NPDC Colson Road Landfill
Monitoring Programme
Annual Report
2019-2020

Technical Report 2020-41

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Executive summary

The New Plymouth District Council (NPDC) operates a regional landfill located on Colson Road, New Plymouth, in the Waiwhakaiho catchment. During the year under review, the landfill was continuing to fill Stage 3 of the site which has a design capacity of approximately 800,000 m^3. Stages 1 and 2 have been closed and are fully reinstated. This report for the period July 2019 to June 2020 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess NPDC'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 NPDC's activities.

During the monitoring period, NPDC demonstrated an overall good level of environmental performance and improvement was required in their administrative performance.

NPDC holds nine resource consents, which include a total of 113 conditions setting out the requirements that NPDC must satisfy. NPDC holds one consent to discharge uncontaminated stormwater into the Puremu Stream, two consents to discharge leachate and contaminated stormwater into the Puremu Stream, two consents to discharge emissions into the air, one consent to discharge solids onto and into land and two consent to discharge stormwater from earthworks, one of which was granted during the year under review. NPDC also holds one consent to divert water.

The Council's monitoring programme for the year under review included 12 routine compliance monitoring inspections, seven stormwater/discharge samples, 18 surface water samples, six groundwater samples, two biomonitoring surveys of receiving waters, and two ambient air quality surveys. NPDC also collected eight leachate samples and four under liner drainage samples for physicochemical analysis. An additional unscheduled inspection was also undertaken to monitor a specific special waste disposal activity.

At inspection issues were found in regards to site management, although most of them were attended to and none resulted in significant off site effects. The issue of cap management and maintenance on Stage 2 remained unresolved at the end of the monitoring period. Extensive investigations into the cap depth and compaction were carried out during the 2018-2019 year and the remediation necessary was identified. It was found that there were areas where the cap depth needed to be increased. An abatement notice was issued allowing NPDC until March 2020 to complete the work so that the appropriate methodology could be developed and then be undertaken during the next dry weather construction season. It was agreed that this could be delayed to prioritise working on the Stage 3 cap following the landfill closure to municipal waste (August 2019) on the basis that this would minimise the potential discharge of contaminants from the site as a whole. The due date on the abatement notice was extended to March 2021.

Groundwater and under liner drainage sampling indicated that there is no significant contamination occurring in the local aquifer as a result of the landfill's presence, although there may be emerging trends of increasing, but still low level, concentrations of chloride and nitrate/nitrite nitrogen in some bores and ammoniacal nitrogen in the under liner drainage. NPDC has engaged a consultant to investigate this further to ensure that there are no significant adverse effects likely to result from these changes.

Chemical and bacteriological monitoring of the Puremu and Manganaha Streams found that the receiving water quality criteria on the consents were met at the time of the three sampling surveys with the exception of one manganese result, two faecal coliform counts and one dissolved iron concentration in the Puremu Stream. Although the total manganese concentration exceeded the consent limit, the bioavailable dissolved fraction was below the concentration expected to result in significant adverse effects. The concentration was also compliant with consent conditions at the time of the following survey. In terms of the faecal coliform and dissolved iron exceedance at the time of the May 2020 survey, it was concluded that there were other off site influences resulting in these elevated results. The elevated faecal coliform result found during the June 2020 survey was recorded as an incident and a letter of explanation was received and accepted with no further enforcement action considered necessary.

Overall, both surveys indicated that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effect on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream.

Air quality monitoring showed that off-site there were no significant adverse effects in relation to suspended particulates, dust deposition rates or odour beyond the site boundary.

An enclosed gas flare system was installed for air quality control during the 2017-2018 monitoring period and there were no odour complaints received during the 2019-2020 period that were associated with the Colson Road landfill.

Overall, NPDC demonstrated a good level of environmental performance, however an improvement is required in their administrative performance and compliance with the resource consents as defined in Section 1.1.4 of this report. During the year under review there were on-going, and still unresolved, issues with the compliance of the cap on Stage 2, with an abatement notice in place requiring the works to be undertaken by 14 March 2021. Although there may be some changes occurring in the receiving water quality below this area with regard to the manganese concentration, with one consent non-compliance recorded, it is not considered to be a significant adverse effect at this point in time. Biomonitoring found that there were effects on the macroinvertebrate communities inside the mixing zone as a result of the discharge of sediment from the site. There were also effects found at the compliance point, however there are other potential contributing sources at this location, so this could not be attributed to the landfill discharges. Following evaluation during the year under review, improved erosion and sediment control measures are being put in place. NPDC's monitoring results provided to the Council indicates that there may be emerging trends of increasing concentrations of some contaminants in the spring/groundwater collected by the under liner drainage system. NPDC engaged a consultant during the year under review to further analyse the data and will subsequently investigate the potential implications of changes identified, if any, and develop guidelines for assessing if contamination is occurring.

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% 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 had improved. However, in the year under review and in the previous year, there is still an improvement required with their administrative performance and compliance with some consent conditions.

This report includes recommendations for the 2020-2021 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 2019 to June 2020 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by New Plymouth District Council (NPDC). NPDC operates a regional landfill situated on Colson Road, New Plymouth, in the Waiwhakaiho catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by NPDC that relate to discharges of water, discharge to land, a stream diversion within the Waiwhakaiho catchment, and the two air discharge permits held by NPDC to cover emissions to air from the Colson Road landfill.

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 NPDC's use of water, land and air, and is the 20th site specific Annual Report by the Council for NPDC covering only this site. Prior to this, during the period from 1990-1999, the Council produced ten combined NPDC landfills' Annual Reports that included the Colson Road landfill.

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 NPDC in the Waiwhakaiho catchment that relate to the Colson Road landfill;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Colson Road landfill.

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 2020-2021 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
b. physical effects on the locality, including landscape, amenity and visual effects;

c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
e. risks to the neighbourhood or environment.

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

1.1.4 Evaluation of environmental and administrative performance

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

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

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.[1]

1.2 Process description

Wastes originating from municipal refuse kerbside collection, the Colson Road transfer station, other municipal transfer stations and commercial operators are discharged to the landfill. As of December 2007 Colson Road became the sole operating landfill in the Taranaki region. Once the waste is discharged it is compacted and covered daily with clay or a suitable alternative as per the requirements of the management plan. During the year under review, waste was discharged to Stage 3 of the operation until early August 2019, with the site re-opening for accepting only special waste later that month. The area, with the exception of the special waste disposal area, will be covered with a clay cap and topsoil to a predetermined specification before being grassed. Leachate from Stages 2 and 3 is collected and directed to the New Plymouth wastewater treatment plant, along with contaminated stormwater from Stage 3. An aerial plan of the site is shown in Figure 1.

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

Figure 1 Aerial view of the Colson Road landfill

The current stage in use (Stage 3) has a fully engineered liner consisting of high density polyethylene (HPDE) laid over compacted clay. Leachate is collected in porous pipes that have been put down in herring bone configuration over the polyethylene liner. During the 2013-2014 year, the lining of Stage 3 was completed so that the liner covered Stage 3's entire footprint (Photo 1). From this point on, there was an increase in the amount of potentially contaminated stormwater generated due to the increase in the lined and filled area, and this was therefore directed to the leachate collection system for discharge via the New Plymouth wastewater treatment plant. As the volumes of leachate/contaminated stormwater generated exceeded the instantaneous capacity of the pipe to the waste water treatment plant, the landfill pond was used as storage to prevent overflows to the Puremu Stream tributaries.

Daily operations at the site are governed by the requirements contained in the Colson Road Regional Landfill Management Plan.

Photo 1 Stage 3 extension works, February 2011

The landfill had been operated for most of its life without significant off site problems, but during the 2014-2015 period, 20 complaints were received regarding odours from the landfill. The Council worked with NPDC to target on site odour sources, whilst a consultant was engaged by NPDC to provide expert advice on remedial actions and longer term solutions. Mitigation measures undertaken by NPDC during the 2014-2015 year included the installation of fixed deodorant sprayers and an automated spray system, and capping of the lateral leachate lines. There was also on-going monitoring of ponding in the landfill foot print to ensure this remained minimal.

The report produced by the consultant in June 2015 identified a number of actions that could be undertaken at the site to improve odour management including:

1. Operational improvements
    a. Upgrade odour spray system
    b. Regular visual inspections to identify point sources of landfill gas or odour
    c. Modifications to leachate collection pipes as a point source of landfill gas
    d. Improve methodology for sludge disposal
2. Cap remediation particularly with intermediate cover and targeting any gas hotspots
3. Install a gas collection and disposal system

NPDC worked towards implementing the recommendations from the consultant report, with the first two stages involving operational improvements and cap remediation undertaken during the 2015-2016 and early 2016-2017 periods.

Specifically:

- Reticulation was improved to capture leachate breakouts and mitigate associated landfill gas venting.
- Regular visual walkover inspections were implemented by the operator.
- NPDC engaged a consultant to carry out outstanding work such as updating the site management plan, project managing further work to mitigate the point source discharges from the protruding leachate lines, following up on the depth of final cover being applied to areas that were at final level, and reviewing operational issues to feed into future versions of the management plan.
- Improvements were made to the fence mounted odour mitigating sprayers and the system was upgraded so that it could be automated.
- Trials of alternative spray on daily cover materials were carried out.
- A trial biofilter to treat air emissions was installed on one of the protruding leachate lines.
- The volume and pressure of the landfill gas present in the leachate system was investigated.
- A preliminary design report was completed for the collection and treatment of landfill gas that could be extracted from the leachate lines and directed to either a biofilter or flare.
- Data was gathered to allow the special waste disposal practices to be reviewed, with wastes with less than 20% solids no longer being accepted after 31 July 2015 as per the site management plan.
- NPDC recognised that optimal operational performance could not be achieved under the current tender cost and in April 2016 the landfill operator contract was tendered with the intention of lifting operational performance.
- Daily cover practices were improved, with the new contractor opting to trial large metal covers that could be lifted onto compacted refuse at the end of one working day and lifted off at the start of the next.
- Intermediate cover was applied to all but a relatively small area that was to be completed as and when weather permitted.
- Clay was used to try to prevent fugitive emissions around leachate line protrusions.
- The large special waste 'lagoon' was remediated.

During 2017-2018 a fully enclosed gas flare was installed at the site as a mitigation measure for reducing odours at the landfill site. The landfill is approaching capacity and closed to municipal waste in August 2019 but still receives special waste. The landfill could continue to produce potentially odorous gas for up to 30 years post closure.

Commissioning of the landfill gas management system occurred during January to March 2018, with operational and monitoring procedures developed to ensure the gas system was managed effectively. NPDC operations staff have been provided with training in order to carry out operation of the system in a safe and effective manner, while ongoing support and maintenance is provided by consultants.

Photo 2 Leachate pipes feeding into the gas collection system

Figure 2 As built drawing of the stage 1 landfill gas collection system

There has been a noticeable reduction in odour around the landfill perimeter since all of the above measures have been initiated and the operation of the flare began. This has resulted in no substantiated odour complaints being received in relation to the site since October 2017. There was only one unsubstantiated complaint that was received in September 2017, before the flare was installed and another unsubstantiated complaint post installation that was received on 18 August 2018.

Photo 3 The fully enclosed flare

Contouring and preparation work for the application of the final cap has commenced. This included installing drainage around the composting area at the southern end of the site previously occupied by Return2Earth, to allowing Revital to relocate to that area so that additional cover material could be safely accessed. The Council was informed of NPDC's intent to continue to use the site for the disposal of special

waste only (within the existing conditions of the various consents), and a significant amount of consultation occurred during the 2018-2019 year around how this could be managed in such a way as to continue to comply with the conditions of the existing consents.

Photo 4 Final cap compaction assessment area on northern toe, May 2020

Photo 5 Former compost area being prepared for use as a cover borrow area, May 2020

Photo 6 Construction of sediment pond for the cover borrow area, May 2020

1.3 Resource consents

NPDC holds nine resource consents in relation to the Colson Road landfill, the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in Section 3 of this report.

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

During the year, consent was granted (**10804-1.0**) for the discharge of stormwater from the earthworks that would be associated with a new borrow area on the former compost pad to enable cover material to be borrowed to cap Stage 3 and remediate the cap of Stage 2. This consent was granted on 7 February 2020. The existing earthworks consent for the Stage 3 area (**6177-1**) expired on 1 June 2020. An application to renew this consent was received on 17 February 2020. Section 124 of the RMA provides for consent holder to continue to operate under the terms and conditions of their existing consent until a decision is made on the renewal. As the application was received between three and six months prior to the expiry of the consent, the Council exercised its discretion to allow NPDC to do so.

Table 1 Consents held by NPDC that relate to the Colson Road landfill

Consent number	Purpose	Granted	Review	Expires
Water discharge permits				
2370-3	To discharge leachate and contaminated stormwater from area A to the Puremu Stream	March 2003	June 2020	June 2026
4619-1	To discharge treated stormwater and minor amounts of leachate from areas B1, B2, C1 & C2 to groundwater and the Puremu Stream	March 1999	-	1 June 2025
4620-1	To discharge uncontaminated stormwater from areas B1, B2, C1 and C2 into the Puremu Stream	March 1999	-	1 June 2025
6177-1	To discharge stormwater from earthworks	June 2003	-	Expired – S.124 protection
10804-1.0	To discharge stormwater and sediment arising from earthworks into an unnamed tributary of the Puremu Stream	Feb 2020	June 2022	1 June 2026
Air discharge permit				
4622-1	To discharge emissions to air from composting	March 1999	-	1 June 2025
4779-1.1	To discharge emissions to air from landfilling	Jan 2017*	-	June 2026
Discharges of waste to land				
4621-1	To discharge contaminants onto and into land in areas B1, C1 and C2	Jan 2010	-	1 June 2025
Land use permits				
0226-1	To divert the Puremu Stream by placing a culvert to provide road access	Oct 1986	-	Oct 2026

Key Commencement date of varied consent

1.4 Monitoring programme

1.4.1 Introduction

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

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

The monitoring programme for the Colson Road landfill site consisted of five primary components, as described in Sections 1.4.2 to 1.4.6. A summary is also provided in Table 2.

Table 2 Summary of monitoring activity for 2019-2020

Activity	Number
Inspections	13
Discharge samples	1
Stormwater samples	6
Receiving water samples	18
Groundwater samples	6
Air deposition samples	11
Ambient methane readings	14
Ambient hydrogen sulphide readings	14
Ambient PM_{10} readings	14
Biomonitoring surveys	2

1.4.2 Programme liaison and management

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

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

1.4.3 Site inspections

Twelve routine monitoring inspections were undertaken at the Colson Road landfill during the monitoring period. With regard to consents for the discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on site processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by the NPDC were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects. An additional inspection was also carried out in relation to a specific special waste activity that was undertaken during the year under review.

1.4.4 Chemical sampling

The Council undertook sampling of both the discharges from the site and the water quality upstream and downstream of the discharge points and mixing zones. Water quality and discharge sampling sites are shown in Figure 3.

The Puremu Stream, Manganaha Stream, and stormwater were all sampled on three occasions during the period under review. There were no discharges from the composting area found at the time of inspection or at the time of the sampling survey. Therefore a sample was collected from the pond system on one occasion. The samples were analysed for a range of parameters including ammoniacal nitrogen, unionised ammonia, suspended solids, conductivity, and metals.

Groundwater in the vicinity of the landfill was sampled on one occasion. The groundwater sampling sites are shown in Figure 4. These bores were analysed for a range of physicochemical parameters including semi volatile organic compounds (SVOC) and metals.

1.4.5 Air quality

The Council undertook sampling of the ambient air quality in the neighbourhood.

Six deposition gauges were placed at selected sites in the vicinity of the landfill and at the landfill on two occasions, and the collected samples analysed for solids.

Two ambient suspended particulate and two methane surveys were also undertaken. The air monitoring sites are shown in Figure 5.

1.4.6 Biomonitoring surveys

Biological surveys were performed on two occasions in the Puremu Stream (three sites) and Manganaha Stream (two sites) to determine whether or not the discharges from the site have had a detrimental effect upon the communities of the streams.

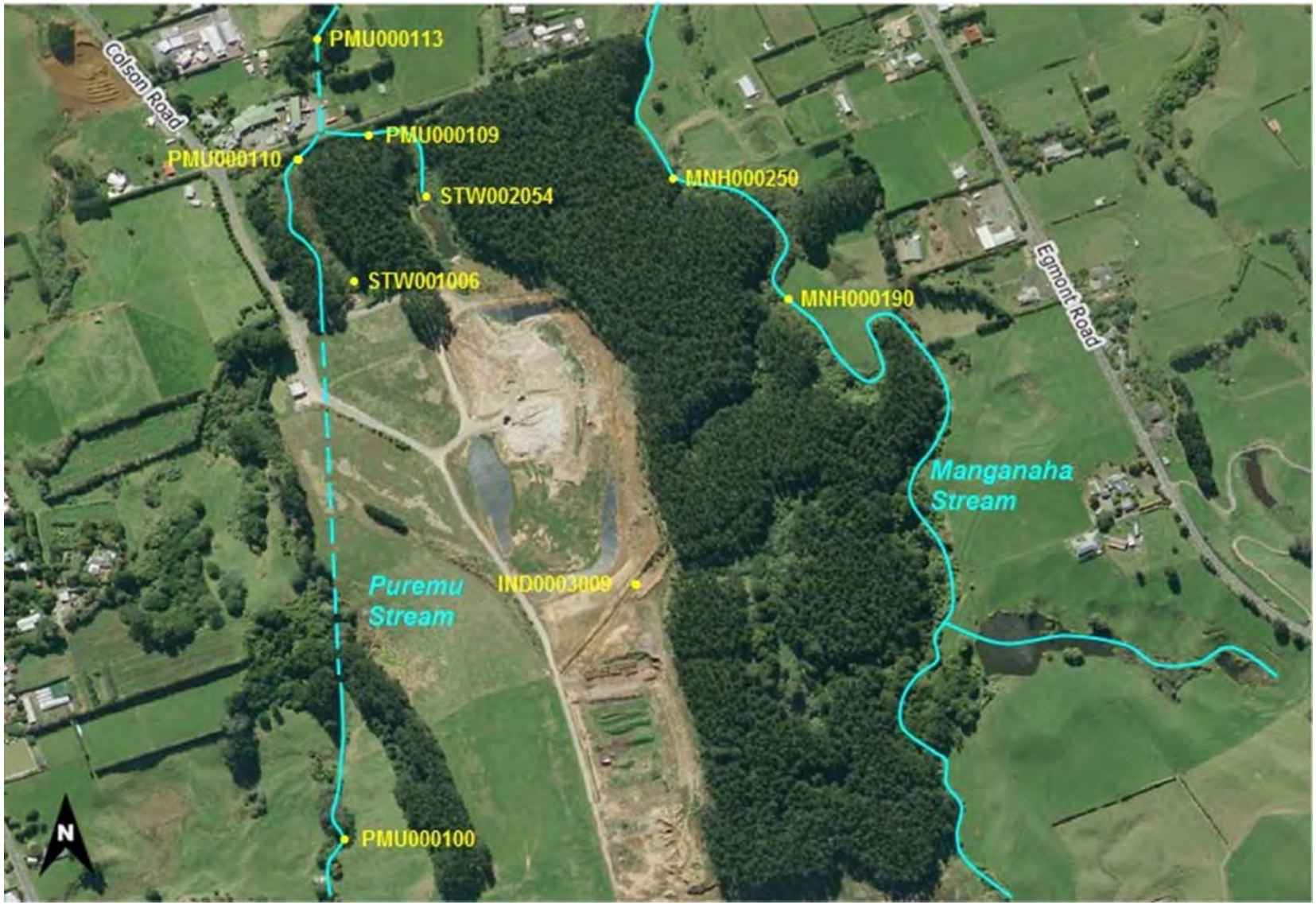

Figure 3 Aerial photo showing the stormwater and receiving water sampling sites at Colson Road landfill

Figure 4 Aerial view showing the groundwater sampling sites at Colson Road landfill

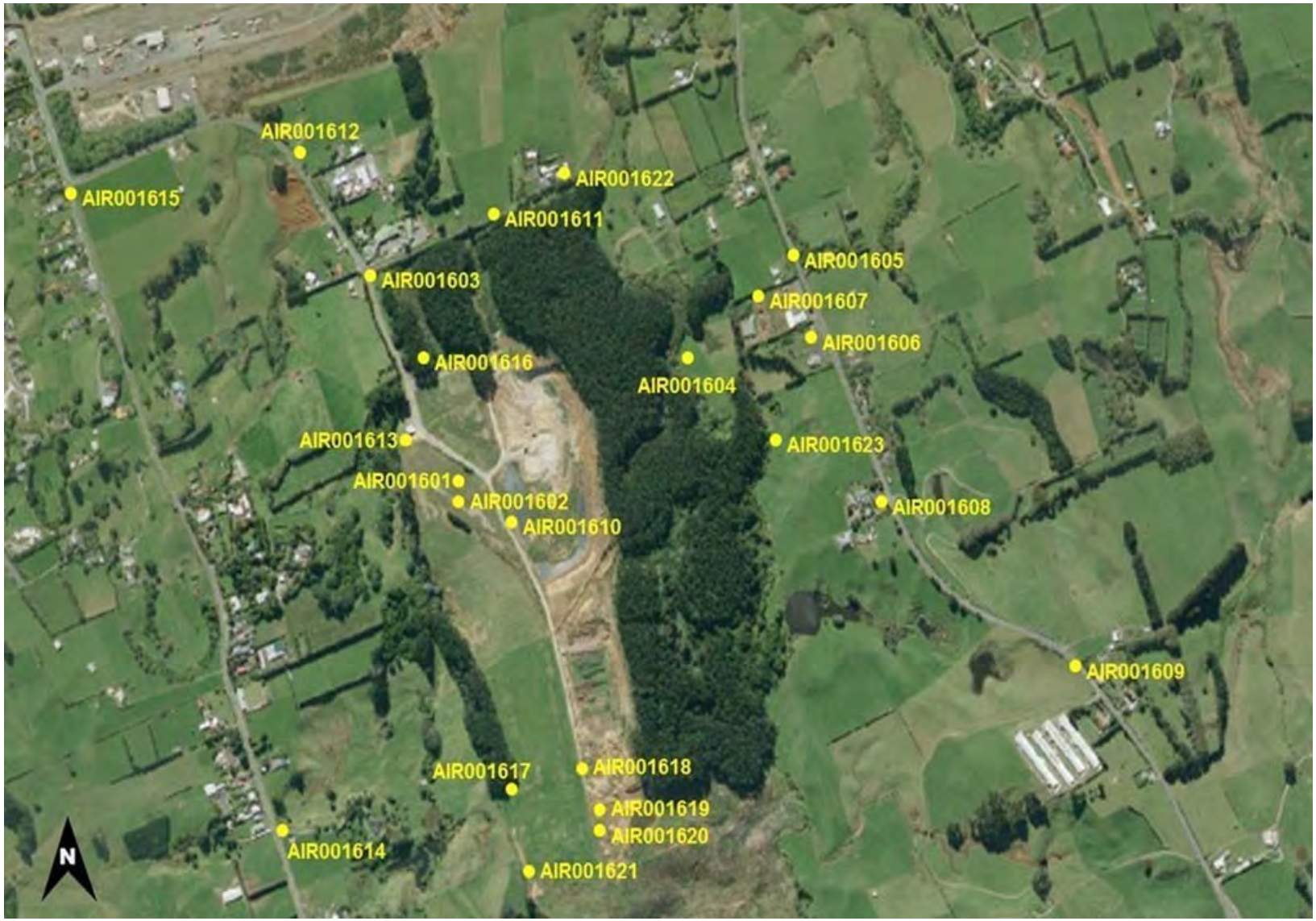

Figure 5 Aerial view showing the positions of air quality monitoring sites at and around Colson Road landfill

2 Results

2.1 Inspections

Twelve routine inspections were undertaken during the 2019-2020 monitoring period. Photos were taken on each inspection and were shared with relevant NPDC staff and the contractor following each inspection. An additional unscheduled inspection was undertaken to confirm that adequate controls were in place and consent conditions were complied with in relation to the management of a special waste activity.

