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Report

Mangaheka Water Quality Assessment

Prepared for Hamilton City Council

Prepared by CH2M Beca Ltd

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Revision History

Revision Nº	Prepared By	Description	Date
1	**Angela Pratt**	Draft for Client Review	8/6/2017
2	**Angela Pratt**	Final Report including Pollution Plan Template	19/9/17
3	**Angela Pratt**	Update of Final Report	12/1/18
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Document Acceptance

Action	Name	Signed	Date
Prepared by	**Angela Pratt**		15/2/18
Reviewed by	**Graham Levy/Dan Evans**		15/2/18
Approved by	**Kristina Hermens**		15/2/18
on behalf of	CH2M Beca Ltd		

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1 Introduction

This report has been prepared to document a range of water quality related aspects of the draft Mangaheka Integrated Catchment Management Plan. This work has been carried out in a number of stages, with additional scope being added after each stage.

The purpose of this report includes:

- To confirm whether the devices have been designed to adequately treat the contaminants likely to be generated after Maximum Probable Development (MPD) has occurred
- To detail how the current requirements for on-lot treatment and Pollution Control Plans could be improved to provide better water quality outcomes

2 Scope

The following tasks were requested to be carried out by HCC:

Stage 1a

Review the design reports and consent applications for each of the three existing devices to determine:

- What design standard should the devices have met (likely Auckland Regional Council's Stormwater Management Devices: Design Guidelines Manual, Technical Publication 10 (TP10))?
- Have the devices been designed to this standard?
- Have they been constructed in accordance with the consents and the standards?
- Any other concerns with the current device designs in relation to their water quality performance?
- If the devices are designed and constructed in accordance with the plans, what treatment performance would the devices likely achieve? This would involve a literature/guideline review (TP10 + others) to identify the types of contaminants that the devices will remove and the expected removal performance

The above tasks have been documented in **Section 6**.

Stage 1b

Based on the proposed MPD industrial development (some existing and some still to be developed) contributing to each device and the fact that any lots with high risk industrial activities will trigger the Waikato Regional Council (WRC) Rules or HCC bylaws and will be required to provide an onsite management plan:

- What are the likely residual contaminants being generated (performance and types)? i.e. what types of activity does the industrial zone in the District Plan allow developers to carry out and what are the likely contaminants from such industries? **See section 9**
- Therefore are the existing devices likely to be sufficient to provide appropriate treatment, or is additional on-lot treatment likely to be required? **See section 8**
- Review any monitoring data that the WRC may have in terms of whether the performance of the devices is appropriate. This is a difficult task as treatment performance should be considered over a long time period rather than based on a few discrete events which may have been sampled. Timing of samples, as well as incoming water quality, also have an impact on device performance. It is therefore likely that this task may be of little real benefit but still worth having copies or any records help. **See Section 6.4 and Section 4.3**

Note that no monitoring data has been collected during this study and we have not been able to find any other monitoring data for the devices by WRC, HCC or others.

Stage 2

The following tasks have been carried out as part of Stage 2.

- Provision of a brief list of device improvements that could be implemented to increase the treatment efficiency of the existing devices – **See section 6.5**
- Review the list of industrial activities contained in the Draft Waikato Stormwater Management Guideline and provide some recommendations on which industrial activities will need to prepare Pollution Control Plans (PCPs). This included a discussion with the HCC staff in order to understand any issues with the proposed list. **See section 9**
- Provision of a list of requirements/expectations for what would be contained within a PCP e.g. a description of the site practices where there is potential for contaminant export into the stormwater system. This would not only help developers but also HCC staff assessing the plans. This would link in with the Waikato Stormwater Management Guidelines**. See section 10**
- Brief discussion on / qualitative justification for providing PCPs as well as more detailed information in PCPs. This would likely be based on existing policy approaches elsewhere. It is expected that some developers will need to provide a plan now when previously it would not have been necessary so it is important that they understand why this is now required. Note that this task could be quite involved depending on the level of detail required. **See Section 9.4**

Since preparing the PSP for HCC, the following have also been requested as scope items:

- Review the existing HCC Pollution Control Plan template and advise whether this is appropriate or whether additions/modifications should be made. **See section 10.2**
- Provide an assessment of the options for managing water quantity and quality for future devices including pros and cons of offline versus online flood mitigation and high flow bypass options**. See section 11.1**
- The 1D Modelling report (Beca, 2017) provides the sizes of flood mitigation devices required in order to mitigate the effects of Maximum Probable Development. If these devices were enlarged to also provide treatment, determine how large the proposed devices would need to be to provide treatment as well as flood mitigation. **See section 11.2.4**

In addition to this scope, to provide context to the content of the report, we have also provided the following:

- Background information in terms of the current legislation that the Mangaheka ICMP is operating under and the objectives of the ICMP. **See Section 3.2**
- A summary of the existing water quality in the Mangaheka Catchment. This forms the baseline for assessment of the future effects of development. **See Section 5**

2.1 Exclusions

- Note that this report does not consider effects of stormwater discharges on groundwater or the interaction of devices with groundwater. Such effects would need to be carried out during detailed design of developments. It should be noted however that there are no known (based on Waikato Regional Council GIS system) drinking water supply bores within 2 km down-gradient from the industrial area
- This report considers treatment performance during the MPD operational phase – construction effects are dealt with separately in the ICMP and are generally short term in nature

3 Background

3.1 Overview

The Mangaheka Stream catchment is located on the north-west side of Hamilton City. In the upper catchment, there is a 280 ha area of industrially-zoned land that is progressively being developed. Currently there are three stormwater treatment and attenuation devices serving parts of this area. These devices each have their own stormwater discharge consent (currently held by the developers), however these devices will be vested in HCC (ownership transferred to HCC) at some time in the future.

The three existing stormwater devices are shown on Figure 3-1. These devices are:

- Porters Properties Pond (hereafter referred to as “Porters Pond”): This is an online “wetland pond”
- Hamilton Joint Venture Pond (hereafter referred to as “HJV Pond”): This is an online “wetland pond”
- 4 Guys Car Yard Pond (hereafter referred to as “4 Guys Pond”): This pond only provides stormwater attenuation and has not been specifically designed to provide treatment. The downstream HJV Pond has been designed to provide treatment for the catchment of the 4 Guys Pond

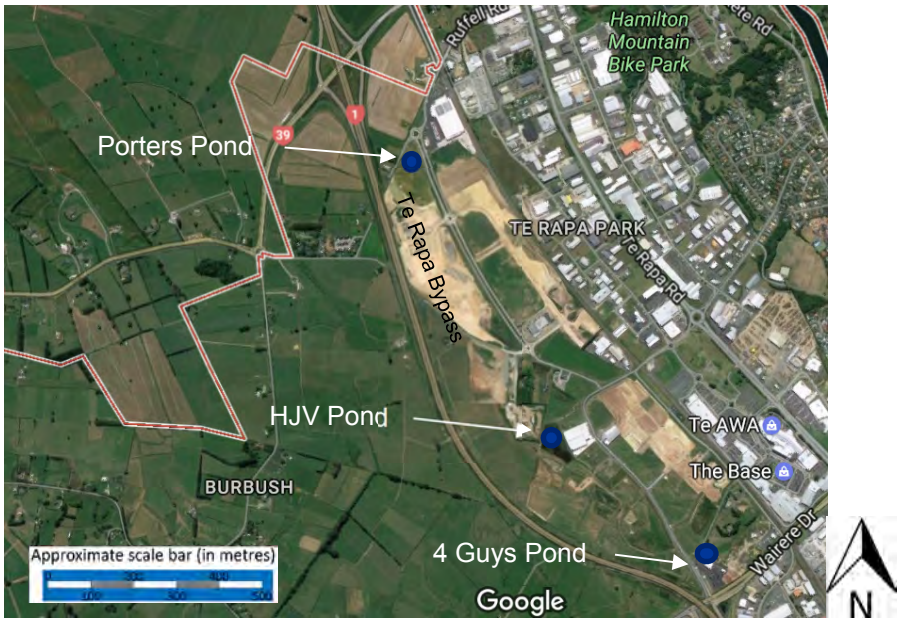

Figure 3-1: Existing Device Locations (Adapted from Google Maps, 2017)

In the future, the remainder of the industrially zoned land will likely be developed. The proposed Mangaheka ICMP will therefore set out the requirements for design of future development, as well as any undeveloped lots with the area served by the existing devices.

3.2 Current Legislation and Guidelines

3.2.1 Overview

When a developer wants to develop land within an Industrial Zone, they may need to do the following:

- Apply for a Building Consent for construction of buildings
- Apply for a land use consent if all the relevant rules for the zone area not met
- Apply for a connection to the HCC stormwater network from their site

There are a number regulatory documents governing such activities. These are detailed below.

3.2.2 Operative HCC District Plan

The District Plan sets out activities that can occur within certain zones e.g. Industrial zone. Some activities are permitted and some require a consent to be applied for. In terms of the Mangaheka Industrial Zone, it is the Industrial Zone chapter which applies, and in some cases, also the Hazardous Facilities Chapter.

The current Industrial Zone chapter in the Partially Operative HCC District Plan (2016) provides restrictions in terms of how industries that can develop including requiring a maximum of 90% impermeable surface area across each site. In addition, the Hazardous Facilities chapter contains restrictions on:

- Site design
- Site drainage to avoid discharge of hazardous substances
- Wash-down areas to avoid contaminated washwater from discharging into the stormwater drainage network or contaminating any water body
- Spill containment systems
- Storage of hazardous substances
- Tanks for storage of petroleum products

3.2.3 HCC Stormwater Bylaw

In 2015, HCC introduced a stormwater bylaw which governs and protects both private and public stormwater systems, along with watercourses within the HCC boundary. One of the bylaw's purposes is to manage the input of contaminants into the stormwater system. The bylaw states that in order to not breach the bylaw, sites on the WRC High Risk Facilities register need individual site measures to control discharges of contaminants to the environment. This is discussed further in Section 3.2.4 below.

3.2.4 Waikato Regional Council High Risk Facilities Register

The High Risk Facilities Register is a section of the Waikato Regional Plan, referenced in the HCC stormwater bylaw. The register lists the types of sites/facilities seen as having a high risk of spillages of hazardous substances or contaminants which, if not controlled appropriately, pose a further risk of discharging into the environment. Under the HCC bylaw, such sites "must install and maintain an appropriate private stormwater interception system to eliminate, as far as practicable and otherwise minimise, the risk of prohibited materials entering the public stormwater system" (Source: HCC Stormwater Bylaw, 2015). Any owner or occupier of a high risk facility must also prepare and comply with a Pollution Control Plan. A copy of this register is attached as Appendix A.

3.2.5 Waikato Regional Plan

Discharges of stormwater (and other activities) are controlled by Regional Plans, normally through discharge consents. Hamilton City Council currently hold a comprehensive discharge consent for discharges from its stormwater network. This consent requires that they need to control inputs from land within the city which discharge to their network.

3.2.6 HSNO Act

The *Hazardous Substances and New Organisms Act 1996* relates to the management of hazardous substances and new organisms. The Act defines what is considers a hazardous substance or new organism as well as thresholds and controls to manage these things. Where hazardous substances or new organisms are going to be used, stored or manufactured within the Industrial Zone, the HSNO Act regulates the activity in addition to any local Council regulations.

3.2.7 Other Documents

Auckland Unitary Plan - Industrial and Trade Activities

The Industrial and Trade Activities section of the Unitary Plan assigns an activity status (permitted, discretionary, controlled etc.) using a risk based approach. Depending on size and type of activity, sites are classified as low, medium or high risk in terms of stormwater contamination. Under this plan controlled activities must provide treatment devices and restricted discretionary activities must also provide a Spill Control Plan and Environmental Management Plan. The Unitary Plan forms a framework for managing such sites and could be referred to in Hamilton as part of the management of Industrial sites. A copy of this list is attached as Appendix B.

WRC Draft Waikato Stormwater Management Guideline

Waikato Regional Council has recently prepared a Draft Waikato Stormwater Management Guideline (not publically released yet) which provides site/stormwater design guidance particularly for industrial developments (Table 11.1). A copy of this table is provided as Appendix C.

Additional Development Restrictions

In addition to the above legislation and guidelines, developers in the Mangaheka Industrial area will also need to meet the requirements of the Te Rapa Gateway “development guidelines” which include the following requirements:

- Individual lot Low Impact Design (LID) measures
- The use of unpainted Zincalume® roofing materials is not permitted

4 Water Quality Targets and Objectives

4.1 Water Quality Targets

The draft Mangaheka ICMP document contains a number of water quality targets which will apply to all discharges to the Mangaheka Stream. These are provided in the Design Parameters table in the ICMP document, provided in section 6.4

In terms of TSS, for which the ICMP target is 75% removal (typical industry value), it is important to consider (when developing monitoring programmes) that TP10 standards for TSS removal are intended to indicate performance on a long-term average basis rather than on an individual storm basis. In addition, inherent in the definition of performance, both the input and output from a stormwater treatment device would need to be monitored. Timing of sampling within a storm will lead to large variance in the reported performance of a device. This will be dependent on temporal differences in both inputs of sediments delivered to the device and the treatment capacity of the system and this variation should be considered when both designing a water quality monitoring program to obtain 'representative samples' and when analysing any water quality monitoring data.

This report deals only with the operational phase targets and effects. Construction phase targets will also be important, but will be dealt with through other statutory mechanisms and short term treatment approaches.

4.2 Draft ICMP Operational Objectives

In addition to the targets section 6.4, the Draft ICMP document also sets out an operational objective to "maintain or enhance Mangaheka Stream quality". This objective should be referred to when assessing performance of treatment and the quality of discharges. This could be done by comparing baseline water quality conditions (see Section 5) with samples taken in the future.

4.3 Water Quality Target Locations and Timing

The design parameters outlined in the ICMP document and mentioned above include the proposed location where these water quality targets should apply. In the Mangaheka catchment at MPD, there is likely to be a range of on-lot treatment devices and larger centralised devices, so definition of the point(s) of compliance is essential. The following two locations are referred to in the Design Parameters table:

- Where there is a centralised device: target should be met at the discharge point of the device
- Where there is on-lot treatment, with no downstream centralised device, target should be met at the discharge point from the on-lot treatment system

In addition, some of the parameters will need to be measured "after reasonable mixing downstream of a discharge point" with "reasonable mixing" being defined in the Regional Plan.

Section 6.4 of the Draft ICMP provides the Draft Design Parameters Table which identifies which parameters should be achieved and where.

Currently HCC consents require annual monitoring and that a monitoring plan be prepared by a suitably qualified professional..

The WRC consents for each development as well as HCC's Comprehensive consent have been reviewed in terms of monitoring requirements. These require that "The consent holder shall retain suitably qualified and experienced persons to prepare a Stormwater Monitoring Programme. The objective of this monitoring programme shall be to monitor the effectiveness of the wetland treatment pond for water quality and water quantity purposes post wetland construction. The monitoring programme shall be to a standard acceptable to the Waikato Regional Council and shall be submitted to the Waikato Regional Council for written approval acting in a technical certification capacity, prior to commencement of the activities authorised by this resource consent."

It would be expected that this monitoring would require:

- Checking of overall system state including vegetation, presence of erosion etc.
- Sampling of the discharge to determine effectiveness in terms of removing contaminants of concern in the catchment. Samples would need to be taken prior to treatment and downstream of the device

Whilst HCC normally requires annual monitoring, we recommend that more frequent sampling occur initially after development has occurred and then annually if results are appropriate. One annual sample is often not enough to assess effectiveness of treatment systems on a long term average basis. Monitoring during rainfall events of varying sizes as well as between events can give a better indication of performance.

5 Existing Water Quality

5.1 Overview

In order for the effect of future discharges to be assessed against the ICMP targets and objectives, it is important to understand baseline Mangaheka Stream water quality conditions.

Boffa Miskell's 2016 ecological assessment details the existing water quality in the Mangaheka catchment. For key stormwater contaminants, the assessment compared the existing water quality against the ANZECC 2000 guidelines (Trigger values for aquatic ecosystem protection at 90% protection of species, based on a high disturbed environment) and MfE guidelines and suggested that:

- Arsenic, cadmium, chromium, lead and nickel were generally below ANZECC guidelines
- Aluminium (total and dissolved) exceeded the ANZECC guidelines
- Iron levels were elevated (note there are no ANZECC guideline values for iron).
- Nutrient (nitrogen and phosphorus) levels exceeded Ministry for the Environment (MfE) water quality guidelines for limiting algal growth
- Turbidity was elevated in comparison to NZ slightly modified Aquatic Ecosystem ANZECC Guidelines (5.6 NTU)
- Faecal coliform levels exceeded ANZECC guidelines for livestock watering and MfE guidelines for human contact

Boffa Miskell (2016) also noted that thermal pollution i.e. elevated water temperatures, is likely to be an issue for watercourses receiving urban drainage. Temperature measurements taken as part of sampling indicated existing temperatures ranging between 11.4 and 15.7 degrees Celsius. Values at the time of sampling were all lower than the ICMP target of 23 degrees however it is likely that with industrial development occurring, that temperature will be higher, especially during summer.

In summary, Boffa Miskell (2016) states that the existing water quality in the catchment is poor to moderate, but similar to most Hamilton waterways.

5.2 Typical Contaminants of Concern for Industrial Development

Whilst rural drainage and groundwater discharge accounts for a large proportion of the above issues, industrial development has the potential to reduce water quality further, especially once MPD has occurred. Of particular concern in regard to the industrial development are the parameters and existing concentration ranges listed in Table 5-1 which were noted in BML (2016) as exceeding the ANZECC 2000 guideline values for 90% protection. These values are from sampling carried out by Boffa Miskell and reported in BML (2016). The range represents values from a number of sites through the catchment. Literature also provides information on generation rates and treatment device removal efficiencies for these contaminants.

Table 5-1: Existing Contaminant Concentrations (Source: Boffa, 2016)

Contaminant	Existing Concentration Range (all g/m³)
TSS	5 – 13
Total nitrogen	0.44 – 4.6
Total phosphorus	0.035 – 0.106
Total zinc	0.0175 – 0.069
Total copper	0.0022 – 0.0028

There are also a range of other contaminants that are likely to be generated by industrial developments, such as:

- Hydrocarbons
- Metals: lead, cadmium, aluminium, chromium, arsenic, iron
- Pathogens
- Biochemical Oxygen Demand (BOD)
- Coarse debris such as litter

As there is not sufficient literature on generation rates of these additional contaminants, this assessment has only focussed on those contaminants in Table 5-1 as indicators of treatment performance and down-gradient environmental conditions.

6 Existing Devices

6.1 Porters Pond

6.1.1 Overview

The Porters Development is located in the northern part of the Mangaheka Industrial area. It comprises a land area of approximately 69 hectares (ha). Figure 6-1 below shows the area of the site.

