

McKechnie Aluminium Solutions Ltd

Monitoring Programme

Annual Report

2020-2021

Technical Report 2021-60



Working with people | caring for Taranaki



Taranaki Regional Council
Private Bag 713
Stratford

ISSN: 1178-1467 (Online)
Document: 2813651 (Word)
Document: 2886177 (Pdf)
November 2021

McKechnie Aluminium Solutions Ltd

Monitoring Programme

Annual Report

2020-2021

Technical Report 2021-60

Taranaki Regional Council
Private Bag 713
Stratford

ISSN: 1178-1467 (Online)
Document: 2813651 (Word)
Document: 2886177 (Pdf)
November 2021

Executive summary

McKechnie Aluminium Solutions Ltd (MASL) operates an aluminium foundry and extrusion plant located at Bell Block, in the Mangaone and Mangati catchments. Processing of copper and brass (copper/zinc) at the plant ceased in June 2002 and January 2003, respectively. This report for the period July 2020 to June 2021 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess MASL's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of MASL's activities.

During the monitoring period, McKechnie Aluminium Solutions Ltd demonstrated an overall high level of environmental performance.

MASL holds two resource consents that are covered within this particular report: consent 1857 to discharge stormwater into an unnamed tributary of the Mangaone Stream, and consent 4034 to discharge emissions into the air, which together include a total of 22 conditions setting out the requirements that they must satisfy.

The Council's monitoring programme for the year under review included three inspections, 21 water samples collected for physicochemical analysis, two biomonitoring surveys of receiving waters, and one deposition gauge survey in the vicinity of the foundry site.

Sample results during the period under review support the trend of reductions in the levels of contaminants in the receiving water at Sanger's Intake seen during recent years. No samples outside of the mixing zone exceeded the relevant USEPA receiving water criteria for the protection of aquatic ecosystems for zinc or copper, and all other parameters were below levels stipulated by consent conditions.

Biomonitoring results indicated that treated stormwater discharged from the site was not having a detrimental effect on the macroinvertebrate communities of the unnamed tributary of the Mangaone Stream.

The results from deposition gauging indicated that there was an environmentally acceptable level of particulate deposition in the vicinity of the foundry site. No visible emissions or odour issues were noted during inspections and no complaints were received during the period under review.

During the year, MASL demonstrated an overall high level of environmental performance and administrative compliance with the resource consents. There were no unauthorised incidents recorded at the site during the year.

For reference, in the 2020-2021 year, consent holders were found to achieve a high level of environmental performance and compliance for 86% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 11% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that MASL's performance remains at a good or high level.

This report includes recommendations for the 2021-2022 year.

Table of contents

		Page
1	Introduction	1
1.1	Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1	Introduction	1
1.1.2	Structure of this report	1
1.1.3	The Resource Management Act 1991 and monitoring	2
1.1.4	Evaluation of environmental and administrative performance	2
1.2	Process description	4
1.2.1	Discharges to stormwater	4
1.2.2	Discharges to air	5
1.3	Resource consents	6
1.4	Monitoring programme	7
1.4.1	Introduction	7
1.4.2	Programme liaison and management	7
1.4.3	Site inspections	7
1.4.4	Chemical sampling	7
1.4.5	Biomonitoring surveys	8
2	Results	9
2.1	Water	9
2.1.1	Inspections	9
2.1.2	Results of physicochemical discharge and receiving water monitoring	9
2.1.3	Results of biological monitoring in the receiving environment	14
2.2	Air	16
2.2.1	Inspections	16
2.2.1.1	Deposition dust gauging	16
2.3	Incidents, investigations, and interventions	17
3	Discussion	19
3.1	Discussion of site performance	19
3.2	Environmental effects of exercise of consents	19
3.2.1	Environmental effects of exercise of water discharge permit	19
3.2.2	Environmental effects of exercise of air discharge permit	19
3.3	Evaluation of performance	20
3.4	Recommendations from the 2019-2020 Annual Report	22
3.5	Alterations to monitoring programmes for 2021-2022	22

4	Recommendations	23
	Glossary of common terms and abbreviations	24
	Bibliography and references	26
	Appendix I Resource consents held by McKechnie Aluminium Solutions Ltd	

List of tables

Table 1	Summary of resource consents held by MASL	6
Table 2	Results of comprehensive discharge and receiving environment monitoring	11
Table 3	Results of combined discharge (STW001027) and receiving water (MGO000031) monitoring	13
Table 4	Dry weather Sanger's Intake (MGO000031) monitoring results	14
Table 5	Biomonitoring sites in the tributary of the Mangaone Stream	15
Table 6	Foundry deposition gauge results for the April 2021 survey	17
Table 7	Summary of performance for consent 1857-6	20
Table 8	Summary of performance for consent 4034-3	20
Table 9	Evaluation of environmental performance over time	21

List of figures

Figure 1	MASL foundry site, showing the boundary between Mangaone and Mangati Stream catchments	4
Figure 2	Location of the MASL plant in Bell Block and related water quality monitoring sites	10
Figure 3	Levels of dissolved copper in the East Arm (site MGO000028)	12
Figure 4	Levels of dissolved zinc in the East Arm (site MGO000028)	13
Figure 5	Biomonitoring sites in the Mangaone Stream in relation to the MASL stormwater discharge	15
Figure 6	Locations of dust deposition monitoring sites in relation to the MASL site	16

List of photos

Photo 1	MASL baghouse	6
---------	---------------	---

1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2020 to June 2021 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by McKechnie Aluminium Solutions Ltd (MASL). MASL operates an aluminium foundry and extrusion plant situated at Paraita Road, in the Mangaone and Mangati catchments, Bell Block. The location of the site is shown in Figures 1 and 2.

Copper and brass foundries and extrusion processes had previously been operated at the site. Copper processing ceased in June 2002 and brass processing ceased in January 2003. MASL also previously operated a separate powdercoating facility on Connett Road in the Mangati catchment. This operation was shifted to the main Paraita Road site during the 2008-2009 year and is now monitored under the existing consents for this site.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by MASL that relate to discharges of water within the Mangaone¹ catchment, and the air discharge permit held by MASL to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of MASL's use of water, land and air, and is the 28th combined annual report by the Council for MASL.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by MASL in the Mangaone and Mangati catchments;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at MASL's site.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2021-2022 monitoring year.

¹ Two stormwater discharge permits are held for the MASL site, consents 1857 and 3139. Consent 3139 (for the discharge of cooling water and stormwater from the MASL site to the Mangati Stream) monitoring is reported separately by the Council in a joint report covering discharges within the Mangati catchment.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act 1991 and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
- b. physical effects on the locality, including landscape, amenity and visual effects;
- c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
- e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' in as much as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by MASL, this report also assigns them a rating for their environmental and administrative performance during the period under review.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with MASL's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

Good: Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

Poor: Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

High: The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

Improvement required: Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

Poor: Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2020-2021 year, consent holders were found to achieve a high level of environmental performance and compliance for 86% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 11% of the consents, a good level of environmental performance and compliance was achieved.²

² The Council has used these compliance grading criteria for more than 17 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

1.2 Process description

1.2.1 Discharges to stormwater



Figure 1 MASL foundry site, showing the boundary between Mangaone and Mangati Stream catchments

The MASL manufacturing plant extends across the boundary between two stormwater catchments (Figure 1). Drainage from the western side (3.9 ha) is to the eastern headwaters of the Mangaone Stream, about four kilometres from where the stream enters the Waiwhakaiho River. Drainage from the eastern side (4.9 ha) is to the Mangati Stream. There are separate consents for stormwater discharges to the two catchments. This report relates to the western stormwater discharge. The eastern stormwater discharge, consent 3139, is monitored under the Mangati Stream Catchment Monitoring Programme.

The area which drains to the Mangaone catchment is bounded by the Marton – New Plymouth railway, Henwood Road, and the main building. Significant changes have occurred at the site during the last 25 years with respect to both processing activities undertaken at the site and improvements to control the effects of historical activities. An outline of the historical activities and their potential impacts on current stormwater quality is given below. More detailed discussions are contained in previous monitoring reports, which are listed in the bibliography.

Approximately 40% of the site draining to the Mangaone catchment is planted, 16% roofed, 41% tar seal or concrete, and 3% bare gravel.