24 July 2019

The inspection was undertaken in cold but fine weather with scattered cloud and a light south-easterly wind. It was dry in the two days before the inspection but quite wet before that with 48 mm of rainfall recorded at the Hillsborough monitoring station in the seven days prior to the inspection.

There were no off-site odours or dust issues observed prior to going on site. Very little refuse was noted on Colson Road between the transfer station and the landfill gates. The culvert grate at the inlet to the SPCA driveway culvert was clear with a moderate, slightly cloudy, flow in the main branch of the stream. No scums, sheens or debris were present. The side tributary that drains from the large silt pond had a moderate flow and no heterotrophic growths were observed.

The odour mitigating sprays were operating on arrival. No odours or litter were noted around the weighbridge. There was a small amount of flow in the drains in this area. Silt socks had been removed from around the grates and were lying up on the grass above the drains. NPDC was informed that these needed to be put back in place. The ground on Stage 2 was firm underfoot. No ponding or riling was observed and grass cover was well established across the entire area. No odours were noted.

The majority of the compost had been moved to the new location. The material present consisted mostly of piles of aged compost, with a digger working on a smaller amount of fresher material at the time of the inspection. No odours or dust were noted around the new area. The old composting area was muddy with a couple of rows of aged compost remaining. As in the previous two inspections, it was noted that drains near the entrance were not directed to the ponds. A mound of soil was blocking any runoff from entering the ponds (Photo 7).

Again there was no stormwater escaping the area at the time of the inspection, however it was noted that this was the third inspection where this was reported. NPDC was informed that it needed to be fixed as soon as possible to ensure any runoff is diverted to the ponds, rather than potentially flowing down the road. The ponds all contained moderate levels of water, which was a dark black/brown colour. The compost ponds were not discharging to the eastern drain at the time of the inspection, but looked like they may have over the previous week.

Photo 7 Stormwater impoundment at compost area entrance, 24 July 2019

The tipping pit was being accessed from the track between the southern litter fence and the compost ponds. Activity was focused on the very top, in the centre of the landfill.

There was no stormwater flowing in the covered drain along the north-eastern side. The ground on the roadway was damp, muddy in places, with a bit of overland flow present in places. No airborne dust was noted. Very little litter was noted along the top part of the north-eastern boundary and there were no odours.

Earthworks had advanced since the previous inspection, but were still in the process of being undertaken along the lower north-eastern side. It appeared that wet weather conditions may have prevented these works from being completed. It was noted that there was some scattered exposed refuse along the bank in this area.

The old bottom pond/bund area was full with silt/water after the recent wet weather. In two places the bund along the north-eastern side had been breached and silt had over-topped onto the cover of the north-eastern side drain. This was noted to NPDC for information and was not a breach of consent conditions.

No dust was noted around the flare, and there were only mild landfill odours in this vicinity. Silt traps, including hay bales, were in place in the roadside drain. There was ponded water along the drain but no flow at the time of the inspection.

There was good grass cover on the north-western side of the landfill and a bund was directing run-off to a pond/silt trap area at the bottom.

The large silt pond was at a moderate level and was a turbid brown colour. No odours were noted in the area. There was a large patch of sheen at the northern (outlet) end. This quickly flowed back together when

disturbed, indicating a possible hydrocarbon sheen. The outlet to the stream was clear of obstructions and water flowing out was turbid brown. No sheens were noted below the outlet.

No odours were observed around the leachate pond. No flow was entering the pond from the pipe on the western edge. The pond was turbid brown with a steady discharge to the outlet pipe.

Both small silt ponds contained moderate levels of turbid orange-brown water with bright orange-red surface films that were considered to be bacterial in nature. There was a steady inflow and outflow to and from both ponds. The tributary below the eastern small silt pond contained banks of silt. Although this is in the head of the wetland treatment area and well within the mixing zone, it indicated that additional silt controls would be beneficial below any areas of earthworks on site.

The Puremu Stream was running clear above the confluence with the small silt pond discharges and the outlet grate clear of obstructions.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2020).
- Ensure drains/bunds in the composting area are directed to the ponds.
- Ensure silt socks are in place around drains by weighbridge.

9 August 2019

An inspection of the recently closed site was carried out with NPDC staff. There had been rain prior to the inspection and there were intermittent showers during the time on site. It had rained every day in the week prior to the inspection, with 29 mm of rainfall recorded at the Hillsborough monitoring station.

There were no off-site odours or dust issues observed prior to going on site. Very little refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate was clear with a swift, moderate to high, cloudy flow in the main branch of the stream. No scums or sheens were observed. The side tributary that drains from the large silt pond also had a moderate-high flow and no heterotrophic growths were observed.

The odour mitigating sprays were operating on arrival. No odours or litter were noted around the weighbridge. The site was closed at the time of the inspection and there was very little activity occurring. The site was due to reopen from the following week, accepting special waste only, on Tuesdays and Fridays each week.

There was some activity in the old compost area as the final few piles of compost were being moved over to the new area. No odours or dust were noted. The drains near the entrance had been directed to the ponds as requested. The ponds all contained moderate levels of water, this was a dark black/brown colour.

There was no activity on the landfill area. The entire area had been covered, with either final cap or intermediate cover, and no exposed refuse was visible. The inspecting officer was informed that special waste pits would be dug into the rubbish for the time being, with any rubbish excavated covered immediately and the pits themselves covered at the end of each day to prevent any odours. It was anticipated that any stormwater running from the face would now be uncontaminated. Any contaminated stormwater in the special wastes areas would be contained by the pits and would drain to the leachate collection system.

There was stormwater flowing in the drain along the north-eastern side. This was no longer covered by netting as the previous contractor had taken the covers with them. It was not anticipated that there would be any further issues with litter as all refuse had been covered.

Earthworks for the new leachate drain had been completed along the lower north-eastern side. This area would receive final cover when weather allowed.

The old bottom pond/bund area was full with silt/water after the recent wet weather. The inspecting officer was informed that this bund drained to the leachate collection and in the future uncontaminated stormwater would be directed away from this drain unless there was reason to suspect it had become contaminated.

The leachate vent was still occasionally overtopping with stormwater in this area. The inspecting officer was informed that this had been flushed but would need to be looked at again.

The new pond/silt trap was working well to collect uncontaminated stormwater from the entire northern face. This was currently being directed under the road via plastic pipe to the big silt pond. Plans were being made to install a permanent concrete pipe.

No dust or odours were noted around the flare.

The large silt pond was at a moderate level and was a turbid brown colour. No odours were noted in the area.

No odours were observed around the leachate pond. There was some water in the back area of the pond but nothing was discharging. The grate was back in place after having been repaired.

Both small silt ponds contained moderate levels of pale grey water, the bright orange colours of the previous several months was no longer present. There was a steady inflow and outflow to and from both ponds. These ponds were much improved now that stormwater from the northern face had been directed to the large silt pond. Stormwater to these ponds was now only from anything not captured by the north-western bund and from the road above.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2020).

9 September 2020

It was noted that the purpose of this visit was to inspect the containment and recovery of wastewater laden with tallow. The method being used was to construct a series of ponds. Tallow was separated out from the wastewater with the wastewater recovered and transported to the New Plymouth wastewater treatment plant. The solid tallow was disposed of in to the landfill. The containment and recovery of the liquid wastewater was required as a result of a tallow spill at Port Taranaki, and was undertaken in accordance with section 330 of the RMA (Emergency works and power to take preventive or remedial action).The activity to disposal of tallow on to and into the Colson road landfill, appeared to comply with resource consent conditions at the time of inspection.

24 September 2019

There had been heavy rain prior to the inspection (almost 10 mm since midnight), after several days with no rain. It continued raining lightly during the time on site, with light winds from the north-west.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate was blocked by debris and, although draining slowly, water was backed up in the main branch of the stream. No scums were observed, however there was a small slight hydrocarbon sheen on top of the backed up water. The inspecting officer kicked out what debris they could, however NPDC was informed that the grate would need to be cleared properly. The side tributary had a fairly low flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates. The site had been re-opened as a ‘Special waste facility’ and was open at the time of inspection. A couple of

trucks were waiting to drop loads when the inspecting officer arrived, and the site manager said they were expecting some asbestos later in the day.

There was no activity in the new compost area. The area was over half full with mostly aged compost and a couple of rows of fresher material. No odours or dust were noted.

The old compost area had been levelled and the soil was being removed for use elsewhere on site. All drains/bunds were directed to the compost ponds. The ponds all contained moderate levels of water, which was a dark black/brown colour. The ponds were not discharging to the drain.

Special waste pits were apparent on the top eastern side of the old landfill area. Grass was beginning to grow in some places across the top of the site.

There was some stormwater flowing in the drain along the north-eastern side. Most of the flow originated from the north-west face and roadway, with a bund near the bottom directing flow into the drain.

There was good grass cover on the north-western side of the face, however there was still a lot of exposed soil on the north-east face, and along the eastern and western sides.

The old bottom pond/bund area was filled with silt. No stormwater was flowing into this at the time of inspection.

The leachate vent down at the bottom of the site was no longer overtopping with stormwater.

The new pond/silt trap was working well to collect uncontaminated stormwater from the entire northern face. This was still being directed under the road via the plastic pipe to the big silt pond.

No dust or odours were noted around the flare.

The large silt pond was at a moderate to high level and was a turbid orange-brown colour. No odours were noted in the area.

No odours were observed around the leachate pond. There was some water in the back area of the pond but nothing was discharging.

Both small silt ponds contained moderate levels of orange-brown water. There was a steady inflow and outflow to and from both ponds. Water entering the western pond was mostly clear. These ponds continued to appear much improved now that stormwater from the northern face had been directed to the large silt pond.

The Puremu Stream was running clear with a moderate flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2020).
- Ensure the grate by SPCA driveway is cleared of debris.

25 October 2019

There had been rain earlier in the day of the inspection, with 32 mm recorded in the preceding week at the Hillsborough monitoring station. There was no rain during the inspection and the site was quite dry despite it having rained every day in the week prior to the inspection. It was noted that there had been strong winds during the week, with quite strong westerly winds during the inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate was partially obstructed by debris, however the stream wasn't too impounded behind this and there were no scums or hydrocarbon sheens observed. The inspecting officer cleared off most of the debris, however NPDC were informed that the grate would need to be cleared properly. It was also noted

that there was a log perched on top that probably needed removing before it falls into the stream and blocks the grate even more. The side tributary had a low to moderate flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates. There was no flow in these drains at the time of inspection.

There was no activity in the new compost area. The area was quite full with approximately half aged and half fresh compost. No odours or dust were noted.

There was activity in the old compost area around a final pile of aged compost. The drain around the exterior had been filled in one place to provide access to the area. This wasn't a problem at the time of inspection as there was no water flowing in the drain, however NPDC was advised that this should be recontoured once the remaining compost pile had been moved and/or before any heavy rain occurred (as per objective 5.2.1. of the management plan). The rest of the drains/bunds in the area were directed to the ponds. The ponds all contained moderate levels of water, which was a dark black/brown colour. The ponds were not discharging to the outlet drain. No odours were noted.

Special waste pits were apparent on the top eastern side of the old landfill area, although there was no activity in the area at the time of the inspection.

The north-eastern drain and roadway were dry. The old bottom pond/bund area was filled with silt. No stormwater was flowing into this at the time.

The new pond/silt trap was working well to collect uncontaminated stormwater from the entire northern face. This was still being directed under the road via the plastic pipe to the big silt pond, although there was no discharge at the time of the inspection.

The eastern side of the northern face was still quite bare and NPDC were advised that these areas of exposed soil should be minimised to prevent silt runoff.

No dust or odours were noted around the flare.

The large silt pond was at a moderate to high level and was a turbid brown colour. No odours were noted in the area.

No odours were observed around the leachate pond. Nothing was discharging via the grate however there was some water in the back area of the pond. NPDC were informed that this area needed to be filled to get rid of the low spot to ensure the leachate pond empties completely through the drainage system to prevent leachate standing the in the unlined pond, as this is a potential source of groundwater contamination (as per objective 5.3.3 of the management plan).

Both small silt ponds were orange-brown, with most of their surface covered in bright orange film. There was a small but steady inflow and outflow to and from both ponds.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2020).
- Ensure the grate by SPCA driveway is cleared of debris as required.
- Fill the back area of the leachate pond to get rid of the low spot to ensure leachate empties completely through the drainage system to prevent leachate standing in the unlined pond.
- Ensure any bare areas of the landfill are stabilised to minimise silt and sediment run off.

21 November 2019

The inspection was undertaken on a clear sunny day with light winds from the south. There had been no rain in the 24 hours before the inspection, however 41 mm was recorded in the preceding week at the Hillsborough monitoring station.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate was mostly clear of debris and the stream was flowing swiftly with no scums or sheens noted above the culvert. The log perched on top of the culvert at the last inspection was still present. The side tributary had a low-moderate flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates, although there was no flow in the drains at the time of inspection.

The new compost area was quite full. No odours were noted.

There was no activity in the old compost/borrow area. The gap in the exterior drain noted in the previous inspection had been fixed, and all bunds/drains were satisfactory.

The ponds all contained low-moderate levels of water, which was a dark black/brown colour. The ponds were not discharging to the outlet drain. No odours were noted.

The landfill was closed to special waste and there was no activity in the special waste area on top of the landfill. There were two active pits and both of these had adequate cover over them. There was no water in either pit.

The north-eastern drain and roadway were dry. The old bottom pond/bund area was filled with silt. There was some ponded water along the roadway but otherwise the entire northern side was fairly dry.

The new pond/silt trap was working well to collect uncontaminated stormwater from the entire northern face. This was still being directed under the road via the plastic pipe to the big silt pond, although there was no discharge at the time of the inspection.

Staff were raking in grass seed on the bund along the north-western side. The eastern side of the northern face was still quite bare and NPDC was advised that these areas of exposed soil should be minimised to prevent silt runoff.

No dust or odours were noted around the flare.

The large silt pond was at a moderate level and was a turbid brown colour. No odours were noted in the area. There were hydrocarbon sheens around the outlet end, but none were noted as being present in the discharge.

No odours were observed around the leachate pond. Nothing was discharging via the grate, however there was still some water in the back area of the pond. NPDC had advised that there were plans to fill this area to get rid of the low spot to ensure the leachate pond empties completely through the drainage system to prevent leachate standing in the unlined pond as this is a potential source of groundwater contamination (as per objective 5.3.3 of the management plan).

Both small silt ponds were orange-brown, with most of their surface covered in bright orange/red film. There was a small but steady inflow and outflow to and from both ponds.

The Puremu Stream was clear at the culvert with a moderate-swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2020).

- Clear the grate at the inlet to the SPCA driveway culvert (including moving log) and continue to clear of debris as required.
- Fill the back area of the leachate pond to get rid of the low spot to ensure leachate empties completely through the drainage system to prevent leachate standing in the unlined pond.
- Ensure any bare areas of the landfill are stabilised to minimise silt and sediment run off as per section 5.3.1 of the management plan. Due to sedimentation occurring in the wet land beyond the ponds and potential for effects beyond the mixing zone, please grass areas of earthworks that are exposed and will not be worked for more than three months as per Section 5.7.2.

19 December 2019

It was noted that this was a reduced inspection of the ponds and northern face area only as there was no vehicle access to the site at the time of inspection.

The inspection was undertaken during fine weather with light to moderate wind from the west. There had been 52 mm of rain recorded in the preceding week at the Hillsborough monitoring station, with most of this falling in the three days prior to the inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate was clear of debris and the log perched above this at the previous inspections had been removed. The stream appeared fairly clear and was flowing swiftly, with no scums or sheens noted above the culvert. The side tributary had a moderate flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates, although there was no flow in the drains.

The north-eastern drain and roadway were dry. There was some ponded water along the roadway but otherwise the entire northern side was dry with no flowing water noted anywhere despite the rain of the previous few days. The entire north face had some stage of grass growth across it.

The new pond/silt trap was working well to collect uncontaminated stormwater from the entire northern face. This was still being directed under the road via the plastic pipe to the big silt pond, although there was no discharge at the time of the inspection.

No dust or odours were noted around the flare.

The large silt pond was at a moderate level and was a turbid brown colour. No odours were noted in the area. There were no sheens present around the outlet end.

No odours were observed around the leachate pond. NPDC had filled in the back area with gravel to get rid of the low spot to ensure the leachate pond empties completely.

Both small silt ponds were orange-brown, with most of their surfaces stagnant and covered in film. There was a small but steady inflow into both ponds, although it was unclear as to whether or not they were discharging.

The Puremu Stream was clear at the culvert with a moderate-swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2020).
- Continue to ensure any bare areas of the landfill are stabilised to minimise silt and sediment run off as per section 5.3.1 of the management plan. Due to sedimentation occurring in the wet land beyond the ponds and potential for effects beyond the mixing zone, please grass areas of earthworks that are exposed and will not be worked for more than three months as per Section 5.7.2.

24 January 2020

The inspection was undertaken during fine weather with a light westerly. No rain was recorded in the week prior at the Hillsborough monitoring station.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate was mostly clear of debris, although the stream was still a bit backed up by the small amount of debris due to the very low flow. This was resulting in a bit of scum above the culvert. The inspecting officer kicked the debris out. The side tributary had a low flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates, although there was no flow in the drains. The entire site was quite dry, but localised dust was only noted with vehicle movements.

There was no activity in the new compost area. The area was quite full, mostly with aged product. No odours were noted.

There was no activity in the old compost/borrow area. The compost ponds contained very low levels of water. This was a dark black/brown colour. The ponds were not discharging to the outlet drain. No odours were noted.

The landfill was open to special waste, however no deliveries were noted during the time of the inspection. Two pits were open on top of the landfill and two diggers were in operation. These appeared to be contouring.

The north-eastern drain and roadway were dry, as was the entire north face, including all bunds and drains. The majority of the north face had some stage of grass growth across it. A silt fence had been installed down near the northern roadway in a place where the soil was bare above it (Photo 8).

No dust or odours were noted around the flare.

The large silt pond was at a moderate level and was a greenish colour. No odours were noted in the area. There were no sheens present around the outlet end.

No odours were observed around the leachate pond, which was completely dry.

Both small silt ponds were orange-brown, with most of their surfaces stagnant and covered in an iron oxide film. Both pond levels were low and there was a small inflow into both ponds. It was unclear as to whether or not they were discharging.

The Puremu Stream was clear at the culvert with a moderate-swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2020).

Photo 8 Silt controls below northern face, 24 January 2020

24 February 2020

The inspection was undertaken during fine weather with a moderate-strong southerly. There had been some quite heavy rain in the few days prior to the inspection, with 77mm recorded in the previous week at the Hillsborough monitoring station.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

Flow in the stream was moderate to low and clear. The culvert grate had a small amount of trapped debris, although the stream was flowing freely with no scums, sheens, or foaming present. The side tributary had a low, clear flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates, although there was no flow in the drains.

There was no activity in the new compost area. The area was quite full, mostly with aged product. No odours were noted.

There was no activity in the old compost/borrow area. The compost ponds contained very low levels of water. This was a dark black/brown colour. These were not discharging to the outlet drain. No odours were noted.

The site was not open to receiving any special waste. Two special waste pits were marked out. These had sufficient cover and no odours were noted. The landfill area appeared to be ready for final capping to be applied.

The ground was damp in places but there was no flow or discharge anywhere around the site. No dust was observed either.

The large silt pond was a greenish colour with a moderate level and a trickle inflow. No odours were noted in the area. There were no sheens present around the outlet end.

No odours were observed around the leachate pond, which was completely dry.

Both small silt ponds were orange. Both pond levels were low, with a trickle inflow into the western pond.

The Puremu Stream was clear at the culvert with a moderate-swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2021, following approval of a request to extend the due date).

24 March 2020

It was fine at the time of the inspection, however there had been rain overnight and some drizzle earlier in the day. A total of 15 mm of rain was recorded in the preceding week at the Hillsborough weather station. There was a strong south-west wind at the time of inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate had a small amount of trapped debris, and there was some water backed up behind this. The inspecting officer again cleared the grate, and there was a low flow with no scums, sheens or films. The side tributary had a low, clear flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates.