The Porters Development is serviced by the following stormwater management system, designed by Lysaght Consultants Ltd:

- Individual lot water quality management including requirements to paint any galvanised roofs, on-site treatment for high contaminant generating sites, LID measures (permeable paving, rain tanks, sand filters, re-use and soakage)
- Conventional kerb and channels, sumps and pipes discharging to:
  - Vegetated swales (treatment and conveyance)
  - A wetland/pond

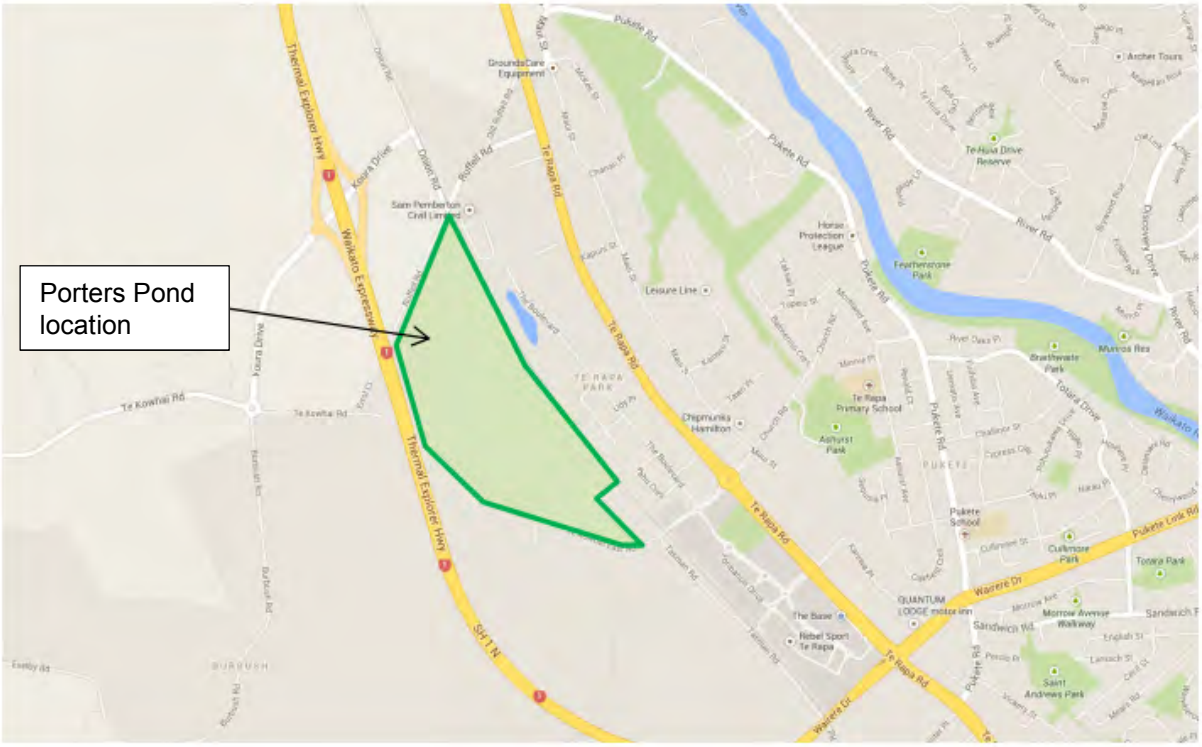

Figure 6-1: Porters Development (Source: Lysaght, 2013a)

The wetland/pond is located in the north-western part of the site and discharges via culverts under Ruffell Road and into Porters Drain.

The Porters Pond has been designed and constructed to suit a staged approach to the development. A smaller wetland pond is currently constructed, serving Stage 1 of the development. It will later be enlarged to service the whole site. We note that the Stage 1 pond size and area served has not been confirmed in Lysaght (2013a).

6.1.2 Design Standards

Lysaght (2013b) states that Porters Pond has been designed in accordance with TP10 which requires 75% removal of TSS. To achieve this standard, Lysaghts concluded that the wetland/pond needed to be designed to treat a water quality volume (WQV) of 1/3rd of a 2-year 24-hour storm volume.

The pond has also been designed to provide extended detention and peak flow attenuation of up to the 100-year storm.

The Porters development swales have residence times between 17 minutes and 100 minutes. TP10 requires a minimum residence time of 9 minutes, therefore it is expected that treatment will be equal to or better than the standard.

Given the importance of the WQV to the performance of the pond, we have sought to verify that this factor was calculated correctly. In reviewing the design report (Lysaght, 2013), it is noted that whilst there is an Appendix C which states that it contains calculations, it does not appear that any calculations have been provided. Rather, only model results and device stage/volume tables/graphs have been included. It is therefore unclear whether the wetland/pond has been designed to treat the WQV. The report does however state that the forebay is 1,700 m^3, which is 15% of the Water Quality Volume (WQV). From this the WQV should be 11,333 m^3.

To confirm if the volume is approximately correct, we have undertaken a basic Rational Method calculation of the WQV. Based on a runoff coefficient of 0.81 (curve number of 89.7), this gives a WQV of 12,100 m^3, which is appropriate compared to the estimated pond volume based on the forebay volume stated. It is normal that TP108 (which would have been used by Lysaghts to calculate the WQV) would give a slightly different volume than the Rational Method, therefore based on the above, it is concluded that the volume is likely to be correct but this requires further verification.

6.1.3 Treatment Performance

Lysaght (2013a) refers to the treatment performances in NZTA (2010) and the formula in the same reference for calculating a combined efficiency based on using swales and wetland/ponds in series. Below is the treatment performance stated in Lysaght (2013a).

Table 6-1: Combined Treatment Efficiency (Source: Lysaght, 2013a)

Practice	TSS	Nitrogen	Phosphorus	Zinc	Copper
Swales	70%	20%	30%	75%	60%
Wetland/Pond	90%	40%	50%	80%	80%
Combined	**97%**	**52%**	**65%**	**95%**	**92%**

The treatment efficacy for TSS is within the performance target defined in Section 4.1. However, as described later, we have reservations about the reliability of the combined treatment efficacy, which tends to overstate the likely performance.

6.1.4 Site Visit Findings

During the CH2M Beca site visit on 8 June 2016, the following was noted:

- Swales had been constructed and planted in accordance with the plans (see Figure 6-2)
- The pond is being used as an erosion and sediment control pond as:
  - It hadn't been finished to the standard expected of a permanent treatment pond
  - The outlet was fitted with T-bar decant structures as required for erosion and sediment control ponds, but not normally used for permanent ponds
  - Baffles made of silt fence material were being used. These appeared temporary in nature. Figure 6-3 and Figure 6-4, shows these baffles

In addition:

- No forebay had been constructed
- There was minimal planting/grassing within the wetland or on the banks
- There was quite a lot of erosion of the banks of the pond, especially the south side
- It did not appear that the bunds defining the flow path within the wetland/pond (as shown on the construction drawings) had been constructed. These were to be higher than the extended detention depth so should have been obvious if they were in place, given it did not seem to have rained recently (ground was dry throughout and devices were not discharging)
- The overall area of the pond appeared to match the plans

Figure 6-2: Central swale along the main road through the Porters development (looking south)

Figure 6-3: Porters Pond looking west

Figure 6-4: Aerial photo of Porters Pond (Source: Google Earth)

6.1.5 Concerns with the Existing Devices

Whilst it appeared that the overall area of the pond was in accordance with the design, its use as an erosion and sediment control pond in the longer term is not recommended. Whilst WRC has confirmed (Brian Richmond, *pers. comm.*, 29 May 2017) that the pond is not yet operational in terms of the wetland features, it is only considered appropriate to use the device in this way whilst the bulk earthworks and road construction of the initial stages of the development are constructed. Using it in this way long term, whilst individual sites are being developed, is not recommended. These sites should employ their own individual on-site erosion and sediment control practices. The use of the pond in this way could potentially have the following effects:

- Lower standard of treatment for stormwater discharges from completed parts of the site
- High levels of sediment inflow can reduce the volume of the pond and hence the attenuation abilities
- Lack of planting will have an impact on the water temperature. Planting acts to shade the water and to reduce temperature of the pond. Plants would also perform a sediment trapping role in their root structure and provide uptake / assimilation potential for bio-available components of contaminants of concern such as metals and nutrients

In terms of this project and the overall performance of the system, it is unclear as to what the final "pond" system function is. Lysaghts (2013a) discusses the fact that it is a wetland/pond but also suggests that it will act like a large swale, although the treatment function of a swale is supposed to involve slow flow through a thick grass sward, which is not what happens here. Compared to a standard TP10 wetland, this pond has a low flow channel rather than a series of bunds across the wetland with deeper pools between (banded bathymetry). The bunds would normally spread the flow over the full pond width, hence slowing flows. Whilst the report suggests that this occurs, this wetland does not have the same form as a TP10 wetland. A TP10 wetland has a number of benefits via promoting a range of chemical and biological reactions for contaminant removal that do not occur in a wet pond. Whilst the current form of the wetland/pond will undoubtedly provide treatment, when it comes to the stated removal efficiency of the system (see Section 6.1.3), it is our opinion that this system would not achieve the rates of removal of a TP10 wetland. It is likely it would be more like a TP10 wet pond in terms of treatment efficiency.

Whilst it may not have been possible and it is not expected in TP10, separation of treatment from attenuation (i.e. two systems in parallel) is recommended. This is likely to improve treatment performance as a result of high peak flows not causing turbulence and resuspension within a treatment system. This will also reduce the treatment efficiency. It is recommended that this is considered for future device designs.

In addition, the pond outlet design does not have a method for excluding hydrocarbons from the discharge e.g. downturned elbow, upwards sloping pipe. It is likely that volatilisation would occur from the large pond surface however it is possible that any hydrocarbons that are not removed in the swale or pond, could discharge to the Mangaheka Stream.

In addition, faecal coliforms can increase as a result of ponds/wetlands becoming bird habitats. This is a normal occurrence and given the other benefits of this sort of system, it is generally not considered to be a major issue given there are no known contact recreation sites in the vicinity of the devices or drinking water takes from the stream. Given the expected loads of nutrients assessed in section 7, there is also potential for algal growth which may need ongoing management.

6.1.6 Overall Performance

Based on our review of Lysaght (2013b) and our site visit, we conclude the following:

- When properly converted to a normal wetland/pond, performance is likely to improve.
- The wetland/pond is not likely to be performing as well as a TP10 wetland due to the form (as per design) being different
- The swales are likely to be providing treatment performance in the high end of the range due to the much longer retention times achieved

Overall, it is considered that the treatment performance for the swales will be at the high end of normal ranges and the wetland/pond performance would be more in line with that expected for a wet pond.

6.2 Hamilton Joint Venture (HJV) Pond

6.2.1 Overview

The HJV development is located in the southern part of the Mangaheka industrial area, south of the Porters Development. The development itself is 70 ha in size, however the stormwater system manages flows from an additional 11.1 ha of rural land (the “Shark Fin” block) and 14.1 ha of the Giles Block.

At MPD, stormwater flows from the Shark Fin will discharge into the Rotokauri catchment, rather than discharging through the culvert under Te Rapa Bypass at the south end of the development. The Giles block will likely be developed as industrial land and discharge to the HJV pond via the 4 Guys pond. Note that the 4 Guys Pond only provides flood storage and has not been designed to provide treatment. This has not been included in the Water Quality Volume Calculations.

The HJV development is serviced by the following stormwater management system, designed by Lysaght Consultants Ltd and reported in Lysaght (2013b):

- Individual lot water quality management including requirements to paint any galvanised roofs, on-site treatment for high contaminant generating sites, LID measures (permeable paving, rain tanks, sand filters, re-use and soakage
- Conventional kerb and channels, sumps and pipes discharging to:
  - Swales (treatment and conveyance)
  - A wetland/pond

Figure 6-5 and 6-6 show a plan location and aerial photo of the HJV pond.

Figure 6-5: HJV Pond Location

Figure 6-6: Aerial photo of HJB Pond (Source: Google Maps)

6.2.2 Design Standards

Lysaght (2013b) states that the HJV pond has been designed in accordance with TP10, which requires 75% removal of TSS. To achieve this standard, Lysaghts concluded that the wetland/pond needed to be designed to treat a water quality volume of 1/3rd of a 2-year 24-hour storm volume.

The HJV pond has also been designed to provide extended detention and attenuation of up to the 100-year storm.

Similar to Lysaght (2013a), the HJV design report (Lysaght, 2013b) does not appear to contain any calculations of the WQV. It also doesn't state a forebay volume to enable a check of the volume. It is therefore unclear whether the wetland/pond has been designed to treat an appropriate volume. This should be checked, however for the purposes of this report, we have assumed that it has been.

The Porters development swales have residence times between approximately 3 minutes and 2 hours (total for swales in series), with shorter residence times being for sections of swale just upstream of where these discharge into the wetland/pond. Overall, the average residence time is well in excess of the TP10 minimum residence time of 9 minutes. It is therefore it is expected that, on average, treatment will be better than standard, although there will be some swales where that is not the case It is the overall performance that is considered important for compliance.

6.2.3 Treatment Performance

Similar to Lysaght (2013a), Lysaght (2013b) also refers to the treatment performances in NZTA (2010). See Table 6-1 for the reported treatment efficiency of the combined swale/wetland pond treatment performance.

6.2.4 Site Visit Findings

During the CH2M Beca site visit on 8 June 2016, the following was observed:

- The bunds required for the Stage 1 pond had been constructed (see Figure 6-7)
- The outlet manhole slot (extended detention outlet) was submerged, although water did not seem to be flowing at all through the system. An area of ponded water was also present downstream of the outlet (see Figure 6-8). The cause of this could not be ascertained during the visit, however it is noted in Lysaght (2013a) (Section 4.5.4) that there was a requirement to lower the upper end of the downstream channel by 300 to 500 mm to match the invert of the basin. It is possible that this lowering has not occurred to a distance far enough downstream as to provide sufficient gradient on the drain. This issue does however appear to suggest that the dead storage of the pond is higher than expected, which reduces the flood storage/attenuation volume provided
- The wetland planting indicated in Lysaght (2013b) did not appear to have been fully completed. Some grasses appeared to have grown or been planted within the pond and grassing of the banks had been completed but the vegetation is not as extensive as shown in the design plans
- The swales appeared planted in accordance with the design plans

Figure 6-7: HJV Pond looking from the north

Figure 6-8: Downstream of HJV Pond Outlet

Figure 6-9: HJV Pond Outlet

Figure 6-10: Swale C (along Arthur Porter Drive looking south)

6.2.5 Concerns with Existing Device

- Like the Porters Pond, the HJV wetland/pond does not have the banded bathymetry required of a TP10 wetland, therefore it is expected that there will be a lower standard of treatment than that stated in Lysaghts (2013b)
- The lack of planting is likely to have an impact on the water temperature. Planting acts to shade the water and to reduce temperature of the pond. Plants would also perform a sediment trapping role in their root structure and provide uptake / assimilation potential for bio-available components of contaminants of concern such as metals and nutrients
- Whilst it may not have been possible and it is not expected in TP10, separation of treatment from attenuation (i.e. two systems in parallel) is recommended in that this is likely to improve treatment performance as a result of high peak flows not causing turbulence (resulting in less effective sedimentation) within a treatment system
- Like the Porters Pond, the HJV Pond outlet design does not have a method for excluding hydrocarbons from the discharge e.g. downturned elbow, upwards sloping pipe. It is likely that volatilisation would occur from the large pond surface however it is possible that any hydrocarbons that are not removed in the swale or pond, could discharge to the Mangaheka Stream
- Faecal coliforms can increase as a result of ponds/wetlands becoming bird habitats. Given the expected loads of nutrients calculated in Section 8.4, there is also potential for algae growth and ongoing management may be required
- 100 year spillway is lower (30.45 ha) than the manhole weir level (30.5 ha). A 100 year spillway should be used as a last resort, with flow going over the top of the outlet manhole first

6.2.6 Overall Performance

Based on our review of Lysaght (2013b) and our site visit, we conclude the following:

- The wetland/pond is not likely to be performing as well as a TP10 wetland due to the form being different
- The swales are likely to be providing adequate treatment on average

Overall, it is considered that the treatment performance for the swales will be at the high end of normal ranges and the wetland/pond performance would be more in line with that expected for a wet pond.

6.3 4 Guys Pond

6.3.1 Device Description

The 4 Guys Pond is located at the southern end of the industrial development within the Mangaheka catchment. The pond serves the 4 Guys car yard, a Z Energy petrol station and some existing rural land referred to as the “Giles block” (part of labelled Proposed Future Development on Figure 6-11 plus the block to the north of that). The 4 Guys Pond has been designed to only provide attenuation of flows rather than treatment, with treatment for the contributing catchment being provided in the downstream swales and HJV Pond (see Section 6.2).

This device has been designed by CKL Ltd.

Currently, flows from the land labelled “Proposed Future Development” on Figure 6-11 are diverted via a drain around the pond.

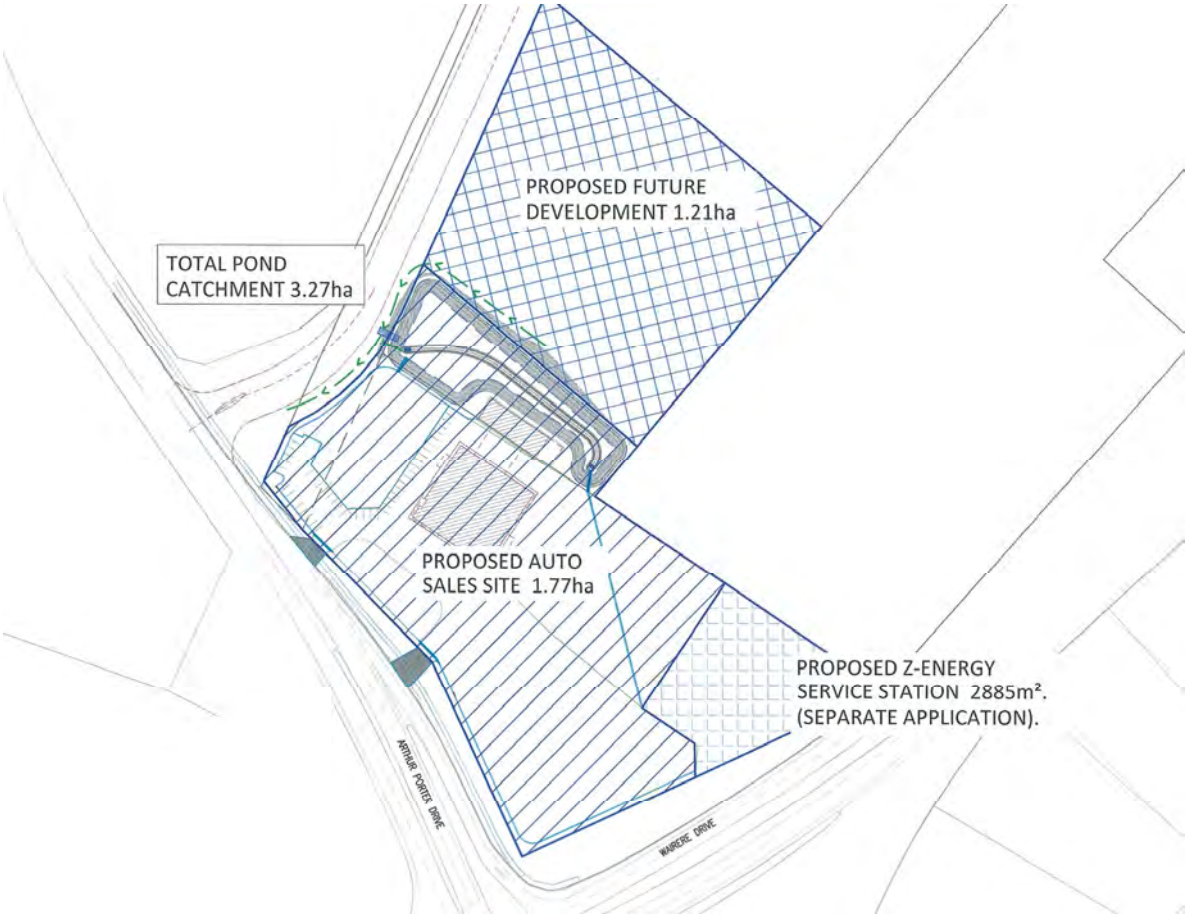

Figure 6-11: 4 Guys Pond Catchment

The existing car yard (which contains a car wash facility) and petrol station are sites considered to be at high risk of spillages of contaminants; classified as “High Risk Facilities” by the WRC. In order to achieve the requirements of the HCC bylaw for such facilities, the following on-lot measures have been implemented:

- A rainwater tank system collecting roof water for car washing. The tank overflows to the pond.
- An oil and grit interceptor serving the car wash slab
- A Fox valve for flow diversion to the wastewater system during car-washing. This discharges to the stormwater pond when car-washing is not occurring

It is unknown what measures the Z Energy service station has installed however it is likely that an oil interceptor would also have been required at this site.

At MPD, it is proposed that this pond be enlarged to be able to provide attenuation for an additional 3.8 ha of future development (currently rural land). Flows from this land are currently diverted around the 4 Guys Pond. This will either be carried out by HCC or the land owner/developer.

6.3.2 Design Standards

As noted above, this pond has not been designed to provide treatment, relying on the downstream HJV pond for the necessary treatment. That said, it is likely that some removal of contaminants would be occurring in the pond via settlement and other processes.

The pond has the following characteristics as provided in CKL (2015):

- Extended detention volume: 900 m³
- Outlet diameter of 80 mm allowing release over 24 hours

These appear appropriate for the contributing catchment.