The estimated storm flow to the Mangaone system, for a 10 minute duration event of five year return period, is 670 L/s. Currently, for consent compliance purposes, the discharge point is at Henwood Road railway crossing. Monitoring is also undertaken at the points of exit from the site.

Aerial emissions from the now defunct brass and copper foundry and swarf drying plant (prior to the installation of the baghouse in 1996), have contributed to the significant concentrations of metals, particularly copper, zinc and lead, now found in the surface soils at the site. Historical practices relating to the handling and storage of scrap, dross and baghouse dust have also resulted in particular areas having elevated metals concentrations. Included in the Mangaone catchment are a tool room, fabrication shops, an

aluminium anodising plant, an anodising effluent treatment plant, and a powdercoating facility. Within the catchment some areas, previously used in relation to the copper and brass re-melting and extrusion activities, are now used for aluminium scrap sorting, finishing and warehousing.

A Stormwater Management Plan developed by MASL identifies actions that MASL has already carried out and is continuing to undertake to minimise the potential for contaminants to enter the stormwater from current operating practices and historical contamination.

There are two main stormwater drains westward from the site, which converge immediately above the railway crossing.

The southern drainage ditch runs approximately parallel with the railway, starting outside the former swarf drying plant and brass foundry. Its catchment includes a bunded holding area for drummed waste substances. The drainage from this area is discharged via a piped system which incorporates a baffled sediment and oil trap. A stop valve is fitted just downstream of the trap allowing isolation of the discharge in the event of a spillage in this catchment.

The western drain services the area around the aluminium anodising plant and fabrication building. The anodising effluent treatment plant is contained within a bunded area. The stormwater discharges to a small swamp in the eastern headwaters of the Mangaone Stream, about four kilometres from where the stream enters the Waiwhakaiho River further west. The swamp is fed from groundwater seeps and from a small lake previously on the property of the Pacific International Hotel Management School on Henwood Road. This area was redeveloped during the creation of the SH3 Bell Block bypass. Transit NZ holds consents for the reclamation of part of the northern end of the lake (5801) and to discharge stormwater from road surface drainage into the lakes (5803).

1.2.2 Discharges to air

In January 2008, a reconditioned gas fired furnace was installed which replaced the previous gas fired melting and holding furnaces. Only clean scrap is loaded into the new gas furnace, which discharges directly to atmosphere through a separate stack.

MASL receives clean in-house production and purchased scrap aluminum extrusions and ingots for re-melting and casting into extrusion log. A small amount of fumeless cleaning flux is used during the melting process. Small additions of silicon and magnesium are made to the aluminum in the gas fired furnace after it is melted for alloying purposes. The furnace burners are turned to low during dross removal, which combined with the fumeless flux, means that there are no emissions generated. No toxic metals are used during the melting process.

Before the aluminum is cast, further fumeless cleaning flux is used, along with casting table and launder coating applications. Continuous lubricant is injected into molds during the casting process.

Anodised and powdercoated scrap is chopped for loading into a separate induction furnace where emissions are routed to the aluminum baghouse. A fumeless cleaning flux is used after melting, followed by dross removal with the melt then being transferred to the gas fired furnace.

Discharges to air from the powdercoating facility are monitored under the foundry site consent. The potential effects from powdercoating are emissions of powder and odours into the air from the process. If solvents are used in the process there is also potential for air emissions to contain a toxic component. These effects can all be avoided by use of appropriate technology; in this case an exhaust fan followed by a baghouse. This technology is simple, robust and effective.

During past (historical) monitoring periods, there were frequent, but intermittent, plume discharges from the various sources to air. These varied in their impact offsite, depending on processing and weather conditions at the time of emission. Fugitive emissions have not been noted from vents on the aluminium

building roof in several years. The baghouse controls have pre-set temperature limits, which will divert the exhaust gases directly to the stacks if the incoming gases exceed the limits set. This avoids the superheated gases damaging the baghouse or its components. This type of discharge is still subject to conditions 1 and 2 of consent 4034-3, which require the consent holder to adopt the 'best practicable option' to minimise adverse effects upon the receiving environment from the discharges.



Photo 1 MASL baghouse

1.3 Resource consents

MASL holds two resource consents which are the subject of this report, the details of which are summarised in Table 1 below. Summaries of the conditions attached to each permit are set out in Section 3 of this report.

A summary of the various consent types issued by the Council is included in Appendix I, as are copies of the permits held by MASL during the period under review.

Table 1 Summary of resource consents held by MASL

Consent number	Purpose	Granted	Review	Expires
<i>Water discharge permit</i>				
1857-6	To discharge treated stormwater from an industrial premises that includes a metal extrusion plant into an unnamed tributary of the Mangaone Stream	December 2012	-	June 2026
<i>Air discharge permit</i>				
4034-3	To discharge emissions into the air from extrusion and re-melting of aluminium and associated activities	August 2008	-	June 2026

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

The monitoring programme for the MASL site consisted of four primary components.

1.4.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

The MASL site was visited three times during the monitoring period. With regard to consents for the discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by MASL were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.4.4 Chemical sampling

The Council undertook sampling of the discharges from the site for the purpose of compliance monitoring, and surveyed the water quality upstream and downstream of the discharge point and mixing zone to determine the impact on the receiving water.

There are eight permanent chemical monitoring sites (as shown in Figures 1 and 2). These are the western and eastern discharge points; the discharge drain at Henwood Road; the lake outlet upstream of the stormwater discharge; the northern arm of the swamp upstream of the discharge; the eastern arm of the swamp which receives the discharge (just inside the mixing zone); the receiving water in the unnamed tributary (Sanger's intake); and the receiving water in the Mangaone Stream at Egmont Road.

One monitoring run is carried out annually in wet weather, for compliance monitoring of the stormwater discharge, and one run is carried out annually in dry weather, to determine long term trends in the quality of the receiving water. Samples are analysed for pH, conductivity, suspended solids and concentrations of total and dissolved copper and zinc.

Additional sampling of the combined discharge and receiving water at Sanger's intake is carried out where possible. During the 2020-2021 monitoring period samples of the combined discharge and receiving waters

were collected four times during wet weather, while the receiving water only was sampled twice during dry weather.

To assess levels of particulate emissions to air, deposition gauges were placed in the vicinity of the site on one occasion during the period under review. The collected samples were analysed for deposited particulates and selected metals.

1.4.5 Biomonitoring surveys

Biological surveys were performed in January and May 2021 in an unnamed tributary of the Mangaone Stream to determine whether or not the discharge of stormwater from the site had had a detrimental effect upon the communities of the stream.

2 Results

2.1 Water

2.1.1 Inspections

Three inspections were undertaken at the MASL site during the period under review, on 31 July and 26 November 2020, and 24 May 2021.

31 July 2020

The site was busy with normal operations. The scrap area was tidy and had recently been swept. In the area of high traffic between the scrap area and factory, swarf was observed tracking to the drain. Drain screens were in place on all stormwater drains, however it was noted that these would require cleaning at some stage due to swarf accumulation. All hazardous chemicals were appropriately contained, and the bunding around the larger storage sites contained clear stormwater. A truck was unloading liquid chemicals at the time of the inspection and following this the driver washed the truck with water which was drained into the appropriate chemical bund storage area (to trade waste). Spill kits were in place around the site and these were in good condition. The flammable liquid storage shed was tidy with no sign of spills or leaks. All drains onsite were clear and free-flowing to the stormwater system. The stormwater outlet to the Mangaone Stream was clear and tidy with no discharge occurring at the time of the inspection. The waste material storage was tidy with the valve closed. This area was clear of any water as it had recently been pumped.

26 November 2020

The site was busy with normal operations being undertaken. The scrap area was busy and full of scrap aluminium. In the area of high traffic between the scrap area and factory, swarf was noted tracking to the drains. Drain screens were in place on all stormwater drains and it was noted that these required cleaning due to swarf accumulations. All hazardous chemicals onsite were appropriately contained. It was noted that the bunding around the larger storage sites contained a high level of clear stormwater and staff advised that these would be pumped imminently. The flammable liquid storage shed was tidy with no sign of spills or leaks. All drains onsite were clear and free-flowing to the stormwater system. There had been a blocked drain the previous day near the scrap storage during heavy rainfall, however this had been unblocked. The new shed at the front of the site has a settling pond which stormwater drains through into the ground, and this was observed to be coping with the volume of rain at the time.

