

Stormwater Drainage

Activity Management Plan

Long Term Plan 2015–2025

As amended through the Annual Plan 2017/18

1 July 2017

Quality Assurance Statement

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1 Key Issues for the Stormwater Drainage Activity

The stormwater drainage network is provided and maintained to effectively collect and remove stormwater whilst protecting the community from surface flooding during storm events of up to 1:50 yr return periods (1:50 yr return periods within Greenfield and Brownfield developments). The primary stormwater drainage network includes artificial wetlands, basins, low impact design infrastructure, drains, pipes and pump stations that convey and/or improve stormwater quality before it is discharged into waterways. Implementation of the CCC Surface Water Strategy 2009 – 2039 has resulted in Stormwater Management Plans (SMPs) being developed and implemented across Christchurch City and Banks Peninsula where the Council has stormwater infrastructure. The SMPs are integrated catchment management plans aiming to address and improve the six values for waterways: drainage, ecology, cultural values, recreation, heritage and landscape. The SMP technical documents support and define how Council will comply with rules in stormwater discharge consents it has with Environment Canterbury Regional Council.

Post earthquakes, the Land Drainage Recovery Programme 2012 – 2016 is assessing damage to waterways and where necessary reinstating the flood carrying capacity of waterways; this includes the primary stormwater drainage network.

This activity is linked to the Flood Protection and Control Works activity.

1.1 Community Outcomes

Everything that the Council does in its day-to-day work is focused on achieving community outcomes. All activities outlined in this plan aim to deliver the results required to achieve these outcomes, contribute to Council strategies and meet legislative requirements. Likewise, all Council capital and operating expenditure is directed towards a level of service that moves the community closer to these outcomes now or at some future point.

The effective management of Stormwater Drainage for Christchurch and Banks Peninsula means achieving the following community outcomes:

- Water quality in rivers, streams, lakes and wetlands is improved
- Streams and river flows are maintained
- Existing ecosystems and indigenous biodiversity are protected
- A range of indigenous habitats and species is enhanced
- Injuries and risks to public health are minimised
- Risks from flooding are minimised
- Sites and places of significance to tangata whenua are protected.

Section 4 shows how these outcomes flow down into and influence the Council's activities and levels of service in relation to Stormwater Drainage.

1.2 Effects of growth, demand and sustainability

Population Growth and Demand

Post earthquakes Christchurch's population distribution has seen a shift from eastern suburbs (the residential red zone) to newly built subdivisions in the west. Subdivisions in these new developments have integrated and constructed stormwater treatment and detention facilities to accommodate the increased surface water run-off from the developed area.

The rebuild of the city needs to be well managed to reduce the risk of sediment discharges into the waterways via dewatering or erosion run-off during storm events.

Central city redevelopment has the potential to see wider adoption of cladding materials such as zinc and copper, in the form of roofs and guttering. These materials should either be coated or buildings have stormwater filters installed on-site to reduce the level of metal contaminants being discharged into the stormwater network.

Ngai Tahu, Canterbury Water Management Strategy Zone Committees Community, river care groups, Ihutai Trust, recreational users and other community groups have aspirations to see an improvement in stormwater quality discharges, waterway ecology and recreational values.

Sustainability

The Local Government Act 2002 places a legal imperative on Council to adopt a ‘sustainable approach’. Council recognises that sustainability is a journey, not a destination. It is not a point that is reached, but a process of continual improvement, where the community adapts and responds to changes over time. The sustainable approach is embraced in Council’s Vision, Mission and Objectives, and shapes the community outcomes. The levels of service and the performance measures that flow from these inherently incorporate the achievement of sustainable outcomes as defined by:

- The Christchurch City Council Sustainability Policy
- Christchurch City Council Biodiversity Strategy 2008-2035
- Christchurch City Council Sustainable Energy Strategy 2008-2018
- Christchurch City Council Surface Water Strategy 2009-2039

1.3 Key Challenges and Opportunities for Stormwater Drainage

In working towards the community outcomes and influenced by population growth and demand, Council faces the challenge of making decisions that prioritise resources to deliver the best mix of services at the right level and in a sustainable way. The key challenges and opportunities that have been prioritised by Council are below in Table 1-1.

Table 1-1 Key Issues

Key Issue	Discussion
Increasing demand for stormwater drainage services	Greenfield and brownfield developments include stormwater treatment and detention facilities in accordance with the SMP and the stormwater discharge consent for the catchment. In existing urban areas the stormwater network is maintained and retrofitted where and when required to meet increasing demands.
Increasing demand for improvement in stormwater quality discharged to waterways	<p>Stormwater Management Plans detail opportunities for location of stormwater treatment infrastructure and opportunities for their establishment needs to be identified and included when road renewals and land use activities change in business and industrial zones.</p> <p>Establishment of stormwater treatment infrastructure can bring an additional cost to the existing conveyance network, hence the timing of its establishment and the form it takes needs to fit in with development of the immediate area, e.g. Low impact design approaches, swales, rain gardens are incorporated in streetscapes and have dual functions.</p> <p>The Water Services Bylaw provides requirements for quality of stormwater to be received by the Council's network.</p>
Need for city-wide collaboration to mitigate stormwater contaminants affordably	<p>Urban related growth continues to deliver contaminants into streams, rivers and the estuary (by increasing vehicle numbers, building site activities, environmentally toxic building materials and road runoff, etc). Most contaminants are:</p> <ol style="list-style-type: none"> a) very difficult to trap (especially when dissolved, e.g. dissolved zinc) b) most readily and economically controlled at source <p>Water quality objectives cannot be met affordably without the informed cooperation of all parts of the city’s residential and commercial communities.</p>
Earthquake damage to waterways	<p>Land Drainage Recovery Programme is assessing level of damage and flood carrying capacity of waterways and the stormwater network. Remedial work required is being prioritised and implemented.</p> <p>The residential red zone area in the lower Avon River catchment potentially offers opportunities for stormwater management.</p>

2 Proposed changes to activity

Table 2-1 summarises the proposed changes for the management of the Stormwater Drainage activity since the Three Year Plan 2013-16 Activity Management Plan.

