a regular basis so as to maintain stormwater management in line with this Strategy.

(n) Identify any funding options and look for opportunities where such funding could enhance the benefits of stormwater management projects.

(o) Integrate stormwater maintenance and renewal programmes carried out in the town centres and development zones.

(p) Ensure the appropriate skills are brought together in producing Catchment Management Plans.

(q) Work with schools and community groups to form stormwater management partnerships.

(r) Undertake sustainable stormwater management demonstration projects and promote these district- and region-wide.

(s) Carry out community surveys to gauge people's attitudes and obtain their suggestions about stormwater management.

(t) Monitor and report progress against targets and report results to the community.

(u) Develop and support community based care-stormwater monitoring programmes.

(v) Hold regular workshops internally and with community stakeholders on stormwater management issues.

(w) Promote and assist community involvement and input into planning processes.

4 Loss of Habitat Quality and Quantity

4.1 Objective 3

Restrict the loss of habitat quantity and the degradation of habitat quality.

4.2 Policies

(a) Protect and enhance riparian vegetation.

(b) Minimise vegetation loss, both riparian and catchment-wide.

(c) Maintain sufficient water flows in streams to support health aquatic life.

(d) Minimise earthworks in or around watercourses.

(e) Ensure adequate sediment control conditions on all building and resource consents.

(f) Minimise work in watercourses, including removal of obstructions where flooding is likely.

(g) Promote bridges instead of culverts for stream crossings.

(h) Raise the level of understanding of the adverse effects of activities on habitat quality and promote sustainable solutions.

(i) When undertaking flood management or erosion protection, use methods that minimise interference with natural channel morphology.

(j) Include maximum impervious surface coverage limits in the District Plan.

(k) Avoid the creation of barriers to migration of inanga and other weak-climbing native fish species.

(l) Remedy existing barriers to mitigation of inanga and other weak-climbing native fish species.

(m) Avoid the piping and channelling of streams.

(n) Promote the restoration of degraded and piped or channelled streams.

(o) Stormwater management devices can and must be designed to increase habitat opportunities.

4.3 Explanation

Development should be located away from vulnerable watercourses and areas prone to flooding. Urban development should not occur in locations where such development will lead to significant adverse effects on water quality and water quantity. Identifying Riparian Margins and acquiring esplanade reserves are additional tools for maintaining and enhancing water and habitat quality.

At present, when development occurs, natural stream and wetland habitats are often only considered in isolation on single sites, and seen as dispensable, with the results that fewer and fewer of the region's natural aquatic habitats are being retained. The value of these remaining habitats is unappreciated and, as yet, little understood. Logs, natural debris and other objects can provide habitat and should be left in a stream unless serious flooding or stream erosion would result. Riparian vegetation plays an important role in shading streams, thereby reducing both peak water temperatures and water temperature fluctuations, and so maintaining more even water temperatures. It also provides shelter and refuge for aquatic invertebrates and fish, as well as a food source by dropping debris and providing habitat for terrestrial invertebrates. Riparian vegetation can also provide breeding and resting areas for many native birds and sheltered breeding areas for fish. Riparian areas also act as corridors for the movement and dispersal of native birds and vegetation. Vegetation throughout the catchment also assists in maintaining groundwater levels and filtering overland run-off. District Councils should advocate a precautionary approach to retaining what remains of these habitats in the District and maintaining their ecological health.

Appropriate management of headwaters of streams and watercourses is important for protecting and enhancing water quality and aquatic and riparian ecosystems. Revegetation of riparian areas is especially valuable because it reduces erosion and flooding, as well as helping to filter out contaminants before they reach the watercourse.

An understanding of in-stream fauna and their behaviour assists with providing for their habitat needs such as shade, shelter and food sources and their functional needs such as migration and breeding opportunities.

4.4 Implementation Methods

(a) Undertake riparian restoration on Parks, Drainage Reserves and other Council-owned land.

(b) Ensure replanting of appropriate species when undertaking willow and other riparian weed control.

(c) Revegetate banks of major streams as part of stream clearance/maintenance programmes.

(d) Ensure all Catchment Management Plans include provision for riparian protection, restoration and habitat enhancement.

(e) Plan the timing of any work in streams in their driest period when fish are not migrating.

(f) Comply with District Plan rules for Riparian Margins.

(g) Ensure that Section 13 consents are obtained from Environment Bay of Plenty workshops with Council regulatory and field staff on erosion and sediment control.

(h) Promote the use of contractors who have sediment and silt control qualifications.

(i) Investigate the possible transfer of powers from Environment Bay of Plenty with regard to sediment control requirements.

(j) Produce information and educational material about the effects of aquatic habitats and ways to protect and enhance them.

(k) The works and services department will ensure work is really required before undertaking removal of obstructions in watercourse.

(l) In conjunction with Environment Bay of Plenty, develop a manual of techniques suitable for erosion protection in streams within the District.

(m) When developing Catchment Management Plans, favour options that minimise interference with natural stream channels.

