Dow Chemical (NZ) Ltd

Monitoring Programme

Annual Report

2022-2023

Technical Report 2023-71

Working with people | caring for Taranaki

Taranaki Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

Corteva Agriscience New Zealand Ltd (Corteva) and subsequently Dow Chemical (NZ) Ltd (Dow) operated a former agrichemical production and packaging site situated on Paritūtū Road, New Plymouth in the Herekawe catchment. Corteva announced the closure of the plant in 2020. The final product was packed in February 2021 and by the end of May 2021 all chemicals had been removed and the site thoroughly cleaned in preparation for the demolition of all above ground structures. This was completed in early 2023 and ownership of the site was transferred from Corteva to Dow on 21 February 2023, along with the site's resource consents.

This report for the period July 2022 to June 2023 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the consent holder'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 activities at the site.

During the monitoring period, both Corteva and Dow demonstrated a high level of environmental performance and a high level of administrative performance.

Dow holds two resource consents, which allow it to discharge stormwater into the Herekawe Stream and to discharge emissions into the air at this site. These consents include a total of 24 conditions setting out the requirements that the Company must satisfy.

The Council's monitoring programme for the year under review included four inspections, two water samples collected for physicochemical analysis, two biomonitoring surveys of receiving waters, and one marine ecology inspection.

The monitoring showed that activities at the Paritūtū site had no significant impact on air quality in the vicinity of the plant or on water quality in the Herekawe Stream. There were no unauthorised incidents recording non-compliance in respect of the consent holders during the period under review.

For reference, in the 2022-2023 year, consent holders were found to achieve a high level of environmental performance and compliance for 878 (87%) of a total of 1007 consents monitored through the Taranaki tailored monitoring programmes, while for another 96 (10%) of the consents a good level of environmental performance and compliance was achieved. A further 27 (3%) of consents monitored required improvement in their performance, while the remaining one (<1%) achieved a rating of poor.

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.

This report includes recommendations for the 2023-2024 year.

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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 2022 to June 2023 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Corteva Agriscience New Zealand Ltd (Corteva) and subsequently Dow Chemical (NZ) Ltd (Dow). Ownership of the site was transferred from Corteva to Dow on 21 February 2023. The companies operated a former agrichemical production and packaging site situated on Paritūtū Road, New Plymouth in the Herekawe catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents that relate to discharges of water within the Herekawe catchment, and the air discharge permit held to cover emissions to air from the site. This report is the 31st annual report to be prepared by the Council to cover air and water discharges from the Paritūtū site.

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 *Resource Management Act 1991* (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 Herekawe catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Company'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 2023-2024 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' 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 performance

Besides discussing the various details of the performance and extent of compliance by the consent holders, this report also assigns a rating as to each Company's environmental and administrative performance during the period under review. The rating categories are high, good, improvement required and poor for both environmental and administrative performance. The interpretations for these ratings are found in Appendix II.

For reference, in the 2022-2023 year, consent holders were found to achieve a high level of environmental performance and compliance for 878 (87%) of a total of 1007 consents monitored through the Taranaki tailored monitoring programmes, while for another 96 (10%) of the consents a good level of environmental performance and compliance was achieved. A further 27 (3%) of consents monitored required improvement in their performance, while the remaining one (<1%) achieved a rating of poor. [1]

1.2 Site description

The 16 hectare Paritūtū site was used for production and preparation of a range of agricultural chemicals from 1960 to 2021. Corteva announced the closure of the plant in 2020. The final product was packed in February 2021 and by the end of May 2021 all chemicals had been removed and the site thoroughly cleaned in preparation for the demolition of all above ground structures. Details of the operational site are contained in previous consent compliance monitoring reports (see Bibliography).

Under Corteva's supervision, demolition works commenced in June 2022 and carried on until early 2023. Nīkau Group was the principle contractor for the works, with sampling and testing services provided by SGS NZ. All above ground structures were removed except for the hazardous substances compound and some concrete buildings which provide structural integrity to the elevated portion of the site. The tradewaste system was decommissioned and removed, and all drains and sumps leading to tradewaste were filled with concrete. The stormwater collection, storage and discharge infrastructure was retained, including all four stormwater ponds and the sump in the hazardous substances compound. The latter was fitted with a solar power system to pump stormwater to the ponds.

For the majority of the period under review, all stormwater collected from the site was irrigated to the grassed areas to the south of the property using two large standalone pumps. This avoided the need for offsite discharges during the demolition phase when there was increased risk of entrainment of contaminants. The irrigation is permitted under Rule 29 of the Council's Regional Fresh Water Plan which allows discharges of contaminants from industrial premises onto land. The likely contaminants of concern,

[1] The Council has used these compliance grading criteria for more than 19 years. They align closely with the four compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

herbicides and pesticides, are also licenced for use on pasture at far higher concentrations than were found in the stormwater during the monitoring period.

Upon assuming ownership on 21 February 2023, Dow retained SGS for stormwater management and engaged local security contractors to monitor the site while it is unmanned. A detailed site investigation and remediation project was announced with Tonkin & Taylor as the lead environmental consultants.

Further details of site activities during the period under review are included in the inspection notes in section 2.1.1.

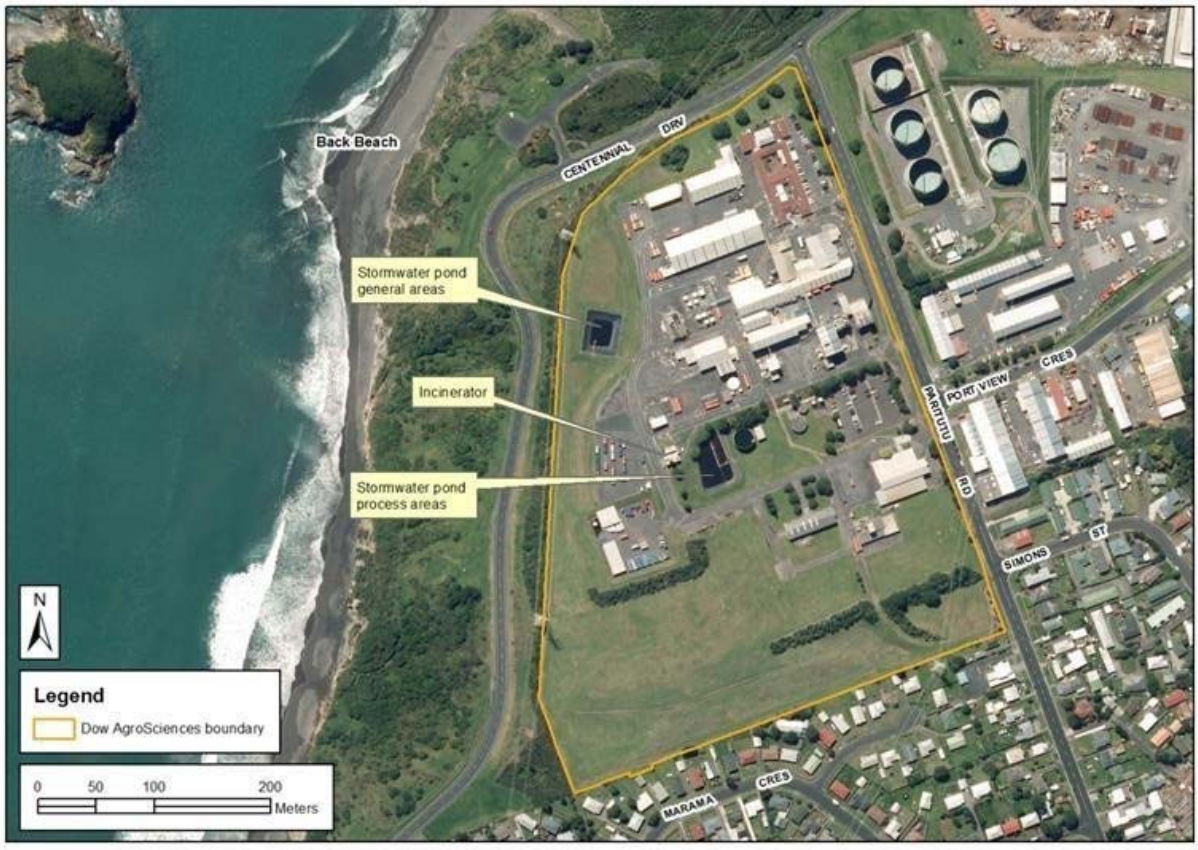

Figure 1 Aerial photograph of the Paritūtū site prior to demolition in 2022

1.3 Resource consents

The Company holds two resource consents the details of which are summarised in the table below. These were transferred from Corteva Agriscience New Zealand Ltd to Dow Chemical (NZ) Ltd on 21 February 2023. 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 all permits held by the Company during the period under review.