There was no activity in the compost area. The area was quite full, mostly with aged product. No odours were noted.

There was no activity in the borrow area. Work had begun on excavating the silt control pond for the area. The appropriate notification had been received as per condition 3 of consent 10804-1. Because of the nationwide lockdown due to the COVID-19 pandemic, work was to cease on this project until staff were able to return to work. It was not expected that any silt or sediment would be discharged from the area during this time

The ponds contained very little water and were not discharging to the outlet drain. No odours were noted.

The site was open to receiving special waste and a couple of trucks were noted while the inspecting officer was onsite. The site manager explained that a couple of extra pits had been prepared to cover the needs of essential services in the next few weeks of lockdown while some staff were not onsite.

The ground was damp in places but there was no flow or discharge anywhere around the site. No dust was observed either.

No dust or odours were noted around the flare.

The large silt pond was a greenish/brown colour with a moderate level and a trickle inflow. No odours were noted in the area. A small patch of hydrocarbon sheen was present around the outlet end, but none was noted as being discharged.

No odours were observed around the leachate pond. This was completely dry.

Both small silt ponds were a brownish colour. Both pond levels were low and there was a trickle inflow into the western pond, with no inflow or outflow detected to or from the eastern pond.

The Puremu Stream was clear at the culvert with a low flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2021).

1 May 2020

It was noted that due to the Covid-19 restrictions preventing fieldwork, this was a catch-up inspection for the one that would normally have been undertaken in April.

It was fine, cloudy with very light winds from the west at the time of the inspection. A total of 2 mm of rain was recorded in the preceding week at the Hillsborough weather station.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate had a small amount of trapped debris, and there was water backed up behind this with some minor scums, iron oxide sheens and foam noted. Once the grate was cleared, this ran through and left a low flow with no scums, sheens or films. The side tributary had a low, clear flow and no heterotrophic growths were observed.

No odours or litter were noted around the weighbridge. Silt socks were in place around drain grates.

A digger was turning piles in the compost area, with other machinery also being used to sort compost. The area was quite full, mostly with aged product. No odours were noted.

A digger was continuing work on excavation in the borrow area. There was no dust or odours noted. The compost ponds contained very little to no water and were not discharging to the outlet drain. No odours were noted.

The site was open to receiving special waste, however no incoming trucks were noted while the inspecting officer was onsite. There were a couple of special waste pits ready to receive waste.

The ground was dry around the site, however no dust was observed.

No dust or odours were noted around the flare.

The large silt pond was a greenish colour, with a low-moderate level and a trickle inflow. No odours were noted in the area. A small patch of hydrocarbon sheen was present around the outlet end. A small amount of discharge was entering the stream below, with no sheens noted. The area of stream below the outlet was a brown colour and appeared to be very wide/ponded.

No odours were observed around the leachate pond. This was completely dry.

The small western pond was very low with a trickle inflow. This was a brown/orange colour and fairly clear. The eastern pond was bright orange and appeared stagnant with an iron oxide film across the surface. There was no evidence of any inflow or outflow.

The Puremu Stream was clear at the culvert outlet with a low flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2021).
- Ensure the culvert above the SPCA driveway is regularly cleared to ensure compliance with condition 13 of 2370-3.

26 May 2020

The weather was fine with light southeast winds. A total of 94 mm of rain was recorded in the preceding week at the Hillsborough weather station. It was noted that all of this rain fell in the 48 hours prior to the inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The culvert grate was mostly clear of debris. The stream was quite clear and flowing at a moderate level with no scums, sheens or foam noted. The side tributary had a clear flow with no heterotrophic growths observed.

A digger was operating in the compost area. The area was quite full, mostly with aged product. No odours or issues with stormwater were noted.

There was no activity in the borrow area. There was some ponded water in the excavation, but no other surface water in the area.

The old compost ponds contained a moderate amount of water but were not discharging to the outlet drain. No odours were noted.

The site was open to receiving special waste, with a couple of special waste pits open and some activity in the area.

The flare was operating, no dust or odours were noted.

The large silt pond was a green-brown colour, with a moderate level and a small inflow and outflow. No odours were noted in the area.

No odours were observed around the leachate pond. This was completely dry.

Both small silt ponds were brown/orange in colour with a small amount of inflow and outflow.

The Puremu Stream was clear at the culvert with a moderate, swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2021).
- Continue to ensure the culvert above the SPCA driveway is regularly cleared to ensure compliance with condition 13 of 2370-3.

11 June 2020

The weather was fine and cold with moderate westerly wind. It had been raining off and on over the week prior, with a total of 47 mm of rain recorded in the preceding week at the Hillsborough weather station.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA culvert inlet grate was clear of debris and the stream was fairly clear and flowing at a moderate level with no scums, sheens or foam noted. The side tributary was also fairly clear, with no heterotrophic growths observed.

There was no activity in the compost area. The area was quite full, mostly with aged product, although there was some fresher material present. No odours or issues with stormwater were noted.

There was no activity in the borrow area. There was a very small amount of ponded water in the hole but no other surface water in the area.

The old compost ponds contained a small amount of water and were not discharging to the outlet drain. No odours were noted.

The site was not open to special waste discharges at the time of inspection. No special waste pits were noted on the main fill area. Staff were busy putting in drainage, and it looked like a large proportion of the area up top and along the western side had been hydro-seeded.

The flare was operating. No dust or odours were noted.

The large silt pond was an orange-brown colour with a moderate level. From certain angles the afternoon sun showed a large sheen across over the first one-third of the pond. No sheen was noted near the outlet end or below the discharge. The outflow was slightly more than usual. No odours were noted in the area.

No odours were observed around the leachate pond. This was completely dry.

Both small silt ponds were brown/orange in colour with a small amount of inflow and outflow.

The Puremu Stream was clear at the culvert with a moderate, swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2021).
- Please ensure activities on site do not result in hydrocarbons entering the stormwater system.

2.2 Water

2.2.1 NPDC monitoring results

2.2.1.1 Leachate

NPDC collected eight samples of leachate during the 2019-2020 monitoring period. Analyses were carried out for a range of parameters. The leachate is pumped to, and treated at the New Plymouth wastewater treatment plant. Whilst the leachate is not discharged directly to the environment, the results are used by the Council to compare with groundwater and surface water quality. The results are also of interest to the Council because the leachate can reveal information about the landfill processes taking place. The results of the analyses from the samples collected by the NPDC are presented in Table 3.

Table 3 Chemical analysis of Colson Road landfill leachate

Parameter	Unit	Date							
		21-Aug-19	20-Sep-19	09-Oct-19	14-Nov-19	15-Jan-20	19-Mar-20	29-Apr-20	03-Jun-20
pH	pH	7.5	7.4	7.1	7.6	7.5	7.4	7.6	7.7
BOD	g/m^3	40	44	30	95	70	52	37	51
Suspended solids	g/m^3	30	19	18	30	6	14	14	6
Conductivity	mS/m	537	525	488	923	745	599	538	769
Alkalinity	g/m^3	-	-	-	3851	-	-	-	-
Ammoniacal N	g/m^3	448	419	350	770	598	450	411	503
Cadmium	g/m^3	-	-	-	-	-	-	<0.005	-
Chromium	g/m^3	0.077	0.074	0.09	0.17	0.11	-	-	0.1
Copper	g/m^3	<0.011	<0.011	<0.01	<0.01	<0.005	0.05		<0.01

Parameter	Unit	Date							
		21-Aug-19	20-Sep-19	09-Oct-19	14-Nov-19	15-Jan-20	19-Mar-20	29-Apr-20	03-Jun-20
Iron	g/m^3	9.9	9.4	9.56	7.87	6	163	6.25	7.8
Lead	g/m^3	<0.0021	<0.0021	<0.01	<0.01	<0.1	<0.02	<0.005	<0.01
Manganese	g/m^3	1.61	1.32	1.5	1.09	0.7	2.86	0.77	1.53
Nickel	g/m^3	-	-	-	0.04	0.03	0.04	0.03	0.03
Zinc	g/m^3	<0.021	0.047	<0.05	0.03	0.02	0.13	0.02	0.03
Turbidity	NTU	-	-	-	-	-	-	-	21.9

The results gathered by NPDC during the year under review reflect typical leachate quality. There are no obvious trends in the indicator leachate constituents measured emerging at this stage (for example, the concentration variations within each parameter are likely to reflect seasonal variations in leachate quality and the dilution afforded by the contaminated stormwater that is diverted through this system).

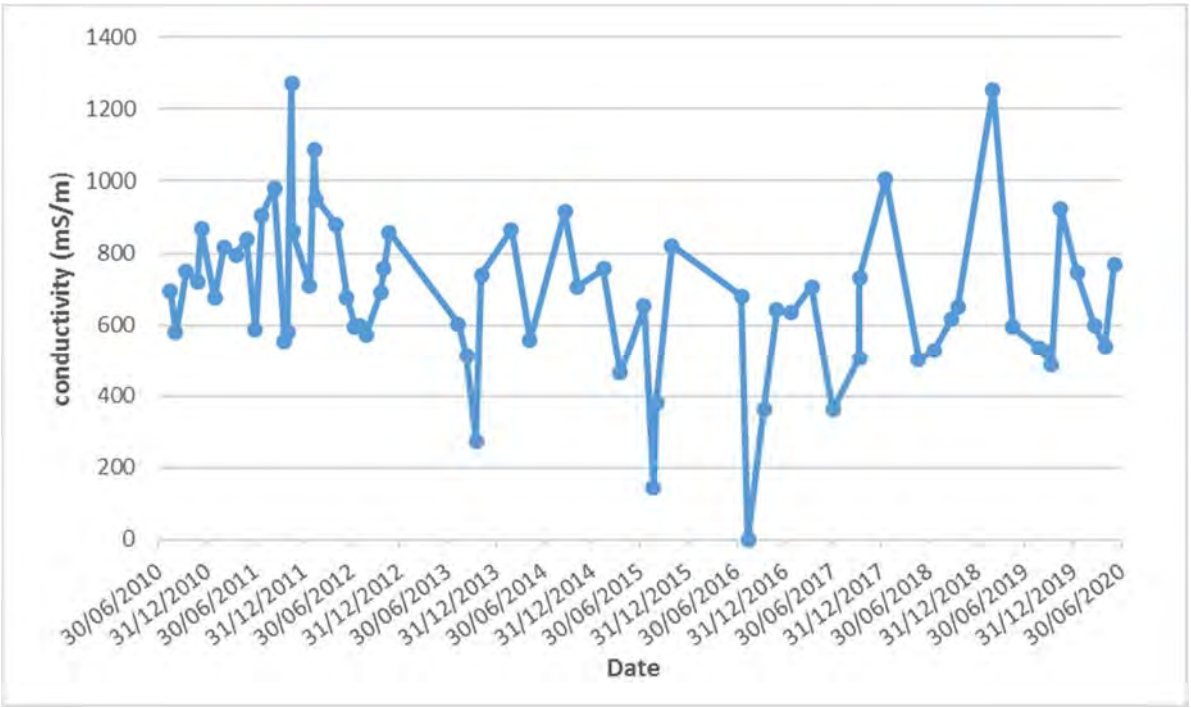

Figure 6 Leachate conductivity July 2010 to date

2.2.1.2 Under liner drainage

NPDC collected four samples of the groundwater that drains from a network of pipes under the liner. The results of the analyses are given in Table 4. The quality of this water is a useful indicator of whether leachate is passing through the liner. This is especially important in view of the slip that occurred in 2005 that ripped the liner in several places on the western side of Stage 3. The exposed rips were repaired but it was not known if the liner had ripped underneath the slipped refuse. There were also rips in the liner at the edge of the landfill footprint found at inspection in June 2017. The rips were small, but in an open drainage channel that (at that time) was capturing leachate breakouts from the south eastern area of the landfill. These were appropriately repaired early in July 2017.

Table 4 Results of analysis of under liner drainage

Parameter	Unit	Date			
		13-Nov-19	29-Apr-20	03-Jun-20	18-Jun-20
pH	pH	6.9	7.0	6.6	6.7
CBOD	g/m^3	14	12	13	9
BOD	g/m^3	<3	<3	<3	<2
Suspended solids	g/m^3	22	7	13	15
Faecal coliforms	/100ml	24	2	2	
Conductivity	mS/m	47.2	43.0	44.0	43.0
Turbidity	N.T.U.	59.8	35.6	50.4	46.0
Alkalinity	g/m^3	134	122	123	124
Ammoniacal nitrogen	g/m^3-N	3.8	2.2	3.4	3.0
Cadmium	g/m^3	<0.01	<0.005	<0.005	<0.000053
Chromium	g/m^3	<0.01	<0.005	<0.005	0.00055
Chloride	g/m^3	60.0	56.3	58.0	52.0
Copper	g/m^3	<0.01	<0.005	<0.005	<0.00053
Iron	g/m^3	10.8	5.6	7.8	6.6
Lead	g/m^3	<0.01	<0.005	<0.01	<0.00011
Manganese	g/m^3	1.96	1.90	1.55	1.48
Nickel	g/m^3	<0.01	<0.005	<0.005	<0.00053
Zinc	g/m^3	0.04	<0.1	0.03	0.0026

Historically, drainage analysis has shown that little, if any, contamination has been occurring in the groundwater immediately below the liner. Although the level of key indicator species such as zinc and chloride (Figure 7) are relatively stable over the last several years there may be an emerging trend of very slight increasing contaminants. In particular, the results for the 2017-2020 years indicate that some contaminant concentrations such as ammoniacal nitrogen have increased more noticeably (Figure 8).

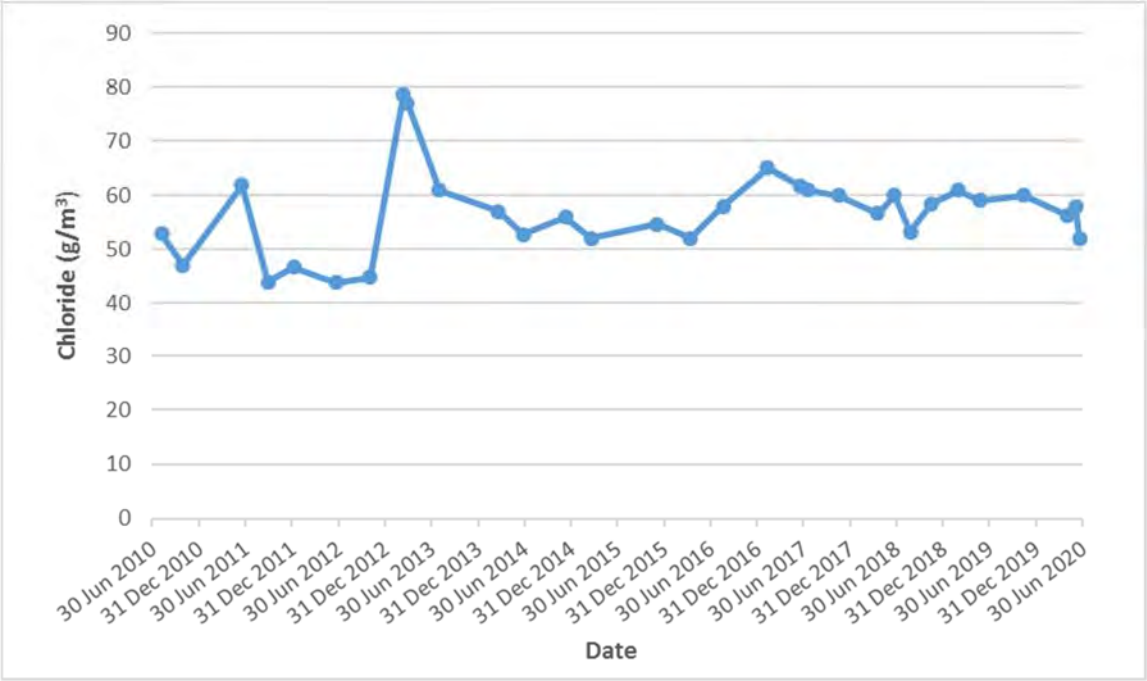

Figure 7 Chloride concentration in the under liner drainage

Although these indicator constituents show very slight contamination of the groundwater and or springs under the landfill, the levels are not currently of immediate environmental concern as they remain within normal ranges for Taranaki groundwater. They are however comparatively higher than any of the monitoring bores surrounding the landfill. At this stage it is difficult to assess whether the increase in the ammoniacal nitrogen concentration in the under liner drainage is as a result of changes in the leachate strength or an increasing amount of leachate getting through the liner. It is noted that during the 2017-2019 years, the ammoniacal concentration of the under liner drainage followed a similar pattern to the leachate. Monitoring of the contaminant concentrations in the under liner drainage will continue. Given the changes in this indicator, a recommendation was included in the 2018-2019 report that NPDC widen the range of parameters be increased to those given in Table 8-1 of the Technical Guidelines for Disposal to Land (WasteMINZ, 2018) on at least one occasion annually. During the year under review, this was carried out on a sample collected on 18 June 2020. The results showed that the volatile and semi volatile organic compounds were all below the detection limits. An additional recommendation was that the NPDC review the Landfill Management plan to ensure that the criteria for determining whether any contamination is occurring that is greater than the natural variation be included along with measure to be taken remedy, mitigate or if practicable prevent continuation of any effect on the groundwater quality as per conditions 5, 6 and 7 of consent 4621-1. NPDC have engaged a consultant to assist with this, and work is underway. Part 1 of a desk top study was undertaken during the year under review, with the report provided to Council in July 2020. The scope of the study is outlined in Section 3.2, and the findings of the consultant's report will be discussed in Council's 2020-2021 Annual Report.

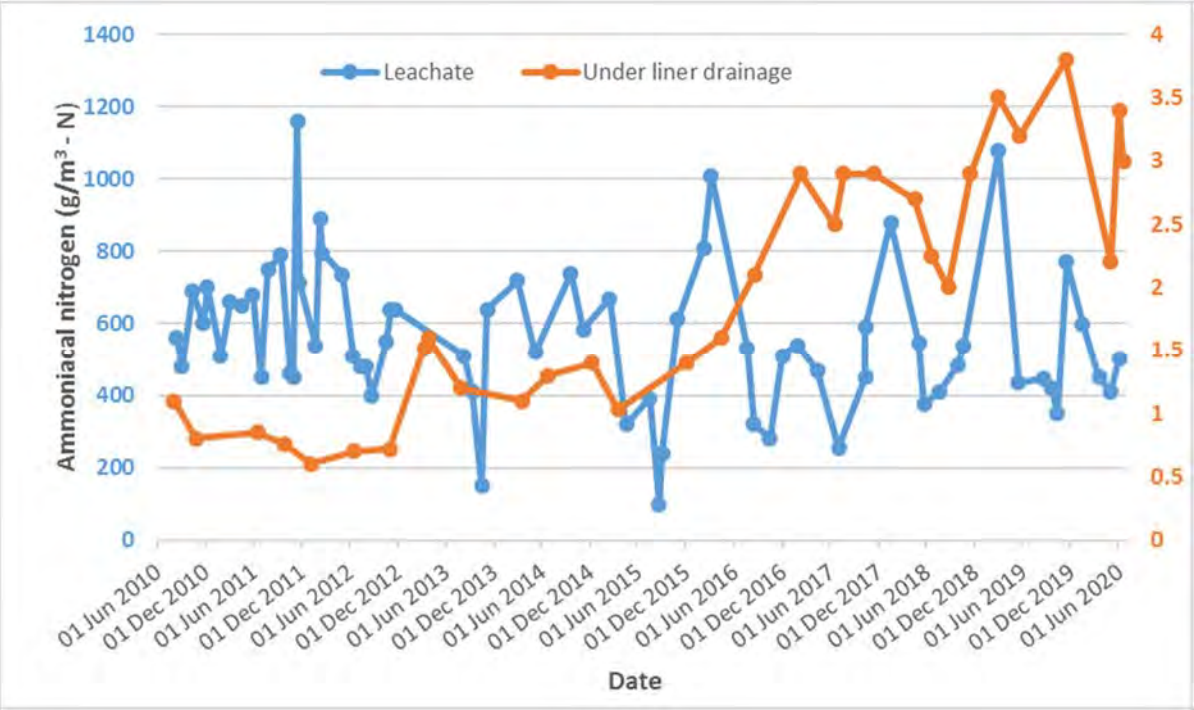

Figure 8 Ammoniacal nitrogen concentration in the under liner drainage

Results obtained during the 2019-2020 year continue to indicate that there does not currently appear to be any potential issues in regards to faecal coliform levels, and that the unusually high faecal coliform result obtained on 18 March 2014 (3,460 cfu/ 100 ml) has not been repeated to date. It is therefore considered likely to have been as a result of sample contamination, rather the start of an on-going issue.

2.2.2 Results of dry weather stormwater and receiving environment monitoring

2.2.2.1 Dry weather stormwater monitoring

Samples of the discharge from the composting area (IND0003009), stormwater from below the large silt pond (STW002054), and discharge from the small eastern silt pond (STW001006) were collected if they were discharging during dry weather runs. The sites are shown in Figure 9. The compost pond discharge and the under liner drainage discharge via the large silt pond. The catchment areas within the landfill footprint that drain through each of the stormwater ponds can change as the active filling areas and those areas with intermediate cover change. The results of the sampling are presented in Table 5 below.

