# Waste Remediation Services Ltd
# Waikaikai Landfarm

Monitoring Programme

Annual Report

2021-2022

Technical Report 22-30

Working with people | caring for Taranaki

Taranaki
Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

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# Executive summary

Waste Remediation Services Ltd (the Company) operates a drilling waste landfarm (Waikaikai Landfarm) located off Lower Manutahi Road at Manutahi, South Taranaki, in the Mangaroa catchment.

This report for the period July 2021 to June 2022 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.

**During the monitoring period, the Company demonstrated an overall high level of environmental performance and an overall high level of administrative performance.**

The Company holds one resource consent, which includes 32 conditions setting out the requirements that the Company must satisfy. The consent allows the Company to discharge drilling waste from hydrocarbon exploration and production activities from well sites and contaminated soil onto and into land via landfarming.

The Council's monitoring programme for the year under review included three inspections, twenty groundwater samples and six composite soil samples collected for physicochemical analysis.

Inspections found the site to be compliant on all occasions. Previously landfarmed areas held good pasture cover.

Groundwater sample results indicated compliance with consent conditions. Most of the samples demonstrated stability for the analytes tested. However, there is some evidence that recent landfarming has increased the analyte concentrations in one of the groundwater samples.

Soil sample analysis found that further bioremediation would be required prior to surrender of the two areas sampled.

For reference, in the 2021-2022 year, consent holders were found to achieve a high level of environmental performance and compliance for 88% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 10% 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.

This report includes recommendations for the 2022-2023 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 2021 to June 2022 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Waste Remediation Services Ltd hereafter referred to as the Company. The Company operates a landfarm situated on Lower Manutahi Road at Manutahi, South Taranaki, in the Mangaroa catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consent held by the Company, that relate to the discharges of drilling waste within the Mangaroa catchment, under the practice known as landfarming.

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 land and is the ninth annual report by the Council for the Waikaikai Landfarm, and the seventh with WRS as the consent holder.

### 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 Mangaroa 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 2021-2022 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 and administrative 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 2021-2022 year, consent holders were found to achieve a high level of environmental performance and compliance for 88% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 10% of the consents, a good level of environmental performance and compliance was achieved.[1]

## 1.2 Process description

#### Drilling waste

Waste material is produced during well drilling for hydrocarbon exploration. The primary components of this waste are drilling fluids (muds) and rock cuttings. Drilling fluids are engineered to perform several crucial tasks in the drilling of a hydrocarbon well. These include; transporting cuttings from the drill bit to the well surface for disposal, controlling hydrostatic pressure in the well, supporting the sides of the hole and preventing the ingress of formation fluids, and lubricating and cooling the drill bit and drill pipe in the hole.

#### Drilling fluids

Oil and gas wells may be drilled with either synthetic based mud (SBM) or water based mud (WBM). As the names suggest, these are fluids with either water (fresh or saline) or synthetic oil as a base material, to which further compounds are added to modify the physical characteristics of the mud (for example mud weight or viscosity). More than one type of fluid may be used to drill an individual well. In the past, oil based muds (OBM) (diesel/crude oil based) have also been used. Their use has declined since the 1980s due to their ecotoxicity; they have been replaced by SBM. SBM use olefins, paraffins or esters as a base material. While this is technically still a form of oil based fluid, these fluids have been engineered to remove polycyclic

[1] The Council has used these compliance grading criteria for more than 18 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

aromatic hydrocarbons, reduce the potential for bioaccumulation, and accelerate biodegradation compared with OBM.

Common constituents of WBM and SBM include weighting agents, viscosifiers, thinners, lost circulation materials (LCM), pH control additives, dispersants, corrosion inhibitors, bactericides, filtrate reducers, flocculants and lubricants. Of these, the naturally occurring clay mineral barite (barium sulphate) is generally the most common additive. It is added to most drilling muds as a wetting and weighting agent.

Drilling fluids may be intentionally discharged in bulk for changes to the drilling fluid programme or at the completion of drilling. Depending on operational requirements and fluid type and properties, fluids may be re-used in multiple wells.

### Cuttings

Cuttings are produced as the drill bit penetrates the underlying geological formations. They are brought to the surface in the drilling fluid where they pass over a shaker screen that separates the cuttings and drilling fluids. The drilling fluids are recycled for reuse within the drilling process, but small quantities of drilling fluids remain adhered to the cuttings. The cuttings and smaller particle material from the drill fluid treatment units drain into sumps. If sumps cannot be constructed corrals or special bins are used. During drilling this material is the only continuous discharge.

### Landfarming

The landfarming process has typically been used in the Taranaki region to assist the ultimate conversion of sandy coastal sites prone to erosion into productive pasture. Results of an independent research project conducted by AgKnowledge Ltd (2013) have indicated that the re-contoured sand dunes, after the inclusion of the drilling wastes (as per the consents), and with the addition of appropriate fertilisers and water (irrigation) are capable of producing high quality clover-based pastures and thus increasing the value of the land from about $3-4,000/ha to $30-40,000/ha (2013).

Landfarming uses natural and assisted bioremediation to reduce the concentration of petroleum compounds through degradation. The basic steps in the landfarming process are:

1. Drilling waste is transported from wellsites by truck (cuttings) or tanker (liquids). It may be discharged directly to land or placed in a dedicated storage pit.
2. The required area is prepared by scraping back and stockpiling existing pasture/topsoil and levelling out uneven ground.
3. Waste is transferred to the prepared area by excavator and truck and spread out with a bulldozer. Liquids may be discharged by tanker or a spray system.
4. Waste is allowed to dry sufficiently before being tilled into the soil to the required depth with a tractor and discs.
5. The disposal area is levelled with chains or harrows.
6. Stockpiled or brought in topsoil/clay is applied to aid stability and assist in grass establishment.
7. Fertiliser may be applied and the area is sown in crop or pasture at a suitable time of year.

The landfarming process utilised at the Waikaikai Landfarm site was initially undertaken on a single application basis. This means dedicated spreading areas receive only single applications of waste. When disposal is complete, the area will be reinstated and monitored until consent surrender criteria have been met.

In a previous monitoring period the consent was varied to allow for the re-application of impacted soils to an area which was initially utilised for landfarming in 2012. The consent holder undertook analysis to quantify the concentrations of specific parameters in the soil which stipulated the area of land was within surrender criteria. Thus the decision was undertaken to allow for the second application of material.

More recently the consent holder requested the surrender of the areas of site which had been re-utilised for the landfarming and as a result of the request, additional soil sampling was undertaken by the Council.

## 1.3 Site location and description

The Company operates a drilling waste landfarm off Manutahi Road, Manutahi. The site is owned by P. F. and K. M. Wards, trading under the name Waikaikai Farms Ltd. The predominant land use was previously dairy farming. The site location is detailed in Figure 1. The predominant soil type has been identified as black loamy sand and vegetation growth consists mostly of pasture. Test pitting and the logging of boreholes on site indicated a relatively shallow water table. Test bores were augured to 10 m both around the waste holding pit area and to the south-western site boundary, revealing alternating layers of sand and clays. Bore construction also revealed localised peat layers within some augured cores (approximately 4–8 m below surface). Average annual rainfall for the site is 1,043 mm (taken from the nearby Patea monitoring station).

Origin Energy Ltd's Kauri D wellsite is situated in the eastern corner of the site, and there is a small coastal lake inland and to the northeast (up gradient) of the storage pit area. Both of these operational features are presented in Figure 1.


Figure 1 WRS Waikaikai Landfarm and regional insert

A summary of the site data is provided below:

| | |
|---|---|
| Site data: | Waikaikai Landfarm |
| Location: | Lower Manutahi Road, Manutahi, Taranaki |
| Word descriptor: | |
| Map reference (NZTM): | E 1719720<br>N 5605515 |
| Mean annual rainfall: | 1,043 m |
| Mean annual soil temperature: | 15.1°C |
| Mean annual soil moisture: | 32.9% |
| Elevation: | ~45 m |
| Geomorphic position: | Dune back slope |
| Erosion / deposition: | Erosion |
| Vegetation: | Pasture, dune grasses |
| Parent material: | Aeolian/alluvial deposits |
| Drainage class: | Free/well-draining |

## 1.4 Resource consents

The Company holds one resource consent, the details of which are summarised in the table below. Summaries of the conditions attached to the permit are set out in Section 3 of this report.

A copy of the consent issued by the Council is included in Appendix I.

Table 1 Consent held by the Company

| Consent number | Purpose | Granted | Review | Expires |
|---|---|---|---|---|
| *Discharges of waste to land* | | | | |
| **5956-2.0** | To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsites and contaminated soil onto and into land via landfarming | 2017 | 2023 | 2034 |

## 1.5 Monitoring programme

### 1.5.1 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 Waikaikai site consisted of four primary components.

### 1.5.2 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.

### 1.5.3 Site inspections

The Waikaikai Landfarm was visited three times during the monitoring period. Sources of data being collected by the Company were identified and assessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

### 1.5.4 Chemical sampling

#### Soil sampling

Soil sampling is undertaken to monitor the quality of the landfarming in the first instance. It also serves as a marker for the degree of remediation achieved in the landfarming process at the time of sample collection.

The methodology utilised by the Council for collecting soil samples across the landfarmed area is adapted from the Guidelines for the Safe Application of Biosolids to land in New Zealand (2003).

To collect the sample, a soil corer is inserted to a depth of 400 mm +/- to encompass the zone of application. Ten soil cores are collected, spaced 10 m apart. These ten soil cores are then composited to gain one representative soil sample of an application area. An example of an extracted soil core is provided in Photo 1.

Photo 1 An example of an extracted soil core

#### Soil analysis parameters

- Total heavy metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc) and barium;
- Calcium, chloride, conductivity, magnesium, potassium, sodium , total soluble salts and sodium adsorption ratio (SAR);
- Total petroleum hydrocarbons: $C_7$-$C_9$, $C_{10}$-$C_{14}$, $C_{15}$-$C_{36}$ and $C_7$-$C_{36}$, poly-cyclic aromatic hydrocarbons and mono-cyclic aromatic hydrocarbons ; and
- Moisture factor, ammoniacal nitrogen and nitrate/nitrite nitrogen.

### Groundwater monitoring

Groundwater monitoring is also undertaken at this landfarm. The facility, as required by consent, contains an active groundwater monitoring network which is comprised of five groundwater monitoring wells.

All five wells were sampled four times this monitoring year to account for seasonal fluctuation and to assess for any adverse effects resulting from the exercise of the consent. The results are presented in Section 2.2.

The sampling was conducted through a peristaltic pump and field parameters are captured via a YSI flow through cell and a multi parameter probe. The samples are collected once field parameters have been stable within 8% for three consecutive readings.

### Groundwater analysis parameters

- Barium (dissolved and acid soluble), chloride, conductivity (@ 25°C), sodium, total dissolved salts (TDS), pH;
- Benzene, ethylbenzene, total petroleum hydrocarbons (speciated), toluene, meta-xylene, ortha-xylene; and
- In-situ readings: pH, conductivity, dissolved oxygen (DO), oxidation and reduction potential (ORP) and temperature.

## 1.5.5 Review of consent holder data

In accordance with conditions 11 and 12 of the consent, the Company must provide the Council with an annual report. This report contains information relating to the receipt, handling, storage and disposal of wastes.

The annual report was provided by the consent holder for this period. It is attached in Appendix II.

# 2 Results

## 2.1 Inspections

### 29 October 2021

During the inspection it was observed that material had been discharged into pit 1 and 3. Some sawdust was noted in pit 1 also. It was confirmed by K. Brodie that this material was not LOSP treated (chemically treated timber).

The inspection found that there has been no recent land farming activities and those which were previously farmed had good pasture growth.

Overall, there was no issue to note at the time of inspection and the Company was found complaint.

### 5 April 2022

At the time of inspection it was noted that the area in front of the pits was being prepped for spreading. The waste in pit 1 was also being turned. Pit 2 remains empty as it is still without a liner. Pit 3 contained liquids.

The recently land farmed area next to the pits had good pasture growth at the time of inspection. All other historic spreading areas also had good pasture cover which appeared healthy.

Overall, there was no issues to note and the Company was found complaint on the assessed conditions.

### 7 June 2022

At the time of inspection it was observed that pit 2 without the liner had remained empty, with pit 1 containing some solids, and pit 3 containing some liquids.

There had been some recent land spreading activities undertaken adjacent to the pit area. There appeared to be good pasture strike in the seeded area. Further land spreading activities will occur in this area. The seaward land spreading area was also inspected, with no barren patches observed.

Overall, there was no issues to note and the Company was found compliant under the conditions assessed.

## 2.2 Results of receiving environment monitoring

### 2.2.1 Groundwater monitoring

The Waikaikai Landfarm contains five groundwater monitoring wells. These wells, which were a consent requirement, are situated in two locations (Figure 2). Three wells are located down gradient from the lined storage cells (GND2290, 2291 and 2292). The intention of these wells is to assess the groundwater in the immediate vicinity of the storage cells. The remaining two wells (GND2293 and 2294) are situated on the south western boundary of the landfarm to assess for any potential offsite contaminant migration. The results of the sample analysis for the four monitoring rounds, is provided in Tables 2-6.

The analyses of total petroleum hydrocarbons ($C_7$-$C_9$, $C_{10}$-$C_{14}$, $C_{15}$-$C_{36}$) and benzene, toluene, ethylbenzene and xylenes (m, o and p), collectively termed BTEX, have not been tabulated as the analyses did not recorded any of the analytes above the laboratory defined limit of detection (LOD).