Table 2-1 Proposed changes to activity

Key Change	Reason	Level of significance? What investigations are needed?	Options for consultation and engagement
Deferral of renewals from the Infrastructure Rebuild Programme	SCIRT will not deliver all stormwater pipe repairs and renewals. Deferred works will pass to Council. This will create a significant increase in the pipe renewals programme.	Development of a clear programme of deferred pipe renewals/repairs.	Limited but will be carried out if and when required. Consult with the other infrastructure teams to align with their renewal programmes to deliver 'dig once' renewal programmes
Rationalised maintenance and renewal of stormwater drainage assets	Reduced budgets	Investigate where efficiencies can be made and the longer term effects of these, such as reduced levels of service and deferral of renewals.	Through the LTP process

3 Activity description

3.1 Focusing on what we want to achieve

Council activities deliver the chosen community outcomes for Christchurch and Banks Peninsula. The outcomes that relate most directly to the management of the Stormwater Drainage network are:

- Risks from flooding are minimised
- Water quality in rivers, streams, lakes and wetlands is improved
- Existing ecosystems and indigenous biodiversity are protected
- The range of indigenous habitats and species is enhanced
- Injuries and risks to public health are minimised
- Sites and places of significance to tangata whenua are protected.

3.2 How we will know we are achieving the outcomes

We will know we are achieving the above outcomes when we see the following results:

- A well-maintained stormwater drainage system is provided that looks after natural waterways protects water quality and safeguards public health.
- Flooding is reduced and results from extreme events, not system malfunctions.
- Construction of water treatment systems meets Stormwater Management Plan guidelines.
- The management of waterways protects ecosystems, indigenous vegetation and wildlife, and opportunities are taken to enhance the range of indigenous species.
- Water quality in waterways is maintained and/or improved. It is measured against reportable targets.
- A safe and reliable stormwater drainage system is maintained to reduce the risk of flooding and erosion.
- The stormwater system is managed and maintained to reduce pollutants and enhance the waterway environment which contributes to the protection of the surface water values of tangata whenua.

The activities that follow in section 4 and the levels of service within them are all linked to the above results to ensure Councils stays focused on moving towards the community outcomes. This link aims to confirm why we are doing the activities – that they will realistically move us closer to our goals – and that service delivery remains relevant to strategic direction.

3.3 What services we provide

This activity includes the following services:

- Provide and maintain the stormwater drainage system (surface water management systems, e.g. streams, rivers, utility waterways, basins, structures, pipes)
 - The provision and management of infrastructure to collect and remove stormwater from roads and properties.
 - Protecting the community from surface flooding during normal events.
 - The Six Values approach addressing drainage, ecology, landscape, recreation, culture and heritage to enhance waterways and protect water quality.

The activity includes the management of the stormwater network including rivers and streams, basins, drains, pipes and treatment infrastructure which convey and/or improve stormwater quality before it is discharged into the waterways. The activity is linked to the Flood Protection and Control Works activity.

In delivering this service the Council provides a balanced mix of maintenance and renewals to preserve the levels of service as well as capital investment to respond to increasing demands.

3.4 Benefits and Funding Sources

3.4.1 Who benefits

Who benefits	
Individual	
Identifiable part of the community	
Whole community	Full

Key:
Full
Majority
Some

Explanatory Comments:

The entire community benefits from this activity.

There are health and environmental benefits from stormwater drainage systems for the whole community.

3.4.2 Who pays

Funding - Fees / User Charges	Other revenue Grants & Subsidies	General rate	Targeted rate
0%	0%	0%	100%
			Full

Note, Funding Split % is derived from the 'Summary of Cost for Activity' (section 13).

Key:		Typically
Full	All or almost all the cost is funded from that source. If the comment is made in the general or targeted rate columns it does not preclude making minor charges for the service but indicates that the charges are a negligible part of the fund.	95%+
Majority	The majority of the activity is funded from this source.	50%+
Some	Some revenue is derived from this source.	<50%

Does this Activity generate surplus funds that can be applied to other areas? **No**

Explanatory Comments:

The cost of this service is covered by Targeted Rate.

3.5 Key legislation and Council strategies

Resource Management Act 1991; Local Government Act 1974 & 2002; Building Act 1991; Christchurch District Drainage Act 1951, and Land Drainage Act 1908; Health Act 1956 and amendments; Waterways and Wetlands Natural Asset Management Strategy, 1999; Surface Water Strategy 2009, Water Related Services By-Law 2008 ; Public Open Space Strategy; Biodiversity Strategy; Land and Water Regional Plan 2014.

4 Levels of service and performance measures

Table 4-1 summarises the levels of service and performance measures for the Stormwater Drainage activity. Shaded rows are the levels of service and performance measures to be included in the Long Term Plan. Non-shaded rows are non-LTP management level measures, agreed with and reported to Council but not included as part of the community consulted document.

Table 4-1 Levels of Service

Performance Standards Levels of Service (we provide)	Results (Activities will contribute to these results, strategies and legislation)	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmarks	Future Performance (targets)			Future Performance (targets) by Year 10 2024/25
					Year 1	Year 2	Year 3	
					2015/16	2016/17	2017/18	
Provide and maintain the stormwater drainage system (surface water management systems, e.g. streams, rivers, utility waterways, basins, structures, pipes)								

Performance Standards Levels of Service (we provide)		Results (Activities will contribute to these results, strategies and legislation)	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmarks	Future Performance (targets)			Future Performance (targets) by Year 10 2024/25
						Year 1	Year 2	Year 3	
						2015/16	2016/17	2017/18	
14.0.11	Stormwater system is adequate to deal with flood events up to a 1 in 5 year event. <i>Stormwater Drainage mandatory performance measures 1a-b.</i>	A safe and reliable stormwater drainage system is maintained	<p><i>Total number of flooding events (1 in 5 yr) per annum.</i></p> <p><i>CCC defines flooding as an event exceeding the capacity of the SW system</i></p>	New national performance measure	New national performance measure	14.0.11.1 Total number of flooding events per annum, measured as a 10 year rolling average: <2	14.0.11.1 Total number of flooding events per annum, measured as a 10 year rolling average: <2	14.0.11.1 Total number of flooding events per annum, measured as a 10 year rolling average: <2	14.0.11.1 Total number of flooding events per annum, measured as a 10 year rolling average: <2
	14.0.11.2 For each flooding event, the number of habitable floors affected, expressed as an average per 100,000 properties connected to the territorial authority's stormwater system: <1					14.0.11.2 For each flooding event, the number of habitable floors affected, expressed as an average per 100,000 properties connected to the territorial authority's stormwater system: <0.5	14.0.11.2 For each flooding event, the number of habitable floors affected, expressed as an average per 100,000 properties connected to the territorial authority's stormwater system: 0	14.0.11.2 For each flooding event, the number of habitable floors affected, expressed as an average per 100,000 properties connected to the territorial authority's stormwater system: 0	

