Taranaki Galvanizers Ltd
Monitoring Programme
Annual Report
2018-2019

Technical Report 2019-16

ISSN: 1178-1467 (Online)
Document: 2281395 (Word)
Document: 2289537 (Pdf)

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September 2019

Executive summary

Taranaki Galvanizers Limited (the Company) operates a zinc galvanising plant located on Monmouth Road, approximately 1 km north of Stratford, in the Kahouri Stream catchment. The Company utilises a hot-dip galvanising process to provide a protective coating for steel materials. This report for the period July 2018 to June 2019 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company'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 the Company's activities.

The Company holds two resource consents, which include a total of 16 conditions setting out the requirements that the Company must satisfy. The Company holds one consent to allow it to discharge stormwater into an unnamed tributary of the Kahouri Stream, and one consent to discharge emissions into the air at this site.

During the monitoring period, Taranaki Galvanizers Limited demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included two inspections and seven water samples collected for physicochemical analysis.

Elevated zinc concentrations were recorded in the receiving waters upstream and downstream of the Company's discharge. The historical disposal of galvanising waste materials into a bore on the Company's site is considered to be the most likely source of zinc contamination in this discharge, and in the unnamed tributary of the Kahouri Stream. Results from the current monitoring period showed that zinc concentrations were consistent with results obtained in recent years, with concentrations show an overall decreasing trend in the receiving environment over time.

In the reported period, no effects from the emissions to air from the galvanising site were detected at or beyond the boundary of the site.

During the year, the Company demonstrated a high level of environmental and administrative performance with the resource consents.

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% 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 the consent holder's performance remains at a high level in the year under review.

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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 2018 to June 2019 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Taranaki Galvanizers Ltd (the Company). The Company operate a galvanising plant situated on the corner of Monmouth Road and State Highway 3, near Stratford. This site is located in the Patea catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to discharges of water within the Patea catchment, and the air discharge permit held by the Company 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 the Company's use of water, land and air, and is the eighth combined annual report by the Council for the Company.

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 though annual programmes;
- the resource consents held by the Company in the Patea catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Company's site/catchment.

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 2019-2020 monitoring year.

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' inasmuch 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 the Company, 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 the Company'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 significant 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 in response to unauthorised incident reports, 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 in response to unauthorised incident reports. 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 in response to unauthorised incident reports. 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 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.[1]

1.2 Process description

The galvanising plant owned and operated by the Company is situated at the corner of State Highway 3 and Monmouth Road, approximately 1 km north of Stratford (Figure 1). Road access to the site is via Monmouth Road.

The galvanising plant was owned and operated by Union Galvanizers 1995 Ltd until September 1998, at which time that company ceased to operate. The plant operations remained suspended until May 1999, when Taranaki Galvanizers (2003) Ltd took over ownership of the site (TRC, 2004). During the 2006–2007 monitoring period ownership changed once again, to Taranaki Galvanizers Ltd.

The Company utilise a hot-dip galvanising process which protects steel from corrosion by providing a thick, tough metallic zinc alloy coating. The process consists of various stages of preparation and treatment prior to completion of the process. A brief description of the process is given in Figure 2.