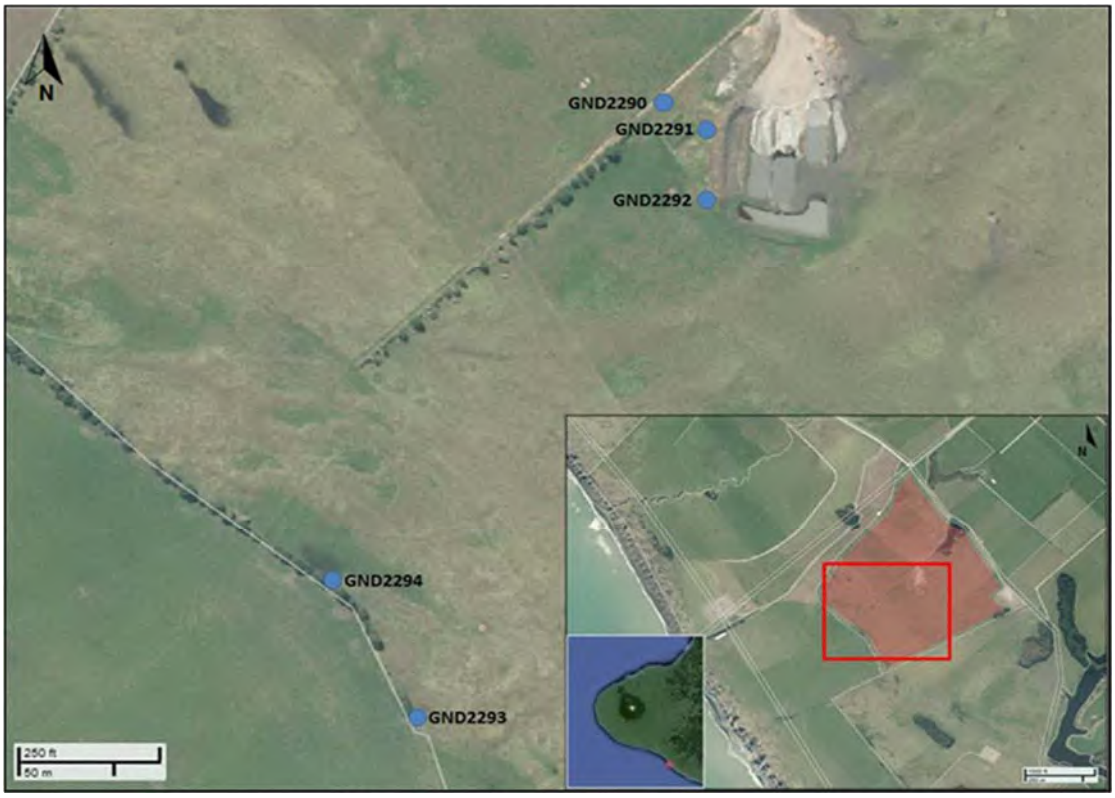



Figure 2 WRS Waikaikai Landfarm groundwater monitoring well locations

Table 2 GND 2290 2021-2022 monitoring period

| GND2290 | Collected | 14 Sep 2021 | 13 Jan 2022 | 31 Mar 2022 | 29 Jun 2022 |
|---|---|---|---|---|---|
| Parameter | Time | 09:45 | 08:45 | 10:15 | 10:40 |
| Temperature | °C | 14.3 | 15.6 | 17.5 | 15.1 |
| Electrical Conductivity (EC) | mS/m | 40.5 | 40.0 | 33.4 | 46.6 |
| pH | pH Units | 6.7 | 6.8 | 6.8 | 7.1 |
| Chloride | g/m$^3$ | 31 | 33 | 30 | 64 |
| Total Sodium | g/m$^3$ | 21 | 25 | 18.7 | 22 |
| Acid Soluble Barium | g/m$^3$ | < 0.11 | < 0.11 | < 0.11 | < 0.11 |
| Dissolved Barium | g/m$^3$ | 0.040 | 0.039 | 0.031 | 0.044 |
| Total Dissolved Solids (TDS) | g/m$^3$ | 250 | 300 | 260 | 330 |

All analytes remained stable throughout the monitoring period in bore GND2290. Slight increases in chloride, dissolved barium, total dissolved solids (TDS) and, as a function of those, electrical conductivity (EC), were noted in the June 2022 monitoring round. Figures 3, 4 and 5 show the long term monitoring records for chloride, TDS and EC respectively at this site.

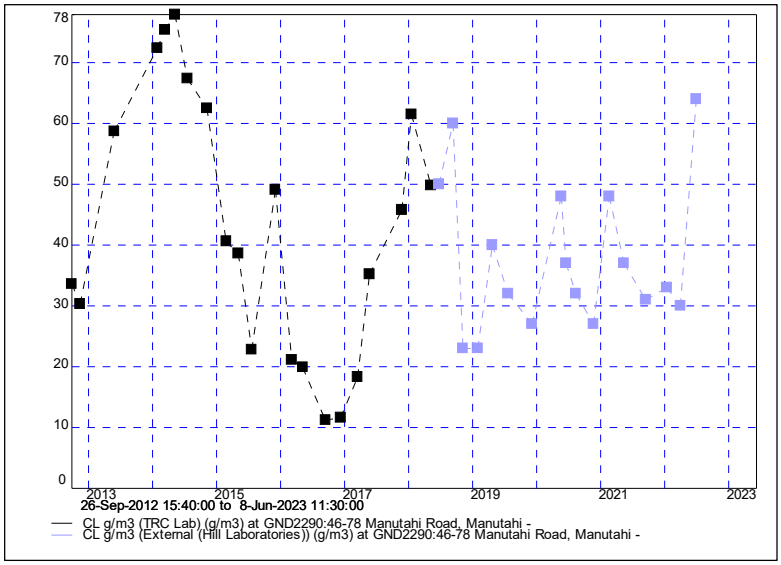



Figure 3 Long term chloride monitoring GND2290 2012-2022

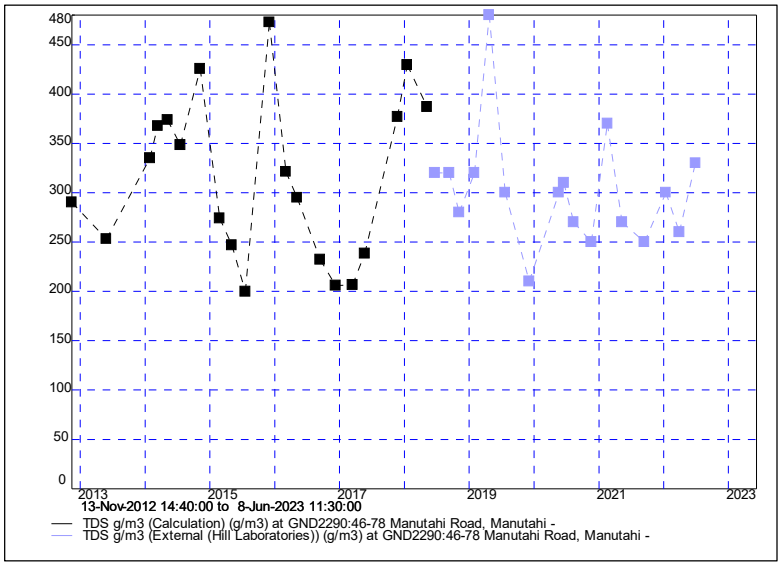



Figure 4 Long term TDS monitoring GND2290 2012-2022

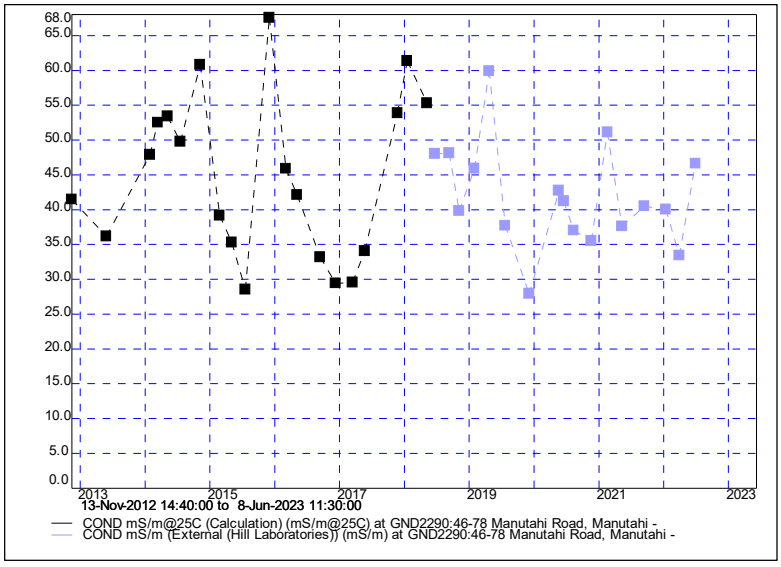



Figure 5 Long term EC monitoring GND2290 2012-2022

Table 3 GND2291 2021-2022 monitoring period

| GND2291 | Collected | 14 Sep 2021 | 13 Jan 2022 | 31 Mar 2022 | 29 Jun 2022 |
|---|---|---|---|---|---|
| Parameter | Time | 10:20 | 09:15 | 09:45 | 10:00 |
| Temperature | °C | 14.8 | 15.6 | 16.4 | 14.9 |
| Electrical Conductivity (EC) | mS/m | 165.7 | 178.5 | 131.5 | 147.8 |
| pH | pH Units | 6.2 | 6.3 | 6.2 | 6.5 |
| Chloride | g/m$^3$ | 300 | 340 | 210 | 270 |
| Total Sodium | g/m$^3$ | 84 | 86 | 77 | 81 |
| Acid Soluble Barium | g/m$^3$ | < 0.11 | < 0.11 | < 0.11 | < 0.11 |
| Dissolved Barium | g/m$^3$ | 0.022 | 0.021 | 0.022 | 0.026 |
| Total Dissolved Solids (TDS) | g/m$^3$ | 1080 | 1210 | 920 | 1010 |

All analytes displayed a relatively stable trend for the monitoring period for bore GND2291. The first two monitoring rounds (September 2021 and January 2022) recorded slightly elevated chloride, TDS, and EC, compared to those for March and June 2022. Figures 6, 7 and 8 show the long term monitoring record for these parameters at this site.

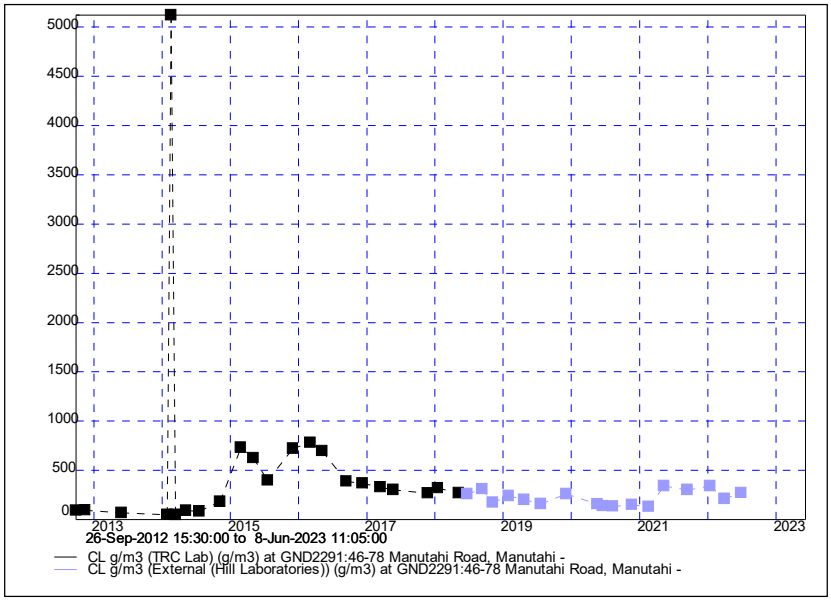



Figure 6 Long term chloride monitoring GND2291 2012-2022

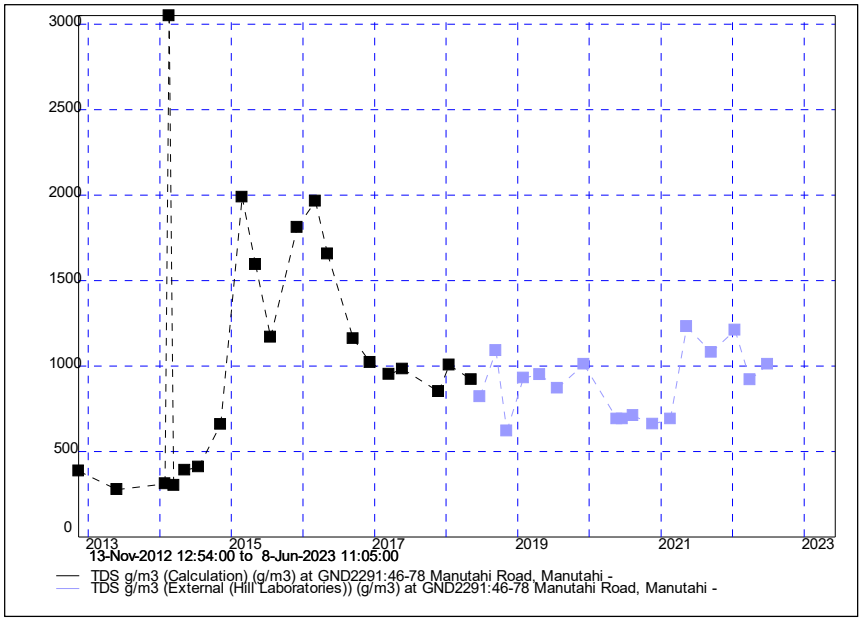



Figure 7 Long term TDS monitoring GND2291 2012-2022

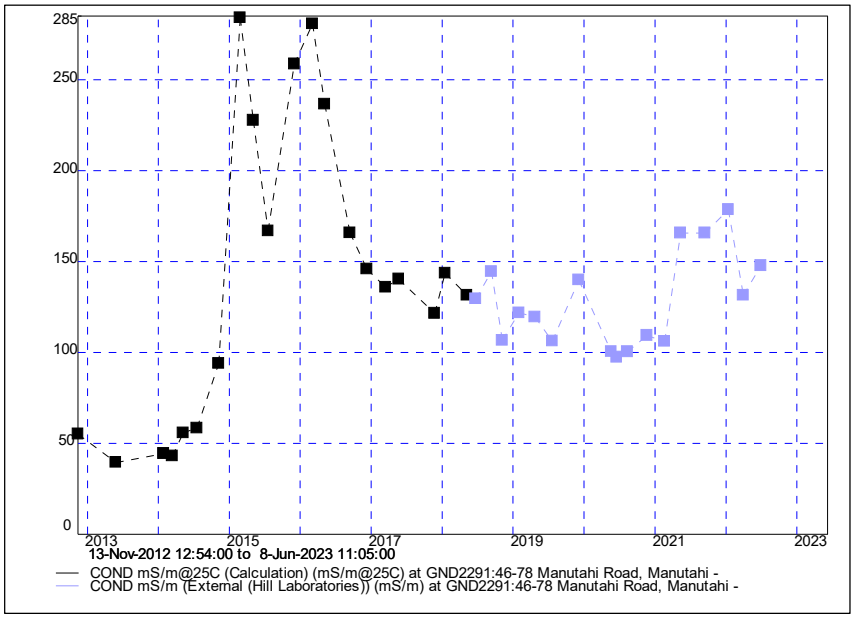



Figure 8 Long term EC monitoring GND2291 2012-2022

Table 4 GND2292 2021-2022 monitoring period

| GND2292 | Collected | 14 Sep 2021 | 13 Jan 2022 | 31 Mar 2022 | 29 Jun 2022 |
|---|---|---|---|---|---|
| Parameter | Time | 10:55 | 09:50 | 09:15 | 11:25 |
| TEMP | °C | 14.7 | 15.9 | 16.4 | 14.9 |
| Electrical Conductivity (EC) | mS/m | 133.0 | 95.5 | 114.4 | 95.9 |
| pH | pH Units | 6.4 | 6.6 | 6.4 | 6.8 |
| Chloride | g/m$^3$ | 220 | 132 | 210 | 170 |
| Total Sodium | g/m$^3$ | 147 | 115 | 117 | 94 |
| Acid Soluble Barium | g/m$^3$ | 0.17 | 0.12 | 0.16 | < 0.11 |
| Dissolved Barium | g/m$^3$ | 0.180 | 0.124 | 0.158 | 0.114 |
| Total Dissolved Solids (TDS) | g/m$^3$ | 780 | 600 | 720 | 570 |

All analytes demonstrated general stability, with two samples having slightly elevated concentrations of EC, chloride and TDS at bore GND2292 during the monitoring period. The slightly elevated levels were recorded in September 2021 and March 2022. However, when compared to the long term trends, as demonstrated by Figures 9 to 11, the levels are continuing to show an overall decreasing trend.