Performance Standards Levels of Service (we provide)		Results (Activities will contribute to these results, strategies and legislation)	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmarks	Future Performance (targets)			Future Performance (targets) by Year 10 2024/25
						Year 1	Year 2	Year 3	
						2015/16	2016/17	2017/18	
14.0.2	Resource consent compliance for consents held by Land Drainage Operations for discharge from stormwater system <i>Stormwater Drainage mandatory performance measures2a-d</i>	Water quality is maintained and/or improved	Compliance with the territorial authority's resource consents for discharge from its stormwater system, measured by the number of notices or orders received by the TA in relation to those resource consents, for; (a) abatement notices (b) infringement notices (c) enforcement orders (d) convictions	2013/14: 100%, no resource consent breaches resulting in court action by ECan 2012/13: No resource consent breaches 2011/12: No resource consent breaches 2010/11: No resource consent breaches 2009/10: No resource consent breaches	No infringement notices served on Auckland water authorities by respective Regional authorities – Auckland Water Industry Report	100%	Number of abatement notices: 0 Number of infringement notices: 0 Number of enforcement orders: 0 Number of convictions: 0	Number of abatement notices: 0 Number of infringement notices: 0 Number of enforcement orders: 0 Number of convictions: 0	100%

Performance Standards Levels of Service (we provide)		Results (Activities will contribute to these results, strategies and legislation)	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmarks	Future Performance (targets)			Future Performance (targets) by Year 10 2024/25
						Year 1	Year 2	Year 3	
						2015/16	2016/17	2017/18	
14.0.10	Response times to attend a flooding event <i>Stormwater Drainage mandatory performance measure 3</i>	Response times as specified in the Waterways and Land Drainage Maintenance contract are met	The median response time to attend a flooding event, measured from the time that the territorial authority receives notification to the time that service personnel reach the site. <i>CCC – operational response on advise of imminent wet weather</i>	New national performance measure	New national performance measure	Median response time to attend a flooding event, from time notification received 30 minutes	Median response time to attend a flooding event, from time notification received 30 minutes	Median response time to attend a flooding event, from time notification received 30 minutes	Median response time to attend a flooding event, from time notification received 30 minutes

Performance Standards Levels of Service (we provide)		Results (Activities will contribute to these results, strategies and legislation)	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmarks	Future Performance (targets)			Future Performance (targets) by Year 10 2024/25
						Year 1	Year 2	Year 3	
						2015/16	2016/17	2017/18	
14.0.1	Response times to drainage faults and surface water management issues	Response times as specified in the Waterways and Land Drainage Maintenance contract are met.	CSRs via the Council call centre and Contractor reporting	<p>2013/14: 100%</p> <p>2012/13: 100%</p> <p>2011/12: 100%</p> <p>2013/14: 100%</p> <p>2012/13: 97%</p> <p>2011/12: 100%</p> <p>2013/14: 97% / 94%</p> <p>2012/13: 93%/100%</p> <p>2011/12: 100%</p> <p>2013/14: 92% / 91%</p> <p>2012/13: 85% / 80%</p> <p>2011/12: 100%</p>	<p>Auckland City Council:</p> <p>>90% urgent stormwater requests responded to within 2 hours in urban areas,</p> <p>>90% urgent stormwater requests responded to within 4 hours in rural areas.</p> <p>>85% non-urgent stormwater requests responded to within 3 working days.</p> <p>Palmerston North City Council:</p> <p>95% of stormwater requests responded to within 2 hours (response only, not resolution)</p>	<p>14.0.1.1: Emergency works – urban 2 hours; rural 6 hours: 95%</p> <p>14.0.1.2: Urgent works – urban 24 hours; rural 24hours: 95%</p> <p>14.0.1.3: Priority call outs – urban 3 working days; rural 5 working days: 85%</p> <p>14.0.1.4: Routine call outs – urban 5 working days; rural 10 working days: 85%</p>	<p>14.0.1.1: Emergency works – urban 2 hours; rural 6 hours: 95%</p> <p>14.0.1.2: Urgent works – urban 24 hours; rural 24hours: 95%</p> <p>14.0.1.3: Priority call outs – urban 3 working days; rural 5 working days: 85%</p> <p>14.0.1.4: Routine call outs – urban 5 working days; rural 10 working days: 85%</p>	<p>14.0.1.1: Emergency works – urban 2 hours; rural 6 hours: 95%</p> <p>14.0.1.2: Urgent works – urban 24 hours; rural 24hours: 95%</p> <p>14.0.1.3: Priority call outs – urban 3 working days; rural 5 working days: 85%</p> <p>14.0.1.4: Routine call outs – urban 5 working days; rural 10 working days: 85%</p>	<p>14.0.1.1: Emergency works – urban 2 hours; rural 6 hours: 95%</p> <p>14.0.1.2: Urgent works – urban 24 hours; rural 24hours: 95%</p> <p>14.0.1.3: Priority call outs – urban 3 working days; rural 5 working days: 85%</p> <p>14.0.1.4: Routine call outs – urban 5 working days; rural 10 working days: 85%</p>

