

**BEFORE THE HEARINGS PANEL SOUTHLAND REGIONAL COUNCIL**

**IN THE MATTER** of the Resource Management Act  
1991

**AND** of an Application for Resource  
Consent to Discharge from  
Stormwater Network

**BY** **INVERCARGILL CITY COUNCIL**  
**APP-201668843**

Applicant

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**BRIEF OF EVIDENCE OF MALCOLM RONALD LOAN**

**Dated 25 July 2017**

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*Filed by*

**Invercargill City Council**

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I, Malcolm Ronald Loan state:

## **Background**

1. My name is Malcolm Ronald Loan. I am Invercargill City Council's Drainage Manager and have held that position for 31 years. I am responsible for Invercargill's sewerage and stormwater drainage systems. I hold a Bachelor of Engineering (Civil) degree and am a member of the Institute of Professional Engineers of New Zealand.

## **The Consent Applications**

2. Invercargill City Council applied for consent to discharge stormwater to each of five waterways through the city in September 2016. The water ways are the Waikiwi Stream, the Waihopai River, Otepuni Stream, Kingswell Creek and Clifton Channel.
3. The application seeks consent to authorise the discharge from the reticulated stormwater network to multiple discharge points in each of the waterways. This includes stormwater from roads, hardstand areas, roofs and permeable areas, as well as drainage water as described in Section 2.1 (page 4) of the Application.
4. The application seeks consent durations of 35 years to provide surety to Invercargill City Council in developing asset management plans which will over time develop the drainage infrastructure, and improve the quality of discharges to water. After consideration of the concerns expressed by submitters, the ICC have agreed to reduce the duration sought to 25 years.
5. The five water ways pass through the urban area, from east to west, from intensive pastoral farming areas. The northern most water way, the Waikiwi Stream, is a tributary of the Oreti River which flows into the New River Estuary. Each of the remaining four waterways discharge to the Waihopai arm of the New River Estuary. All of the water ways have been extensively modified and straightened through Invercargill's history, and during the 1980's, floor protection including stopbanks and detention dams were constructed on the Waihopai, Otepuni and Kingswell.
6. In addition to the discharges to fresh water which form this application, stormwater from parts of Invercargill totalling 664Ha drain discharge directly to the coastal marine area along the eastern shore of the Waihopai arm of the estuary and have been undertaken as permitted activities subject to rule 7.3.4.1 of the Regional Coastal Plan and are not included in this application.

## **Description of Stormwater Network**

7. The five stormwater catchments subject to this application are shown on the attached plan (Attachment 1 of my evidence), and described as follows:

### *Waikiwi Stormwater Catchment*

8. The Waikiwi stormwater catchment includes an area of 46.27Ha of predominately residential landuse, with a small area of commercial landuse along North Road.
9. Five stormwater pipes ranging in size from 300mm to 600mm diameter discharge to an open drain alongside Gloucester Street, to the west of the catchment, and then through a flood gated discharge pipe to the Waikiwi Stream. A sixth pipe of 750mm diameter discharges to a rural ditch at the west end of Renfrew Street, which discharges to the Waikiwi stream a further 660m to the west. The stormwater catchment represents approximately 0.4% of the total stream catchment area of 127km<sup>2</sup>. The Waikiwi Stream is a tributary of the Oreti River, which flows into the New River Estuary.

### *Waihopai River Stormwater Catchment*

10. The Waihopai River stormwater catchment includes an area of 818Ha of predominately residential landuse, with an area of rural land to the north, and industrial and commercial landuse in the Prestonville area. There are 39 stormwater discharge outfalls along the 2.8km length of river through the stormwater catchment area, ranging in size from 225mm to 1800mm diameter. The stormwater catchment is approximately 4.4% of the total river catchment area of 184km<sup>2</sup>.