(n) In conjunction with Environment Bay of Plenty, establish criteria and guidelines for stream crossings.

(o) Amend the Council's Code of Practice to include requirements and methodologies to allow fish passage in accordance with DOC or Niwa guidelines when creating vehicle and pedestrian crossings over streams.

(p) Undertake a programme of identifying and removing barriers to fish passage in conjunction with other stormwater and park management projects.

(q) In areas with good upstream habitat values, investigate possibilities where daylighting (unpiping and unchannelling) streams may be feasible as part of stormwater catchment management planning.

(r) When developing Catchment Management Plans, include keeping streams open and in their natural state as a key aspect.

(s) Take enforcement action where illegal piping and filling of streams occurs.

(t) Ensure compliance with the Riparian Margins rules in the District Plan.

(u) Avoid development within the 1:100-year flood plain.

(v) Amend the Council's Code of Practice to ensure specifications for stormwater treatment devices take into account habitat requirements.

5 Point-Source Contamination

5.1 Objective 4

To reduce the amount of contaminants entering stormwater from point source discharges.

5.2 Policies

(a) Ensure that erosion and sediment control methodologies and utilised for all land disturbing activities that may lead to the discharge of sediment to surface water.

(b) Eliminate where possible, or treat discharges containing contaminants and spills of hazardous substances before they enter natural water bodies.

(c) Minimise sewer overflows.

(d) Ensure that the design and maintenance of on-site wastewater systems avoids or minimises the discharge of contaminants to natural water bodies.

(e) Ensure that sites where hazardous substances are used or stored are designed and operated so as to contain any spills.

(f) Promote Cleaner Production programmes and other source control initiatives.

(g) Raise community awareness of the ecological effects of spills and waste dumping.

5.3 Explanation

The discharge of sediment from earthworks, occasional spills and chronic low-level discharges of substances harmful to aquatic life can destroy in-stream fauna for considerable periods of time, or lead to long-term degradation. Prevention of these discharges is crucial for maintaining and enhancing stormwater quality of both freshwater and estuarine receiving environments.

5.4 Implementation Methods

(a) Incorporate erosion and sediment control requirements into land use consents and building consents.

(b) Place resource consent conditions and requirements on all building consents involving earthworks to address sediment generation and runoff.

(c) Include monitoring conditions on all resource consents involving earthworks.

(d) Provide information on sediment control in the Council's Code of Practice.

(e) Promote and implement clean-up measures after wastewater overflows.

(f) Eliminate overflows from local pumping stations that cause adverse effects on the environment or public health.

(g) Control infiltration into the Districts sewer system to minimise sewer overflows.

(h) Implement best management practices available for reducing wastewater overflows.

(i) Undertake aftercare to mitigate the effects of contamination from former landfill sites in the District.

(j) Enforce the new Hazardous Substances and New Organisms (HSNO) legislation.

(k) Ensure regular cleaning of septic tanks.

(l) Promote the use of high-tech septic tanks through the use of a rates rebate scheme.

(m) In non-reticulated areas, ensure adequate on-site sewage treatment systems are in place.

(n) In areas where sewage contamination is indicated as posing a public health risk, undertake programmes, including enforcement if required, to ensure all sites have adequate wastewater treatment.

(o) Identify major potential sources and areas vulnerable to contamination from accidents or emergencies and maintain accurate records of potentially contaminated stormwater in such areas.

(p) Undertake compliance monitoring of discharges to the stormwater system (particularly high risk sites).

(q) Develop a policy on contaminated sites and hazardous substances as part of the Council's annual work programme.

(r) Identify the major sources of stormwater pollution in partnership with Environment Bay of Plenty.

(s) In partnership with Environment Bay of Plenty, develop a programme to reduce pollution, through education, source control and treatment systems.

6 Non-Point Source Contamination

6.1 Objective 5

To reduce the amount of contaminants entering stormwater from non-point source discharges.

6.2 Policies

(a) Provide for the treatment of road runoff within the road corridor wherever practicable.

(b) Encourage the use of swales within road reserves.

(c) Promote the use of low impact design for development.

(d) Ensure that sediment control is undertaken for all earthworks.

(e) Advocate to central government the replacement of or phasing out building and other materials that have the potential to contaminate stormwater.

(f) Promote the environmentally safe use of agrochemicals.

(g) Encourage the fencing of stock from natural water bodies and their margins.

(h) Encourage the public to avoid activities that contribute contaminants directly to the stormwater system.

6.3 Explanation

Non-point source contamination of stormwater can only be controlled through raising community awareness and offering alternative solutions to unsustainable practices. The effects are cumulative and cause and effect relationships are not easily monitored, so prevention of all known sources is the only prudent management approach.

Swales and low urban impact design with retention of riparian vegetation can physically trap sediment and sediment-bound nutrients. Passage of subsurface flows through riparian margins, particularly swampy margins, can significantly reduce nitrate concentrations in water.