[1] The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

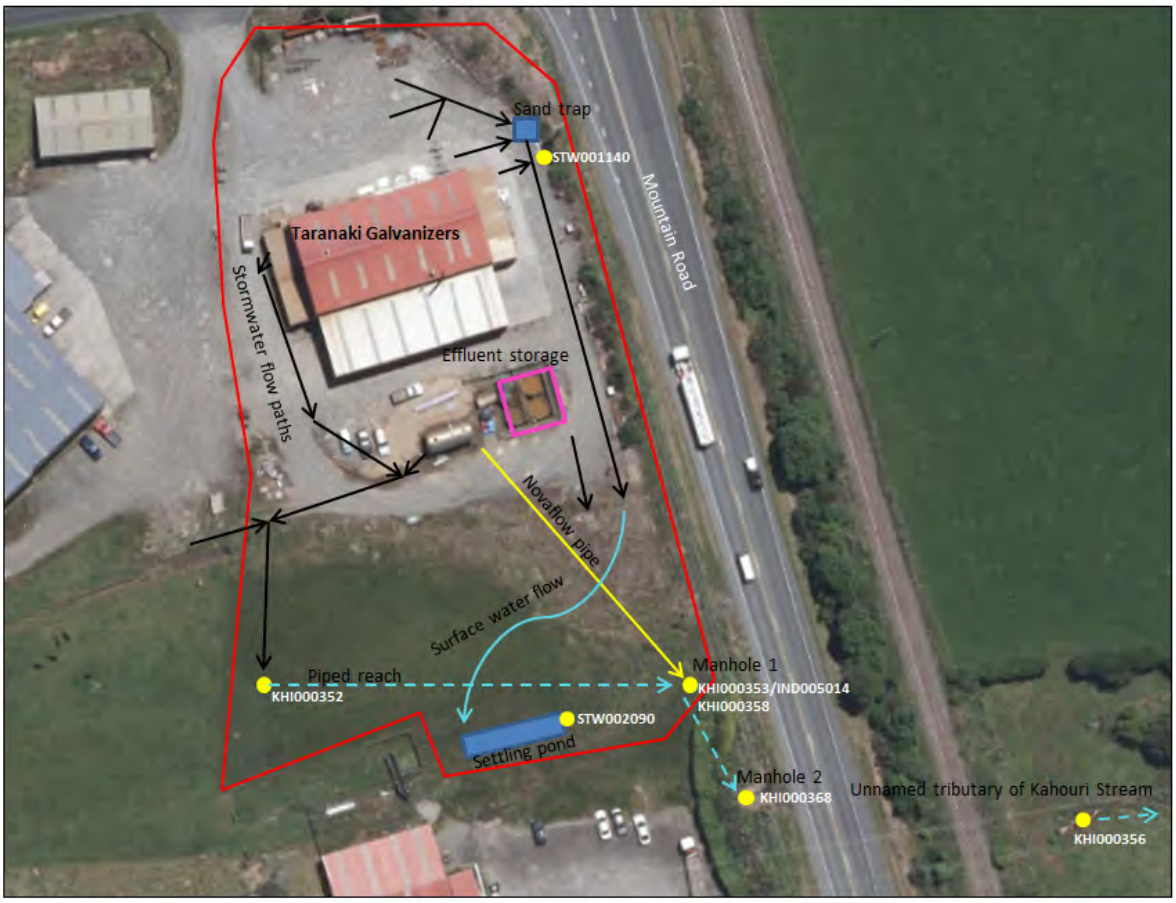

Figure 1 Taranaki Galvanizers site layout

Photo 1 The view down manhole 1

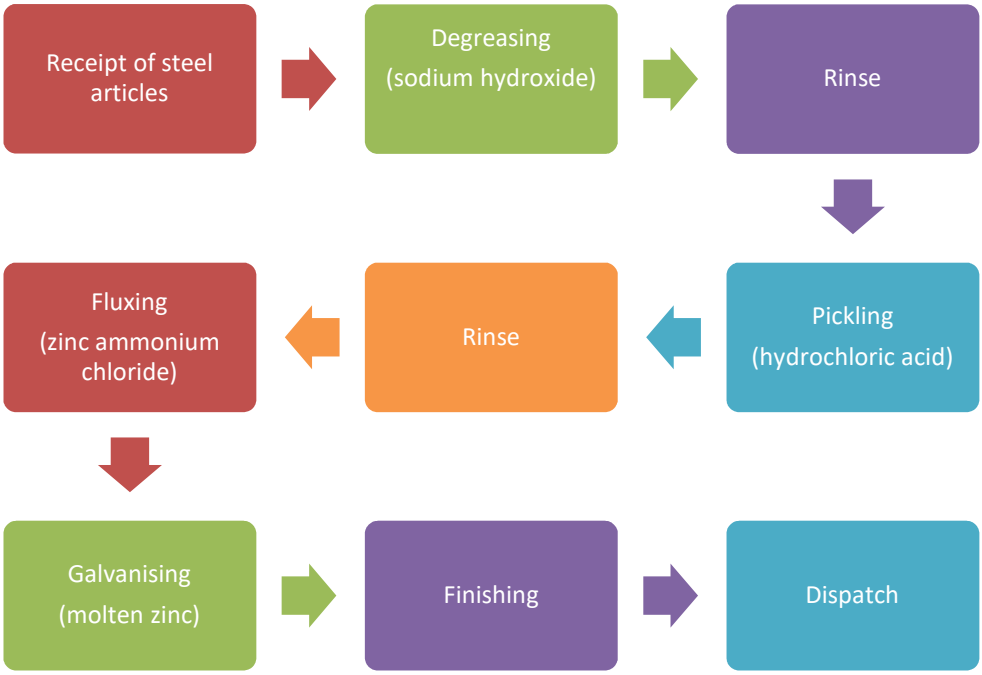

Figure 2 Hot-dip galvanising process undertaken at Taranaki Galvanizers

Articles of steel to be galvanised are initially immersed in a hot sodium hydroxide degreasing or stripping bath to remove any oil or grease contaminants. Oils removed from the surface of the steel remain on the surface of the degreasing bath. After degreasing, the articles are rinsed in a water bath to reduce the carry-over of caustic solution into the next phase of the process.

The next stage of the process involves the removal of mill scale, rust, paint and other oxides from the article being galvanised by 'pickling', or acid treatment, in hydrochloric acid. Again, the article is rinsed in water to remove any excess acid and to minimise the amount of acid carried over to the next stage in the process.

The acid-cleaned steel is then immersed in a flux solution containing zinc ammonium chloride to remove the oxide film which forms on the highly reactive steel surface after acid cleaning and prevents further oxidation prior to galvanising. The fluxing treatment also assists with the adhesion of the molten zinc to the steel, thereby providing a more uniform coating.

Fluxed steel articles are then galvanised by immersion in a hot bath of molten zinc. On completion of the galvanising process articles may be filed or sanded down to remove excess zinc prior to dispatch.

The galvanising plant is positioned in the central part of the site and houses a series of treatment tanks involved in the galvanising process (Figure 1). Two exhaust fans, one positioned at either end of the main building, are used to extract fumes from the building during galvanising operations. Large doors positioned on the northern and eastern sides of the main building provide access for the receipt and dispatch of materials at the site.

The area immediately surrounding the galvanising buildings is concreted. The concrete and metal yard located on the northern side of plant is used as laydown area for materials waiting to be processed or dispatched.

Effluent tanks collecting wastewater from the plant are housed within a concrete bunded area situated on the south-eastern corner of the galvanising plant (Figure 1).

Wastewater produced during the galvanising process can be divided into two main categories: a concentrated wastewater stream comprising largely of spent caustic cleaning and acid pickling liquids, and a dilute wastewater stream consisting of washings from the rinsing of articles and cleaning of floors as well as condensation from steam-jacketed vessels. These wastewater streams are disposed of separately.

All dilute wastewater is directed to a series of concrete tanks set within a concrete bunded area. Stormwater collected inside the bund is also pumped into these tanks. These tanks are used to neutralise pH and settle the wastewaters. This wastewater is then transported by road tanker from the galvanising plant to the Stratford oxidation ponds, after testing for zinc and pH under the supervision of the Stratford District Council.

The more concentrated wastewater is either recycled or directed to trade waste but is rarely stored on site. Plastic tanks situated in a bunded area lined with acid/caustic resistant resin are utilised entirely for emergency storage and have not been required for this purpose since 1995.

Stormwater from the roofs of the galvanising plant is collected for use on-site.