### *Otepun Stream Stormwater Catchment*

11. The Otepun Stream stormwater catchment includes an area of 985Ha. The stream flows through the centre of the city and the catchment includes residential, commercial, industrial and recreational landuses, including parts of the Central Business District. Prior to entering the Waihopai arm of the New River Estuary, the stream passes through the Liddel/Mersey Street industrial area which includes the Invercargill rail yards. The rail yards have their own stormwater system that is not included in or discharge to the ICC network. There are 67 stormwater discharges to the stream in its 4.1km length between the railway culvert and Rockdale Road, ranging in size up to 1200mm diameter. The stormwater catchment is approximately 29% of the total stream catchment area of 34.5km<sup>2</sup>.

### *Kingswell Creek Stormwater Catchment*

12. The Kingswell Creek stormwater catchment includes an area of 374Ha. The stream flows through the southern part of the city and is predominately residential landuse

with a small amount of commercial activity. There are 29 stormwater discharges in the 2.2km length of stream between Bluff Highway and Chesney Street, ranging in size up to 1200mm diameter. The stormwater catchment is approximately 36% of the total stream catchment area of 10.4km<sup>2</sup>.

#### *Clifton Channel Stormwater Catchment*

13. The Clifton Channel stormwater catchment includes a catchment of 98.2Ha. The catchment is to the south of the city and is largely low density residential landuse, mixed with rural. There are 6 stormwater discharges in the 1.4km length of channel between Bluff Highway and Chesney Street. The Channel passes from pastoral farmland through the Clifton Residential Community, and an industrial area to the west of Bluff Highway which includes the Clifton Wastewater Treatment Plant, before entering the New River Estuary. The industrial area discharges stormwater runoff to open ditches and is not part of the reticulated stormwater area. The stormwater catchment is approximately 52% of the total stream catchment area of 190Ha.

#### **Drainage Infrastructure – Benefit and Ongoing Need**

14. Invercargill's Drainage Networks were first established over 100 years ago to protect public health, to reduce the risk of property damage due to flooding, and to enhance the urban environment. Over the intervening years the systems have grown with the city, and have been improved to provide better separation of the two networks, and to improve their performance in terms of the protection of public health and of property, and to reduce adverse effects on the environment.
15. The sewerage network includes 364 km of pipes in Invercargill, Otatara, Omaui, and Bluff, 31 pump stations, and three treatment plants, located at Bluff, Omaui, and Clifton. The Clifton and Bluff treatment plants both produce tertiary quality effluent, and the Omaui Plant is consented to discharge to land. Discharges from each of the treatment plants consistently comply with their consented quality standards. The network collects and treats sewage and tradewaste from more than 20,000 residential, commercial and industrial properties. The removal and treatment of sewage and tradewaste provides health benefits to the community, and provides one of the building blocks for business to establish and contribute to the prosperity of the community. In June 2014, the sewerage activity has an Optimised Replacement Value of \$180M and the activity has an annual budget for 2017/18 of \$6.4M, including an asset renewal budget of \$2.1M.
16. The stormwater network includes 414km of pipes in Invercargill and Bluff, and nine pump stations. The system discharges at more than 250 locations along the five streams through the city and within the Coastal Marine Area. The discharges to the fresh water streams have been consented since 2011. These consents expired in December 2016, and ICC have lodged this application for a new consent. Consents

for discharges to the coastal marine area have not been required in the past. The stormwater network collects rainwater from rooves of buildings, and from ground level surfaces through mudsumps.