Table 5 Chemical analysis of site discharges during dry weather

Parameter	units	IND003009		STW001006		STW002054	
		17-Mar-20*	12-May-20*	17-Mar-20	12-May-20	17-Mar-20	12-May-20
Alkalinity	g/m³ $CaCO_3$	-	-	176	220	100	72
Ammoniacal nitrogen	g/m³-N	-	-	13.1	18.0	0.22	1.9
Unionised ammonia	g/m³	-	-	0.034	0.044	0.0037	0.0092
Conductivity	mS/m@25°C	-	-	55.2	65.4	40.9	43.8
Faecal coliforms	cfu/100ml	-	-	20	< 10	470	< 100
pH	pH	-	-	6.9	6.9	7.7	7.2

Parameter	units	IND003009		STW001006		STW002054	
		17-Mar-20*	12-May-20*	17-Mar-20	12-May-20	17-Mar-20	12-May-20
Suspended solids	g/m^3	-	-	14	23	4	5
Temperature	Deg.C	-	-	15.1	14.0	15.5	14.2
Acid soluble iron	g/m^3	-	-	10.0	16.2	0.71	1.6
Dissolved zinc	g/m^3	-	-	0.0010	<0.0010	0.0015	0.0023
Nitrate+Nitrite-N	g/m^3	-	-	13.1	0.137	0.22	1.48
Sulphate	g/m^3	-	-	-	-	6.1	24
BOD (total)	$g\ O_2/m^3$	-	-	0.6	2	1.3	1.4

* Sample not collected as no discharge occurring

Historically, the compost pond discharge is usually found to be the major source of faecal coliforms at the time of sampling surveys. At the time of the dry weather surveys undertaken during the year under review there was insufficient water in the compost ponds to obtain a sample. At the times the surveys were undertaken the highest faecal coliforms results were obtained in the discharge from the large stormwater pond through which the non-landfill leachate contaminated stormwater drains. The receiving water results are presented in Table 7 and Table 8 and discussed in Section 2.2.2.2.2.

Other contaminants of note in the pond discharges are alkalinity, ammoniacal nitrogen and iron, which as per previous years, tended to be higher in the discharge from the small eastern silt pond, during the year under review. Although the biochemical oxygen demand of the discharge from the small silt pond was slightly elevated on 12 May 2020, the value obtained in the receiving water downstream at site PMU000110 was acceptable (Table 8).

2.2.2.2 Dry weather receiving environment monitoring

The Colson Road landfill site has two streams associated with it. The Puremu Stream has been culverted to run under the north-western quadrant of the landfill site. It emerges from the culvert near the driveway to the landfill entrance, and then flows approximately 300 m to a second culvert that takes it under two other properties. Just upstream of the second culvert, the unnamed tributary that carries the discharge from the large settling pond, flows into the main stream stem. The smaller silt pond discharges directly into the main stream stem just upstream of the confluence (see Figure 9).

The Manganaha Stream follows alongside the eastern boundary of the site and is approximately 200 m away from the landfill (at its closest point). As required by the landfill's water discharge permits, there are no direct discharges into the Manganaha Stream from the landfill.

The results of the dry weather receiving water sampling undertaken during the period under review are given in Table 6 to Table 10.

2.2.2.2.1 Manganaha Stream

On both sampling occasions the Manganaha Stream showed no adverse effects from the landfilling operation.

For the most part the upstream and downstream results showed little, if any, difference in water quality. There were small changes in the acid soluble iron concentrations, which are expected in a stream that has groundwater infiltration and runs through an agricultural area. All results were comparable to background levels, and were similar to those found over the last six years.

Table 6 Chemical analysis of the Manganaha Stream

Parameter	Units	17-Mar-20		12-May-20	
		MNH000190 u/s of landfill	MNH000250 d/s of landfill	MNH000190 u/s of landfill	MNH000250 d/s of landfill
Alkalinity	g/m^3 – $CaCO_3$	35	37	25	26
Conductivity	mS/m@25°C	17.5	17.8	17.5	17.4
Acid soluble iron	g/m^3	0.91	1.31	0.45	0.55
Ammonia (unionised)	g/m^3	0.00007	0.00046	<0.000018	<0.00004
Ammoniacal nitrogen	g/m^3-N	0.013	0.049	<0.010	<0.010
pH	pH	7.2	7.5	6.8	7.1
Suspended solids	g/m^3	< 3	7	< 3	< 3
Temperature	Deg C	14.4	14.5	13.2	13.4
Dissolved zinc	g/m^3	< 0.0010	< 0.0010	0.0012	0.0012

There are no specific consent conditions in regards to the Manganaha Stream water quality other than the requirements that authorised discharges to land and to the Puremu Stream from the landfill shall not affect water quality in the Manganaha Stream.

Based on these results, and those from previous monitoring periods, the landfill's presence is having no measurable effect on water quality in the Manganaha Stream.

2.2.2.2.2 Puremu Stream

In stream limits are given for a range of parameters for Stage 2 (2370-3) where the compliance point is at PMU000110 and for Stage 3 (4619-1) where the compliance point is at PMU000113. For certain constituents, the limit placed on the consent is in the form of a maximum change from the upstream value, which is determined at site PMU000100. These requirements are indicated within the square brackets in the following tables.

The Puremu Stream was also sampled on two occasions in dry weather under low to moderate flow conditions.

The downstream sampling sites are shown in Figure 9. The results for the general parameters are given in Table 7 and Table 8, with the dry weather metals analysis covered in Section 2.2.2.3.

Table 7 Chemical analysis of the Puremu Stream, sampled on 17 March 2020

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	*Consent limits at PMU000113* (PMU000110**)*
Alkalinity	g/m^3 $CaCO_3$	32	98	99		*NA*
BOD	g/m^3	0.4	1.4	1.1	0.9	*NA*
Conductivity	mS/m@25°C	16.1	35.2	35.9	34.6	*NA*

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	*Consent limits at PMU000113* (PMU000110**)*
Dissolved oxygen	g/m^3	8.29	6.73	4.95	8.29	*≥ 7.29 [-1] (≥ 5.0)*
DRP	g/m^3	< 0.004	< 0.004	< 0.004	< 0.004	*NA*
Faecal coliforms	cfu/100 ml	4,300	1,100	250	700	*≤ 1,000*
Unionised ammonia	g/m^3 N	0.00054	0.00197	0.0105	0.0104	*NA*
Ammoniacal-N	g/m^3 N	0.141	0.39	2.5	1.41	*2 [at pH<7.75; limit is pH dependant] (2.5)*
Nitrate/nitrite N	g/m^3 N	0.157	0.114	0.44	0.44	*10 (100)*
Oxygen saturation	%	81.5	66.5	49.8	81.5	*NA*
pH	pH	7.1	7.2	7.1	7.4	*≥ 6.5 & ≤ 8.5 ([within ± 0.5])*
Sulphates	g/m^3	6.6	4.5	2.8	3.9	*1,000 (500)*
Suspended solids	g/m^3	4	10	8	6	*14 [+10]*
Temperature	Deg C	14.3	14.8	14.6	14.9	*(≤ 16.3 [+2])*

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[ ] indicates this is a maximum permitted change from the upstream value at PMU000100

The results of this survey showed that the consent conditions were being complied with at the time of sampling.

Although the faecal coliform count was elevated below the site, the samples complied with the consent limit and it is noted that the count had reduced substantially from that obtained at the upstream control site.

In terms of ammoniacal nitrogen concentration, although the concentration in the discharge from the eastern small stormwater pond was high (13.1 g/m^3), this had reduced to 2.5 g/m^3 in the western tributary and was compliant with conditions on consent 2370 at the compliance point (PMU000110). The unionised ammonia concentration was also less than the 0.025 g/m^3 considered to be toxic to aquatic ecosystems.

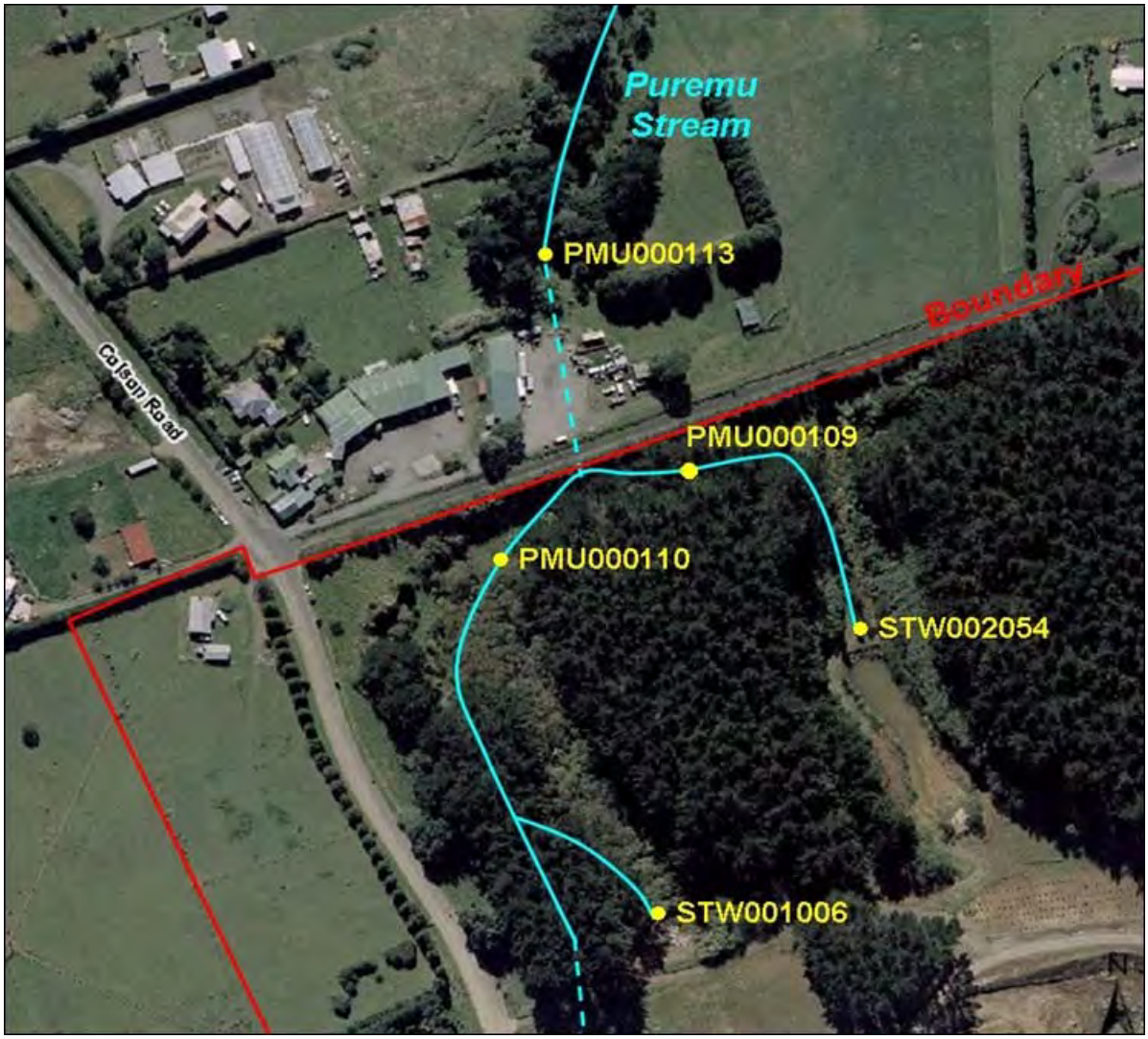

Figure 9 Sampling sites on the Puremu Stream downstream of the landfill

Table 8 Chemical analysis of the Puremu Stream, sampled on 12 May 2020

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	*Consent limits at PMU000113* (PMU000110**)*
Alkalinity	g/m^3 $CaCO_3$	22	86	45	52	*NA*
BOD	g/m^3	0.9	0.7	0.5	1.5	*NA*
Conductivity	mS/m@25° C	17.4	35.7	24.6	25.9	*NA*
Dissolved oxygen	g/m^3	8.30	7.38	4.97	8.76	*≥ 7.30 [-1] (≥ 5.0)*
DRP	g/m^3	< 0.004	< 0.004	< 0.004	< 0.004	*NA*
Faecal coliforms	cfu/100 ml	40	1,400	760	**19,000**	*≤ 1,000*
Unionised ammonia	g/m^3 N	0.00009	0.0028	0.00176	0.0032	*NA*

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	*Consent limits at PMU000113* (PMU000110**)*
Ammoniacal-N	g/m^3 N	0.036	0.98	1.00	0.94	*2 [at pH<7.75; limit is pH dependant] (2.5)*
Nitrate/nitrite N	g/m^3 N	0.055	0.30	0.78	0.75	*10 (100)*
Oxygen saturation	%	79	70.5	48.1	84.1	*NA*
pH	pH	6.9	7.9	6.8	7.1	*≥ 6.5 & ≤ 8.5 ([within ± 0.5])*
Sulphates	g/m^3	21	11.0	16.4	16.4	*1,000 (500)*
Suspended solids	g/m^3	< 3	4	< 3	< 3	*13 [+10]*
Temperature	Deg C	13.0	13.8	13.2	13.5	*(≤ 15.0 [+2])*

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[ ] indicates this is a maximum permitted change from the upstream value at PMU000100

The faecal coliform count exceeded the limit on consent 4619 on 12 May 2020. It is noted on this occasion that the count was only slightly elevated upstream of the site and that the counts in both the small and large silt ponds were below the detection limits of the test method (< 10 cfu/100ml and < 100 cfu/100ml respectively, Table 5). The count obtained at PMU000113 was higher than would be expected given the values obtained for the western and eastern tributaries, indicating an additional contribution from outside the landfill.

With the exception of faecal coliforms, the samples taken during the year under review complied with the consent conditions of both 2370 and 4619 for the parameters listed in the above table.

2.2.2.3 Dry weather metals analysis

Consents 2370 and 4619 have some differing limits on the concentrations of various metals at sites PMU000100 and PMU000113 respectively, with PMU000110 being the compliance point for consent 2370, and with PMU000113 being the compliance point for consent 4619.

In the consents, total recoverable metal limits are given as absolute concentrations that must not be exceeded, whereas the dissolved metal limits are given in terms of a maximum permitted increase relative to the upstream site as indicated within the square brackets in the following tables.

In previous monitoring periods, as the limits for each are similar, and PMU000110 is only a short way upstream of PMU000113, a metals screen was undertaken on site PMU000113 only, with site PMU000100 (upstream of the landfill) acting as a control.

During the 2013-2014 year, metals monitoring at sites PMU000110 and PMU000109 was introduced. The results of the dry weather metals monitoring for the year under review are given in Table 9 and Table 10.

Table 9 Results of metal analysis undertaken on 17 March 2020

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Dissolved aluminium	g/m^3	< 0.003	< 0.003	< 0.003	< 0.003	0.103 [+0.1]
Total aluminium	g/m^3	0.0165	0.184	0.0159	0.021	5.0 (5.0)
Dissolved arsenic	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.05 [+0.05]
Total arsenic	g/m^3	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.2 (0.1)
Dissolved beryllium	g/m^3	< 0.00010	< 0.00010	< 0.00010	< 0.00010	NA
Total beryllium	g/m^3	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)
Dissolved boron	g/m^3	0.018	0.024	0.038	0.031	NA
Total boron	g/m^3	0.0169	0.023	0.038	0.029	5.0 (0.5)
Dissolved cadmium	g/m^3	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.001 [+0.001]
Total cadmium	g/m^3	< 0.000053	< 0.000053	< 0.000053	< 0.000053	0.05 (0.01)
Dissolved chromium	g/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.02 [+0.02]
Total chromium	g/m^3	< 0.00053	< 0.00053	< 0.00053	< 0.00053	1.0 (0.1)
Dissolved cobalt	g/m^3	0.0013	0.0012	0.0008	0.0009	NA
Total cobalt	g/m^3	0.00157	0.00136	0.00090	0.00096	1.0 (0.05)
Dissolved copper	g/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.007 [+0.002]
Total copper	g/m^3	< 0.00053	< 0.00053	< 0.00053	< 0.00053	0.5 (0.2)
Dissolved iron	g/m^3	0.46	0.05	0.12	0.20	0.76 [+0.3]
Total iron	g/m^3	1.62	2.9	4.9	3.0	10.0 (5.0)
Dissolved lead	g/m^3	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.002 [+0.002]

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Total lead	g/m^3	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)
Dissolved manganese	g/m^3	0.47	2.7	1.81	2.1	NA
Total manganese	g/m^3	0.53	3.1	**1.95 ±0.20**	2.1	5.0 (1.0)
Dissolved selenium	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.001 [+0.001]
Total selenium	g/m^3	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.05 (0.02)
Dissolved vanadium	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Total vanadium	g/m^3	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.1 (0.1)
Dissolved zinc	g/m^3	0.0017	< 0.0010	< 0.0010	0.0015	0.0317 [+0.03]
Total zinc	g/m^3	0.0021	0.0012	< 0.0011	0.0029	2.4 (2.0)

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[ ] indicates this is a maximum permitted change from the upstream value at PMU000100

With the exception of total manganese, the metals limits on both consent 2370 and 4619 were complied with on this occasion. The total manganese concentration obtained (1.95±0.2 g/m^3) marginally exceeded the ANZECC default guideline for freshwater offering protection to 95 % of species (1.9 mg/m^3), however the dissolved bioavailable fraction (1.81 mg/m^3) was below the guideline concentration. When resampled in May, the manganese concentration was found to be compliant with consent conditions. It is also noted that there is currently an abatement notice in place to address the depth and contouring of the cap on Stage 2 that has a completion date of 15 March 2021. As the condition of the cap results in the potential for a slight increase in the amount of leachate entering the western tributary, the minor non-compliance that is not resulting in significant adverse effects is considered to be implicitly allowed for under the abatement notice. It is noted that the onsite sources of manganese cannot be determined at this time. It is therefore recommended that total and dissolved manganese analysis be introduced to the parameters monitored in the samples from stormwater ponds that are collected during the dry weather surveys.

Table 10 Results of metal analysis undertaken on 12 May 2020

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Dissolved aluminium	g/m^3	0.004	< 0.003	< 0.003	< 0.003	0.104 [+0.1]

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Total aluminium	g/m^3	0.0145	0.0099	0.0055	0.0073	5.0 (5.0)
Dissolved arsenic	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.05 [+0.05]
Total arsenic	g/m^3	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.2 (0.1)
Dissolved beryllium	g/m^3	< 0.00010	< 0.00010	< 0.00010	< 0.00010	NA
Total beryllium	g/m^3	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)
Dissolved boron	g/m^3	0.019	0.026	0.028	0.027	NA
Total boron	g/m^3	0.0193	0.028	0.029	0.028	5.0 (0.5)
Dissolved cadmium	g/m^3	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.001 [+0.001]
Total cadmium	g/m^3	< 0.000053	< 0.000053	< 0.000053	< 0.000053	0.05 (0.01)
Dissolved chromium	g/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.02 [+0.02]
Total chromium	g/m^3	< 0.00053	< 0.00053	< 0.00053	< 0.00053	1.0 (0.1)
Dissolved cobalt	g/m^3	0.0004	0.0010	0.0003	0.0004	NA
Total cobalt	g/m^3	0.00045	0.00106	0.00035	0.00044	1.0 (0.05)
Dissolved copper	g/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.008 [+0.002]
Total copper	g/m^3	< 0.00053	< 0.00053	0.00055	0.00064	0.5 (0.2)
Dissolved iron	g/m^3	0.37	0.71	0.93	**0.768 (±0.055)**	0.67 [+0.3]
Total iron	g/m^3	0.90	2.5	1.75	1.57	10.0 (5.0)
Dissolved lead	g/m^3	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.002 [+0.002]
Total lead	g/m^3	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Dissolved manganese	g/m^3	0.117	1.99	0.58	0.78	NA
Total manganese	g/m^3	0.117	2.0	0.58	0.79	5.0 (1.0)
Dissolved selenium	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.001 [+0.001]
Total selenium	g/m^3	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.05 (0.02)
Dissolved vanadium	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Total vanadium	g/m^3	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.1 (0.1)
Dissolved zinc	g/m^3	0.0013	< 0.0010	< 0.0010	0.0014	0.0313 [+0.03]
Total zinc	g/m^3	0.0015	0.0012	0.0011	0.0019	2.4 (2.0)

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[ ] indicates this is a maximum permitted change from the upstream value at PMU000100

With the exception of dissolved iron, the metals limits on both consent 2370 and 4619 were complied with on this occasion. It is noted that the acid soluble iron concentration of the stormwater ponds at the time of sampling was at, or below median for these sites. For the western stormwater pond (STW001006) the result obtained was the second lowest on record. Therefore the change observed in the receiving waters at PMU000113 may either reflect a lack of dilution due to the low flow conditions at the time of the survey or a contributing off-site source, as may be the case with the faecal coliform results (Table 8).

There were only very slight, if any, increases in most of the other metals determined.

The results from the dry weather sampling during the year under review indicate that discharges from the landfill were not resulting in any significant adverse effect at the time of the surveys.

2.2.3 Results of wet weather stormwater and receiving environment monitoring

A survey was conducted following a rainfall event and the results are given in the tables below. Table 11 shows the results for discharges and receiving water into which the discharges from within the landfill catchment flow (Puremu Stream). Table 12 shows the results for the Manganaha Stream, which lies adjacent to the landfill site and has no surface water discharges from the landfill directed to it.

The Puremu Stream system receives discharges from two stormwater ponds on the site. STW001006 discharges stormwater and leachate from Stages 1 and 2, and STW002054 discharges stormwater from the eastern forest of the site and the composting pad. STW002054 also receives leachate from Stage 3 in the event that the leachate pumping system is overloaded, or fails. It is noted that consent 4619 provides only for minor amounts of leachate to be present in this discharge.

The results show that during stormwater discharges, the site was complying with consent conditions in regards to all the water quality parameters in both the Puremu and Manganaha Streams, with the exception of faecal coliforms at site PMU000113. At the time of this survey, although the faecal coliform concentration in the compost pond was high, it was not discharging at the time of the survey and from the observations at the preceding site inspection, was unlikely to have discharged in the lead up to the survey. This was recorded as a consent non-compliance on the Council's unauthorised incidents register. NPDC undertook to reduce the wildlife population around the ponds and wetland area, with follow-up sampling and DNA source tracking to be carried out if the issue reoccurs.

The small eastern silt pond was again found to be the main contributor of ammoniacal nitrogen, however, at all the freshwater sites monitored the levels of unionised ammonia, suspended solids and conductivity were within environmentally acceptable ranges, and indicated reasonable water quality during these surveys.