24 May 2021

The site was busy with normal operations. In the area of high traffic between the scrap area and factory, swarf was observed tracking to the drains. Drain screens were in place. All hazardous chemicals onsite were appropriately contained and rainwater within bunding was at a low level. The flammable liquid storage shed was tidy with no sign of spills or leaks. All drains onsite were clear. Construction of a new building to house a second powder coat line was underway. It was noted that this building, coupled with the new storage building at the front of the site, would increase the stormwater catchment and as such the stormwater management plan may require alteration.

2.1.2 Results of physicochemical discharge and receiving water monitoring

Samples were taken by the Council from several permanent sampling points in wet weather conditions on 12 October 2020, and under dry conditions on 26 February 2021. The sites are shown in Figure 2 and the results are presented in Table 2.

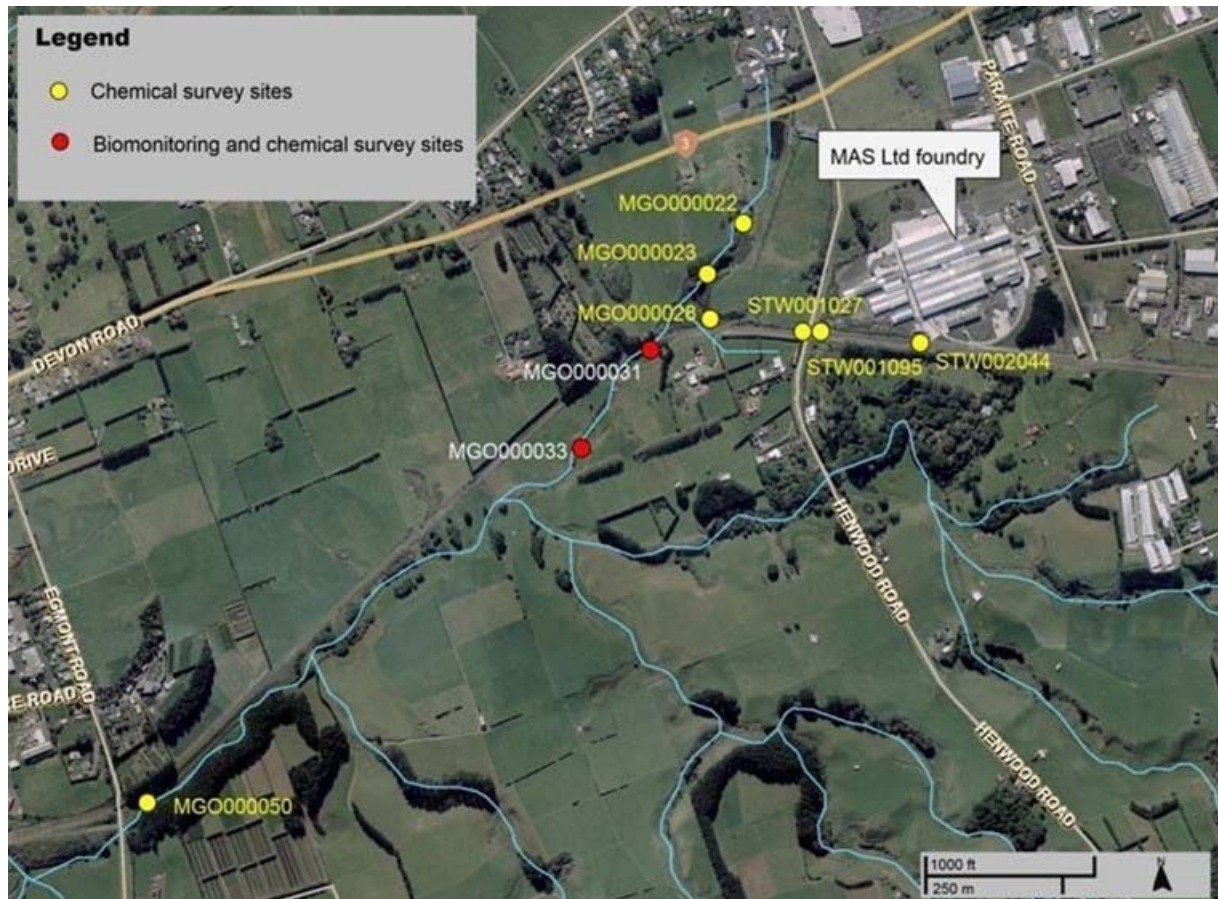


Figure 2 Location of the MASL plant in Bell Block and related water quality monitoring sites

Dry weather sampling runs are intended to determine long term trends in the quality of the receiving water. Historical metals concentration data available for dry weather runs was limited prior to the introduction of regular sampling at the start of the 1999-2000 monitoring period.

Wet weather sampling runs enable the Council to determine whether compliance with the discharge conditions on consent 1857-6 is being achieved, and what effects the discharge is having on the receiving waters.

Up until a consent renewal in September 2003 there were six prescribed control limits imposed upon the MASL stormwater discharge. These limits applied to the pH, suspended solids, oil and grease, and copper, lead and zinc concentrations. From September 2003 to the end of the 2012 monitoring period the three prescribed control limits imposed on contaminants were for pH, oil and grease, and suspended solids. The current version of the consent also includes a limit of 0.05 g/m^3 on dissolved copper in the combined discharge and 1 g/m^3 for dissolved zinc.

The consent also limits the effects that the discharge may have on the receiving water beyond a mixing zone extending 150 m from the discharge point at the Henwood Road railway crossing. Site MGO000028 is within this mixing zone.

Traditionally, the establishment of water quality criteria has been based upon the use of measures such as "total recoverable metals" for determining acceptable limits for metal concentrations in discharges. However, in recent years a number of countries including the United States (under the aegis of the USEPA) have revised their toxicant criteria towards the protection of freshwater aquatic ecosystems in the receiving environment, and as such dissolved metal concentrations are considered more representative of the bioavailable fraction of metals in the water column.

The receiving water quality criteria for dissolved copper and zinc, in water with hardness of 50 g/m³ CaCO₃, are 0.0062 g/m³ Cu and 0.058 g/m³ Zn for chronic (long-term) exposure. The corresponding criteria for acute (1-hour) exposure are 0.0088 g/m³ Cu and 0.064 g/m³ Zn. Chronic exposure criteria are best related to dry weather sampling results, whilst acute exposure criteria are best related to wet weather sampling conditions.

Aside from the dissolved metal concentrations within the mixing zone in the Eastern Arm (MGO000028), none of the samples collected from the tributary of the Mangaone Stream exceeded the relevant USEPA receiving water criteria for the protection of aquatic ecosystems.

The levels of dissolved copper found within the mixing zone of the Eastern Arm was similar to the median of previous sampling (0.0245 g/m³), with 0.024 g/m³ found during the current survey. At 0.153 g/m³ levels of dissolved zinc in the Eastern Arm were significantly lower than the median of previous results (0.288 g/m³) during the current year. In general, there is continuing evidence of an improvement in the water quality of the tributary of the Mangaone Stream in relation to both dissolved copper and dissolved zinc as shown in figures 3 and 4.

The results for all other parameters indicated that the discharge was not having an adverse effect on the receiving waters. Levels of aluminium, lead, oil and grease, and suspended solids in the discharge were low and in compliance with applicable consent conditions.