17. Stormwater is susceptible to contamination from a number of sources including contaminants which can accumulate on the surfaces from which water is drained, cross connection or overflow from the sewerage system due to blockage or damaged pipes, and overloading of both drainage systems due to high intensity rainfall. The system receives stormwater from more than 20,000 residential, commercial, and industrial properties.
18. The drainage of stormwater provides health benefits to the community and protects properties from damage due to flooding. Following the major flooding of Invercargill in 1984, the stormwater network has been significantly upgraded to provide sufficient capacity for similar storms in the future. The upgrade included new and larger pipes to all the areas flooded in 1984, and has provided trunk mains to extend improved drainage into areas not yet upgraded. This upgrade has contributed to improved stormwater quality by reducing the frequency of stormwater overflow to sewerage, which in turn reduces the risk of sewage overflows entering the stormwater system and the receiving waters. In June 2014, stormwater activity has an Optimised Replacement Value of \$206M and the activity has an annual budget for 2017/18 of \$ 3.3M including a renewal component of \$1.8M.
19. In addition to the public networks, each connected property has stormwater and sewerage pipes which in total exceed the length of the public networks. While installation of these private systems are subject to building consent issued and supervised by Territorial Authorities, ongoing maintenance is the responsibility of property owners. These systems have similar age profiles to the public systems, and cross contamination can occur through open and failing joints or through damaged pipes, particularly in the older properties. Because both stormwater and sewerage pipes are typically laid in the same trench, cross contamination is more likely to occur within private systems. With maintenance of these systems being the owner's responsibility, maintenance is often neglected, and quick fix solutions to a problem can result in illegal work and direct cross connections between the two drainage systems. These issues can be difficult to identify, and ICC officers often spend many frustrating hours locating contaminant sources, but these must be clearly identified before property owners can be required to rectify. The methods that have been used to identify sources of sewage over the past five years and the results of these efforts are discussed further by Mr Cocker.
20. The drainage infrastructure will continue to be required as long as the city is inhabited. To ensure the service is continually available, ICC has developed asset management

plans which provide for the maintenance, development, upgrading, and renewal of assets.

### **Management of Drainage Infrastructure**

21. Operators and maintenance contractors continuously maintain the pipe networks and mechanical plant to ensure continuing optimum performance, and are on 24 hour call to respond to emergency events including mechanical breakdown, blockage, system overflow, and contamination events.
22. The networks are regularly monitored for performance and condition using CCTV inspection, flow monitoring, and maintenance records, and assets are scheduled for renewal to ensure continued optimum performance. The oldest parts of the piped networks have now reached their anticipated asset life of 100 years, and renewal programmes for these assets are underway. Annual asset renewals are currently budgeted at \$2.1M for sewerage, and \$1.8M for stormwater (33% and 54% of respective activity budget) and are planned to increase to \$2.4M for sewerage and \$2.6M for stormwater by 2022 (35% and 65% of activity budget), and will then continue indefinitely. With the current drainage budget amounting to 17% of the total city rate draw, and this percentage expected to rise further as renewal programmes ramp up, these are very significant commitments on ICC's part to the maintenance and continual improvement of the drainage activities.
23. Detailed network condition assessment using close circuit television (CCTV) has been undertaken for 7% of the network. These assessments, along with spot inspections during maintenance activities, or when new connections are made, indicate the network is in moderate condition, consistent with its age. The low number of system blockages and collapses tends to confirm this assessment.
24. Stormwater enters the network from roofs, and from hard ground level areas through siphoned mud sumps. Subsoil drainage systems installed since about 1980 are also connected through mud sumps. Older parts of the network are constructed with open or butted joints, specifically to provide for groundwater drainage to the network.
25. Stormwater also enters the pipe network from open drainage systems draining rural land and recreational reserves in all of the catchments. The largest of these areas is the northern most part of the Waihopai stormwater catchment, but all the catchments include some inlets from open drains. Some drains also discharge to open ditches prior to entering the waterways, most notably crossing the Waihopai flood area.
26. The mud tanks on all ground level entry points to the stormwater on properties and roads trap sediment and debris and retain small amounts of oils. Otherwise stormwater is untreated and quality is reliant on site management of materials with the potential to contaminate stormwater. When mud tanks are filled to the outlet level

with sediment, they will cease to operate, prompting owners to have them cleared. Road sumps are monitored to ensure that sediments do not reach this level.

27. Council officers audit businesses identified as carrying a specific risk of stormwater contamination, and encourage business owners to manage sites to avoid contaminants entering the stormwater network and specific industry groups are required to install devices to remove contaminants typical of those industries from stormwater. These audits are described further in Mr Cocker's evidence.