6.4 Implementation Methods

(a) Set up a partnership with Transfund and/or other appropriate Government bodies and seek contribution towards the cost of stormwater management practices for road runoff.

(b) Install cut off drains at the end of driveways in areas with no stormwater reticulation.

(c) Promote the use of the least toxic agrochemicals and application methods that minimise the amounts applied.

(d) Encourage the use of swales and vegetative filter strips within road reserves.

(e) In conjunction with Environment Bay of Plenty, investigate and trial new techniques for treating stormwater runoff from roads.

(f) In all priority catchments where existing roads are used as primary or secondary flow paths, aim to provide some stormwater treatment.

(g) Identify options for providing assistance for fencing stock from water bodies.

(h) In conjunction with other territorial authorities and Environment Bay of Plenty, promote to central government policies and mechanisms to remove from use substances such as metals that contaminate stormwater and have adverse effects on fresh water and ecological systems.

(i) Place resource consent conditions and requirements on all building consents involving any degree of earthworks to address sediment runoff.

(j) Include monitoring conditions on all resource consents involving earthworks.

(k) Provide information on sediment control in the Council's Code of Practice.

(l) In co-operation with other agencies, advocate for legislative changes and changes to Regional Policies and Plans where necessary to improve the quality of stormwater runoff.

(m) Undertake a programme to put in place stormwater treatment systems that improve stormwater quality in priority catchments.

(n) Undertake public education regarding activities that contribute contaminants to the stormwater system (e.g. car washing, placement of grass clippings in overland flow paths).

7 Flooding

7.1 Objective 6

To reduce the amount of stormwater runoff generated and control the peak volumes of runoff at source.

7.2 Policies

(a) In addressing flooding problems, priority will be given to solutions that also address water quality and habitat values.

(b) Subdivisions should be designed so that the 1:100-year flood plain is included in a drainage reserve.

(c) Subdivision design should, as far as possible, ensure that secondary flow paths are located on public land or in areas where they will not be obstructed by buildings or fences.

(d) Building is not permitted where the floor level is less than 0.5 m above the 1:100-year flood plain, except where a higher freeboard has been specified in the Catchment Management Plan.

(e) Buildings and other obstructions must be kept clear of secondary flow paths.

(f) When planting for environmental quality or to aid stability, plants to be used must not be species that are known to exacerbate flooding (e.g. certain willow types).

(g) Avoid development that is likely to cause or accelerate inundation of other property.

(h) The placement of earth or filling or otherwise reducing the capacity of the flood plain is not permitted within the 1:100-year flood plain, except in circumstances where it can be demonstrated that adverse effects can be remedied or mitigated.

7.3 Explanation

Catchment development traditionally takes place from the bottom up, starting at the lower end where the land is flatter, usually near the coast or lake edge. As steeper, less desirable land is developed further up in the catchment, the resultant increased imperviousness transmits more runoff to the lower areas, and flooding of property begins to occur. In less-developed catchments, the opportunity for flood management is still available, and flooding can be addressed on a more planned comprehensive basis.

Riparian vegetation can be very effective in slowing the velocity of floodwaters and reducing runoff and floods peaks. For maximum effectiveness, riparian vegetation is needed throughout the entire catchment. However, instream vegetation like willows obstruct and restrict flow by occupying part of the water area. Willows also trap debris and sediment around their roots, further blocking water flow and cause localised ponding or flooding. In contrast, sedges and reeds can slow water velocities and hold back flow – a benefit to downstream areas – but are flattened by bigger flows, allowing water to spill over them, reducing localised ponding or flooding.

7.4 Implementation Methods

(i) Minimise the number of flood hazards affecting people and property.

(j) Determine freeboard requirements as part of Catchment Management Plans.

(k) Consider relocating or raising houses in floodplains before major engineering works.

(l) Map 1:100-year flood plains in the District.

(m) Allow no more than 250 mm of standing water during a 1% AEP (the 1:100-year) flood event on roads built in 1:100-year flood plains.

(n) Maintain a current hazard register of all known or potential flooding problems within the District.

(o) When approving subdivision plans or building consents, check secondary flow paths to ensure buildings, fences and other development is kept clear of them,

(p) In new subdivisions, place easements over secondary flow paths.

(q) Promote the use of permeable and semi-permeable surfaces in subdivisions and development where appropriate.

(r) Control willows and replace with more appropriate riparian species in areas where they are contributing to flooding problems.

(s) Identify other plant species contributing to flooding problems and undertake control programmes where required.

(t) Limit stormwater flows to predevelopment levels in structure plan and rural residential areas.

8 Accelerated Erosion and Land Instability

8.1 Objective 7

To reduce the amount of accelerated erosion, including channel erosion and land instability.

8.2 Policies

(a) Identify streams at risk from stream bank and streambed erosion, and promote appropriate solutions.

(b) Promote the use of soft engineering or bioengineering solutions to address erosion.

(c) Reduce the adverse effects of land instability on people and property.

