



4.0 STATUTORY CONSIDERATIONS

4.1 Introduction

The Resource Management Act 1991 (RMA) identifies the circumstances where resource consents are required for an activity. In addition it requires the management of physical and natural resources through the development and implementation of Regional Plans. Section 15 of the RMA addresses discharges of contaminants to water and land. Of relevance to this application is the control of discharges to water (stormwater) or land in a manner that may result in the contaminant entering water.

Regional Plans developed and implemented by Regional Councils pursuant to section 30 of the RMA, identify resource management issues for the region, and outline objectives, policies and methods (rules) to show how those issues will be managed. Rules specify in what situations resource consents are required pursuant to section 15 of the RMA as well as establishing the 'thresholds' that must not be contravened by an activity.

The Statutory Assessment provided in Section 9 assesses the statutory matters that arise from the RMA and the Regional Land and Water Plan for the Bay of Plenty region, in relation to the discharge of stormwater to land and water.

Section 4.2 below introduces each of the relevant planning documents and describes in general the matters they address.

4.2 Relevant Planning Documents and Rules

4.2.1 Bay of Plenty Regional Council Regional Policy Statement

The Regional Policy Statement (RPS) became operative in December 1999. However, Council has undertaken a review of the operative RPS with the Proposed Regional Policy Statement November 2010 (PRPS) being notified on 8 November 2010. Submissions closed on 8 February 2011 but the operative RPS remains the applicable RPS until such time as the PRPS has been through the notification process and all outstanding appeals on it are settled.

The RPS provides the framework for the manner in which the region's natural and physical resources will be managed. The purpose of the RPS is to identify the major resource management issues for the Bay of Plenty region, and how to sustainably manage the region's natural and physical resources.

Three changes have been made to the RPS since it became operative. However, none of these are of relevance to this particular application.

4.2.2 Regional Water and Land Plan

The Regional Water and Land Plan (RWLP) was made operative on 1 December 2008. Plan Change 5 regarding Lake Okareka was formally withdrawn by the Policy and Planning Committee on 17 September 2009 and there are no other relevant plan changes to this application.

The purpose of the RWLP is to promote the sustainable and integrated management of land and water resources within the Bay of Plenty Region. To achieve this, the RWLP contains policies and methods (which include rules) to address issues of use, development and protection of land resources, geothermal resources and freshwater resources, including the beds and margins of water bodies.

The chapters of relevance to this application include:

- Chapter 3 – the integrated management of land and water.
- Chapter 4 – discharges to water.
- Chapter 9 – regional rules (in particular, Section 9.4: Discharges from Land Use and Discharge Activities in the Rotorua Lakes Catchments).



Relevant objectives and policies of the RWLP are assessed in Section 10.2.

4.2.3 Regional Water and Land Plan Rule applicability

Permitted activity Rule 30 of the Regional Water and Land Plan allows for the discharge of clean stormwater to surface water and Rule 31 allows for the discharge of clean stormwater to land soakage subject to certain conditions (a copy of Rules 30 and 31 is provided in Appendix C (i)).

RDC engineering design parameters implemented through the RDP land use development rules requires development within all 'management areas'¹ in the Lake Okareka catchment to provide a stormwater collection and disposal system on-site for all building and hard surfaces. The system must accommodate at least a 10% AEP stormwater event using soakage, vegetated swales, ponds or wetlands. However in some areas RDC consider it is not appropriate to require ground discharge as this may result in instability and slope failure.

The discharge of stormwater to land soakage in excess of the 10% AEP requirement of permitted condition 31 is classified as a restricted discretionary activity under Rule 31A of the RWLP (a copy of rule 31A is provide in Appendix C (i)). Stormwater in excess of a 10% AEP stormwater event is directed into the RDC stormwater network.

Hence, the RDC stormwater network predominantly collects stormwater from roads in the Lake Okareka settlement and stormwater from residential sections which are unable to be disposed to land soakage.

As a result, permitted activity Rule 30 does not apply, and overall the discharge of stormwater from the RDC stormwater network to water or land is classified as a discretionary activity under Rule 37 (a copy of Rule 37 is provided in Appendix C (ii)).