Performance Standards Levels of Service (we provide)		Results (Activities will contribute to these results, strategies and legislation)	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmarks	Future Performance (targets)			Future Performance (targets) by Year 10 2024/25
						Year 1	Year 2	Year 3	
						2015/16	2016/17	2017/18	
14.0.12	Number of complaints received by CCC about the performance of the stormwater system <i>Stormwater Drainage mandatory performance measure 4.</i>	A well maintained stormwater drainage system is provided	The number of complaints received through the call centre about the performance of the stormwater systems, expressed per 1000 properties connected to the TA's stormwater system.	2013/14: 15.7 total CSRs, 9.42 are complaints <i>(Total 2354 calls, 150,000 properties connected to the network, 60% complaints)</i>	New national performance measure.	Number of complaints about the performance of the stormwater systems, per 1000 connected properties: 9	Number of complaints about the performance of the stormwater systems, per 1000 connected properties: 8.5	Number of complaints about the performance of the stormwater systems, per 1000 connected properties: 8	Number of complaints about the performance of the stormwater systems, per 1000 connected properties: 5
14.0.3	Customer satisfaction with Stormwater Drainage Management	Customers satisfied with the stormwater service provided	Measured through the Annual General Residents Satisfaction Survey. To monitor satisfaction with the levels of service provided.	2013/14: 51% 2012/13: 56% 2011/12: 61% 2010/11: no survey 2009/2010: 72% <i>Historic performance based on satisfaction with waterway appearance and amount of maintenance</i>	Auckland Council: Percentage of residents satisfied with stormwater management \geq 50%	\geq 65%	\geq 70%	\geq 75%	\geq 90%

Performance Standards Levels of Service (we provide)		Results (Activities will contribute to these results, strategies and legislation)	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmarks	Future Performance (targets)			Future Performance (targets) by Year 10 2024/25
						Year 1	Year 2	Year 3	
						2015/16	2016/17	2017/18	
14.0.6	Diversion of all aquatic weed from landfill (mechanical and hand harvested)	Measuring and managing the diversion of green-waste from landfill to support Council's Sustainability Policy.	Percentage of green waste diverted from landfill	2013/14: 100% 2012/13: 100% 2011/12: no result 2010/11: no result 2009/10: 88% <i>Historic performance based on mechanical harvesting of weed ONLY</i>		≥85%	≥90%	≥95%	≥95%
14.0.13	Three waters strategies, policies and plans to protect or enhance the natural environment including ecosystems, natural and cultural landscapes, freshwater; manage natural hazards; and promote sustainability are developed					17.0.31.2 Single Stormwater Discharge Consent granted by Environment Canterbury Regional Council June 2016	17.0.31.2 Stormwater Management Plans for City catchments completed Dec 2016	Stormwater Management Plans for Banks Peninsula catchments completed by 2020	Stormwater Management Plans for Banks Peninsula catchments completed by 2020

5 Review of cost effectiveness - regulatory functions and service delivery

The Local Government Act requires local authorities to review the cost effectiveness of current arrangements for delivering its services and regulatory functions. The review below is in regard to operational expenditure (OPEX).

The majority of service delivery for the Stormwater Drainage Activity is carried out through the maintenance contracts. Council maintains a wide range of assets for stormwater drainage purposes and has (several??) maintenance contracts in place to ensure these assets are maintained to the appropriate level.

Council uses the New Engineering Contract (NEC) form of contract which requires a collaborative working environment with the contractor, promoting the best for asset approach to maintenance, while working within closely monitored budgets.

The following table shows the types of contracts that the Council is currently engaged in, the assets maintained through those contracts and the approximate annual operational expenditure associated with the contracts.

Table 5-1 Maintenance Contracts

Contract Type	Term of Contract	Asset Maintained	Annual Operational Expenditure
Waterways & Land Drainage Maintenance - covers Stormwater Drainage and Flood Protection Activities	One year rolling	Rivers Tributary & Utility Waterways Grills, grates, energy dissipaters & silt traps Stormwater Reticulation Back Control Valves Detention & Treatment Facilities	\$7,600,000
Wai Ora Forest Trust	Annual	Planted areas Restoration and conservation of open waterways	\$180, 000
Crown Public Health Mosquito Control	Annual	Pest control of open waterway, ponds and wetlands	\$50,000

6 Long Term Infrastructure Strategy

Changes to the Local Government Act now require local authorities to consider their strategy and planning for infrastructure and assets over a 30-year timeframe. The strategy describes how assets will be managed taking into account growth, renewals, changes in levels of service and resilience in terms of natural hazards.

6.1 Significant Infrastructure Issues

Asset Condition

Asset management for stormwater drainage is not as advanced as the other infrastructure groups and as such there are gaps in the asset data and quality issues. Very little documented asset condition data exists for the portfolio and known recorded data pre-dates the earthquakes. SCIRT have surveyed a large proportion of the stormwater pipe network and condition information is slowly coming back to Council. The remainder of the portfolio needs to be accurately recorded into the AMIS. A programme of verifying and correcting asset data and collecting condition information is being developed, with the intention of having a fully populated asset register in 2-3 years time.

Earthquake Legacy

SCIRT was created to repair and rebuild the piped stormwater network. Council has a good understanding of what SCIRT has completed so far but does not know how much earthquake recovery work will be required when SCIRT ends in 2016. Ongoing additional maintenance is required to reinstate pre-quake levels of service in the stormwater drainage network, including extensive removal of liquefaction material and relining of lined channels. The final decisions about the Residential Red Zone have yet to be made, however it is likely that any reticulated stormwater infrastructure in the area will become redundant.

The Land Drainage Recovery Programme includes some 52 projects to assess the impacts of the earthquakes on land drainage and the associated infrastructure. Land settlement has exposed new areas to flood risk and adversely affected the natural drainage of some areas of the City.

The Mayoral Flood Taskforce was set up in May 2014 to identify a package of measures that can assist the most vulnerable households in Christchurch cope in the short term with increase in regular flooding due to earthquake land damage.

Capacity

The capacity of the stormwater network has been compromised as a result of citywide development and the earthquakes. The rate of infill housing has increased without a parallel programme to upgrade stormwater mains. Major dredging of waterways was a common practice up until the 1990s and has not been carried out on a large scale since then. The degree of siltation across the network has been exacerbated as a result of liquefaction material filling open channels.

It is understood that SCIRT will replace damaged stormwater pipes like-for-like, without addressing capacity issues. Where possible council engineers are working with SCIRT to identify under capacity networks and to cost share the repair and upgrade. Capacity of pipes is also considered at the time of renewal to ensure that the network meets increasing demand. For future years a citywide hydraulic model should be considered to identify capacity issue areas for future needs.

Flood Risks

The district has always been exposed to flood risk from both the sea and the river network, with the stormwater network functioning well enough to deal with average sized flood events (1 in 10 year Annual Recurrence Interval). As the predicted climate change and sea level rise scenarios unfold flood risk will increase, exposing more people and properties to increasingly frequent flood events.