### **Sewage Contamination of Stormwater**

28. Stormwater can be contaminated with sewage in the following events:

#### *Blockage and Overflow*

29. Blockage can occur in either stormwater or sewerage drainage systems. Generally Council would be alerted to such events by residents suffering reduced service, or reporting overflows onto roads or properties. Such issues are usually resolved quickly and with little contamination of stormwater. However, it is possible for blockages to cause backup of sewage, and leakage to the stormwater network through open pipe joints or constructed overflows, and not to be noticed by residents as a reduced service. We would normally expect overflows of this nature to be visually obvious in discharges to receiving waters, and then to be traced to source. However, low levels of contamination may not be visually obvious.

#### *Storm Events / Overflows*

30. High intensity rainfall events can cause stormwater drains to surcharge, and ponded water to enter sewers through gully traps. Leakage can also occur through leaking pipe joints during storm events. Sewerage drains can thus become overloaded, causing overflow through constructed overflow drains and/or affected manholes. These events are infrequent, and would generally occur when streams are high.
31. In 2013 ICC commissioned consultant engineers GHD to do a flow monitoring review of the sewer network. The review identified 64 historic overflow locations, 52 of which were within the study area. 19 of these overflow locations were validated as spilling or close to spilling at peak flow, including the 14 constructed overflows within the network.

#### *Leaky Pipes*

32. It is possible for sewage to enter the stormwater through leaking pipes, either on private property or within the Council networks. Normally such leakage would be associated with blockages and storm events as noted above. However, it is possible that leakage through pipe systems also accounts for low level faecal coliform levels

not associated with these events. Given that the sewerage and stormwater pipes in the Council network are generally laid in different trenches, the potential for this to occur in the Council system is minimal.

#### *Human and Non-Human Faecal Contamination of Stormwater*

33. High faecal coliform counts have been identified as a feature of stormwater drainage systems during rainstorms, and have been assumed to originate from animal and bird sources (ref: Williamson – Stormwater Data Book). Recently developed sterol source marking has been able to differentiate between animal, bird and human faecal sources, and faecal coliform counts in Invercargill stormwater have been found to include human sourced faecal contamination, with counts being higher during wet weather.
34. Invercargill City Council accepts that stormwater is contaminated with sewage and has adopted the following strategies to identify and reduce the number of sources. Because there are a variety of sources of sewage contamination, no single strategy will effectively address this issue, and Council is committed to implementing this range of strategies.

#### **Protection of Stormwater Quality**

35. Council has adopted the following procedures to protect the quality of stormwater.

#### *Contracts for Network Repair, Renewal or Extension*

36. All physical work on the drainage networks is done as part of the drainage maintenance contract or as specific construction contracts. Contract documents require contractors to submit environmental protection plans as part of their tenders, and these are evaluated by Council staff during tender consideration. As part of normal contract inspections, Council staff check that specific procedures are in place to avoid contaminated discharges to the stormwater network, and that the procedures are effective. Typical actions for stormwater contaminated with sediment during construction work, or requiring to be pumped from excavations include flowing over grass or through filter fabric to filter contaminants, prior to discharge to the stormwater system, or discharge to the sewerage system.

#### *Spill Management*

37. When spillage on roads or properties resulting in contamination of waterways are notified to Council, the drainage maintenance contractor is urgently called to identify and remedy the cause of the contamination and recover contaminant from waterways and the network. Depending on the spillage, contaminants may be pumped to the sewerage system, or recovered using absorbent booms or pillows from waterways and manholes. Recovery of contaminants may take some time if distributed through



significant lengths of the network. Council responds to an average of two spills per year, but is not always advised of spills within properties, or on roads which do not enter the drainage network.