6.3.3 Site Visit Findings

A site visit to the pond was carried out by CH2M Beca on the 8 June 2016. The pond appeared to be constructed in accordance with the plans. The following points were noted:

- Erosion at the southern inlet to the pond (See Figure 6-12). This appeared to be due to high flows down the relatively steep inlet channel. Scour protection has been provided but this appears inadequate for the flows involved. This issue is likely to generate sediment (from erosion) in higher amounts than the downstream system is designed for, if it does not settle out before leaving the 4 Guys Pond and could also lead to undermining and loss of integrity of surrounding infrastructure
- There is minimal planting on upper batter slopes and in parts of the pond invert, particularly in the northern part of the pond. See Figure 6-12 and Figure 6-14

Figure 6-12: 4 Guys Pond Inlet

Figure 6-13: 4 Guys Pond (looking east from outlet)

Figure 6-14: 4 Guys Pond (looking west)

6.3.4 Issues with the Pond

The pond appears to be constructed in accordance with the plans. The most significant issue was in relation to the erosion of the inlet shown in Figure 6-12. In addition, but generally not of major concern was:

- Lack of planting in invert – this would help with shading to reduce temperature of the pond water and any discharge from it
- Pathogens - faecal coliforms can increase as a result of ponds/wetlands becoming bird habitats. As there are no down-gradient water users for drinking water purposes and there is likely to be a far higher input from downstream farming practices, it is therefore not considered necessary to modify the system to improve this situation

6.4 Monitoring Data

WRC have been contacted to determine if they have carried out any sampling of the discharges from the HJV and Porters devices. They have indicated that this has not been done, therefore this aspect of the scope has not been carried out. Refer also section 4 which provides some recommendations on monitoring.

6.5 Device Improvements

Based on our observations during site visits, the following amendments could be implemented to improve the performance of the existing treatment devices in the Mangaheka Catchment.

- The existing device outlets could be fitted with mechanisms for preventing the release of floatables/hydrocarbons – Refer to Section 9.5.6.5, page 167 including Figure 9.30 of the Draft WRC Waikato Stormwater Management Guideline
- Install appropriate wetland planting as this will enhance metals and nutrient removal efficacy

- Install submerged outlets on all existing road sumps. These help to prevent floatables and hydrocarbons from being discharged downstream. Additional maintenance is however required to remove these contaminants from the sumps intermittently e.g. 6 monthly
- When the Porters Pond is converted from an erosion control pond to a wetland, the layout of the device could be modified to introduce the banded bathymetry detailed in ARC's TP10, rather than the current meandering low flow channel. Banded bathymetry forces the flows through bands of dense wetland planting, hence improving sediment trapping and contaminant uptake by plants, as well as slowing water velocities, leading to increased settlement

Whilst some of the above items may be harder to implement, as none of the existing devices are currently vested in Council, there is an opportunity for HCC to require the developer to implement these improvement measures prior to vesting with HCC.

It is also recommended that the above measures are provided in larger treatment devices in other parts of the catchment when they are developed. In addition, it is recommended that flood flows bypass the treatment systems such that the more contaminated initial flows are treated appropriately are not diluted and discharged faster by later high flow rate flood flows.

7 Expected Contaminant Generation

The following are the key stormwater contaminants that can be found in urban stormwater. Such contaminants are generally generated by roofs, carparks, roads and pervious surfaces.

- Suspended sediment
- Hydrocarbons
- Nutrients (nitrogen and phosphorus)
- Metals with the primary focus being on zinc and copper as indicators for other metal contamination such as lead, cadmium, aluminium, chromium, arsenic and iron
- Pathogens
- Biochemical Oxygen Demand (B.O.D)
- Coarse debris such as litter

Roads and paved areas are expected to generate additional sediment, metals and hydrocarbon loads.

In terms of pathogens, it is often found that bird life within wetlands, vegetated swales and ponds are the main generator of contamination. This is difficult to treat, but there are practical ways bird populations can be managed, as is normally required for any ponds close to airports due to the risk of birds striking aeroplanes.

It is expected that sites within the Mangaheka industrial zone will produce all of the above contaminants to some extent. In addition, a range of other contaminants could be generated depending on the type of industry and the site controls in place. The likely contaminants are noted in the Draft Waikato Stormwater Guideline, Table 11.1.

A literature review has been carried out to determine the expected rates for generation of contaminants within the Mangaheka industrial area. As there is little available industry specific data (i.e. for individual industries) more generic generation rates have been referred to.

For comparison, generation rates for the undeveloped “rural” land use have also been provided in order to identify where development of the industrial area will result in contaminant generation will be higher than existing and thus potentially degrading the existing water quality.

Three main sources of information have been used to compile generation rates from. These are:

- Auckland Council’s TP10 document
- Auckland Council’s Contaminant Load Model
- Contaminant loads and impacts on the Waikato River (NIWA, 2001)

Table 7-2 below compares the contaminant loads relevant to the Mangaheka catchment, provided in each of these sources. It should be noted that the AC CLM only provides sediment, zinc copper and hydrocarbon loadings. Whilst these are likely to be some of the main contaminants, a range of others are also likely in this location. In terms of the Mangaheka industrial area, roofs, roads and industrial paved surfaces are the most applicable here.

Table 7-1: Expected Contaminant Loadings g/m²/year

Contaminant	Rural (TP10)	Farmed Pasture (ARC's CLM)	Roads ARC TP10	Commercial ARC TP10	Roofs ARC CLM	Roads (ARC CLM) <1000 VPD	Paved Surfaces other than roads (ARC CLM)	Industrial area (NIWA 2001)
TSS	10.3-58.3	152.0	28.1-72.3	24.2-136.9	5.0	21.3	32.0	133
TP	0.001-0.025	N/A	0.059-0.15	0.069-0.91	-	-	-	0.331
TN	0.12-0.71	-	0.13-0.35	0.16-0.88	-	-	-	0.85
Zn	0.002-0.017	0.0053	0.018-0.045	0.17-0.49	0.020	0.004	0.590	0.576
Cu	0.002-0.004	0.0011	0.003-0.009	0.011-0.032	0.002	0.001	0.107	0.0214

In selecting the rates above, the following should also be noted:

- The NIWA, 2001 figures are 16 years old and are from an area of older development. This means they are likely to be high compared to the newer development being assessed. The newer development design has had a higher level of focus on environmental protection, which is likely to drive site practices. It is therefore expected that the NIWA values are at the high end of the range
- Roads in the ARC CLM have different values depending on the traffic numbers. The stated values are for less than 1,000 vehicles per day. TP10 does not distinguish vehicle numbers therefore the lower end of range is appropriate

Based on the source values in Table 7-2, it is considered that the values shown in Table 7-2 and Table 7-3 are likely to be representative of the Mangaheka site, both for existing rural development and Industrial future development. Each table also provides justification as to how the value has been selected from the values in Table 7-1.

Table 7-2: Selected Contaminant Loadings g/m²/year - Rural

Contaminant	Selected Value	Justification
TSS	73.5	Average of source values
Total phosphorus	0.013	Average of source values
Total nitrogen	0.415	Average of source values
Total zinc	0.0081	Average of source values
Total copper	0.0024	Average of source values

Table 7-3: Selected Contaminant Loadings g/m²/year - Industrial

Contaminant	Selected Value	Justification
TSS	32	TSS will mostly be sourced from paved surfaces. Selected value fits in the range also.
Total phosphorus	0.15	Average of source values
Total nitrogen	0.35	Average of source values
Total zinc	0.49	Zinc is often sourced from paved areas where vehicles turn (due to tyre wear) and also from galvanised roofs. Roofs are not to be bare galvanised in this development. “Commercial“ value selected as this is lower than paved surfaces and roof generated stormwater will likely provide dilution.
Total copper	0.11	Copper is often sourced from brakes i.e. road and paved areas.

The rates in Table 7-2 and Table 7-3 have been applied to the whole site, and hence represent a high level indicator of effects assuming homogenous contaminant generation. The project scope did not provide for a detailed load assessment to quantify sub-plot level contaminant generation into more detail in terms of individual land uses and specific rates for each site.

8 Expected Device Performance

8.1 Stated Performance

Lysaght (2103a) and Lysaght (2013b) provided information on the expected performance of the Porters and HJV wetland pond/swale treatment systems. Values stated were based on removal rates stated in NZTA (2010). Both reports also used a calculation method shown in NZTA (2010) for determining the combined performance for treatment systems in series (swales and wetland/ponds).

Table 6-1 provides the combined swale and wetland pond system for both systems, from Lysaght (2103a) and Lysaght (2013b).

8.2 Performance of TP10 Devices

If the devices were both designed in accordance with the TP10 guidelines and then constructed in accordance with the design plans, it would be expected that the devices would achieve the level of performance stated in TP10 on a long term average basis. However we note that given the expected future nutrient and sediment loads and erosion noted at some sites, there is also potential for the export of contaminants and the growth of algae.

Table 8-1: TP10 treatment system contaminant removal rates (%)

Contaminant	Wetland Removal Rate	Wet pond Removal Rate	Swale Removal Rate
TSS	45	50-90 (70)	85
Total phosphorus	No value stated	55	No value stated
Total nitrogen	33	45	No value stated
Total zinc	86	60 (30-90)	62-73 but up to 80
Total copper	79	50 (20-80)	60

8.3 Comparison to Other Literature

In addition to TP10 removal efficiencies, a literature review has also been carried out to determine what the expected performance of the devices would be. Whilst TP10 is the design standard used for the Porters and HJV ponds, other design guidelines require similar sizing of devices and hence reported removal efficiencies are likely to apply.

Table 8-2 below compares removal rates for wet ponds from various literature. “Rate Used” values are those used to determine device performance (see Section 8.4).

Table 8-2: Wet Pond Contaminant Removal Rates

Contaminant	Reduction rate TP10	AC CLM	Reduction rate NZTA	Average Reduction rate CCC (range in brackets)	Rate Used
TSS	50-90 (70)	75	75	70 (60-80)	75
Total phosphorus	55		40	60 (40-80)	50
Total nitrogen	45		25	50 (40-60)	40
Total zinc	60 (30-90)	30	50	60 (40-80)	50
Total copper	50 (20-80)	30	40	60 (40-80)	45

Table 8-3 below compares removal rates for wetlands from various literature.

Table 8-3: Wetland Contaminant Removal Rates

Contaminant	Reduction rate TP10	Reduction rate NZTA	Average Reduction rate CCC (range in brackets)	ARC CLM	Rate Used
TSS	45	90	70 (60-80)	75	70
Total phosphorus		50	60 (40-80)		55
Total nitrogen	33	40	40 (20-60)		35
Total zinc	86	80	60 (40-80)	30	65
Total copper	79	80	60 (40-80)	40	65

Table 8-4 below compares removal rates for swales from various literature.

Table 8-4: Swale Contaminant Removal Rates

Contaminant	Reduction rate TP10	ARC CLM	Reduction rate NZTA	Average Reduction rate CCC (range in brackets)	Rate Used
TSS	85 (73-94)	75	75	40 (20-60)	65
Total phosphorus			30	30 (20-40)	30
Total nitrogen			20	30 (20-40)	30
Total zinc	62-73 but up to 80	40	75	40 (20-60)	60
Total copper	60	50	60	40 (20-60)	50

8.4 Expected Performance

Based on our site observations and reading of the design reports, we are of the opinion that because the wetland/ponds do not have the form of a TP10 wetland, that the treatment performance is not expected to be as high as suggested. The swale performance is however likely to be higher than expected due to the increased residence times. Based on this, we have reassessed the removal efficiencies and have determined a combined removal efficiency based on the use of swales and wet ponds in series on a long term average basis using the NZTA method as used in Lysaght (2103a) and Lysaght (2013b). Our reassessed efficiencies are shown in Table 8-5.

However, as outlined later, we have reservations about the reliability of the combined treatment performance, which tends to overstate the likely performance.

Table 8-5: Reassessed Treatment System Contaminant Removal Efficiency (%)

Contaminant	Lysaght reported Rate	Rate Used
TSS	97	91
Total phosphorus	65	65
Total nitrogen	52	58
Total zinc	95	80
Total copper	92	78

To assess the effects of the developments' treatment systems, an overall contaminant load for the two developments (Porters and HJV) has been calculated and is shown in Table 8-6: Calculated Contaminant Loads and Concentrations – Existing Rural . This has been compared to a calculated existing rural contaminant load for the same land area. For the developed land contaminant load, a pre-treatment and a post-treatment load. For the developed landuse, a pre-treatment contaminant load, as well as a post treatment contaminant load is provided in Table 8-7 below. The calculated contaminant loads have also been converted to an average concentration in order that it can be compared to the ANZECC Guideline Values and MfE guideline values the ICMP targets and objectives.

The following values have been used as part of this assessment

- Annual rainfall depth – 1400 mm (Source: WRC website)
- Runoff coefficient Rural – 0.45 (pervious value for rural area's from 1D modelling report- Beca, 2017)
- Runoff coefficient Industrial – 0.75 (average value from 1D modelling - Beca, 2017)
- Land area – 143.7 ha (Porters and HJV development areas, not including the Shark Fin area)

More detailed calculations are provided in Appendix D.

Table 8-6: Calculated Contaminant Loads and Concentrations – Existing Rural

Contaminant	Contaminant load generated ($g/m^2/year$)	Average concentration (g/m^3)	Guideline g/m^3
TSS	73.5	116.7	No value
Total phosphorus	0.013	0.021	0.015-0.3[a]
Total nitrogen	0.415	0.659	0.04-0.1[a]
Total zinc	0.0081	0.013	0.015[b]
Total copper	0.0024	0.004	0.0018[b]

Note (a): MfE, 2001, (b): ANZECC, 2000. 90% species protection limit based on disturbed environment.

From Table 8.6, it can be seen that the existing rural land use would likely have been generating contaminants at rates higher than the guideline limits for total phosphorus, total nitrogen and total copper (indicated in red).

Table 8-7: Calculated Contaminant Loads and Concentrations - Industrial

Contaminant	Contaminant load generated (g/m^2/year)	Removal efficiency %	Contaminant load post treatment (g/m^2/year)	Average concentration g/m^3	Guideline g/m^3
TSS	32	91	2.8	2.7	None
Total phosphorus	0.15	70	0.525	0.050	0.015-0.3
Total nitrogen	0.35	58	1.47	0.14	0.04-0.1
Total zinc	0.49	80	0.098	0.093	0.015
Total copper	0.11	78	0.024	0.022	0.0018

From Table 8.6, it can be seen that the existing rural landuse would likely have been generating contaminants at rates higher than the guideline limits for total phosphorus, total nitrogen and total copper (indicated in red).

Table 8-7 above indicates that even with treatment, it is likely that the guideline values would not be met for metals and nutrients (indicated in red). Table 8-8 below also compares the developed industrial figures against the existing rural values.

Table 8-8: Comparison of Existing Rural with Future Industrial Concentrations

Contaminant	Existing Rural Calculated Concentration (g/m^3)	Calculated Industrial Concentration (g/m^3)
TSS	111.4	2.7
Total phosphorus	0.021	0.050
Total nitrogen	0.659	0.14
Total zinc	0.013	0.093
Total copper	0.004	0.023

Table 8-8 above indicates even after treatment, discharges of total phosphorus, total copper and total zinc are likely to be higher than existing (red). It is therefore likely that even with the existing treatment (Porters and HJV ponds), it is likely that the ICMP targets of maintaining or enhancing the existing water quality may not be met and will need to be supported by additional on-lot stormwater quality measures.

The residual nutrient concentrations may also contribute to algae growth in locations where there may be slow moving water downstream and also within the wetland/ponds. Given that all flows pass through the treatment devices, it is possible that particulate contaminants (e.g. sediment, metals and nutrients) may re-suspend during high flows and may result in the export from the treatment devices, thus resulting in lower overall treatment performance of the devices.

8.5 Discussion

Whilst the NZTA method results documented above are also used in other reference literature (e.g. Auckland Council's Contaminant Load Model), it is our opinion that this method is not particularly appropriate or effective at estimating overall treatment train treatment efficiencies. This is because it assumes the second device in the treatment train achieves the full removal performance on the residual contaminant flowing to it, when in practice the second device will not achieve full performance. Further, any bypass or incomplete capture of flow in larger storms will still occur in both devices.

This opinion is based on relatively simple sedimentation theory. Whilst other processes occur in treatment devices, especially for nutrients, a large amount of the contaminant removal occurs due to sedimentation, including for TSS and metals, for which the particulate component generally attaches to sediment particles. According to theory, the removal efficiency of sediment relates to the range of sizes of the particles and hence how long they take to drop through the water column.

If, for example, 75% of TSS (standard TP10 device) is removed down to a certain size particle, the remainder of the sediment present after treatment is likely to be very small. When the stormwater enters the next device, this sediment becomes "stirred up" and has to settle through the full water column of the next device. Assuming the retention time and depth of the second device being similar to the first, it is unlikely that these smaller particles will settle out to the same degree as the first device, hence it is not logical that a second device (standard TP10 device) would be able to remove 75% of the sediment which is delivered from the first device. It would likely be much less than this. If the size of the sediment are particularly small to start with e.g. silty and clayey soils in the catchment, the removal will be much less again, often requiring flocculation.

Based on this, it is expected that the values presented in Table 8.5, although lower than the Lysaght's values, these are likely to still be optimistic. This said, without carrying out a detailed assessment, which doesn't form part of this report's scope, the NZTA method still provides a high level (if optimistic) gauge as to performance. The values from Table 8.5 have therefore still been used to carry out the above assessment of the effects of the devices.

9 On-lot Pollution Prevention Regulations

9.1 Introduction

The above sections have identified that the existing treatment systems are not likely to provide high enough levels of treatment to meet the ICMP targets, specifically for nutrients and metals. It is also likely that even with the best practicable option treatment based on current good practice, this is still not likely to be possible. This means that additional measures are required to mitigate the effects of development.

Conventional stormwater treatment systems remove a range of contaminants including those noted in section 7 and 8. Industrial activities are also likely to generate these contaminants. However, these can sometimes be at far higher rates, and non-conventional contaminants may also be generated depending on the nature of industry. Some of these contaminants will be removed by a conventional treatment system e.g. the existing HJV and Porters ponds, but some may not. WRC's Draft Stormwater Management Guideline (WRC, 2017) provides a comprehensive list of industrial activities in Table 11.1. This table lists contaminants of concern associated with each activity as well as a "risk of release rating".]

The most effective way to provide additional mitigation is on-lot via source control, i.e. stopping the contaminants entering the stormwater system in the first place. If source control is not appropriate or practical, additional on-lot treatment measures would need to be implemented. Another advantage of on-lot treatment is that contaminants are more readily removed when the flow and dilution are low (i.e. at source) than when they are mixed with other runoff at larger devices.

Currently, on-lot source control and treatment is required for industries which are listed on the WRC High Risk Facilities Register (HRFR). These industries are also required to prepare a Pollution Control Plan as part of their development, which outlines how the site will be managed to prevent contaminants being entrained and discharged into the stormwater system. The current focus for HCC are "high-risk" industries i.e. those which are likely to produce contaminants which are at high risk of being released into the environment.

The issue then is whether requiring high risk sites to have on-lot treatment be enough to meet the targets. Part of this is whether the current list of high risk sites is appropriate. Given that rates of contaminant generation are likely to be industry specific and highly influenced by site practices, it is difficult to quantify this. As a result it is unclear as to whether medium and low risk sites also need some treatment. On the basis that this ICMP provides design parameters which will govern the design of future centralised and on-lot devices (for sites where no centralised device is provided), it would be reasonable to assume that the future devices will provide a slightly (i.e. wetland efficiency versus wet pond) higher level of treatment than the existing HJV and Porters Devices. Treatment efficiencies of the HJV and Porters devices could also be improved if the recommendations in section 6.5 were implemented. This said, it is not expected that the guideline values will be achieved with such treatment and will therefore need to be supported by additional on-lot treatment measures.

We therefore have the following options as to how to manage this:

- Require all sites which are likely to generate nutrients and metals to prepare a PCP. To determine which industries this may apply to. We have highlighted in red in Appendix E all the medium and low risk industries that would likely generate nutrients or metals. Based on this, the bulk of the list is affected.
- Rely on the trade waste consent process to pick up any industries that are not high-risk but may be generating nutrients or metals. Currently during review of trade waste discharge consents, HCC staff flag to the stormwater engineering team when applications are lodged that may require additional stormwater management measures.

We recommend that the first option is taken as this means that developers know what they need to do by looking at the ICMP early in their design process, rather than later when it is more difficult to incorporate any requirement for on-lot treatment.