Flood risk has worsened since the earthquakes due to land settlement, loss of natural gravity drainage, loss of capacity and damaged assets. The level of damage and flood carrying capacity of waterways and the stormwater network is being assessed. Remedial work required is being prioritised and implemented. Land settlement has exposed new areas to flood risk and increased the size of existing areas. This was highlighted in the significant storm events of March 2014. Some short term measures have been implemented and longer term flood management schemes are being investigated particularly in Flockton area and the Lower Heathcote catchment.

There is an opportunity to provide stormwater treatment and flood management within the Residential Red Zone. The scope and scale of such stormwater management works remain to be agreed with the Government in conjunction with the future of the Red Zone land uses.

Climate Change

The functionality of stormwater infrastructure will be compromised over time as the climate changes. During flood events stormwater in low lying suburbs may need to be pumped from areas below sea level into waterways at higher elevations. In time this will affect most stormwater systems east of Fitzgerald Avenue. A number of short term measures have been identified to address flood risk to the most vulnerable households in Christchurch, however longer term mitigation measures need to be developed to address the extreme flooding which will result through climate change and sea level rise.

Aging Network

The majority of the piped stormwater network has been constructed post-1970, in response to major flooding in the Wahine storm and several severe floods in the 1970s. Before this time the city prioritised its wastewater infrastructure. As a result the stormwater pipe network has a mean age of 30-40 years, and is about one third through its expected life. The most important components of the stormwater network are streams and rivers, whose channels have an indefinite life. However urban activities have impaired the ecology of urban streams and continually clog waterways with sediment. These issues have the potential to drive significant restoration costs.

Urban Development

Unmitigated urban development profoundly alters stormwater flows. When land is developed the vegetation that intercepts and slows rainfall run-off is removed. Grading flattens the terrain and fills in natural depressions that would normally provide temporary storage for rainfall and slow run-off. The topsoil and layers of humus are removed and the remaining subsoil is compacted. The addition of buildings, roads, car parks and other impervious surfaces increase stormwater run-off. Development and impervious surfaces also limit the amount of water that can infiltrate the soil and reach groundwater, reducing the amount of water that can recharge aquifers and feed springs. Finally, as stormwater runs over rooftops and lawns, car parks and industrial sites, it picks up a variety of contaminants and pollutants which are discharged into waterways and the coastal environment. Mitigation of high flows and contaminant entrainment are provided for all new subdivisions and through modern detention systems. Retrofitting to existing unmitigated developments is an expensive addition to the City's infrastructure but can be undertaken as opportunity arises.

Stormwater Quality

All of the zone implementation programmes relevant to Christchurch have recommendations related to surface water quality. There is a clear direction in the Christchurch-West Melton Zone Implementation Programme for improved water quality in Christchurch's streams, rivers and the estuary. The Stormwater Management Plans are driving improvements in stormwater quality.

The recently re-furbished National Policy Statement for Freshwater Management (2013) added a national objectives framework that includes a set of national bottom lines for a number of pollutants. Almost all water bodies will be expected to have water quality no worse than the national bottom lines and there are likely to be water bodies for which regional standards will be set that are more stringent than the national bottom lines. Standards applicable to specific water bodies are to be determined by regional councils. There are water bodies in Christchurch that did not meet one or more national bottom lines per ECan's monitoring data in 2011/12 and/or 2012/13 (e.g. ammonium nitrogen in Halswell retention basin; *E. coli* in the Heathcote River at Rose Street).

6.2 Significant Projects

There are several key projects included within the expenditure profile including:

- Stormwater pipe renewals
- Growth related projects – South West, Avon and Styx.
- Land Drainage Recovery Programme

7 Review of cost-effectiveness - infrastructure delivery

The Local Government Act requires local authorities to review the cost effectiveness of current arrangements for delivering its services and regulatory functions. The review below is in regard to Capital expenditure (CAPEX).

The capital renewal of assets and new capital projects are primarily undertaken through competitively tendered contracts, thereby ensuring cost effectiveness of infrastructure delivery. The timing of these works is driven by the Capital Programme and the tender process follows Councils procurement policy to ensure rigour and cost effectiveness.

8 Significant Effects

Clause 2(1)(c) of Schedule 10 to the Local Government Act 2002 requires that each Long Term Plan in relation to each group of activities of the local authority must:

“Outline any significant negative effects that any activity within the group of activities may have on the social, economic, environmental, or cultural well-being of the local community.”

The Council recognises the following negative and positive effects of providing, operating and managing its stormwater assets.

Table 8-1 Significant Negative Effects

Effect	Council's Mitigation Measure
Environmental Degradation	Working within the conditions of resource consents, Limiting damage through sensitive maintenance and operations. Monitoring the health of water environments. Work with the dischargers to improve site containment and work practices.
Reduction in water quality	Working within the conditions of resource consents. Maintenance and operational practices to safeguard water quality. Regular monitoring of water quality. One of the main contamination sources to the main rivers on a day to day basis is birdlife and dogs rather than sewer overflows. Whilst of concern sewer overflow affects are transitory in nature.
Third party non-compliance	Enforcement of the Resource Management Act 1991

Table 8-2 Significant Positive Effects

Effect	Description
Public Health & Safety	The provision of a stormwater drainage system collects and takes stormwater away from property and people, so reducing the flood risk during normal rainfall events.
Economic Development	Provision of a functioning stormwater drainage network allows safe considered urban growth and the associated economic growth and prosperity
Recreation and Amenity	Provision of clean, tidy and accessible waterways, ponds and wetlands enables the community to partake in water related recreational activities and to enjoy water amenities
Improved Environment	Provision of a functioning stormwater drainage system reduces the amount of contaminants entering waterways, lakes and the sea, It provides habitat for a wide range of flora and fauna.
Image	The provision of well maintained waterways enhances the Garden City profile

8.1 Assumptions

Council has made a number of assumptions in preparing the Activity Management Plan. Table 8-3 lists the most significant assumptions and uncertainties that underline the approach taken for this activity.