Table 1 Summary of consents held by Dow Chemical (NZ) Ltd

Consent number	Purpose	Granted	Review	Expires
Water discharge permit				
4108-2	To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and no-manufacturing areas into the Herekawe Stream	September 2008	-	June 2026
Air discharge permit				
4020-4	To discharge contaminants to air from all activities associated with the current and future operation of an agrichemical formulation and packaging plant	June 2020	June 2026	June 2044

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 Paritūtū site consisted of six 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 Paritūtū site was visited four times during the monitoring period. With regard to the consent for discharge to water, the main points of interest were processes with potential or actual discharges to receiving watercourses, including contaminated stormwater. Air inspections focused on 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 Stormwater sampling

Stormwater from the former production plant and storage areas, dangerous goods storage compound, incinerator pad and roads in these areas is collected in two retention pond systems. It is sampled and analysed for comparison with consent limits. Stormwater which meets the release criteria may be discharged to the Herekawe Stream.

There are four stormwater retention ponds at the Paritūtū Road site: SV9000, SV9100, SV9200 and SV8000. Stormwater from former production areas and roading is collected in SV9100 after treatment in separators to remove silt. SV9000 is used as an overflow retention pond. Stormwater from around the incinerator pad and roadway is collected in SV9200, while stormwater from around the former despatch area and dangerous goods storage compound is collected in SV8000.

The Council undertook sampling of the stormwater ponds on one occasion during the monitoring year, after releases to the Herekawe Stream had recommenced in April 2023. The Company collected samples at the same time for analysis and inter-laboratory comparison.

1.4.5 Groundwater monitoring

The Company conducts an on-going groundwater monitoring and modelling program, prepared in consultation with the Council, to assess the quality of groundwater beneath the site. Results are forwarded to the Council annually, while relevant matters are discussed as they arise. Shallow groundwater under the site flows under natural gradients north and west towards the coastal marine area, including the Sugar Loaf Islands (Ngā Motu) Marine Protected Area.

To address the low-level contamination found through a past investigation, the Company developed a Site Groundwater Management Plan, which was received and agreed to by the Council during the 1996-1997 period and (updated) in 2001. Contaminants (phenoxies and chlorophenols) were initially detected at low levels and groundwater flow suggested that the contamination evident would pose no environmental risk and over time would reduce to levels below detection.

The Company fully evaluated the site and recommended a monitoring approach to ensure that, as predicted by modelling, no adverse environmental effects occur. The current monitoring approach adopted through the Site Groundwater Management Plan requires the Council to remain fully informed of the results. The approach enables the risk of effects on the environment to be assessed fully on an on-going basis, and appropriate action to be taken. The information available at this time suggests that no adverse environmental effects are likely and that the contaminants will fully degrade before migration from the site occurs.

1.4.6 Biomonitoring surveys

The Council has a programme to assess biological diversity and richness of the Herekawe Stream. Two biological surveys were conducted during the monitoring year to assess whether discharges from the Paritūtū site were having any environmental impact on the stream.

1.4.7 Foreshore marine ecology inspection

An annual marine ecology inspection of the Back Beach foreshore below the Paritūtū plant is undertaken to look for any evidence of a discharge from the site (including any groundwater seeps) and to assess any environmental impact.

2 Results

2.1 Water

2.1.1 Inspections

Officers of the Council carried out four inspections of the site during the 2022-2023 monitoring period. The inspections included the maintenance and housekeeping of former process areas and roadways; the stormwater collection and retention systems; stormwater sampling and inspections of the discharge point and receiving waters in the Herekawe Stream. Scheduled inspections were carried out on 20 July 2022, 8 December 2022, 26 January 2023 and 6 June 2023. Notes from these visits are summarised below.

20 July 2022

On site 14:00 to 15:00 with Corteva staff. Weather was cloudy with a moderate northerly wind. 18 mm of rainfall had been recorded over the previous week at the Brooklands Zoo station. Nīkau Contractors had commenced demolition of the above ground structures. The site was generally tidy with some stockpiling areas where processing of materials for recycling or disposal was being undertaken. Due to the recent detection of contaminants in the stormwater ponds in excess of consent limits, no discharges were occurring to the Herekawe Stream at the time of inspection. All collected stormwater was instead being irrigated to the southern grassed area using large pumps adjacent to each of the two stormwater pond locations. Testing of the water prior to irrigation continued to be undertaken by SGS. Works to date were well managed and stormwater grates in operational areas were surrounded by filter socks. There were no visible emissions to air or noticeable odours.

8 December 2022

On site 09:00 to 10:00 with Corteva staff. Weather was fine with a moderate easterly wind. 0.4 mm of rainfall had been recorded over the previous week at the Brooklands Zoo station. Removal of the above ground structures was largely completed. The stormwater pond systems and hazardous substances storage area were to remain in place and a solar charged battery system had been installed to provide power for pumping stormwater from the storage area sump to the ponds. There were ongoing site works to fence off drops of over one metre and repair the remaining pavement. The stormwater ponds were to be cleaned prior to site handover which was proposed for 1 February 2023. Both consents were to be transferred to Dow and retained for the site investigation. All stormwater from the ponds continued to be tested and irrigated to land at the site. There were no discharges to the Herekawe Stream, and no visible emissions to air or noticeable odours. The site was tidy.

26 January 2023

On site 14:00 to 15:30 for an inspection with stakeholders including representatives from Dow, Corteva, Tonkin & Taylor, New Plymouth District Council and iwi/hapū. Weather was fine with a northerly breeze. 14.6 mm of rainfall had been recorded over the previous week at the Brooklands Zoo station. The site demolition, clean up and installation of safety measures had been completed. The gatehouse had been removed and the stormwater ponds emptied in preparation for cleaning. The concrete structures around the eastern raised area were to remain in place to maintain integrity of the underlying soils. Site handover had been confirmed for February. SGS were to continue the sampling and analysis of the stormwater, and other contractors had been engaged for site maintenance. WorkSafe had undertaken an inspection that morning and approved the installed safety measures. Security cameras were to be installed while the site is idle and unmanned, with active monitoring by Dow and a local firm. The site was very tidy with no noticeable odours.

6 June 2023

On site 13:00 to 13:45 with SGS staff. Weather was fine with a very strong southerly wind. 53 mm of rainfall had been recorded over the previous week at the Brooklands Zoo station. Security systems had been installed and contractors were keeping the grounds well maintained. Stormwater ponds SV8000 and SV9200 were sampled. Both ponds were very clean and to be discharged to the Herekawe Stream the following day. Ponds SV9000 and SV9100 contained residual contaminants and were still being irrigated to land. Stormwater from the empty hazardous substances storage area was still being pumped to the ponds. The irrigation pump at SV8000 was to be removed as it was no longer required. The site was very tidy with no noticeable odours.