9.2 Current Requirements for On-Lot Treatment and Controls

Currently, the main way of HCC controlling on-lot source control and treatment is via requiring developers to prepare a Pollution Control Plan as part of the building consent process when a site is developed. The existing HCC Stormwater Bylaw currently only requires this for activities on the WRC High- Risk Facilities Register (HRFR). As this register is quite limited in nature (as demonstrated in Section 9.3), it is possible that on-lot controls and treatment are not being provided as frequently as required to mitigate effects.

9.3 Review of the WRC High Risk Facilities Register

The current HRFR list of applicable industries is relatively short, therefore this has been compared to the WRC Stormwater Management Guideline list (Table 11.1) and Auckland Councils list of Industrial and Trade Activities to identify gaps that, if filled, would provide a more comprehensive set of industries requiring on-lot treatment and pollution control. This will further help to achieve the ICMP targets.

In comparing the AC and WRC documents, it is recommended that the Stormwater bylaw refer to both the HRFR and the WRC Guideline as this will provide a comprehensive list. There are however gaps i.e. industries listed in the AC list that are not on the other two documents. The ICMP should clearly identify these, or the relevant reference documents should be updated.

Appendix E, provides a list of high risk industries from the AC list which are currently not on the HRFR or on the WRC Stormwater Management Guideline List. It is possible that the bylaw could be changed to only refer to the WRC guideline. If this occurs, Appendix E also provides a list of activities on the HRFR but not in the other two documents i.e. activities that would need to be added to the Guideline list.

During the course of this work, we have also identified that the risk rating of some industries is different across the different documents. Appendix E also provides a list of industries where the rating is different. The reasons for these differences have not been investigated in detail however this should be done if the documents are updated.

Appendix F provides list of recommended updates to the WRC Guideline Industrial Activities list in terms of missing items, and recommended changes to risk ratings.

9.4 Justification

The following statements have been prepared to provide some justification for requiring PCPs and on-lot measures more frequently, and to explain why the regulations need to be made more onerous i.e. more sites required to prepare PCPs and that the plans provide more detailed information.

“The existing Mangaheka industrial area has three treatment and attenuation devices. Future development of greenfields land within the catchment will also need to provide treatment and attenuation. The treatment devices will need to be/have been designed in accordance with ARC’s TP10 plus HCC’s ITS or the new WRC guideline, however such devices are generally only designed to treat typical contaminants and at standard loadings. Depending on the individual lot site practices, it is expected that industries may develop that generate contaminants at higher loadings or containing different contaminants than these standards are intended to apply to. If this is the case, HCC will need to know how these contaminants are managed on the site, prior to discharge to the HCC stormwater network (after it is vested in Council) such that discharges of contaminants are avoided or minimised to typical industry standards.”

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10 Pollution Control Plans

10.1 Overview

The original scope of this work was to provide a template for a Pollution Control Plan. Subsequent to this, HCC has identified that they already have an existing document. This section therefore details a review carried out of this document, against the template previously provided. This HCC template is provided as Appendix H. For reference, our previous template is provided as Appendix I.

10.2 Review of the Existing HCC Pollution Control Plan Template

The existing PCP Plan Template provides a detailed description of what a PCP is and why it is important. It also lays out a template of what is expected in such a plan. This has been compared to our previous template and it is felt that this template is appropriate for the purpose. We do however suggest that the following is added to the existing template:

- References to guideline documents which provide information that would be useful in preparing the plan
- A section describing who has prepared the plan. Refer section 10.3 below
- There are some examples in the table of the template but there needs to be guidance provided on what sorts of controls are required to prevent stormwater contamination and when these are required. This needs to take a risk based approach based on:
  - The size of the site
  - The likely contaminants generated at the site
  - The amount of the contaminant present at the site/likely to be generated by the site
  - How the site operates i.e. likelihood of these being entrained in stormwater
  - How easily contaminants can be removed on-site. This relates to the types of contaminant
  - When additional on-lot treatment is required. For some sites, source control is the only way to reduce contamination as the contaminants are hard to remove once entrained in stormwater. For others, treatment may be an appropriate solution
  - The baseline condition and sensitivity of the receiving environment

In addition we also note that it is not compulsory for sites to submit their PCP to HCC. It is recommended that this is submitted as part of the building consent or discharge consenting process for the site.

The Draft WRC Stormwater Management Guideline also provides details of how to prepare a site plan (section 11.2) and general Industrial site management guidance and should be referred to when developing an Industrial site, whether a PCP is required or not. Table 11.1 also indicates what sort of treatment would be appropriate for the various contaminants generated by industry.

10.3 Who Should Be Preparing the Pollution Control Plan?

It is recommended that a suitably qualified and experienced practitioner will need to prepare PCPs. It is recommended that the person preparing the PCP provides a statement including the following information:

- Name of person who has prepared the plan
- Qualifications of person who has prepared the plan
- A statement of experience which provides information justifying why they are appropriate to prepare such a Pollution Control Plan

It is possible that the owner or developer of the site is the most appropriate person to prepare a PCP, however requiring the above information will give HCC confidence that that person is suitable.

11 Proposed New Devices

11.1 Options Assessment

11.1.1 Introduction

The Mangaheka ICMP will set out requirements for managing water quantity and water quality (amongst other things) for future land development within the catchment. As part of this ICMP, future centralised devices have been identified and sized in order to determine requirements for mitigating effects of future development within the HCC city limits. Sizing of these devices in terms of flood mitigation is provided as part of the 1D Modelling report (Beca, 2017). The below information discusses the options that were considered in terms of both water quantity (flooding) and water quality mitigation. Whilst this report discusses water quality, water quantity is also discussed below as it is possible that combined devices will be constructed in some locations and it is useful to detail the background to this here.

11.1.2 Flood Storage (On-line or off-line)

It is possible to provide both on-line or offline flood storage in a development area.

- By on-line, this means that the flood storage mechanism, sits in the stream or watercourse and the stream flow (both from the development area and from upstream catchments) passes through the device in all events including low flow
- An off-line flood storage device would collect water from a specific sub-catchment or development area and attenuate the peaks prior to discharging to a stream or watercourse

Either of these options can achieve the required outcomes, although fish passage considerations would be important (and can usually be addressed) with the on-line system.

The current Porters and HJV devices are both considered on-line according to the above definitions.

11.1.3 Treatment Bypass options.

The following are options for configuring treatment devices:

- Water quality treatment is provided within a device and higher flows are **bypassed**. Bypass could occur in all events greater than the water quality storm, or greater than the 10 or 100 year event for example, depending on the implications of the larger flows in damaging or affecting performance of a particular device
- All flows are passed through the device, with **no bypass**

The water quality treatment device can be located within the margins of the flood attenuation ponding, but still be off-line from the main stream channel that it discharges to, as in the devices proposed for Mangaheka.

It is recommended that flows higher than the water quality storm are bypassed for the following reasons:

- High flows can cause scouring within the treatment device resulting in sediment generation and potentially stability issues of the slopes of the device (pond/wetland type devices)
- High flows can cause disturbance/dislodging of vegetation within the treatment device, thus requiring maintenance or replanting
- High flows can cause resuspension of sediment and contaminants which have settled on the invert of the device. This can result in export of contaminants from the device.
- Flood water can quickly displace the water quality volume and discharge it after a much shorter detention time

If bypassing all events larger than the water quality storm, it is also possible to configure this in two ways:

- Bypassing the entire device , so bypass flows receive no treatment
- Bypassing after the forebay, where the bulk of larger contaminants settle out

11.1.4 Centralised versus decentralised (on-lot)

Where devices are to be vested in Council, larger centralised devices are generally preferred in order to minimise ongoing operational and maintenance costs. It may also be appropriate in some cases to provide a small treatment device for a particular site or part of a site in order to target a particular contaminant source. This could be done to minimise the size of the device especially where most of a site is not likely to be generating contaminants.

11.1.5 Treatment Types

In terms of treatment, there are a number of types of devices for treating stormwater. These are described in detail in AC's TP10 and WRC's Stormwater Management Guideline. In terms of choosing an appropriate device, this should always be done based on the types of contaminants expected. However HCC also has a list of preferred devices in the Infrastructure Technical Specifications. Based on this, HCC prefer the use of wetlands and raingardens as they generally provide a higher level of treatment for standard contaminants. The HCC Infrastructure Technical Specifications (ITS) should also be referred to for other design guidance and considerations.

11.2 Device Description and Sizing

11.2.1 Introduction

The below sections describe the proposed water quantity mitigation devices proposed as part of Beca, 2017. They also describe the options for how water quality mitigation could be provided in each catchment as well as the water quality volume needing to be stored for each contributing catchment.

Appendix G provides a plan with locations of these devices and the contributing catchments.

11.2.2 Device 5 (Catchment E, G and H))

Device 5 is located and sized to serve several catchments with several land owners. A larger device serving these multiple catchments is proposed. Catchments E and H will be able to drain to the device but catchment G will not due to its location on the east side of the Te Rapa Bypass. Device 5 therefore over attenuates in order to offset the un-attenuated flows from catchment G as well. In order to provide treatment, three devices would likely be required, one to serve catchments E1 and H and separate devices for within catchment G and E2.

11.2.3 Device 6 (Catchment D)

Device 6 (as proposed in Beca, 2017) serves an area of land owned by singled owner. Device 6 is an offline device sized to provide flood mitigation for the areas of land on both sides of the stream (off-set mitigation). Other options that may be considered here are two off-line devices, one on each side of the existing stream, or to realign the stream northwards so that the whole catchment can drain to a single device.

If the watercourse is retained in its current position, treatment for the south-western section of the catchment could be combined in conjunction with the flood mitigation system, for the section of the development on the north side of the stream. Device 7 (Catchment C).

Device 7 is an online flood mitigation device. This proposed device is online due to the location of the stream through the centre of catchment, resulting in it being difficult to have an offline device without realigning the stream. The proposed device relies on flood storage within the existing watercourse flood plain.

In this catchment, there are a large number of lots draining to the device and a large number of different land owners. It is therefore likely to be hard to get all land owners to work together in order to construct a single off-line treatment device. Such a device would also likely require a realignment of the existing watercourse due to its location in the middle of the catchment. Based on this it is recommended that treatment occur offline and then discharge to an online flood storage device which utilises the existing topography.

11.2.4 Water Quality Volumes

In order to provide treatment as well as flood storage with the devices proposed in Beca, 2017, additional storage volume and area will be required as well as specific design of device hydraulics in order to manage the full range of storm events. In order to provide treatment, the water quality volume needs to be stored. This has been calculated and is presented below. As HCC's treatment type preference is for wetlands, we have referred to the Draft WRC Guideline for sizing guidance (see below).

Water Quality Volume calculations are based on a runoff coefficient of 0.75 and a water quality rainfall depth of 22.4 mm. This is 1/3rd of a 2 year 24 hour storm. For clarity, the water quality volumes for each catchment contributing to each device are provided. This has been done as in some locations treatment needs to be provided separately for each catchment due to catchments being physically separated by a stream or other feature, catchments, e.g. Catchment G

- The standard surface area of 3% of the contributing catchment from WRC (2017)
- As an allowance for maintenance (5 m all around)
- Depth has been assumed to be 1 m deep with a normal operating depth of 0.6 m (average- will vary with banded bathymetry) i.e. 0.2m freeboard

Table 11.1 - Device Water Quality Volumes

Device	Catchment	Area requiring treatment (ha) [a]	Water Quality Volume (m^3)	Required Surface Area (m^2)
5[a]	E and H	27.21	4571	14300
	G	3.29	553	2475
6 [b]	D – west side of stream	35.78	6010	18200
	D- east side of stream c	9.27	1557	5600
7[b]	C - west side of stream	11.68	1961	6750
	C- east side of stream	17.53	2945	9600

Note (a) These areas do not include the area of the Te Rapa bypass which has its own separate treatment system (swales). (b) Treatment for this catchment needs to be via two devices, one combined with flood storage device 6 and the other for the catchment on the east side of the stream.

12 Conclusions and Recommendations

Based on our review of the design reports for each of the devices and their treatment performance, as well as literature, we make the following conclusions:

- Existing swales are likely to be providing treatment of an appropriate (or better) standard of treatment due to longer residence times (other than some of the shorter HJV pond swales)
- The wetlands/ponds are considered to be functioning more like wet ponds than wetlands due to their form, therefore treatment is not likely to be as high as for a TP10 wetland,
- Based on our assessment, with the current treatment, it is likely that total nitrogen and total copper levels would be higher than existing and that nutrients (total phosphorus and total nitrogen) and metals (such as total zinc and total copper) would also be higher than ANZECC guidelines. It is therefore possible that the treatment will not meet the ICMP targets and objectives to maintain or enhance the existing water quality in Mangaheka Stream. Overall, it is considered that the existing devices are not likely to be providing appropriate levels of treatment in order to achieve the ICMP targets
- It is likely that there could be high risk industries that develop in the area which would not be required to provide on-lot treatment due to not being included in the WRC High-Risk Facilities register. If such industries develop, it is therefore possible that treatment would not be provided or that it will not be appropriate to achieve the ICMP targets/objectives

Based on our assessment, we make the following recommendations for future actions:

- HCC should consider referring to the Auckland Unitary Plan as part of their management of industrial sites.
- HCC should seek further information in regard to sizing of the Porters and HJV ponds in terms of water quality volume, at the engineering approval stage.
- HCC should investigate the feasibility of implementing the suggested changes to existing devices such that treatment is improved.
- HCC should recommend to WRC that they either :
  - 1. review and update the High Risk Facilities register to include all high risk activities (including those in the WRC Guideline and those in Appendix F that are missing from the WRC Guideline) or:
  - 2. Refer to the WRC SW Guideline list as well as those that are missing or are noted as likely to need a change of rating (Appendix F)
- HCC should review the SW bylaw to also refer to high risk activities on the WRC Stormwater Guideline Industrial Activities list.
- HCC should require all “high risk” industries to prepare a PCP and provide on-lot treatment as well as any industries that are likely to generate nutrients or metals
- HCC should refer developers to the Draft WRC Stormwater Management Guideline in terms of what sorts of on-lot treatment would be appropriate for their activity.
- HCC should update their existing PCP template to include the recommendations suggested in section 10.2.
- HCC should always require developers (who need to) to submit their PCP as part of the building consent/resource consent process. The HCC Stormwater Bylaw wording would need to be updated to do this.

13 References

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CCC, 2003*, Waterways, Wetlands and Drainage Guide*, Christchurch City Council, 2003.

CKL Ltd, 2015, *Engineering Report,* March 2015.

HCC, 2015, Hamilton Stormwater Bylaw 2015, Hamilton City Council, May 2015 (date adopted).

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MfE, 1992. *Water Quality Guidelines No. 1: Guidelines for the Control of Undesirable Biological Growths in Water*. Ministry for the Environment.

NZTA, 2010, *Stormwater Treatment Standard for State Highway Infrastructure*, New Zealand Transport Agency, May 2010.

NIWA, 2001. *Hamilton City Stormwater: assessment of contaminant loads and impacts on the Waikato River*. NIWA Client Report: HCC00210.

WRC 2017, *Draft Waikato Stormwater Management Guideline Draft 11*, Aqua Terra International Consulting Ltd, 2017.

Appendix A

WRC High Risk Facilities Register

Activity	Reason for High Risk Classification
1. Mechanical workshops and service stations.	These sites use and handle large volumes of oils and other petroleum products. Spillages of these substances are not uncommon, hence the greater risk of stormwater discharges to the environment.
2. Printers.	Relatively large quantities of dyes and paints are handled at these sites. The risk of spillages is relatively high.
3. Spray painting facilities.	Paints can not only be spilt at these sites but can enter stormwater as a consequence of drift from spray painting operations.
4. Meat, fish and shellfish processing industries.	Wastes from these industries can typically have a high BOD. This can cause significant adverse effects.
5. Dairy products processing.	Wastes from these industries can typically have a high BOD. This can cause significant adverse effects.
6. Waste management sites (transfer stations, compost sites, landfills etc.).	Litter, hazardous substances and high BOD wastes can all enter stormwater systems from these sites.
7. Truck wash facilities	The activity of truck washing can was hazardous contaminants of trucks as well as sediments and wastes from spillages on site.
8. Unenclosed manufacturing and bulk storage of fertiliser.	Fertilisers can give rise to high levels of nutrient in stormwater discharges. Where fertilisers are manufactured or stored in such a way that fertilisers can enter stormwater the risk of adverse effects is unacceptably high.
9. Textile fibre and textile processing industries where dying and washing of fabric occurs.	Large quantities of dye and high BOD wastes (from wool scourers for instance) are handled on these site. The risk of spillages that could enter stormwater is high.
10. Tanneries and leather finishing.	Large quantities of dye and high BOD wastes are handled on these sites. The risk of spillages that could enter stormwater is high.
11. Footwear manufacture.	Large quantities of dye and high BOD wastes are handled on these sites. The risk of spillages that could enter stormwater is higher.
12. Manufacture of paper and paper products.	Hazardous substances such as chlorine based bleaches and dyes are regularly handled on these sites. The risk of spillages etc. entering stormwater can be high.
13. Manufacture or processing of chemicals, and of petroleum, coal, rubber and plastic products.	The risk of spillages associated with hazardous substances used in these industries can be high.
14. Manufacture of clay, glass, plaster, masonry, asbestos and related mineral products.	The risk of spillages associated with hazardous substances used in these industries can be high.
15. Manufacture of fabricated metal products, machinery and equipment.	The risk of spillages associated with hazardous substances used in these industries can be high.
16. Electroplaters, Foundries, galvanizers and metal surfacing.	The risk of spillages associated with hazardous substances used in these industries can be high.
17. Concrete batching plants and, asphalt manufacturing plants.	The risk of spillages associated with hazardous substances used in these industries can be high.
18. Stock saleyards.	High BOD run-off can be associated with these sites.
19. Bakeries.	Outside washing of trays, dishes and pans can result in high BOD, fats, greases and detergents entering stormwater systems.
20. Car wash and valet services.	High oil, solvent and solid discharges can occur from these activities.
21. Commercial laundries (excluding self-service laundrettes and Laundromats).	The risk of spillages associated with detergents, alkalis and salts used in this industry can be high.
22. Furniture/wood manufacturing and refinishing industries.	Some of these industries work outside extensively, usually with no stormwater treatment, Contaminants such as sawdust, glues and alkali stripper solution in the stormwater coming of these sites can include high solids, BOD and high pH.
23. Timber preservation, treatment and storage sites where chemically treated timber is sorted.	A range of hazardous substances are used on these sites (e.g. Copper Chrome, Arsenic, Boron and copper-quinoline compounds). In addition, timber treatment chemicals have been shown to be able to leach from treated wood in storage.

Appendix B

Auckland Unitary Plan – Industrial and Trade Activities

E33. Industrial and trade activities

E33.1. Background

Industrial and trade activities involve the use, handling and storage of environmentally hazardous substances as part of their production and operation. Unless these activities are appropriately managed, hazardous substances can be discharged from the site, as contaminants, onto land or into rivers and streams, groundwater systems and coastal waters. Appropriate management includes:

- disposal as trade waste to the wastewater network;
- collection for disposal or recycling to an appropriate facility;
- treatment onsite prior to discharge to the receiving environment; and
- adoption of appropriate industry standards, site practices, operating procedures and plans.

It is the overriding purpose of the land use provisions to avoid the discharge of contaminants in the first instance. Where the avoidance of discharges cannot be achieved, good onsite management practices remain the primary method of minimising the discharge of environmentally hazardous substances

E33.2. Objective [rcp/rp]

(1) Industrial and trade activities are managed to avoid adverse effects on land and water from environmentally hazardous substances and discharge of contaminants, or to minimise adverse effects where it is not reasonably practicable to avoid them.

E33.3. Policies [rcp/rp]

(1) Manage the use of land for industrial or trade activities to prevent or minimise any adverse effects of storage, use or disposal of environmentally hazardous substances.

(2) Require industrial or trade activities to have, where reasonably practicable, onsite management systems, processes, containment, treatment, or disposal by lawful means.

(3) Require measures to be implemented, where contaminants cannot be disposed as trade waste to the wastewater network or contained on site, to minimise adverse effects on land and water including:

(a) reducing contaminant volumes and concentrations as far as practicable; and

(b) applying measures, including treatment, management procedures, monitoring, controls, or offsite disposal, having regard to the nature of the discharge and the sensitivity of the receiving environment.