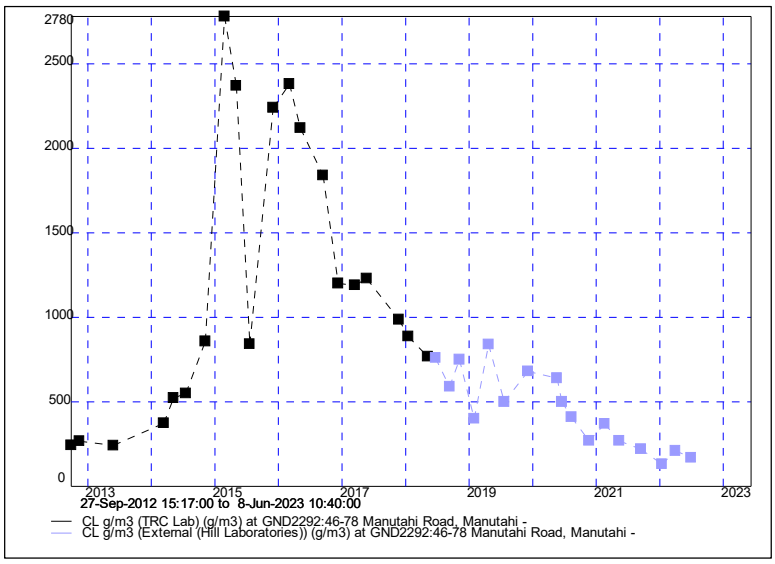



Figure 9 Long term chloride monitoring GND2292 2012-2022

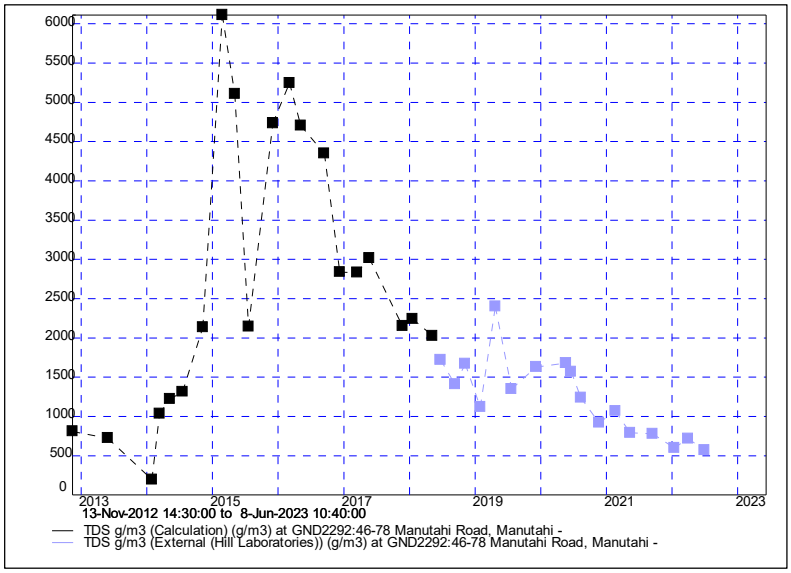



Figure 10 Long term TDS monitoring GND2292 2012-2022

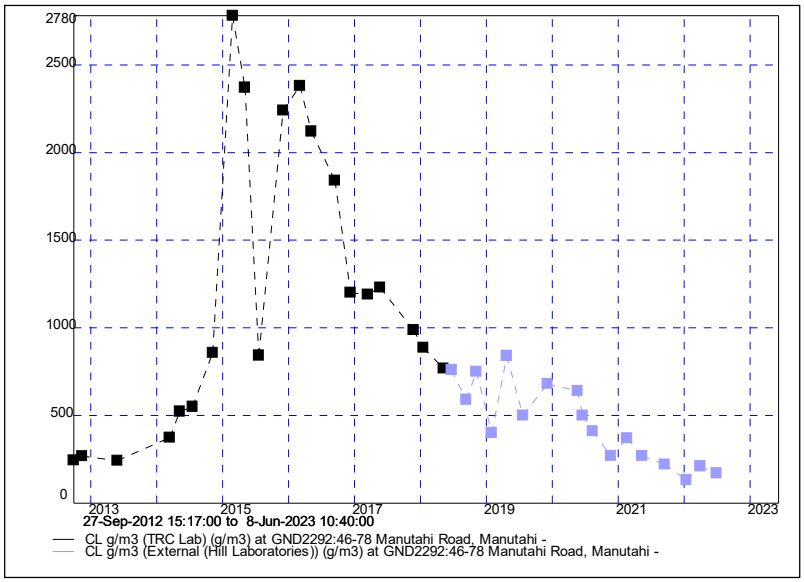



Figure 11 Long term EC monitoring GND2292 2012-2022

Table 5 GND2293 2021-2022 monitoring period

| GND2293 | Collected | 14 Sep 2021 | 13 Jan 2022 | 31 Mar 2022 | 29 Jun 2022 |
|---|---|---|---|---|---|
| Parameter | Time | 12:25 | 11:20 | 11:50 | 12:25 |
| TEMP | °C | 14.8 | 17.6 | 16.9 | 15.6 |
| Electrical Conductivity (EC) | mS/m | 113.6 | 112.6 | 100.2 | 102.4 |
| pH | pH Units | 6.8 | 6.9 | 6.9 | 6.8 |
| Chloride | g/m$^3$ | 250 | 240 | 210 | 230 |
| Total Sodium | g/m$^3$ | 69 | 68 | 65 | 69 |
| Acid Soluble Barium | g/m$^3$ | 0.13 | 0.12 | 0.11 | 0.12 |
| Dissolved Barium | g/m$^3$ | 0.136 | 0.133 | 0.121 | 0.121 |
| Total Dissolved Solids (TDS) | g/m$^3$ | 720 | 780 | 710 | 690 |

All analytes remained relatively stable throughout the monitoring period. Slight reductions were recorded in TDS and EC during the second part of the monitoring period. There continues to be an overall decreasing trend for chloride, TDS and EC as shown in Figures 12, 13 and 14.

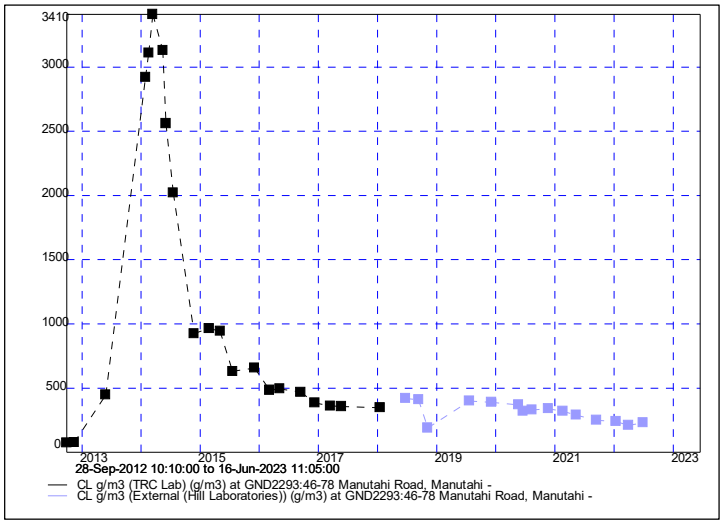



Figure 12 Long term chloride monitoring GND2293 2012-2022

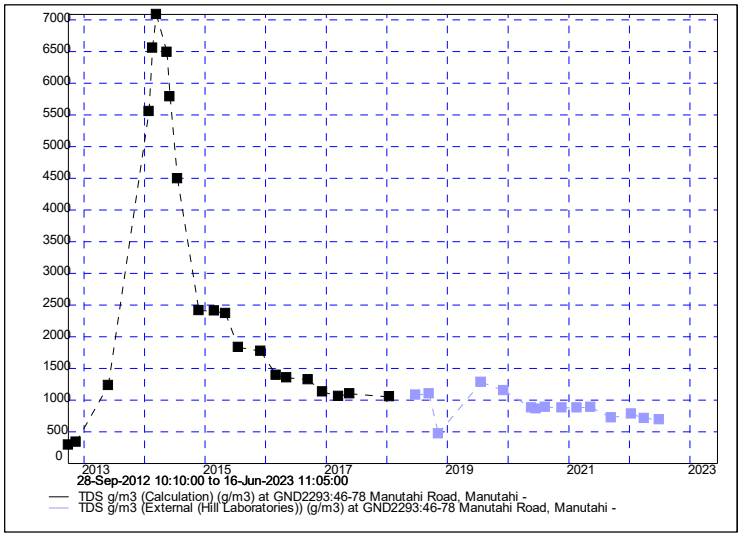



Figure 13 Long term TDS monitoring GND2293 2012-2022

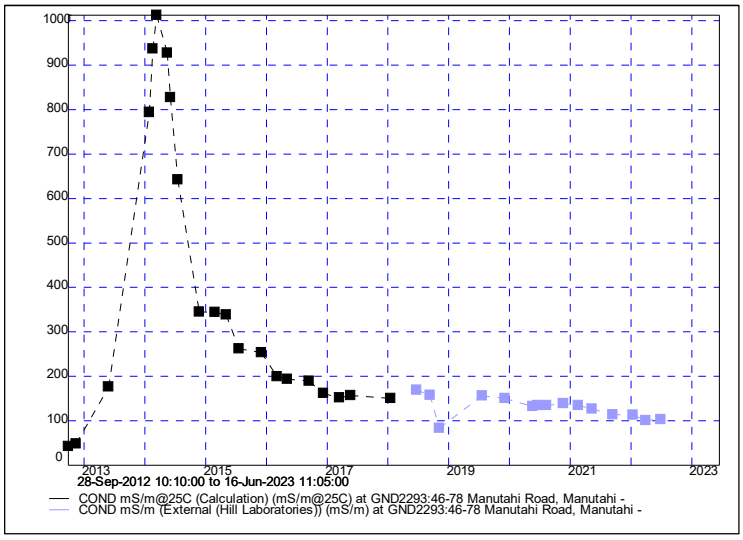



Figure 14 Long term EC monitoring GND2293 2012-2022

Table 6 GND2294 2021-2022 monitoring period

| GND2294 | Collected | 14 Sep 2021 | 13 Jan 2022 | 31 Mar 2022 | 29 Jun 2022 |
|---|---|---|---|---|---|
| Parameter | Time | 11:35 | 10:30 | 10:55 | 13:15 |
| TEMP | °C | 14.8 | 16.1 | 16.1 | 14.8 |
| Electrical Conductivity (EC) | mS/m | 38.5 | 45.7 | 131.9 | 191.1 |
| pH | pH Units | 7.6 | 7.6 | 6.8 | 6.8 |
| Chloride | $g/m^3$ | 50 | 74 | 360 | 560 |
| Total Sodium | $g/m^3$ | 31 | 34 | 53 | 69 |
| Acid Soluble Barium | $g/m^3$ | < 0.11 | < 0.11 | < 0.11 | < 0.11 |
| Dissolved Barium | $g/m^3$ | < 0.005 | < 0.005 | 0.025 | 0.051 |
| Total Dissolved Solids (TDS) | $g/m^3$ | 230 | 300 | 950 | 1290 |

The monitoring of GND2294 indicated an increasing trend of all analytes except for pH and acid soluble barium throughout the monitoring period. This can be clearly seen as an increase compared to the baseline in Figures 15, 16 and 17 for chloride, TDS and EC respectively. It is likely that this increase in analyte concentrations is associated with the landfarming activity from area W2205, the shallow groundwater table and sandy soils. However, all parameters are presently compliant with the consent conditions.