The discharge of stormwater is also subject to the requirements of the rules in Section 9.4 of the RWLP. All discharges to surface water that are discretionary activities are to be assessed against the Water Quality Classification of the receiving water body. Lake Okareka is classified as a Natural State water body (refer Appendix C (iii)). The standards and criteria for discharging into a natural state water body have been taken into account in the assessment of environmental effects provided in Section 8.

4.2.4 Rotorua District Plan

The RDP is the primary document that manages land use within the district. It identifies issues within the district and methods (including rules) on how to manage those issues. The RDP includes the Lake Okareka area within Part 20 – Lakes A Zone, which provides particular guidance on managing existing and future land uses within Rotorua District lakes catchments in order to maintain and enhance lake water quality.

The RDP is in part prepared to give effect to the RPS. The RDP is currently undergoing a ten year review and a proposed new plan is being drafted. However, the Lakes A Zone is not part of that review.

5.0 IDENTIFICATION OF STRATEGIC OBJECTIVES FOR STORMWATER MANAGEMENT

5.1 Asset Management Plan

RDC has prepared an Asset Management Plan (AMP) for land drainage and stormwater within the District.

Objectives from the Asset Management Plan include:

- To provide a land drainage and stormwater system that meets the levels of service statutory requirements and provides for the planned development of the District.

¹ Management Areas are the applicable 'zones' in the Lakes A section of the RDP. The management area includes the Lake Okareka Settlement area, as well as the rural areas surrounding the settlement.



- To match the level of service provided by the asset with the expectations of customers.
- To provide land drainage and stormwater control that optimises the social and economic benefits to the community.
- To provide a drainage network that meets the standards set in the building code while having a minimal effect on the receiving environment.

5.2 Lake Okareka Stormwater Management Objective

Taking into account the intent expressed in the AMP and the Lake Okareka Catchment Management Plan (LOCMP), RDC have developed the following strategic objective for stormwater management at Lake Okareka:

- To provide a land drainage and stormwater system and level of service that minimises the magnitude and frequency of flooding of properties and maintains the quality and values of Lake Okareka.

6.0 DESCRIPTION OF CATCHMENT

6.1 Built Environment

6.1.1 Land use and development

Land use types within the overall Lake Okareka catchment, as measured in 2003, have been documented in the Rotorua Lakes Water Quality Report 2009 (BoPRC 2009) and are reproduced in Table 1. The majority of Lake Okareka catchment remains in indigenous forest, followed by pasture. The pasture and rural land use predominates on the lake's southern and western sides, with natural wetlands and native forest on the northern and eastern shores of the lake.