### **Stormwater Maintenance and Monitoring Procedures**

38. In addition to the spill response procedures noted above, the following maintenance activities are undertaken:
39. Clearance of Blockages – Council maintenance contractors are expected to attend to reports of network or connection blockages within 45 minutes of callout and achieve better than 85% success to this target. Response includes removal of the blockage, clean-up of spilled contaminants, and checking of the network and receiving waters for carry-over of contaminants. Since 2010, the contractor has responded to an annual average of 65 sewerage main blockages, 62 sewerage connection blockages, 35 stormwater main blockages and seven stormwater connection blockages. Some of these blockages are due to third party damage, caused by contractors working on major projects, such as the UFB cable installation project. Few blockages result in detected contamination of stormwater and most are reported as a result of service reduction for connected properties. Council does not respond to blockage issues on private property, and does not record these events. As discussed in Mr Cocker’s evidence, these issues could result in contamination of the Council network. The monitoring programme in the proposed conditions will identify the catchments within which these issues result in contamination of the discharge from the Council stormwater network, such that the source can be identified.
40. Pump Station Maintenance – Invercargill’s drainage system include 31 sewerage pump stations and nine stormwater pump stations. It is essential for stormwater quality that these continuously operate. Pump stations are therefore maintained to high level, and are equipped with dual systems for failure events. Maintenance contractors are available on 24 hour call to attend to electrical and mechanical failure, and are expected to attend within 45 minutes of callout.
41. Inspection of Siphon, Constructed Overflows and Floodgated Stormwater Discharges – These are inspected at six monthly intervals by the maintenance contractor and cleared of debris. There are 14 constructed overflows from the sewerage system to stormwater which operate infrequently during high intensity storm events, with one overflow structure being removed as part of a renewal project. Overflow structures have been monitored for five years, with two found to have operated in that time, each on two occasions. For one of these overflow structures, which is monitored electronically, both overflows resulted from blockage in an under-stream syphon, and for the other overflow location, the cause has not been identified.

42. Cleaning of Mud Sumps – Street mud sumps are checked on a three or six monthly basis and are cleaned of silt and floating substances when necessary, as part of the road maintenance contract.

### **Sewerage Source Identification**

43. As a condition of the current consent, where dry weather sewage contamination of stormwater has been identified, Council has initiated programmes to trace and identify sources of contamination, and to have these resolved, and the application proposes conditions for this action to continue. Mr Cocker describes this in more detail in his evidence.

### **Development and Renewal Strategies**

44. Invercargill's drainage asset management plans include the following development and renewal strategies to enhance stormwater quality:

#### *Pipe System Renewal*

45. As pipe systems age, they deteriorate and risk of leakage increases. Infiltration into the sewerage system can cause overload and overflow to the stormwater system. Council has a renewal programme for both drainage systems to address this issue. Stormwater renewal includes upgrades to current design standards to reduce the incidence of stormwater flooding which may enter and overload sewerage drains. Upgraded pipe systems are well sealed to reduce leakages from one system to the other. A sewer modelling programme has been initiated to identify systems with high infiltration of stormwater, with the intention of advancing renewal programmes in areas of high infiltration. High infiltration can lead to surcharging of the sewer network, which can lead to overflows. Therefore, reducing the level of infiltration into the network will reduce the frequency and volume of overflows from the sewerage system.
46. Since 2010 Invercargill City Council has invested \$8.43M in stormwater renewals and \$7.02M in sewerage renewals (\$1.2M and \$1M per annum respectively) and a further \$1M in service extensions. A list of these projects is provided as Attachment 2 of my evidence. In the 25 years prior to 2010, annual expenditure on stormwater upgrading averaged \$1.35M as previously indicated this expenditure will increase over the next five years and then continue indefinitely.

#### *Urban Renewal / Redevelopment*

47. Notwithstanding the improvements that can be made to water quality through renewals of the drainage systems, the majority of stormwater contamination is believed to originate on private properties, and this is much more difficult for ICC to deal with.

48. Because the total length of drains on private property exceeds the length of the public drainage system, and because private stormwater and sewerage drains are usually laid in a common trench, there is a greater likelihood that leakage will occur between private drains than in the public systems.
49. As the housing stock ages and is demolished and replaced, ICC can and does require new property drainage systems for the new structure, but where maintenance issues arise with aging systems serving buildings still in use, the issue must first be identified and proven before remedial work can be required. This can be a long and frustrating process.

#### *Low Impact Stormwater Designs for Greenfields Development*

50. The proposed stormwater discharge consents provide for the inclusion of new subdivisional development into the consented stormwater network. Invercargill's Code of Land Development includes Low Impact Stormwater Design Features to reduce the carry over of contaminants to receiving waters, and to attenuate peak stormwater flows. Features include pond systems, wetlands and grass swales. The need to incorporate these features into the stormwater for greenfields development is considered in the conditions of sub-division consents.