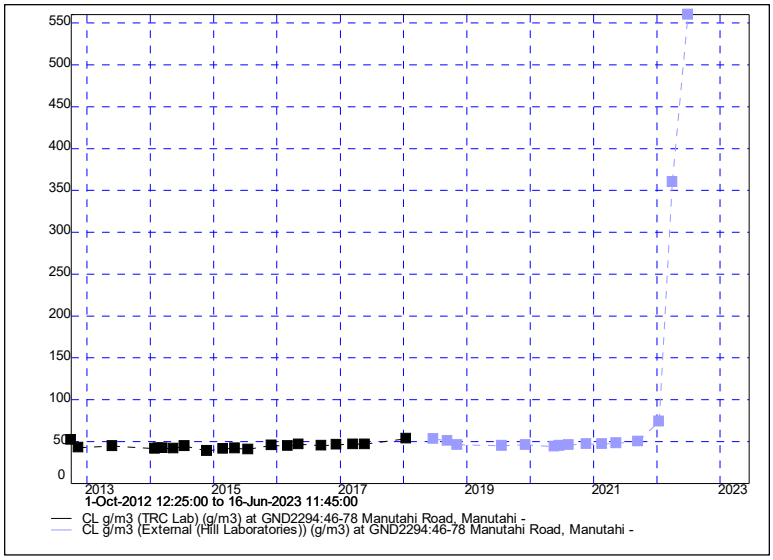



Figure 15 Long term chloride monitoring GND2294 2012-2022

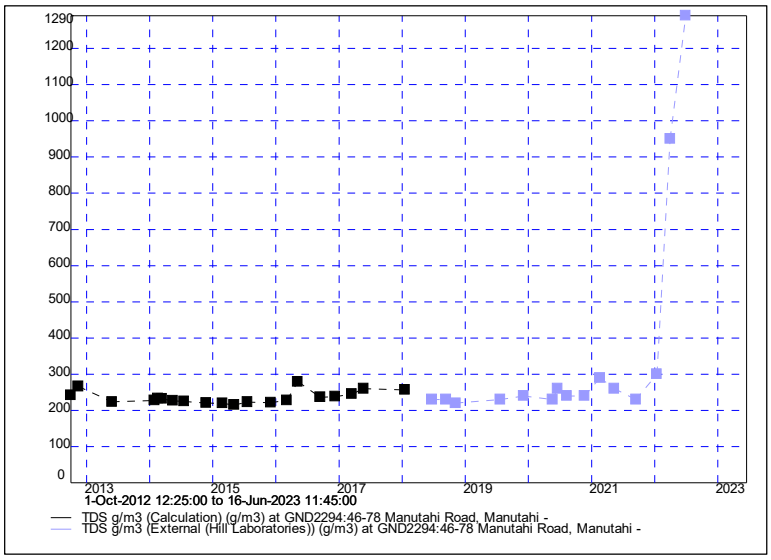



Figure 16 Long term TDS monitoring GND2294 2012-2022

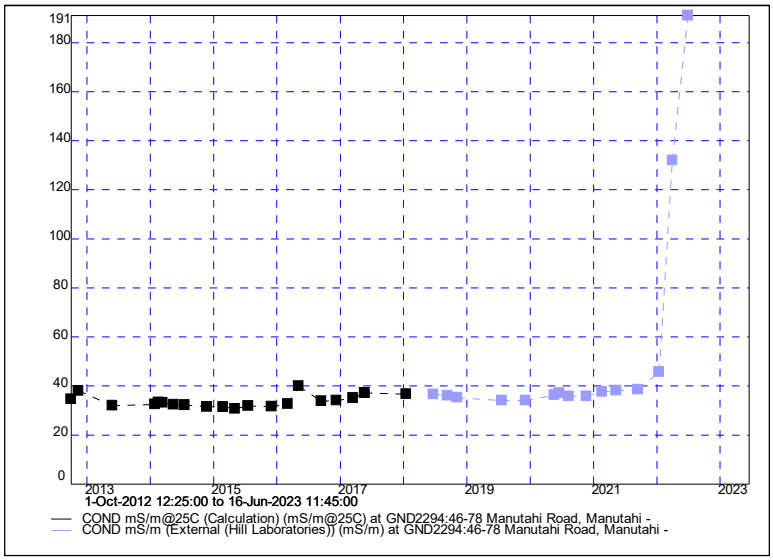



Figure 17 Long term EC monitoring GND2294 2012-2022

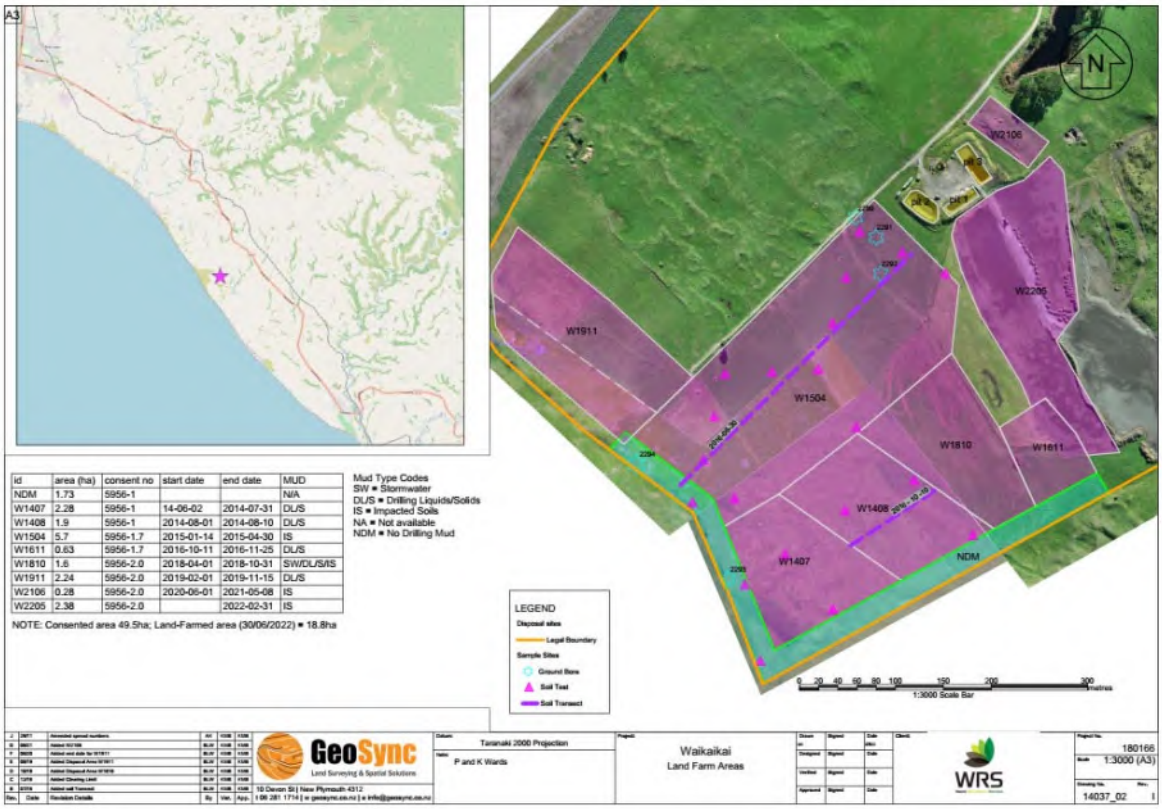
The analysis of the groundwater monitoring network at Waikaikai landfarm indicated results were within consent condition limits for the 2021-2022 monitoring period. For most of the bores, the analytes were stable or slightly decreasing during the monitoring period. There was a slight elevation in chloride, EC and TDS observed within GND2291 for the first part of the monitoring period which decreased during the second part of the monitoring period to levels similar to 2020-2021 levels.

There is a significant increase in GND2294 levels of EC, TDS, chloride, sodium and barium, particularly during June 2022. Given the location of this bore (on the boundary of the site) it is likely that the increase is due to the activity on area W2205, the sandy soils and shallow groundwater. It is therefore important to continue monitoring the trend of analytes in this bore during the 2022-2023 period.

## 2.2.2 Soil monitoring

During this monitoring period spreading and incorporation of waste material into the iron sands was undertaken in a new spreading area W2205. The area farmed, including previously landfarmed areas are depicted in the consent holder provided map (Figure 18). The landfarmed location of W2205 contained both solid and liquid material from Greymouth Petroleum's Turangi B-14, B-16 and A-15 wells, First Gas's Ahuroa B, Tamarind's Cheal A pipeline A-B and NPDC Matai Street. Six samples were collected from the site. Two transects were taken from the previously landfarmed areas W1911. Area W1911 was farmed during the 2019-2020 monitoring period. Four transects were taken from area W2205 which was farmed during 2021-2022. Figure 19 shows the location of the soil transects for the 2021-2022 monitoring period.

The analysis is provided in Table 7. Please note that analytes which did not record results above the LOD were not tabulated. This includes analytes which have specific consent limits.




| id | area (ha) | consent no | start date | end date | MUD |
|---|---|---|---|---|---|
| NDM | 1.73 | 5956-1 | | | N/A |
| W1407 | 2.28 | 5956-1 | 14-06-02 | 2014-07-31 | DL/S |
| W1408 | 1.9 | 5956-1 | 2014-08-01 | 2014-08-10 | DL/S |
| W1504 | 5.7 | 5956-1.7 | 2015-01-14 | 2015-04-30 | IS |
| W1611 | 0.63 | 5956-1.7 | 2016-10-11 | 2016-11-25 | DL/S |
| W1810 | 1.6 | 5956-2.0 | 2018-04-01 | 2018-10-31 | SW/DL/S/IS |
| W1911 | 2.24 | 5956-2.0 | 2019-02-01 | 2019-11-15 | DL/S |
| W2106 | 0.28 | 5956-2.0 | 2020-06-01 | 2021-05-08 | IS |
| W2205 | 2.38 | 5956-2.0 | | 2022-02-31 | IS |

Figure 18 WRS Waikaikai Landfarm landfarmed areas (image provided by WRS)*

*(Note that the soil transects and soil samples are not from monitoring period 2021-2022, but from a previous period – current transects are shown in Figure 19).

Table 7 WRS Waikaikai Landfarm soil monitoring 2021-2022 monitoring period

| WRS Waikaikai soil | Site | Consent surrender limit 5956-2.0 | Transect 1 W2205 | Transect 2 W2205 | Transect 3 W2205 | Transect 4 W2205 | Transect 5 W1911 | Transect 6 W1911 |
|---|---|---|---|---|---|---|---|---|
| 2021-2022 | Collected | | 30 June 2022 | 30 June 2022 | 30 June 2022 | 30 June 2022 | 30 June 2022 | 30 June 2022 |
| Parameter | Unit/Time | | 10:50 | 11:20 | 11:45 | 12:10 | 13:05 | 13:30 |
| Dry Matter (Env) | g/100 g as rcvd | | 88 | 86 | 89 | 86 | 85 | 84 |
| 1- Methylnaphthalene | mg/kg dry wt | | < 0.012 | 0.021 | 0.012 | 0.099 | < 0.012 | < 0.012 |
| 2-Methylnaphthalene | mg/kg dry wt | | < 0.012 | 0.021 | 0.012 | 0.139 | < 0.012 | < 0.012 |
| Naphthalene | mg/kg dry wt | 7.2 | <0.06 | < 0,06 | < 0.06 | 0.09 | < 0.06 | < 0.06 |
| Perylene | mg/kg dry wt | | < 0.012 | < 0.012 | < 0.011 | 0.027 | < 0.012 | < 0.012 |
| Phenanthrene | mg/kg dry wt | | < 0.012 | 0.014 | < 0.011 | 0.044 | < 0.012 | < 0.012 |
| Total of Reported PAHs in soil | mg/kg dry wt | | <0.3 | <0.3 | <0.3 | 0.6 | <0.3 | <0.3 |
| pH | pH Units | | 7.3 | 7.9 | 7.7 | 8.0 | 7.6 | 8.0 |
| Calcium (Sat Paste) | mg/L | | 161 | 305 | 252 | 1406 | 132 | 147 |
| Magnesium (Sat Paste) | mg/L | | 22 | 39 | 24 | 51 | 17 | 22 |
| Sodium (Sat Paste) | mg/L | | 34 | 69 | 62 | 230 | 34 | 46 |
| Conductivity from soluble salts | mS/cm | 2.9 | < 0.2 | 0.2 | < 0.2 | 1.0 | < 0.2 | < 0.2 |
| Sodium Absorption Ratio (SAR) | | 18 | 0.7 | 1.0 | 1.0 | 1.6 | 0.7 | 0.9 |
| Soluble Salts | g/100 g dry wt | 0.25 | < 0.05 | 0.09 | < 0.05 | 0.34 | 0.06 | 0.06 |
| C10 - C14 | mg/kg dry wt | 150 | 330 | 920 | 420 | 7700 | 185 | 1260 |
| C15 - C36 | mg/kg dry wt | 1,300 | 1700 | 3700 | 1490 | 15800 | 1230 | 4400 |
| Total hydrocarbons (C7 - C36) | mg/kg dry wt | | 2000 | 4700 | 1920 | 23000 | 1420 | 5600 |
| Chloride | mg/kg dry wt | 700 | 70 | 197 | 101 | 1230 | 24 | 72 |
| Total Recoverable Barium | mg/kg dry wt | 10,000 | 670 | 2700 | 2600 | 1990 | 3500 | 3200 |

| WRS Waikaikai soil | Site | Consent surrender limit 5956-2.0 | Transect 1 W2205 | Transect 2 W2205 | Transect 3 W2205 | Transect 4 W2205 | Transect 5 W1911 | Transect 6 W1911 |
|---|---|---|---|---|---|---|---|---|
| 2021-2022 | Collected | | 30 June 2022 | 30 June 2022 | 30 June 2022 | 30 June 2022 | 30 June 2022 | 30 June 2022 |
| Parameter | Unit/Time | | 10:50 | 11:20 | 11:45 | 12:10 | 13:05 | 13:30 |
| Total Recoverable Calcium | mg/kg dry wt | | 4100 | 7200 | 6300 | 8100 | 8600 | 7000 |
| Total Recoverable Chromium | mg/kg dry wt | 600 | 12 | 17 | 13 | 12 | 15 | 14 |
| Total Recoverable Copper | mg/kg dry wt | 100 | 8 | 14 | 11 | 12 | 13 | 13 |
| Total Recoverable Lead | mg/kg dry wt | 160 | 2.0 | 4.6 | 5.0 | 4.7 | 3.6 | 2.9 |
| Total Recoverable Magnesium | mg/kg dry wt | | 1710 | 2400 | 1650 | 2100 | 2400 | 2200 |
| Total Recoverable Nickel | mg/kg dry wt | 60 | 6 | 9 | 6 | 7 | 8 | 8 |
| Total Recoverable Potassium | mg/kg dry wt | | 300 | 730 | 490 | 610 | 740 | 620 |
| Total Recoverable Sodium | mg/kg dry wt | 460 | 240 | 360 | 280 | 420 | 450 | 450 |
| Total Recoverable Zinc | mg/kg dry wt | 300 | 50 | 64 | 48 | 51 | 67 | 66 |

The analysis of the soil samples indicated the following:

- Sodium absorption ratio (SAR) remained below 1.6, the limit is set at <18.
- In terms of petroleum hydrocarbons
  - $C_7$-$C_9$ was not recorded above the LOD and was not tabulated.
  - $C_{10}$-$C_{14}$ ranged 185-7,770 mg/kg. The limit for surrender is set at <150 mg/kg. All six transects are currently above the limit for surrender, for this analyte.
  - $C_{15}$-$C_{36}$ ranged 1,230-15,800 mg/kg the limit for surrender is <1,300 mg/kg. The only transect below the limit is Transect 5 in area W1911.
- Soil chloride ranged 24-1,230 mg/kg. The surrender concentration must be below 700 mg/kg. This analyte was only above the surrender limit on one location (Transect 4) and remained below in the other transects.
- Sodium was close to the limit of surrender (460 mg/kg), ranging 240-450 mg/kg.