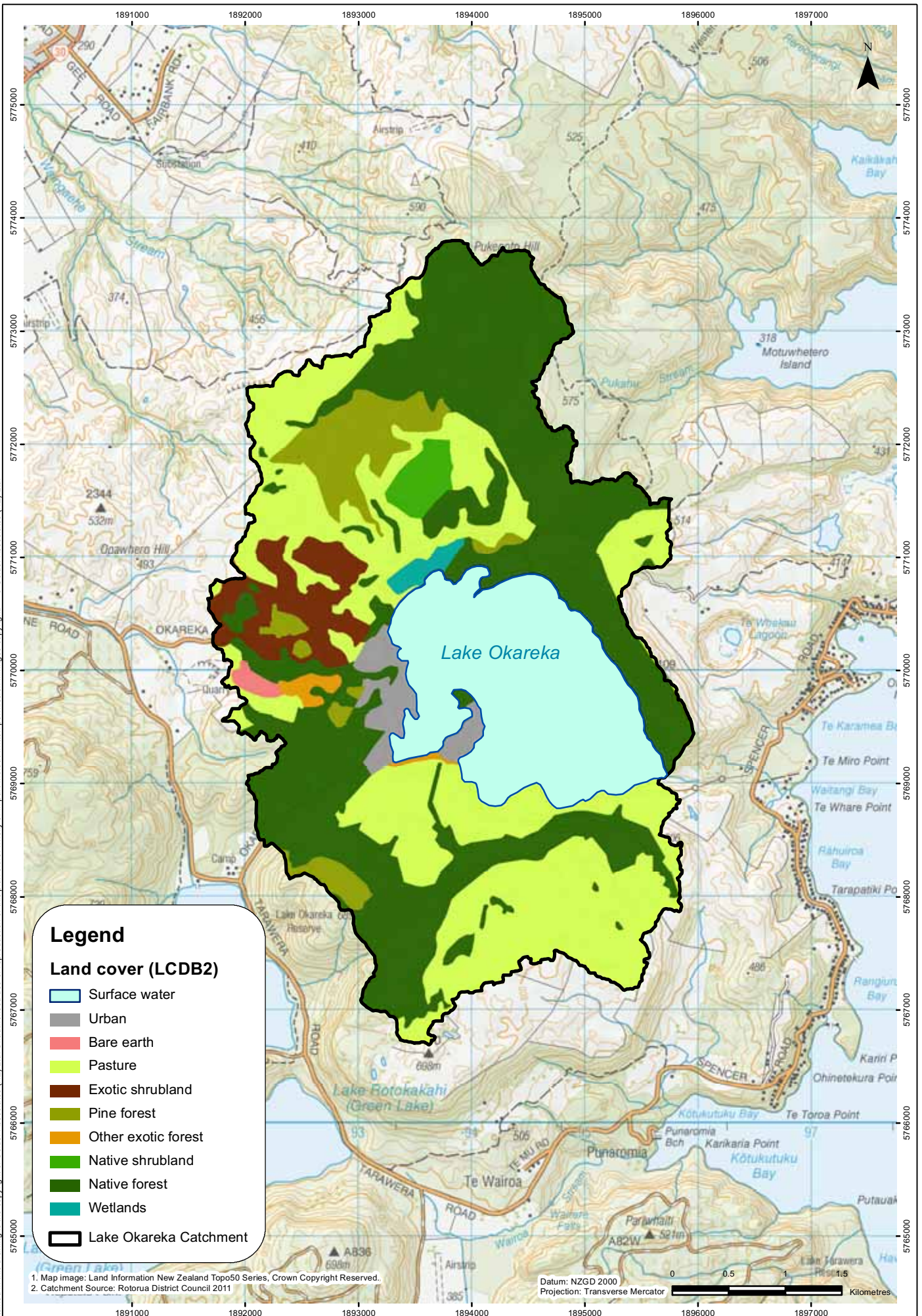
Table 1: Land use in Lake Okareka catchment.

Land Cover %	2003
Exotic forest	7.6
Indigenous forest/scrub	51.6
Pasture	37.8
Urban	2.9

The urban area of the catchment (the Lake Okareka Settlement) which is all residential land use, only accounts for 2.9% of the catchment area. The Lake Okareka Settlement is located in the south western corner of the lake within the Lakes A Zone of the RDP.

The settlement area is zoned as "Settlement" and identified on Planning Map 266 of the Lakes A Zone (Appendix D) and the Settlement zone is limited to the existing settlement zone boundaries in the District Plan with no provision for growth. The immediate surrounding land cover type is "native forest", "pasture" or "exotic forest".

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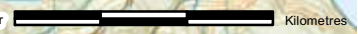
Legend

Land cover (LCDB2)

- Surface water
- Urban
- Bare earth
- Pasture
- Exotic shrubland
- Pine forest
- Other exotic forest
- Native shrubland
- Native forest
- Wetlands
- Lake Okareka Catchment

1. Map image: Land Information New Zealand Topo50 Series, Crown Copyright Reserved.
 2. Catchment Source: Rotorua District Council 2011

Datum: NZGD 2000
 Projection: Transverse Mercator



TITLE | LANDCOVER OF THE OKAREKA CATCHMENT (LCDB2)

JUNE 2011

PROJECT | 1078207446

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There are no commercial or industrial zoned sites within the settlement area, nor are there any non-residential type developments. Most dwellings are permanently occupied and have roofing materials consisting of colour-steel/corrugated iron (approximately 70%) and tiled (approximately 30%). All roading is sealed with some curbing. Approximately 90% of the driveways are sealed with the remainder in gravel.

The lake itself is used for recreation, including boating, fishing, water skiing and bathing. Public reserves around the lake provide good access.