#### *Industrial / Commercial Development*

51. In conjunction with Environment Southland, Invercargill City has worked with individual site operators with a history of stormwater contamination to upgrade onsite stormwater collection systems, and to develop site management practices to resolve these issues. As part of its building consent process, specific industry groups are required to incorporate features into their drainage systems to protect stormwater quality. These groups include transport operators, petrol stations, concrete manufacturers, sites storing hazardous liquids, scrap metal and vehicle dismantling yards.

#### *Stormwater Treatment Systems*

52. As part of the consent application, ICC has considered the possibility of treatment of stormwater. Treatment systems are available which will remove sediments and attached contaminants from stormwater, but these come at very significant cost for end of pipe systems which would be expected to at least double the total city rate draw over the 25 year anticipated life of the devices, if installed. Unfortunately, due to the high variance of stormwater flows, systems are not available to treat the contaminants of most concern, being nitrogen and phosphate nutrients, and sewage, as discussed in Appendix A of the application. ICC has therefore proposed strategies to target and reduce contaminant sources as a means to improve stormwater quality, as proposed in Conditions 11 and 12 of the proposed conditions attached to Mr

Dunning's evidence. Mr Leahy will discuss in more detail why end-of-pipe Stormwater Treatment Systems are not proposed for the ICC Stormwater network .

### **Legal Remedies to Deal with Onsite Contamination Issues**

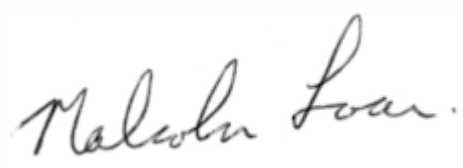
53. Invercargill City Council can apply the following legislation and regulation to require property owners to rectify issues that may be causing contamination of stormwater.
54. Local Government Act - Enables Council to require property owners to provide, cleanse, repair or relay private drains to public drains
55. Health Act 1956 (section 29) - Power to identify and abate nuisances to public health including discharge of contaminants to stormwater.
56. Hazardous Substances Act - Requires properties using or storing hazardous substances to provide adequate and safe containment for these substances. The Act is administered by WorkSafe New Zealand, but Council Officers undertaking site audits of business premises will assess the adequacy of the containment structure.
57. Council By laws - Power to act on nuisances including discharges of contaminants to stormwater.
58. Food Act 2014 - Provides for Council to audit food premises, including identification of contamination of stormwater.
59. Trade Waste Bylaw - Provides for Council to regulate Tradewaste discharges to sewer, including prohibition of substances which may be hazardous to public health or the sewerage system and to levy charges. The Tradewaste Bylaw does not regulate discharges to stormwater, but can limit discharges which would compromise the sewerage system, and result in discharge to stormwater.
60. Building Code – During the building consenting process Council can require suitable drainage systems to assure appropriate separation of sewerage and stormwater, and discharge to correct public drains.

### **Conclusion**

61. The ICC have a much better understanding of the nature of the discharges from their network than was the case five years ago. Given the learnings in terms of the sources of contamination to the network, the proposed conditions should enable the appropriate management and continuous improvement of the quality of the discharges over the requested consent term.
62. The working party will enable the effective collaboration between the ICC and the key parties, such that actions can be co-ordinated, including public engagement,

education and protection. It will also allow adaptation to new issues which arise can be undertaken through the course of the consent.