The stormwater drain located on the north-eastern side of the site was blocked off by the Company and no longer enters the roadside drain along SH3. This roadside drain discharges into the manhole beside the entranceway to the neighboring property owned by Taranaki Steelformers (manhole 2 in Figure 1). Stormwater from the northern part of the site now collects in a sand trap and is directed to the south paddock where it flows over pasture, and eventually collects in a settling pond at the southern end of the site. The stormwater discharge exits the settling pond through two black novaflow pipes, where it eventually collects in the roadside drain and then discharges into manhole 2 (Figure 1).

An unnamed tributary of the Kahouri Stream originally ran close to the southern boundary of the galvanising site. This stream is now piped from its origin, through two manholes (Figure 1), to where it appears as an open channel on the other side of SH3. The piped tributary is also thought to receive groundwater seepage from a disused bore on site which was in the past contaminated with waste from the galvanising plant. Further discussion of this event is given in section 1.4 of this report.

Stormwater from the southern side of the site either flows overland to a grated manhole (manhole 1 in Figure 1) on the south-eastern corner of the site or via a yellow nova flow pipe that then discharges into this same manhole. The novaflow pipe conveys both site stormwater and some groundwater seepage from the southern end of the site and is therefore referred to as an industrial discharge as opposed to only a stormwater discharge. The piped unnamed tributary enters manhole 1 immediately above the point of discharge from the industrial discharge novaflow pipe (Photo 1).

1.3 Resource consents

The Company holds two resource consents the details of which are summarised in the table 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 Appendix I, as are copies of all permits held by the Company during the period under review.

Table 1 Summary of consents held by Taranaki Galvanizers Ltd

Consent number	Purpose	Granted	Review	Expires
Water discharge permit				
4657-2	To discharge stormwater from the galvanising plant premises into an unnamed tributary of the Kahouri Stream in the Patea catchment at or about (NZTM) 1709996E-5647129N.	17 June 2010	June 2022	1 June 2028
Air discharge permit				
4064-3	To discharge emissions into the air from the operation of a hot dip galvanising plant and associated processes at or about GR: Q20: 198-088	17 June 2010	June 2022	1 June 2028

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 Taranaki Galvanizers 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;
- in 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 galvanising site was visited two times during the monitoring period. With regard to consents for the abstraction of or 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 the Company 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 both the discharges from the site and the water quality upstream and downstream of the discharge point and mixing zone.

The industrial discharge was sampled on one occasion. The unnamed tributary of the Kahouri Stream was sampled on two occasions, and the samples analysed by Hill Laboratories Ltd (Hills) for temperature, pH, conductivity, ammoniacal nitrogen, chromium, hydrocarbons, turbidity, suspended solids and zinc.

Table 2 shows a summary of the current sampling sites related to the Company’s discharge to water, and these locations are illustrated in Figure 1.

Table 2 Location of the physicochemical sampling points associated with the Company's discharge to water

Site	Location	GPS location	Site code	Sampling date/s
Unnamed tributary of the Kahouri Stream	Immediately upstream of Company's industrial discharge	1709995E-5647129N	KHI000353*	11/12/2018 05/06/2019
Industrial discharge (stormwater and ground water seepage)	Stormwater and groundwater leachate from the southern end of the site	1709995E-5647129N	IND005014*	05/06/2019
Unnamed tributary of the Kahouri Stream	200 m downstream of Taranaki Galvanizers	1710232E-5647063N	KHI000356	11/12/2018 05/06/2019
Stormwater discharge point *(new site)*	Settling pond at the southern end of the site	1709986E-5647127N	STW002090	No discharge
Unnamed tributary of the Kahouri Stream	Approximately 75 m u/s of SH3	1709926E-5647120N	KHI000352	11/12/2018 05/06/2019

**These sites are given the same GPS point as they are all located in the same manhole (1)*

The industrial discharge novaflow pipe (IND005014) was not sampled during the inspection undertaken on 11 December 2018, as there was no discharge of leachate occurring at the time of inspection.

The stormwater discharge point (STW002090) located at the southern end of the site was not sampled during the 11 December 2018 inspection and the 5 June 2019 inspection due to no discharge occurring at the time of sampling.

Sampling was undertaken at all receiving water sites on both sampling occasions. The sites sampled included; the unnamed tributary approximately 75 m upstream of SH3 (KHI000352), the unnamed tributary immediately above the Company's industrial discharge as it entered manhole 1 (KHI000353), and an open channel of the unnamed tributary approximately 200 m downstream of the Company's industrial discharge (KHI000356).

Samples were analysed by Hills for conductivity, pH, water temperature, ammonia, chromium, turbidity, suspended solids and zinc (dissolved).

1.4.5 Air quality monitoring

Air monitoring in the 2017-2018 period comprised of visual and olfactometric surveys undertaken during December and June inspection visits.

1.4.6 Previous monitoring of discharge to water

The unnamed tributary of the Kahouri Stream had been monitored at two sites (manhole 1-KHI000358 and manhole 2-KHI000368) downstream of the Company's site on an intermittent basis since it was discovered that spent acid containing a high concentration of zinc was disposed of in a bore on the galvanising plant

site in 1987. Periodically, samples had also been taken from the unnamed tributary upstream of the Company's site (KHI000353) when zinc was found to be leaching from the site and appearing in the piped tributary parallel to the boundary of the galvanising plant site. The then Regional Water Board decided to monitor the tributary regularly and take action if there was a risk to biota of the Kahouri Stream, rather than excavating the area which risked releasing a large amount of zinc into the Kahouri system. The zinc concentration in the tributary decreased through the 1990's and remained relatively stable since.

2 Results

2.1 Water

2.1.1 Inspections

Two inspections of the Company's site were performed during the period under review. The inspections focused on stormwater and wastewater management, and the impacts of air emissions from the site.

11 December 2018

The site was inspected in overcast but dry conditions, following fine weather.

Some zinc flecks were present on the gravel yard and concrete pad, but these were being actively collected during the inspection. There were no obvious discharges to air at the time of the inspection. The stormwater pond at the southern end of the site was not discharging at the time of sampling. The stormwater areas were clear of any chemicals. No odour, foaming or sheen was noted. Samples were collected from three out of five sampling locations.