E33.4. Activity table

Table E33.4.1 specifies the activity status of use of land for industrial or trade activities pursuant to section 9(2) of the Resource Management Act 1991.

The industrial or trade activity land use and discharge rules address stormwater quality aspects of the discharge of contaminants from an industrial or trade activity area. The rules should be read in conjunction with E31 Hazardous substances, E8 Stormwater – Discharge and diversion and relevant zone rules.

For the purposes of this section 'existing' means existing at the date of notification of the Proposed Auckland Unitary Plan, being 30 September 2013.

Table E33.4.1 Activity Table – Use of land for an industrial or trade activity

Activity		Activity status
Consented industrial or trade activities		
(A1)	Use of land for an industrial or trade activity that is authorised by a resource consent to discharge contaminants	P
(A2)	Use of land for an industrial or trade activity that is listed in Appendix 22 Consented existing high risk industrial or trade activities and for which the specified consent(s) has not expired or may be exercised under section 124(1) and (3) of the Resource Management Act 1991	P
Unlisted industrial or trade activities		
(A3)	Use of land for an existing or new industrial or trade activity not listed in Table E33.4.3	P
Low risk industrial or trade activities		
(A4)	Use of land for an existing or new industrial or trade activity listed as low risk in Table E33.4.3	P
Moderate risk industrial or trade activities		
(A5)	Use of land for an Existing or new industrial or trade activity listed as moderate in Table E33.4.3	P
High risk industrial or trade activities		
Existing sites		
(A6)	Use of land for an existing industrial or trade activity listed as high risk in Table E33.4.3 (before the Table E33.4.3 timeframe expires)	P
(A7)	Use of land for an existing industrial or trade activity listed as high risk in Table E33.4.3 (after the Table E33.4.3 timeframe expires)	C
New sites		
(A8)	Use of land for a new industrial or trade activity listed as high risk in Table E33.4.3	C

Unlisted, low, moderate and high risk industrial or trade activities that do not meet the relevant land use standards		
(A9)	Any activity in this table that does not meet the relevant permitted or controlled land use standards	D

Table E33.4.2 Activity table – Discharge of contaminants from an industrial or trade activity area

Table E33.4.2 specifies the activity status of discharges of contaminants from industrial or trade activity areas pursuant to section 15 section of the Resource Management Act 1991.

The industrial or trade activity land use and discharge rules address stormwater quality aspects of the discharge of contaminants from an industrial or trade activity area. The rules should be read in conjunction with E31 Hazardous substances, E8 Stormwater – Discharge and diversion and relevant zone rules.

For the purposes of this section 'existing' means existing at the date of notification of the Proposed Auckland Unitary Plan, being 30 September 2013.

Activity		Activity status
Consented industrial or trade activities		
(A10)	The discharge of contaminants from an industrial or trade activity that is authorised by a resource consent to discharge contaminants.	P
Unlisted industrial or trade activity areas		
(A11)	Discharge of contaminants from an existing or new industrial or trade activity area not listed in Table E33.4.3	P
(A12)	Discharge of contaminants from an existing or new industrial or trade activity area not listed in Table E33.4.3 where the permitted discharge standards are not met	C
(A13)	Discharge of contaminants from an existing or new industrial or trade activity area not listed in Table E33.4.3 where the controlled discharge standards are not met	D
Low risk industrial or trade activity areas		
(A14)	Discharge of contaminants from an existing or new industrial or trade activity area listed as low risk in Table E33.4.3	P
(A15)	Discharge of contaminants from an existing or new industrial or trade activity area listed as low risk in Table E33.4.3 where the permitted discharge standards are not met	C
(A16)	Discharge of contaminants from an existing or new industrial or trade activity area listed as low risk in Table E33.4.3 where the controlled discharge standards are not met	D
Moderate risk industrial or trade activity areas		

(A17)	Discharge of contaminants from an existing or new industrial or trade activity area listed as moderate risk in Table E33.4.3	P
(A18)	Discharge of contaminants from an existing or new industrial or trade activity area listed as moderate risk in Table E33.4.3 where the permitted discharge standards are not met	C
(A19)	Discharge of contaminants from an existing or new industrial or trade activity area listed as moderate risk in Table E33.4.3 where the controlled discharge standards are not met	D
High risk industrial or trade activity areas		
Existing sites		
(A20)	Discharge of contaminants from an existing industrial or trade activity area listed as high risk in Table E33.4.3 (before the Table E33.4.3 timeframe expires)	P
(A21)	Discharge of contaminants from an existing industrial or trade activity area listed as high risk in Table E33.4.3 (before the Table E33.4.3 timeframe expires) where the permitted discharge standards are not met	C
(A22)	Discharge of contaminants from an existing industrial or trade activity area listed as high risk in Table E33.4.3 (before the Table E33.4.3 timeframe expires) where the controlled discharge standards are not met	D
(A23)	Discharge of contaminants from an existing industrial or trade activity area listed as high risk in Table E33.4.3 (after the Table E33.4.3 timeframe expires)	D
New sites		
(A24)	Discharge of contaminants from a new industrial or trade activity area listed as high risk in Table E33.4.3	D

Table E33.4.3 Activity table – Industrial or trade activity risk criteria

Table E33.4.3 contains a list of industrial or trade activity risk criteria to assist in application of Table E33.4.1 and Table E33.4.2.

The industrial or trade activity land use and discharge rules address stormwater quality aspects of the discharge of contaminants from an industrial or trade activity area. The rules should be read in conjunction with E31 Hazardous substances, E8 Stormwater – Discharge and diversion and relevant zone rules.

For the purposes of this section ‘existing’ means existing at the date of notification of the Proposed Auckland Unitary Plan, being 30 September 2013.

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
Agricultural support industries	Inorganic fertiliser manufacture, storage or handling	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
Animal feedstuffs	Stock food manufacture storage or handling	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Pet food manufacture	Less than 1000m^2	1,000m^2 to 5000m^2	More than 5,000m^2	12
Chemical and associated product manufacturing	Batteries	Activity is never low risk	No activity area	Any activity area	12
	Cosmetics, toiletry, soap and other detergents	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Explosives and pyrotechnics	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Fungicides, herbicides, pesticides, timber preservatives and related products	Activity is never low risk	No activity area	Any activity area	12
	Industrial Gas	Activity is never low risk	Less than 5,000m^2	More than 5,000m^2	12
	Medicinal, pharmaceutical or veterinary products	Less than 1000m2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Paint, pigment, inks and dyes	Less than 1000m2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Polishes, adhesives or sealants	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m2	12
	Solvents	Less than 1000m^2	1,000m2 to 5,000m2	More than 5,000m2	12
	Synthetic resins	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Acids, alkalis or heavy metals	Activity is never low	No activity area	Any activity area	12
	Other chemical products (e.g. plastic manufacturing)	Less than 1000m^2	1,000m^2 to 5000m^2	More than 5,000m^2	12
Commercial livestock	Slaughter	Less than 1000m^2	1,000m^2 to 5000m^2	More than 5,000m^2	12

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
processing industries	Manufacture, store or handle products derived from animal slaughter (e.g. gelatin, fertiliser or meat products)	Less than 1000m^2	1,000m^2 to 5000m^2	More than 5,000m^2	12
	Scouring or carbonising greasy wool or fleeces	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Tanneries or Fellmongeries	Activity is never low risk	No activity area	Any activity area	12
	Rendering or fat extraction	Activity is never low risk	No activity area	Any activity area	12
Electronics	Circuit board manufacturing (excluding assembly only)	Activity is never low risk	No activity area	Any activity area	12
Food or beverage manufacturing or handling	Bakery product manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Bakery product handling	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A
	Beverages or malt product manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Beverages or malt product handling	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A
	Flour mill or cereal foods	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Meat and meat product manufacture (including fish)	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Meat product handling (including fish)	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A
	Oil or fat product manufacturing or handling	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Processed dairy foods manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Processed dairy foods handling	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
	Vineyards or wine manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Other foodstuffs manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Other foodstuffs handling	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A
Research or defence	Research establishments	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A
	Naval and Air Force defence activities	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	0
Machinery or equipment manufacturing	Industrial machinery or equipment	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Motor vehicles or parts	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Other machinery or equipment	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
Metal product manufacturing	Sheet and structural metal products	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A
Motor vehicle services facilities	Existing or new service stations that comply with the Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand, Ministry for the Environment, December 1998	Activity is never low risk	Activity is always moderate risk	Activity is never high risk	N/A
	All other service stations	Activity is never low risk	Activity is never moderate risk	Activity is always high risk	12
	Mechanical servicing of motor vehicles	Activity is never low risk	Activity is always moderate risk	Activity is never high risk	N/A

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
Non-metallic mineral product manufacturing	Cement, lime, plaster and concrete products	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Concrete batching plants - ready mixed concrete	Activity is never low risk	No activity area	Any activity area	12
	Glass	Activity is never low risk	Less than 5,000m^2	More than 5,000m^2	12
Metal processing, metallurgical works or metal finishing	Metal plating, anodising or polishing	Activity is never low risk	No activity area	Any activity area	0
	Metal blasting or coating, excluding spray painting	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Refinement of ores	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Processing of metals e.g. smelting, casting	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
Petroleum or coal product manufacturing	Bitumen/asphalt premix or hot mix	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Coal products	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Petroleum refining	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Petroleum hydrocarbon, oil or grease manufacturing	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
Power	Electricity generation	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
Product storage or handling centres	Bulk chemicals	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Bulk hydrocarbons - non-service station	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
Recycling, recovery, reuse or	Automotive dismantling	Activity is never low risk	No activity area	Any activity area	12

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
disposal	Batteries	Activity is never low risk	No activity area	Any activity area	12
	Chemicals	Activity is never low risk	No activity area	Any activity area	12
	Crushing, grinding or separation works other than sand, gravel, rock or mineral e.g. slag, road base, demolition material	Activity is never low risk	Less than 5,000m^2	More than 5,000m^2	12
	Hazardous materials storage or treatment	Activity is never low risk	No activity area	Any activity area	12
	Landfills	Activity is never low risk	No activity area	Any activity area	12
	Metals - crushing, grinding, sorting or storage	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	0
	Non-metal recycling e.g. composting, glass, paper or paper board	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Oil, petroleum hydrocarbon wastes	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Chemical containers cleaning reconditioning, or recycling	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Sewage solids treatment or storage facilities	Activity is never low risk	No activity area	Any activity area	12
	Tyres	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Waste transfer stations	Activity is never low risk	No activity area	Any activity area	12
Rubber industries	Tyre manufacturing or retreading	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
	Synthetic rubber manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
Transport and related activities	Boat or ship construction, repair or maintenance	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	0
	Bus depots	Activity is never low risk	Less than 5,000m^2	More than 5,000m^2	12
	Commercial airports other than Auckland International Airport Limited	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Auckland International Airport Limited activities contained within the secure area as declared from time to time by the Director of Civil Aviation under section 84 of the Civil Aviation Act 1990 provided that the stormwater runoff from that secure Area complies with Stormwater Management Devices: Design Guidelines Manual second edition, May 2003, Technical Publication 10	Activity is never low risk	Activity is always moderate risk	Activity is never high risk	N/A
	Heliports other than Auckland International Airport Limited	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Road freight transport depot (non-chemical) with mechanical servicing	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A
	Road freight transport depot (bulk chemical)	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
	Railway workshops or refuelling depots	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Shipping container reconditioning (not located at port areas)	Less than 1000m^2	More than 1,000m^2	Activity is never high risk	N/A

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
	Commercial ports (including the Ports of Auckland Limited), shipping container reconditioning, and shipping loading/unloading	Activity is never low risk	Less than 5,000m^2	More than 5,000m^2	12
	Existing or new truck refuelling facilities (non-service stations) that comply with the Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand, Ministry for the Environment, December 1998	Activity is never low risk	Less than 1,000m^2	More than 1,000m^2	12
Wood or paper product storage, manufacturing or fabrication	Log storage yards outside forested areas	Activity is never low risk	Less than 5,000m^2	More than 5,000m^2	12
	Plywood or veneer manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Particle board or other wood panel manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Pulp, paper or paper board manufacturing	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12
	Timber treatment	Activity is never low risk	Activity is never moderate risk	Any activity area	0
	Treated timber storage	Activity is never low risk	Less than 5,000m^2	More than 5,000m^2	12
Sewage treatment and handling	Environmentally hazardous substances storage or use (excluding sewage)	Activity is never low risk	No activity area	Any activity area	12

Description of Industrial or trade activity		Low risk	Moderate risk	High risk	Time-frame (mths)
(excluding any part of a sewage conveyance network as that network does not form an industrial or trade activity for the purposes of the industrial or trade activity rules	Sewage solids storage.	Less than 1000m^2	1,000m^2 to 5,000m^2	More than 5,000m^2	12

Note 1

The risk is based on the size of the industrial or trade activity area. The level of risk e.g. low, moderate or high, determines the type of authorisation required for the activity. Thereafter compliance or otherwise with the provisions of the industrial or trade activity rules, or changes to the size of the industrial or trade activity area, dictate the site's status and therefore the site's risk status can change over time.

Note 2

Some activities are categorised as moderate risk even if they have no industrial or trade activity area.

Note 3

Timeframes should be interpreted as the number of months after this chapter of the Auckland Unitary Plan becomes operative.

Note 4

If the timeframe is 0, this means the timeframe expires the date the provisions becomes operative.

Note 5

The timeframes apply to high risk activities only.

Note 6

The owners or operators of high-risk industrial or trade activity whose permitted activity status expiry dates are approaching should commence the preparation of an Environmental Management Plan for the activity.

Note 7

Electrical substations that contain 1,000 litres or less of oil, are not considered an industrial or trade activity for the purposes of the plan.

E33.5. Notification

(1) An application for resource consent for a controlled activity listed in Table E33.4.1, Table E33.4.2 and Table E33.4.3 will be considered without public or limited notification or the need to obtain written approval from affected parties unless the Council decides that special circumstances exist under section 95A(4) of the Resource Management Act 1991.

(2) Any application for resource consent for an activity listed in Table E33.4.1, Table E33.4.2 and Table E33.4.3 and which is not listed in E33.5(1) will be subject to the normal tests for notification under the relevant sections of the Resource Management Act 1991.

(3) When deciding who is an affected person in relation to any activity for the purposes of section 95E of the Resource Management Act 1991 the Council will give specific consideration to those persons listed in Rule C1.13(4).

E33.6. Standards

E33.6.1. Permitted activities

Activities listed as a permitted activity in Table E33.4.1, Table E33.4.2 and Table E33.4.3 must comply with the following permitted activity standards except activities (A1) and (A2) from Table E33.4.1 and Activity (A10) from Table E33.4.2 do not have to comply with the permitted activity standards.

E33.6.1.1. Use of land for an industrial or trade activity

Activities listed as a permitted activity in Table E33.4.1 must comply with Standards E33.6.1.1(1) to E33.6.1.1(12). In addition, activities (A17) and (A20) in Table E33.4.2 must also comply with Standards E33.6.1.1(13) and E33.6.1.1(14).

(1) Wastewater and washwater produced by industrial or trade activities must be disposed of on-site via the sanitary sewer, subject to approval from Watercare, or it must be collected, either for recycling or disposal, to a system or facility with all the appropriate authorisations to accept wastewater of that type. For the purposes of this rule, wastewater or washwater also includes:

(a) boiler blow down and condensate;

(b) all waste liquids generated or collected as part of an industrial or trade activity;

(c) cooling tower water excluding vapour; and

(d) condensate from air compressors.

(2) A spill response plan is prepared where any environmentally hazardous substance is handled, used or stored on land at a quantity greater than used for domestic purposes. These plans must meet the requirements of Table E33.9.1 as relevant and be supplied to the Council on request.

(3) For environmentally hazardous substances in quantities covered by Part 4 of the Hazardous Substances (Emergency Management) Regulations 2001, a spill response plan prepared in accordance with those regulations will be considered to comply with Standard E33.6.1.1(2) provided the emergency spill response plan also explicitly addresses matters (vi) to (x) in Table E33.9.1.

(4) For environmentally hazardous substances not covered by Part 4 of the Hazardous Substances (Emergency Management) Regulations 2001, a spill response plan prepared in accordance with Council's factsheet 'Being Prepared for a Spill' will be considered to comply with Standard E33.6.1.1(2).

(5) When the quantity of environmentally hazardous substances stored above the ground exceeds that used for domestic purposes, it must be stored:

(a) in a container and in a manner that prevents the entry of rainwater into the container; and

(b) within a secondary containment device or within a containment system that is constructed of impervious materials that are resistant to chemical attack from the substances contained therein.

(6) For environmentally hazardous substances in quantities covered by Part 4 of the Hazardous Substances (Emergency Management) Regulations 2001, storage requirements in accordance with those regulations will be considered to comply with Standard E33.6.1.1(5).

(7) For environmentally hazardous substances not covered by Part 4 of the Hazardous Substances (Emergency Management) Regulations 2001, storage requirements in accordance with council's factsheet 'Above Ground Storage' noting the following bund sizing criteria for secondary stage storage, will be considered to comply with Standard E33.6.1.1(5) where:

(a) for tanks the bund has a storage capacity of at least 110 per cent of the capacity of the largest tank taking into account the volume displaced by any equipment and/or materials stored within the bund; and

(b) for drums the bund has an effective storage height of at least 100mm, allowing for any sloping ground, and the bund is set back from the drums by a distance equal to half the height of the stacked or stored drums.

(8) All secondary containment devices must be designed, constructed and managed so that uncontaminated rainwater and stormwater runoff is prevented from flowing into the contained area.

(9) Weekly inspections must be undertaken and recorded to check that environmentally hazardous substances are stored and/or contained appropriately except as follows:

(a) National Grid - monthly inspections;

(b) electricity substations – annual inspections; and

(c) unmanned depots or facilities - monthly inspections.

(10) A regular reconciliation process must be undertaken for any environmentally hazardous substance stored in an underground storage tank that will identify any leakage or unaccounted losses of material from the tank.

(11) Any waste compactors and bins must be located and operated in such a manner that prevents leachate or waste leaking from them.

(12) All on-site vehicle re-fuelling areas must be segregated and housed under cover, and/or surrounded by a drain that drains to an appropriately designed and sized stormwater treatment and spill containment device fitted with a shut-off valve.

(13) Operations must be undertaken in accordance with an environmental management plan specific to the industrial or trade activity. This plan must be prepared in accordance with Table E33.9.2, and supplied to Council upon request.

(14) Where the industrial or trade activity is located within a sewage treatment facility then the wastewater generated on site by that industrial or trade activity may be disposed of within that facility.

E33.6.1.2. Discharge from an industrial or trade activity area

Activities listed as a permitted activity in Table E33.4.2 must comply with the following standard.

(1) The discharges of contaminants from an industrial or trade activity area must result in less than minor adverse environmental effects on the receiving environment without the need for stormwater treatment (with the exception of on-site vehicle refuelling areas requiring stormwater treatment and spill contaminant devices under the permitted activity Standard E33.6.1.1(12).

E33.6.2. Controlled Activities

E33.6.2.1. Use of land for an industrial or trade activity

Activities listed as a controlled activity in Table E33.4.1 must comply with the following standard.

(1) The activity must comply with 'Use of land for an industrial or trade activity' permitted activity standards E33.6.1.1(1) to E33.6.1.1(12).

E33.6.2.2. Discharge from an industrial or trade activity area

Activities listed as a controlled activity in Table E33.4.2 must comply with the following standards.

(1) The activity must comply with the relevant 'Use of land for an industrial or trade activity' in Standard E33.6.1.1.

(2) Treatment devices to treat the discharge of contaminants from the industrial or trade activity area are installed and operated to avoid, remedy of mitigate adverse environmental effects.

E33.7. Assessment – controlled activities

E33.7.1. Matters of control

The Council will reserve its control to all of the following matters when assessing a controlled activity resource consent application:

(1) management practices, treatment systems or devices, to the extent that they are required to avoid remedy or mitigate adverse environmental effects, having regard to:

(a) the degree to which the land use controls avoid or minimise the risk of discharge contaminants from the industrial or trade activity area; and

(b) the nature and sensitivity of the receiving environment and its susceptibility to the adverse effects of the contaminants of concern.