(d) In stability sensitive areas (as determined in the District Plan/Natural Hazards or Hazard Register), ensure that stormwater from new developments is managed so that it does not flow directly to roads.

(e) In stability sensitive areas, ensure that stormwater disposal from roads and other impermeable surfaces is managed to avoid risk of land slippage or other environmental damage.

8.3 Explanation

The increases in peak flow volume and velocity that results from development causes accelerated erosion of stream banks and the bed of streams. This results in

increased sedimentation that smothers instream life and accelerates deposition to receiving environments. The presence of suitable deep-rooting riparian vegetation enhances the stability of stream banks by reducing the erosive effects of the water.

8.4 Implementation Methods

(a) Identify streams and land areas at risk of instability or erosion and promote appropriate stormwater management and other solutions.

(b) Developments shall not be permitted in areas subject to erosion and land instability unless it can be demonstrated that the adverse effects can be avoided or mitigated.

(c) Promote the use of infiltration basins, swales and other measures to reduce stormwater volume velocity.

(d) Promote keeping stock away from the edges of streams.

(e) Identifying options for providing assistance with fencing of stock from streams.

(f) Undertake stream restoration programmes to control bank slippage and erosion.

(g) When undertaking erosion protection, maximise instream habitat opportunities by promoting riparian vegetation and materials such as rip-rap and rock methods over wooden retaining walls.

(h) When addressing erosion problems use soft engineering methods in preference to traditional hard engineering techniques.

(i) Develop guidelines for erosion protection that minimise adverse impacts on habitat values.

(j) Ensure compliance with District Plan Rules about impermeable surfaces, building and vegetation clearance close to streams.

(k) Protect streams in developing areas so that there is no increase in the 2-year return period storm flow and a significant reduction in more frequent storm peaks to reduce total erosive power on the stream banks.

(l) Promote development design and materials that mimic natural runoff patterns.

(m) Minimise direct discharges from stormwater pipes to streams

(n) Where direct discharge of stormwater pipes to streams occurs, ensure erosion protection is undertaken.

9 Land Development Potential

9.1 Objective 8

Plan and provide for principle stormwater infrastructure ahead of development to allow for future land development.

9.2 Policies

(a) Settlement should be of a type and density that avoids, remedies or mitigates adverse effects of stormwater runoff on water quality, flow volumes and patterns and freshwater and estuarine receiving environments.

(b) Subdivision and development of greenfield sites such as Structure Plan Areas should be designed and managed so as to emphasise the protection and enhancement of streams, lakes, watercourses, wetlands and the coast and the enhancement or restoration of riparian vegetation.

(c) Promote designs that minimise the need for stormwater infrastructure, especially reticulated systems with direct discharges to streams.

(d) Ensure that stormwater management provisions keep pace with urban growth.

9.3 Explanation

The effects of development on stormwater runoff are closely related to the design and materials used, especially the percent impervious area and the extent of stormwater reticulation. The extent of catchment imperviousness is the single most critical determinant of the environmental effects of development. Moreover, in two catchments with the same percent impervious coverage, the one with the most extensive stormwater reticulation will experience the more severe effects on freshwater receiving environments.

9.4 Implementations Methods

(a) Implement a development contributions policy to ensure that development pays for its fair share of new infrastructure in accordance with District Plan requirements.

(b) Require stormwater quality treatment on all developments of greater than 20 lots/units.

10 Altering the Natural Water Balance

10.1 Objective 9

To minimise the effect on the natural water balance when planning and providing for future development.

10.2 Policies

(a) Encourage development styles and stormwater management methods that mimic natural runoff patterns.

(b) Maintain perennial flows in streams.

(c) Promote the use of stormwater methods that minimise, retain and treat stormwater runoff.

10.3 Explanation

Efficient collection and disposal of stormwater running off extensive impervious areas of reticulated systems short-circuits the natural water cycle, increasing runoff

peaks, lowering the water table and causing seasonal low flows or cessation of flows in streams. The resulting water shortage compromises catchment vegetation as well as instream communities.

10.4 Implementation Methods

(a) Limit impervious surfaces.

(b) Identify infiltration zones on soil maps across the District.

(c) Promote the use of infiltration basins, swales and other measures where appropriate, to promote groundwater recharge.

(d) Develop and implement an action plan to promote stormwater reuse.

(e) Evaluate the economic and environmental costs and benefit of options for reusing rainwater and stormwater in new subdivisions and developments.

(f) Explore the potential domestic and commercial applications of greater on-site use of rainwater, including by horticulturists.

(g) Investigate the possibility of stormwater reuse as part of irrigation programmes on sports fields.

11 Existing Stormwater Infrastructure

11.1 Objective 10

To optimise the effectiveness of the existing stormwater infrastructure network in a way that meets the needs of the community and, where possible, to implement alternative instead of traditional stormwater management solutions while ensuring that Council's management of stormwater pays due regard to the safety of staff and the public.

11.2 Policies

(h) Maintain the reticulated stormwater system in an efficient and cost-effective manner.