The resampling of area W1911 occurred in 2021-2022 due to concentrations of TPH $C_{10}$-$C_{14}$ & $C_{15}$-$C_{36}$ and sodium being above the consent criteria of surrender during the previous monitoring period. The current results indicate that area W1911 cannot be surrendered due to concentrations of TPH $C_{10}$-$C_{14}$ & $C_{15}$-$C_{36}$ remaining above the consent criteria for surrender. Sodium concentrations have reduced, and these now just meet the limit of surrender. Disposal at this site occurred from February – November 2019. As disposal has only recently been completed, it is anticipated that TPH levels will decline with time.

Sampling of area W2205, landfarmed in 2021-2022, demonstrated that it may not be surrendered due to concentrations of TPH $C_{10}$-$C_{14}$ & $C_{15}$-$C_{36}$, chloride and soluble salts. Part of this area adjacent to the soil transects was operational during this monitoring period. Rehabilitation of the site was completed in 2022, it is anticipated with adequate aerobic soil conditions, with time these levels will decline.

Soil monitoring in the upcoming monitoring period will assess the degree of bioremediation over time for both areas.


Figure 19 Location of soil transects 1 to 6

## 2.3 Consent holder provided information

As required by their consent, the Company provided the Council with an annual report of operations undertaken at the Waikaikai Landfarm during this monitoring period. This is attached in Appendix III.

In addition, the Company have been proactive in communications with the Council, including providing associated analysis of material accepted at the landfarm. They also undertake the necessary notification of deliveries and landfarming operations.

The log of material delivered is provided below, (adapted from the Company annual report, Appendix A).

Table 8 Inwards drilling waste register WRS Waikaikai Landfarm 2021-2022

| Date | Source | Customer | Remediation Site $m^3$ | | |
|---|---|---|---|---|---|
| | | | Solid | Liquid | Total |
| Jul 21 | Turangi- B – Turangi – 14 | GPL | 537 | 464 | 1001 |
| Aug 21 | Turangi- B – Turangi – 14 | GPL | 186 | 225 | 411 |
| | **Turangi B T 14 Total** | | **723** | **689** | **1412** |
| Nov 21 | Turangi – B – T – 16 | GPL | 582 | 175 | 757 |
| Dec 21 | Turangi – B – T – 16 | GPL | 290 | 259 | 549 |
| Jan 22 | Turangi – B – T–16 | GPL | 71 | 132 | 203 |
| | **Turangi B T16 Total** | | **943** | **566** | **1509** |
| Aug 21 | First Gas Ahuroa B | First Gas | 26 | - | 26 |
| | **First Gas Ahuroa B Total** | | **26** | **-** | **26** |
| Sep 21 | Downer/NPDC – Matai St | Downer/NPDC | 10 | - | 10 |
| | **Downer NPDC Total** | | **10** | **-** | **10** |
| Oct 21 | Cheal A Pipeline A-B | Tamarind | 7 | - | 7 |
| | **Tamarind Cheal A Total** | | **7** | **-** | **7** |
| Mar 22 | Turangi A T–15 | GPL | 472 | 265 | 737 |
| Apr 22 | Turangi A T–15 | GPL | 442 | 211 | 653 |
| | Turangi A T–15 | GPL | 108 | 177 | 285 |
| | Turangi A T–15 | GPL | - | 8 | 8 |
| | **Turangi A T-15 Total** | | **1022** | **661** | **1683** |
| | **Annual Total to 30 June 2022** | | **2731** | **1916** | **4647** |

## 2.4 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 2021-2022 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

During the 2021-2022 period, spreading and incorporation into the iron sands of waste material was undertaken in a new spreading area W2205 (Figure 18). This included the liquid/solid wastes received from Greymouth Petroleum's Turangi B-14, B-16 and A-15 wells, First Gas's Ahuroa B, Tamarind's Cheal A Pipeline A-B and NPDC's Matai Street soils.

At the end of the monitoring period all the storage pits were emptied in order to assess the pit liner integrity. Pit 2 has been decommissioned, the liner removed and a layer of clay placed to reduce the mobilisation of sand on the pit walls and floor. This pit has been unused for the entire monitoring period, and will be modified in the following year if mud volumes received increase in the future and the need arises. Both operational Pits 1 and 3 were visually inspected. Minor liner stabilisation of the southern pit top selvage of Pit 1 was required and undertaken.

During inspections there was no issues to note, and the Company was found compliant under the conditions assessed. Notifications, associated waste analysis and the Company's annual report, were provided to the Council.

## 3.2 Environmental effects of exercise of consents

The previously landfarmed area within W1911 was sampled again this monitoring period. The corresponding results indicated that the parcel of land is still above surrender criteria for mid to high range petroleum hydrocarbons, but is now within the limit for sodium. Part of area W2205 was sampled this monitoring period, and the results indicate that this land area is above surrender criteria for mid to high range petroleum hydrocarbons.

Groundwater monitoring for wells GND2290, GND2291, GND2292 and GND2293 recorded relatively stable chloride, electrical conductivity (EC) and TDS concentrations. For wells GND2292 and GND2293 there is a decreasing trend for analytes chloride, EC and TDS concentrations. GND2294 has shown an increasing trend in concentrations of chloride, EC and TDS. No petroleum related compounds were recorded above the LOD in any of the site monitoring wells this period.

Landfarmed areas, W1504, W1810, W1611, W1408 and W1407 have met their limit for surrender. If the consent holder intends to return these areas back to their former land use (agriculture) they will need to apply for a variation of consent 5956-2.0. Once this has been undertaken, the consent holder must then supply the District Council with the associated surrender analysis and the updated varied consent, for a removal of the temporary industrial zoning.

## 3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review and previous years is set out in Tables 9 and 10.

Table 9 Summary of performance for consent 5956-2.0

| **Purpose: 5956-2.0** ***To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsite's and contaminated soil onto and into land via landfarming*** | | |
|---|---|---|
| **Condition requirement** | **Means of monitoring during period under review** | **Compliance achieved?** |
| 1. Definitions of material | N/A | Yes |

| Purpose: 5956-2.0 *To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsite's and contaminated soil onto and into land via landfarming* | | |
|---|---|---|
| **Condition requirement** | **Means of monitoring during period under review** | **Compliance achieved?** |
| 2. Application area detailed on attached map | Landfarming occurred in specific area | Yes |
| 3. Adoption of Best Practicable Option (BPO) | Inspections | Yes |
| 4. Groundwater monitoring well installation | Inspections and sampling | Yes |
| 5. Cell lined with fit for purpose liner | Inspections noted compromised liner in Pit 2 which remained empty and has been decommissioned. All others were compliant | Yes |
| 6. Storage cell integrity check every 24 months | One cell liner removed and currently decommissioned | Yes |
| 7. Operation in accordance with management plan | Inspections, annually reviewed management plan received September 2019 | Yes |
| 8. Notify TRC 48 hours prior to transfer of waste to disposal site | Notifications received | Yes |
| 9. Notify TRC 48 hours prior to landfarming wastes | Notifications received | Yes |
| 10. Representative waste sample from each source and each type of waste and have it analysed for the following:<br>a) total petroleum hydrocarbons ($C_6$-$C_9$, $C_{10}$-$C_{14}$, $C_{15}$-$C_{36}$);<br>b) benzene, toluene, ethylbenzene, and xylenes;<br>c) polycyclic aromatic hydrocarbons screening;<br>d) barium, calcium, chloride, magnesium, sodium, potassium, sodium adsorption ratio, nitrogen and pH, and<br>e) heavy metals; arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc. | Submitted | Yes |
| 11. Record keeping | Annual report provided and mud delivery log provided. All consent notifications provided by consent holder this period | Yes |
| 12. Annual Report due by 31 August | Report received | Yes |
| 13. No discharge within 25 m of surface water or property boundaries | Inspections | Yes |
| 14. No hydraulic fracturing fluids | Record check | Yes |

| Purpose: 5956-2.0 *To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsite's and contaminated soil onto and into land via landfarming* | | |
|---|---|---|
| **Condition requirement** | **Means of monitoring during period under review** | **Compliance achieved?** |
| 15. Contaminated soil may only be brought to site after it has been assessed by condition 10 of this consent and by the Chief Executive | Yes, contaminated soil assessed and agreed prior to being brought to site | Yes |
| 16. All waste brought to site must be landfarmed as soon as practicable but no later than 24 months after delivery date | Inspections and liaison with Company | Yes |
| 17. Application of drilling material thickness | Inspections and review of consent holder data | Yes |
| 18. No ponding or overland flow after one hour of application | No ponding noted | Yes |
| 19. As soon as practicable after landfarming the consent holder shall mix the wastes with native topsoil with a minimum of 250 mm | Inspections | Yes |
| 20. Maximum application rate of 20,000 mg/kg (TPH) at any point after incorporation | Inspections and sampling | Yes |
| 21. Secondary application of material is permitted if the standards of condition 29 have been met and the Chief Executive has considered this analysis appropriate | Not required this period | N/A |
| 22. Revegetation as soon as practicable | Achieved | Yes |
| 23. Shall not exceed a value of 2,500 $g/m^3$ TDS within any groundwater or surface water | Monitoring | Yes |
| 24. Consent shall not lead or be liable to lead to contaminants entering a surface water body | Monitoring | Yes |
| 25. Shall not result in any adverse impacts on groundwater and or surface water | Minor short term impacts in terms of salinity, though below consent conditions for TDS | Yes |
| 26. Conductivity must be less than 400 $mSm^{-1}$. If background soil has an conductivity greater than 400 $mSm^{-1}$, then conductivity after disposal shall not exceed original conductivity by more than 100 $mSm^{-1}$ | Inspections and sampling | Yes |

| Purpose: 5956-2.0 *To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsite's and contaminated soil onto and into land via landfarming* | | |
|---|---|---|
| **Condition requirement** | **Means of monitoring during period under review** | **Compliance achieved?** |
| 27. Sodium absorption ratio [SAR] must be less than 18.0, if background SAR exceeds 18.0 then increase shall not exceed 1.0 | Inspections and sampling | Yes |
| 28. The concentration of metals and salts in the soil layer containing the discharge shall comply with certain criteria | Sampling | Yes |
| 29. Prior to expiry/cancellation of consent these levels must not be exceeded:<br>a) Conductivity, 290 $mSm^{-1}$<br>b) Chloride, 700 $g/m^3$<br>c) Total dissolved salts, 2,500 $g/m^3$<br>d) Sodium, 460 $g/m^3$<br>e) MAH's/PAH MfE 1999 CS NZ Table 4.12<br>f) TPH CCME 2008 Table 5.2 Ecological direct contact | Current soil samples indicate area W1911 remains above the surrender limit for $C_{10}$-$C_{14}$, $C_{15}$-$C_{36}$.<br>Current soil samples indicate area W2205 is above the surrender limit for $C_{10}$-$C_{14}$, $C_{15}$-$C_{36}$, chloride and soluble salts | N/A |
| 30. Consent cannot be surrendered until standards in condition 29 have been met | No consent surrender | N/A |
| 31. Notification of discovery of archaeological remains | None this monitoring period | N/A |
| 32. Review, amend, delete | Not 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 10 Evaluation of environmental performance over time

| Year | Consent no | High | Good | Improvement req | Poor |
|---|---|---|---|---|---|
| 2011-2012 | 5956-1 | - | - | - | 1 |
| 2012-2013 | 5956-1 | - | - | - | 1 |
| 2013-2014 | 5956-1 | - | - | 1 | - |
| Waste Remediation Services consent holder from 2014-2015 onwards | | | | | |
| 2014-2015 | 5956-1.7 | - | 1 | - | - |
| 2016-2017 | 5956-2.0 | - | 1 | - | - |
| 2017-2018 | 5956-2.0 | 1 | - | - | - |

| Year | Consent no | High | Good | Improvement req | Poor |
|---|---|---|---|---|---|
| 2018-2019 | 5956-2.0 | 1 | - | - | - |
| 2019-2020 | 5656-2.0 | - | 1 | - | - |
| 2020-2021 | 5656-2.0 | 1 | - | - | - |
| 2021-2022 | 5656-2.0 | 1 | | | |
| Totals | | 4 | 3 | 1 | 2 |

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

## 3.4 Recommendations from the 2020-2021 Annual Report

In the 2020-2021 Annual Report, it was recommended:

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

Recommendation 1 was undertaken.

Recommendation 2 was undertaken. Alterations to monitoring programmes for 2022-2023

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 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 2022-2023.

## 3.5 Exercise of optional review of consent

Resource consent 5956-2.0 provides for an optional review of the consent in June 2023. Condition 32 allows the Council to review the consent, 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.

Based on the results of monitoring in the year under review, and in previous years as set out in earlier annual compliance monitoring reports, it is considered that there are no grounds that require a review to be pursued.

# 4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Waikaikai Landfarm 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.
3. THAT the option for a review of resource consent(s) in June 2023, as set out in condition 32 of the consent, not be exercised, on the grounds that the current consent conditions are sufficient.

# Glossary of common terms and abbreviations

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

| | |
|---|---|
| Al* | Aluminium. |
| As* | Arsenic. |
| 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 µS/cm. |
| 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. |
| Fresh | Elevated flow in a stream, such as after heavy rainfall. |
| $g/m^2/day$ | 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. |
| LOD | Limit of detection: the lowest measurement that analysis can differentiate from a non-detectable result. |
| 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. |
| µS/cm | Microsiemens per centimetre. |
| 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. |
| 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 an Environment Quality Manager.

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Taranaki Regional Council (2021): Waste Remediation Services Ltd Waikaikai Landfarm Monitoring Programme Annual Report 2020-2021 Technical Report 2021-50.