5 June 2019

The site was inspected in overcast and wet conditions following recent wet weather.

Many zinc flecks were observed on the gravel yard and concrete pad and it was advised these be gathered up on a regular basis. There was a discharge to air evident at the time of the inspection but there was no associated odour and the discharge dissipated at the site boundary. Stormwater areas were observed to be clear of any chemicals. No odour, foaming or sheen was noted. The stormwater pond at the southern end of the site was not discharging at the time of sampling. Samples were collected from four out of five sampling locations.

2.1.2 Physicochemical sampling

On one occasion during the reported period (11 December 2018), sampling was undertaken at both upstream sites (KHI000353 and KHI000352) and one downstream site (KHI000356). On the other sampling occasion (5 June 2019) sampling was undertaken at the two upstream sites (KHI000352 and KHI000353), a downstream site (KHI000356) and at the industrial discharge novaflow pipe (IND005014).

2.1.2.1 Upstream sites (KHI000352 and KHI000353)

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000) propose that for protection of 95% of species (the default value for ecological protection), zinc in fresh water should be less than 0.008 g/m^3 (at a hardness 30 g/m^3 $CaCO_3$). For protection of 80% of species (the lowest level of ecological protection in the guideline), zinc in freshwater should be less than 0.031 g/m^3. These numbers refer to chronic (on-going) exposure. Zinc concentrations recorded upstream of the Company's site by the two surveys were indicative of zinc contamination (Table 3). Measured concentrations were however far below the resource consent limit for zinc of 5 g/m^3.

During the period under review both surveys returned elevated amounts of zinc across the two upstream sites. Therefore the contaminated bore is likely to be still having an effect on water quality at the site.

Table 3 Results of the two sampling surveys at the two upstream sites (KHI000352 and KHI000353)

Parameter	Unit	Survey 11/12/18		Survey 05/06/19	
		Upstream 1 (KHI000352)	Upstream 2 (KHI000353)	Upstream 1 (KHI000352)	Upstream 2 (KHI000353)
Temperature	Deg.C	13.2	13.2	13.6	12.8
pH	pH	6.7	6.7	6.4	6.8
Conductivity at 20°C	mS/m	12.4	14.0	9.5	10.0
Ammoniacal Nitrogen	g/m^3N	1.01	1.01	0.64	0.59
Chromium-acid soluble	g/m^3	<0.010	<0.010	<0.010	<0.010
Hydrocarbons	g/m^3	<0.7	<0.7	<0.7	<0.7
Turbidity	NTU	13.5	10.2	83	25
Suspended solids	g/m^3	9	4	78	16
Zinc-dissolved	g/m^3	0.096	0.196	0.85	0.37

Discharge sampling undertaken in the reported period, at site upstream 2 (KHI000353) showed that the latest concentrations of dissolved zinc (0.196 g/m^3 and 0.37 g/m^3) were below the median of historical dissolved zinc concentrations (0.594 g/m^3) (Figure 3).

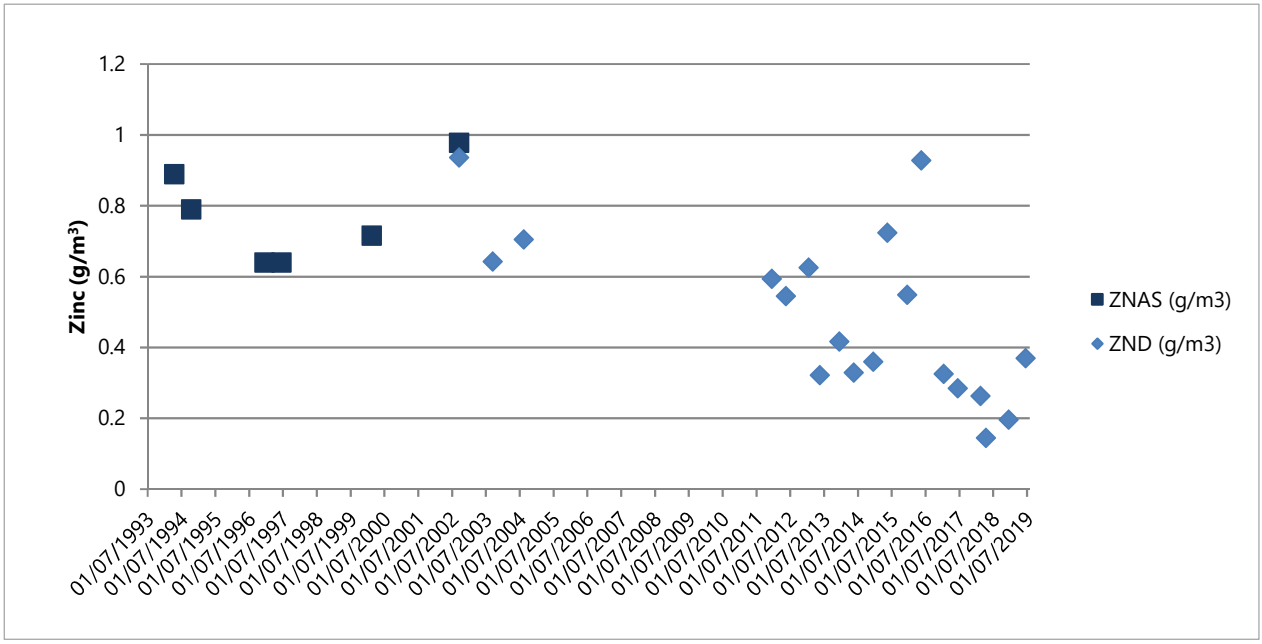

Figure 3 Zinc concentrations in the unnamed tributary of the Kahouri Stream immediately upstream of the Company's industrial discharge since 1994 (site KHI000353)

2.1.2.2 Industrial discharge site (IND005014)

Historical and current results from industrial discharge samples obtained from the industrial discharge novaflow pipe (IND005014) samples are presented in Table 4. Due to insufficient flow from the pipe to enable sampling, there are no results for the 2012-2013 and 2013-2014 monitoring periods. Prior to the May 2016 inspection, part of the novaflow pipe was replaced after it was found that a section was damaged. It is likely the damaged section had previously restricted flow through the pipe. No sample was collected during the December 2018 survey, again due to a lack of discharge at the time of sampling.