2.1.2 Results of discharge monitoring

All stormwater collected in the four stormwater retention ponds was sampled and analysed by a local contractor on behalf of the consent holder prior to discharge by irrigation to grassed areas of the site or release to the Herekawe Stream. The samples were checked for the parameters controlled by consent 4108: floatable and suspended materials, odour, colour and visual clarity, pH and potential chemical contaminants including phenoxy herbicides, organophosphates, triclopyr and picloram.

At the outset of the monitoring period, stormwater sampling on behalf of Corteva showed an exceedance of the release criteria, with 0.13 mg/L of total phenoxy herbicides detected in SV8000. The source was believed to be small amounts of contaminants from pipework being removed as part of the demolition. Because all drains that previously directed water from process areas to the tradewaste system had been sealed, trace remnants of herbicides were now flushing to the stormwater system. The decision was made to irrigate all collected stormwater to site, as discussed in Section 1.2.

No stormwater was subsequently discharged under consent 4108 until the final quarter of the monitoring period, well after the site demolition works had been completed. Dow commenced discharging to the Herekawe Stream from SV9200 in April 2023, followed by SV8000 in May. SV9000 and SV9100 continued to be irrigated to land at this time.

Two of the stormwater ponds were sampled by the Council for consent compliance and inter-laboratory comparison. In 2022-2023, due to the site closure, only one sample run was programmed. This was collected on 6 June 2023 after releases to the Herekawe Stream had recommenced and was analysed for a total of 110 pesticide residues and acid herbicide compounds.

The results of Council monitoring for 2022-2023 are presented in Tables 2 and 3.

Table 2 Stormwater results for acid herbicides and pH on 6 June 2023

Parameter	Concentration (mg/L)		
	SV8000	SV9200	Consent limit
2,4,5-T	0.0125	0.0005	
2,4-D	< 0.0004	< 0.0006	
2,4-DB	< 0.0004	< 0.0004	
MCPA	< 0.0004	< 0.0004	
MCPB	< 0.0004	< 0.0004	
Total phenoxy herbicides	0.0125	0.0005	0.10
Picloram	0.0008	0.0004	0.10
Triclopyr	0.0007	0.0005	0.10
pH	7.0	6.6	6.0 – 9.0

Table 3 Stormwater results for pesticides on 6 June 2023

Parameter	Concentration (mg/L)		
	SV8000	SV9200	Consent limit
Chlorpyrifos	< 0.00004	< 0.00004	
Chlorpyrifos-methyl	< 0.00004	< 0.00004	
Total organophosphates	< 0.00004	< 0.00004	0.0005
Oxyfluorfen	< 0.00002	< 0.00002	0.005

The sampled stormwater complied with the release criteria stipulated by consent 4108.

Because 2,4,5-T has not been produced at the site for decades, its presence in the stormwater may indicate leaching of contaminants from areas exposed by the demolition works. Further sampling was planned for the following monitoring period to determine the extent of this issue.

A summary of Dow's results from inter-laboratory comparison exercise is presented in Table 4. The results indicate good agreement between laboratories, and compliance with the conditions of the stormwater discharge consent.

Table 4 Dow's stormwater results on 6 June 2023

Consent Item	Consent limit	SV8000	SV9200
Oil, floatables, suspended solids	None present	Pass	Pass
Objectionable odour	None present	Pass	Pass
Colour and visual clarity	No change	Pass	Pass
pH	6.0 – 9.0	7.08	6.71
Total phenoxy herbicides	0.10 mg/L	0.02	< 0.02
Total organophosphates	0.0005 mg/L	< 0.0004	< 0.0004
Picloram	0.10 mg/L	< 0.02	< 0.02
Triclopyr	0.10 mg/L	< 0.02	< 0.02

2.1.3 Groundwater monitoring

Field investigations into possible groundwater contamination at the site were commenced by the Company in 1993 and concluded in 1996. The site investigation identified two locations where soil and/or groundwater have been impacted by phenoxy herbicides and chlorophenols.

For a history of groundwater monitoring see 'Dow AgroSciences (NZ) Ltd, Monitoring Program Annual Report 2002-2003' Technical Report 2003-72.

The Council received a groundwater management report from the Company covering the period between July 2022 and June 2023. The report is based on the results of the groundwater sampling round undertaken in June 2022 by consultant Tonkin & Taylor. The sampling is usually carried out in October, but was brought forward due to the planned commencement of demolition works in August 2022.

Groundwater sampling of the nine Groundwater Monitoring Plan wells was carried out using in-well bladder pumps in accordance with a low flow sampling methodology.

The results of the chlorophenol and phenoxy acid analyses are listed in Table 5.

Table 5 Groundwater monitoring results June 2022

Well identification No.	Phenoxy Herbicides Concentration (µg/L)	Chlorophenol Concentration (µg/L)
Shallow perimeter wells		
1	ND	ND
21	ND	ND
Deep Perimeter wells		
20	ND	ND
32R	ND	ND
41	ND	ND
42	ND	ND
47R	ND	ND
Additional non-perimeter wells		
39R	≤ 23.2	≤ 43.5
46A	≤ 1.5	≤ 0.3
Trigger levels	50,000	10,000

Phenoxy herbicides [2,4-D; 2,4,5-T; MCPA; MCPB]
Chlorophenols [2,4-DCP; 2,4,5-TCP; 2,4,6-TCP; PCOC]
ND = Non Detect: below laboratory reporting limits (<1.6 µg/L for phenoxy acids and <0.2 µg/L for chlorophenols)

No phenoxy acid or chlorophenol was detected in either of the shallow perimeter wells (1 and 21), or in any of the deep perimeter wells (20, 32R, 41, 42 and 47R).

Non-perimeter wells 39R and 46A showed low levels of phenoxy herbicides (≤ 23.2 µg/L and ≤ 1.5 µg/L respectively) and chlorophenols (≤ 43.5 µg/L and ≤ 0.3 µg/L respectively). These values were well below the trigger levels (which do not apply to non-perimeter wells anyway as these are sampled for interest and not subject to the established action levels).

Total phenoxy acid herbicide and total chlorophenol concentrations have not exceeded the Groundwater Management Plan trigger levels since sampling rounds began in 1993, and if detected, concentrations typically continue to show a decreasing trend.

Wells 20, 32, 39J, 41 and 47 were redeveloped in August 2013 to provide more reliable groundwater levels for low flow sampling techniques, and to free up the dedicated sampling pump in well 20. Wells 32, 39J and 47 frequently had insufficient water to sample and as a result were decommissioned in August 2015 and replaced with adjacent new wells 32R, 39R, and 47R.

All 34 existing monitoring wells were gauged on 14 June 2022 to assess groundwater levels, water column and silt build-up thickness. Groundwater gauging was not due until 2023 under the Groundwater Monitoring Plan, but was carried out at the request of the Company.

2.1.4 Freshwater biological monitoring

Freshwater biological surveys were undertaken in the Herekawe Stream on 16 November 2022 and 8 March 2023. The surveys were undertaken using standard Council procedures and indicated that the streambed communities had not been significantly affected by stormwater discharges from the Paritūtū site or other industrial sites in the vicinity. Decreases in the MCI and $SQMCI_s$ scores between the upstream 'control' site and site downstream of the discharges was more likely attributable to habitat differences between these sites which appeared to be related primarily to substrate type and possibly seawater inundation.

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

2.1.5 Marine ecological inspection

A marine ecological inspection of the intertidal area at the base of Paritūtū Rock was undertaken on 4 April 2023 at 14:10 NZDT (low tide at 15:02 NZDT, 0.7 m). At the time of the inspection, the conditions were sunny, warm (20.2 degrees C), with a low to moderate westerly wind. The near shore waters were slightly turbid with a blue/green colouration and appeared to have been stirred up by the wind. In the days preceding the inspection, the weather had been relatively fine (no rainfall for two days) but windy.