# Appendix I

# Resource consent held by Waste Remediation Services

(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: | Waste Remediation Services Limited<br>PO Box 7150<br>New Plymouth 4341 |
| Decision Date: | 19 April 2017 |
| Commencement Date: | 19 April 2017 |

## Conditions of Consent

| | |
|---|---|
| Consent Granted: | To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsites, and contaminated soil onto and into land via landfarming |
| Expiry Date: | 1 June 2034 |
| Review Date(s): | Annually until June 2020 and then every three years thereafter |
| Site Location: | Lower Manutahi Road, Manutahi<br>(Property owner: Waikaikai Farms Limited) |
| Grid Reference (NZTM) | 1720190E-5605380N |
| Catchment: | Mangaroa |

*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 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. For the purposes of this consent the following definitions shall apply:
    a) drilling wastes consist of; drilling fluids and cuttings from drilling operations with water based muds, and drilling fluids and cuttings from drilling operations with synthetic based muds;
    b) oily wastes from wellsites consist of; sludge removed from tanks and separators, slops oil removed from well cellars, tank wax which builds up in separators and tanks, oily formation sand, contaminated ground material from leaks and spills;
    c) contaminated soil refers specifically to the hydrocarbon contaminated soil;
    d) storage means a discharge of wastes from vehicles, tanks, or other containers onto land for the purpose of temporary storage prior to landfarming, but without subsequently spreading onto, or incorporating the discharged material into the soil within 48 hours;
    e) landfarming means the discharge of wastes onto land, subsequent spreading and incorporation into the soil, for the purpose of attenuation of hydrocarbon and/or other contaminants, and includes any stripping and relaying of topsoil.

2. This consent authorises the application of material to land only within the area indicated on the attached map.

3. 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.

4. Prior to the exercise of this consent, the consent holder shall after consultation with the Chief Executive, Taranaki Regional Council, install a minimum of three groundwater monitoring bores. The bores shall be at locations and to depths that enable monitoring to determine any change in groundwater quality resulting from the exercise of this consent. The bores shall be installed in accordance with NZS 4411:2001 and all associated costs shall be met by the consent holder. The bores shall be sampled prior to stockpiling or landfarming for baseline water quality parameters and concentrations of contaminants.

5. Any pits intended for the storage of solid or liquid wastes shall be lined with high-grade (fit for purpose) synthetic liners or equivalent so that they retain liquid without leakage through the base or side walls.

6. At intervals not exceeding 24 months the consent holder shall check the integrity of the pit liners, repair or replace liners as required and demonstrate to the Chief Executive, Taranaki Regional Council they retain liquid as required by condition 5.

7. The site shall be operated in accordance with a 'Management Pan' prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The plan shall detail how the site will be managed to achieve compliance with the consent conditions of this consent and shall include as a minimum:

   a) control of site access;
   b) procedures for notification to Council of disposal activities;
   c) procedures for the receipt and stockpiling of drilling wastes onto the site;
   d) procedures for the management of stormwater recovered from, or discharging from, the drilling waste stockpiling area;
   e) procedures for demonstrating storage cell integrity;
   f) methods used for the mixing and testing of different waste types;
   g) procedures for landfarming drilling wastes and or contaminated soil (including means of transfer from stockpiling area, means of spreading, and incorporation into the soil);
   h) contingency procedures;
   i) sampling regime and methodology; and
   j) post-landfarming management, monitoring and site reinstatement.

**Notification and sampling requirements**

8. The consent holder shall notify the Chief Executive, Taranaki Regional Council, (by emailing worknotification@trc.govt.nz) at least 48 hours prior to permitting wastes onto the site for storage. Notification shall include the following information:

   a) the consent number;
   b) the name of the well and wellsite, or other source, from which the waste was generated;
   c) the type of waste to be stored; and
   d) the volume of waste to be stored.

9. The consent holder shall notify the Chief Executive, Taranaki Regional Council, (by emailing worknotification@trc.govt.nz) at least 48 hours prior to landfarming stored material, or material brought onto the site for landfarming within 48 hours. Notification shall include the following information:

   a) the consent number;
   b) the name of the well(s)/or location from which the waste was generated;
   c) the type(s) of waste to be landfarmed;
   d) the volume and weight of the waste to be landfarmed;
   e) the specific concentrations of Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), Salts (Barium, Calcium, Chloride, Magnesium, Sodium, Potassium) and Sodium Adsorption Ratio. Hydrocarbons (Total Petroleum Hydrocarbons, Mono Cyclic Aromatic Hydrocarbons and Poly Cyclic Aromatic Hydrocarbons) and Nitrogen in the waste prior application to land;
   f) results of sampling undertaken in accordance with condition 8, including in a spreadsheet compatible format;
   g) proposed loading rate and required area calculations showing compliance with condition 18; and
   h) the specific location and area over which the waste will be landfarmed.

10. The consent holder shall take a representative sample of each type of waste, from each individual source, and have it analysed for the following:

    a) total petroleum hydrocarbons ($C_6$-$C_9$, $C_{10}$-$C_{14}$, $C_{15}$-$C_{36}$);
    b) benzene, toluene, ethylbenzene, and xylenes;
    c) polycyclic aromatic hydrocarbons screening;
    d) barium, calcium, chloride, magnesium, sodium, potassium, sodium adsorption ratio, nitrogen and pH, and
    e) heavy metals; arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc.

    The consent holder shall record the data from these results onto a master spreadsheet to be supplied to the Taranaki Regional Council in accordance with conditions 8 and 9.

**Monitoring and reporting**

11. The consent holder shall keep records of the following:

    a) wastes from each individual well/source;
    b) analytical composition of wastes;
    c) stockpiling area(s);
    d) volumes of material stockpiled;
    e) landfarming area(s), including a map showing individual disposal areas with GPS co-ordinates and up-to-date GIS shapefiles;
    f) volumes and weights of wastes landfarmed;
    g) dates of commencement and completion of stockpiling and landfarming events;
    h) dates of sowing landfarmed areas;
    i) treatments applied; and
    j) details of monitoring, including sampling locations, sampling methods and the results of analysis;

    and shall make the records available to the Chief Executive, Taranaki Regional Council.

12. The consent holder shall provide to the Chief Executive, Taranaki Regional Council:

    a) by 31 August of each year, a report on all records required to be kept in accordance with conditions 8, 9, 10 and 11 for the period of the previous 12 months, 1 July to 30 June;
    b) monthly records of all movements of waste to the site in spreadsheet format, including source, material type, transporter, volumes and receiving storage pit.

### Discharge Limits

13. No discharge shall take place within 25 metres of surface water or property boundaries.

14. Waste brought to the site shall not contain any hydraulic fracturing fluids.

15. Contaminated soil may be brought to the site only after the Chief Executive, Taranaki Regional Council has assessed the analysis required by condition 10 and advised that the material is suitable for bioremediation.

16. All wastes must be landfarmed as soon as practicable, but no later than 24 months after being brought onto the site.

17. For the purposes of landfarming, solid wastes shall be applied to land in a layer not exceeding:

    a) 100 mm thick for wastes with a hydrocarbon concentration less than 50,000 mg/kg dry weight; or
    b) 50 mm thick for wastes with a hydrocarbon concentration equal to or greater than 50,000 mg/kg dry weight.

18. For the purposes of landfarming, liquid wastes shall be applied to land:

    a) at a rate such that there is no overland flow of liquids; and
    b) at a rate such that no ponded liquids remain after one hour, after application.

19. When landfarming, as soon as practicable following the application of solid wastes to land, the consent holder shall mix the wastes with, as a minimum, the top 250 mm of native soil.

20. The hydrocarbon concentration in the soil over the landfarming area shall not exceed 20,000 mg/kg dry weight at any point where:

    a) liquid waste has been discharged; or
    b) solid waste has been discharged and incorporated into the soil.

21. The secondary application of material to land may only occur if:

    a) the areas of application meet the standards of surrender as shown in conditions 28 and 29 of this consent;
    b) the Chief Executive, Taranaki Regional Council, having considered the appropriate soil analysis, has confirmed that the standards specific in a) above have been met.

22. As soon as practicable following landfarming, areas shall be sown into pasture (or into crop). The consent holder shall monitor revegetation and if adequate establishment is not achieved within two months of sowing, shall undertake appropriate land stabilisation measures to minimise wind and stormwater erosion.

### Receiving environmental limits for water

23. The exercise of this consent shall not result in a level of total dissolved salts within any surface or groundwater of more than 2,500 $gm^3$.

24. The exercise of this consent, including the design, management and implementation of the discharge, shall not lead or be liable to lead to contaminants entering a surface water body.

25. The exercise of this consent shall not result in any adverse impacts on groundwater as a result of leaching, or on surface water including aquatic ecosystems, and/or result in a change to the suitability of use of the receiving water as determined by the Chief Executive, Taranaki Regional Council

### Receiving environmental limits for soil

26. The conductivity of the soil/waste layer after application shall be less than 400 mSm, or alternatively, if the background soil conductivity exceeds 400 mSm, the landfarming of waste shall not increase the soil conductivity by more than 100 mSm.

27. The application of waste shall not increase the sodium adsorption ratio (SAR) of the soil by more than 2.0 and in no case shall the SAR of the soil/waste layer exceed 18.0 after application.

28. The concentration of metals and salts in the soil layer containing the discharge shall comply with the following criteria:

| Metal/ Salt | Maximum value (mg/kg) |
|---|---|
| Arsenic [1] | 17 |
| Barium – Barite [2] | 10,000 |
| Extractable Barium [2] | 250 |
| Cadmium [1] | 0.8 |
| Chromium [3] | 600 |
| Copper [3] | 100 |
| Lead [1] | 160 |
| Nickel [3] | 60 |
| Mercury | 1 |
| Zinc [3] | 300 |
| [1]SCS – Rural Residential MfE 2011b; [2] Alberta Environment 2009; [3] NZWWA 2003, lowest of protection of human health and ecological receptors. (Biosolids to land) | |

29. From 1 March 2034 (three months prior to the consent expiry date), constituents in the soil at any depth less than 500 mm (below ground level) shall not exceed the standards shown in the following table:

| Constituent | Standard |
|---|---|
| Conductivity | Not greater that 290 mS/m |
| Chloride | Not greater than 700 mg/kg |
| Sodium | Not greater than 460 mg/kg |
| Total Soluble Salts | Not greater than 2500 mg/kg |
| TPH Fraction | Guideline Value Agricultural Ecological Direct Soil Contact (Fine Sand) From table 5.2 |
| F1 (C6-C10) | 210 |
| F2 (>C10-C16) | 150 |
| F3 (>C16-C34) | 1300 |
| F4 (>C34) | 5600 |
| Canadian Council of Ministers of the Environment (CCME), in the document Canada Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale, 2008. Table 5.2 | |
| Soil Type/ Contaminant | Depth of contamination |
| | Surface (<1m) (mg/kg) |
| SANDY Silt | |
| MAHs | |
| Benzene | 1.1 |
| Toluene | 82 |
| Ethylbenzene | 59 |
| Xylene | 59 |
| PAHs | |
| Naphthalene | 7.2 |
| Non-carc (Pyrene) | 160 |
| Benzo(a)pyrene | 0.027 |
| Table 4.12 SANDY SILT Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 1999) | |

MAHs - benzene, toluene, ethylbenzene, xylenes
PAHs - napthalene, non-carc. (pyrene), benzo(a)pyrene eq.
TPH - total petroleum hydrocarbons ($C_7$-$C_9$, $C_{10}$-$C_{14}$, $C_{15}$-$C_{36}$)

The requirement to meet these standards shall not apply if, before 1 March 2034, the consent holder applies for a new consent to replace this consent when it expires, and that application is not subsequently withdrawn.

30. This consent may not be surrendered unless the standards in condition 29 have been met.

31. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.

32. 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 annually until 2020 and every three years thereafter, 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 19 April 2017

For and on behalf of
Taranaki Regional Council

_____

A D McLay
**Director - Resource Management**

*The consent holder's attention is drawn to MPI's "Food safety and animal welfare guidance if spreading rocks and minerals from drilling oil and gas wells on land" (July 2015) which provides guidance to producers and processors of food, including farmers, on how ensure food safety and animal welfare if spreading rocks and minerals from drilling oil and gas wells on land.*
*Should you require further information, please contact Mary Western (MPI, Wellington) or visit https://www.mpi.govt.nz/document-vault/8698 for the report.*

*Advice Note (included at the request of DITAG)*
*The consent holder's attention is drawn to MPI's "New Zealand Code of Practice for the Design and Operation of Farm Dairies (NZCP1) which restricts:*

- *The discharge of specified wastes to land used for grazing of milking animals; and*
- *The use of feed from land which has had specified wastes applied to it.*

*Should you require further information, please contact a Dairy Industry Technical Advisory Group (DITAG) representative* ***or*** *visit http://www.foodsafety.govt.nz/elibrary/industry/dairy-nzcp1-design-code-of-practice/amdt-2.pdf (specifically section 6.4 Disposal of effluent and other wastes and section 7.8 Purchased Stock Food) or contact an operation dairy processing company regarding conditions of supply.*


**Total consented area for Waikaikai Landfarm (in yellow) as authorised by consent 5956-2.0**

# 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.

# Appendix III

# Company provided annual report

31 October 2022

Chief Executive
Taranaki Regional Council
Private Bag 713
47 Cloten Road
Stratford

Attention: Chania Hattle

Dear Chania

**RE: Resource Consent 5956 -2.0 - Waikaikai (Wards) – Waikaikai Farms Ltd, 78 Lower Manutahi Road, RD 2, Patea**

As required under special condition 12 of resource consent 5956-2.0, please find all relevant information recorded from the operational period 1 July 2021 to 30 June 2022 relating to receipt and land-spreading activities undertaken at Waste Remediation Services (WRS) Waikaikai remediation site. This is the eighth annual report completed by WRS for this site covering the previous periods:

2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21

This report follows on from the previously submitted 2020-21 consent monitoring report and as such is focused on activities, records, and results from the 2021-22 period. This report is structured into six sections, as per the following:

1. Overview and Background
2. Wastes Received for Remediation
3. Remediation - comprising preparatory earthworks, land-spreading and incorporation and, Rehabilitation Operations - comprising topsoil application, sowing and additional works)
4. Monitoring
5. Additional Consent Requirements
6. Summary

## 1. OVERVIEW AND BACKGROUND

WRS took over operating the Waikaikai remediation site in 2014, after the original remediation consent 5956-1 was transferred to them by the landowner of the site, following an unsuccessful attempt at operating the site by a third party operator. Between 2014 and the currently reported on year (2021-22), operations at the site have improved, as reflected in the TRC consent compliance ratings for these years. Similar to WRS's other site (Manawapou, consent 7795-1) there have been intermittent periods of activity at the site, reflecting fluctuating levels of activity within the local drilling industry. During the 2016-17 period, consent 5956-1.7 was superseded by the current consent, 5956-2.0.