Table 4 Historical results of the discharge from the industrial discharge novaflow pipe (IND005014) for the period 24 October 1991 to 05 June 2019 and current results

Parameter	Unit	Consent limit	Historical data 24/10/1991-14/4/2018			Current data 05/06/2019
			No. of samples	Range	Median	
Temperature	°C	-	22	8.7-17.0	13.6	14.0
pH	pH	6.0-9.0	31	3.5-6.9	4.6	6.5
Conductivity at 20°C	mS/m	-	30	5.8-150	34.7	19.9
Ammonia-N	g/m^{3}N	-	15	<0.003-68.0	0.690	1.39
Chromium-acid soluble	g/m^3	-	9	<0.03-<0.03	0.02	<0.010
Turbidity	NTU	-	11	0.14-96	0.95	15.4
Suspended solids	g/m^3	100	7	<2-64	21	14
Dissolved zinc	g/m^3	5	13	0.24-39.2	4.3	3.3
Hydrocarbons	g/m^3	15	4	0.5-0.5	0.2	<0.7

Special condition 4 of consent 4657-2 has specified limits on certain constituents of the discharges including; pH, hydrocarbons, suspended solids and zinc. Although historical discharges do not relate to this consent, these conditions can be a useful guide, to which comparisons can be made. Previous sampling records have shown that pH levels have increased markedly since the 1990's to within the lower end of the consented pH range in the last few years (Figure 4). The concentrations of suspended solids have consistently fallen within the specified consent limits at the industrial discharge site (IND005014) (Table 4).

Dissolved zinc concentrations have fallen within the consent limit of 5 g/m^3 (consent conditions granted June 2010) and have decreased considerably over the last 12 years. The most recent result (3.3 g/m^3) was within the consent limit, but had increased substantially since the previous sampling occasion (0.931 g/m^3) (Figure 5). The historical disposal of galvanising waste materials into a bore on the Company's site is considered to be the most likely source of zinc contamination in this discharge; although zinc in stormwater from the southern end of the site may have also contributed to this result.

Stormwater discharge site (STW002090)

The stormwater discharge point (STW002090) located at the southern end of the site was not sampled during the December 2018 or June 2019 inspections due to a lack of discharge.

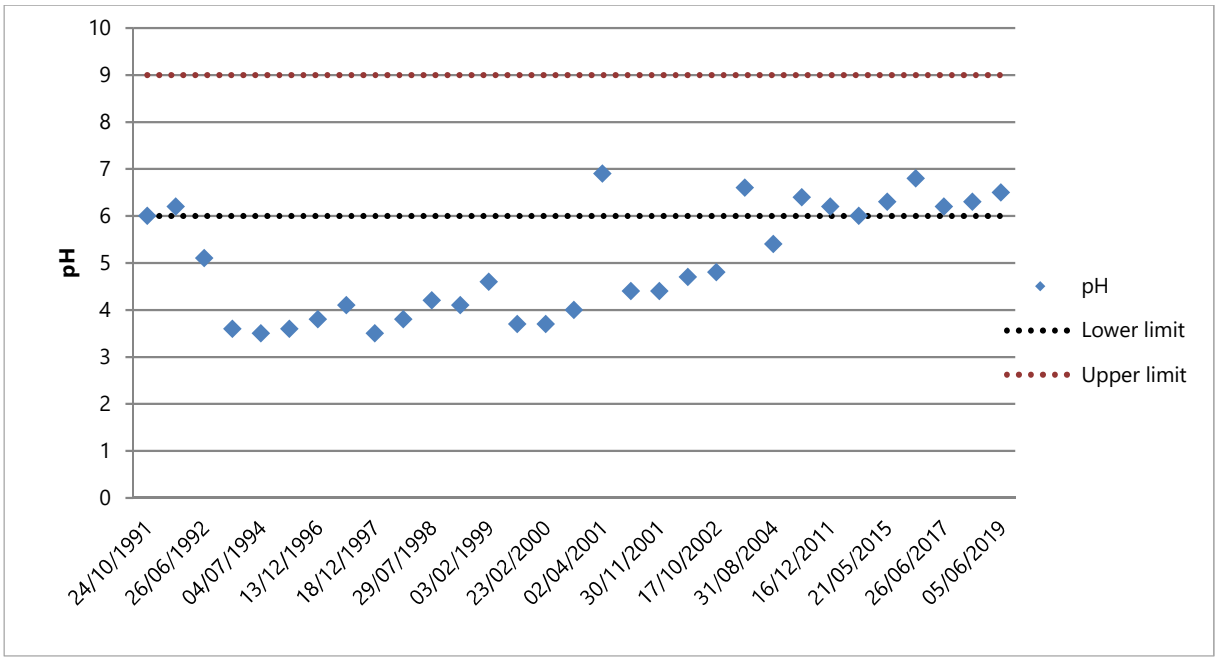

Figure 4 pH levels recorded in the discharge (IND005014) from the Company's site between October 1991 and June 2019