Table 2 Results of comprehensive discharge and receiving environment monitoring

Parameter	Discharge			Downstream			Upstream	
	Western drain	Eastern drain	Combined Discharge	East Arm	Sanger's Intake*	Egmont Road	North Arm	Lake outlet
Site code	STW001095	STW002044	STW001027	MGO000028	MGO000031	MGO000050	MGO000023	MGO000022
Wet run – 12 October 2020								
Temperature (°C)	13.9	13.7	14.2	14.2	14.3	14.0	14.4	14.5
Conductivity (mS/m @25°C)	3.4	5.9	3.9	8.3	12.5	14.0	11.9	9.9
pH	6.8	7.3	7.0	7.2	7.0	7.3	6.9	7.1
Suspended Solids (g/m ³)	< 3	16	18	< 3	4	24	< 3	4
Cu Total (g/m ³)	0.0101	0.039	0.175	0.046	0.0043	0.0033	0.00171	0.0021
Cu Dissolved (g/m ³)*	0.0094	0.0135	0.035	0.024	0.0026	0.0015	0.0011	0.0013
Zn Total (g/m ³)	0.88	0.20	0.38	0.180	0.021	0.0082	0.021	0.043
Zn Dissolved (g/m ³)*	0.91	0.093	0.25	0.153	0.0157	0.0027	0.0168	0.041
Al Total (g/m ³)	0.097	0.59	0.84	-	-	-	-	-
Pb Total (g/m ³)	0.00059	0.0049	0.0111	-	-	-	-	-
Oil and Grease (g/m ³)	< 0.7	< 0.7	< 0.7	-	-	-	-	-

Parameter	Discharge			Downstream			Upstream	
	Western drain	Eastern drain	Combined Discharge	East Arm	Sanger's Intake*	Egmont Road	North Arm	Lake outlet
Dry run – 26 February 2021								
Temperature (°C)	-	-	-	-	17.5	18.9	19.2	19.6
Conductivity (mS/m @25°C)	-	-	-	-	22.4	22.7	23.6	18.3
pH	-	-	-	-	7.2	7.3	7.0	6.8
Suspended Solids (g/m ³)	-	-	-	-	< 3	< 3	< 3	37
Cu Total (g/m ³)	-	-	-	-	0.00123	0.00078	<0.00053	<0.00053
Cu Dissolved (g/m ³)*	-	-	-	-	0.0009	0.0006	<0.0005	<0.0005
Zn Total (g/m ³)	-	-	-	-	0.0070	<0.0011	0.0080	0.0025
Zn Dissolved (g/m ³)*	-	-	-	-	0.0061	<0.0010	0.0069	<0.0010
*USEPA acute criteria for dissolved metals: Cu 0.0088 g/m ³ and Zn 0.064 g/m ³ [at hardness of 50 g/m ³ CaCO ₃]								

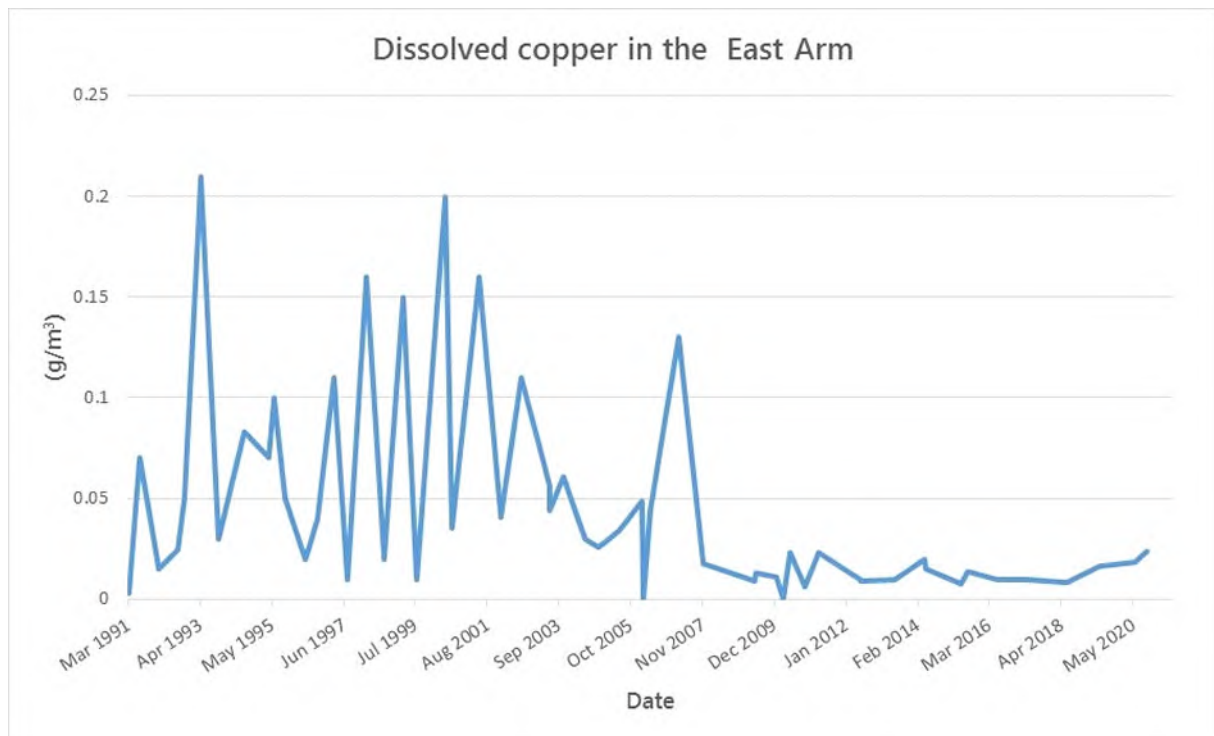


Figure 3 Levels of dissolved copper in the East Arm (site MGO000028)

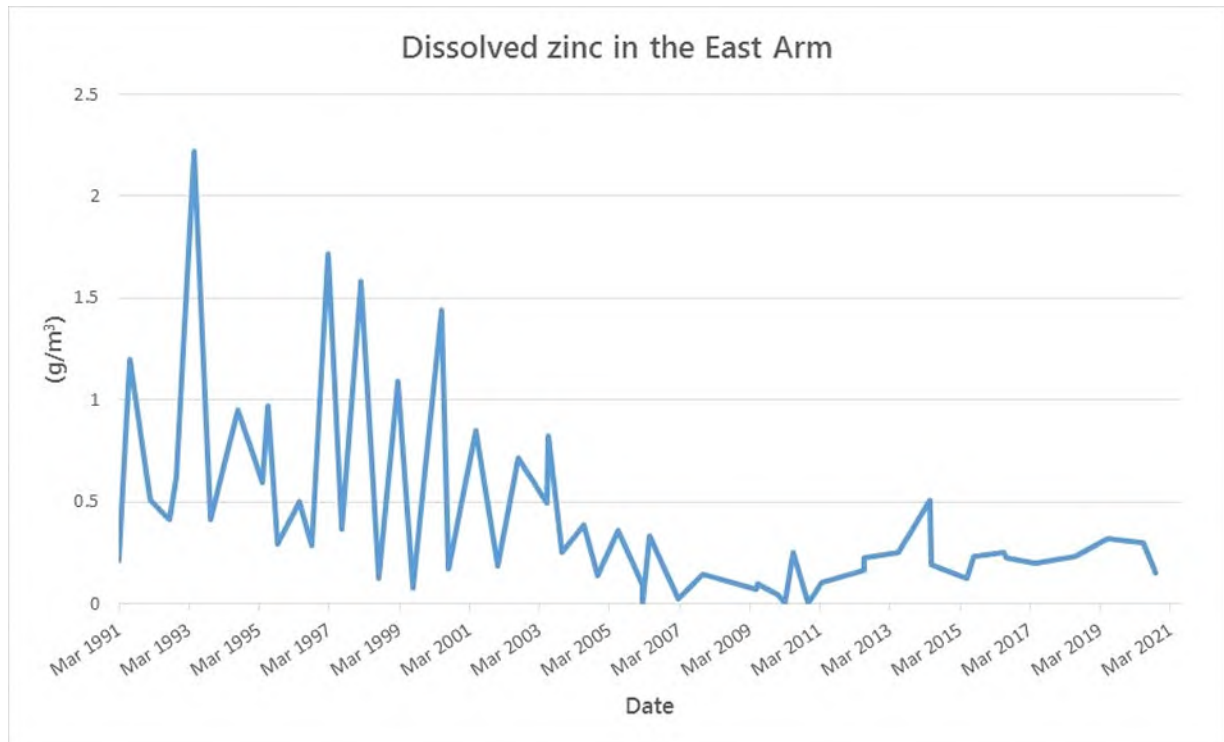


Figure 4 Levels of dissolved zinc in the East Arm (site MGO000028)

Table 3 Results of combined discharge (STW001027) and receiving water (MGO000031) monitoring