(i) Design stormwater infrastructure to minimise long-term maintenance costs.

(j) Provide as a minimum, pipe capacities that accommodate the 1:5-year storm.

(k) Provide secondary flow systems such that buildings and property are protected from flood flows in accordance with building regulations.

(l) Ensure stormwater system design does not conflict with the operation of other utilities.

(m) Where possible implement innovative solutions for stormwater management.

(n) Optimise the timing of replacement of infrastructure to minimise the cost of that infrastructure.

(o) Ensure safety of staff and the public with regard to the Council's management of stormwater.

(p) Discharges to road drainage systems shall be in compliance with the guidelines for kerb discharges.

(q) Provide adequate signage for areas known to flood.

(r) Apply safety standards for all temporary sediment retention ponds.

11.3 Explanation

Stormwater infrastructure comprises a large part of Council's managed assets and must be maintained in an efficient and cost effective manner. New services must be able to meet the needs of the community well into the future, providing for expected growth and keeping pace with changes in technology and environmental performance standards.

The key safety hazards of stormwater structures are falling into water retention or conveyance devices (ponds, streams and pipes) and not being able to get out. The risk of drowning must be reduced by reducing opportunities for accidental trapping such as dense riparian planting, providing safe egress points and by posting warning signs.

11.4 Implementation Methods

(a) Survey stormwater infrastructure to identify condition and priorities for replacement.

(b) Continue with prioritised improvements to the condition and capacity of stormwater infrastructure.

(c) Benchmark performance of stormwater infrastructure against best practice and agreed performance measures.

(d) Ensure compliance with Environment Bay of Plenty resource consent conditions for all stormwater consents.

(e) Ensure the Council's Asset Management Plan complies with Audit New Zealand and accounting standards.

(f) Keep adequate rainfall records to provide accurate estimates for the 1:5-year storm and 1:100-year storm.

(g) Ensure the Council's Code of Practice has adequate rules about the design and capacity of stormwater infrastructure.

(h) Review the Council's Asset Management Plan annually in line with the condition rating analysis.

(i) Ensure adequate specifications are in place so that appropriate materials and construction techniques are used in constructing and/or replacing existing stormwater network assets.

(j) Advocate for legislative changes where necessary, to enable implementation of the Funding Policy.

(k) Carry out risk assessment of the stormwater asset to identify critical assets and implement prioritised renewal of decision-making.

(l) Ensure entry gradients to stormwater ponds comply with safety requirements as set out in the Council's Code of Practice.

(m) Ensure dense planting and/or fencing of stormwater ponds as outlined in the Code of Practice.

(n) Set standards for temporary sediment retention pond fencing, pursuing a Bylaw to require fencing if necessary.

(o) Put in place signage indicating public areas known to flood.

(p) Keep an updated hazard register of all properties with know flooding hazard.

(q) Put in place warning signage where public health risks arise as a result of sewer overflow or septic tank discharges.

12 Iwi Involvement

12.1 Objective 11

Encourage and have regard to Iwi participation in the management of resources affected by the discharge of stormwater.

12.2 Policies

(a) Ensure that water quality is of a standard to ensure the continued use of cultural harvesting of food and other resources where this is appropriate.

(b) Ensure what quality standards are met in areas of fishing and shellfish gathering.

(c) Maintain the mauri of water.

12.3 Explanation

Iwi are recognised as having a special relationship with water and Council has special responsibilities regarding the exercise of kaitiakitanga by Iwi. Activities in the riparian margins must avoid adverse effects on the mauri of that water, taiapure or mahinga maataitai (traditional areas for harvesting cultural materials).

12.4 Implementation

(a) Have regard to Iwi management plans and other statutory iwi documents when developing TA stormwater strategies and action plans.

(b) Allow for appropriate and meaningful consultation in the development of stormwater strategies and action plans.

(c) Ensure appropriate water standards are met for areas of cultural harvesting of food.

13 Loss of Community Use of Water Resources

13.1 Objective 12

Protect and enhance values of receiving environments for the benefit of the community.

13.2 Policies

(a) Ensure that water bodies remain in their natural state to continue providing sustainable stormwater management and landscape and visual amenity.

(b) Ensure that water quality is of a standard suitable for contact recreation where this has been or potentially is an appropriate activity (i.e. has been identified by Environment Bay of Plenty).

(c) Ensure that water bodies are not degraded to the extent that renders them unsuitable for non-contact recreation.

(d) Ensure water quality standards are met in areas of fishing and shellfish gathering.

13.3 Explanation

Human activities should not impede natural changes in watercourses, lakes or wetlands and should avoid modifying the interface between wetlands or streams and the surrounding land. This interface between land and water is a transitional zone which is highly vulnerable to development, but which performs important hydrological, ecological and landscape functions.

Water quality must be maintained or improved to enable various activities in and around the District's water bodies to continue. Swimming and shellfish gathering need the highest water quality. The water quality measures for the community use of water bodies may not directly relate to water quality necessary to maintain healthy aquatic or marine ecosystems, but the precautionary approach promotes management to the most conservative standard where possible.