During 2021-22, material from Greymouth Petroleum's wells Turangi B-14, B-16 and A-15 were augmented with small quantities of oil and gas wastes from First Gas' Ahuroa B, Tamarind's Cheal A Pipeline A-B and NPDC Matai Street.

Monitoring of the site undertaken in the 2021-22 year by both the Taranaki Regional Council (TRC) and WRS management has shown the operations undertaken at Waikaikai to be compliant with consent conditions.

## 2. WASTES RECEIVED FOR REMEDIATION

### Waste Types and Volumes

WRS' Waikaikai site is consented to dispose of a wider range of petrochemical industry wastes than the Manawapou site, including oily wastes. During the 2021-22 year, a total of 4,646m³ of both solid and liquid wastes were received onsite from Greymouth Petroleum's Turangi B-14, B-16 and A-15 wells, First Gas's Ahuroa B, Tamarind's Cheal A Pipeline A-B and NPDC Matai Street.

An updated mud register is attached as Appendix A for reference.

### Waste Characterisation

Consent 5956-2.0 requires the site operator to sample and keep records of the waste's chemical composition. Samples are taken (generally by well site staff prior to transport or by WRS staff at the landfarm). WRS, following discussion with the TRC, no longer takes composite pre-spreading samples from the pits prior to landspreading for further waste characterization as 1) the waste is only stored for short periods of time and 2) there is minimal mixing of waste in the pits before incorporation into the sand horizons of the spread area.

With the significantly increased volume of waste now being directed to WRS's operations- the only two remaining sites able to accept oilfield waste in the region- storage pits that originally enabled the accumulation of both liquid wastes for campaign spreading, now operate as facilities enabling the transfer of waste from road haulage to agricultural machinery; waste for remediation is being continually delivered and then removed for spreading and remediation with very little storage involved.

All samples are sent to RJ Hill Laboratories for analyses. Results are all sent directly and simultaneously by Hills Laboratories to the TRC for their records and for cross-referencing purposes. Results are used by WRS to calculate the required spreading areas as per condition 17 of consent 5956-2.0 ensuring the hydrocarbon limits in condition 20 are adhered to. Additionally, consent 5956-2.0 condition 15 requires WRS to present pre-remediation results to the TRC for any contaminated soil, to assess on a case-by-case, its suitability for spreading.

This is typically undertaken and provided by the owner/source of the waste and supplied to the TRC directly when the delivery notification to the TRC is negotiated and undertaken.

As TRC have been provided directly with all incoming analyses of incoming waste sampling, in the interest of avoiding duplication and confusion, PDF copies will not be attached to this report.

## 1. REMEDIATION AND REHABILITATION OPERATIONS

In the 2021-22 period spreading and incorporation into the iron sands of waste material was undertaken in a new spreading area W2205, as indicated on the site map (Appendix B). This included the liquid/solid wastes received from Greymouth Petroleum's Turangi B-14, B-16 and A-15 wells, First Gas's Ahuroa B, Tamarind's Cheal A Pipeline A-B, and NPDC's Matai Street soils. At the end of the monitoring period all the storage pit were emptied.

Appendix B: Site Map

The land spreading processes employed at this site are detailed further in the site management plan. WRS closely monitors spreading operations to ensure contractors practices are consistent with the procedures outlined in the management plan and to ensure application thickness and ponding consent conditions are adhered to. The inspection notices received from the TRC imply these processes were implemented satisfactorily during 2021-22. Photographs of spreading and rehabilitation operations at the Waikaikai site are attached as Appendix C as further reference.

Appendix C: Photographs

## 2. MONITORING

**Site Inspections - WRS**

WRS closely supervises site operations to ensure all contractors are following best practice as per the site operation management plan and conditions specified in consent 5956-2.0. Regular site inspections are also undertaken during periods of inactivity at the site.

**Site Inspections – TRC**

WRS has received three inspection notices from the TRC for the 2021-22 year. No issues with the state of the site or practices were noted or required any further action by the TRC or WRS..

Appendix D: TRC site inspection notices .

**Receiving Environment Sampling**

Composite soil sampling and groundwater sampling is now undertaken exclusively by TRC field staff, with all samples being sent to RJ Hill Laboratories for the full suite of analyses required under consent 5956-2.0. At the time of reporting, WRS has received both soil sample and groundwater results from the TRC, but has not undertaken any in depth analysis of the soil results that have, in previous years, been undertaken by the TRC

The results of soil sampling are not interpreted here as in the past TRC has commented on these. WRS remains willing to discuss the results would any concerns arise. To date no issues have been raised

Groundwater results are presented below in Table 1.

*Table 1 TRC supplied groundwater results, Waikaikai site, all bores 2021-22*

| Parameter | Consent Limit | Bore | GND2290 | | | | GND2291 | | | | GND2292 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | 14/09/21 | 13/01/22 | 31/03/22 | 29/06/22 | 14/09/21 | 13/01/22 | 31/03/22 | 29/06/22 | 14/09/21 | 13/01/22 | 31/03/22 | 29/06/22 |
| | | Lab Number | 2704277.1 | 2827010.1 | 2940605.1 | 3023552.1 | 2704277.2 | 2827010.2 | 2940605.2 | 3023552.2 | 2704277.3 | 2827010.3 | 2940605.3 | 3023552.3 |
| pH | NS | pH Units | 6.7 | 6.8 | 6.8 | 7.1 | 6.2 | 6.3 | 6.2 | 6.5 | 6.4 | 6.6 | 6.4 | 6.8 |
| Electrical Conductivity (EC) | NS | mS/m | 40.5 | 40.0 | 33.4 | 46.6 | 165.7 | 178.5 | 131.5 | 147.8 | 133.0 | 95.5 | 114.4 | 95.9 |
| Electrical Conductivity (EC) | NS | µS/cm | 405 | 400 | 334 | 466 | 1,657 | 1,785 | 1,315 | 1,478 | 1,330 | 955 | 1,144 | 959 |
| Total Dissolved Solids (TDS) | 2,500 | g/m3 | 250 | 300 | 260 | 330 | 1,080 | 1,210 | 920 | 1,010 | 780 | 600 | 720 | 570 |
| Dissolved Barium | NS | g/m3 | 0.040 | 0.039 | 0.031 | 0.044 | 0.022 | 0.021 | 0.022 | 0.026 | 0.180 | 0.124 | 0.158 | 0.114 |
| Acid Soluble Barium | NS | g/m3 | <0.11 | <0.11 | <0.11 | <0.11 | <0.11 | <0.11 | <0.11 | <0.11 | 0.17 | 0.12 | 0.16 | <0.11 |
| Total Sodium | NS | g/m3 | 21 | 25 | 18.7 | 22 | 84 | 86 | 77 | 81 | 147 | 115 | 117 | 94 |
| Chloride | NS | g/m3 | 31 | 33 | 30 | 64 | 300 | 340 | 210 | 270 | 220 | 132 | 210 | 170 |
| Benzene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Toluene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Ethylbenzene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| m&p-Xylene | NS | g/m3 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| o-Xylene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| C7 - C9 | NS | g/m3 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| C10 - C14 | NS | g/m3 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| C15 - C36 | NS | g/m3 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total hydrocarbons (C7 - C36) | NS | g/m3 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 |

*NS Not Specified*

*Table 1 cont TRC supplied groundwater results, Waikaikai site, all bores 2021-22*

| Parameter | Consent Limit | Bore | GND2293 | | | | GND2294 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | 14/09/21 | 13/01/22 | 31/03/22 | 29/06/22 | 14/09/21 | 13/01/22 | 31/03/22 | 29/06/22 |
| | | Lab Number: | 2704277.4 | 2827010.4 | 2940605.4 | 3023552.4 | 2704277.5 | 2827010.5 | 2940605.5 | 3023552.5 |
| pH | NS | pH Units | 6.8 | 6.9 | 6.9 | 6.8 | 7.6 | 7.3 | 6.8 | 6.8 |
| Electrical Conductivity (EC) | NS | mS/m | 113.6 | 112.6 | 100.2 | 102.4 | 38.5 | 45.7 | 131.9 | 191.1 |
| Electrical Conductivity (EC) | NS | µS/cm | 1,136 | 1,126 | 10,02 | 1,024 | 385 | 457 | 1,319 | 1,911 |
| Total Dissolved Solids (TDS) | 2,500 | g/m3 | 720 | 780 | 710 | 690 | 230 | 300 | 950 | 1,290 |
| Dissolved Barium | NS | g/m3 | 0.136 | 0.133 | 0.121 | 0.121 | <0.005 | <0.005 | 0.025 | 0.051 |
| Acid Soluble Barium | NS | g/m3 | 0.13 | 0.12 | 0.11 | 0.12 | <0.11 | <0.11 | <0.11 | <0.11 |
| Total Sodium | NS | g/m3 | 69 | 68 | 65 | 69 | 31 | 34 | 53 | 69 |
| Chloride | NS | g/m3 | 250 | 240 | 210 | 230 | 50 | 74 | 360 | 560 |
| Benzene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Toluene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Ethylbenzene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| m&p-Xylene | NS | g/m3 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| o-Xylene | NS | g/m3 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| C7 - C9 | NS | g/m3 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| C10 - C14 | NS | g/m3 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| C15 - C36 | NS | g/m3 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total hydrocarbons (C7 - C36) | NS | g/m3 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 |

*NS Not Specified*

The groundwater results show compliance with the groundwater conditions 23-25 of consent 5956-2.0. No hydrocarbons have been detected in any of the samples, salinity is slightly elevated in bores GND2291 and 2294 but remains well within the consented TDS limit (2500 g/m³) given in condition 23.

## 3. ADDITIONAL CONSENT REQUIREMENTS

As per condition 3 of consent 5956-2.0, the site management plan is in the process of minor updating where necessary. Operations at the Waikaikai landfarm are all undertaken generally in accordance with the WRS' Landfarm Management Plan (LMP) that covers both the Manawapou and Waikaikai sites. It is a live document and is constantly reviewed and updated as necessary to reflect operational requirements and practices at both sites operated by WRS. In 2020-21 no significant changes were made to the LMP. The current 2022-23 updated plan is available upon request.

Consent 5956-2.0 condition 6 requires WRS to assess pit liner integrity at regular intervals. Pit 2 has been decommissioned the liner removed and a layer of clay placed to reduce the mobilization of sand on pit walls and floor This pit has been unused for the entire monitoring period, and will be modified in the following year if mud volumes received increase in the future and the need arises. As previously mentioned, both operational pits 1 and 3 were emptied prior to the end of the monitoring period and visually inspected. Minor liner stabilization of the southern pit top selvage of Pit 1 was required and undertaken. The nearest down gradient groundwater monitoring bore results did not show any signature of the contained waste whatsoever.

Pasture establishment and ongoing vegetation coverage are monitored by TRC and by WRS in partnership with the landowner at the Waikaikai site. If either the landowner or the TRC are not satisfied with vegetation coverage at the site, WRS and their contractors will work with the landowner to address any issues. In 2021- 22, neither written nor verbally has there been any concerns noted during or following field inspections by the TRC. Similarly, no rehabilitation issues were raised.

## 4. SUMMARY AND COMMENT

As in the previous year, there was a reasonable level of activity at the Waikaikai site in 2021-22. Earlier in the operational period, moderate quantities of material were received from Greymouth Petroleum's Turangi B-14, B-16 and A-15 sites, and smaller consignments from First Gas's Ahuroa B, Tamarind's Cheal A Pipeline A-B and NPDC's Matai Street. All of the waste received for remediation during the 2021-22 monitoring year has been spread and successfully rehabilitated.

No incidents or significant issues have been identified at the site during 2021-2022.

It should be noted that WRS is now being asked by the major oil and gas operators in the region what is the expected life of both WRS's land-farms. This is a conundrum dependent upon national and local political decisions, the volume and rate of drilling waste produced and the implications of the Waste Minimization Act (WMA) 2008 registration and reporting requirements. In effect the countdown of remaining acreage for land farming in the region is underway; once this is exhausted, the operational areas - turnarounds and pits- will be returned to functional farmable paddocks by removing the pits recontouring the ground and spreading the last of the waste accepted. At this point the efforts undertaken by the consent holder to construct and maintain the impermeability of the storage pits, now transfer points, will have immediately become a futile exercise in respect of avoiding discharge to ground, cost, and efforts by all during the entire operational life of the land farm.

It should also be noted WRS's Waikaikai remediation operation alone has prevented 4,647 m3 of incompressible liquids and solids going to land fill at facilities several hundred Km further afield.

WRS would welcome constructive comment on this aspect of the consent holders' views and the sector's future options for disposal of oilfield wastes by well managed remediation activities that are undertaken in full compliance with consents and with positive outcomes for the oil and gas operators, and landowner, all of which contribute to the continuing support of livelihoods.