(2) the operation and maintenance requirements of any structural controls or treatment devices.

E33.7.1.1. Assessment criteria

The Council will consider the relevant assessment criteria below for controlled discretionary activities:

(1) policies in E33.3 Policies.

E33.8. Assessment - Restricted discretionary activities

There are no restricted discretionary activities in this section.

E33.9. Special information requirements

Table E33.9.1 Spill response plan requirements

No.	Requirement

i.	A protocol/method for identifying and stopping the discharge of environmentally hazardous substances to land or water and avoiding future events of this nature
ii.	Emergency containment and clean-up procedures
iii.	A list of appropriate spill kit contents to enable the containment and/or absorption of spilt material and a plan showing the location of the spill kits
iv.	A requirement for appropriate signage to identify the location of spill kits and the actions to be taken in the event of a spill
v.	Actions to remedy or mitigate any adverse effects on the environment or public health and safety arising from the discharges or spills of environmentally hazardous substances to land or water
vi.	Methods for disposal of spilt environmentally hazardous substances and any other contaminated materials used in the spill clean-up
vii.	A schedule of adequate training for personnel in the use of the emergency spill response plan and in anticipating and preventing the likelihood of spills
viii.	Up-to-date and accurate copies of all drainage plans for the land on which the industrial or trade activity is undertaken showing the location of the final discharge point to the public stormwater system or to land or water
ix.	A procedure for notifying as soon as practicable Council's 24-hour emergency response service and the relevant stormwater or wastewater network operator in the event of any discharge of environmentally hazardous substances that results in, or is likely to result in, contamination of any stormwater system, or land or water
x.	Methods for disposing of any spills in a secondary containment device. The plan must set out how it will be disposed of in an appropriate and authorised manner

Table E33.9.2 Environmental management plan requirements

No.	Requirement
i.	Specify how the permitted activity controls will be complied with
ii.	Identify the environmentally hazardous substances associated with the industrial or trade activity
iii.	Set out the methods to be used to avoid discharges of environmentally hazardous substances onto or into land or water
iv.	For discharge of contaminants arising from land on which the industrial or trade activity is undertaken, set out the primary treatment or source control methods that may be necessary to avoid, remedy or mitigate more than minor adverse effects on the receiving environment
v.	Specify the methods for the operation and maintenance of any treatment devices on site
vi.	Identifies assessment requirements to report on the performance of the environmental management plan

Note 1

The environmental management plan must be appropriate to the scale and significance of the risk at each site. Where appropriate, the environmental management plan may include cross references to relevant documentation that is readily accessible at the site, rather than including the full documents themselves.

Appendix C

WRC Stormwater Management Guideline Table 11.1 – Industrial Activities

Industrial Activity	Description of Trade	Contaminants of Concern	Likelihood of Release	Treatment Processes
Wood or paper product storage, manufacturing or fabrication	Treated timber storage	Cu, Cr, As, TSS	High	Settling, sand/peat filter
Wood or paper product storage, manufacturing or fabrication	Timber treatment	Cu, Cr, As, Sn, TSS, Oil and Grease, pesticides	High	Sand/peat filter
Transport and related activities	Boat or ship construction, repair or maintenance	Cu, Zn, TSS, Oil and Grease	High	Settling, oil/water separator, sand/peat/carbon filter
Research or defence	Naval and air force defence activities	Metals, pesticides, oil and grease	High	Settling, , oil/water separator, sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Metals (crushing, grinding, sorting or storage)	Oil and grease, TSS, Zn, Cu, Pb, Cd, Cr	High	Oil/water separator, sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Automotive dismantling	Oil and grease, TSS, particulate metals, Zn, Cu, Pb, Cd, Cr	High	Coarse settling, oil/water separator, sand/peat/carbon filter
Metal processing, metallurgical works or metal finishing	Processing of metals (smelting, casting)	Metals (Al, Pb, Zn, Cu, Fe), TSS, pH	High	Sand/peat/carbon filter
Metal processing, metallurgical works or metal finishing	Metal plating, anodising or polishing	Metals (Zn, Cu, Cr, Ni, Ag), pH, Cyanide	High	Peat filter
Transport and related activities	Marinas	TSS, Zn, Cu	Medium	Peat filter
Sewage treatment and handling	Sewage treatment plants	TSS, BOD, NO_3+NO_2, NH_3, Pathogens	High	Settling, wetlands, disinfection
Sewage treatment and handling	Sewage solids storage	TSS, BOD, NO_3+NO_2, NH_3, Pathogens	Low	Settling, wetlands, disinfection
Rubber industries	Synthetic rubber manufacturing	Zn, TSS, organics	Medium	Wetlands
Recycling, recovery, reuse or disposal	Tyres	Zn, TSS	High	Sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Chemical containers cleaning, reconditioning or recycling	Metals, COD, NO_3+ NO_2	Medium	GPT screen, coarse settling, oil/water separator, oxidation sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Waste transfer stations	GPs, TSS, COD, Metals, Oil & Grease, residual organic compounds	Medium	GPT screen, coarse settling, oil/water separator, oxidation, sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Hazardous materials storage or treatment	TSS, COD, Metals, Oil and Grease, organics	Medium	Sand/peat/carbon filter

Recycling, recovery, reuse or disposal	Non-metal recycling (composting, glass, paper or paper board	TSS, COD, NO_3+ NO_2, pathogens	High	Wetlands + oxidation
Recycling, recovery, reuse or disposal	Crushing, grinding or separation works (other than sand, gravel, rock or mineral - e.g. slag, road base, demolition material)	TSS, pH, Zn	High	Sand/peat filter, wetlands
Recycling, recovery, reuse or disposal	Landfills	Metals, TSS, BOD, No_3+NO_2, NH_3, organics	Low	Coarse settling, oil/water separator, oxidation, sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Chemicals	Fe, Al, pH, No_3+NO_2, metals, organics	Low	Sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Batteries	Pb, pH	Low	Sand/peat filter, carbonate filter
Product storage or handling centres	Bulk chemicals	AL, Fe, Zn, No_3+NO_2	Medium	Sand/peat/carbon filter
Petroleum or coal product manufacturing	Coal products	TSS, AL, Fe, pH	Medium	Settling, wetlands
Non-metallic mineral product manufacturing	Cement, lime, plaster and concrete products	TSS, Fe, pH, Oil and Grease	High	Settling, wetlands
Non-metallic mineral product manufacturing	Concrete batching plants (ready mixed concrete)	TSS (lime), pH	High	Settling, wetlands
Motor vehicle services facilities	Mechanical servicing of motor vehicles	Oil and grease, metals	High	Sand/peat/carbon filter
Motor vehicle services facilities	Service stations	Oil and grease, PAH, BTEX, TSS	High	Oil/water separator, sand filter, oxidation
Metal processing, metallurgical works or metal finishing	Refinement of ores	TSS, metals	Medium	Settlement, wetland
Metal processing, metallurgical works or metal finishing	Metal blasting or coating (excluding spray painting)	Zn, other metals, TSS	High	Sand/peat filter
Electronics	Circuit board manufacturing (excluding assembly only)	Metals (Zn, Cu, Cr, Ni), pH, organics	Medium	Sand/peat filter
Commercial livestock processing centres	Tanneries and Fellmongeries	BOD, oil and grease, sulfides, Cr, N	High	Oil/water separator, oxidation, peat filter
Chemical and associated product manufacturing	Fungicides, herbicides, pesticides, timber preservatives and related products	COD, pH, As, Cu, Cr, Pesticides	Medium	Sand/peat/carbon filter

Chemical and associated product manufacturing	Batteries	Pb, pH	Medium	Sand/peat filter, carbonate filter
Chemical and associated product manufacturing	Paint, pigment, inks and dyes	Al, Zn, Fe, COD, organics	Medium	Sand/peat/carbon filter
Chemical and associated product manufacturing	Acids, alkalis or heavy metals	PH, TSS, metals	Medium	Sand/peat/carbon filter, carbonate filter
Transport and related activities	Railway workshops or refuelling depots	Oil and grease, TSS, COD, Zn	Medium	Settlement, sand/peat filter
Transport and related activities	Road freight transport depot (bulk chemical)	Oil and grease, TSS, COD, Zn, organics	Medium	Sand/peat/carbon filter, oxidation
Transport and related activities	Truck refuelling facilities (non-service station)	TPH, PAH	Medium	Sand/peat filter
Transport and related activities	Shipping container reconditioning	Oil and grease, TSS, COD	Medium	Oil/water separator, Settlement
Rubber industries	Tyre manufacturing or retreading	Zn, TSS, organics	Medium	Sand/peat filter
Recycling, recovery, reuse or disposal	Oil, petroleum hydrocarbon wastes	Oil and grease, PAH, BTEX	Medium	Oil/water separator, sand/carbon filter
Recycling, recovery, reuse or disposal	Sewage solids treatment or storage facilities	TSS, BOD, No_3+NO_2, Pathogen	Medium	Retention, oxidation
Product storage or handling centres	Bulk hydrocarbons (non-service stations)	Oil and grease, PAH, BTEX	Medium	oil/water separator, sand/peat/carbon filter
Power	Gas, coal or liquid power generation	Oil and grease, Zn, TSS	Medium	oil/water separator, wetlands
Power	Electrical substations	Oil and grease	medium	Sand filter
Petroleum or coal product manufacturing	Bitumen/asphalt premix or hot mix	TSS, Zn, TPH	Medium	oil/water separator, Sand/carbon filter
Animal feedstuffs	Pet food manufacture	BOD	Medium	Sand/peat filter, swales
Agriculture support industries	Inorganic fertiliser manufacture, storage or handling	COD, TSS, Pb, Fe, Zn, P	Medium	Sand/peat filter, high plant surface area and soil organics
Wood or paper product storage, manufacturing or fabrication	Log storage yards (outside of forested areas)	TSS, COD, NO_3+NO_2	High	Wetlands
Chemical and associated product manufacturing	Synthetic resins	TPH, pH, Zn	Low	Sand/peat filter
Chemical and associated product manufacturing	Solvents	TPH	Low	Sand filter
Chemical and associated product manufacturing	Explosives and pyrotechnics	Metals (Pb, Zn), VOC's	Low	Sand/peat/carbon filter

Wood or paper product storage, manufacturing or fabrication	Particle board or other wood panel manufacturing	TSS, COD, NO_3+NO_2, oil and grease	Medium	GPT, Settling, sand filter
Wood or paper product storage, manufacturing or fabrication	Pulp, paper or paper board manufacturing	TSS, COD, NO_3+NO_2, oil and grease, Zn	Medium	Wetlands, oil/water separator
Wood or paper product storage, manufacturing or fabrication	Plywood or veneer manufacturing	TSS, COD, NO_3+NO_2, organics	Medium	Wetlands
Transport and related activities	Shipping, loading/unloading	Oil and grease, TSS, COD	Medium	Oil/water separator, sand/peat filter
Transport and related activities	heliports	Oil and grease, TSS, COD		Oil/water separator, sand/peat filter
Transport and related activities	Toad freight transport depot (non-chemical) with mechanical servicing	Oil and grease, TSS, metals	High	Oil/water separator, sand/peat filter
Petroleum or coal product manufacturing	Petroleum refining	Oil and grease, PAH, BTEX	Medium	Oil/water separator, sand/carbon filter
Petroleum or coal product manufacturing	Petroleum hydrocarbon, oil or grease manufacturing	Oil and grease, PAH, BTEX	Low	Oil/water separator, sand/carbon filter
Non-metallic mineral product manufacturing	Glass	Oil and grease, BOD, TSS	Medium	Oil/water separator, sand/peat filter
Metal product manufacturing	Sheet and structural metal products	Fe, Al, Zn	Medium	Sand/peat filter
Machinery or equipment manufacturing	Other machinery or equipment	Oil and grease, Fe, Al, Zn	Medium	Sand/peat filter
Machinery or equipment manufacturing	Industrial machinery or equipment	Oil and grease, Fe, Al, Zn	Medium	Sand/peat filter
Food or beverage manufacturing or handling	Vineyards or wine manufacturing	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Processed dairy foods manufacturing	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Oil or fat product manufacturing or handling	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Meat and meat product manufacture (including fish)	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Processed dairy foods handling	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Other foodstuffs handling	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area

Food or beverage manufacturing or handling	Meat product handling (including fish)	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Beverages or malt product handling	BOD, TSS, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Bakery product handing	BOD, TSS, oil and grease	Medium	Oil/water separator, high plant activity and surface area
Commercial livestock processing industries	Slaughter	BOD, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Commercial livestock processing industries	Manufacture, store or handle products derived from animal slaughter (gelatin, fertiliser or meat products	BOD, oil and grease, N	Medium	Oil/water separator, high plant activity and surface area
Commercial livestock processing industries	Scouring or carbonising greasy wool or fleeses	BOD, oil and grease, N	Medium	Oil/water separator, oxidation
Commercial livestock processing industries	Rendering or fat extraction	BOD, oil and grease	Medium	Oil/water separator, oxidation
Chemical and associated product manufacturing	Other chemical products (plastic manufacturing	pH, TSS, Zn, N	Low	Sand/peat filter
Chemical and associated product manufacturing	Polishes, adhesives or sealants	BTEX, pH, Zn	Low	Sand/peat/carbon filter
Chemical and associated product manufacturing	Medicinal, pharmaceutical or veterinary products	COD, As, Cd, Cr, Phenol	Low	Sand/peat/carbon filter
Chemical and associated product manufacturing	Industrial gas	N, pH, TSS	Low	Sand filter
Animal feedstuffs	Stock food manufacture storage or handling	BOD, TSS	Medium	Swale/high plant surface area and soil organics
Transport and related activities	Bus depots	Cu, Zn, TSS, TPH, PAH	Low	Sand/peat/carbon filter
Transport and related activities	Commercial airports	Oil and grease, TSS,COD	Low	Settling, oil/water separator, sand/peat/carbon filter
Machinery or equipment manufacturing	Motor vehicles or parts	Oil and grease, Fe, Al, Zn	Low	Sand filter
Food or beverage manufacturing or handling	Other foodstuffs manufacturing	BOD, TSS, oil and grease, N	Low	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Flour mill or cereal foods	BOD, TSS, oil and grease, N	Low	Oil/water separator, high plant activity and surface area
Chemical and associated product manufacturing	Cosmetics, toiletry, soap and other detergents	Zn, N	Low	oil/water separator, oxidation, peat filter

Appendix D

Contaminant Load Calculations

Catchments

Rural

		Area (ha)	CN	% Imp	
A	4 Guys	7.0	70.45	0.05	
B	HJV	66.7	70.45	0.05	Not incl Sharksfin
F	Porters	69.9	70.45	0.05	
		143.7			

Existing Development **Catchment Areas and CN/RC** - as per design report

		Area (ha)	Curve Number	% Imperv	CN * A
A	4 Guys Pond	7.0	95.1	0.90	667.5
B	HJV	66.7	88.6	0.68	5912.5
F	Porters Pond	69.9	89.6	0.71	6260.8
		143.7	Sum		12840.9
			Weighted CN		89.38

Runoff Coefficients

Rural		0.45	based on CN of 70.5.	
Existing Equiv Rc (Existing D)		0.81	Conversion from 1D modelling curve number.	
Check against composite runoff coeff:				
		RC	Area	Rc x A
	Perv	0.45	42.7	19.2
	Imp	0.9	101.0	90.9
			Sum	110.1
			Composite Rc	0.77

Annual Runoff Volume

Area (ha)		143.7		
Annual Rainfall		1400	mm/year	- from WRC website - see diagram on right
Runoff coeff	Rural	0.45	based on CN of 70.5.	-see calculations above
	ED	0.75		
Annual runoff volume	Rural	905,070	m³/yr	
Annual runoff volume	ED	1,508,450	m³/yr	

Efficiency Formula from NZTA (2010)

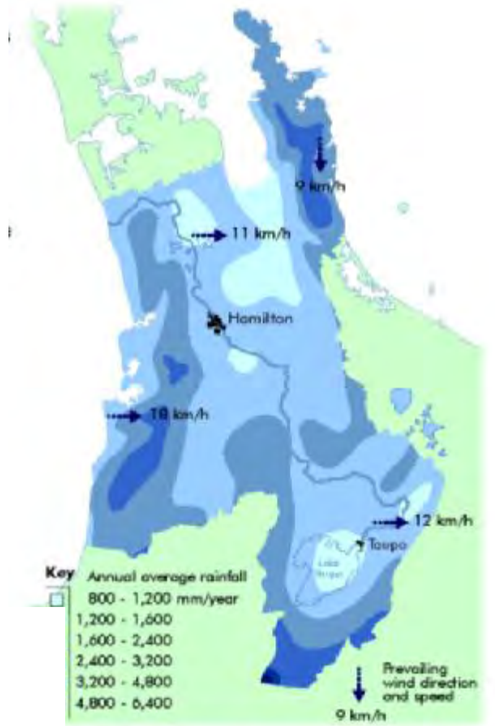
$$R = A + B - [(A \times B)/ 100]$$

Where:
R = total removal rate
A = Removal rate of the first or upstream practice
B = Removal rate of the second or downstream practice

Efficiencies

	Wetponds	Wetlands	Swales	Combined (Treatment train) Efficiency %	Lysaghts value
Total suspended solids	75	70	65	91	97
Total phosphorus	50	55	30	65	65
Total Nitrogen	40	35	30	58	52
Total Zinc	50	65	60	80	95
Total Copper	45	65	60	78	92

Rainfall Sourced from WRC website:



Loads and Concentrations - Rural

Contaminant	Load g/m²/yr	Load kg/year	Average concentration g/m³	Guideline Value	Guideline Ref
Total suspended solids	73.5333	105,639	116.7		No guideline value
Total phosphorus	0.0130	19	0.021	0.015-0.3	MfE Water quality guidelines for the control ob Undesirable Biological Growths in Water. (MFE,1992)
Total Nitrogen	0.4150	596	0.659	0.04-0.1	MfE Water quality guidelines for the control ob Undesirable Biological Growths in Water. (MFE,1992)
Total Zinc	0.0081	12	0.013	0.015	ANZECC
Total Copper	0.0024	3	0.004	0.0018	ANZECC

Loads and Concentrations - Industrial

Contaminant	Load g/m²/yr	Load kg/year	Load Post treatment (g/m2/year)	Average concentration g/m³	Guideline	Guideline Ref
Total suspended solids	32	45,972	4022.5	30.476		No guideline value
Total phosphorus	0.15	215	75.4	0.143	0.015-0.3	MfE Water quality guidelines for the control ob Undesirable Biological Growths in Water. (MFE,1992)
Total Nitrogen	0.35	503	211.2	0.333	0.04-0.1	MfE Water quality guidelines for the control ob Undesirable Biological Growths in Water. (MFE,1992)
Total Zinc	0.49	704	140.8	0.467	0.015	ANZECC
Total Copper	0.107	154	33.8	0.102	0.0018	ANZECC

Above guideline value
Between upper and lower guideline value

-Note - Concentration looks similar to loads because rainfall (1400mm/hr x rc (0.75) is almost 1000.