Table 8-3 Major Assumptions

Assumption Type	Assumption	Discussion
Financial assumptions	That all expenditure has been stated in 1 July 2014 dollar values and no allowance has been made for inflation.	The LTP will incorporate inflation factors. This could have a significant impact on the affordability of the plans if inflation is higher than allowed for.
Asset data knowledge	That Council has adequate knowledge of the assets and their condition so that the planned renewal works will allow Council to meet the proposed levels of service.	There are several areas where Council needs to improve its knowledge and assessments but there is a low risk that the improved knowledge will cause a significant change to the level of expenditure required.
Growth forecasts	That the district will grow as forecast in the Greater Christchurch UDS and the LURP	If the growth is very different it will have a moderate impact. If higher, Council may need to advance capital projects. If it is lower, Council may have to defer planned works.
Network capacity	That Council's knowledge of network capacity is sufficient enough to accurately programme capital works.	If the network capacity is higher than assumed, Council may be able to defer works. The risk of this occurring is low and will have little significance. If the network capacity is lower than assumed, Council may be required to advance capital works projects to address limitations of the system. The risk of this occurring is moderate; however the impact on expenditure would be significant.
Emergency funding	That the Council annual budget is adequate to cover response costs associated with an emergency event.	Traditionally Council manage such risks through the entire Annual Plan budget. The risk of requiring additional funding is moderate and may have an effect on planned works due to reprioritisation of funds.
Timing of capital projects	That capital projects will be undertaken when planned.	The risk of the timing of projects changing is high due to factors like resource consents, funding and land purchase. Council tries to mitigate these issues by undertaking the consultation, investigation and design phases sufficiently in advance of the construction phase. If delays are to occur, it could have significant effects on the level of service.
Accuracy of capital project cost estimates	That the capital project cost estimates are accurate enough to determine the required funding level.	The risk of large under estimation is low. However the importance is moderate as Council may not be able to afford the true cost of the projects should the cost estimate be too low. Council tries to reduce the risk by including a standard contingency based on the projects lifecycle and updates the costs at each major phase of each project.

Assumption Type	Assumption	Discussion
Changes in legislation and policy, and financial assistance	That there will be no major changes in legislation or policy.	The risk of major change is high due to the changing nature of the government and politics. If major changes occur it is likely to have an impact on the required expenditure. Council has made no allowance for such changes.

9 Risk Management

All operational and organisational risks have been identified and recorded into the Stormwater Risk Register. The risks listed below in Table 9-1 have been identified as the most critical risks to the stormwater drainage activity.

Table 9-1 Significant Risks and Treatment Measures

Risk	Impact	Priority	Risk Strategy	Risk Response
Increased rainfall intensities as a result of climate change	Heavier storms, increased likelihood of flooding, reduced LoS	Extreme	Mitigate	Plan, design and build new assets to deal with CC; model existing network to identify weaknesses over various sized storm events
Land settlement-discharge points no longer functional	Reduced ability to discharge, pooling/backing up of stormwater leading to increased flood risk and reduced LoS	Very High	Accept	Carry out assessment of land changes, identify critical discharge points and prioritise renewal
Reduced funding	LoS falls or short term strategies are adopted that lead to increased cost in the future	Very High	Mitigate	Investigate alternative contract or management arrangements; review priorities and identify efficiencies; reduce LoS
SCIRT fail to deliver SW pipe repairs within time or budget	CCC left with significant cost to restore LoS	Very High	Mitigate	Ensure SCIRT programme for SW repairs is transparent and receives the appropriate priority. Discuss cost share agreement and review outcome with Government
SCIRT handover a greater volume of deferred work than expected	Unknown volume of work with increased funding requirements	Very High	Mitigate	Early involvement in optimisation project, develop plans/strategies to deal with increased work
EQ results in changes to long term plans	Loss of key subdivision developments. Land drainage works still need to be undertaken but developer contributions are not available. Funding shortfall to be sought	Very High	Accept	Seek alternative funding streams. Assess the validity of plans post quake and prioritise projects
Incomplete asset register for all stormwater assets owned, operated and maintained by Council	Inspection, maintenance and renewals planning incomplete and budgets therefore inadequate to maintain LoS	High	Mitigate	Complete asset register and condition assessment of all CCC owned, operated and maintained assets; actively review the register to maintain as current
Stormwater discharge quality is not improved	Water quality standards are not achieved, prosecution by ECan	High	Mitigate	Accurately monitor water quality, early discussions with ECan

10 Improvement Plan

This document is part of a new approach to developing the 2015-25 Long Term Plan and is expected to require an improvement plan. To date this document has not been reviewed however a review for compliance with the requirements of the relevant legislation, especially the LGA 2002 should be a primary improvement item. The findings and suggestions from the review will be assessed and prioritised, to either be implemented for the final version of this document or added to the Improvement Plan. It is intended that the Improvement Plan will be a live document which is continually monitored and updated.

City Water and Waste have developed a Contract Management Improvement Plan. Version 1.0 dated May 2014 is saved in TRIM, 14/995771.

The Land Drainage Asset Management Plan includes an Improvement Plan to address stormwater asset management issues in time for the next plan review in 2017-18.

The Surface Water Strategy strives to improve how surface water resources are managed for future generations by delivering nine goals. The Stormwater Drainage Activity contributes to these goals.

11 Operations, Maintenance and Renewals Strategy

11.1 Operations and Maintenance

Maintenance activities are carried out across the Land Drainage asset portfolio which includes both flood protection and stormwater drainage assets. These activities include aquatic weed harvesting, vegetation control, rubbish/debris collection and disposal and patch repairs to structures, pump stations and drain linings. Stormwater drainage is also provided by the road network through kerb and channel and road sumps. These assets are maintained by the roading teams.

Maintenance is approached in two ways, either through the planned programme or through reactive response and delivered through the contracts as discussed in Section 5. Performance measures from the Activity Management Plans and Council specifications define the outcomes the contractors are required to achieve. The contractor prepares monthly, quarterly and annual programmes of work, which are reviewed and approved by Council contract managers.

Budget restrictions in future years are likely to lead to changes in the levels of service currently provided. The frequency at which some maintenance tasks are carried out may have to reduce. A drive for more planned maintenance should reduce reactive maintenance and help maintain Levels of Service at a lower cost.

11.2 Renewals

Assets are considered for renewal as they near the end of their effective working life, where the cost of maintenance becomes uneconomical, or when the risk of failure of critical assets is sufficiently high.