6.1.2 Existing stormwater reticulation and treatment

The total Lake Okareka stormwater network catchment area is 313 ha, with seven urban (1, 2, 4, 5, 6, 8, 9) and two rural sub-catchments (3 and 7) (Figure 3), ranging in size from 0.7 ha (catchment 01) to 157.8 ha (catchment 03). Catchment areas are listed in Table 1 of the LOCMP (RDC, 2010), Appendix B and shown in Figure 3. Catchment delineation was achieved from visual observation during site visits undertaken for the LOCMP and a digital elevation model based on the LIDAR database provided by RDC.

Stormwater reticulation is via pipes and channels. Pipes vary from 225 to 375 mm diameters. Stormwater pipe lines are short in distance with a maximum length of 452 m along Summit Road. The discharging environment is to the lake through seven outlets as described below. Culverts are numerous, mainly draining road reserves and rural areas. Culvert diameters are small with a maximum of 750 mm diameter at the corner of Summit Road and Okareka Loop Road draining a large bush area of 123 ha. There are approximately 40 stormwater inlets into the stormwater network and eight open channel stormwater conduits. The stormwater network is shown in Figure 3.

Sixty-seven properties along the lake shores and on the Acacia Road Peninsula do not discharge into the RDC network but discharge stormwater directly into the lake through overland flow paths.

Primary stormwater treatment devices were identified during field work undertaken for this CSCA. Figure 2 provides the location of the existing stormwater treatment devices in the Lake Okareka Settlement catchment area. Stormwater treatment devices include:

- Stormwater grates and catchpit sumps at all inlets to the piped network.
- A stormwater dry pond and silt fence on private land above Millar road in stormwater catchment 03.
- Council maintained swales and silt bags at the base of stormwater catchment 01.
- Gabion basket check dams and gross debris steel traps in lower reaches of The Wash in stormwater catchment 02.
- Silt bags near the fire station at the base of stormwater catchment 07.

All of these treatment devices will reduce the amount of sediment and associated contaminants transported to the lake.

6.1.3 Catchment discharge locations

The catchment discharge points are located around the lake margin and are either directly piped or flow to the lake edge overland. Figure 3 shows the discharge points labelled DP1, DP2 (The Wash), DP4, DP5, DP6 and 7, DP8 and DP9 and are discussed in more detail below.

Discharge Point 1 (DP1) (5770323.895 N, 1893247.497 E NZTM)

Discharge Point 1 (DP1) drains a small catchment approximately 0.7 ha in size at the northern end of the Lake Okareka Settlement. Most of this catchment runoff is concentrated into a number of catchpits located on the northern end of a steep street where they are concentrated and piped to the discharge point at DP1. The stormwater generated on the properties on the lake edge generally drain directly to the lake via overland flow. Figure 5 shows the outlet pipe for PD1 where stormwater then enters a short, armoured channel (approximately 5 m long) before discharging to the lake.



Figure 5: DP1 discharge point on the edge of Lake Okareka.

Discharge Point 2 (DP2) – The Wash

The Wash is the largest of the Lake Okareka Settlement stormwater catchments, while also draining sub-catchments 2 and 3. Land use in The Wash catchment is mainly pastured with native bush and wetland. The Wash is 440 m long and flows under Millar Road and Steep Street via bridge crossings. A privately owned drain, The Wash has several constrictions such as footpath bridges, a fence and driveway constructed across the channel. The portion of the drain along the reserve at 71 Okareka Loop Road is on public reserve. Although The Wash is essentially a highly modified natural water course it is maintained as a public drain under the Local Government Act 2002.

The Wash's main channel bisects properties numbered 9 and 11 Steep Street to discharge into the lake at Discharge Point 2 (DP2). Here water leaves The Wash's lined channel and spills into the lake via a poorly confined channel over the grassed reserve for approximately 20 m. The Wash drains approximately 167 ha of which only a small portion is within the Lake Okareka Settlement. Figure 6 shows The Wash channel and where it enters the lake. The Wash outlet appears to drain onto a small headland, possibly formed by the deposition of silt carried as bedload when The Wash is in flood.



Figure 6: DP2 (The Wash) discharge point to Lake Okareka. The photo on the left shows the overland flow path to the lake whereas the photo on the right shows the outlet from the confined channel.