The purpose of this inspection was to ascertain whether activities at the Dow site on Paritūtū Rd were having any observable environmental effects on the intertidal communities at Back Beach. The inspection was undertaken as part of the 2022-2023 monitoring programme for this company.

An area of intertidal reef is present at the north-eastern end of Back Beach at the base of Paritūtū Rock. The landward edges of the reef are subject to fluctuating levels of sand inundation. During this inspection, sand cover appeared to have increased from the previous year. This was most apparent in the middle of the bay, where much of the underlying boulder and rock visible in previous years was covered with sand (Photo 1).

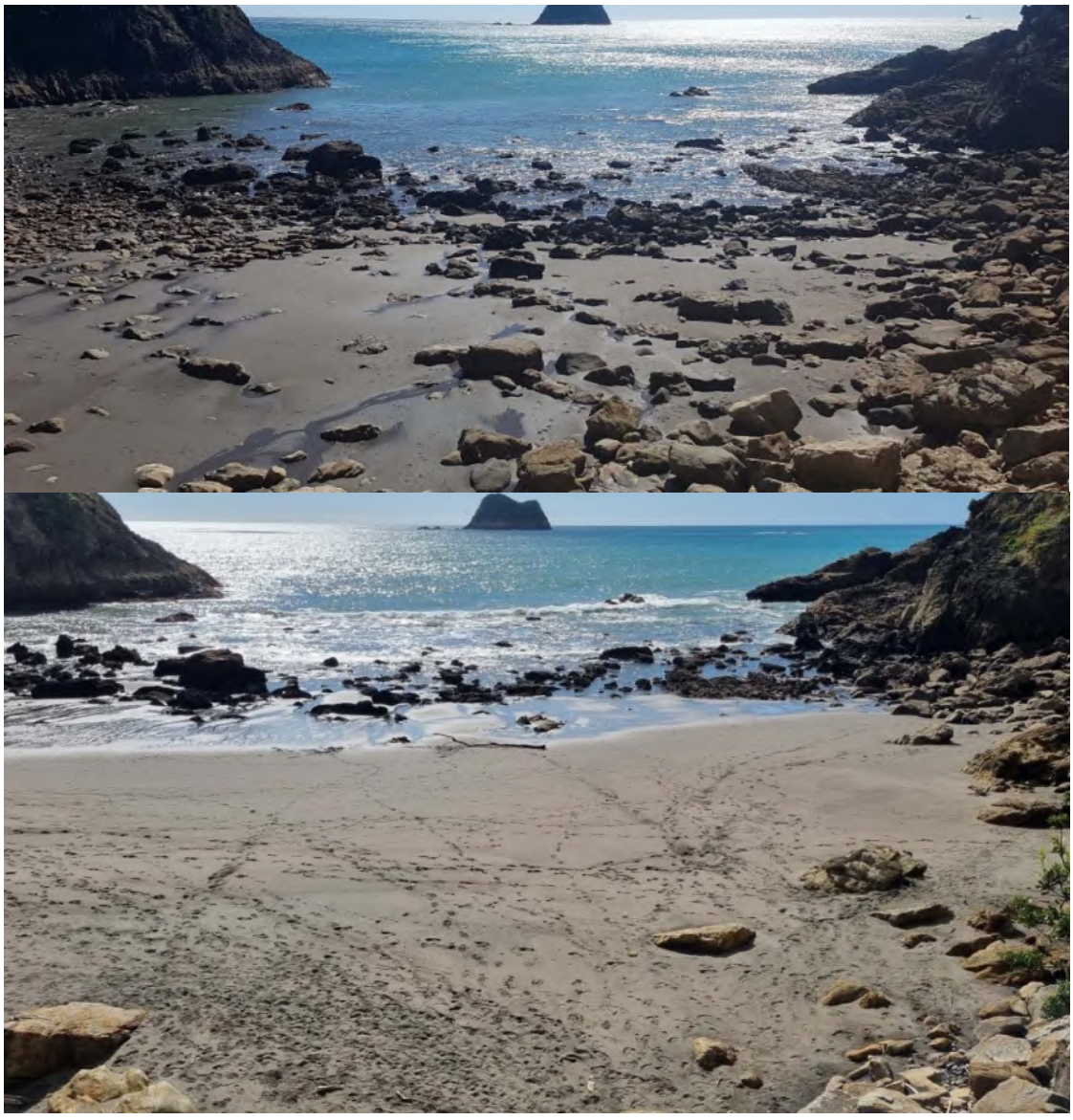

Photo 1 Rocky intertidal reef at the northern end of Back Beach (top Mar 2022; bottom Apr 2023)

A steady groundwater seep was observed flowing down the cliffs to the south west of Paritūtū Rock (approximately 30 m from the beach access). The seep flowed down the beach and around the exposed reef before entering the sea. Rapid, qualitative surveys of intertidal rocky reef biota were undertaken at three locations varying in distance from the groundwater seep.

The first survey area was immediately beneath the groundwater seep, in the mid-high intertidal zone. As is typical for this intertidal zone, biomass and diversity was relatively low. Three algal species were identified, *Coralline* spp. (coralline paint), *Ralfsia* sp. and *Ulva* sp. Two species of barnacle were found in this zone, *Epopella plicata* and *Chamaesipho columna*; with the latter being widespread. Five species of molluscs were identified (*Cellana ornata*, *C. radians*, *Diloma aethiops*, *Haustrum scobina* and *Sypharochiton pelliserpentis)* with the radiate limpet, *C. radians,* being the most abundant (Photo 2).

Photo 2 Species found on a boulder in the high intertidal zone, beneath the groundwater seep

The second survey area was in the low intertidal zone, where the groundwater seep mixed with the sea. The level of sand at this site was relatively high, limiting the amount of available rocky habitat. Still, biomass and diversity was much higher here compared to the high shore site (typical for this tidal height). Eight algal species and were identified. These presented equivalent coverage, with no obvious dominant algal species. One species of barnacles (*C. columna)* was present, but less abundant than at the high shore site. The little black mussel *Xenostrobus pulex* was very abundant, covering the vast majority of the available boulder habitat (Photo 3). Five species of grazing molluscs (two limpets, a chiton and two top shells) and three species of predatory whelks were present (*Dicathais orbita*, *Haustrum haustorium* and *H. scobina*). Amphipods and hermit crabs (*Pagurus novizealandiae*) were also found at this site.

Photo 3 Little black mussels and whelks in the low intertidal zone

The third survey area was in the low intertidal zone, 50 m west of where the groundwater seep mixed with the sea. The level of sand at this site also appeared to have increased compared to the previous year; meaning there was less rocky habitat available. Diversity was similar to the previous site; however, there appeared to be slightly greater biomass here. The large boulders at this location appeared to be providing a stable habitat for seaweeds (in particular *Scytothamnus australis* and *Petalonia binghamiae*) and encrusting animals (i.e., *X. pulex,* Figure 3). Two anemone species (*Diadumene neozelandica* and *Oulactis magna,* photo 4), one barnacle species (*C. columna*), and three predatory gastropod species were also present (*D. orbita*, *H. haustorium* and *H. scobina*). Five grazing molluscs were identified, of which *D. orbita* were relatively abundant. Hermit crabs and sea stars (*Stichaster australis*) were also found at this site.

Photo 4 Giant shore anemones in the low intertidal zone, 50 m from the groundwater seep

Comparatively, the site 50 m west of where the groundwater seep mixed with the sea seemed to have a higher abundance of *D. orbita* and *X. pulex* than the site in the low intertidal zone beneath the seep. Moreover, the site further away from the seep had two species of anemones while the site below the seep had just one. The site below the seep presented amphipods, while the site 50 m away did not. Finally, predatory sea stars were found only at the site further away from the groundwater seep. Overall, no significant differences were observed between the two low intertidal zones.