Table 11 Results of rain event monitoring – discharge and Puremu Stream samples, 2 June 2020

Site	Alkalinity g/m3 CaCO3	Conductivity mS/m @25°C	Faecal Coliforms cfu/100ml	Unionised ammonia g/m³-N	Ammoniacal nitrogen g/m³-N	pH	Suspended solids g/m³	Temp. Deg.C	Turbidity NTU
Limits PMU000110	**NA**	**NA**	**NA**	**NA**	**2.5**	***[within ±0.5]***		***≤ 15.2 [+2]***	**NA (visual)**
Limits PMU000113	**NA**	**NA**	**≤ 1000**	**NA**	**2.0 at pH < 7.75**	***≥ 6.5 & ≤ 8.5***	***13 [+10]***		**NA (visual)**
IND003009+	-	49.7	8,000	0.00102	0.43	6.9	14	13.5	14.1
STW001006	166	49.9	50	0.032	12.2	6.9	22	14.2	260
STW002054	76	42.1	1,400	0.0082	0.98	7.5	8	13.1	27
PMU000100	21	16.8	90	0.00011	0.032	7.1	< 3	13.2	1.9
PMU000109	77	36.9	-	0.00199	0.64	7.0	3	13.4	39
PMU000110	33	21.6	-	0.0027	0.66	7.2	< 3	12.9	9.5
PMU000113	38	23.0	**1,200**	0.0036	0.63	7.3	< 3	13.2	8.6

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[ ] indicates this is a maximum permitted change from the upstream value at PMU000100

+ no discharge occurring, sample obtained from second to last pond as the final pond was empty

As stated earlier, the Manganaha Stream receives no direct discharges from the landfill catchment, but it is a useful indicator for any groundwater contamination, or potential effects from windblown refuse.

The results show that water quality in the stream is quite high and there is negligible difference in water quality when comparing the results from the two Manganaha Stream sites. These results are comparable to those obtained in previous monitoring periods.

Table 12 Results of rain event monitoring - Manganaha Stream, 2 June 2020

Parameter	Unit	Site	
		MNH000190	MNH000250
Conductivity	mS/m@25 °C	16.6	16.8
Unionised ammonia	g/m³	0.00016	0.00013

Parameter	Unit	Site	
		MNH000190	MNH000250
Ammoniacal nitrogen	g/m^3-N	0.021	0.022
pH	-	7.4	7.3
Suspended solids	g/m^3	< 3	< 3
Temperature	Deg C	12.9	13.3
Turbidity	NTU	1.04	1.57

2.2.4 Biological monitoring

2.2.4.1 Macroinvertebrate surveys

Two macroinvertebrate surveys were conducted during the year under review. Summaries of the surveys' findings are given below and a full copy of the reports can obtained from the Council upon request.

Biological surveys have been undertaken on the Puremu Stream since 1986, to assess potential adverse effects of leachate from the landfill on the macroinvertebrate communities of the stream. Further to this, biological monitoring has been undertaken on the Manganaha Stream since 1994 to assess the effects of seepage from the landfill site on the macroinvertebrate communities in the stream.

Results of freshwater biological surveys performed in relation to the Colson Road landfill since the 2000-2001 monitoring year are discussed in numerous biomonitoring reports listed in the biomonitoring report reference lists.

The Council's 'kick-sampling' technique and a combination of the 'kick-sampling' and 'vegetation-sweep' sampling techniques was used at six sites to collect streambed macroinvertebrates from the Manganaha Stream, Puremu Stream and an unnamed tributary of the Puremu Stream. This has provided data to assess any potential adverse effects of leachate from the landfill on the macroinvertebrate communities of these streams. Samples were processed to provide number of taxa (richness), MCI, and SQMCI scores for each site.

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

The sites sampled are described in Table 13 and their locations are shown in Figure 10.

Overall, both surveys indicated that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effect on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream.

Table 13 Biomonitoring sites in the Puremu and Manganaha Streams related to the Colson Road landfill

Stream	Site No.	Site Code	Location
Puremu Stream	1	PMU000104	Upstream of the landfill
	2	PMU000110	400 m downstream landfill
	3	PMU000113	Downstream of the RSPCA driveway
Unnamed tributary of Puremu Stream	PT1	PMU000108	60 m upstream of the confluence with Puremu Stream
Manganaha Stream	M4	MNH000190	10 m downstream of an unnamed tributary of the Manganaha Stream
	M6	MNH000260	500 m downstream of site M4

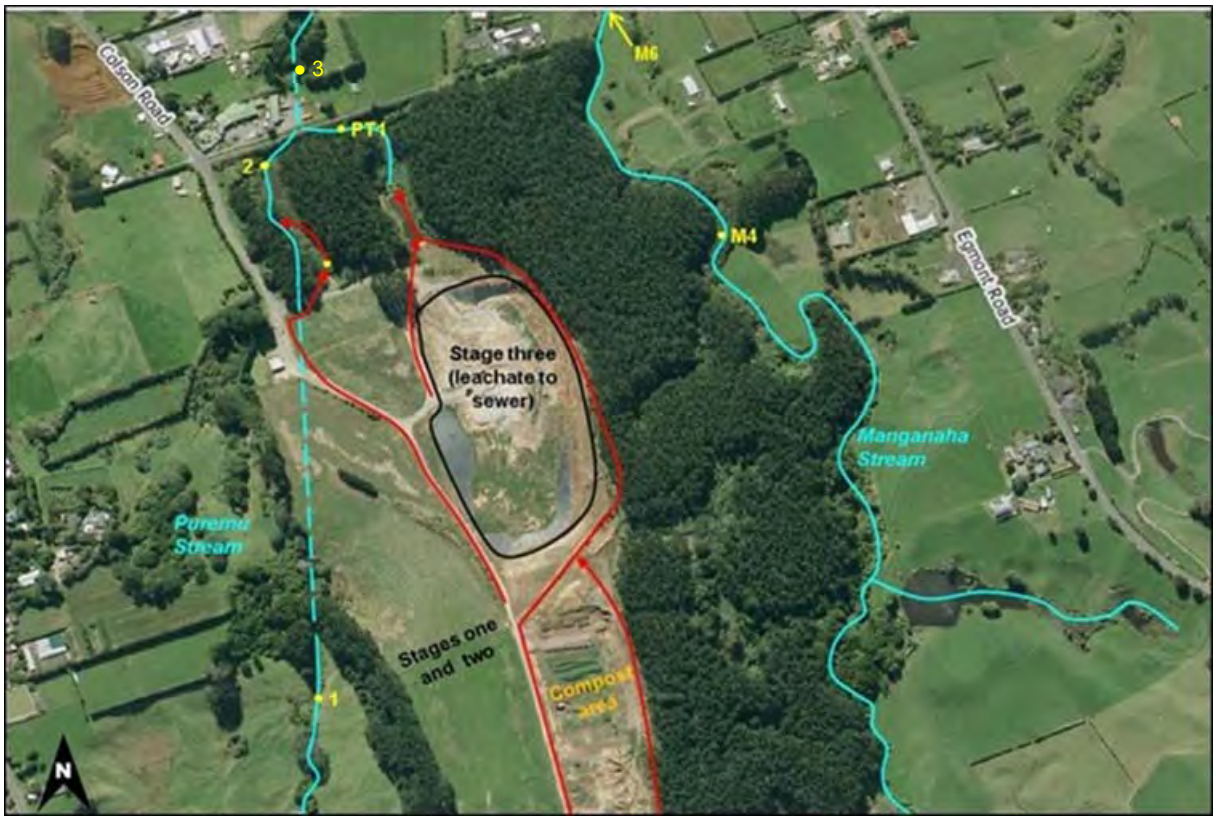

Figure 10 Biomonitoring sites related to the Colson Road landfill, New Plymouth

7 November 2019

Site 1, the 'control' site, recorded the highest MCI score of the three Puremu Stream sites surveyed and indicated 'fair' macroinvertebrate community health. This MCI score was significantly higher than the preceding survey score and higher than the median score for this site. The SQMCI score of 4.2 units was also the highest score recorded for the Puremu Stream sites surveyed and was higher than the median score for the site and significantly higher than the previous survey score. Taxa richness was similar to the median for the site and much higher than the previous survey result. All three macroinvertebrate indices measured at this site showed significant improvement from the previous survey results and a return to results more typical of this site. Site 2 in the Puremu Stream recorded an MCI score reflective of "poor" macroinvertebrate community health. This score was similar to both the median for the site and the previous survey score and was not significantly different to that recorded upstream at site 1. The SQMCI score of 3.2 units was similar to the median for the site, but was slightly lower than that recorded by 'control' site 1. Taxa richness was

moderate and higher than that recorded by the previous survey. The iron oxide bacteria and high proportion of silt substrate recorded at the time of the survey is likely to have reduced the quality of the habitat at this site. It is thought that stormwater discharges carrying suspended sediment from the Colson Road Landfill has possibly contributed to the poor habitat at this site. Site 3 in the Puremu Stream recorded an MCI score of 60 units which was also reflective of 'poor' macroinvertebrate community health. This score was significantly lower than that recorded upstream at sites 1 and 2 and significantly lower than that recorded at site PT1 in the unnamed tributary of the Puremu Stream. It is important to note, a concrete products site is situated directly upstream of site 3 and may have contributed stormwater discharges to this site. In addition, minor stock damage was recorded at site 3, while no stock damage was recorded at the three upstream sites.

Site PT1 in the unnamed tributary of the Puremu Stream recorded a 'fair' MCI score of 80 units and a 'poor' SQMCI score of 3.0 units, which were both significantly higher than the previous survey results. Taxa richness was moderate and slightly higher than the previous survey result. Unlike the previous survey results, no *Chironomus* bloodworms were recorded, which was also indicative of an improvement in macroinvertebrate community health at this site. Overall, the results recorded at site PT1 were suggestive of average physicochemical water quality and/or habitat quality and indicated no significant detrimental impacts from the discharge of treated stormwater and leachate discharges from the Colson Road landfill.

Sites M4 and M6 in the Manganaha Stream recorded similar MCI scores, and were both reflective of 'fair' macroinvertebrate community health. In comparison to historical medians, the MCI scores recorded by the current survey were similar at site M4, but significantly higher at site M6. In comparison to the previous survey results, the MCI scores were slightly lower at site M4 and significantly higher at site M6. The SQMCI scores recorded at sites M4 and M6 were also similar to one another, and were higher than the previously recorded scores and were not significantly different to site medians. The macroinvertebrate communities were similar between sites M4 and M6, with only two significant differences in taxa abundance recorded. The current results were indicative of reasonable preceding water quality and there was no evidence of detrimental effects from the Colson Road Landfill leachate discharges.

Overall, the results of this survey indicate that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effect on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream. Site PT1, which recorded an MCI score reflective of 'fair' macroinvertebrate health, showed a significant recovery from the 'very poor' results recorded in the previous survey. There were no significant differences in MCI scores between sites 1 and 2 in the Puremu Stream and site PT1 in the unnamed tributary of the Puremu Stream. All three sites recorded higher MCI scores than the previous survey results. Site 3 in the Puremu Stream recorded an MCI score significantly lower than that recorded upstream at sites 1 and 2 and at site PT1 in the unnamed tributary of the Puremu Stream. The extent to which the Colson Landfill site and associated discharges may have affected the macroinvertebrate communities at this site cannot be determined, due to the upstream concrete products site and the minor stock damage observed at the site. Lastly, the results from site M4 and M6 in the Manganaha Stream suggest there were no detrimental impacts from the Colson Road Landfill leachate discharges on the macroinvertebrate communities of this stream. No undesirable biological growths were detected at any of the six sites during this November 2019 survey.

3 March 2020

'Control' site 1, on the Puremu Stream recorded an MCI score indicative of 'poor' macroinvertebrate community health and was similar to the median score for the site. The SQMCI score, also reflective of 'poor' health, was insignificantly lower than the median for the site, but significantly lower than the previous survey score. Taxa richness was the same as that recorded in the previous survey and was similar to the median for

the site. Overall, results were typical for the site, with the decrease in MCI and SQMCI scores recorded from the previous survey likely related to seasonal habitat change.

Site 2 in the Puremu Stream recorded an MCI score reflective of 'fair' macroinvertebrate community health, which was significantly higher than the median for the site, and significantly higher than the MCI scores recorded at sites 1, 3 and PT1. The SQMCI score of 4.8 units was the highest SQMCI score recorded for the site to date and was significantly higher than the median for the site and the SQMCI scores recorded at sites 1 and PT1. Taxa richness was low (10 taxa) and the macroinvertebrate community was dominated by one taxon, the 'moderately sensitive' chironomid midge (Tanypodinae). Overall, results were indicative of an improvement in macroinvertebrate community health from the previous survey and were slightly better than typical for this site.

Site 3 recorded a low taxa richness of nine and an MCI score reflective of 'poor' macroinvertebrate community health. The MCI score of 73 units was significantly lower than that recorded upstream at site 2 and it is possible that the Colson Road landfill stormwater and leachate discharges have contributed to this significant decrease. However, it is important to note, a concrete products site is situated directly upstream of site 3 and may have contributed stormwater discharges immediately upstream of site 3. The SQMCI score recorded at site 3 was the highest recorded for the site to date and was significantly higher than the median for the site. Only one taxon was dominant at this site, the 'tolerant' snail (*Potamopyrgus*), with the eight remaining taxa recorded as rarities. Overall, these results were reflective of 'poor' macroinvertebrate community heath, although were slightly better than what has previously been recorded at this site.

Site PT1 in the unnamed tributary of the Puremu Stream recorded an MCI score reflective of 'poor' macroinvertebrate health, a score similar to the median for the site and equal to that recorded upstream at 'control' site 1, but significantly lower than that recorded at site 2 . Taxa richness was low and the macroinvertebrate community comprised only 'rare' and 'common' taxa, with no 'abundant' taxa recorded. The SQMCI score recorded at site PT1 was the highest recorded for the site to date, higher than that recorded at 'control' site 1, but significantly lower than that recorded at site 2. No *Chironomus* bloodworms were recorded in the current survey, which showed an improvement since the previous summer survey (April 2019). Again, given that the Colson Road Landfill site is situated in the head of the catchment of the unnamed tributary of the Puremu Stream, it is possible that the Colson Road landfill stormwater and leachate discharges may have contributed to the 'poor' macroinvertebrate health and lowered taxa richness and abundance at this site.

Site M4 recorded an MCI score reflective of 'fair' macroinvertebrate community health, while site M6 recorded a significantly lower MCI score reflective of 'poor' health. In comparison to site medians and previous survey scores, both sites recorded lower MCI scores. The SQMCI score was also lower at site M6, however the decrease between sites M4 and M6 was not significant. Macroinvertebrate community composition was similar between sites, with three shared dominant taxa and only one significant difference in taxon abundance recorded between the two sites. Taxa richness was low and substantially lower than the medians at both sites. Results were indicative of below-average macroinvertebrate community health at both sites.

Overall, the results of this survey indicated that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effects on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream. No undesirable biological growths were detected at any of these sites during this March 2020 survey.

2.3 Groundwater

Groundwater was sampled from six bores over three separate days in June 2019 due to the difficulty in finding and/or accessing the bores in the forest undergrowth. The results of the analyses are given in Table 15.

It has been noted that the bore depths of three of the bores has reduced from that provided in the original bore logs. The affected bores are GND0251, GND0255 and GND1300. During the year under review NPDC engaged a contractor to attempt the redevelopment of these bores. A comparison of the depths of these bores is shown in Table 14. The depths recorded indicate that the bores have backfilled over time, with two of the bores shallower than they should be (GND0255 and GND0251) and the third also being compromised as this had also infilled over time. The Council is continuing to work with NPDC during the 2020-2021 year to ensure that suitable monitoring bores are provided and maintained.

Table 14 Bore depth and screen depth information for potentially collapsed bores

Bore	Original screen depth	Depth prior to redevelopment [a] (17 June 2019)	Depth post redevelopment [a] (17 June 2020)	Depth at time of sampling (25-26 June 2020)	Difference (to top of screen)
GND0255 (L8)	19.8 – 20.8 m	16.9 m	17.080 m	18.85 m	1.95 m
GND1300 (AH3)	19 – 21 m	19.850 m	20.030 m	20.98 m	0.02 m
GND0251 (L2)	21.6 – 22.6 m	19.210 m	19.270 m	20.20 m	2.4 m

Key: [a] Depths provided by the Contractor engaged by NPDC

Although the NPDC subsurface drainage samples (Table 4, Section 2.2.2) may be starting to show the early signs of slight leachate impact in terms of the ammoniacal nitrogen concentration, on the whole, the groundwater results show little evidence of leachate contamination. Although all parameters measured for all the bores, were well within the ranges expected in Taranaki groundwater, there are some small changes in recent years, particularly in the chloride and nitrate/nitrite nitrogen concentrations, that may be indicative of newly emerging trends (Figure 11 and Figure 12).

Table 15 Chemical analysis of Colson Road landfill groundwater sampled June 2019

Parameter	Unit	GND0573	GND0255	GND0575	GND0251	GND0598	GND1300	GND1301
Date		26 Jun 20	25 Jun 20	26 Jun 20	26 Jun 20	26 Jun 20	25 Jun 20	26 Jun 20
Alkalinity	g/m^3 $CaCO_3$	29	36	99	56	159	30	112
Chloride	g/m^3	77	44	49	17.9	23	21	29
COD	g/m^3	< 6	< 6	< 6	6	8	< 6	< 6
Conductivity	mS/m @ 25 °C	33.8	24.1	35.9	17.3	36.9	15.8	31.2
Water level	m	4.78	11.36	8.50	13.50	10.73	12.60	8.50
Unionised ammonia	g/m^3 N	< 0.000010	< 0.000010	< 0.000010	< 0.000018	0.0102	< 0.000010	0.00047
Ammoniacal N	g/m^3 N	< 0.010	< 0.010	< 0.010	< 0.010	1.25	< 0.010	0.088
Nitrate/nitrite N	g/m^3 N	0.45	1.62	0.98	0.32	0.003	1.43	0.99
Nitrite N	g/m^3 N	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
pH	pH	5.8	6	6.4	6.7	7.4	6.3	7.2
Sulphate	g/m^3	7.6	2.6	2.2	8.4	< 0.5	6.6	3.8
Temperature	Deg C	15.3	15	15.2	15.2	14.6	15.2	15.2
Dissolved aluminium	g/m^3	< 0.003	0.007	0.005	0.01	0.004	0.025	< 0.003
Dissolved arsenic	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved beryllium	g/m^3	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010

Parameter	Unit	GND0573	GND0255	GND0575	GND0251	GND0598	GND1300	GND1301
Dissolved boron	g/m^3	0.023	0.020	0.020	0.014	0.055	0.019	0.027
Dissolved cadmium	g/m^3	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved cobalt	g/m^3	< 0.0005	< 0.0005	0.0012	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved chromium	g/m^3	< 0.0002	< 0.0002	< 0.0002	0.0002	< 0.0002	< 0.0002	0.0002
Dissolved copper	g/m^3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Iron	g/m^3	< 0.02	< 0.02	< 0.02	< 0.02	0.23	< 0.02	0.25
Dissolved lead	g/m^3	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.00016	< 0.00010	< 0.00010
Dissolved manganese	g/m^3	0.0059	0.0034	0.0023	0.0065	0.069	0.0035	0.103
Dissolved selenium	g/m^3	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved vanadium	g/m^3	< 0.0010	< 0.0010	0.0099	0.0022	0.0026	0.0015	0.0042
Dissolved zinc	g/m^3	0.0025	0.0014	0.0049	< 0.0010	0.006	0.001	0.0063

Historically, GND0598 shows some elevation in alkalinity, ammoniacal nitrogen, pH and dissolved iron when compared to the other bores. However, this bore is up gradient of the landfill in terms of groundwater flow, and the results are consistent with those obtained from the bore since 1996. The elevated levels of these parameters in this bore are therefore not considered to be a result of leachate contamination.

The samples were also analysed for SVOCs (semi-volatile organic compounds) and none were found to be above detection levels. A copy of the SVOC results is available on request.

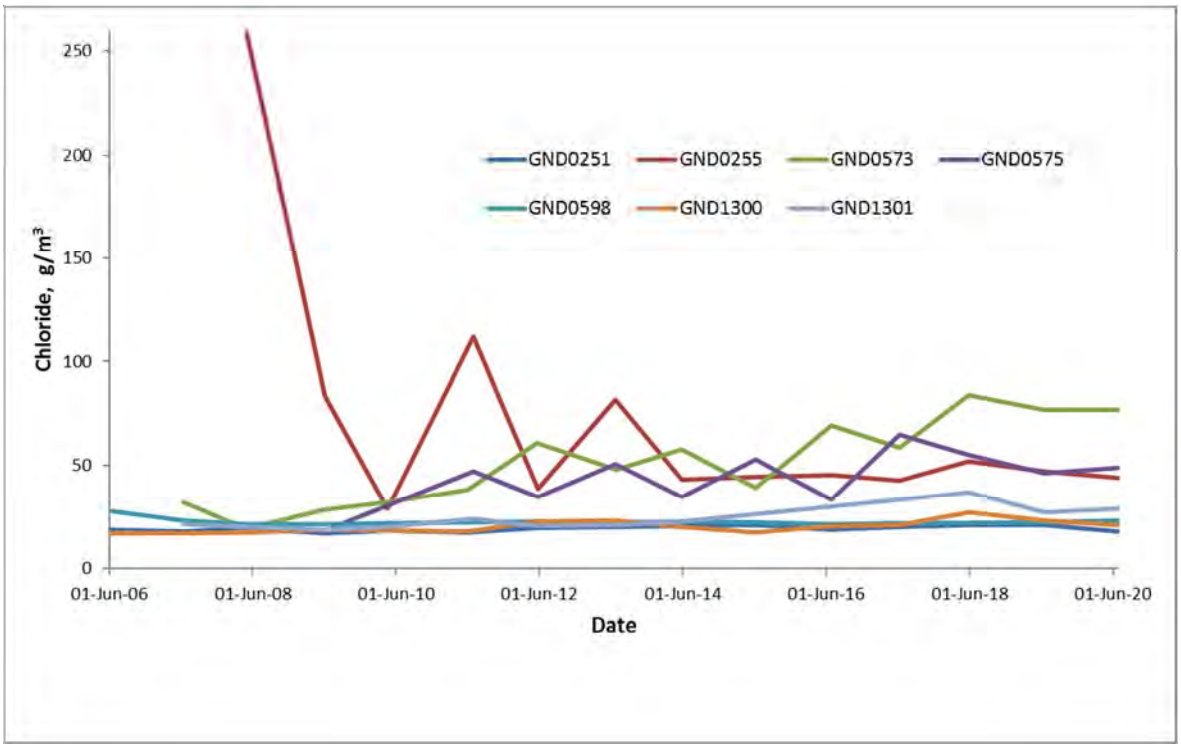

Figure 11 Chloride concentrations in the Colson Road groundwater bores, June 2006 to date

It can be seen that the chloride concentration in bore GND0255 (up gradient of the landfill) have been stabilising at a decreased level since the spike found in April 2008. Conversely, in bores GND0573, GND0575 (and to a lesser extent GND1301), although the changes are relatively small, it does appear that there may

be an emerging trend of increasing chloride concentrations. These bores are down gradient of landfill Stages 2 and 3, and may be indicative of some minor leachate contamination.