Dated: 25 July 2017

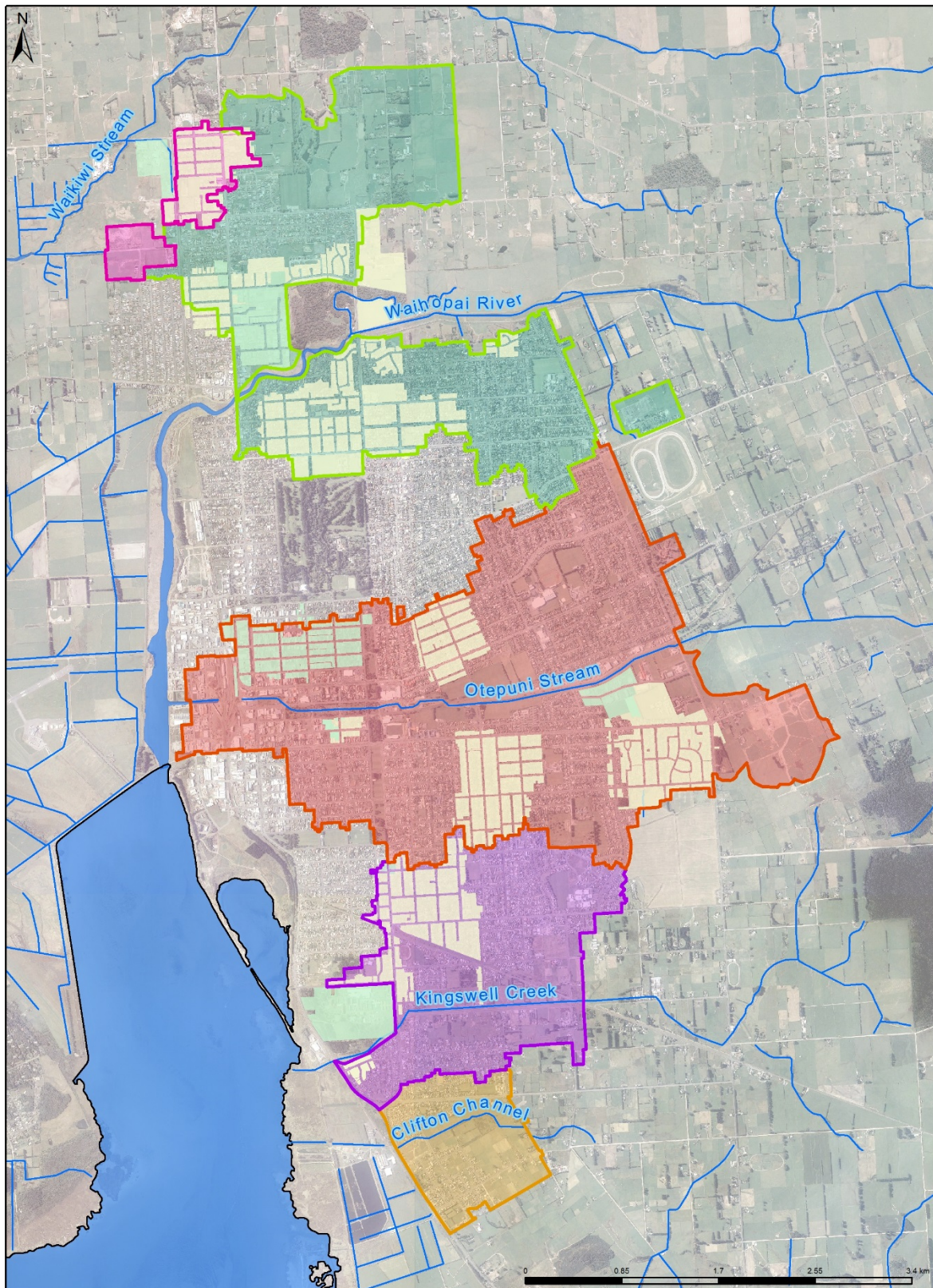
A rectangular box containing a handwritten signature in black ink that reads "Malcolm Loan".