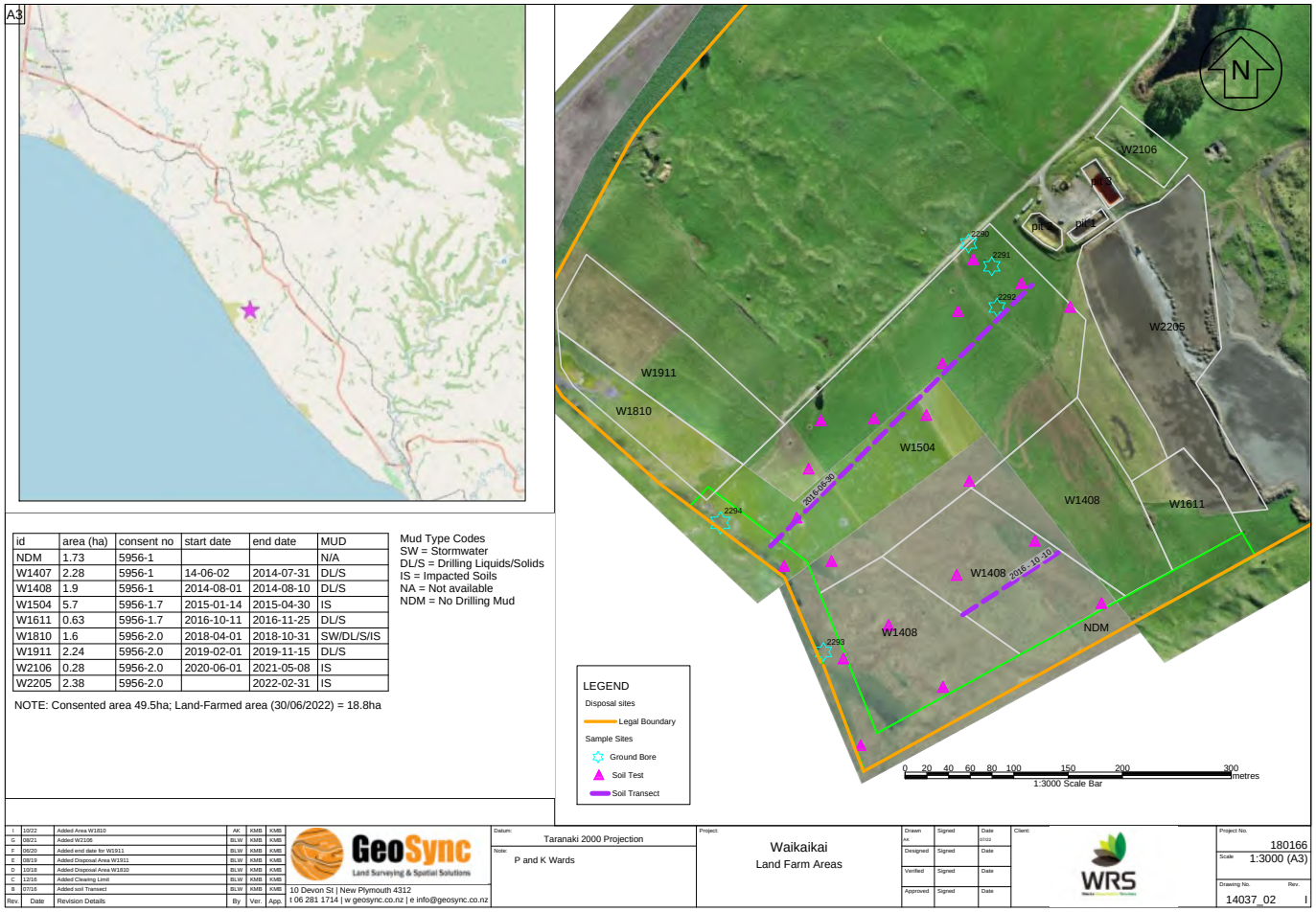
**Waste Remediation Services Ltd**
**w +64 6 751 9221 m + 64 275 996 105 f +64 751 9225**
**Address 141 – 143 Connett Road East, Bell Block 4312, New Zealand Post**
**PO Box 7150, New Plymouth 4341, New Zealand**
**Email**: keith@wrsltd.co.nz

## Appendix A Mud Register

| Date | Source | Customer | Remediation Site m3 | | | |
|---|---|---|---|---|---|---|
| | | | Solids | Liquids | Direct Spread | Total |
| Jul-21 | Turangi - B - Turangi -14 | GPL | 537 | 464 | - | 1,001 |
| Aug-21 | Turangi - B - Turangi -14 | GPL | 186 | 225 | - | 411 |
| | ***Turangi B T14 Total*** | | ***723*** | ***689*** | **-** | ***1,412*** |
| | | | | | | |
| Nov-21 | Turangi - B - T-16 | GPL | 582 | 175 | - | 757 |
| Dec-21 | Turangi - B - T-16 | GPL | 290 | 259 | - | 549 |
| Jan 22 | Turangi - B - T-16 | GPL | 71 | 132 | - | 203 |
| | ***Turangi B T16 Total*** | | ***943*** | ***566*** | **-** | ***1,509*** |
| | | | | | | |
| Aug-21 | First Gas Ahuroa B | First Gas | 26 | - | - | 26 |
| | ***First Gas Ahuroa B Total*** | | ***26*** | **-** | **-** | ***26*** |
| | | | | | | |
| Sep-21 | Downer / NPDC - Matai St | Downer / NPDC | 10 | - | - | 10 |
| | ***Downer NPDC Total*** | | ***10*** | **-** | **-** | ***10*** |
| | | | | | | |
| Oct-21 | Cheal A Pipeline A-B | Tamarind | 7 | - | - | 7 |
| | ***Tamarind Cheal A Total*** | | ***7*** | **-** | **-** | ***7*** |
| | | | | | | |
| Mar 22 | Turangi A T-15 | GPL | 472 | 265 | - | 737 |
| April 22 | Turangi A T-15 | GPL | 442 | 211 | - | 653 |
| May 22 | Turangi A T-15 | GPL | 108 | 177 | - | 285 |
| Jun-22 | Turangi A T-15 | GPL | - | 8 | - | 8 |
| | ***Tuangi A T-15 Total*** | | ***1,022*** | ***661*** | **-** | ***1,683*** |

NB: This is a summary table; a full mud register with records of individual deliveries is available upon request.

## Appendix A Waikaikai Site Map




| id | area (ha) | consent no | start date | end date | MUD |
|---|---|---|---|---|---|
| NDM | 1.73 | 5956-1 | | | N/A |
| W1407 | 2.28 | 5956-1 | 14-06-02 | 2014-07-31 | DL/S |
| W1408 | 1.9 | 5956-1 | 2014-08-01 | 2014-08-10 | DL/S |
| W1504 | 5.7 | 5956-1.7 | 2015-01-14 | 2015-04-30 | IS |
| W1611 | 0.63 | 5956-1.7 | 2016-10-11 | 2016-11-25 | DL/S |
| W1810 | 1.6 | 5956-2.0 | 2018-04-01 | 2018-10-31 | SW/DL/S/IS |
| W1911 | 2.24 | 5956-2.0 | 2019-02-01 | 2019-11-15 | DL/S |
| W2106 | 0.28 | 5956-2.0 | 2020-06-01 | 2021-05-08 | IS |
| W2205 | 2.38 | 5956-2.0 | | 2022-02-31 | IS |

NOTE: Consented area 49.5ha; Land-Farmed area (30/06/2022) = 18.8ha

Mud Type Codes
SW = Stormwater
DL/S = Drilling Liquids/Solids
IS = Impacted Soils
NA = Not available
NDM = No Drilling Mud

| Rev. | Date | Revision Details | By | Ver. | App. |
|---|---|---|---|---|---|
| I | 10/22 | Added Area W1810 | AK | KMB | KMB |
| G | 08/21 | Added W2106 | BLW | KMB | KMB |
| F | 06/20 | Added end date for W1911 | BLW | KMB | KMB |
| E | 08/19 | Added Disposal Area W1911 | BLW | KMB | KMB |
| D | 10/18 | Added Disposal Area W1810 | BLW | KMB | KMB |
| C | 12/16 | Added Clearing Limit | BLW | KMB | KMB |
| B | 07/16 | Added soil Transect | BLW | KMB | KMB |

GeoSync Land Surveying & Spatial Solutions
10 Devon St | New Plymouth 4312
t 06 281 1714 | w geosync.co.nz | e info@geosync.co.nz

Datum: Taranaki 2000 Projection
Note: P and K Wards
Project: Waikaikai Land Farm Areas
Drawn AK | Signed | Date 07/22
Designed | Signed | Date
Verified | Signed | Date
Approved | Signed | Date
Client: WRS
Project No. 180166
Scale 1:3000 (A3)
Drawing No. 14037_02 Rev. I

## Appendix C Field Photographs

*Photograph 1: 20/07/21 Waikaikai GMPL Discharging Pit 3*

*Photograph 2: 20/07/21 Waikaikai Ground Preparation 1*

*Photograph 3: 20/07/21 Waikaikai Ground Preparation 2*

*Photograph 4: 20/07/21 Waikaikai Pit 1 Pre-Spreading*

Photograph 5: 20/07/21 Waikaikai Pit 3 Pre-Spreading

Photograph 6: 20/07/21 Waikaikai Ground Preparation 3

Photograph 7 : 20/07/21 Waikaikai Topsoil Stockpiling

Photograph 8 : 31/08/21 Waikaikai Spread Area W2205

*Photograph 9: 7/08/21 Waikaikai Spreading Mud – Area W2205*

*Photograph 10: 14/12/21 Waikaikai Spreading Mud – Area W2205*

*Photograph 11: 1/04/22 Waikaikai Rehab 1 Area W2205*

*Photograph 12: 1/04/22 Waikaikai Rehab 2 Area W2205*

*Photograph 13: 17/05/22 Waikaikai Rehab Area W2205*

## Appendix D TRC Inspection Notices

Private Bag 713 | 47 Cloten Road | Stratford 4352 | New Zealand | T: 06 765 7127 | F: 06 765 5097 | www.trc.govt.nz

Taranaki Regional Council

### Inspection Notice

Under section 332 of the Resource Management Act 1991

| | |
|---|---|
| **Consent Number:** | R2/5956-2.0 |
| **Consent Name:** | Waste - discharge landfarming |
| **Contact Name:** | Waste Remediation Services Limited |
| **Postal Address:** | PO Box 7150, New Plymouth 4341 |
| **Site Location Address:** | Lower Manutahi Road, Manutahi (Property owner: Waikaikai Farms Limited) |
| **Inspection Number:** | OBS-2021-94166 |
| **Inspection Type:** | Compliance Monitoring Insp. |
| **Inspection Date:** | 29 Oct 2021 |
| **Inspection Time:** | 11:13 |
| **Weather Details:** | Rainfall: None<br>Wind Direction:<br>Wind Strength: |
| **Samples Taken:** | No |
| **Consent Purpose:** | To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsites, and contaminated soil onto and into land via landfarming |
| **Conditions Assessed:** | 2 of 32 |
| **Overall Compliance Status:** | Compliance |
| **Inspection Comments:** | Inspection 1/3. Compliance monitoring inspection undertaken to assess compliance with resource consent conditions. The inspection fond that material has been discharges into pit 1 and 3. Some saw dust noted in pit 1. Confirmed by K. Brodie that saw dust is not LOSP treated. No recent land farming activities. Recently land farm areas have good pasture growth. No issues to note. Compliant at the time of inspection. Thanks, Celeste. |
| **Further Actions Advice:** | Nil |

**Signed:**

| | |
|---|---|
| **Council Officer:** | Celeste Bevins |
| **Officer Warrant Number:** | 299 |

Disclaimer: The compliance rating reflects the warranted Officer/s observations at the time of inspection and does not provide a comprehensive assessment of compliance with the consent. Therefore the compliance rating is limited to the exact period during which the inspection was undertaken as well as the specific aspects that were inspected.

Private Bag 713 | 47 Cloten Road | Stratford 4352 | New Zealand | T: 06 765 7127 | F: 06 765 5097 | www.trc.govt.nz

Taranaki Regional Council

## Inspection Notice

Under section 332 of the Resource Management Act 1991

| | |
|---|---|
| **Consent Number:** | R2/5956-2.0 |
| **Consent Name:** | Waste - discharge landfarming |
| **Contact Name:** | Waste Remediation Services Limited |
| **Postal Address:** | PO Box 7150, New Plymouth 4341 |
| **Site Location Address:** | Lower Manutahi Road, Manutahi (Property owner: Waikaikai Farms Limited) |
| **Inspection Number:** | OBS-2022-99122 |
| **Inspection Type:** | Compliance Monitoring Insp. |
| **Inspection Date:** | 05 Apr 2022 |
| **Inspection Time:** | 14:55 |
| **Weather Details:** | Rainfall:<br>Wind Direction:<br>Wind Strength: |
| **Samples Taken:** | No |
| **Consent Purpose:** | To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsites, and contaminated soil onto and into land via landfarming |
| **Conditions Assessed:** | 32 of 32 |
| **Overall Compliance Status:** | Compliance |
| **Inspection Comments:** | Inspection 2/3. Compliance monitoring inspection undertaken to assess compliance with consent conditions. Area in front of the pits is being prepped for spreading. Mr Ward on site turning waste in pit one. Pit two without the liner is still empty. Pit three contained liquids. The area next to the pits which was land farmed most recently had good pasture growth. All historic spreading areas had good pasture cover which appeared healthy. No issues to note. Thanks, Celeste. |
| **Further Actions Advice:** | Nil |

**Signed:**

| | |
|---|---|
| **Council Officer:** | Celeste Bevins |
| **Officer Warrant Number:** | 299 |

Disclaimer: The compliance rating reflects the warranted Officer/s observations at the time of inspection and does not provide a comprehensive assessment of compliance with the consent. Therefore the compliance rating is limited to the exact period during which the inspection was undertaken as well as the specific aspects that were inspected.

Private Bag 713 | 47 Cloten Road | Stratford 4352 | New Zealand | T: 06 765 7127 | F: 06 765 5097 | www.trc.govt.nz

Taranaki Regional Council

## Inspection Notice

Under section 332 of the Resource Management Act 1991

| | |
|---|---|
| **Consent Number:** | R2/5956-2.0 |
| **Consent Name:** | Waste - discharge landfarming |
| **Contact Name:** | Waste Remediation Services Limited |
| **Postal Address:** | PO Box 7150, New Plymouth 4341 |
| **Site Location Address:** | Lower Manutahi Road, Manutahi (Property owner: Waikaikai Farms Limited) |
| **Inspection Number:** | OBS-2022-100436 |
| **Inspection Type:** | Compliance Monitoring Insp. |
| **Inspection Date:** | 07 Jun 2022 |
| **Inspection Time:** | 09:51 |
| **Weather Details:** | Rainfall:<br>Wind Direction:<br>Wind Strength: |
| **Samples Taken:** | No |
| **Consent Purpose:** | To discharge drilling wastes from hydrocarbon exploration and production activities, oily wastes from wellsites, and contaminated soil onto and into land via landfarming |
| **Conditions Assessed:** | 0 |
| **Overall Compliance Status:** | Compliance |
| **Inspection Comments:** | Inspection 3/3. Inspection undertaken to assess compliance with resource consent conditions. The inspection found that Pit 2 was empty (no liner), Pit 1 contained some solids, and pit 3 contained liquids. Recent land spreading activities have been undertaken adjacent to the pit area. Good pasture strike in the seeded area. Further land spreading activities will occur in this area. The seaward land spreading area was inspected. No barren patches were noted. No issues to note today. Compliant at the time of inspection. Thanks, Celeste. |
| **Further Actions Advice:** | Nil |

**Signed:**

| | |
|---|---|
| **Council Officer:** | Celeste Bevins |
| **Officer Warrant Number:** | 299 |

Disclaimer: The compliance rating reflects the warranted Officer/s observations at the time of inspection and does not provide a comprehensive assessment of compliance with the consent. Therefore the compliance rating is limited to the exact period during which the inspection was undertaken as well as the specific aspects that were inspected.

## Appendix E WRS Landfarm Management Plan

Available upon request