13.4 Implementation

All drainage works should be designed, installed and maintained so as to incorporate water quality improvements where it identified that potential sources of contaminants or values in the receiving environment require managing.

14 Stormwater Reuse

14.1 Objective 13

Encourage the reuse of stormwater.

14.2 Policies

Identifying with appropriate industry groups the possible opportunities for reuse of stormwater runoff.

14.3 Explanation

Utilising stormwater as a beneficial resource has the potential to reduce the total quantity and rate of runoff, reducing downstream effects of the discharge of stormwater. Measures such as on-site tanks for retaining stormwater from individual lots and commercial and industrial premises may provide water for non-potable uses and provide an overall receiving environment water quality benefit due to lessening the velocity and volume of water entering conveyance systems.

14.4 Implementation

(a) Develop guidelines on domestic, commercial and industrial reuse and associated costs.

(b) Undertake and publicise a cost-benefit analysis on the reuse of stormwater.

15 Awareness of Stormwater Issues

15.1 Objective 14

Undertake education activities to raise the awareness of stormwater management issues with the general public and industry interests.

15.2 Policies

(a) Improve the understanding of the effects of stormwater derived sediments and contaminants on the ecological and amenity values of the receiving environment.

(b) The basis why increased costs can be expected when addressing flooding and contamination issues, as well as the loss of property due to stream erosion as urbanisation increases.

15.3 Explanation

By raising awareness of the effect of certain activities on aspects of the water cycle and the generation and discharge of contaminants via stormwater is identified as an effective means of altering behavioural patterns leading to reduced downstream effects. In general, effects resulting from elevated stormwater flows and the discharge of contaminants require some form of management response that includes investment in time and money. Private and public sector education about how household, recreational and work activities contribute to the contamination of urban runoff is recognised as essential for the implementation of effective stormwater management initiatives.

15.4 Implementation

(a) Increase awareness in public and private sectors about the fate of contaminants discharged to the stormwater system.

(b) Target industries that have recognised high risk processes or materials on site that have the potential to cause significant adverse effects on the downstream environment and undertake on site education and mitigation activities.

(c) Undertake workshops and/or publish guidelines to certain industry groups as well as commercial and residential land users notifying the land users of the consequences of certain actions.

(d) Undertake a survey regarding general stormwater management issues across the public and industry to gauge the level of comprehension of these matters. Target those areas that are identified as being poorly understood.

16 Stormwater Strategy Implementation

16.1 Objective 15

Monitor the effectiveness of the implementation of the Stormwater Strategy and Action Plan.

16.2 Policies

(a) Ensure comprehensive monitoring and review processes are built into all stormwater strategies and action plan.

(b) Ensure involvement of external stakeholders, including Environment Bay of Plenty, iwi, landowners, developers and other industry representatives and the local community.

(c) Set standards and/or guidelines where practicable to enable useful and comparative environmental assessments to be undertaken.

(d) Publicise the findings of review processes, and highlight stormwater issues and promote better community understanding of the problems and solutions.

(e) Ensure day to day management issues are identified so that implementation methods may be adapted to maximise benefits.

16.3 Explanation

Monitoring and reviewing the effectiveness of the implementation of the Stormwater Strategy and associated action plan is a necessary element in order to measure whether the overall environmental goals are being achieved. Monitoring identifies whether resources invested in stormwater management are producing the expected benefits and help to focus the remedial measures to real issues and problems. The results of monitoring the effectiveness of implementing the stormwater strategy will also provide useful information that may be referred to for future decision making purposes.

16.4 Implementation

(a) Identify the appropriate range of monitoring indicators with which to gauge the overall environmental goals against.

(b) Review the current monitoring initiatives being undertaken and assess whether modifications may be required to obtain more useful information regarding the effects of stormwater discharge on the downstream environment.

(c) Centralise complaint systems so that all relevant complaints regarding stormwater issues (flooding, erosion, and odour) are contained in the same database or co-ordinated so that a more accurate picture of stormwater problems is available.

(d) Identify monitoring projects and allow for them in the annual plan process.

(e) Undertake monitoring to allow refinements in the application of the strategy principles and action plan requirements.

(f) Undertake monitoring to demonstrate the result of investment in stormwater management infrastructure and management techniques.

(g) Continue research to better understand the condition of the environment.

(h) Undertake monitoring of the condition of the environment and the effectiveness of management methods.

(i) Ensure response mechanisms included which link monitoring findings/establishment of trends to an appropriate action by a specified party. These typically include emergency response procedures; strategic decisions in response to trends; and tactical decisions related to the effectiveness of any remedial measures.

(j) Exchange information with Environment Bay of Plenty.

17 Monitoring

Post-implementation, the District's stormwater management measures would require monitoring and maintenance, in order to determine and maintain their efficacy. Monitoring should be undertaken with the general aim of:

- Protecting the public from the adverse effects of both pollution and flooding; and

- Protecting the health of aquatic ecosystems.