Discharge Point 4 (DP4) (5769958.815 N, 1893405.402 E NZTM)

Discharge Point 4 (DP4) drains a small portion of the Lake Okareka Settlement of around 0.8 ha and is located below the properties of number 47 and 49 Okareka Loop Road. Figure 7 shows the DP4 outlet to Lake Okareka.



Figure 7: DP4, the discharge point to Lake Okareka. The photo on the left shows the pipe outlet to a small open channel that spills to the lake as shown in the photo to the right.



Discharge Point 5 (DP5) (5769664.136 N, 1893409.367 E NZTM)

Discharge Point 5 (DP5) is located adjacent to property number 1 on the Okareka Loop Road. A catchpit collects runoff and discharges into an open drain/channel around 30 m upstream from the lake margin. The channel is lined with a wooden outfall before it flows into an unlined shallow drain approximately 10 to 15 m from the lake edge. Figure 8 shows the discharge point to Lake Okareka.



Figure 8: DP5, the discharge point to Lake Okareka. The photo on the left shows the wooden outfall to a small open channel that flows to the lake shown in the photo to the right.

Discharge Points 6 and 7 (DP6 and 7) (5769440.386 N, 1893244.808 E NZTM)

Discharge Point 6 and 7 (DP6 and 7) combine at the intersection of Okareka Loop Road and Acacia Roads and each discharges into an open drain/channel around 30 m upstream from the lake margin. DP6 drains around 11 ha of the Lake Okareka Settlement and DP7 drains around 123 ha of predominantly native bush and pasture. Figure 9 shows the discharge point to Lake Okareka.



Figure 9: DP6 and 7, the discharge point to Lake Okareka. The photo on the left shows the pipe outlet to an open channel/drain that flows to the lake. The drain is shown in the photo to the right looking from the lake edge.

Discharge Point 8 (DP8) (5769241.856 N, 1893304.894 E NZTM)

Discharge Point 8 (DP8) is located adjacent to the intersection of Acacia Road and Benn Road. DP8 drains two shallow roadside drains on Benn Road that extend between Wattle Grove Road and Acacia Road. DP8 discharges spring water from an unknown source into an open channel 5 to 10 m upstream from the lake margin on a grassed reserve next to the public toilets. Figure 10 shows DP8 discharge location on the edge of Lake Okareka.



Figure 10: DP8 discharge point on the edge of Lake Okareka.



Discharge Point 9 (DP9) (5769302.003 N, 1893946.088 E NZTM)

Discharge Point 9 (DP9) drains a small portion (approximately 0.6 ha) of the Lake Okareka Settlement on the Acacia peninsula. The outlet is located below the properties of number 69 and 71 Okareka Loop Road. Here runoff from the catchment discharges directly to Lake Okareka via a submerged pipe extending into the water for approximately 5 to 10 m. Figure 11 shows DP9 discharge location on the edge of Lake Okareka.



Figure 11: DP9 discharge point on the edge of Lake Okareka. The photo to the left shows the submerged pipe end and the photo on the right shows the submerged pipe leaving landfall.

6.2 Potential Sources of Stormwater Contamination

6.2.1 Catchment land use activities and their contamination generation potential

The RDC District Plan does not separate the urban settlement area into different land uses. Rather, the built up area is zoned as “settlement”. The land use within the urban settlement area of Lake Okareka consists predominantly of residential housing. There are no commercial or industrial land uses within the settlement area, and therefore any potential contaminants are from activities on the local road network, footpaths, small parts of immediately adjacent property driveways or from overflow from the residential land use sites.

Stormwater contaminants in residential catchments are derived from a number of sources including building roofs and sides, road surfaces, and other impervious surfaces such as pavements, driveways and parking areas.

As discussed in Sections 3 and 4.2.3 of this report, all stormwater from roofs and residential driveways in the Lake Okareka catchments are required to drain to ground via soak holes or other on-site disposal methods capable of accommodating at least a 1 in 10 year storm event. Therefore, the key source of stormwater (and stormwater contaminants) in the Lake Okareka catchments is runoff from the roading network.