Appendix E

High Risk Activities - Comparison

GAPs- Items in ITA but not in SW Mgmt Guideline

Industrial Activities -Waikato SW Management Guideline	Description of Trade	Contaminants of Concern	Likelihood of Release	Treatment Processes
Research or defense	Research establishments	Less than 1000m2	More than 1,000m2	Activity is never high risk
Research or defense	Motor vehicles or parts	Less than 1000m2	1,000m2 to 5,000m2	More than 5,000m2

GAPS: Not on ITA or SW Mgmt Guideline

On HRFR		WW/Tradewaste Component??
2. Printers	Relatively large quantities of dyes and paints are handled at these sites. The risk of spillages is relatively high.	Yes
3. Spray painting facilities	Paints can not only be spilt at these sites but can enter stormwater as a consequence of drift from spray painting operations.	Yes- paint washing facilities
7. Truck wash facilities	The activity of truck washing can was hazardous contaminants of trucks as well as sediments and wastes from spillages on site.	Yes
9. Textile fibre and textile processing industries where dying and washing of fabric occurs.	Large quantities of dye and high BOD wastes (from wool scourers for instance) are handled on these site. The risk of spillage that could enter stormwater is high.	Yes
11. Footwear manufacture.	Large quantities of dye and high BOD wastes are handled on these site. The risk of spillage that could enter stormwater is high.	Yes
18. Stock saleyards.	High BOD run-off can be associated with these sites.	Yes
20. Car wash and valet services.	High oil, solvent and solid discharges can occur from these activities.	Yes
21. Commercial laundries (excluding self-service laundrettes and Laundromats)	The risk of of spillages associated with detergents, alkalis and salts used in the industry can be high.	Yes

Activities which have a lower risk rating in the Waikato Guideline to HRFR or AC ITA

Industrial Activities -Waikato SW Management Guideline	Description of Trade	Contaminants of Concern	Likelihood of Release	Treatment Processes	Classification elsewhere	WW/Tradewaste Component??
Sewage treatment and handling	Sewage solids storage	TSS, BOD, NO3+NO2, NH3, pathogens	Low	Settling, wetlands, disinfection	On HRFR	??
Recycling, recovery, reuse or disposal	Waste transfer stations	GPs, TSS, COD, Metals, Oil & Grease, residual organic compounds	Medium	GPT screen, coarse settling, oil/water separator, oxidation sand/ peat/carbon filter	On HRFR, Always high on AC ITA	No
Recycling, recovery, reuse or disposal	Chemicals	Fe, Al, pH, NO3+NO2, metals, organics	Low	Sand/peat/carbon filter	Always high on AC ITA	Yes
Recycling, recovery, reuse or disposal	Batteries	Pb, pH	Low	Sand/peat filter, carbonate filter	Always high on AC ITA	Yes
Chemical and associated product manufacturing	Batteries	Pb, pH	Medium	Sand/peat filter, carbonate filter	Always high on AC ITA	Yes
Chemical and associated product manufacturing	Fungicides, herbicides, pesticides, timber preservatives and related products	COD, pH, As, Cu, Cr, pesticides	Medium	Sand/peat/carbon filter	Always high on AC ITA	Yes
Chemical and associated product manufacturing	Cosmetics, toiletry, soap and other detergents	Zn, N	Low	Oil/water separator, oxidation, peat filter	Never low on AC ITA	Yes
Chemical and associated product manufacturing	Explosive and pyrotechnics	Metals (Pb, Zn), VOC's	Low	sand/peat/carbon filter	Never low on AC ITA	?
Chemical and associated product manufacturing	Industrial gas	N, pH, TSS	Low	Sand filter	Never low on AC ITA	?
Commercial livestock processing centres	Rendering or fat extraction	BOD, oil and grease	Medium	Oil/water separator, oxidation	Always high on AC ITA	Yes
Electronics	Circuit board manufacturing (excluding assembly only)	Metals (Nz, Cu, Cr, Ni), pH, organics	Medium	Sand/peat filter	Always high on AC ITA	No
Agricultural support industries	Other chemical products (e.g. plastic manufacturing)	Less than 1000m2	1,000m2 to 5,000m2	More than 5,000m2	On AC ITA but not on Waikato List	?
Commercial livestock processing centres	Rendering or fat extraction	BOD, oil and grease	Medium	Oil/water separator, oxidation	Always high on AC ITA	yes

Electronics	Circuit board manufacturing (excluding assembly only)	Metals (Nz, Cu, Cr, Ni), pH, organics	Medium	Sand/peat filter	Always high on AC ITA	?
Motor vehicle services facilities	Mechanical servicing of motor vehicles	Oil and grease, metals	High	Sand/peat/carbon filter	Never high on AC List	?
Petroleum or coal product manufacturing	Petroleum hydrocarbon, oil or grease manufacturing	Oil and grease PAH, BTEX	Low	Oil/water separator, sand/catbron filter	Never low on AC ITA	?
Recycling, recovery, reuse or disposal	Hazardous materials storage or treatment	TSS,COD, Metals, Oil and Grease, organics	Medium	Sand/peat/carbon filter	Always high on AC ITA	?
Recycling, recovery, reuse or disposal	Landfills	Metals, TSS, BOD, NO3+NO2, NH3, organics	Low	Coarse settling, oil/water separator, sand/peat/carbon filter, oxidation	Always high on AC ITA	?
Recycling, recovery, reuse or disposal	Sewage solids treament or storage facilities	TSS, BOD, NO3+NO2,Pathogen	Medium	Retention, oxidation	Always high on AC ITA	Yes
Transport and related activities	Road freight transport depot (non-chemical) with mechanical servicing	Oil and grease, TSS, metals	High	Oil water separator and, sand/peat filter	Never high on AC List	No

References:
HRFR= Waikato High Risk Facilities Register, referenced in the MCC SW Bylaw
AC ITA= Auckland Councils Industrial and Trade Activities list.

Waikato Stormwater Management Guideline - High Risk Industries

Industrial Activities	Description of Trade	Contaminants of Concern	Likelihood of Release	Treatment Processes
Agriculture support industries	Inorganic fertiliser manufacture, storage or handling	COD,TSS,Pb,Fe,Zb,P	Medium	sand /peat filter, high plant surface area and soil organics
Animal feedstuffs	Pet food manufacture	BOD	Medium	sand/peat filter, swales
Animal feedstuffs	Stock food manufacture storage or handling	BOD, TSS	Medium	Swale/high plant surface area and soil organics
Chemical and associated product manufacturing	Fungicides, herbicides, pesticides, timber preservatives and related products	COD, pH, As, Cu, Cr, pesticides	Medium	Sand/peat/carbon filter
Chemical and associated product manufacturing	Batteries	Pb, pH	Medium	Sand/peat filter, carbonate filter
Chemical and associated product manufacturing	Paint, pigment, inks and dyes	Al, Fe, Zn, Organics	Medium	Sand/peat/carbon filter
Chemical and associated product manufacturing	Acids, alkalis or heavy metals	pH, TSS, metals	Medium	Sand/peat/carbon filter, carbonate filter
Chemical and associated product manufacturing	Synthetic resins	TPH, pH, Zn	Low	Sand/peat filter
Chemical and associated product manufacturing	Solvents	TPH	Low	sand filter
Chemical and associated product manufacturing	Explosive and pyrotechnics	Metals (Pb, Zn), VOC's	Low	sand/peat/carbon filter
Chemical and associated product manufacturing	other chemical products (Plastic manufacturing)	pH, Tss, Zn, N	Low	Sand/peat filter
Chemical and associated product manufacturing	Polishes, adhesive or sealants	BTEX, pH, Zn	Low	Sand/peat/carbon filter
Chemical and associated product manufacturing	Medicinal, pharaceutical or veterinary products	COD, As, Cd, Cr, Phenol	Low	Sand/peat/carbon filter
Chemical and associated product manufacturing	Industrial gas	N, pH, TSS	Low	Sand filter
Chemical and associated product manufacturing	Cosmetics, toiletry, soap and other detergents	Zn, N	Low	Oil/water separator, oxidation, peat filter
Commercial livestock processing centres	Slaughter	BOD, oil and grease, N	Medium	Oil/water separator , high plant activity and surface area
Commercial livestock processing centres	Manufacture, store and handle manufacturer products derived from animal slaughter (gelatin, fertiliser or meat products	BOD, oil and grease, N	Medium	Oil/water separator , high plant activity and surface area

Commercial livestock processing centres	Scouring or carbonising greasy wool or fleeses	BOD, oil and grease, N	Medium	Oil/water separator, oxidation
Commercial livestock processing centres	Rendering or fat extraction	BOD, oil and grease	Medium	Oil/water separator, oxidation
Electronics	Circuit board manufacturing (excluding assembly only)	Metals (Nz, Cu, Cr, Ni), pH, organics	Medium	Sand/peat filter
Food or beverage manufacturing or handling	Vineyards or wine manufacturing	BOD, TSS,oil and grease, N	Medium	Oil water separator high plant activity and suraface area
Food or beverage manufacturing or handling	Processed dairy foods manufacturing	BOD, TSS,oil and grease, N	Medium	Oil water separator high plant activity and suraface area
Food or beverage manufacturing or handling	Oil or fat product manufacturing or handling	BOD, TSS,oil and grease, N	Medium	Oil water separator high plant activity and suraface area
Food or beverage manufacturing or handling	Meat and meat product manufacture (including fish)	BOD, TSS,oil and grease, N	Medium	Oil water separator high plant activity and suraface area
Food or beverage manufacturing or handling	Processed dairy foods handing	BOD, TSS,oil and grease, N	Medium	Oil water separator high plant activity and suraface area
Food or beverage manufacturing or handling	other foodstuffs handling	BOD, TSS,oil and grease, N	Medium	Oil water separator high plant activity and suraface area
Food or beverage manufacturing or handling	Meat product handling (including fish)	BOD, TSS,oil and grease, N	Medium	Oil/water separator , high plant activity and surface area
Food or beverage manufacturing or handling	Beverage or malt product handling	BOD, TSS,oil and grease, N	Medium	Oil/water separator , high plant activity and surface area
Food or beverage manufacturing or handling	Bakery product handling	BOD, TSS, oil and grease	Medium	Oil/water separator , high plant activity and surface area
Food or beverage manufacturing or handling	Other foodstuffs manufacturing	BOD, TSS, oil and grease, N	Low	Oil/water separator, high plant activity and surface area
Food or beverage manufacturing or handling	Flour mill or cereal foods	BOD, TSS, oil and grease, N	Low	Oil/water separator, high plant activity and surface area
Machinery or equipment manufacturing	other machinery or equipment	Oil and grease, Fe, Al, Zn	Medium	Sand/peat filter
Machinery or equipment manufacturing	Industrial machinery or equipment	Oil and grease, Fe, Al, Zn	Medium	Sand/peat filter
Machinery or equipment manufacturing	motor vehicles or parts	Oil and grease, Fe, Al, Zn	Low	Sand filter
Metal processing, metallurgical works or metal finishing	Refinement of ores	TSS, metals	Medium	Settlement, wetland
Metal product manufacturing	sheet and structural metal products	Fe, Al,Zn	Medium	Sand/peat filter
Non-metallic mineral product manufacturing	glass	Oil and grease, BOD, TSS	Medium	Oil/water separator, sand/peat filter
Petroleum or coal product manufacturing	Coal products	TSS, Al, Fe, pH	Medium	Settling, wetlands
Petroleum or coal product manufacturing	Bitumen/asphalt premix or hot mix	TSS, Zn, TPH	Medium	Oil/water separator, sand/carbon filter

Petroleum or coal product manufacturing	Petroleum refining	Oil and grease PAH, BTEX	Medium	Oil/water separator, sand/catbron filter
Petroleum or coal product manufacturing	Petroleum hydrocarbon, oil or grease manufacturing	Oil and grease PAH, BTEX	Low	Oil/water separator, sand/catbron filter
Power	Gas, coal or liquid power generation	Oil and grease, Zn, TSS	Medium	Oil/water separator, wetland
Power	electrical substations	Oil and grease	Medium	Sand filter
Product stoarge or handling centres	Bulk hydrocarbons (non-service stations)	Oil and grease, PAH,BTEX	Medium	Oil/water separator, sand/peat/carbon filter
Product storage or handling centres	Bulk chemicals	Al, Fe, Zn, NO3+NO2	Medium	Sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Synthetic rubber manufacturing	Zn, Tss, organics	Medium	Wetlands
Recycling, recovery, reuse or disposal	Chemical containers cleaning, reconditioning or recycling	Metals, COD, NO3 + NO2	Medium	GPT screen, coarse settling, oil/water separator, oxidation sand/
Recycling, recovery, reuse or disposal	Waste transfer stations	GPs, TSS, COD, Metals, Oil & Grease, redisual organic	Medium	GPT screen, coarse settling, oil/water separator, oxidation sand/
Recycling, recovery, reuse or disposal	Hazardous materials storage or treatment	TSS,COD, Metals, Oil and Grease, organics	Medium	Sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Landfills	Metals, TSS, BOD, NO3+NO2, NH3, organics	Low	Coarse settling, oil/water separator, sand/peat/carbon filter, oxidation
Recycling, recovery, reuse or disposal	Chemicals	Fe, Al, pH, NO3+NO2, metals, organics	Low	Sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Batteries	Pb, pH	Low	Sand/peat filter, carbonate filter
Recycling, recovery, reuse or disposal	Oil, petroleum hydrocarbon wastes	Oil and grease, PAH, BTEX	Medium	Oil/water separator, sand/carbon filter
Recycling, recovery, reuse or disposal	Sewage solids treament or storage facilities	TSS, BOD, NO3+NO2,Pathogen	Medium	Retention, oxidation
Rubber industries	Typre manufacturing or retreading	Zn, Tss, organics	Medium	Sand/peat filter
Sewage treatment and handling	Sewage solids storage	TSS, BOD, NO3+NO2, NH3, pathogens	Low	Settling, wetlands, disinfection
Transport and related activities	Marinas	TSS, Zn, Cu	Medium	Peat filter
Transport and related activities	Railway workshops or refuelling depots	Oil and Grease, TSS, COD, Zn	Medium	Settlement, sand/peat filter
Transport and related activities	Road freight transport depot (bulk chemical)	Oil and Grease, TSS, COD, Zn, organics	Medium	Sand/peat/carbon filter, oxidation
Transport and related activities	Truck refuelling facilities (non-service station)	TPH,PAH	Medium	sand/peat filter

Transport and related activities	Shipping container reconditioning	Oil and grease, TSS, COD	Medium	Oil/water separator, settlement
Transport and related activities	Shipping, loading/unloading	Oil and grease, TSS, COD	Medium	oil/water separator and sand/peat filter
Transport and related activities	bus depots	Cu, Zn, TSS, TPH, PAH	Low	sand/peat/carbon filter
Transport and related activities	commercial airports	oil and grease , TSS, COD	Low	Settling, oil/water separator, sand/peat/carbon filter
Wood or paper product storage, manufacturing or fabrication	Particle board or other wood panel manufacturing	TSS, COD,NO3+NO2, oil and grease	Medium	GPT , settling, sand filter
Wood or paper product storage, manufacturing or fabrication	Pulp, paper or paper board manufacturing	TSS, COD,NO3+NO2, oil and grease, Zn	Medium	Wetlands, oil/water separator
Wood or paper product storage, manufacturing or fabrication	Plywood or veneer manufacturing	TSS, COD, NO3+NO2, organics	Medium	wetlands

Appendix F

Recommended Updates to the WRC Stormwater Guideline Industrial Activities list.

Recommended changes to the risk ratings of activities on the WRC Guideline list

Industrial Activity	Description of Trade	Contaminants of Concern	Current WRC Guideline rating: "Likelihood of Release"	Treatment Processes
Recycling, recovery, reuse or disposal	Chemicals	Fe, Al, pH, NO3+NO2, metals, organics	Low	Sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Batteries	Pb, pH	Low	Sand/peat filter, carbonate filter
Chemical and associated product manufacturing	Batteries	Pb, pH	Medium	Sand/peat filter, carbonate filter
Chemical and associated product manufacturing	Fungicides, herbicides, pesticides, timber preservatives and related products	COD, pH, As, Cu, Cr, pesticides	Medium	Sand/peat/carbon filter
Commercial livestock processing centres	Rendering or fat extraction	BOD, oil and grease	Medium	Oil/water separator, oxidation
Electronics	Circuit board manufacturing (excluding assembly only)	Metals (Nz, Cu, Cr, Ni), pH, organics	Medium	Sand/peat filter
Commercial livestock processing centres	Rendering or fat extraction	BOD, oil and grease	Medium	Oil/water separator, oxidation
Electronics	Circuit board manufacturing (excluding assembly only)	Metals (Nz, Cu, Cr, Ni), pH, organics	Medium	Sand/peat filter
Recycling, recovery, reuse or disposal	Hazardous materials storage or treatment	TSS,COD, Metals, Oil and Grease, organics	Medium	Sand/peat/carbon filter
Recycling, recovery, reuse or disposal	Landfills	Metals, TSS, BOD, NO3+NO2, NH3, organics	Low	Coarse settling, oil/water separator, sand/peat/carbon filter, oxidation
Recycling, recovery, reuse or disposal	Sewage solids treament or storage facilities	TSS, BOD, NO3+NO2,Pathogen	Medium	Retention, oxidation

Recommended additions to the WRC SW Guideline List.

Description of Industrial or trade activity	Description of Trade	Low risk	Moderate risk	High risk
Research or defense	Research establishments	Less than 1000m2	More than 1,000m2	Activity is never high risk
Research or defense	Motor vehicles or parts	Less than 1000m2	1,000m2 to 5,000m2	More than 5,000m2

AC ITA= Auckland Council's Industrial and Trade Activities list.

Classification elsewhere	Recommended Risk Rating
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High
Always high on AC ITA	High

Appendix G

Device Locations and Catchments

ISSUE	AMENDMENTS	SIGNED	DATE
A	FOR INFORMATION		4/04/2017

		NAME	SIGNED	DATE
DATUM				
BENCH MK.	DESIGNED			
RL	DES. REVIEW			
SURVEY	DRAWN			
SURVEY LB	DRW. CHECK			
COORD DATUM	FILE LOCATION			
DRAIN. REF.				
SAP WBS				

DATE	SIGNED
FOR CONSTRUCTION	
DATE	SIGNED

CONSULTANT: Beca

CONSULTANT PROJECT REF. | CONSULTANT FILE REF.

PROJECT TITLE: **MANGAHEKA MAXIMUM PROBABLE DEVELOPMENT CATCHMENT BOUNDARIES CLOSE UP**

DRAWING TITLE: **FOR INFORMATION ONLY**

CONTRACT NUMBER

CAD DRAWING FILE REF.

ORIGINAL SHEET SIZE: A3

SCALES: 0 110 220 Metres — 1:11,000 @ A3

CAD PROJECT FILE NUMBER

SHEET: 1 OF 1

P:\651\651219\5\THY\GIS\Presentation Maps\Mangaheka revised catchment MPD close up.mxd

Appendix H

HCC Pollution Control Plan

POLLUTION CONTROL PLAN

Hamilton City Council
Te kaunihera o Kirikiriroa

Introduction

This document provides practical advice and guidance to help you prevent pollution.

There are frequent pollution incidents from work sites/ factories/ building sites/mechanical workshops/ restaurants/ etc. every year that damage the environment, yet most can easily be prevented.

Managing your activities properly on site will protect people's health and the natural environment.

What is a Pollution Control Plan?
A Plan is a written record detailing how you will manage the pollution risks from your site. It is designed to ensure your site is set up correctly and that you and your employees know how to minimise the potential for pollution to occur.

Your Plan will contain important information about your site such as stormwater drainage, chemical storage areas, loading areas, processing areas, etc. It will also contain information about activities that are undertaken by you and the risks of pollution from these.

Your Plan will contain written procedures in the event of spills or other emergencies. It will also contain details of staff training that you undertake to ensure preparedness for pollution incidents.

Why does my site need a Pollution Control Plan?
A pollution control plan is required under Hamilton City Council's Stormwater Bylaw and is designed to protect you, your company and the environment from pollution.

What is my role in protecting the environment?
Everyone has a responsibility to protect our environment – especially people and companies engaged in high-risk activities.

What is Hamilton City Council's role in protecting the environment?
Hamilton City Council is responsible for managing the city's stormwater network, ensuring the community's safety and protecting our environment.

The Council has a pivotal role in actively promoting and protecting the environment through a range of planning tools and legislative requirements. The Hamilton Stormwater Bylaw helps protect the natural environment by setting out everyone's responsibilities in regards to stormwater.

What is stormwater?
Stormwater is rain which has run off sealed/paved surfaces such as roads, carparks, roofs into stormwater drains. From there it drains into local waterways, lakes, streams and the Waikato River.
Stormwater is drained from Hamilton's urban catchment area of approximately 9000 ha that services approximately 140,000 people including domestic, industrial and commercial properties.

Who else is involved in protecting the environment?
The discharge of stormwater into waterways is regulated by Waikato Regional Council. Hamilton City Council has a 'citywide' Stormwater Discharge Consent from Waikato Regional Council to divert and

discharge stormwater from across Hamilton city to waterways and the river from the stormwater network.

Hamilton City Council works closely with Waikato Regional Council and Tainui to protect the greater Waikato water catchment.