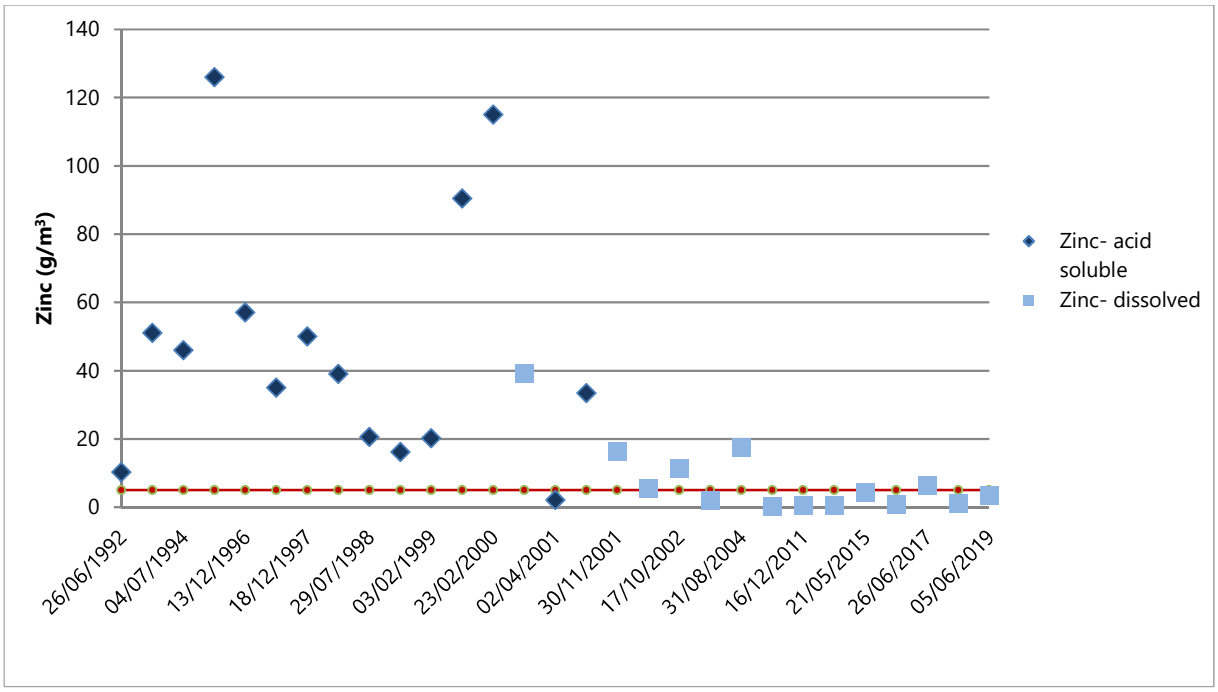

Figure 5 Zinc concentrations recorded in the discharge sample (IND005014) from the Company's site between June 1992 and June 2019

2.1.2.3 Downstream site (KHI000356)

Results for the surveys carried out on the 11th December 2018 and 5th June 2019 are presented in Table 5. The results from the December 2018 and June 2019 surveys are somewhat consistent with the historic median values.

Table 5 Results of two sampling surveys at the downstream site (KHI000356)

Parameter	Units	Survey date		Median
		11/12/2018	05/06/2019	-
Temperature	g/m^3	13.5	12.7	14
pH	pH	6.7	6.6	6.6
Conductivity at 20°C	mS/m	12.1	9.2	10.2
Ammonia	g/m^{3}N	0.68	0.33	0.796
Chromium-acid soluble	g/m^3	<0.010	<0.010	0.02
Hydrocarbons	g/m^3	<0.7	<0.7	0.2
Turbidity	NTU	11.9	16.8	26
Suspended solids	g/m^3	4	11	6
Zinc-dissolved	g/m^3	0.186	0.23	0.35

The results of the 11 December 2018 survey showed an increase in zinc concentration of 0.1 g/m^3 between the upstream site 1 and lower upstream site 2 (Figure 6). There was a slight decrease in zinc from the upstream site 2 and downstream site (0.01 g/m^3). Typically, freshwater waterbodies do not naturally have zinc concentrations above 0.060 g/m^3.

During the 5 June 2019 survey, the highest level of zinc was recorded at upstream site 1 (0.85 g/m^3). A decrease in zinc of 0.48 g/m^3 was recorded between upstream site 1 and upstream site 2, and a further decrease of 0.14 g/m^3 between upstream site 2 and the downstream site (Figure 6). Seepage from the contaminated bore under the Company's site is the most likely source of the contamination recorded upstream of the industrial and stormwater discharges.

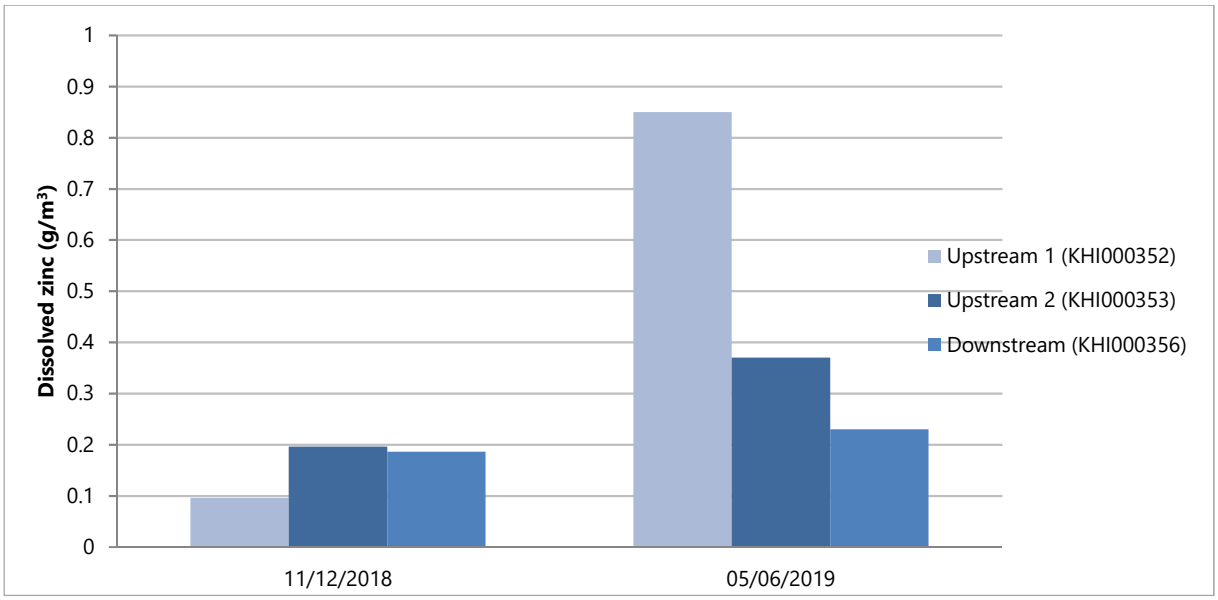

Figure 6 Dissolved zinc concentrations in the unnamed tributary of the Kahouri Stream upstream and downstream of the site.