Date	Sampling point	Temp (°C)	pH	Conductivity (mS/m)	Suspended solids (g/m ³)	Oil & grease (g/m ³)	Dissolved Copper* (g/m ³)	Dissolved Zinc* (g/m ³)
24 Sep 2020	STW001027	15.4	7.3	7.2	4	< 0.7	0.030	0.35
	MGO000031	14.6	7.2	19.2	3	< 0.7	0.0016	0.0124
25 Nov 2020	STW001027	13.6	6.7	1.1	23	< 0.7	0.041	0.188
	MGO000031 [^]	-	-	-	-	-	-	-
18 May 2021	STW001027	12.7	7.1	6.0	3	< 0.7	0.030	0.45
	MGO000031	13.8	7.0	8.9	5	< 0.7	0.0031	0.0125
14 June 2021	STW001027	15.4	6.9	3.7	11	< 0.7	0.023	0.21
	MGO000031	14.8	7.0	12.4	7	<0.7	0.0026	0.0133
<i>Consent limits (STW001027)</i>		-	6.0-9.0	-	100	15	0.05	1.0
<i>USEPA acute criteria for dissolved metals in receiving water*</i>							0.0088	0.064

* at hardness of 50 g/m³ CaCO₃

[^] a sample was not collected as there was flooding at the site and the downstream culvert had been blocked turning the stream into a lake

The results of combined discharge and receiving water monitoring for the 2020-2021 monitoring period are summarised in Table 3. The monitoring points are the stormwater culvert at the Henwood Road railway crossing (STW001027), which is representative of the total stormwater discharge from the foundry site to the Mangaone catchment, and the unnamed tributary of the Mangaone Stream that is located downstream of the MASL stormwater discharge point. The second location is shown in Figure 1 and Figure 2 and is referred to as Sanger's Intake (MGO000031)³. Four sets of samples were taken during the period under review. All results for dissolved metals in the tributary below the mixing zone were below the USEPA acute receiving water criteria. The discharge was in compliance with consent 1857-6.

The aim of this monitoring was to examine any potential correlation between the levels of dissolved metals in the MASL discharge and in the tributary of the Mangaone Stream below the mixing zone. This monitoring was instigated for the purpose of gathering data to assist in setting practical metals content limits in MASL's renewed stormwater discharge consent.

Samples of the tributary of the Mangaone Stream at Sanger's Intake during dry weather were also collected during the year. The results are shown in Table 4.

Table 4 Dry weather Sanger's Intake (MGO000031) monitoring results

Date	Temp (°C)	pH	Conductivity (mS/m)	Dissolved Copper (g/m ³)	Dissolved Zinc (g/m ³)
5 February 2021	15.1	7.2	21.6	0.001	0.0073
7 April 2021	15.4	7.1	19.1	<0.001	0.0051
<i>USEPA chronic criteria for dissolved metals in receiving water*</i>				<i>0.0062</i>	<i>0.058</i>

* at hardness of 50 g/m³ CaCO₃

The results of sampling from Sanger's Intake under dry weather conditions show lower levels of copper and zinc than when stormwater was discharging from the MASL site. This was particularly notable with regards to zinc with the results obtained during wet weather around double that of the dry weather samples. As discussed above, the USEPA acute criteria for dissolved metals in receiving water was not exceeded in any of the wet weather samples.

In interpreting the impact of the discharge on the receiving water at Sanger's Intake, a number of other sources of metals not directly associated with the discharge itself that also affect the receiving water must be considered. For example, other sources may include: leaching related to historical aerial contamination from the MASL site; stormwater run-off from the Bell Block shopping complex and State Highway; earthworks associated with the bypass and industrial area development; and release of metals from the Eastern Arm associated with historical stormwater discharge activities.

2.1.3 Results of biological monitoring in the receiving environment

The Council collected streambed macroinvertebrates at two sites in the Mangaone Stream (Table 5, Figure 5) on 31 January and 7 May 2021 to investigate the effects of MCK Metals plant on macroinvertebrate health. Macroinvertebrates were identified and the number of different types of taxa counted (taxa richness), and MCI and SQMCI scores were calculated for each site.

³ Sanger's Intake sampling location is downstream of the stormwater mixing zone. It also provides a useful indication of the overall quality of the receiving water within the unnamed tributary because this particular sampling location is representative of all contributing sources of heavy metals, including several other sources of contaminants that are not directly associated with the stormwater discharge itself.

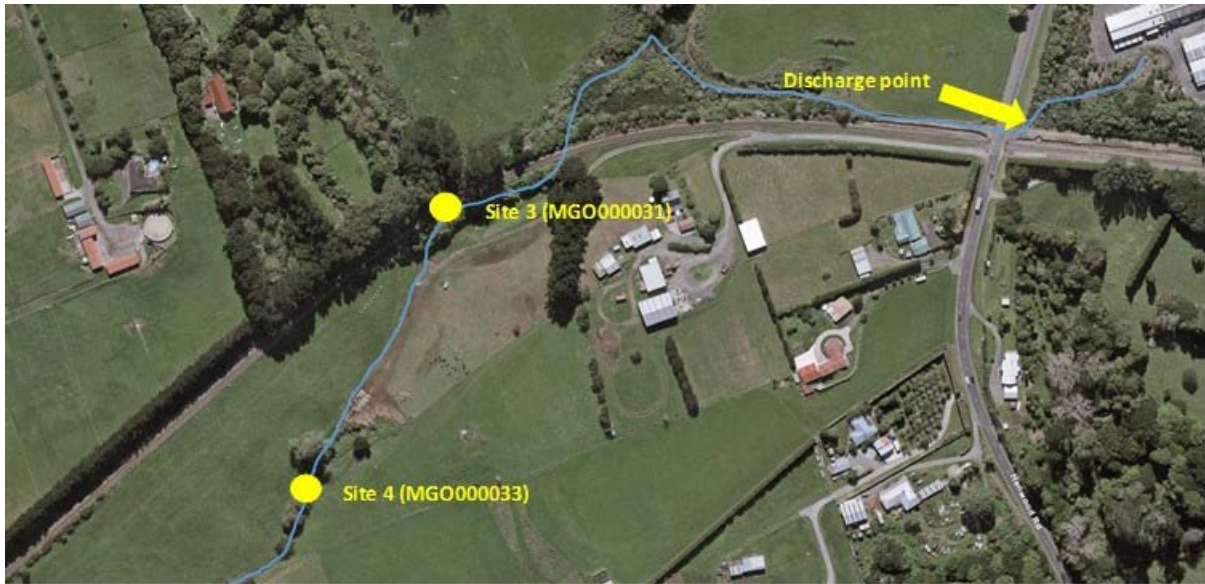


Figure 5 Biomonitoring sites in the Mangaone Stream in relation to the MASL stormwater discharge

Table 5 Biomonitoring sites in the tributary of the Mangaone Stream

Site No	Site code	Location
3	MGO000031	Below swamp (Sanger's intake)
4	MGO000033	400 metres downstream of site 3

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of nutrient pollution in streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to pollution. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored and enable the overall health of the macroinvertebrate communities to be determined.

The January survey found that the Mangaone Stream sites had low macroinvertebrate community richness. Taxa richness was lower than historical medians at both sites (by 6-7 taxa) but there was no indication of any recent toxic discharges affecting the macroinvertebrate community. Instead, very low water levels may have contributed to lower than normal taxa richness. MCI scores indicated that the macroinvertebrate community was in 'fair' health for both sites with no significant difference between sites. Both sites had a higher score than normal. Improvements in water quality from the stormwater discharge may account for the improved MCI scores. The SQMCI scores for both sites were similar to each other and to their respective medians indicating 'fair' health at both sites. There was a slight, non-significant decrease in SQMCI score from site 3 to site 4.

The May survey found that the Mangaone Stream sites had low to moderate macroinvertebrate community richness. Taxa richness was lower than historical medians at both sites, although there was no indication of any recent toxic discharges affecting the macroinvertebrate community. MCI scores indicated that the macroinvertebrate community was in 'poor' health at both sites, with no significant difference between sites. Both sites recorded MCI scores similar to their respective medians. SQMCI scores were not significantly different to one another, and were both indicative of 'fair' macroinvertebrate community health.

Overall, these results indicate that the stormwater discharge from the MASL site had not had any impact on the macroinvertebrate communities present in this unnamed tributary of the Mangaone Stream.

Copies of biomonitoring reports for this site are available from the Council upon request.

2.2 Air

2.2.1 Inspections

No issues regarding air quality were noted during inspections in the monitoring period.