Basic principles – things you should know

What is pollution?	**Pollution** is the release of any substance that can harm people or animals, plants, soil or water; for example, an oil spill, or sediment getting into a river. **Common pollutants from sites include:** silt, oil (including fuel), cement, concrete, grout, chemicals, sewage, and waste materials. **Common causes of pollution are**: illegal discharges, pollutants carried by stormwater run-off, poor site maintenance or supervision, accidental spillage and vandalism. 
What's at risk from pollution?	**The Waikato River and Local Tributaries** are at extreme risk from pollution. • Pollution can kill fish and other aquatic life. • Pollution affects other users of the Waikato River such as recreational users. • Pollution can affect drinking water abstractions downstream • Pollution can affect the ground water table. It is an offence to pollute our environment. Your site doesn't need to be next to a stream or river to cause a problem; any pollutants getting into stormwater drains can end up in the river even if it's miles away from site. The stormwater network in Hamilton doesn't have any filters or treatment devices in it, so anything that enters into a catch pit will end up in local streams, lakes and the Waikato River.

What are the consequences if you cause pollution?	If your site activities cause pollution you may face a significant fine and court costs. Under the Hamilton City Council Stormwater Bylaw you may be liable for penalties not exceeding $20,000. Under the RMA, polluters can face fines of up to $600,000 and even imprisonment. You may also have to pay clean up and restoration costs. 
What are Pollution Control Plans?	 Pollution Control Plans contain important information about your site such as stormwater drainage, chemical storage areas, loading areas, processing areas, etc. It will need to contain information about activities that are undertaken by you and how you intend to reduce and manage pollution risks. A Plan may be required under Hamilton City Council's Stormwater Bylaw, depending on the type of activity you are carrying out. It will generally be required for facilities that undertake high risk activities and sites that have ongoing stormwater pollution issues.

Contents

1. Company overview

1.1 Company description and site location

Insert a brief description of your company and details of the location= including:

- **Company operations**, what does your company do or produce?
- **Staff numbers** (include detail of contractors used in the company's operations).
- **Company structure** i.e. key responsibilities and reporting lines where relevant.
- **Site address and legal description** (for all areas your company utilises for operations).

1.2 Scope of this Pollution Control Plan

Insert the scope of your PCP to clarify what it covers. You should include:

- **Legal requirements** outline the status of your site with regard to requirements set out in the Regional and District Plan as well as any resource consents you hold for the activity carried out onsite.
- **Multiple activities on site?** Does your PCP cover your whole site or do you have separate PCPs for different activities carried out in separate areas?
- **Multiple sites?** If you have more than one site, does the PCP cover all of them? Or do you have separate PCPs specific to each site?
- **Onsite and off-site activities,** if your company carries out some activities on your own site but also works for example on customers sites installing products you may want to separate these activities into separate PCPs as the off-site activities are likely to have quite different environmental risks and mitigation procedures.

1.3 Site activities, facilities and stores

Insert an outline of your site's activities, facilities and stores.
Include detail on the following:

- What you do / make / process/ handle on the site.
- The raw materials stored on site, where on-site the storage areas are
- Waste products, the volume of these wastes, where they are stored on-site and how they are disposed of
- Other supporting activities like vehicle and equipment maintenance and washing, loading and unloading

1.4 Site Plan

Insert a summary of your site layout and drainage. The site plan should include:

- Layout of buildings and all outdoor activity areas
- Vehicle traffic areas and loading/unloading areas
- Vehicle/equipment washing areas
- Storage areas, particularly of hazardous substances or materials
- Stormwater flow paths and ponding areas
- Stormwater drains, manholes, catchpits and soakholes with direction of flow.
- Sewer and tradewaste drains, manholes and cesspits with direction of flow.

This information will help you to identify risk areas on your site and how contaminants can enter receiving environments. It will also become an important part of your spill response plan. To create, plan or confirm the accuracy of an existing plan you may need to involve a specialist to investigate your drainage systems (using CCTV or dye testing).

1.5 Consents and permits

Insert an outline of any consents and permits that your site has or requires to undertake its onsite activities. Complete Table 1 (overleaf) if it helps you to summarise this information.

Table 1.1: Summary of authorisations, consents and permits

Some examples have been inserted for your information; these should be replaced with details that relate to your company's situation.

Type and number	Agency	Status	Summary of key conditions and monitoring required
Tradewaste discharge permit – No. XYZ	Hamilton City Council	Granted (expires 2012)	Relates to discharge from factory and wastewater treatment bund – Discharge Xm3/s (continual monitoring) pH maximum 8 (daily monitoring, mid-flow)

2. Pollution risks and controls

2.1 Pollution risks

Insert a summary of your sites pollution risks. Also insert details of these pollution risks into Table 2.1 overleaf. This table was developed to help you identify your pollution risks and find solutions to minimise and mitigate these risks.

2.2 Pollution controls

2.2.1 Structural and procedural controls – existing:

Insert a summary of your site's pollution controls that have already been implemented. Also insert details of these pollution controls into Table 2.1. You could categorise them into a section each for structural and procedural controls which have been defined below.

Structural controls are physical structures that are designed to control the movement of materials/contaminants (including contaminated stormwater) around your site. Examples could include things like bunds, cut-off valves and physical covers.

Procedural controls are written or informal descriptions of how and where you carry out key activities on your site. They include written standard operating procedures (SOPs) for routine activities as well as for spills e.g. SOP's for spill response.
.

2.3 Spill Response Plan

A spill response plan' is a key pollution control document that formalises the procedures during a spill.

A good spill response plan should include:

- training for staff
- appropriate equipment
- location of equipment
- step by step instructions for spill response
- notification protocols (internal management & external parties)
- Clean up and dispose of the contaminated materials
- restocking the spill kit
- investigation into the cause of event
- review spill procedures post event

Table 2.1: Structural and procedural controls

This table relates to the pollution risks and pollution controls sections (2.1 and 2.2) above. You may use this table or create a similar one of your own.

Area of site: Chemical storage area in Warehouse B **Activity/facility/store:** Activity – Chemical delivery

Risk identification and contaminants of concern		**Existing pollution controls**		**Improved or new pollution controls required**		
Risk	**Contaminant(s)**	**Structural**	**Procedural**	**Structural**	**Procedural**	**Timeframe**
Spills during unloading of chemicals	• hydrocarbons • dissolved metals • chemicals	• bunding of chemical delivery area • sealed surface.	Procedure • deliveries only within bunded area • contractors use safe practices (pallets wrapping, trolley jacks) Inspection • regular checks of seal and bund integrity etc. Training • staff/contractors trained in procedures and Inspections.	• n/a – no further structural controls required	• procedure / Spill response required for staff and contractors to follow in the event of a spill or leak.	• four week review of spill response procedures and produce document
Traces of contaminants tracked from bunded chemical delivery area to yard	As above	• yard area sealed	Inspection: • yard area regularly swept and residues collected for disposal. • integrity of concrete checked 6 monthly.	• stormwater treatment – oil interceptor and sand/peat filter for trace hydrocarbons and metals in yard stormwater	Procedures required for operation and maintenance of stormwater treatment devices	• 12 weeks to install appropriate interceptor system

3. Pollution programmes and systems

3.1 Inspection and maintenance programme

To make sure your Pollution Control Plan is effective in preventing pollution, you need to make sure the structural controls are in good working order and that the procedural controls are being followed. The way to do this is to develop an inspection and maintenance programme.

Insert a summary of your Inspection and maintenance programme.

Completed inspections checklists and maintenance logs with create a paper trail to demonstrate that your inspection and maintenance programme is being followed and will be looked on favourably in the event of an unforeseen spill or non-compliance issue.

3.2 Management and monitoring programme for stormwater treatment devices

Stormwater treatment devices often require more comprehensive checks and more intensive maintenance – they have therefore been given this separate section to outline their specific management and monitoring.

Insert a summary of your pollution control and monitoring programme for any treatment devices you have on site and attach a copy of the programme including any supporting forms as an attachment.

3.3 Record keeping

Insert a summary of the records you will keep in order to ensure (and demonstrate) your PCP works effectively.

This is part of your insurance in case of a spill, accident or non-compliance event. You should include completed forms, checklists and maintenance logs, identified problems and corrective actions taken, monitoring data and results from stormwater treatment devices, incident forms and results of assessments and compliance visits.

3.4 Roles and responsibilities

All staff and contractors have a responsibility in ensuring your Pollution Control Plan is followed and that it is effective in preventing pollution and compliance costs to the company. In order for staff and contractors to understand what is required, you will need to record this in your PCP.

3.5 Pollution Control Plan review

You will need to review and update your Pollution Control Plan regularly to make sure it reflects the changing shape of your business and current best practice techniques

4. Attachment 1- Stormwater Incident Report Sheet – Example form

Stormwater Incident Report Sheet

Use this form to record details of any spill events

Details	
Date/time of incident	
Location of discharge:	
Material/s discharged:	
Approx. volume discharged:	
Cause of discharge:	
Did any material escape offsite? If yes, where to?	

Action Taken	
Who detected the spill and what did they do?	
Who else on the staff was notified and what did they do?	
Were any external agencies notified?	

Health & Safety	
Were there any injuries?	
Any damage to plant or property?	

Costs Report	
Estimate costs of staff down	

time for clean-up and other response	
External clean-up costs	
Disposal costs	

Prevention	
Discuss any changes needed to prevent similar accidents in the future:	
Spill procedures:	
Equipment:	
Staff training:	
Drains or structures:	
Housekeeping practices:	
Standard operating procedures:	

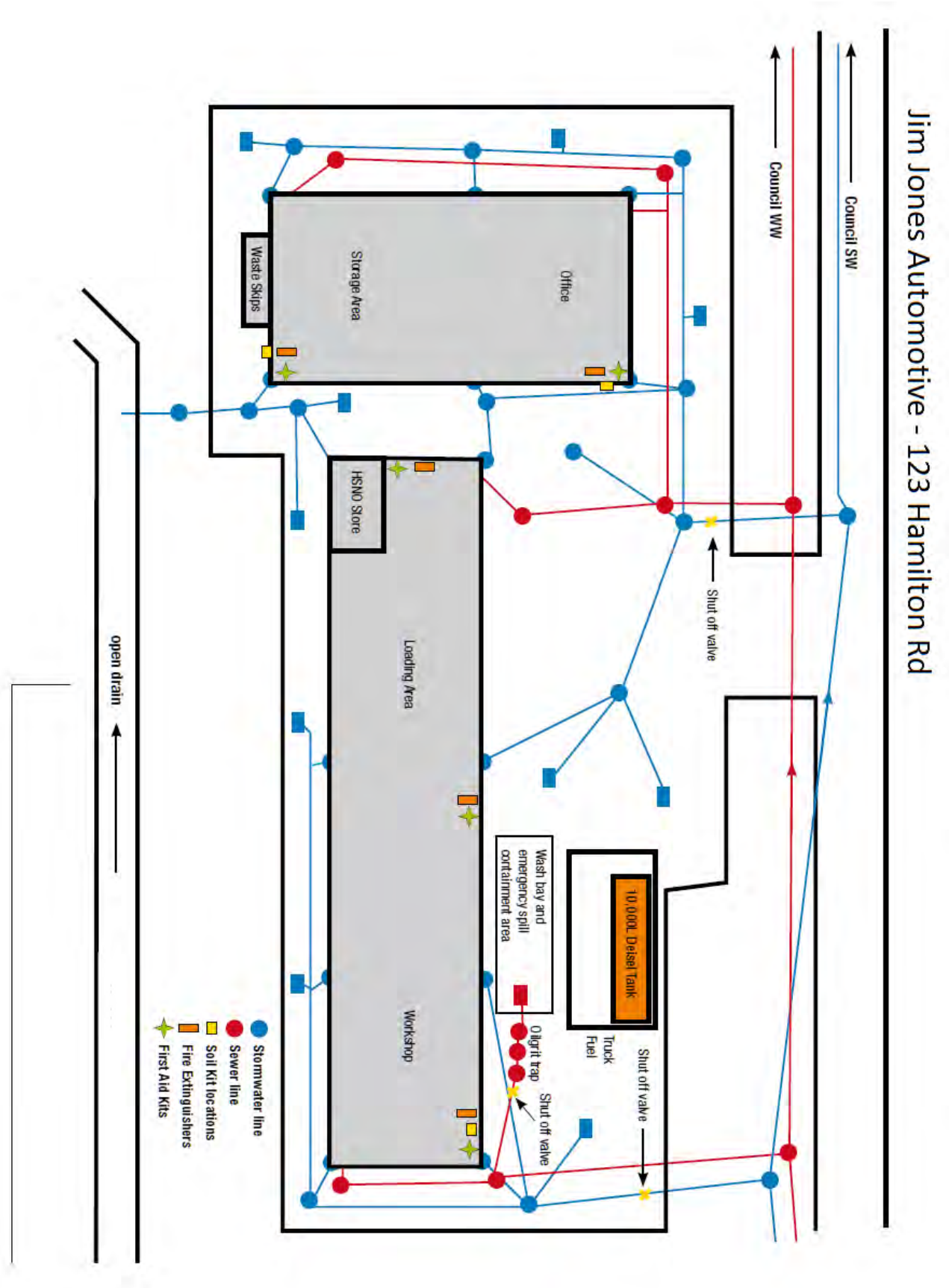
Other Recommendations

Photos

Report completed by

Report reviewed by

5. Attachment 2 – Site Drainage Example



Appendix I

Pollution Control Plan Checklist and Guidance Document

Hamilton City Council Pollution Plan Guide and Checklist - Industrial Zone Developments

Instructions

This guide/checklist should be filled out for all developments within the Industrial Zone as part of a Building Consent or Stormwater Connection (to the HCC network) Approval request .
Sections A to E need to be filled out by all developers.
Section E to J should be filled in if section E indicates you need to prepare a Pollution Plan

Regulatory Framework

HCC Partially Operative District Plan	
HCC Stormwater Bylaw 2015	HCC's Stormwater Bylaw 2015 requires that a person must take all practicable steps to store, handle, transport, and use materials in a way that prevents prohibited materials entering the stormwater system.
WRC Discharge Consents	HJV, Porters
HCC Comprehensive Stormwater Discharge Consent	

Definitions

Prohibited materials means anything	a) pose a danger to life b) pose a danger to public health c) cause flooding or any floor or sub-floor, or public roadway d) cause damage to property e) cause a negative effect on the efficient operation of the stormwater system f) cause damage to any part of the stormwater system g) cause erosion or subsidence of land h) cause long or short term effects on the environment i) cause adverse loss of riparian vegetation j) cause wastewater overflow to land or water k) and means anything that causes a breach of of any stormwater discharge consent condition binding Council.
Pollution Control Plan	Means a plan that includes appropriate policies, procedures and review timetable that is held onsite that guides appropriate management of any material either held on site or intended or likely to be onsite that may cause entry of prohibited materials into the stormwater system or any other breach of this bylaw.

A **Site Details**

1	Site Owner:	
2	Site Address:	
3	Site Legal Description	
4	Grid Reference location and manhole reference location of connection to HCC stormwater network:	
5	Downstream Treatment /Attenuation Facility	eg Porters Pond/HJV Pond

B **What size is your development?**

6	Total Area of lot (m²)		
7	Proposed area of hardstand used by vehicles (m²)		
8	Proposed area of hardstand used for product storage /other usages (m²)		Product storage areas should be separate from other areas. Applicant to specify what "other" is .
9	Total Roof area (m²)		
10	Total Landscaping area (m²)		
11	Total area discharging to Tradewaste (m²)		
12	Total Impervious Area (m²)		

C **Traffic Movements**

13	How many traffic movements (on average) do you expect through your site per week?	
14	Cars	
15	Trucks	
16	Other (Please state type)	

D **Site/ Stormwater System Plans**

17	Please provide a detailed site plan including:	Lot boundaries Building locations Landscaping areas Parking areas Locations of likely vehicle movements Discharge point off site Stormwater catchments (based on proposed topography), conveyance paths from source, to treatment (if any) and to discharge point. Any proposed stormwater treatment system locations Locations where operations may result in contaminants entering the stormwater system Locations of any bunding to prevent contaminants entering stormwater
18	Please provide a more detailed plan of any proposed stormwater treatment systems ie Design Plans	

E **Do I need to prepare a Pollution Plan**

				Reference:
19	Proposed Business/Industry to be developed:			
20	Is your proposed business/industry on the WRC High Risk Facilities Register		If you answered Yes, please prepare a pollution plan according to the below guidance.	
21	Is your proposed business/industry on the list in Table 11.1 of the WRC SW Mgmt Guideline?		If you answered Yes, please prepare a pollution plan according to the below guidance.	Reference once published????
22	Is your proposed business/industry high/medium or low risk according to Table 11.1?	Low	No Pollution Plan required	
23		Medium	No Pollution Plan required	
24		High	If you answered Yes, please prepare a pollution plan according to the below guidance.	

E **Chemical Storage**

25	Do your site use/store/distribute chemicals		Yes - Please refer to HSNO regulations				
26	Are any of these chemicals regulated under the HSNO Act?		If yes, please provide details of controls required under the HSNO and any approvals required for these chemicals.				
27	Please list the chemicals your site ill use/store or distribute:						
	Chemical Name	**Storage Location**	**Reference to Site Plan and Pollution Plan**	**Sub catchment area**	**Storage Area**	**Volume Stored**	**Bunded Volume**
eg	Petrol	Outside not under cover	Fully bunded storage area draining to oil separator in NW corner of site. Discussed in Pollution Plan section x.x (State:)				
i							
ii							
iii							
iv							
v							
vi							

F

	Risk Assessment and Management		
	Refer section 11.3 of the WRC SW Mgmt Guideline or the High Risk Facilities Register		HSNO - storage and appropriate usage
28	For each contaminant listed, please answer :	Is the contaminant used/stored in a fully covered location?	
29		What source control measures have been implemented to prevent this contaminant entering the SW system? Eg bunding, sweeping	
30		If bunding is used, how is the stormwater within this managed and where is it discharged to?	
31		Are any Tradewaste discharges proposed for contaminated stormwater?	
32		Alternatively, what downstream on-lot treatment are you providing prior to discharge?	

33	Please provide details of how and where deliveries are made to site including:	What frequency, volume and type of deliveries are expected		
		Is it possible that contaminants could contaminate stormwater as a result of deliveries? Eg will some products be delivered in loose form and could be blown or dropped around the site?		

G

	Proposed Treatment System			**Reference:**
	Downstream SW Treatment Systems have been provided to treat the following standard contaminants			
	TSS		Link to HCC consent conditions	
	Hydrocarbons		Link to HCC consent conditions	MfE petroleum guidelines require 15 mg/L - refueling areas only
	Nutrients		Link to HCC consent conditions	
	Zinc		Link to HCC consent conditions	
	Copper		Link to HCC consent conditions	
34	What other contaminants do you expect your Industry/operation to produce?			
35	Is it likely that this contaminant could be entrained in stormwater?			
36	What on-lot treatment systems are provided to remove contaminants that become entrained?			
37	What types/rates of removal of contaminants are you expecting this treatment system to remove			
38	What guideline has been used to design this system?			TP10, WRC Draft SW Mgmt Guideline

H

	Operation, Inspections and Maintenance			**Reference:**
39	Please provide details of your proposed inspections including frequency, things to be inspected, and how you plan on ensuring that any maintenance identified as being required by the inspections, is carried out.			Section of WRC's SW Mgmt Guideline. Suggest there should be a check-list specific to the device being used - could use them from TP10 or something similar
40	Please provide details of any routine maintenance that will be carried out as well as frequency of this occuring.			TP10 section on Operation and Maintenance

I

Staff Education and training

41 Please provide details of any current or proposed education/training programmes for staff in charge of managing discharges from the site?

42 Please provide details of when training will occur, and the frequency of retraining ?

43 Please keep a record of training for submission to HCC upon request

J

Spill Response Plan

44 Do any regulations require you prepare a Spill Response Plan? If yes, please provide a copy of this plan?

L

Plan Review

45 How often do you plan on reviewing this plan to ensure it is up to date, including responsibilities for carrying

Key References and Links

	Website Link
WRD Draft SW Management Guideline	

District Plan	
WRC High Risk Facilities Register	See: https://www.waikatoregion.govt.nz/council/policy-and-plans/rules-and-regulation/regional-plan/waikato-regional-plan/3-water-module/35-discharges/3512-high-risk-facilities/
HCC Stormwater Bylaw 2015	See: http://www.hamilton.govt.nz/our-council/policies-bylaws-legislation/bylaws/Documents/Hamilton%20Stormwater%20Bylaw%202015%20-%20Final%20-%20D-1598128.pdf
HSNO Regulations	