Figure 12 shows that there may also be an emerging trend of increasing nitrate/nitrite nitrogen concentrations in some of these bores, that is, GND0575 (north east of the landfill) and GND1300 (north east of the composting area and east of the southern end of the landfill). This finding is consistent with the potential emerging trend of increasing nitrate/nitrite nitrogen in the under liner drainage results provided by NPDC (2.2.1.2, Figure 8). In contrast, it is noted that the nitrate/nitrite nitrogen results obtained at GND1301 (further east of the landfill than GND0575) during the year under review was still relatively low, following the higher results obtained in the 2014-2015, 2015-2016 and 2016-2017 years.

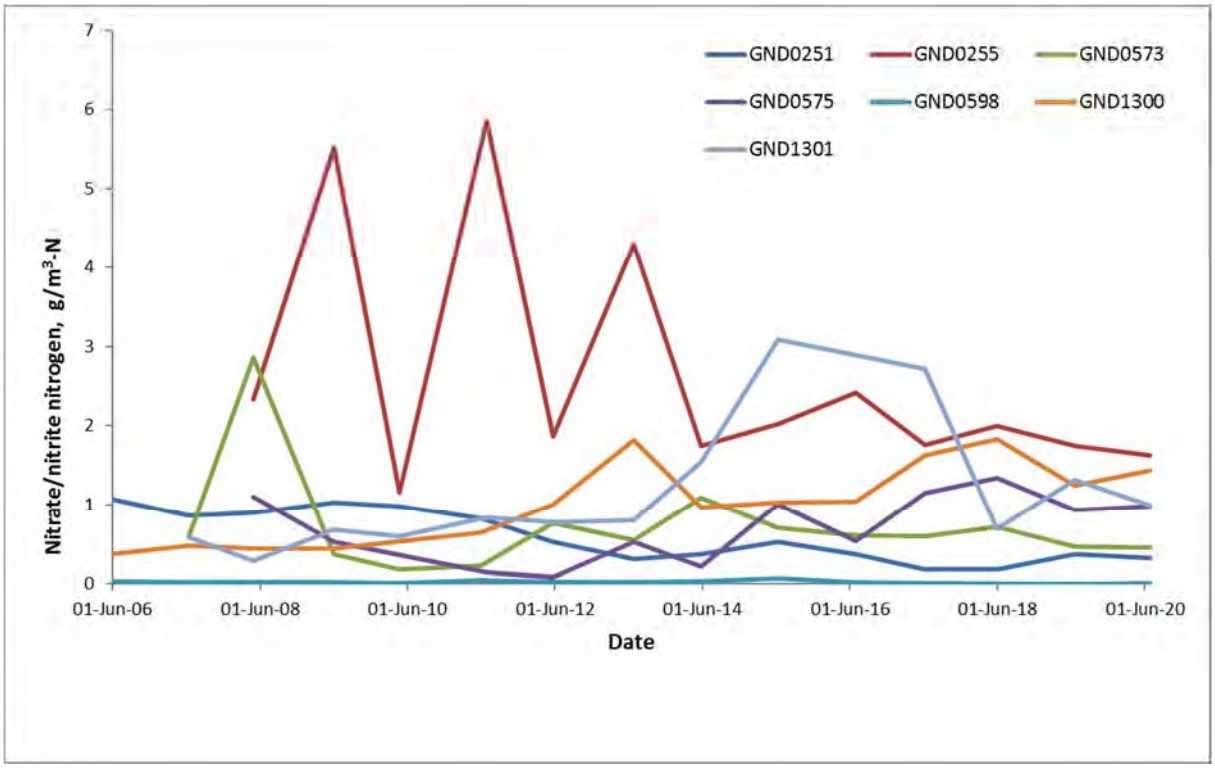

Figure 12 Nitrate/nitrite nitrogen concentrations in the Colson Road groundwater bores, June 2006 to date

In general terms, the groundwater quality in the vicinity of the landfill is good, and all parameters are comparable with typical Taranaki groundwater. The data gathered in this, and other monitoring periods, indicates that the Colson Road landfill is not having a significant adverse effect on groundwater quality.

2.4 Air

2.4.1 Data review – landfill gas flare

The Resource Management (National Environmental Standards for Air Quality) Regulations 2004 as at 1 July 2017 (NES) requires the control of greenhouse gas emissions at landfills (Regulations 25 to 27). Regulation 25 discusses the applicability of the two following regulations. In the case of the Colson Road landfill, Regulations 26 and 27 do not apply as the landfill has a total capacity of less than 1 million tonnes (the threshold for Regulations 26 and 27 to apply).

As discussed in Section 1.2, NPDC chose to install a flare at the landfill to mitigate odour issues that were resulting in a significant number of complaints in the 2014 to 2016 years. Although the NES does not apply at the site, this was used to provide guidance in the development of the conditions attached to the varied consent and on the "best practicable option" requirement contained in the pre-existing consent.

Conditions on the varied consent 4779-1.1 require that:

1. Within three months of the first operation of any landfill gas flare, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a measurement of the temperature of the flare together with a measurement of the concentrations of methane and of hydrogen sulphide in the flare feedstock. Thereafter the consent holder shall annually provide updated information on flare temperature and feedstock composition.

3 The first revision of the landfill management plan, described in condition 9(c) following installation of any landfill gas flare shall describe, variously, methods of, schedules for, and/or the recording of: observations and inspections of the flare, its operation, and its effects, including downwind odour and smoke plume details; a calibration schedule; records of maintenance; and any complaints. Information gathered under these provisions shall be made available to the Chief Executive, Taranaki Regional Council upon request.

Condition 1

Commissioning of the flare was completed on 28 March 2018, with testing undertaken by an independent consultant on the same day. The information required to satisfy special condition 1 was received within the three months stipulated by consent conditions, on 16 April 2018 and has been presented in the 2017-2018 Annual Report.

Updated annual information on the feed gas and temperature was provided upon request in the form of graphed methane and temperature data from the continuous (1 minute) data collected by the monitoring system integrated into the flare system (Figure 13).

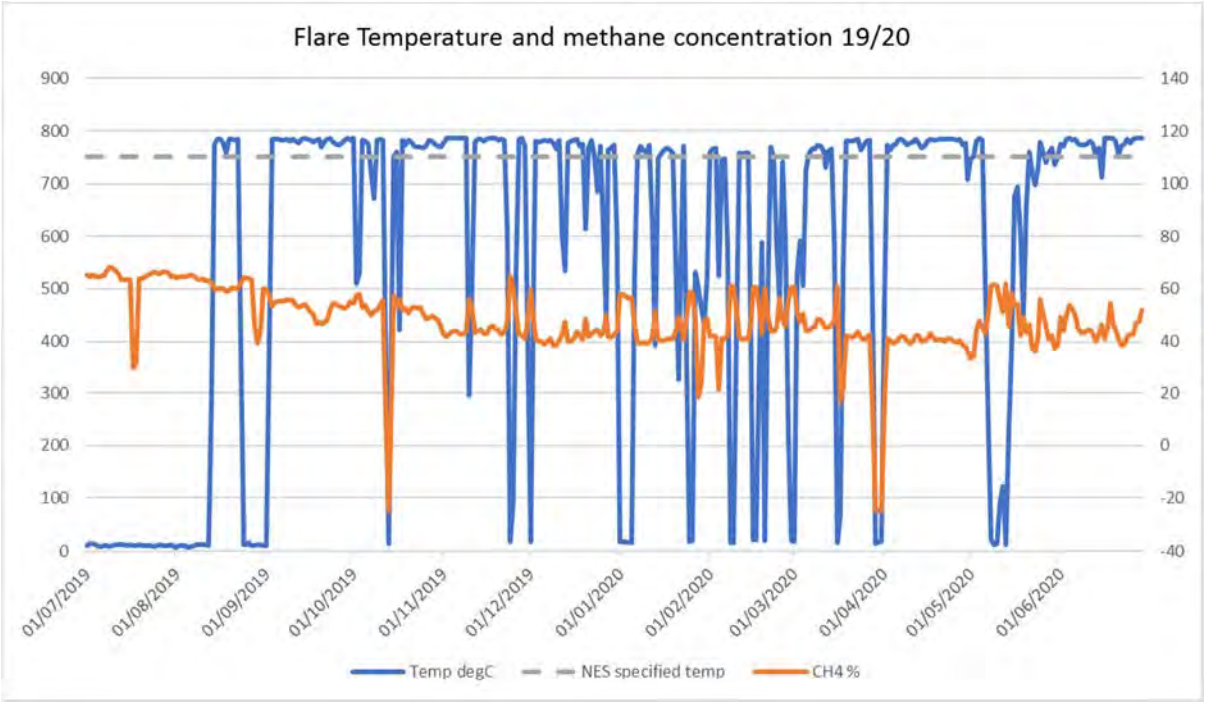

Figure 13 Methane and temperature recorded by the landfill gas flare for the year under review

The hydrogen sulphide concentration of the feedstock gas was measured on three occasions during the year under review with the results given in Table 16.

Table 16 Feedstock gas hydrogen sulphide concentration test results

Date	Hydrogen sulphide concentration (ppm)
31 October 2029	25.0
12 December 2019	11.0
21 January 2020	2.0

Due to the number of occasions that the flare temperature was recorded to be less than is optimal for complete combustion of the landfill gas components, to check that the flare was being operated in accordance with the best practicable option (condition 4 of consent 4779-1.1) based on the guidance provided by the NES, NPDC confirmed that:

- The system incorporates automatic isolation valves and a flame arrestor so that there are no emissions of unburnt gas from the flare during periods when the flare is not operational;
- While the flare is not operating the landfill gas is not extracted. It accumulates in the landfill and vents passively as is the case with all smaller landfills that are not required to have an engineered extraction and flaring system;
- During times of operation the flare temperature was maintained at or above 750°C.
- There is a process for manually restarting the flare given that for safety reasons, the flare does not have an auto-ignition system. Council was informed that a text alarm is sent to NPDC staff, who will respond during work hours and attempt to restart the flare, resulting in varying response times.

The total landfill gas volume treated by the flare during the year under review was 440,758 m^3 calculated from daily average landfill gas flow in m^3/h. This is 14 % higher than the total of 386,959 m^3 for the 2018-2019 year. The monthly averaged landfill gas flows are shown in Figure 14.

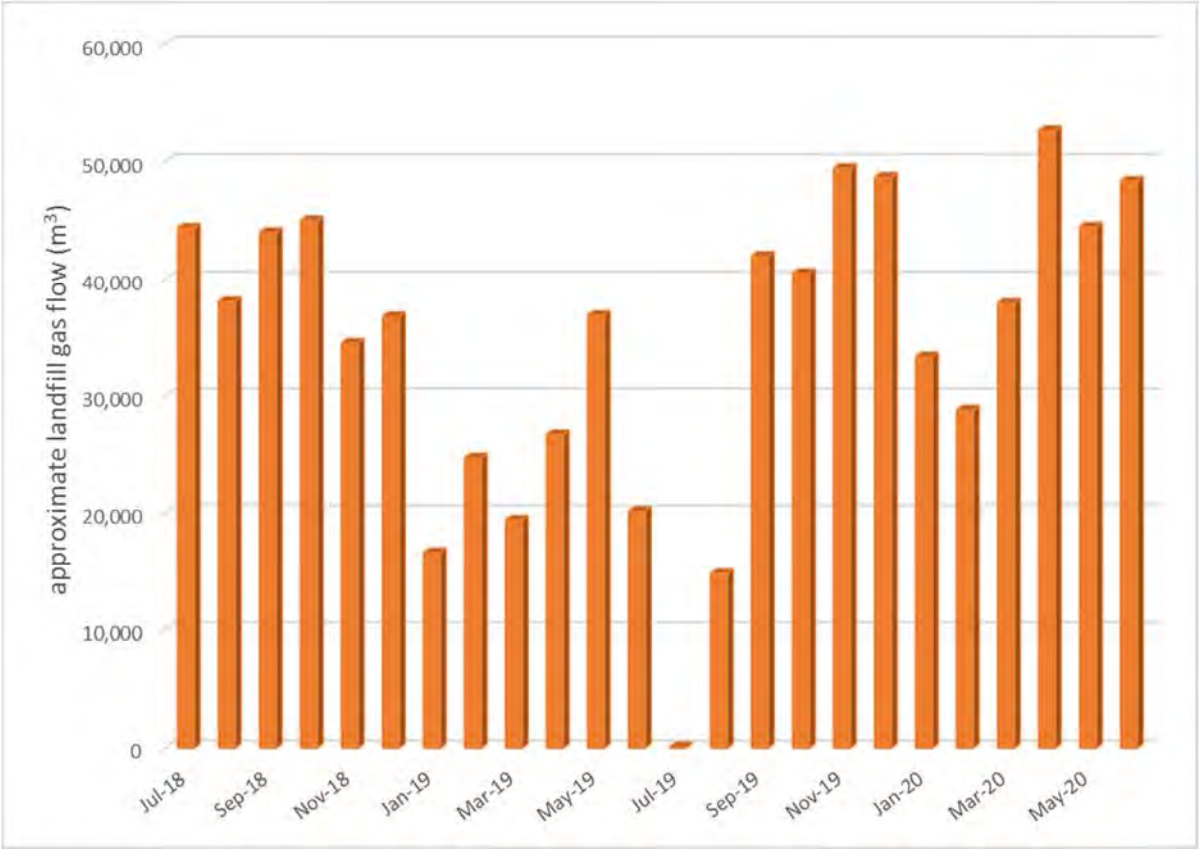

Figure 14 Monthly landfill gas flow volumes flared, July 2018 to date

Condition 3

The Colson Road Regional Landfill Management Plan was updated in June 2018, to include a general description of the flare, outlined that the flare's performance is continually monitored by means of real time electronic data. The plan also clarified that NPDC, with the support of external contractors, have responsibility for the maintenance, inspections and calibration of the flare. The plan references a separate specific NPDC procedure for the management and operation of the flare that must be adhered to, which has also been received. It has previously been confirmed that the plan covers the required procedures, schedules and records keeping information.

A flare fault log was provided for the year under review. This showed that there was a total of 103 non-operational days due to faults, which is 28 % of the year (compared to 27 % in the 2018-2019 year). The longest non-operational period was 31 days from 1 July to 1 August 2019. The reason given for the shutdown was a fault on the burner. A summary of the monthly non-operational hours is given in Table 17 and Figure 15.

Table 17 Statistical summary of the Colson Road landfill gas flare non-operational hours for the year under review

Month	No. shutdowns	Average non-operational time (days)	Maximum non-operational time (days)	Minimum non-operational time (days)	Monthly total non- operational time (days)l
Jul-19	1	31.0	31.0	31.0	31.0
Aug-19	2	10.0	11.3	8.6	19.9
Sep-19	1	1.5	1.5	1.5	1.5
Oct-19	5	0.8	2.0	0.1	3.9
Nov-19	5	0.8	1.9	0.0	4.1
Dec-19	5	0.7	1.3	0.2	3.5
Jan-20	9	1.3	5.3	0.0	11.6
Feb-20	7	1.5	3.1	0.3	10.4
Mar-20	5	1.6	3.4	0.6	7.8
Apr-20	2	0.3	0.4	0.1	0.5
May-20	9	1.0	3.7	0.1	8.8
Jun-20	1	0.2	0.2	0.2	0.2
Totals	52	-	-	-	103

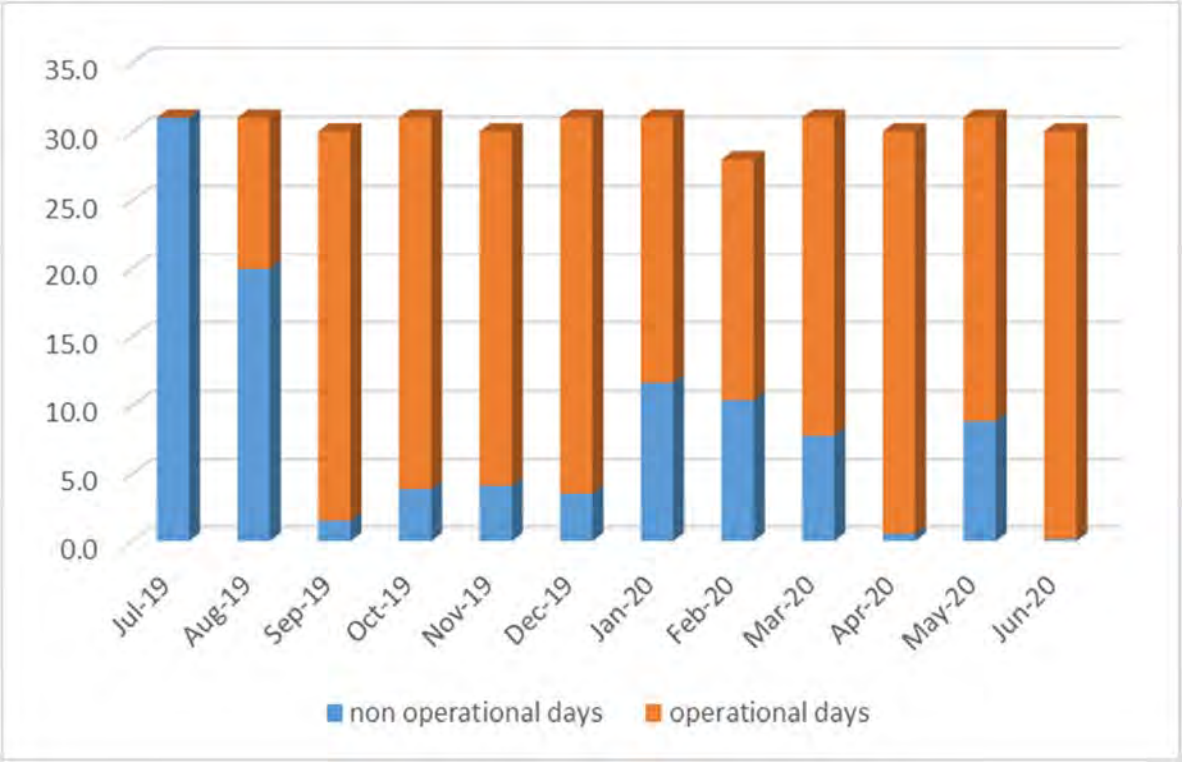

Figure 15 Monthly operational/non-operational hours for the Colson Road landfill gas flare for the year under review

Despite the slightly higher total non-operational time during the 2019-2020 year, a greater volume of landfill gas was treated during the year under review than during the previous year. It is also noted that there were no odour complaints attributable to the landfill operation received by the Council during any of the non-operational periods.

2.4.2 Results of receiving environment monitoring

2.4.2.1 Deposition gauging

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

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

Gauges are placed around the site and within the surrounding community. The gauges were left in place for a period of two weeks to a month, on two separate occasions.

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

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

Material from the gauges was analysed for solid particulates, the results of which are presented in Table 18.

Table 18 Air deposition monitoring results for January and February 2020

Site code	Site description	Particulate g/m²/day	
		7-28 Jan 2020 (21 days)	5-27 Feb 2020 (22 days)
AIR001604	Adjacent to Manganaha Stream, behind rose nursery	0.03	0.08
AIR001608	124 Egmont Road, paddock boundary, west of house	0.02	0.03
AIR001622	At rear of RSPCA building	0.02	0.02
AIR001603	At entrance to landfill	0.04	0.01
AIR001613	Grass lawn, behind work shed	0.03	0.02
AIR001623	Behind 194 Egmont Road	0.03	*

* sample discarded, contaminated by bird droppings.

All results of both surveys were well below guideline deposition values of 0.13 g/m^2/day.

2.4.2.2 Ambient suspended particulate and landfill gas component monitoring

Ambient monitoring of suspended particulates (dust) and/or landfill gas components was undertaken under dry weather conditions on two occasions during the year under review at seven monitoring locations on, and in the neighbourhood of, the landfill. The particulate (dust) monitoring was undertaken using a DustTrak, and the methane and H_2S monitoring was undertaken using a MultiRae. The results are shown in Table 19 and Table 20

Particulates

Particulates can derive from many sources, including motor vehicles (especially diesels), solid and oil-burning processes for industry and power generation, incineration and waste burning, photochemical processes, and natural sources such as pollen, abrasion and sea spray.

PM_{10} particles (those of less than 10 µm in diameter) are linked to adverse health effects that arise primarily from the ability of particles of this size to penetrate the defences of the human body and enter deep into the lungs. Health effects from inhaling PM_{10} include increased mortality and the aggravation of existing respiratory and cardiovascular conditions such as asthma and chronic pulmonary diseases. The national guideline for air quality (averaged over a 24 hr period) is 50 µg/m^3 PM_{10}.

Landfill gas components

The landfill gas components monitored during the ambient surveys in the year under review were methane and H_2S.