Based on observations made during this inspection, the groundwater seep did not appear to be adversely affecting the local reef biota. Instead, the fluctuating sand coverage at this site (and resultant changes in habitat availability), appears to be a significant driver in rocky reef community structure. The diversity of reef biota immediately west of Paritūtū Rock and its zonation patterns are typical of that seen at other intertidal reefs in the Taranaki region.

2.2 Air

2.2.1 Inspections

Officers of the Council carried out regular inspections of the Paritūtū site during the 2022-2023 monitoring period. Scheduled inspections were undertaken on 20 July 2022, 8 December 2022, 26 January 2023 and 6 June 2023. No issues with discharges to air were found.

2.2.2 Air emissions report

As noted in revision 13 of the Air Discharge Management and Monitoring Plan (ADMMP – 1 June 2021), from 29 May 2021 manufacturing operations at the Paritūtū site had ceased; all processes had been discontinued; all raw materials and chemicals had been removed from site; and all equipment and buildings had been cleaned. Consequently, no discharges were made to air during the July 2022 to June 2023 monitoring period; no monitoring of stack emissions was undertaken; and no report was required.

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 2022-2023 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, from the inspections of the site and from discussions held with staff, Council officers have concluded that Corteva and Dow both demonstrated a comprehensive, carefully documented, and well considered approach to all areas of environmental performance. This included documentation of activities, self-monitoring programmes, regular provision of information to the Council, and excellent stakeholder engagement.

During the period under review, stormwater continued to be collected in the pond systems and tested prior to release to the Herekawe Stream or irrigated to land at the site as precaution against discharge of contaminants to surface waters. The majority of the demolition works were carried out in the first half of the monitoring period. These were well managed and the site maintained in an orderly state. There were no visible emissions to air or noticeable odours during inspections.

The annual groundwater management report was produced as agreed in the Site Groundwater Management Plan. All groundwater samples from the perimeter wells were found to be significantly below the contaminant action levels.

3.2 Environmental effects of exercise of consents

Environmental investigations, including biomonitoring of the Herekawe Stream and an intertidal survey, found no cause for concern over the effects of the discharge of stormwater from the site or from any emissions to air.

3.3 Environmental effects of groundwater movement

Monitoring of groundwater quality beneath the site has confirmed modelling that predicts that historical groundwater contamination at two points beneath the site would not result in any off-site effects, nor detection at the limits used for routine monitoring.

3.4 Evaluation of performance

A tabular summary of the consent holders' compliance record for the year under review is set out in Tables 6 and 7, with an evaluation of performance over time presented in Table 8.

Table 6 Summary of performance for consent 4108-2

Purpose: ***To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and no-manufacturing areas into the Herekawe Stream***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option	Checking that standard operating procedures to achieve compliance with consent conditions are followed	Yes
2. Stormwater catchment area not to be exceeded	Inspections of plant site	Yes
3. Provision of stormwater management plan	Plan last updated June 2021	Yes

Purpose: *To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and no-manufacturing areas into the Herekawe Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
4. Keeping of discharge records	Inspection by Council and provision of results by the consent holder	Yes
5. Controls on effect of discharge in receiving water	Inspections, chemical sampling and biomonitoring	Yes
6. Concentration limits upon potential contaminants in discharge	Chemical sampling by consent holder and with validation by Council	Yes
7. Optional review provision re environmental effects	No further option to review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 7 Summary of performance for consent 4020-4

Purpose: To discharge contaminants to air from all activities associated with current and future operation of an agrichemical formulation and packaging plant		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Maintenance and operation of emission control equipment	Monitoring of activity as necessary by Council Officers and review of the ADMMP required by condition 11	Yes
2. Prohibition of offensive odour or dust beyond boundary	Monitoring of activity as necessary by qualified Council officers	Yes
3. Limits on contaminants, other than from incinerator, beyond the site	Monitoring of activity as necessary by qualified Council officers	Yes
4. Limit on specific incinerator emission components	Incinerator decommissioned	N/A
5. Limit on specific incinerator emission components mass discharge rate	Incinerator decommissioned	N/A
6. No incineration of certain materials	Incinerator decommissioned	N/A
7. Incinerator monitoring record keeping	Incinerator decommissioned	N/A
8. Incinerator oxygen concentration	Incinerator decommissioned	N/A
9. Incinerator secondary chamber temperature	Incinerator decommissioned	N/A

Purpose: To discharge contaminants to air from all activities associated with current and future operation of an agrichemical formulation and packaging plant		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
10. Incinerator exhaust gas temperature	Incinerator decommissioned	N/A
11. Air Discharge Management and Monitoring Plan	Plan updated August 2021	Yes
12. Maintenance of Chemical Materials Register for current use	Chemicals removed from site	N/A
13. Introduction of new items to Chemical Material Register	Chemicals removed from site	N/A
14. Air Monitoring and triggers	No action required	N/A
15. Annual report on monitoring results, process change, and consultation	Report received September 2021. No further reports required	Yes
16. Six-yearly report on technological advances in emission reduction	Report received April 2020. No further reports required	Yes
17. Review of consent	Option for review in June 2026 if required	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
2010-11	4108-2	1	-	-	-
	4020-3	-	1	-	-
2011-12	4108-2	1	-	-	-
	4020-3	-	1	-	-
2012-13	4108-2, 4020-3	2	-	-	-
2013-14	4108-2, 4020-3	2	-	-	-
2014-15	4108-2, 4020-3	2	-	-	-
2015-16	4108-2, 4020-4	2	-	-	-
2016-17	4108-2, 4020-4	2	-	-	-
2017-18	4108-2, 4020-4	2	-	-	-
2018-19	4108-2, 4020-4	2	-	-	-
2019-20	4108-2, 4020-4	2	-	-	-
2020-21	4108-2, 4020-4	2	-	-	-

Year	Consent no	High	Good	Improvement req	Poor
2021-22	4108-2, 4020-4	2	-	-	-
2022-23	4108-2, 4020-4	2			
Totals		24	2	0	0

During the year, the companies demonstrated an overall high level of both environmental performance and administrative compliance with the resource consents as defined in Appendix II.

3.5 Recommendations from the 2021-2022 Annual Report

In the 2021-2022 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the Corteva Agriscience New Zealand Ltd Paritūtū Road plant in the 2022-2023 year continue at the same level as in 2021-2022.
2. THAT should there be issues with environmental or administrative performance in 2022-2023, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

These recommendations were implemented.

3.6 Alterations to monitoring programmes for 2023-2024

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.

Planned changes for 2023-2024 monitoring programme include increasing the frequency of stormwater sampling to monitor potential effects from the removal of all above ground structures in the prior period; and allowing for significantly more programme supervision time to cover staff and management involvement in the site investigation process.

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 2023-2024.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at the Dow Paritūtū site in the 2023-2024 year be amended from that undertaken in 2022-2023 by increasing the number of stormwater sampling events from one to four, and increasing the time allotted to programme supervision for company and stakeholder engagement during the site investigation phase.
2. THAT should there be issues with environmental or administrative performance in 2023-2024, 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:

2,4-D	2,4 di-chloro-phenoxy-acetic acid, a herbicide.
2,4-DB	2,4 di-chloro-phenoxy-butanoic acid, a herbicide.
2,4,5-T	2,4,5 tri-chloro-phenoxy-acetic acid, a herbicide.
AEE	Assessment of environmental effects.
ADMMP	Air Discharge Management and Monitoring Plan.
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.
DMA	Dimethylamine.
DMEA	Dimethylethanolamine.
Dioxins	See PCDD.
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.
IPA	Isopropylamine.
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.
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.
MCPA	Methyl-chloro-phenoxy-acetic acid, a herbicide.
MCPB	Methyl-chloro-phenoxy-butanoic acid, a herbicide.
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.
ng/m^3	Nanograms per cubic metre.

NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
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.
SQMCI	Semi quantitative macroinvertebrate community index.
TCP	Trichlorophenol.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.

For further information on analytical methods, contact an Environmental Quality Manager.

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Appendix I

Resource consents held by Dow Chemical (NZ) 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:	Dow Chemical (NZ) Ltd
Decision Date:	5 June 2020
Commencement Date:	5 June 2020

Conditions of Consent

Consent Granted:	To discharge contaminants to air from all activities associated with the current and future operation of an agrichemical formulation and packaging plant
Expiry Date:	1 June 2044
Review Date(s):	June 2026, June 2032, June 2038
Site Location:	89 Paritutu Road, Spotswood
Grid Reference (NZTM)	1688529E - 5675602N

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

47 Cloten Road · Private Bag 713 · Stratford 4352 · New Zealand
T: 06 765 7127 · F: 06 765 5097 · E: info@trc.govt.nz · www.trc.govt.nz
www.facebook.com/TaranakiRegionalCouncil twitter.com/TaranakiRC

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall ensure that all emissions control equipment, including but not limited to that referred to in condition 16(b) is maintained and operated effectively and efficiently at all times.

2. The discharges authorised by this consent shall not give rise to any odour, or dust emissions, at or beyond the boundary of the site that is offensive or objectionable.

3. The discharge of contaminants to air, other than from the High Temperature Incinerator Stack (see conditions 4 and 5) shall be controlled to ensure that the maximum ground-level concentrations off-site do not exceed:

   (a) Subject to condition 3(b),the relevant air quality limits listed in Schedule 1 of this consent and assessed using the process set out in Schedule 3; and

   (b) In the case of emissions due to raw materials or formulations introduced to the site after this consent commences, limits developed in accordance with the approach set out in Schedule 2 and assessed using the process set out in Schedule 3.

   See Advice Notes 1 and 2.

4. The total concentration of polychlorinated dibenzodioxins and polychlorinated dibenzofurans in any discharge from the High Temperature Incinerator Stack shall not exceed 0.1 nanograms per cubic metre (adjusted to 0 degrees Celsius, dry gas basis, 101.3 kPa pressure and 11% oxygen) when calculated as total toxic equivalents using the World Health Organization 2005 toxic equivalence factors.

   See Advice Notes 1 and 3.

5. The rate of discharge of total halides from the High Temperature Incinerator stack shall not exceed 1.5 kg/hour.

   See Advice Note 1.

6. There shall be no incineration of plastics and packaging that contain brominated flame retardants.

7. The consent holder shall record, and make available to the Chief Executive, Taranaki Regional Council upon request:

   a) the carbon monoxide concentration within or at the exit from the secondary combustion chamber;
   b) the feedstock type and loading rate;
   c) operating times; and
   d) the prevailing weather conditions

   for each incinerator burn. Records shall be retained for a period of six months.

8. The oxygen concentration within the secondary combustion chamber of the incinerator shall be maintained between 6% and 9% (by volume) as far as is practicable, and shall not be less than 4.5% (by volume), for more than 60 seconds at any time during the incineration of material during any 24-hour period.

9. The temperature in the secondary chamber of the High Temperature Incinerator shall not be less than 1100 degrees Celsius at any time during the incineration of waste.

10. The temperature of the exhaust gas from the High Temperature Incinerator shall not be less than 1000 degrees Celsius at any time during the incineration of waste.

11. Within three months of the date of commencement of consent, and at intervals not exceeding three years thereafter, the consent holder shall prepare and provide to the Chief Executive, Taranaki Regional Council and the Medical Officer of Health for Taranaki, for comment, a draft Air Discharge Management and Monitoring Plan ("ADMMP") for the site. The ADMMP shall be finalised and submitted to the Chief Executive, Taranaki Regional Council within a further three months. The ADMMP shall be to the satisfaction of the Chief Executive of the Taranaki Regional Council, acting in a technical certification capacity, and shall detail the management and monitoring of air discharges on the site and procedures and methodologies to ensure consent compliance. As a minimum, the ADMMP shall include:

    (a) A summary of the on-site air discharge activities and the nature of the discharges to air from each source on-site;

    (b) A description of how compliance with the conditions of this consent will be achieved;

    (c) A description of the air quality control measures and equipment, and maintenance programme in place for each of the air treatment systems used on-site, including specifically the systems used in the:
        - Commodity Herbicides Plant;
        - Herbicides Plant;
        - Granular Herbicides Plant;
        - Insecticides Plant;
        - High Temperature Incinerator Stack and Building;
        - Raw Material Storage Warehouse;
        - Product Development Laboratory;
        - Bulk Storage Tanks;
        - Natural gas-fired boiler; and
        - Any other air discharge sources on-site.

    (d) Descriptions of the site operating requirements related to the air discharge activities on-site, including:
        - Operating procedures;
        - Monitoring and supervision procedures including any performance indicators ; and
        - Waste processing and discharge logs.

(e) A description of the High Temperature Incinerator operational record-keeping and reporting procedures and requirements including:
- Feedstock type and loading rate, operating times and the prevailing weather conditions for each incinerator burn;
- Continuous monitoring of oxygen, carbon monoxide and temperature;
- Limits on the oxygen concentration at the outlet of the secondary combustion chamber; and
- limits on the halogen content of the feedstock;

(f) A description of the management procedures for the Product Development Laboratory, including management of the air treatment system, to minimise discharges to air to the extent practicable;

(g) A description of any additional air quality limits determined in accordance with condition 3(b);

(h) The consent holder's Air Monitoring Programme including, as a minimum:
- Identification of the contaminants and compounds being monitored;
- A description of the methodology for the air monitoring programme;
- Monitoring locations and frequency; and
- A description of how compliance with consent conditions will be demonstrated.

(i) A description of the Odour Register for the site, which is used to record any observations of odour (both on-site and off-site), the findings of any investigations, and any recommendations that arise; and

(j) A 'Contingency Plan' detailing measures and procedures to be undertaken to avoid or mitigate the adverse environmental effects of any spillage or discharge of contaminants not authorised by this consent. The Contingency Plan shall include the requirement that the Medical Officer of Health for Taranaki be notified as soon as practicable following any contingency event occurring that is likely to adversely affect human health beyond the boundary of the site.

12. At all times the consent holder shall maintain:

(a) A Chemical Materials Register containing details of all of the chemicals or product formulations currently received, prepared, stored, mixed or otherwise processed on-site; and

(b) The Safety Data Sheet, toxicology information and environmental fate information for each chemical and product listed in the Chemical Materials Register; and

(c) Details of the assessments and resulting air quality limits determined in accordance with condition 3(b).

The information required by this condition shall be retained and be made available to the Chief Executive, Taranaki Regional Council upon request.

13. Before any new chemicals or product formulations are introduced to the site for purposes other than research or development, they shall be added to the Chemical Materials Register.