2.2.1.1 Deposition dust gauging

Many industries emit dust from various sources during operational periods. In order to assess the effects of the emitted dust, industries have been monitored using deposition gauges.

Deposition gauges are basically buckets elevated on a stand to about 1.6 m. The buckets have a solution in them to ensure that any dust that settles out of the air is not re-suspended by wind.

The rate of dustfall is calculated by dividing the weight of insoluble material (g) collected by the cross-sectional area of the gauge (m^2) and the number of days over which the sample was taken. The units of measurement are $g/m^2/day$.

Guideline values used by the Taranaki Regional Council for dust deposition are $4 g/m^2/30$ days or $0.13 g/m^2/day$ deposited matter. Consideration is given to the location of the industry and the sensitivity of the surrounding community, when assessing results against these values.

Material from the gauges was analysed both for solid particulates and for various chemicals associated with pollution.

In the 2020-2021 period, gauges were deployed on one occasion at four locations in the vicinity of the foundry site for a period of 20 days from 16 March to 6 April 2021. The locations of the monitoring sites around the foundry are shown in Figure 6.

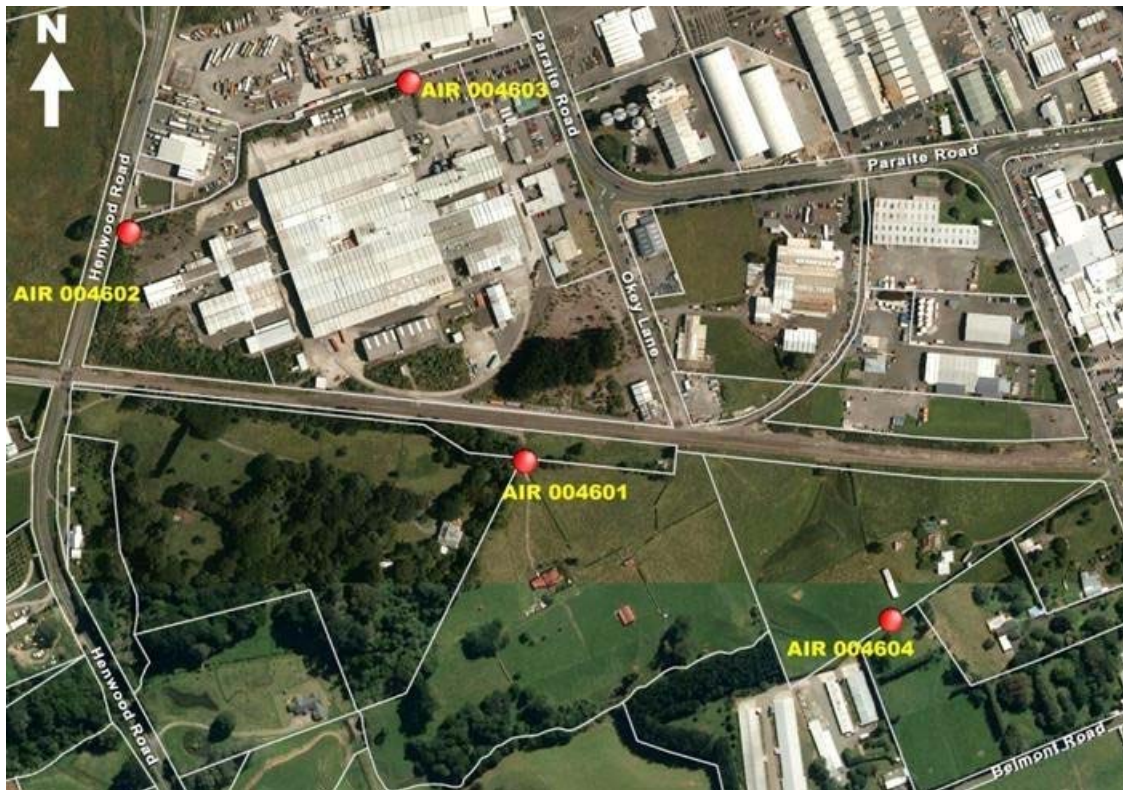


Figure 6 Locations of dust deposition monitoring sites in relation to the MASL site

Material from the gauges was analysed for particulates, aluminium, copper, lead, zinc and conductivity. For comparison, the median values of data obtained from an urban 'state of the environment' deposition gauge

site located on the corner of Mangorei Road and Devon Road (site AIR000012) have been included in Table 6.

Table 6 Foundry deposition gauge results for the April 2021 survey

Site		AIR004601	AIR004602	AIR004603	AIR004604	AIR000012 (median 2000-2003) comparison site
Total particulate mg/m ² /day		30	20	10	30	50
<i>Total particulate mg/m²/day June 1996-June 2020 median</i>		40	40	90	50	-
Aluminium mg/m ² /day	Dissolved	0.29	0.04	0.08	0.14	-
Copper mg/m ² /day	Dissolved	0.08	0.02	0.01	0.01	0.02
Lead mg/m ² /day	Dissolved	<0.01	<0.01	<0.01	<0.01	-
Zinc mg/m ² /day	Dissolved	0.25	0.15	0.23	0.09	0.28

Particulates

The rates of particulate deposition were low and were below historical medians for all sites. Values were well below the 130 mg/m²/day guideline value and complied with the MASL consent condition for depositions at all sites.

Metals deposition

The ratio between the particulate and dissolved fractions varies according to the individual metal and the pH of the liquid in the deposition gauge. As much as 99% of the total zinc has been found to be in the dissolved (bio-available) form. This is likely to be higher than the proportion bio-available in the soil, as historically the pH of the liquid in the gauge has been quite acidic (favouring metal solubilisation) relative to the soil. Because of this, combined with the closure of the copper and brass activities at the site, particulate metal analysis of the filters for copper, lead and zinc has been ceased.

The Department of Health (1992) has set guidelines for maximum annual application to agricultural land of heavy metals (in sewage sludge). These guidelines may be used for assessing the impact of metals deposited on land in the vicinity of the MASL site. The guidelines for copper, lead and zinc are 3.3, 4.1 and 8.2 mg/m²/day for copper, lead and zinc respectively. There is no guideline for aluminium.

The highest values recorded for the dissolved metals deposited in the 2020-2021 monitoring year were 2%, <1%, and 3% of the respective guidelines for copper, lead, and zinc. The levels of dissolved aluminium were well below historical medians for all four sites.

In comparison to the median values found at the urban 'state of the environment' monitoring site AIR000012, the MASL deposition gauge sites showed copper and zinc deposition rates that were mostly much lower those in an urban area close to a main road.

2.3 Incidents, investigations, and interventions

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the MASL. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach, that in the first instance avoids issues occurring, is favoured.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

In the 2020-2021 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with MASL's conditions in resource consents or provisions in Regional Plans.

3 Discussion

3.1 Discussion of site performance

In general the site was found to be tidy and well managed during inspections. MASL has markedly reduced the discharge of contaminants from its foundry site in recent years. Good control of emissions from the aluminium foundry was also achieved. No complaints were received by Council in relation to activities at the site and no incidents were recorded.

3.2 Environmental effects of exercise of consents

3.2.1 Environmental effects of exercise of water discharge permit

Stormwater from the MASL site has discharged to a small swamp in the headwaters of the Mangaone Stream for a period of over 30 years. The Council has monitored the effects of the discharge and the receiving water since 1982 through both chemical and biological surveys.

Continued improvements in effluent management and housekeeping practices by MASL have assisted in reducing the concentrations of contaminants within the stormwater discharged from the site. Sample results during the period under review support the trend of reductions in the levels of contaminants in the receiving water at Sanger's Intake seen during recent years. No samples outside of the mixing zone exceeded the relevant USEPA receiving water criteria for the protection of aquatic ecosystems.

The two biological surveys undertaken during the period under review indicated that the discharge of treated stormwater from the MASL site had not had any recent detrimental effect on the macroinvertebrate communities of the unnamed tributary of the Mangaone Stream. This provides further evidence that there has been an improvement in water quality in recent monitoring years, consistent with the physicochemical water quality monitoring data.

3.2.2 Environmental effects of exercise of air discharge permit

Atmospheric particulate matter can arise from a number of sources, both natural and from human activity, for example: vegetation pollens, smoke and ash, sea spray, dust from soils and paved surfaces, and manufacturing processes. While extremely fine particles may remain floating in the atmosphere for weeks or months, coarser dusts may settle out within timeframes ranging from a few seconds to minutes.