Roading

The local roads are sealed and curbing exists on the lake side of Okareka Loop Road between Steep Street and Millar Street intersections, both sides of Summit Road to Branch Road, on the right hand side of Branch Road, from approximately 60 metres, a small section of Acacia Road and the stormwater channel on Pryce Road.

Similarly the majority of driveways are sealed. Figure 12 shows an example of stormwater drainage from the road edge and a simple silt/gravel diversion practice. The settlement area also includes a local fire station (designated within the RDC District Plan), a community hall and two tennis courts providing for recreational activity use. None of these uses are anticipated to produce any contaminants different to those generated from residential areas.



Figure 12: Left – Turnaround point with a discharge to lake. Sediment on road margins drain to lake without treatment. Right – Gravel driveway next to catchpit with silt/gravel diversion bags around grate.

Stormwater from roads may contain metals (e.g., copper and zinc), total petroleum hydrocarbons and a variety of organic compounds such as polyaromatic hydrocarbons (refer Kennedy 2003). Generally, the levels of these contaminants in stormwater relates to the traffic volumes and the type of vehicles using roads within the catchment.

Stormwater from roads in the Lake Okareka catchment are unlikely to contain significant levels of contaminants, compared to roads in densely populated urban areas, because of several factors. Firstly, traffic volume on the roads is low for the majority of the year, with traffic volumes increasing in the summer months with visitors to the area. There is considered to be minimal through-traffic and parts of the road system in the settlement are dead-end roads reducing traffic movements. Secondly, only some of the roads in the Lake Okareka Settlement have curbing; therefore, any runoff from roads without curbing will discharge firstly to a grass verge, before feeding into the stormwater network. This practice is expected to provide some attenuation of stormwater contaminants in road runoff.

Erosion of stream and drainage channels

During the site visit for this CSCA on 9 March 2011 very little existing erosion within the Lake Okareka Settlement was observed. The majority of the waterways are effectively ephemeral and well vegetated or lined in most places, hence, the potential for erosion is limited. The Wash, between the start of the channelised section approximately 20 m upstream of Millar Road and the lake outlet at DP2 is an ephemeral water way that has been channelised. The Wash banks are lined in most places with either wooden retaining walls or rock filled gabion baskets. In the vicinity of Millar Road some of The Wash stream banks are contoured and vegetated. The Wash channel bottom contains established vegetation and at the time of the field visit there was between 150 and 200 mm of sediment on the bottom. Figure 13 shows the lower reaches of The Wash its channelised nature and the vegetated channel bottom.



Figure 13: Lower reaches of The Wash.

During the field visit, some minor erosion was observed at the upper reaches of The Wash around the Millar Road Bridge where the bank edges are not lined and some minor slumping has occurred. Additionally, stormwater piped into The Wash from surrounding properties or road margins discharge directly to The Wash and cause some minor localised erosion when the pipes are discharging. The majority of these discharges have some rudimentary measures to reduce the localised erosion, such as bricks or rock riprap. Figure 14 presents one such stormwater inflow that has rudimentary erosion control in place. Minor erosion was also present in the open drains on Benn Road, leading to the DP8 discharge point. At this point the open drains have spring water entering the drain. These springs appear to be located at the corner of Wattle Grove Road and the Benn Road intersection. The drains on either side of the road at this location appear to have spring water running in them causing some minor erosion, and they are potentially a source for sediment during heavy rain. Figure 15 shows the open drain and minor erosion (particularly on the right bank) on the bank edges.

Generally, due to the piped and channelised nature of the lower reaches of the catchment, the potential for erosion in these areas is low. In the upper reaches of the catchments, especially in the steeper farmland found above The Wash and Acacia Road, some minor erosion of the ephemeral channels was evident, as was localised of the channel. It is likely that these channels would only flow in relatively heavy rainfall events when the soils are saturated.

Potential sources of sedimentation also include the pumice quarry to the south of the northern arm of Okareka Loop Road. However, from examination of the earthworks and stormwater discharge consent for this operation² it appears that the quarry discharges sediment contaminated stormwater to land soakage.

² Consent number 65847 sourced from EBoP.



Figure 14: Minor erosion around a private stormwater connection pipe flowing into The Wash and the rudimentary measures to control erosion.



Figure 15: Benn Road open drain and minor erosion of main channel.