14. For any air monitoring undertaken, the following actions apply:

    (a) If a measured air quality parameter would result, or has resulted in air quality that is 25% or less of the relevant limit referred to in condition 3, then no action is required;

    (b) If the measured air quality parameter would result, or has resulted in air quality that is more than 25% and less than or equal to 50% of the relevant limit referred to in condition 3, the consent holder shall notify the Chief Executive, Taranaki Regional Council within three working days of receipt of the monitoring results;

    (c) If the measured air quality parameter would result, or has resulted in air quality that is more than 50% and less than or equal to 100% of the relevant limit referred to in condition 3, the consent holder shall notify the Chief Executive, Taranaki Regional Council immediately upon receipt of the monitoring results, and investigate, and where appropriate remedy, the cause of the decrease in discharge quality. The consent holder shall notify the Chief Executive, Taranaki Regional Council of the outcomes of any investigations and subsequent actions, within 10 working days of receipt of the monitoring results; and

    (d) If the measured air quality parameter would result, or has resulted in air quality that is greater than 100% of the relevant limit referred to in condition 3, the consent holder shall immediately cease the discharge activity and notify the Chief Executive, Taranaki Regional Council upon receipt of the monitoring results. The consent holder shall then investigate the cause of the decrease in discharge quality, and remedy the cause of the exceedance prior to any recommencement of the discharge activity. A summary report shall be provided to the Chief Executive, Taranaki Regional Council within 10 working days of the original notification.

15. Before 30 September each year the consent holder shall provide to the Chief Executive, Taranaki Regional Council the following information for the 12 month period ending on the previous 30 June:

    (a) The results of all air quality monitoring that the consent holder has undertaken under the Air Monitoring Programme in accordance with condition 11(h);

    (b) A description of any process changes or changes to emission control technology that have been implemented at the site; and

    (c) A description of any consultation undertaken and any views put forward by those consulted.

16. No later than 30 April 2020 and every six years thereafter, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, a written report which includes:

    (a) A review of any relevant technological advances in the reduction or mitigation of discharges to air from the site activities, and the costs and benefits of these advances;

    (b) A summary concluding which air discharge and treatment methods will be operated on-site and why; and

    (c) A description of any significant changes in air quality assessment methodology since the previous reporting period (including computer modelling techniques and the associated dilution factors set out in Schedule 3) that are likely to materially affect the assessment of environmental effects of the activities authorised by this consent.

17. In accordance with section 128 and 129 of the Resource Management Act 1991, the Chief Executive, 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 2020 and/or June 2026, and/or June 2032, and/or June 2038 for the purpose of ensuring that the conditions are adequate to avoid, remedy or mitigate 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 that time; and

    (b) Within three months of receiving any report provided pursuant to condition 16 to direct the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment.

Transferred at Stratford on 21 February 2023

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Advice Notes

1. *Compliance with the limits in conditions 3, 4, and 5 shall be demonstrated by monitoring, or, as described in the ADMMP, by the use of air emission technology that has been designed to ensure any discharge meets those limits.*

2. *The methodology used for relating stack concentrations to air quality limits shall be determined in accordance with the process provided for in Schedule 3 of this consent.*

3. *If any monitoring is undertaken to assess compliance with condition 4, compliance shall be determined based on the average of not less than 3 samples, each of which shall be taken while the incinerator is fed on different waste types.*

SCHEDULE 1: Air quality limits applying beyond the boundary of the site

The air quality limits for the one hour and the 24-hour average will apply at any location beyond the site boundary. The air quality limits for the annual average will apply at any land on which any residential activity (excluding any temporary or transient residential activity) is established.

Agrichemical actives

Substance	Air quality limit (annual average)
2,4-D acid, esters and salts	2 µg/m^3
2,4-DB acid and salts	4 µg/m^3
aminopyralid acid and amine salts	10 µg/m^3
Buprofezin	2 µg/m^3
Chlorpyrifos	0.57 µg/m^3
chlorpyrifos-methyl	1.9 µg/m^3
clopyralid acid and amine salts	30 µg/m^3
cyhalofop-butyl	0.6 µg/m^3
dicamba acid and amine salts	57 µg/m^3
Fenpyroximate	2 µg/m^3
Florasulam	10 µg/m^3
fluroxypyr, methylheptyl ester	153 µg/m^3
glyphosate acid and amine salts	191 µg/m^3
haloxyfop-R methyl ester	0.06 µg/m^3
lambda cyhalothrin	3.7 µg/m^3
MCPA acid, esters and salts	10 µg/m^3
MCPB acid and salts	2 µg/m^3

(s)-methoprene	10 µg/m^3
methoxyfenozide	19 µg/m^3
myclobutanil	6 µg/m^3
Oxyfluorfen	0.6 µg/m^3
picloram acid, esters and salts	57 µg/m^3
Quinoxyfen	38 µg/m^3
Spinetoram	6 µg/m^3
Spinosad	4 µg/m^3
Sulfoxaflor	6 µg/m^3
triclopyr, ester and amine salt	6 µg/m^3

Note: most of the toxicity data makes no distinction between the individual substances and their esters, amines, or salt forms. The air quality limit specified is a total, inclusive of all forms of the active.

Other compounds

Substance	Air quality limit	Averaging period
Benzene	3.6 µg/m^3	Annual
2,4-dichlorophenol	0.6 µg/m^3	Annual
2-ethyl hexanol	160 µg/m^3	Annual
Diethanolamine	3 µg/m^3	Annual
diethylene glycol monoethyl ether	27 µg/m^3	Annual
Dimethylamine	9 µg/m^3	Annual
dimethylethanolamine	50 µg/m^3	Annual
dipropylene glycol monomethyl ether	310 µg/m^3	Annual
EDTA	5 µg/m^3 120 µg/m^3	Annual 24-hour
Ethylbenzene	570 µg/m^3 1,000 µg/m^3	Annual 24-hour
Isopropylamine	12 µg/m^3	Annual
Monoethanolamine	7.5 µg/m^3	Annual
Naphthalene	3 µg/m^3	Annual
N-methyl-2-pyrrolidone	100 µg/m^3	Annual
propylene glycol	120 µg/m^3	24-hour
sodium bicarbonate	5 µg/m^3	Annual
sodium hydroxide	2 µg/m^3	Annual
triethanolamine	5 µg/m^3	Annual

Substance	Air quality limit	Averaging period
1,2,4-trimethylbenzene	20 µg/m^3	Annual
toluene (as a component in some distillate solvents)	5000 µg/m^3	Annual
triisopropanolamine	40 µg/m^3	Annual
xylene (as a component in some distillate solvents)	870 µg/m^3	Annual

SCHEDULE 2: Process for developing air quality limits for emissions associated with new raw materials or formulations.

The air quality limit for any particular contaminant shall be determined in accordance with the hierarchy set out in the Good Practice Guide (GPG) for Assessing Discharges to Air from Industry (Ministry for the Environment, June 2008), or another hierarchy as may be specified in the ADMMP.

In the event that no recognised air quality criteria (as described in the GPG) are available, a limit will be developed by calculating the air concentration that would give rise to an exposure equivalent to one tenth of the Acceptable Daily Intake (or equivalent) set by the New Zealand Environmental Protection Agency, Joint FAO/WHO Meeting on Pesticide Residues (JMPR) or European Commission. This procedure is described in Appendices E5 and E8, Dow AgroSciences (NZ) Ltd: Technical Air Quality Assessment - Discharges to Air – Paritutu Road Site, New Plymouth, Volume 2, prepared by Graham Environmental Consulting Ltd and Tonkin & Taylor Ltd, 31 October 2013.

The air quality limits for the one hour and the 24-hour average will apply at any location beyond the site boundary. The air quality limits for the annual average will apply at land on which any residential activity (excluding any temporary or transient residential activity) is established.

SCHEDULE 3: Process for relating stack concentrations to air quality limits.