The monitoring showed that there were no exceedances of the PM10 guideline. There were no landfill gas components detected at the time of either of the surveys when this monitoring was carried out.

Table 19 Ambient PM_{10} and methane survey results, 1 May 2020

Site	Methane (%LEL)	H_2S (ppm)	PM_{10} µg/m^3
AIR001603 (on-site)	0	0	22
AIR001610 (on-site)	0	0	20

Site	Methane (%LEL)	H_2S (ppm)	PM_{10} µg/m^3
AIR001619 (on-site)	0	0	25
Top SE corner of track (on-site)	0	0	23
Beside flare (on-site)	0	0	22
AIR001609 (off-site)	0	0	9
AIR001615 (off-site)	0	0	12
Averages	**0**	**0**	**19**

Table 20 Ambient PM_{10} and methane survey results, 11 June 2020

Site	Methane (%LEL)	H_2S (ppm)	PM_{10} µg/m^3
AIR001603 (on-site)	0	0	4
AIR001619 (on-site)	0	0	5
Top SE corner of track (on-site)	0	0	6
Beside flare (on-site)	0	0	7
AIR001615 (off-site)	0	0	11
AIR001605 (off-site)	0	0	8
AIR001609 (off-site)	0	0	6
Averages	**0**	**0**	**7**

2.5 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 NPDC. 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).

Table 21 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to NPDC's activities during the 2019-2020 period. This table presents a summary of all events that required further investigation or intervention regardless of whether these were found to be compliant or not and includes any on-going matters from previous years.

Table 21 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
23-May-2018	During routine monitoring it was found that capping, compaction and vegetative cover in the Stage 2 area was insufficient to comply with resource consent conditions.	N	Abatement notice issued	Cap depth investigations by NPDC during the year under review found that the cap depth was insufficient in some areas. A remediation plan was developed and presented to the Council. An abatement notice was issued requiring that works be undertaken to ensure compliance by 15 March 2020. Extension of due date to 14 March 2021 approved to allow prioritisation of Stage 3 capping
5-July-2019	Self-notification was received regarding minor leachate overflow	Y	N/A	Containment bund repaired and leachate vent pipe unblocked
20-Nov-2019	Self-notification of a separation of the leachate pipe that needed to be repaired	Y	N/A	Separation of leachate pipe was within the landfill liner area
12-Jun-2020	Faecal coliforms exceedance	N	Letter of explanation requested	Explanation received and accepted. No further enforcement action.

2.6 Management and reporting

2.6.1 Landfill management and contingency plans

Daily operations at the site are governed by the requirements contained in the Colson Road Regional Landfill Management Plan, which the consents require to be updated at not less than yearly intervals.

A contingency plan is also required for the site by special condition 7 of consent 6177-1.

The management plan in effect during the year under review was the version updated by NPDC in June 2018. The Update scheduled for June 2019 was deferred to include the additional special waste only considerations and those required by the upcoming potential change in operational contractor. A draft revised plan was provided to Council in August 2019. The contingency planning for the Colson Road landfill is included in the NPDC Three Waters and Resource Recovery Incident Response Plan. The latest version of this plan provided to Council was updated in February 2019.

2.6.2 Colson Road Landfill Liaison Committee

A liaison committee comprising representatives of NPDC, Taranaki Regional Council, landfill contractor, and neighbours of the landfill was set up in 1999 as required by condition 32 of the land use consent for Colson Road landfill. The purpose of the committee is to facilitate the raising of concerns by the neighbours in relation to the landfill operations and to ensure that the landfill's neighbours are kept abreast of the development of the landfill site.

It is also a requirement of condition 11 of consent 4779 that the consent holder, staff of the Council, submitters to the application and any other party (at the Council's discretion) meet at least once per year. The liaison committee meetings also fulfil this consent requirement.

During the period under review, the committee met on 24 July and 20 November 2019. A meeting was scheduled for 18 March 2020, however, this was cancelled due to COVID-19 restrictions. This periodicity of meetings was agreed by all parties. The meetings covered site development progresses, operations at the landfill, and future activities. It is also an opportunity for submitters and neighbours to be kept informed of any issues arising at the site, and mitigation measures NPDC is putting in place. Attendees of the meeting agree that they are worthwhile and provide useful feedback to NPDC.

The Colson Road landfill liaison committee has been very successful to date and will continue in its present format for the 2020-2021 monitoring period.

2.6.3 Independent consultant's reports

A site inspection was undertaken by WAI Environmental (independent consultants) on 24 October 2019.

24 October 2019

It was reported that the first impression was of a neat and tidy operation by an operator who is paying attention to detail. There was practically no litter on the site and no seagulls were present. The site was now almost entirely covered by soil.

In particular, the report of the 24 October 2019 visit noted that:

- Rehabilitation and earthworks associated with landfill closure is complete on Stages 1 and 2. The nursery crop of maize has been harvested and the fields have been replaced with grass. The planned remedial works to rectify the thickness of the final cover had yet to start.
- No landfill gas odours were noted at the landfill. The flare was generally operating optimally but it was noted that it continued to suffer from going out unexpectedly, remaining so for several days. NPDC has continued to experience outages of the system throughout the winter. It is possible the amount of methane being produced has reduced and caused the flare to go out from time to time. There is no automatic start, so the flare must be ignited manually each time this happens. It may be appropriate to add a programmable logic controller (PLC) that turns the flare off for several days per week to allow the level of methane to build to a sustainable volume.
- The fences, weir, silt pond and drainage ditches were clear of litter.
- The ponds separating the composting area from the landfill were full, which is an indication of the recent weather patterns, but were clear of litter.
- The leachate system appeared to be operating satisfactorily. The over-excavated material (in the leachate collection pond) had been replaced with fill to bring the base of the pond up to the correct level and ensure that leachate does not remain in the pond but can all be disposed of via the pumping station. It was noted that a number of historical leachate breakouts have occurred on the sloping sides of the landfill in the past. None were noticed during this visit, although there was evidence of some surface scouring during to stormwater. This appeared to be under control

2.6.4 Composting

In the past concerns have been raised about whether the material in each windrow had a plant derived matter content of at least 95% as required by consent conditions. These concerns were mostly directed at the acceptance of stock bedding which is a mixture of hay (or wood chips) and manure. To address this the Council clarified plant derived matter as being any plant derived material that has only been exposed to external degradation processes (and has not been partially or wholly ingested by any type of animal). This

definition includes green waste, shredded green waste, humate, untreated woodchip/shavings, the plant derived component of animal litter (such as hay and wood shavings), and old existing compost stored on the site. This definition does not include paunch grass, or animal manure. It is however Council's position, that poultry, goat and horse manure are acceptable constituents of the 5% non-plant derived proportion of the windrows.

Changes occurred to the composting operations during the 2014-2015 year, due to a change in the contractor employed by EnviroWaste, who is the operator of the transfer station.

The main compost operator on site changed to Revital, with the previous operator moving to a hard stand area to the south of the main composting area.

The volumes of green waste composted at the site remained high during the period under review. There was an acceptable volume of non-plant derived matter contained in the green waste received at the site. During a couple of the inspections it was noted that heavy traffic movements occurring on the compost area pad during wet weather had caused damage with rutting and some large areas of ponded compost leachate present.

In summary, findings during the year under review were that, based on estimates at inspection, there were no issues raised with regards to the condition relating to the acceptable percentage of non-plant derived material throughout the monitoring period. It was also considered, in general, the stormwater from the composting areas was being managed such that compliance with the conditions of the stormwater discharge consents for the landfill was not being compromised by the composting activities.

During the year under review, work was completed on preparing the old Return2Earth composting area further south, moving the composting activities and commenced on excavating the treatment ponds to allow the extraction of cover material from this composting pad area. Plans were submitted to Council outlining the drainage that would be constructed to accommodate the relocated activity prior to any work being undertaken and this was done. However, at the July and October 2019 inspection it was found that material had been placed in the drain that leads from the area being cleared of compost to the composting treatment ponds to improve vehicle access during works preparing the area to be used to provide landfill capping material. Although there was no evidence of flow escaping from the area at the time of the inspections, the potential for this to impact on the quality of the site discharges during rainfall was raised. In the case of the July 2019 inspection, this was the third consecutive inspection at which it was found that the drain was blocked. Following both the July and October inspections NPDC were asked to ensure that the drains were cleared before the next rain or after the moving of the compost had been completed, which ever came first. The drains were found to have been reinstated at the following inspection on both occasions.

3 Discussion

3.1 Discussion of site performance

At inspection there were aspects of the site operations that continued to be very well managed. These included:

- The continued use of the odour mitigating sprays and operation of the gas extraction system and flare, which resulted in only occasional mild odours being noted on site;
- Appropriate daily cover on the special waste pits; and
- Improvements in intermediate cover over the site.

However, there were also some on-going issues that included:

- Large areas of exposed uncompacted soil, with re-work occurring on previously stabilised areas required as the contour and/or compaction was not adequate for the final cap;
- Hydrocarbon sheens on the large stormwater pond, which although retained in the pond, need to be monitored to ensure that they are not discharged.
- Obstructions at the grate on the inlet to the SPCA driveway culvert; and
- Repair of the Stage 2 cap. A request to extend the date by which the abatement notice required this work to be carried out was approved in order that work on the capping of Stage 3 could be prioritised. The abatement notice was extended to 14 March 2021.

Although the sediment issues were on site and within the mixing zone they appear to have resulted in some impoundment within the tributaries over the 2017-2019 monitoring periods (Photo 9 and Photo 10), so there is, never the less, potential for adverse effects if the sedimentation is not brought under control. During the year under review, NPDC engaged a consultant to undertake an analysis of the erosion and sediment control measures at the site. The report on this work was completed and provided to Council in July 2020. NPDC have confirmed that they will be adopting the recommendations made in the report.

Sampling of the stormwater and compost area discharges found that the constituent concentrations were within historical ranges at the times the surveys were undertaken. It is noted that discharges from the site are resulting in elevated concentrations of manganese in the receiving waters of the Puremu Stream, as discussed in Sections 2.2.2.3 and 3.2. It is therefore being recommended in Section 4, that the dry weather surface water surveys be amended to include monitoring of total and dissolved manganese in the stormwater samples.

Self-notification was received regarding a situation that resulted in increased discharges of leachate to the Puremu Stream. However, at the time of investigation it was found that there was sufficient stormwater dilution to prevent significant adverse effects, and NPDC undertook works to resolve the matter.

Self-notification was also received regarding a leak in the pipework of the leachate collection system. Repairs were undertaken promptly and it was found that the break and leakage was contained within the landfill liner.

Photo 9 Silt in the western tributary below the small eastern silt pond, February 2019

Photo 10 Widening of eastern tributary above wetland polishing area, Jan 2019

Council inspections found that the compositing areas were generally well managed with no dust or odour issues reported relating to these activities. Dust control at the landfill was also adequate to ensure that there were no resultant off site effects. There were two occasions when obstructions were found in the drainage

ditches that are designed to direct stormwater flow to the compost treatment ponds, however no stormwater flows were observed at the times these inspections were undertaken.

3.2 Environmental effects of exercise of consents

Chemical sampling found that there was no evidence of contaminant entering the Manganaha Stream for the landfill and that there were no significant adverse effects occurring in the Puremu Stream during the period under review.

There were a total of three non-compliant results found in relation to discharges to the Puremu Stream authorised by consent 4619: two were exceedances of the faecal coliform count and one was an exceedance of the dissolved iron concentration. Due to the low results for these parameters in the ponds and tributaries in relation to the historical results, it is likely that the faecal coliform and dissolved iron exceedances at the time of the survey undertaken on 12 May 2020 were as a result of contributing off site sources. In the case of the faecal coliform exceedance on 2 June 2020, NPDC undertook measures to reduce the bird life in the ponds and wetland tributaries and will undertake DNA source tracking if the issue reoccurs. It was considered that on this occasion there was likely to have been little, if any adverse environmental effect.

There was also one exceedance of the total manganese limit at the compliance point for discharges authorised by consent 2370 (PMU000110). However, the result obtained for the bioavailable dissolved fraction was less than the ANZECC guideline for the protection of 95% of species. This is the third time in the last three years that the consent limit has been exceeded however, manganese has been monitored at this point only since the 2013-2014 year, and in both cases the following sampling result was compliant (Figure 16). It is therefore too early to confidently comment on whether this is part of an emerging trend of increasing concentrations at this site. There does appear that there may have been a trend of increasing manganese concentration at site PMU000109, which is inside the mixing zone and therefore not a compliance issue. It may however suggest that NPDC may want to investigate this further to ensure continued consent compliance at site PMU000113.

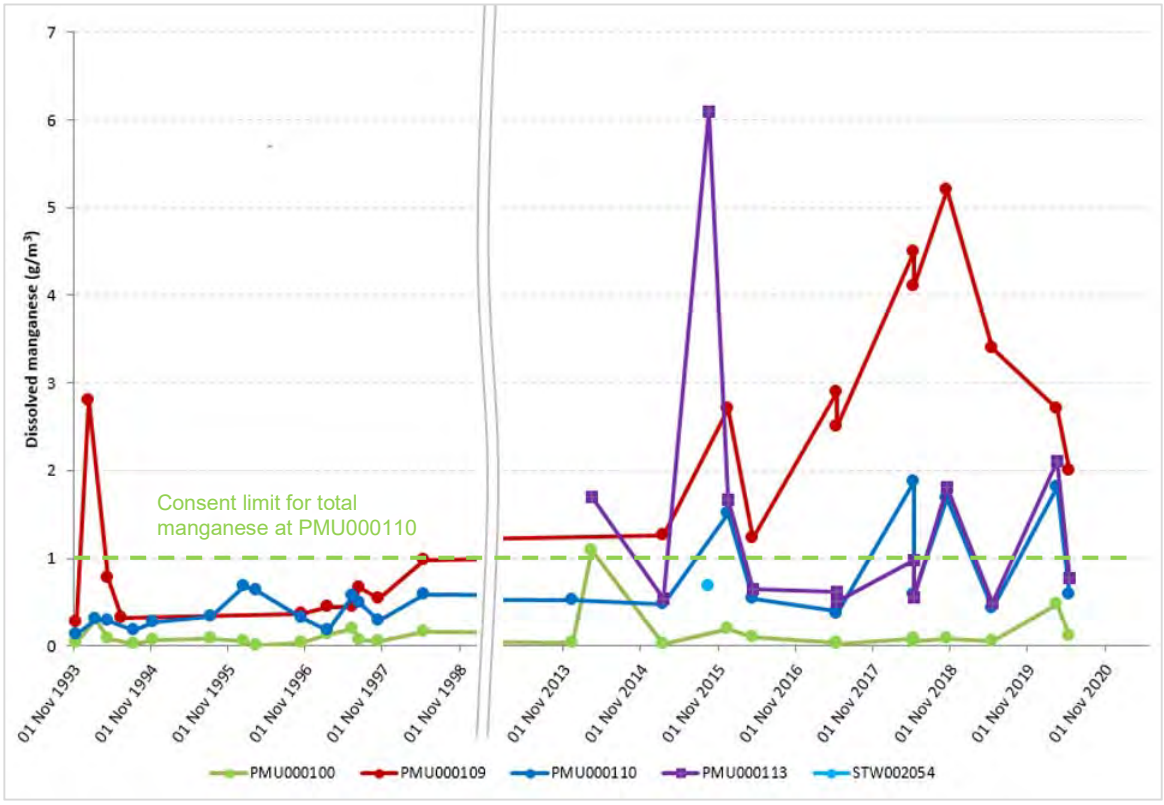

Figure 16 Dissolved manganese concentrations in the wetland polishing area and Puremu Stream

The Manganaha Stream was found not to be affected by discharges from the landfill, and no direct discharges were found to this waterbody during the year under review. Biomonitoring also found that there were no indications of any significant adverse effects on the Manganaha or Puremu Streams from the discharges from the Colson Road landfill at the time of either survey.

Groundwater sampling found that the groundwater in the vicinity of the site was such that no remedial actions, as contained in special condition 5 of consent 4621-1, were required. Groundwater quality remains satisfactory and there is no evidence of significant adverse environmental effects from contamination either in the groundwater or in the under liner drainage system, however increasing trends in chloride and/or nitrate/nitrite nitrogen is observed in some of the bores and in the ammoniacal nitrogen concentration of the under liner drainage (groundwater and springs from under the landfill). In the 2017-2018 Annual Report, it was therefore recommended that NPDC undertake monitoring of additional parameters for at least one sample of the under liner drainage per year, and develop the trigger levels for identifying the levels at which contamination is considered to be occurring, and at which remedial actions are to be undertaken, as per the conditions of consent 4621-1. During the year under review, NPDC commissioned a consultant to conduct a two part desk top study to:

- assess the Stage 3 under liner drainage, and if contamination is confirmed, possible sources of that groundwater contamination; and
- consider the effect of any contamination and options to address it.

The consultant's report covering the first part of this investigation was provided to Council on 21 July 2020 and will be discussed in the 2020-2021 Annual Report.

All ambient deposited particulate levels obtained were below the Council guideline level for dust deposition in residential areas (0.13 g/m^2/day). Therefore, based on the results of the deposition gauge surveys undertaken during the period under review, it is unlikely that landfill is causing off site dust deposition levels that exceed the guideline. Suspended particulate readings also indicate that the landfill is complying with off-site National Environmental Standard for PM_{10}. There were no dust related complaints received by Council during the year under review.

There were no odour complaints received by Council during the year under review in relation to the landfill site.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 22 to Table 29.

Table 22 Summary of performance for diversion consent 0226-1

Purpose*: To divert the Puremu Stream in the Waiwhakaiho catchment by culverting stream to provide road access to refuse tip*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Comply with Water Right 226	Site inspections	Yes
2. Pipe laid in accordance with manufacturer's specifications	Site inspection	Yes
Overall assessment of environmental performance and compliance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

Table 23 Summary of performance for contaminated stormwater and leachate consent 2370-3

Purpose: ***To discharge up to 1,000 m³/day [5 L/s] of leachate and contaminated stormwater from the closed section, Area A, of Colson Road municipal landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Best practice to be adopted	Site inspection	No. Following attempted remediation, cap still needs to be re-contoured and cap thickness addressed. Abatement notice for works by 14 Mar 2021.
2. Consent undertaken in accordance with information supplied in the application	Site inspection and review of documentation on file	No. As per condition 1
3. Discharge not alter colour, clarity or pH of Puremu Stream	Site inspection and water sampling	Yes
4. No significant adverse effects on aquatic life	Site inspection, sampling and biomonitoring	Yes
5. Monitor surface water on/near the site	Undertaken by the Council via site specific monitoring programme, inspections and water sampling	Yes
6. Satisfy all requirements of the District Plan of the New Plymouth District Council	N/A	N/A
7. Management and site contingency plan	Site inspection and review of documentation on file	No. As per condition 1
8. Maintain a landfill capping barrier and vegetative cover	Site inspection (Stages 1 & 2)	No. As per condition 1
9. Area is closed and managed in accordance with the management plan	Site inspection and review of documentation on file	No. As per condition 1
10. Maintain drains, ponds and contours on site to minimise unwanted water movement and ponding on site	Site inspections	No. As per condition 1
11. No cleaning or hosing out of refuse vehicles on site	Site inspections	Yes
12. The mixing zone extends downstream from the culvert outlet to 2 m above the confluence between the Puremu Stream and its tributary	N/A	N/A

Purpose: *To discharge up to 1,000 m³/day [5 L/s] of leachate and contaminated stormwater from the closed section, Area A, of Colson Road municipal landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
13. Discharge shall not alter the Puremu Stream in the way of films, foams or suspended materials, change colour or visibility, objectionable odour, harm aquatic or farm animals, or increase temperature by more than 2.0°C	Site inspection and water sampling	Yes
14. Discharge shall not alter the water quality of the Puremu Stream below the given criteria	Site inspection and water sampling	No. One manganese result above limits
15. Discharge shall not reduce the concentration of dissolved oxygen below 5 mg/litre	Site inspection and water sampling	Yes
16. Discharge shall not render the Puremu Stream unfit for stock consumption	Site inspection and water sampling	Yes
17. Satisfactorily maintain and manage the leachate collection and treatment systems	Site inspection	Yes
18. Optional review provision re environmental effects	No further opportunities to review prior to expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		**Improvement required**
Overall assessment of administrative performance in respect of this consent		**Improvement required**

N/A = not applicable

Table 24 Summary of performance for Consent 4619-1 treated stormwater and leachate discharge

Purpose: *To discharge up to 675 L/s of treated stormwater and minor amounts of leachate from areas B1, B2, C1 and C2 of the Colson Road landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Water quality in the Manganaha Stream shall not be changed	Site inspection and water sampling	Yes

Purpose: *To discharge up to 675 L/s of treated stormwater and minor amounts of leachate from areas B1, B2, C1 and C2 of the Colson Road landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. Water quality of the Puremu Stream shall not exceed the given criteria	Site inspection and water sampling	No. Faecal coliforms was above limits on one sampling occasion. Letter of explanation received and accepted. Dissolved iron was above the limit on one occasion
3. Discharge shall not alter the Puremu Stream in the way of films, foams or suspended materials, change colour or visibility, objectionable odour, harm aquatic or farm animals, or increase temperature by more than 2.0°C	Site inspection and water sampling	Yes
4. Operate according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated August 2019	Yes
5. Maintain and comply with a monitoring programme. Programme to include guidelines for determining if contamination is occurring	Review of documentation on file. Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this
6. Consent will lapse after six years if not exercised	Consent exercised	N/A
7. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		**Good**
Overall assessment of administrative performance in respect of this consent		**Good**