Currently the stormwater and land drainage renewals programme is based on information and evidence from staff involved in the day to day management of the assets, rather than asset condition data. A working group approach has been taken to decide which projects should be included into the programme.

Over the course of the next two years, the asset management information system (AMIS) will be sufficiently populated to allow for renewals modelling to be undertaken as part of the renewals planning process. During this time all assets related to stormwater drainage will be condition assessed to better inform the renewals programme. The use of condition assessment data, expected life and engineering judgement will enhance the renewals programme moving it away from a reactive to a planned approach.

Based on the age and material type of some of the pipe network, a large number of pipes have reached the end of their effective life and significantly increased renewals expenditure is required over the next 30 years. Important upcoming renewals include the Lyttelton Brick Barrels and renewing the backlog of pipes which have exceeded their effective life.

Asset data exists for the network of lined channels and has been used to develop a renewals programme. Over the next 10 years substantial renewal of drain linings will be required. Opportunities to naturalise these drains will also be considered rather than replacing the drain linings like-for-like.

Increasingly low impact design stormwater infrastructure is being incorporated into the street corridors to manage stormwater runoff and contamination. The growth in incorporating this type of infrastructure will require additional renewals planning and funding for future years.

12 Key Projects

Table 12-1 details the key capital and renewal work programmed for years 2015 to 2025.

Table 12-1 Key Projects

Project Name	Description	Year 1 (\$)	Year 2(\$)	Year 3 (\$)	Years 4-10 (\$)	Project Driver
Lyttelton Brick Barrels	Relining of approximately 3km of stormwater brick barrels in Lyttelton. Restoring their condition from 5 to condition rating 2.	522,650	522,650	522,650	522,650	R
Stormwater Pipe Renewals	The renewal of stormwater pipes across the City and Banks Peninsula once they reach the end of their expected useful life.	1,000,000	1,000,000	1,000,000	13,000,000	R
Lined Channel Renewals	The renewal of lined drains across the City and Banks Peninsula once their condition reaches condition grade 4 or worse.	246,347	246,347	246,347	2,739,041	R
South West Area Plan Stormwater Program	Development and construction of detention and treatment facilities as prescribed in the South West Area Plan and the South West Stormwater Management Plan	5,725,000	6,010,475	5,675,000	37,500,000	G
Styx Stormwater Program	Development and construction of detention and treatment facilities as prescribed in the Belfast Area Plan and the Styx Stormwater Management Plan	2,150,000	2,700,000	5,227,000	35,000,000	G
Avon Stormwater Program	Provision of basins and stormwater facilities to support growth in the Avon Catchment and to align with the Avon Stormwater Management Plan	510,000	510,000	1,000,000	18,000,000	G

Note: G = Growth, LoS = Levels of Service, R = Renewal

13 Summary of Cost for Activity

Figure 13-1 Operational Budget Breakdown

STORMWATER DRAINAGE	Funding Caps in 2015/16 Dollars				Funding splits exclude EQ Costs from all calculations				Period of Benefit (years)	Comments
	2014/15 Annual Plan	2015/16	2016/17	2017/18	Funding - User Charges	Other revenue	General rate	Targeted rate		
	000's									
Operational Budget										
Stomwater Drainage	11,378	11,403	11,166	11,029						
Activity Costs before Overheads	11,378	11,403	11,166	11,029						
Earthquake Response Costs	7,337	7,581	7,459	311						
Corporate Overhead	858	840	827	780						
Depreciation	4,731	4,950	4,987	5,003						
Interest	905	1,271	1,635	1,922						
Total Activity Cost	25,208	26,045	26,075	19,046	0% Availability	0%	0%	100% Full		
Funded By:										
Fees and Charges	20	21	21	21						
Grants and Subsidies	-	-	-	-						
Earthquake Recoveries	4,320	-	-	-						
Total Operational Revenue	4,340	21	21	21						
Net Cost of Service	20,868	26,025	26,054	19,026						
Funded by:										
Rates	17,851	18,444	18,595	18,715						
Earthquake Borrowing	3,017	7,581	7,459	311						
	20,868	26,025	26,054	19,026						
Capital Expenditure										
Earthquake Rebuild										
Renewals and Replacements										
Improved Levels of Service										
Additional Demand										