Assessment of compliance with the air quality limits in Schedule 1 and those determined in accordance with Schedule 2 can be achieved based on actual or potential stack emissions, by using the following formula:

Maximum stack concentration ($\mu g/m^3$) = air quality limit ($\mu g/m^3$) x Dilution Factor

Where:

a) The stack concentration of any particular contaminant may be measured by stack emission testing or estimated based on the measured stack concentration of another representative contaminant and corrected for differences in molecular weight and vapour pressure; and

b) The Dilution Factor is taken from:

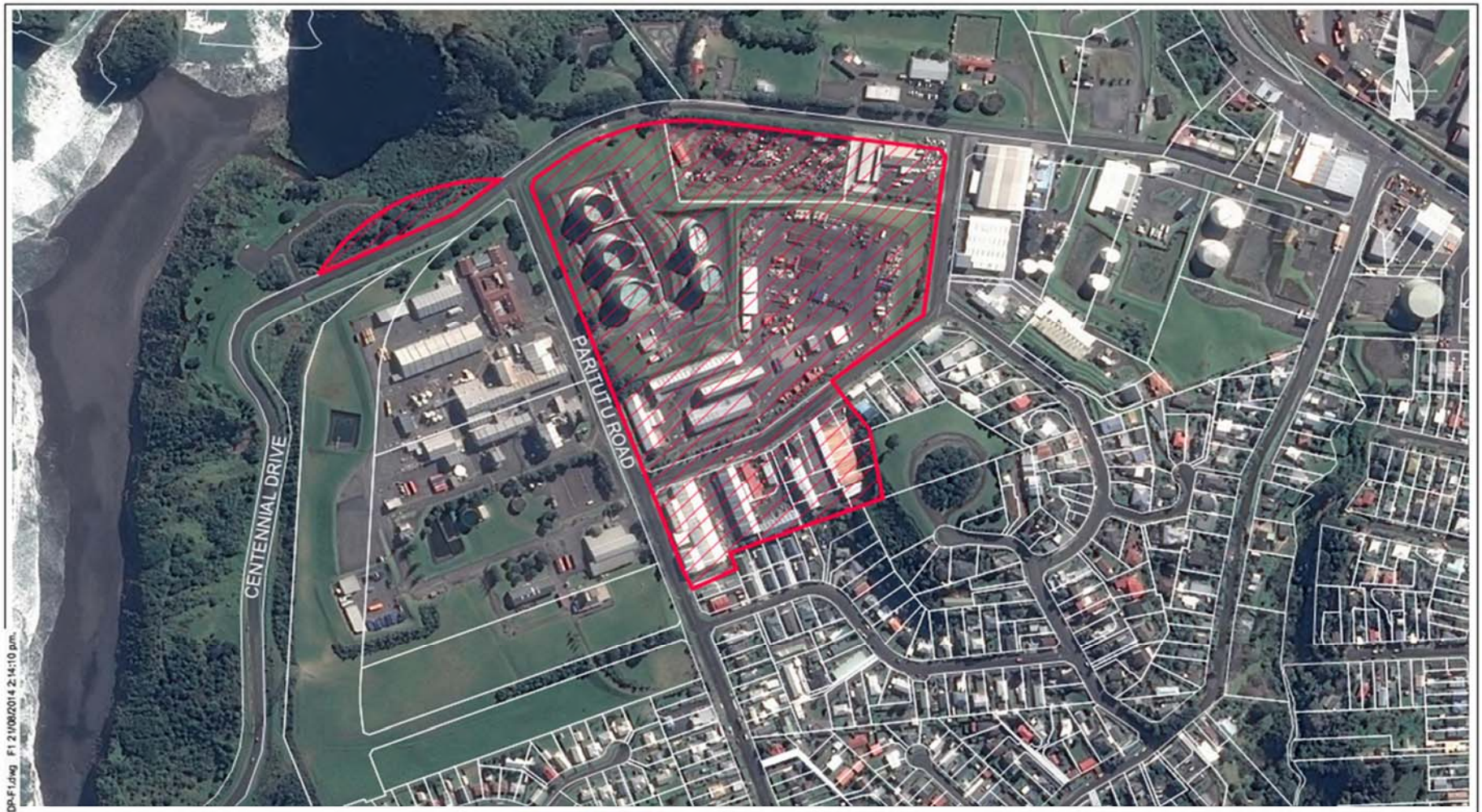
   i. the following table for the averaging period specified for the relevant air quality criterion; or

   ii. where the relevant averaging period is annual average and a residential activity (excluding any temporary or transient residential activity) has established within the hatched area shown on Figure 1 attached, the results of an atmospheric dispersion modelling study carried out to a similar standard as that provided with the application.

Where multiple sources of an individual contaminant are involved, individual stack concentrations for that contaminant will be determined to ensure that the air quality limit is complied with on a cumulative basis.

Process for relating stack concentrations to air quality limits

Plant stack	Dilution Factor		
	1-hour average	24-hour average	Annual average
Commodity Herbicides	750	1,300	29,000
Herbicides	550	1,150	107,000
Granular Herbicides	2,200	3,900	705,000
Insecticides – Emulsifiable Concentrates	700	1,250	232,000
Insecticides – Suspension Concentrates	1,500	2,750	513,000



SCALE 1: 5000

0 50 100 150 200 250 (m)

Aerial photo sourced from Google Earth(Copyright: 2009). Images Copyright; Image @ 2013 DigitalGlobe. Flown 23/02/2013.

Property boundaries sourced from Land Information New Zealand data as at 8-Jul-2013 (Crown Copyright Reserved).

Tonkin & Taylor
Environmental and Engineering Consultants
105 Carlton Gore Road, Newmarket, Auckland

DRAWN	RBS	Aug. 14
DRAFTING CHECKED		
APPROVED		
CADFILE : 85 199.200-ADP-F 1.dwg		
SCALES (AT A4 SIZE) 1: 5000		
PROJECT No. 85 199.200		

DOW AGROSCIENCES (NZ) LTD
AIR DISCHARGE PERMIT
PARITUTU, NEW PLYMOUTH
Site Plan

FIG. No. Figure 1

REV. 0

Discharge Permit

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

Name of Consent Holder:	Dow AgroSciences (NZ) Limited Private Bag 2017 NEW PLYMOUTH
Consent Granted Date:	4 September 2008

Conditions of Consent

Consent Granted:	To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and non-manufacturing areas into the Herekawe Stream at or about (NZTM) 1688226E-5675009N
Expiry Date:	1 June 2026
Review Date(s):	June 2014, June 2020
Site Location:	89 Paritutu Road, New Plymouth
Site Legal Description:	Lot 3 DP 8465 Lot 1 DP 9022 Lots 1 & 2 DP 9829 Lot 1 DP 10018
Catchment:	Herekawe

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

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. 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 collected from a catchment area of no more than 16 hectares.

3. The consent holder shall maintain, and comply with at all times, a stormwater management plan, approved by the Chief Executive, Taranaki Regional Council, detailing measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not licensed by this consent, and measures to avoid, remedy or mitigate the environmental effects of such a discharge.

4. The consent holder shall keep records of the date and time that the stormwater discharges begin and end, the volume of water discharged, and the results of all physicochemical testing carried out on water discharged to the Herekawe Stream. These records shall be made available to the Chief Executive, Taranaki Regional Council, upon request.

5. After allowing for a mixing zone of 25 metres from the point of discharge, the discharge shall not give rise to any of the following effects in the Herekawe Stream:

   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) any significant adverse effects on aquatic life.

6. Concentrations of the following components shall not be exceeded in the discharge:

Component	**Concentration**
Total phenoxy herbicides [2,4-D, MCPA and MCPB]	0.10 mg/L
Total organophosphates [chlorpyrifos and chlorpyrifos-methyl]	0.0005 mg/L
Triclopyr 0.10	mg/L
Picloram 0.10	mg/L
Glyphosate	0.10 mg/L
Oxyfluorfen	0.005 mg/L
pH [range]	6.0 – 9.0

This condition shall apply prior to the entry of the stormwater into the Herekawe Stream, at designated sampling points approved by the Chief Executive, Taranaki Regional Council.

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 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.

Signed at Stratford on 4 September 2008

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

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 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.