Monitoring of the unnamed tributary of the Kahouri Stream has shown that zinc concentrations decreased through the 1990's, then remained relatively constant , varying between the detection limit of 0.005 g/m^3

and 1 g/m^3. Recent monitoring data suggest that zinc concentrations increased slightly from the previous monitoring year but are still relatively stable and generally decreasing over time at the downstream site (KHI000356) (Figure 7). It is considered likely that it will take some years before the zinc concentrations in the tributary are reduced significantly due to the level of contamination (from the bore) under the Company's site.

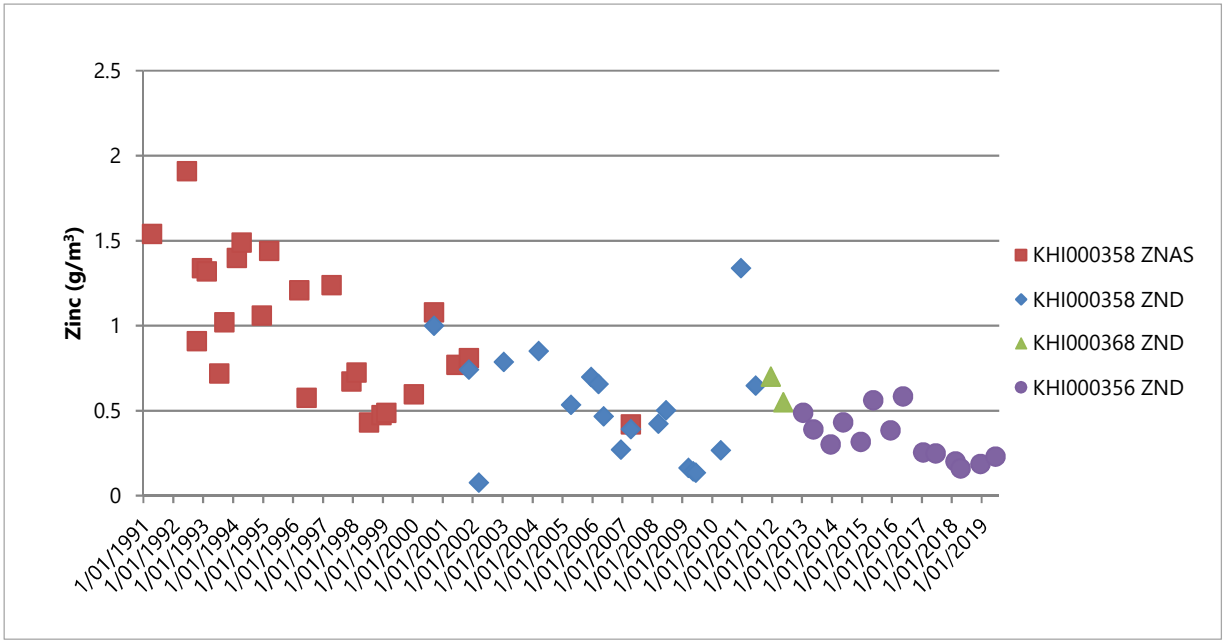

Figure 7 Zinc concentrations in the unnamed tributary of the Kahouri Stream downstream of the Taranaki Galvanizers industrial discharge since 1991

2.2 Air

2.2.1 Inspections

Air monitoring inspections were undertaken on two occasions during the monitoring period under review.

On 11 December 2018 an inspection was carried out. At the time of the inspection there was no visible discharge to air from the building (smoke).

On 5 June 2019 an inspection was carried out. At the time of the inspection there was a smoky discharge to the air but there was no associated odour and the discharge dissipated at the site boundary.

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 Company. 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 2018-2019 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

3 Discussion

3.1 Discussion of site performance

In general, monitoring during the 2018-2019 period found the site in good condition and being well managed. The stormwater catchment area was generally kept clear of contaminants, but zinc fragments were found on the laydown areas of the site during inspection visits. The Company was reminded of the requirement to manage deposition within these areas and to undertake clean-up of zinc fragments at regular intervals to avoid it becoming entrained in runoff from the site. Inspections found wastewater from the site was being well managed, and operations were undertaken in a manner that minimised environmental effects.

No issues related to air emissions where identified during inspection visits.

3.2 Environmental effects of exercise of consents

Physicochemical water quality monitoring over previous monitoring periods indicated that elevated zinc levels were continuing to occur from the discharges of stormwater and groundwater leachate from the galvanising site, as a result of historical disposal of spent acid to a bore on the property. The results have shown that in general, zinc concentrations have continued to decline over time. Sampling undertaken in the current period showed that the latest concentrations of zinc were within the resource consent condition requirements at site and there was no likely effect on the receiving environment downstream of the site.

It is noted that the factory is located in a rural area and is isolated from residences or other commercial premises. Accordingly, there is no evidence of aerial emissions from galvanising activities causing adverse effects off-site.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 6 and Table 7. An evaluation of the Company's historical performance (2010 onwards) is presented in Table 8.