Figure 13-2 Operational Costs

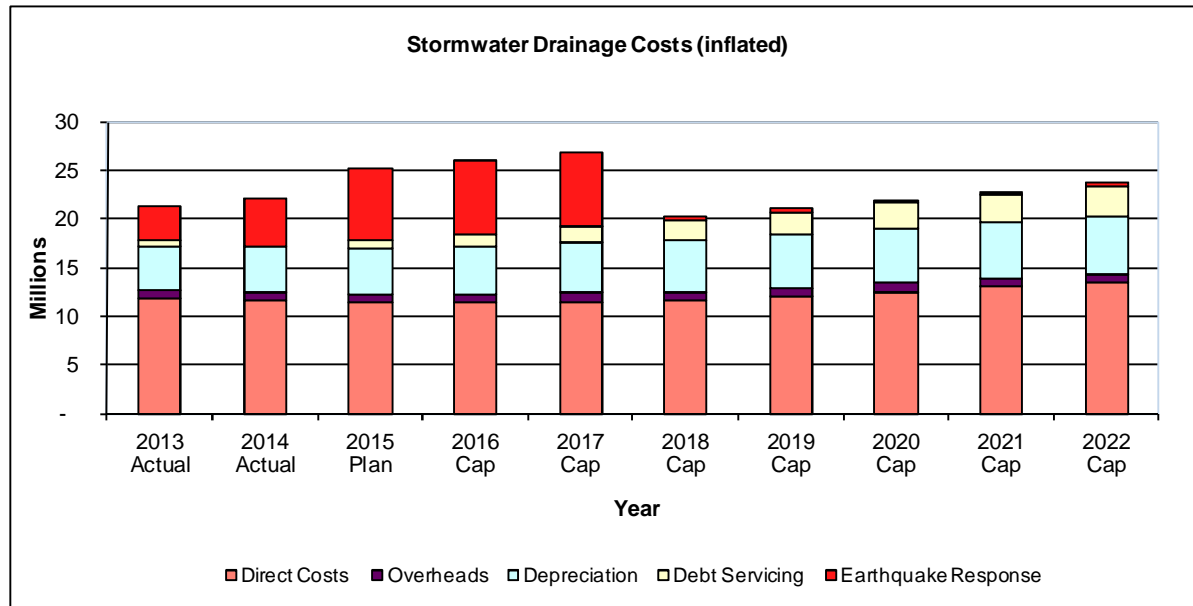


Figure 13-3 Forecasted Total Expenditure



Figure 13-4 Forecasted Operating Expenditure

NOTE – including EQ funding but not including related overheads

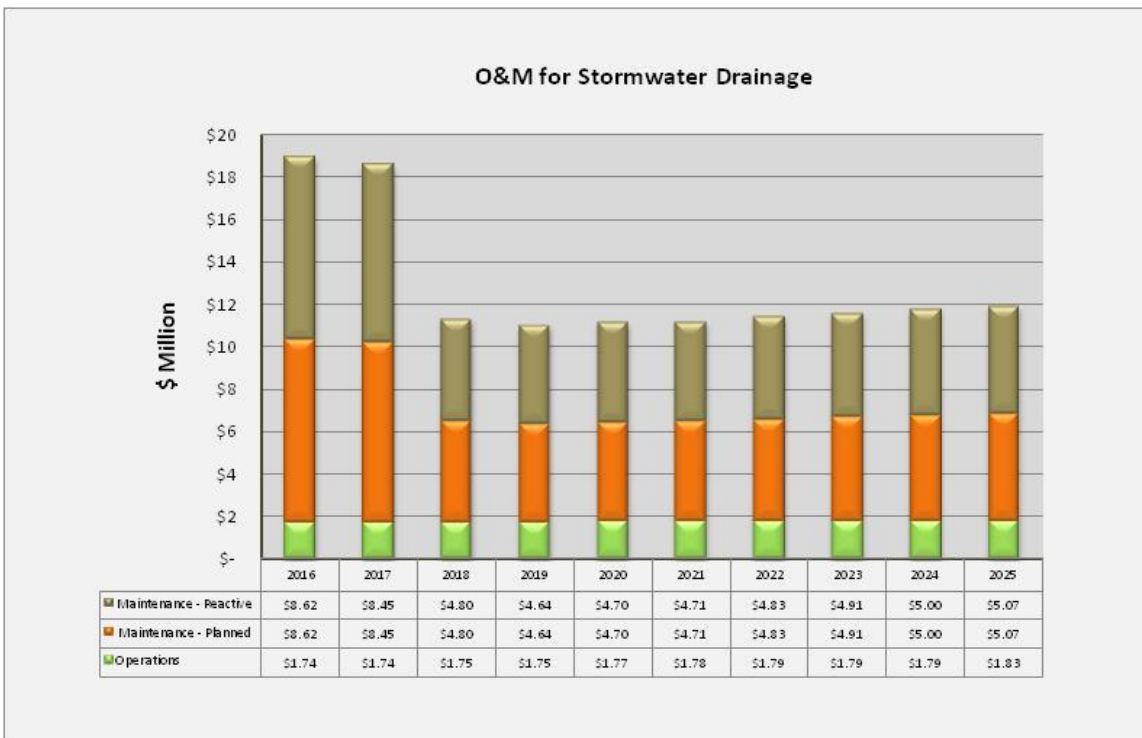


Figure 13-5 Capital Expenditure

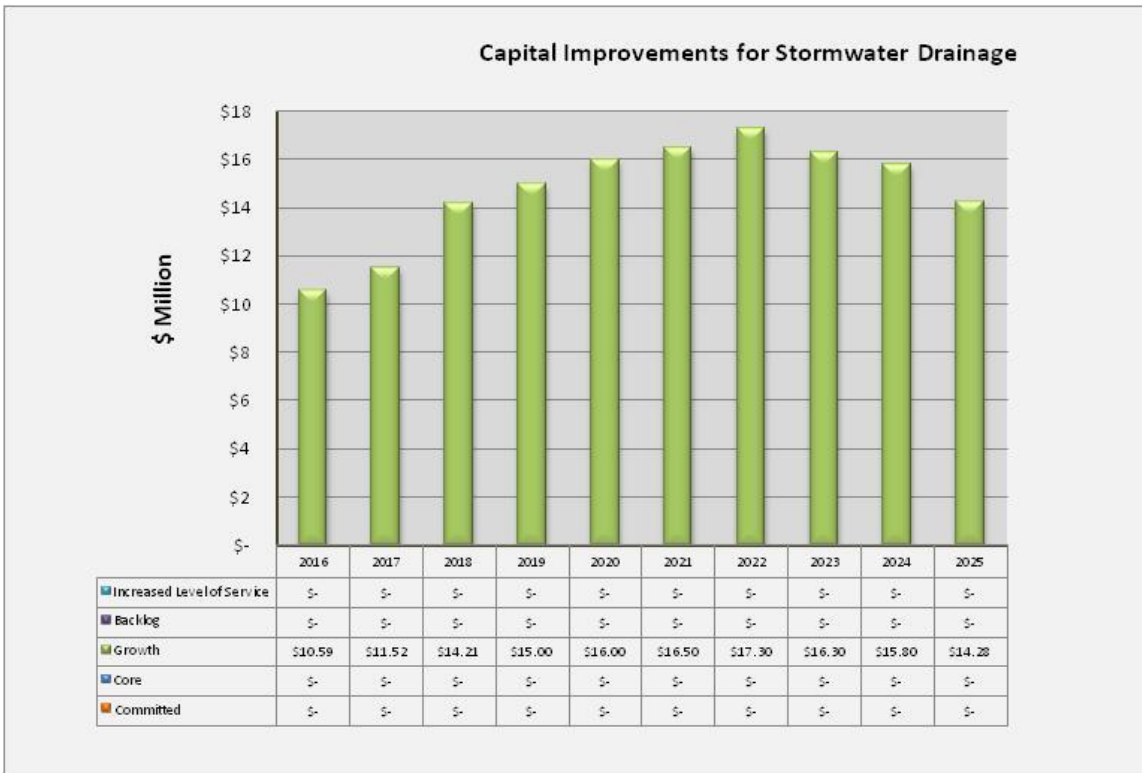


Figure 13-6 Renewals Expenditure