To this end the District would:

- Identify compliance monitoring currently being undertaken and assess its appropriateness and the value of the monitoring information being gathered. Consider compiling such monitoring data into a working report noting the state of general compliance or otherwise;

- Identify key performance indicators, (such as receiving environment flora and fauna, nutrient loading, contaminant concentrations in sediment, water flows and levels), and implement a programme to monitor these;

- Consider the adaptation of ANZECC (Australia New Zealand Environment and Conservation Council) Guidelines or any subsequent updates to the water quality guidelines to determine degradation trigger points. Undertake monitoring as necessary to determine whether these water quality guidelines are being complied with;

- Implement a system of corrective action, should monitoring results exceed guidelines; and

- Implement a system of reviews to gauge the efficacy of stormwater management measures.

Appendix D – Evaluation Criteria used in Prioritisation of Catchments

EVALUATION CRITERIA
Marine AND Freshwater – Catchment Threats

Rankings to be assigned by "workshopped assessment" by evaluation team members supplemented with quantitative information (where available).

Evaluation Criteria	Explanation/Rating	Value
Stormwater Burden	Specific point source discharges to the stormwater catchment. Includes: Existing or old landfill sites, other industries that do not go to sewer; High potential for accidental contaminant discharges Emergency situations Septic tank seepage Consented Discharges Criteria to be used: **(A) High**: Significant number of, or level of, contaminant discharges or significant risk of accidental discharges. **(B) Medium**: Moderate number of, or level of, contaminant discharges or moderate risk of accidental contaminant discharges. (C) Low: No known (or relatively minor) contaminant discharges and little risk of accidental contaminant discharges.	
Flooding	**(A) High:** Areas of known flooding problems to existing buildings and roads, coupled with large areas of green field type development potential, or where redevelopment of existing areas would increase existing flooding problems. **(B) Medium:** Areas where infill could cause erosion problems, or areas where intensification of use would require upgrading services to avoid flooding. **(C) Low:** No known flooding problems that need to be overcome for existing development potential to be fulfilled.	

Erosion/Slippage	Classification of stability of upstream catchment, utilise Environment B·O·P Operations Report 98/13 dated January 1999. **(A) High:** Little vegetation, significant erosion of streambanks occurring. **(B) Medium:** Urban or rural sloping ground silt/clay soils **(C) Low:** Forest cover, volcanic soils, stable streambanks	
Developmental Change	Includes both existing and future development change predicted by TLA's within 20 year horizon (GIS Dist Plan databases). Parameters: • **Catchment size** (GIS Dist Plan databases) – Total catchment area in hectares (ha) • **Proportion of different land uses** (GIS Dist Plan databases) – Area (in ha) and % of catchment represented by current and vacant commercial, industry and residential land, along with data on roads (total area and area of arterial roads, including motorways), other land with a vacant equivalent land use and railways. • **Proportion of vacant land** (GIS Dist Plan databases) • **Proportion of roading surfaces** (GIS Dist Plan databases) • **Runoff characteristics** – Runoff coefficient calculated for each catchment • **Land development trends** (GIS Dist Plan databases) – Data on whether further development will occur in each catchment over the next 20 years, when this development will occur and whether it will be as infill or Greenfield development. **(A) High:** >30 percent **(B) Medium:** 10 – 30 percent **(C) Low:** <10 percent	

Marine Receiving Environments – Ecological Values

Evaluation Criteria	Explanation/Rating	Value
Importance for fauna • Fish diversity • Fish feed/breeding • Diversity/Density of birds • Bird feeding/breeding/roosting • Presence of threatened species	• As detailed information only available for some areas, it is likely that there will be significant gaps in information. *Ratings* (A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.	
Importance for flora • Diversity/Abundance of plants • Presence of threatened species • Intact sequence of saline vegetation	*Ratings* (A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.	
Sediment Deposition/Infilling/Smothering Includes risk of : • Contaminants being discharged and accumulating in low energy environments. • Deposition of sediment contaminants	**(A) High:** Low energy, poorly flushed estuarine/ delta areas. **(B) Medium:** open water within harbours (sub-tidal locations), some deposition likely. **(C) Low:** Well flushed, high energy inter-tidal locations (eg. open coast)	
Ecosystem Health • Diversity of Invertebrates • No degenerative trends	Ratings **(A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.**	
Representative Nature • Naturalness/Range of habitat types • Marine/terrestrial sequence	**Ratings** (A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.	