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Malcolm Loan

**Drainage and Solid Waste Manager**



## Attachment 1 – Map of Stormwater Catchments



Attachment 2 – Renewal Projects undertaken on an Annual Basis from 2010 to 2017

<b>Projects 2010-2011</b>	
<b>Stormwater</b>	
Walker Street Stormwater	\$ 66,620.25
Leven Street SW and Leet Street SW	\$ 414,641.96
Elizabeth Street Stormwater	\$ 50,000.00
Spey Street Stormwater Kelvin to Dee	\$ 143,275.28
Queens Drive Stormwater - Herbert to Chelmsford	\$ 158,805.30
<b>Sub Total</b>	<b>\$ 833,342.79</b>
<b>Foulsewer</b>	
Leven Street FS Spey to Leet	\$ 134,842.52
Spey Street FS Kelvin to Dee	\$ 307,529.00
Liddel Street FS Esk to Otepuni	\$ 147,246.28
<b>Sub Total</b>	<b>\$ 589,617.80</b>
<b>Projects 2011-2012</b>	
<b>Stormwater</b>	
McQuarrie Street Stormwater	\$ 179,899.10
Queens Drive Stormwater - Hebert to Newcastle	\$ 272,909.10
Bluff Road SW	\$ 437,222.41
<b>Sub Total</b>	<b>\$ 890,030.61</b>
<b>Foulsewer</b>	
Queens Drive FS Tay to Gala	\$ 266,614.73
Queens Drive Foulsewer - Hebert to Newcastle	\$ 272,909.10
<b>Sub Total</b>	<b>\$ 539,523.83</b>
<b>Projects 2012-2013</b>	
<b>Stormwater</b>	
Queens Drive SW Gala to Newcastle	\$ 400,000.00
Centre Street SW Pomona to View	\$ 500,000.00
Pomona Street SW 76 to Compton	\$ 360,000.00
Racecrouse Road SW at Roundabout on Tay	\$ 100,000.00
<b>Sub Total</b>	<b>\$ 1,360,000.00</b>
<b>Foulsewer</b>	
Forth Street FS Liddel to Nith	\$ 360,282.10
Queens Drive FS Gala to Newcastle	\$ 300,000.00
<b>Sub Total</b>	<b>\$ 660,282.10</b>
<b>Projects 2013-2014</b>	
<b>Stormwater</b>	
James Street	\$ 392,112.96
Tweed Street Stormwater North Clyde to Ness	\$ 563,366.00
Queens Drive Tay to Gala	\$ 482,875.00
<b>Sub Total</b>	<b>\$ 1,438,353.96</b>
<b>Foulsewer</b>	
Otepuni Gardens Foulsewer	\$ 1,281,580.06
Conon Street Tyne to Ettrick	\$ 398,555.55
<b>Sub Total</b>	<b>\$ 1,680,135.61</b>



<b>Projects 2014-2015</b>	
<b>Stormwater</b>	
Ward Street Stormwater	\$ 750,543.06
Esk Street	\$ 99,737.71
<b>Sub Total</b>	<b>\$ 850,280.77</b>
<b>Foulsewer</b>	
Conon Street Ettrick to Balmoral	\$ 377,568.04
<b>Sub Total</b>	<b>\$ 377,568.04</b>
<b>Projects 2015-2016</b>	
<b>Stormwater</b>	
Nelson Street Martin to Tramway	\$ 450,000.00
Preston Street Pump Station	\$ 160,000.00
<b>Sub Total</b>	<b>\$ 610,000.00</b>
<b>Foulsewer</b>	
153 Mersey Street Renewal	\$ 1,650,000.00
Mersey Street Gravity Main 70m by Bluff Highway	\$ 450,000.00
Mersey Street Rising Main at Otepuni Stream Bridge	\$ 107,095.00
<b>Sub Total</b>	<b>\$ 2,207,095.00</b>
<b>Projects 2016-2017</b>	
<b>Stormwater</b>	
Gala Street - West side of Dee to Deveron	\$ 796,518.38
Jed Street - Otepuni Ave to Yarrow Street	\$ 1,651,871.40
<b>Sub Total</b>	<b>\$ 2,448,389.78</b>
<b>Foulsewer</b>	
Queens Park Foulsewer Line	\$ 845,916.20
Clifton FS line Weir replacement	\$ 120,000.00
<b>Sub Total</b>	<b>\$ 965,916.20</b>
<b>Stormwater Overall Total</b>	
	<b>\$ 8,430,397.91</b>
<b>Foulsewer Overall Total</b>	
	<b>\$ 7,020,138.58</b>
Kennington Sewer Network	\$ 1,000,000.00

Note:

Project not yet complete