The environmental effects of dusts include loss of visibility, loss of the amenity and aesthetic values of a 'clear sky', irritation to breathing, and soiling of surfaces. It has been found that background rates of dust deposition in rural areas of New Zealand are typically 3-50 mg/m²/day, while in urban areas rates are generally higher, in the range of 20-100 mg/m²/day. From experience, rates above 100-135 mg/m²/day tend to lead to complaints by neighbours over the objectionable or offensive nature of dust emissions from particular sources.

Deposition gauging was conducted for the 26th time during the 2020-2021 monitoring period around the foundry site. The results from the gauging indicated that the particulate deposition was at an acceptable level in the vicinity of the foundry site. The analytical results of the gauging also showed that the levels of deposited metals were much lower than allowed by the Department of Health (1992) guidelines for maximum annual application to agricultural land of heavy metals (in sewage sludge).

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 7 and 8.

Table 7 Summary of performance for consent 1857-6

Purpose: To discharge treated stormwater from an industrial premise that includes a metal extrusion plant into an unnamed tributary of the Mangaone Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option to minimise effects on the environment	Inspections and liaison with consent holder	Yes
2. Maximum catchment size	Site inspections	Yes
3. Appropriate hazardous substance storage	Site inspections	Yes
4. Limits on chemical composition of discharge	Sampling	Yes
5. Discharge shall not cause specified adverse effects beyond mixing zone	Sampling and biomonitoring surveys of the receiving water	Yes
6. Implementation and review of a contingency plan	MASL Environmental Management Manual includes contingency plan	Yes
7. Maintenance of a stormwater management plan	Updated Stormwater Management Plan received September 2016	Yes
8. Notification prior to making changes at the site which may alter the nature of the discharge	Notifications and site inspections	Yes
9. Optional review provision re environmental effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 8 Summary of performance for consent 4034-3

Purpose: To discharge emissions into the air from extrusion and remelting of aluminium and associated activities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option to minimise effects on the environment	Site inspections	Yes
2. Selection of best practicable equipment and processes	Site inspections	Yes
3. Discharge shall not give rise to offensive or toxic levels of contaminants at the site boundary	Site inspections and discharge monitoring	Yes

Purpose: To discharge emissions into the air from extrusion and remelting of aluminium and associated activities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Limit on dust deposition rate beyond the site boundary	Deposition gauge monitoring	Yes
5. Maximum particulate concentration of discharges	Testing not undertaken during year under review	N/A
6. Limit on elevation of ambient suspended particulate matter concentration	Testing not undertaken during year under review	N/A
7. Compliance with the MASL Environmental Management Manual	Site inspections and liaison with consent holder	Yes
8. Notification prior to making changes at the site which may alter the nature of the discharge	Notifications and site inspections	Yes
9. Limit on opacity of any discharge	Testing not undertaken during year under review	N/A
10. Limit on effect of emissions on PM ₁₀ concentration at the boundary	Testing not undertaken during year under review	N/A
11. Limits on other contaminants beyond site boundary	Testing not undertaken during year under review	N/A
12. Notification in the event of unauthorised discharge	No unauthorised incidents logged during the year	N/A
13. Optional review of consent	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 9 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2009-10	1857-5	1	-	-	-
	4034-3	1	-	-	-
2010-12	1857-5	1	-	-	-
	4034-3	1	-	-	-
2012-13	1857-6	1	-	-	-
	4034-3	1	-	-	-
2013-14	1857-6	-	1	-	-
	4034-3	1	-	-	-
2014-15	1857-6	1	-	-	-
	4034-3	1	-	-	-

Year	Consent no	High	Good	Improvement req	Poor
2015-16	1857-6	1	-	-	-
	4034-3	1	-	-	-
2016-17	1857-6	-	1	-	-
	4034-3	1	-	-	-
2017-18	1857-6	-	1	-	-
	4034-3	1	-	-	-
2018-19	1857-6	-	-	1	-
	4034-3	1	-	-	-
2019-20	1857-6	1	-	-	-
	4034-3	-	1	-	-
Totals		15	4	1	-

During the year, MASL demonstrated an overall high level of environmental performance and administrative compliance with the resource consents as defined in Section 1.1.4.

3.4 Recommendations from the 2019-2020 Annual Report

In the 2019-2020 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the McKechnie Aluminium Solutions Ltd site in the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

These recommendations were implemented.

3.5 Alterations to monitoring programmes for 2021-2022

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

No planned changes have been made to the 2021-2022 monitoring programme.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2021-2022.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at the McKechnie Aluminium Solutions Ltd site in the 2021-2022 year continue at the same level as in 2020-2021.
2. THAT should there be issues with environmental or administrative performance in 2021-2022, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Al*	Aluminium.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
Bund	A wall around a tank to contain its contents in the case of a leak.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
Cu*	Copper.
Dross	A mass of solid impurities floating on a molten metal or dispersed in the metal, such as in wrought iron. It forms on the surface of low-melting-point metals such as tin, lead, zinc or aluminium or alloys by oxidation of the metal.
g/m ³	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
m ²	Square Metres.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mg/m ² /day	Milligrams/meter ² /day.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.

Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM ₁₀	Relatively fine airborne particles (less than 10 micrometre diameter, respectively).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Swarf	Also known as chips, turnings, fillings or shavings, are pieces of metal (or wood or plastic etc) that are the debris from manufacturing processes.
Temp	Temperature, measured in °C (degrees Celsius).
Zn*	Zinc.

*an abbreviation for a metal or other analyte may be followed by the letters 'As', to denote the amount of metal recoverable in acidic conditions. This is taken as indicating the total amount of metal that might be solubilised under extreme environmental conditions. The abbreviation may alternatively be followed by the letter 'D', denoting the amount of the metal present in dissolved form rather than in particulate or solid form.

For further information on analytical methods, contact a Science Services Manager.

Bibliography and references

- Ministry for the Environment. 2018. *Best Practice Guidelines for Compliance, Monitoring and Enforcement under the Resource Management Act 1991*. Wellington: Ministry for the Environment.
- Taranaki Regional Council (2021): *Biomonitoring of an unnamed tributary of the Mangaone Stream below the McKechnie Aluminium Solutions Ltd plant, May 2021*. Internal Memorandum BZ167.
- Taranaki Regional Council (2021): *Biomonitoring of an unnamed tributary of the Mangaone Stream below the McKechnie Aluminium Solutions Ltd plant, January 2021*. Internal Memorandum BZ163.
- Taranaki Regional Council (2020): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2019-2020*. Technical Report 2020-43.
- Taranaki Regional Council (2020): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2018-2019*. Technical Report 2019-12.
- Taranaki Regional Council (2019): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2017-2018*. Technical Report 2018-20.
- Taranaki Regional Council (2018): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2016-2017*. Technical Report 2017-50.
- Taranaki Regional Council (2017): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2015-2016*. Technical Report 2016-15.
- Taranaki Regional Council (2016): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2014-2015*. Technical Report 2015-88.
- Taranaki Regional Council (2015): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2013-2014*. Technical Report 2014-68.
- Taranaki Regional Council (2014): *McKechnie Aluminium Solutions Limited Monitoring Programme Biennial Report 2012-2013*. Technical Report 2013-91.
- Taranaki Regional Council (2013): *McKechnie Aluminium Solutions Limited Monitoring Programme Biennial Report 2010-2012*. Technical Report 2012-75.
- Taranaki Regional Council (2012): *McKechnie Aluminium Solutions Limited Monitoring Programme Annual Report 2009-2010*. Technical Report 2010-112.
- Taranaki Regional Council (2010): *MCK Metals Pacific Limited Monitoring Programme Annual Report 2008-2009*. Technical Report 2009-86.
- Taranaki Regional Council (2009): *MCK Metals Pacific Limited Monitoring Programme Annual Report 2007-2008*. Technical Report 2008-66.
- Taranaki Regional Council (2008): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 2006-2007*. Technical Report 2007-85.
- Taranaki Regional Council (2007): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 2005-2006*. Technical Report 2006-06.
- Taranaki Regional Council (2005): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 2004-2005*. Technical Report 2005-59.
- Taranaki Regional Council (2005): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 2003-2004*. Technical Report 2004-34.