Marine Receiving Environments – Community Well-being

Evaluation Criteria	Explanation/Rating	Value
Food Gathering • Recreational fishing/personal use • Food gathering	Includes recreational fishing and shell fish collection **(A) High:** Heavily used **(B) Medium:** **(C) Low:** Limited or no known use	
Water Activities • Swimming • Boating	**(A) High:** Heavily used **(B) Medium:** **(C) Low:** Limited or no known use	
Amenity • Visual significance • Scientific/Education	• Visual aspects of stormwater discharged and the outfall structures • Reserve/conservation status or habitat value Ratings (A=High, B=Medium, C=Low)	
Economic • Commercial Fish/Shellfish • Marine Enterprises eg. Marinas • Tourism	Ratings (A) High – significant level of economic activity (B) Medium – Moderate level of economic activity (C) Low – Limited or no known economic activity	
Cultural Values	Includes areas with known Maori cultural sensitivity.	

Freshwater Receiving Environments – Ecological

Evaluation Criteria	Explanation/Rating	Value
Importance for fauna Fish diversity Fish feed/breeding Diversity/Density of birds Bird feeding/breeding/roosting Presence of threatened species Fish passage (elvers/whitebait)	As detailed information only available for some areas it is likely that there will be significant gaps in information. **Ratings** (A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.	
Importance for flora Diversity/Abundance of plants Presence of threatened species Intact sequence of riparian vegetation Naturalness of water channel (indicated by the extent of channel modification by factors such as piping or channel straightening)	**Ratings** (A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.	
Ecosystem Health Diversity of Invertebrates No degenerative trends	**Ratings** (A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.	
Representative Nature Naturalness/Range of habitat types Freshwater/terrestrial sequence	**Ratings** (A=High, B=Medium, C=Low) assigned by comparative assessment of information in existing reports and knowledge of evaluation team members.	

Freshwater Receiving Environments – Community Well-being

Evaluation Criteria	Explanation/Rating	Value
Food Gathering • Recreational fishing/personal use • Food gathering	*(A) High:* ***Heavily used*** **(B) Medium:** **(C) Low:** Limited or no known use	
Water Activities • Swimming • Boating	*(A) High:* ***Heavily used*** **(B) Medium:** **(C) Low:** Limited or no known use	
Amenity/Recreational • Visual significance • Scientific/Education	*Ratings* (A=High, B=Medium, C=Low)	
Economic • Commercial Fish/Shellfish • Marine Enterprises eg. Marina's • Tourism	*Ratings* **(A) High:** Significant level of economic activity **(B) Medium:** Moderate level of economic activity **(C)** Limited or no known economic activity	
Cultural Values	Includes areas with known Maori cultural sensitivity. *Ratings* (A=High, B=Medium, C=Low)	

Appendix E – Guidelines for the Development of Territorial Authority Stormwater Strategy and Action Plans

Developing a Stormwater Strategy

The following is a suggested Stormwater strategy Table of Contents, with comments where appropriate. The scope of the Strategy should suit the scale of the districts stormwater management issues. The aim of Environment Bay of Plenty Strategy and associated appendices is to provide guidance to the Districts as much as practicable. Further information is provided in associated appendices and throughout the SS that may be included in this document.

It is not expected that a lot of text is required to be produced for this document (i.e. it is considered that a 20 page document would cover most aspects). It is noted that the key to implementing a strategy, is the subsequent development and implementation of action plans that highlight the steps to be taken to meet the objectives of the Districts Strategy.

1 Introduction

- 1.1 Purpose
- 1.2 District Vision Statement
- 1.3 Key and Internal Stakeholders
- 1.4 Policy Framework (including legislative implications, central and regional government policies and plans, District Plan policy, iwi requirements/ expectations)

2 Stormwater Management Issues

- 2.1 Urban Stormwater
- 2.2 Iwi Perspective
- 2.3 Stormwater Quality
- 2.4 Stormwater Quantity
- 2.5 Stormwater effects on aquatic resources
- 2.6 Public Healthy and Safety
- 2.7 Stormwater Assets

3 Prioritisation of Stormwater Management Goals for District

- 3.1 Basis for high, medium and low priorities
- 3.2 Identification of high, medium and low priority catchments across the District.

4 Responding to the Issues and Priorities

- 4.1 Vision and Goals
- 4.2 Objectives, policies and explanations

5 Action Plans

- 5.1 Developing Action Plans
- 5.2 Monitoring

6 Costs and Benefits

Developing Action Plans

The following sets out the basic steps to consider for the development of Action Plans to support and provide mechanisms to attain those objectives and goals as set out in the district's own stormwater strategy.

(a) Review the *Recommendations and Timeframes* (section 7) of the Environment Bay of Plenty Stormwater strategy and identify those issues that are relevant to the District and require the implementation of management methods.

(b) Identify local issues and constraints that require consideration in addition to those matters identified from the Environment Bay of Plenty strategy.

(c) Consider the prioritisation process as documented in Section of the Environment Bay of Plenty strategy and identify the catchments of priority within the District.

(d) Once all the recommendations have been identified, assign appropriate action required and include timeframe.

(e) Include a review requirement to ensure that monitoring of the implementation of the Action Plan occurs and that action points are updated as required.

It is expected that the form of an action plan would be similar to that contained in Section 7, detailing out the recommendation, the method or action required to meet the recommendation, and the timeframe within which the action is to take place.