Table 6 Summary of performance for consent 4657-2

Purpose: ***To discharge stormwater from the galvanising plant premises into an unnamed tributary of the Kahouri Stream.***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option	Inspections	Yes
2. Limit on stormwater catchment area	Inspections	Yes
3. Requirements for storage and containment facilities for hazardous substances	Inspections	Yes
4. Discharge contaminant limits	Water quality monitoring	Yes
5. Defines no adverse effects on receiving waters after reasonable mixing	Water quality monitoring and inspections	Yes
6. Requirement to maintain a spill or emergency contingency plan	Review by Council	Yes

Purpose: *To discharge stormwater from the galvanising plant premises into an unnamed tributary of the Kahouri Stream.*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
7. Requirement to maintain a stormwater management plan	Review by Council	Yes
8. Requirement to notify Council of any significant changes that may alter nature of the discharge	Notify Council (no notification)	N/A
9. Optional review of consent	Not exercised	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 7 Summary of performance for consent 4064-3

Purpose: *To discharge emissions into the air from the operation of a hot dip galvanising plant and associated processes*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option	Inspections	Yes
2. Discharge shall not result in offensive or objectionable odours beyond the site boundary	Inspections	Yes
3. Limit on zinc deposition rate near the property boundary	Deposition gauging	N/A
4. Requires galvanising process to be dry flux as far as practicable	Inspections; Records from Company	Yes
5. Wet fluxing or flux dusting prohibited from occurring on site	Inspections	Yes
6. Requirement to notify Council of any significant changes that may alter nature of the discharge	Notify Council (no notification)	N/A
7. Optional review of consent	Not exercised	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 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2010-2011	4657-2	-	1	-	-
	4064-3	-	1	-	-
2011-2012	4657-2	1	-	-	-
	4064-3	1	-	-	-
2012-2013	4657-2	1	-	-	-
	4064-3	1	-	-	-
2013-2014	4657-2	-	1	-	-
	4064-3	1	-	-	-
2014-2015	4657-2	1	-	-	-
	4064-3	1	-	-	-
2015-2016	4657-2	1	-	-	-
	4064-3	1	-	-	-
2016-2017	4657-2	-	1	-	-
	4064-3	1	-	-	-
2017-2018	4657-2	1	-	-	-
	4064-3	1	-	-	-
2018-2019	4657-2	1			
	4064-3	1			
Totals	-	14	4	0	0

During the year, the Company demonstrated a high level of environmental and high level of administrative performance with the resource consents as defined in Section 1.1.4.

3.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT monitoring was continued for the 2018-2019 period, similar in format to the 2017-2018 program.

3.5 Alterations to monitoring programmes for 2019-2020

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.

It is proposed that for 2019-2020 that the monitoring continue at the same level as it had in 2018-2019.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) 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 2019-2020.

3.6 Exercise of optional review of consent

There are no consents held by the Company that allow for an optional review of consent in this period under review.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Taranaki Galvanizers Ltd site in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, 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.
As*	Arsenic.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
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.
Cumec	A volumetric measure of flow-1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
F	Fluoride.
$g/m^2/day$	grams/$metre^2$/day.
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.
L/s	Litres per second.
m^2	Square Metres.
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.
mS/m	Millisiemens per metre.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).

NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
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.
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	*Resource Management Act 1991* and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
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.

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Appendix I

Resource consents held by Taranaki Galavanizers Ltd

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

Consent number	Purpose	Granted	Review	Expires
4064-3	To discharge emissions into the air from the operation of a hot dip galvanising plant and associated processes at or about GR: Q20: 198-088	17 June 2010	June 2022	1 June 2028
4657-2	To discharge stormwater from the galvanising plant premises into an unnamed tributary of the Kahouri Stream in the Patea catchment at or about (NZTM) 1709996E-5647129N.	17 June 2010	June 2022	1 June 2028

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.

Discharge Permit

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

Name of Consent Holder:	Taranaki Galvanizers Limited R D 23 STRATFORD 4393
Consent Granted Date:	17 June 2010

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the operation of a hot dip galvanising plant and associated processes at or about (NZTM) 1709953E-5647196N
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	Corner Monmouth Road and State Highway 3, Stratford
Legal Description:	Lot 2 DP 19286 Blk I Ngaere SD

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 to 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 discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

3. The zinc deposition rate near the property boundary, at sampling locations as agreed to by the Chief Executive, Taranaki Regional Council, shall be less than 8.2 milligrams of zinc per square metre per day [$mg/m^2/day$]. The agreed locations are to be indicative of the zinc deposition rate immediately beyond the boundary.

4. The consent holder shall ensure that all items to be dry flux galvanised shall be clean and dry as far as practicable before hot dipping.

5. No wet fluxing or flux dusting will be undertaken on site.

6. 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, 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 worknotification@trc.govt.nz. Notification by fax or post is acceptable if the consent holder does not have access to email.

7. 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 2016 and/or June 2022, 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 17 June 2010

For and on behalf of
Taranaki Regional Council

_____

Chief Executive

Discharge Permit

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

Name of Consent Holder:	Taranaki Galvanizers Limited R D 23 STRATFORD 4393
Consent Granted Date:	17 June 2010

Conditions of Consent

Consent Granted:	To discharge stormwater from the galvanising plant premises into an unnamed tributary of the Kahouri Stream in the Patea catchment at or about (NZTM) 1709996E-5647129N
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022 and/or within 3 months of receiving a notification under special condition
Site Location:	Corner Monmouth Road and State Highway 3, Stratford
Legal Description:	Lot 2 DP 19286 Blk I Ngaere SD
Catchment:	Patea
Tributary:	Kahouri

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 to 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 0.735 hectares.

3. Any significant volumes of hazardous substances [e.g. hydrochloric acid, zinc ammonium chloride, sodium hydroxide] on site shall be:

   a) contained in a double skinned tank, or

   b) 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.

Constituent	Standard
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm^{-3}
total recoverable hydrocarbons	Concentration not greater than 15 gm^{-3}
zinc	Concentration not greater than 5 gm^{-3}

   This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

5. After allowing for reasonable mixing, within a mixing zone extending 5 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. The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

7. The consent holder shall maintain a stormwater management plan. This plan shall be adhered to at all times and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council document how the site is to be managed in order to minimise the contaminants that become entrained in the stormwater. The plan 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.

   A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

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, 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 worknotification@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 2016 and/or June 2022; 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 17 June 2010

For and on behalf of
Taranaki Regional Council

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Chief Executive