- Taranaki Regional Council (2003): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 2002-2003*. Technical Report 2003-41.
- Taranaki Regional Council (2003): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 2001-2002*. Technical Report 2002-43.
- Taranaki Regional Council (2002): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 2000-2001*. Technical Report 2001-84.
- Taranaki Regional Council (2000b): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 1999-2000*. Technical Report 2000-18.
- Taranaki Regional Council (2000): *MCK Metals Pacific Limited Resource Consents Monitoring Programme Annual Report 1998-1999*. Technical Report 99-98.
- Taranaki Regional Council (1999): *McKechnie Pacific Limited Resource Consents Monitoring Programme Annual Report 1997-98*. Technical Report 98-68.
- Taranaki Regional Council (1998): *McKechnie Pacific Limited Resource Consents Monitoring Programme Annual Report 1996-97*. Technical Report 97-53.
- Taranaki Regional Council (1997): *McKechnie Pacific Limited Plume Monitoring Investigation 1996-97*. Technical Report 97-28.
- Taranaki Regional Council (1996): *McKechnie Pacific Limited Resource Consents Monitoring Programme Annual Report 1995-96*. Technical Report 96-35.
- Taranaki Regional Council (1996): *McKechnie Pacific Limited Resource Consents Monitoring Programme Report 1994/95*. Technical Report 95-77.
- Taranaki Regional Council (1995): *McKechnie Pacific Limited Plume Monitoring Investigation 1994-95*. Technical Report 95-10.
- Taranaki Regional Council (1995): *McKechnie Pacific Limited Resource Consents Monitoring Programme Annual Report 1993-94*. Technical Report 94-64.
- Taranaki Regional Council (1994): *McKechnie Metals Group Resource Consent Monitoring Programme Annual Report 1992-93*. Technical Report 93-41.
- Department of Health (1992): *Public health guidelines for the safe use of sewage effluent and sewage sludge on land*. Public Health Services Report.

Appendix I

Resource consents held by McKechnie Aluminium Solutions Ltd

(For a copy of the signed resource consent
please contact the TRC Consents department)

Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: McKechnie Aluminium Solutions Limited
Private Bag 2007
NEW PLYMOUTH 4342

Decision Date: 4 December 2012

Commencement
Date: 4 December 2012

Conditions of Consent

Consent Granted: To discharge treated stormwater from an industrial premise
that includes a metal extrusion plant into an unnamed
tributary of the Mangaone Stream at or about (NZTM)
1698859E-5677985N

Expiry Date: 1 June 2026

Review Date(s): June 2014, June 2020 and in accordance with special
condition 9

Site Location: 36 Paraitē Road, Bell Block, New Plymouth

Legal Description: Lot 1 DP 10008 Lot 1 DP 9212 Lot 2 DP 330342
[discharge source]

Catchment: Waiwhakaiho

Tributary: Mangaone

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General condition

- a. The consent holder shall pay to the Taranaki Regional Council [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The stormwater discharged shall be from a catchment area not exceeding 4 hectares.
3. Any significant volumes of hazardous substances on site shall be stored in a dedicated bunded area with drainage to sumps, or to other appropriate recovery systems, and not directly to the site stormwater system.
4. Constituents of the discharge shall meet the standards shown in the following table.

<u>Constituent</u>	<u>Standard</u>
pH	within the range 6.0 to 9.0
Suspended solids	concentration not greater than 100 gm ⁻³
Oil and grease	concentration not greater than 15 gm ⁻³
Dissolved copper	concentration not greater than 0.05 gm ⁻³
Dissolved zinc	concentration not greater than 1 gm ⁻³

This condition shall apply in the receiving waters at a designated sampling point immediately downstream of the railway crossing culvert at or about [1698859E-5677985N].

5. After allowing for reasonable mixing, within a mixing zone extending 150 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
 - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b) any conspicuous change in the colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life.
6. The consent holder shall maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

Consent 1857-6

7. The consent holder shall maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to:
 - a) the loading and unloading of materials;
 - b) maintenance of conveyance systems;
 - c) general housekeeping; and
 - d) management of the interceptor system.

8. The consent holder shall notify the Chief Executive, Taranaki Regional Council, prior to making any changes to the processes or operations undertaken at the site, or the chemicals used or stored on site, or any disturbance of soil on site that could alter the nature of the discharge. Any such change shall then only occur following receipt of any necessary approval under the Resource Management Act. Notification shall include the consent number, a brief description of the activity consented and an assessment of the environmental effects of any changes, and be emailed to consents@trc.govt.nz.

9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review:
 - a) during the month of June 2014 and/or June 2020; and/or
 - b) within 3 months of receiving a notification under special condition 8 above;

for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 4 December 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: McKechnie Aluminium Solutions Limited
Private Bag 2007
NEW PLYMOUTH 4342

Consent Granted
Date: 15 August 2008

Conditions of Consent

Consent Granted: To discharge emissions into the air from extrusion and
remelting of aluminium and associated activities at or about
(NZTM) 1699193E-5678120N

Expiry Date: 1 June 2026

Review Date(s): June 2014, June 2020

Site Location: Paraite Road, Bell Block, New Plymouth

Legal Description: Lot 1 DP 9212, Lot 1 DP 10008 & Lot 2 DP 330342

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. Notwithstanding any other conditions of this consent the consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The consent holder shall minimise the emission and effects of contaminants discharged to air from the property, by the selection of the best practicable process equipment, process control equipment, contaminant abatement equipment, and methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes at all times.
3. Any discharge to air from the exercise of this consent shall not give rise to any offensive, objectionable or toxic levels of smoke or dust or odour at or beyond the boundary of the property on which the extrusion and remelting of aluminium and associated activities are occurring.
4. The dust deposition rate beyond the property boundary of the MCK Metals Pacific Ltd Plant, arising from the discharge, shall be less than 4.0 g/m²/30 days or 0.13 g/m²/day.
5. All gas streams ventilated or otherwise discharged from the plant shall be treated to reduce the concentration of total particulate matter to less than 125 milligrams per cubic metre, normal temperature and pressure, at any time.

Consent 4034-3

6. The discharge of suspended particulate matter from the site shall not increase the ambient concentration of suspended particulate matter by more than 3 milligrams per cubic metre (measured under ambient conditions), determined by measurements at the upwind and downwind boundaries of the property.
7. The consent will be exercised in accordance with the procedures set out in the consent holder's Environmental Management Manual (August 2007) and subsequent revisions, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and all other matters specified in the Environmental Management Manual (August 2007), except by specific agreement of the Chief Executive, Taranaki Regional Council. In the case of any contradiction between the Environmental Management Manual (August 2007) and the conditions of this resource consent, the conditions of this resource consent shall prevail.
8. The consent holder shall notify the Chief Executive, Taranaki Regional Council, prior to making any changes to the processes or operations undertaken at the site, or the chemicals used or stored on site, which could alter the nature of the discharge. Any such change shall then only occur following receipt of any necessary approval under the Resource Management Act. Notification shall include the consent number, a brief description of the activity consented and an assessment of the environmental effects of any changes, and to be emailed to worknotification@trc.govt.nz.
9. The opacity of any discharge to air when measured by photoelectric means shall not equal or exceed a value of 20% opacity.
10. The emissions to the air from the Consent Holder's premises shall not significantly contribute to, nor cause the monitored ground level concentrations of particulate material less than 10 microns in aerodynamic diameter to exceed 50 micrograms per cubic metre of air expressed as a 24 hour average at or beyond the boundary of Consent Holder's premises.
11. That the discharge to atmosphere of any contaminants other than those specified above shall not cause the concentration within the air space beyond the boundary of the Consent Holder's property of that contaminant to exceed 1/30th [one-thirtieth] of the relevant Workplace Exposure Standard Time-weighted average [Workplace Exposure Standards Effective from 2002].
12. The Consent Holder shall, for the purposes of adequately monitoring the consent as required under Section 35 of the Act, on becoming aware of any incident or situation that does not comply with this consent, immediately advise the Council on the incident. The Consent Holder shall then supply a written report to the Council on the cause, effects and the actions taken to mitigate the effects on the environment and to prevent recurrence. The written report shall be submitted to the Council within one week of the incident occurring.

Consent 4034-3

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2014 and/or June 2020, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 4 March 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management