Stormwater

Stormwater Summary

Purpose and Scope

The objective of the stormwater assessment is to identify risks and show how these services will be managed by the Christchurch City Council to achieve community outcomes in a sustainable manner.

Stormwater Services in Christchurch City

The roles of Council with respect to stormwater drainage services in the city are to coordinate the setting of Community Outcomes and as a service provider. The key service functions of stormwater drainage infrastructure are the:

- protection of property, public safety and access
- protection of ecosystems
- creation of productive land

Adequacy of Stormwater Services

Council has invested heavily in flood relief works over the past 40 years in response to a series of destructive floods through the 1960s, 1970s and 1980s. A combination of historical investment in physical upgrading works and planning measures has effectively mitigated risks associated with the inundation of dwellings and buildings, and there are few urban development constraints in the city that are not mitigated by planning rules, proper subdivision design and building design.

In rural areas, stormwater is generally disposed of by ground soakage or to watercourses. There are unlikely to be any significant constraints on additional rural-type development related to drainage or disposal of stormwater.

Public Health Risks

Risks Associated With Stormwater Services

Potential health impacts associated with the stormwater drainage network are:

- Illness caused by contact with micro-biological or chemical contaminants in natural water resources, through the use of streams, rivers, estuaries and beaches for recreational purposes, or drinking potable water drawn from polluted water sources.
- Injury or death caused by falls from stormwater structures or drowning.
- Illness from mosquito bites.

The range of contaminants in stormwater and the extent of environmental impacts on the city's watercourses are:

- **Microbiological** concentrations, including bacteria, viruses and protozoa, generally exceeding contact recreation guidelines. The main source of contamination in dry weather is believed to be waterfowl. The impact of wet weather pollution is lessened by rain water dilution and the low level of recreational activity at these times.
- **Chemical** contaminates, including organic compounds, such as hydrocarbons, pesticides and organic wastes, and inorganic compounds, such as metals and metalloids.

  The concentration of heavy metals in stormwater and river sediments exceeding the relevant water quality guidelines for the protection of aquatic organisms.
- **Nutrients**, including nitrogen and phosphorus, can cause algal blooms and prolific growth of aquatic plants when at elevated levels. There is extensive growth of algae, especially in the Avon River, likely to be linked to nutrient enrichment in the streams.

Although microbiological concentrations, at times, exceed contact recreation guidelines, neither the Council nor the Medical Officer of Health has any record of injury or illness that is attributable to deficiencies in the design, operation or maintenance of the stormwater network, and health risks are assessed as low.

Risks Associated With The Lack Of A Reticulated Stormwater Drainage System

There are less likely to be stormwater systems in rural areas. Because of the much larger allotments in rural areas and the higher proportion of permeable, vegetated areas, there are few problems when reticulated stormwater disposal is unavailable.

Risks To Stormwater Communities

Assessments of stormwater services were carried out at a "community" level to identify risks to particular communities.

Types of Communities	Community	Risk Assessment
Communities served by public drainage systems	Urban areas receiving waters - drained by street channels, street, sumps, pipes, open water courses and streams.	Quality of water in urban rivers and streams continues to degrade due to urban discharges. Increasing risk of land flooding due to inner urban intensification. Risk of flooding due to climate change. Risk of insect borne diseases if an exotic vector establishes in Christchurch.
	Rural areas serviced by Council maintained streams and drains.	Low levels of risk
	Brooklands – discharge to a controlled groundwater storage zone.	Low levels of risk
Communities served by private drainage systems	Rural areas discharging stormwater run-off by either direct soakage to ground or to open drains funded privately.	Low levels of risk
	Industrial areas discharging to ground via soakage basins.	Low levels of risk

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Environmental Risks

Water-quality monitoring indicates that several of the environmental parameters monitored exceed minimum guideline levels. Ecosystems in the majority of streams are in a degraded condition, however the impact on waterway habitats appears to be accepted by the majority of the community and a rigorous debate on the community costs and benefits of markedly improving environmental outcomes is required.

Environment Canterbury has issued for comment a draft Natural Resources Plan which will, when adopted, set the rules and water-quality standards with which Council must comply for all existing point source discharges. It is likely that the standards will require additional planning, investigations and investment in land and treatment facilities.

Options To Address Risks

Options to address water-quality degradation.

- Prepare and implement integrated catchment management plans (ICMPs) as required by the Proposed Natural Resources Regional Plan (NRRP). This option will require the Council to be aware of land use activities in the catchment and control harmful discharges;
- Prepare and implement ICMPs; investigate operational measures such as street sweeping and sump cleaning that will improve discharge quality, and implement selected measures;
- As above, but improve stormwater treatment by construction of in-line treatment devices;
- Undertake a study of stormwater discharge quality in selected catchments and assess the impact of stormwater quality on the receiving waterways.

Options to address the risk of land flooding due to urban intensification:

- Continuous improvement of stormwater infrastructure, as proposed in the stormwater drainage asset management plan;
- An increase in stormwater capacity early in the development cycle.

Options to address the risk of insect-borne diseases:

- Minimise the potential habitat for insects by minimising the number of open water bodies in the city (i.e. eliminate ornamental and environmental water bodies);
- Limit the number of likely habitats while monitoring for insect nuisances and maintaining an awareness of potential problems. The Council currently implements this option;
- Control insect populations only if an exotic insect establishes in Canterbury.

Climate change and associated effects is a risk which should be dealt with through planning measures until the timing of effects is better understood.

The risk of groundwater contamination in industrial areas through private stormwater soakage is primarily controlled by Environment Canterbury which authorises these discharges via resource consents. Options available to the Christchurch City Council are:

- Advocate for appropriate levels of environmental protection;
- Construct additional stormwater infrastructure to provide services to at-risk areas.

Council's Role

The proposed role of Council is to continue as:

- Facilitator of community consultation to establish community outcomes and service standards for stormwater services;
- Owner of infrastructure delivering public stormwater services to the community;
- Partner to Environment Canterbury and the Ministry of Health in the achievement of regulatory outcomes, and advocate for the community in the setting of environmental standards;
- Monitoring city growth, water quality and the health of habitats, and the development of policies, infrastructure management and development plans, District Plan measures and public education programmes to ensure environmental and public health standards are achieved.