N/A = not applicable

Table 25 Summary of performance for uncontaminated stormwater consent 4620-1

Purpose: ***To discharge up to 675 L/s of uncontaminated stormwater from areas B1, B2, C1 and C2 of the Colson Road landfill into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Water quality in the Manganaha Stream shall not be altered	Inspections and water sampling	Yes
2. Discharge to have pH 6.5-8.5, maximum suspended solids 100 g/m^3, and maximum ammoniacal nitrogen 0.5 g/m^3 as nitrogen	Inspections and water sampling	Not able to assess as discharge is mixed with that of consent 4619
3. No leachate discharge	Sampling and inspection	Yes
4. Channels shall minimise erosion	Site inspections	Yes
5. Channels shall minimise instability of the surrounding land	Site inspections	Yes
6. Repair land eroded/made unstable due to construction/maintenance	Site inspections	Yes
7. Notification of any proposal which may affect areas contributing runoff	Site inspections and liaison with consent holder	Yes
8. Discharge shall not alter the Puremu Stream in the way of films, foams or suspended materials, change colour or visibility, objectionable odour, harm aquatic or farm animals, or increase temperature by more than 2.0°C	Site inspections and water sampling	Not able to assess as discharge is mixed with that of consent 4619
9. No excavation or landfilling if any runoff to Manganaha Stream will contain suspended solids or any other contaminant	Site inspection and water sampling	Yes
10. Operate according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated August 2019. Plan review in progress to accommodate special waste only considerations	Yes
11. Maintain and comply with a monitoring programme	Not assessed during period under review	N/A

Purpose: *To discharge up to 675 L/s of uncontaminated stormwater from areas B1, B2, C1 and C2 of the Colson Road landfill into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
12. Consent will lapse after six years if not exercised	N/A, consent has been exercised	N/A
13. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		**Not assessed**
Overall assessment of administrative performance in respect of this consent		**Not assessed**

N/A = not applicable

Table 26 Summary of performance for discharge to land consent 4621-1

Purpose: *To discharge up to 500 tonnes/day of contaminants onto and into land in areas B1, C1 and C2 at the Colson Road landfill*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Install and maintain groundwater monitoring piezometers	Site inspection and liaison with consent holder	Three bores compromised. Discussions commenced on appropriate replacement bores.
2. Prevent surface runoff into the Manganaha Stream from any area used or previously used for the deposition of refuse	Site inspection and water sampling	Yes
3. All drainage channels, bunds and contouring is complete prior to use	N/A	N/A
4. Civil works relating to construction of Stage 3 be certified by a registered engineer prior to use	N/A	N/A
5. Mitigate if adverse effects on spring and/or groundwater. Criteria to be set out in plan produced under condition 6	Sampling, review of consent holder data. Changes observed in spring water – NPDC's consultant's investigations continuing. No mitigation required at this stage	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this

Purpose: *To discharge up to 500 tonnes/day of contaminants onto and into land in areas B1, C1 and C2 at the Colson Road landfill*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
6. Maintain and comply with a monitoring programme	Review of documentation on file. Monitoring programme is provided in Landfill Management Plan	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this
7. Operate according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated August 2019	Further update to plan required following work to identify criteria (see conditions 5 and 6)
8. Disposal of waste shall comply with the 'criteria for calculating landfill potentials' and the 'Draft Health and Environment Guidelines for selected Timber Treatment Chemicals'	Not assessed during period under review	N/A
9. Consent will lapse after six years if not exercised	N/A, consent exercised	N/A
10. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		**Good**
Overall assessment of administrative performance in respect of this consent		**Good**

N/A = not applicable

Table 27 Summary of performance for composting air consent 4622-1

Purpose: *To discharge emissions into the air from composting and ancillary activities at the Colson Road landfill*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Minimise adverse effects on the environment	Site inspection and liaison with consent holder	Yes
2. No offensive odours	Air surveys	Yes
3. No adverse ecological effects on any ecosystem	Site inspection, sampling, and neighbourhood surveys	Yes

Purpose: *To discharge emissions into the air from composting and ancillary activities at the Colson Road landfill*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
4. Materials accepted for composting comply with the 'Assessment of Discharges to Air' July 1994 and the New Plymouth District Council Colson Road Landfill Management Plan July 1994	Site inspection	Yes
5. All composting to occur at least 300 m from any dwelling existing as of 21 March 1999	Site inspections	Yes
6. Composting piles must consist of no less than 95% plant-derived material	Site inspections and visual assessment	Yes
7. Composting to occur on a trial basis until the consent is approved or reviewed on receipt of a full report	N/A	N/A
8. Consent will lapse after six years if not exercised	N/A, consent has been exercised	N/A
9. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 28 Summary of performance for air discharge consent 4779-1.1

Purpose: *To discharge contaminants into the air associated with operation of the municipal landfill at Colson Road, New Plymouth*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Provision of temperature and feedstock composition data within three months of landfill gas flare operation commencing and annually thereafter	Data provided	Yes
2. Provision of as built plans and suppliers operating instructions within three months of operation of the flare	Data provided	Yes

Purpose: *To discharge contaminants into the air associated with operation of the municipal landfill at Colson Road, New Plymouth*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
3. First revision of the landfill management plan following the installation of the flare is to include specified aspects of the flares operation, monitoring, maintenance and record keeping	Management plan revised, and is supported by a separate flare specific document (SW-G-20)	Yes
4. Best practicable option (BPO) to prevent or minimise adverse effects on the environment	Site inspection, air surveys, complaint response	Yes
5. No offensive odours or dust or noxious concentrations	Site inspection, air surveys, complaint response	Yes
6. No burning on site with the exception of the flare	Site inspection, complaint response	Yes
7. No adverse ecological effects on any ecosystem	Inspections of site and neighbouring areas	Yes
8. No venting untreated landfill gases within 200 m of any boundary	Site inspection	Yes
9. Comply with 'Air Discharge Consent Application Supporting Documentation' and according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994, or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated June 2018. Plan review in progress to accommodate special waste only considerations	Yes
10. Council approval to be sought in the event of alterations at the site or to site operations	Site inspections and liaison with consent holder and site operator	Yes
11. Meet once a year to discuss any matter relating to the consent	Landfill liaison committee meetings	Yes
12. Provide a report within a year on the collection, extraction, venting and combustion of landfill gas	Review of documentation on file. Compliance previously achieved, as report had been received	Yes
13. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
14. Optional review provision re landfill gas combustion	No further opportunity for review prior to consent expiry	N/A

Purpose: *To discharge contaminants into the air associated with operation of the municipal landfill at Colson Road, New Plymouth*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of environmental performance and compliance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = Not applicable

Table 29 Summary of performance for earthworks stormwater consent 6177-1

Purpose*: To discharge stormwater (due to earthworks in providing an area for Stage 3 of the municipal landfill) onto land and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Discharge quality within specified parameters	Site inspection and sampling	Not able to assess as discharge is mixed with that of consent 4619
2. No leachate discharged	Site inspection	Yes
3. Maintenance of drains to prevent erosion and sedimentation	Site inspections	Yes
4. No conspicuous effect on clarity or colour of receiving waters	Site inspection and sampling	Yes
5. No significant effect on aquatic life	Site inspection, sampling and biomonitoring	Yes
6. Monitoring to satisfaction of the Council	Site inspection, sampling and data review	Yes
7. Preparation and maintenance of management and site contingency plans	Review of Council records and liaison with consent holder	Yes
8. Sediment and erosion management plan	Not assessed during year under review	Plans previously provided
9. Adopt best practice	Site inspection and liaison with content holder	Yes
10. Rehabilitation of disturbed areas	Site inspection	Yes
11. Maintain stormwater system to prevent ponding and overland flow	Site inspection	Yes
12. Receiving waters not adversely affected	Site inspection, sampling and biomonitoring	Yes
13. Provision for review	Consent expired. Renewal application received	N/A

Purpose: *To discharge stormwater (due to earthworks in providing an area for Stage 3 of the municipal landfill) onto land and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of environmental performance and compliance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = Not applicable

Table 30 Summary of performance for earthworks stormwater consent 10804-1.0 (from 7 February 2020)

Purpose: *To discharge stormwater and sediment arising from earthworks into an unnamed tributary of the Puremu Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Consent to be exercised in accordance with application	Site inspection	Yes
2. Adopt best practice	Site inspection	Yes
3. Notification of commencement required	Review of Council records	Yes
4. Site and stormwater to be managed as per NPDC Soil Erosion and Sediment Control Plan	Site inspection	Yes
5. Requirements of Condition 4 and control measures cease only after suitable stabilisation has been established	Site inspection	Yes
6. On site meeting required prior to exercise of consent	Site inspection	Yes
7. Sediment control measures to be installed prior to works other than construction of sediment control pond	Site inspection	Yes
8. Stabilisation required as soon as is practicable, but no longer than 6 month post completion of earthworks	No areas needing stabilisation	N/A
9. Suspended solids limit of 100 g/m^3 from "large silt pond"	Visual assessment at inspection and sampling	Yes
10. Provision for review	Next opportunity to review June 2022	N/A

Purpose: *To discharge stormwater and sediment arising from earthworks into an unnamed tributary of the Puremu Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of environmental performance and compliance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = Not applicable

Overall, NPDC demonstrated a good level of environmental performance, however an improvement is required in their administrative performance and compliance with the resource consents as defined in Section 1.1.4. During the year under review there were on-going, and still unresolved, issues with the compliance of the cap on Stage 2, with an abatement notice in place requiring the works to be undertaken by 14 March 2021. Although there may be some changes occurring in the receiving water quality below this area with regard to the manganese concentration, with one consent non-compliance recorded, it is not considered to be a significant adverse effect at this point in time. Biomonitoring found that there were effects on the macroinvertebrate communities inside the mixing zone as a result of the discharge of sediment from the site. There were also effects found at the compliance point, however there are other potential contributing sources at this location, so this could not be attributed to the landfill discharges. During the year under review, a consultant evaluated the areas of exposed soil and control measures in place. Recommendations were made to improve the erosion and sediment control measures at the site. NPDC is acting on these recommendations. NPDC's monitoring results provided to the Council indicates that there may be emerging contaminants in the spring/groundwater collected by the under liner drainage system. NPDC engaged a consultant during the year under review to further analyse the data and will subsequently investigate the potential implications of changes identified, if any and develop guidelines for assessing if contamination is occurring.

Table 31 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement required	Poor
2012-13	0226-1, 2370-3, 4622-1, 4779-1	4	-	-	-
	6177-1	-	1	-	-
	4619-1, 4620-1, 4621-1	-	-	3	-
2013-14	0226-1, 4779-1, 4620-1, 4619-1, 2370-3, 4622-1, 4621-1, 6177-1	8	-	-	-
2014-15	0226-1, 2370-3, 4619-1, 4622-1	4	-	-	-
	4620-1, 4621-1, 6177-1	-	3	-	-
	4779-1	-	-	1	-
2015-16	0226-1, 4622-1, 6177-1	3	-	-	-
	2370-3	-	1	-	-
	4619-1, 4620-1, 4621-1	-	-	3	-
	4779-1	-	-	-	1
2016-17	0226-1, 4620-1, 4621-1, 4622-1, 6177-1	5	-	-	-

Year	Consent no	High	Good	Improvement required	Poor
	2370-3, 4619-1, 4779-1 (4779-1.1)	-	3	-	-
2017-18	0226-1, 4622-1, 4779-1, 6177-1	4	-	-	-
	4619-1, 4620-1, 4621-1	-	3	-	-
	2370-3	-	-	1	-
2018-19	0226-1, 4620-1, 4622-1, 4779-1.1, 6177-1, 10804-1.0	6	-	-	-
	4619-1, 4621-1	-	2	-	-
	2370-3	-	-	1	-
Totals		34	13	9	1

3.4 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the Colson Road regional landfill in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consent 2370-3 in June 2020, as set out in condition 18 of the consent, not be exercised, on the grounds that the conditions are adequate to deal with any adverse effects on the environment.
4. THAT, given the changes in the ammoniacal nitrogen concentration of the under liner drainage, NPDC widen the range of parameters determined to those given in Table 8-1 of the Technical Guidelines for Disposal to Land (WasteMINZ, 2018) on at least one occasion annually.
5. THAT the NPDC review the Landfill Management Plan to ensure that the criteria for determining whether any contamination is occurring that is greater than the natural variation be included along with measure to be taken remedy, mitigate or if practicable prevent continuation of any effect on the groundwater quality as per conditions 5, 6 and 7 of consent 4621-1.

Recommendations one and three were implemented by Council. Recommendation two did not require implementation. Recommendation four was implemented by NPDC with the results provided to Council. Work commenced by NPDC on the implementation of recommendations five, with the engagement of a consultant to undertake this work. Part 1 of the scope of work was undertaken during the year under review, with the report provided to Council on 21 July 2020. This is scheduled to continue during the 2020-2021 year.

3.5 Alterations to monitoring programmes for 2020-2021

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

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;

- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

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

It is proposed that for 2020-2021 the Council's monitoring of discharges from the Colson Road regional landfill remains unchanged from that of 2019-2020.

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 2020-2021.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at the Colson Road regional landfill in the 2020-2021 year be amended from that of 2019-2020 by the inclusion of total and dissolved manganese determination for the stormwater samples collected during the dry weather surveys.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the NPDC complete the investigations and review of the Landfill Management Plan to ensure that the criteria for determining whether any contamination is occurring that is greater than the natural variation be included along with measure to be taken remedy, mitigate or if practicable prevent continuation of any effect on the groundwater quality as per conditions 5, 6 and 7 of consent 4621-1, and guidelines for determining contamination is occurring as per condition 5 of consent 4619-1, are included in the plan.
4. THAT NPDC replace compromised bores GND0251 (L2), GND0255 (L8) and GND1300 (AH3).

Glossary of common terms and abbreviations

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

Al*	Aluminium.
As*	Arsenic.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Condy	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
Cu*	Copper.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	*Escherichia coli,* an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
F	Fluoride.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
fresh	Elevated flow in a stream, such as after heavy rainfall.
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.
HDPE	High density polyethylene.
L/s	Litres per second.
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.
LFG	Landfill gas, a complex mixture of gaseous components produced as the refuse decomposes.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
Moxie	A large earthmoving truck.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NLG	Neighbourhood liaison group.
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM_{10}	Relatively fine airborne particles (less than 10 micrometre diameter).
ppm	Parts per million on a volume/volume basis.
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 subsequent amendments.
SS	Suspended solids.
SVOC	Semi-volatile organic compounds
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
Zn*	Zinc.

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

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

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Taranaki Regional Council (2020): New Plymouth District Council - Colson Road Landfill Monitoring Programme Annual Report 2018-19. Technical Report 2019-45.

Thomas, B and Clements, K (2019): Biomonitoring of the Puremu and Manganaha streams in relation to the New Plymouth District Council Colson Road landfill, October 2018 (BT091). June 2019.

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Waste Management Institute of New Zealand (WasteMINZ)(2018): Technical Guidelines for Disposal to Land,. August 2018.

Zieltjes, B (2020): Biomonitoring of the Puremu and Manganaha streams in relation to the New Plymouth District Council Colson Road landfill, March 2020 (BZ128). July 2020.

Appendix I

Resource consents held by NPDC

(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.

TRK750226

WATER PERMIT

Pursuant to the RESOURCE MANAGEMENT ACT 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of NEW PLYMOUTH DISTRICT COUNCIL
Consent Holder: PRIVATE BAG 2025 NEW PLYMOUTH

Change to
Conditions Date: 8 October 1986

CONDITIONS OF CONSENT

Consent Granted: TO DIVERT THE PUREMU STREAM A TRIBUTARY OF THE MANGAONE STREAM IN THE WAIWHAKAIHO CATCHMENT BY CULVERTING THE STREAM TO PROVIDE ROAD ACCESS TO THE REFUSE TIP AT OR ABOUT GR: P19:070-380

Expiry Date: 1 October 2026 [as per section 386(2) of the Resource Management Act 1991]
[originally granted 2 April 1975 under the Water and Soil Conservation Act 1967 `at the pleasure of the Commission']

Site Location: COLSON ROAD NEW PLYMOUTH

Legal Description: SEC 223 HUA DIST BK VI PARITUTU SD

Catchment: WAIWHAKAIHO 392.000

Tributary: MANGAONE 392.010
PUREMU 392.012

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

TRK750226

Conditions of right

(a)The Commission may prescribe the method of management of this right, including the limitation of periods during which the right may be fully exercised, if a water shortage or other abnormal circumstances occur in the locality.

(b)This right may be operated only by the person holding the right or his agent and only for the purpose stated in the right.

(c)The right may, with the consent of the Commission in writing, be transferred to a new owner or occupier of the property to which the right relates, but only on the same conditions as contained in this right.

(d)The conditions relating to this right cannot be varied without the prior consent in writing of the Commission.

(e)This right is not a guarantee that the quantity and quality of water specified will be available.

(f)Unless specifically authorised by this right the discharge of water or waste containing pollutants into natural water is not permitted.

(g)This right is not an authority to obtain access to a source of water or a point of discharge.

(h)The grantee of the right shall keep such records as may reasonably be required by the Commission and shall if so requested supply this information to the Commission.

(i)This right may be cancelled by the Commission, or Commission may take such other action as the Act provides, if the right is not exercised within 12 months of its granting or such longer time as the Commission may approve.

(j)This right may be cancelled by the Commission if in the opinion of the Commission it is not diligently and beneficially exercised.

(k)This right is granted subject to the Commission or its servants or agents being permitted access at all reasonable times for the purpose of carrying out inspections and measurements.

(l)The design and maintenance of any works relating to the right must be to a standard adequate to meet the conditions of the right so that neither the works nor the exercise of the right is likely to cause damage to any property or injury to any person.

(m)Should the grantee in the opinion of the Commission commit any breach of the right or its conditions the Commission may cancel the right.

(n)This right is granted, subject to the Commission retaining the right to review the terms and conditions attached hereto including the period of the right at intervals of not less than five [5] years.

(o)This right will expire upon the date shown overleaf or upon 14 days notice, whichsoever comes sooner.

(p)The cost of supervision of this right, including water sampling deemed necessary by the Commission shall be carried by the grantee.

(q)The final drawings of the culvert are to be submitted to the Commission for approval before work is commenced.

TRK750226

VARIATION OF 14 MAY 1986:

Additional General Conditions

(a)The grantee shall provide to the Manager, Taranaki Catchment Commission, on request plans, specifications and maintenance programmes of works associated with the exercise of this right, showing that the conditions of this right are able to be met.

(b)The standards, techniques and frequency of monitoring of this right shall be to the specific approval of the Manager, Taranaki Catchment Commission.

(c)The actual and reasonable cost of administration supervision and monitoring of this right, deemed necessary by the Manager, Taranaki Catchment Commission, shall be met by the grantee.

(d)This right may be cancelled in writing to the grantee by the Commission if the right is not exercised within twelve months of the date of grant of such longer time as the Manager, Taranaki Catchment Commission, may approve.

(e)This right may be terminated by the Commission upon not less than six months notice in writing to the grantee if, in the opinion of the Commission, the public interest so requires, but without prejudice to the grantee to apply for a further right in respect of the same matter.

Additional Special Conditions

1)The terms and conditions pertaining to Water Right 226 shall apply.

2)**[Note: Condition 2 was subsequently deleted as per variation of 8 October 1986.]**

3)The new 900 mm pipe shall be laid in accordance with the manufacturers specifications.

VARIATION OF 8 OCTOBER 1986:

Deletion of special condition 2.

Signed at Stratford on 8 October 1986

For and on behalf of
TARANAKI REGIONAL COUNCIL

_____
OPERATIONS MANAGER

Discharge Permit

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

Name of Consent Holder:	New Plymouth District Council Private Bag 2025 NEW PLYMOUTH
Review Completed Date:	20 July 2004 [Granted: 19 March 2003]

Conditions of Consent

Consent Granted:	To discharge up to 1000 cubic metres/day [5 litres/second] of leachate and contaminated stormwater from the closed section, Area A, of Colson Road municipal landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment at or about GR: P19:074-372
Expiry Date:	1 June 2026
Review Date(s):	June 2004, June 2006, June 2008, June 2014, June 2020
Site Location:	Colson Road Landfill, Colson Road, New Plymouth
Legal Description:	Sec 223 Hua Dist Blk VI Paritutu SD
Catchment:	Waiwhakaiho
Tributary:	Mangaone Puremu

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

   i) the administration, monitoring and supervision of this consent; and
   ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of applications 87/228, 92/205 and 1664. In the case of any contradiction between the documentation submitted in support of applications 87/228, 92/205 and 1664 and the conditions of this consent, the conditions of this consent shall prevail.

3. Any discharge shall not alter to a conspicuous extent the natural colour, clarity or pH of the receiving water, nor shall it contain visible oil or grease, nor shall it emit objectionable odours, nor shall it increase the temperature of the Puremu Stream by more than 2.0°C.

4. There shall be no significant adverse impact upon natural aquatic life downstream of the landfill as a result of the exercise of this consent.

5. Monitoring of surface waters and groundwater on or in the vicinity of the site shall be undertaken to the satisfaction of the Chief Executive, Taranaki Regional Council.

6. The consent holder shall satisfy all relevant requirements, obligations and duties of the Proposed District Plan of the New Plymouth District Council.

7. The consent holder shall prepare, maintain and comply with a site management plan to the approval of the Chief Executive, Taranaki Regional Council.

8. The consent holder shall maintain an adequate landfill capping barrier and vegetative cover on the site to the satisfaction of the Chief Executive, Taranaki Regional Council.

9. The consent holder shall ensure that the area to which this consent is attributed is closed and subsequently managed in accordance with the Colson Road Regional Landfill Management Plan provided June 2004 or as subsequently amended provided that subsequent amendments do not reduce the level of environmental protection set out in the June 2004 plan.

10. The consent holder shall maintain stormwater drains, sediment detention ponds, and/or ground contours at the site, in order to minimise stormwater movement across, or ponding on the site.

11. The consent holder shall ensure that there shall be no cleaning or hosing out of refuse-containing vehicles at the site.

12. The mixing zone in each condition of this consent shall extend for a distance downstream of the point of the culvert outlet of the Puremu Stream to 2 metres above the confluence of the unnamed tributary of the Puremu Stream and the Puremu Stream at the site's legal boundary.

13. After allowing for reasonable mixing the consent holder shall ensure that the discharge shall not give rise to any of the following effects in the receiving waters of the Puremu Stream:

    a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;
    b) any conspicuous change in colour or visual clarity;
    c) any emission of objectionable odour;
    d) the rendering of fresh water unsuitable for consumption by farm animals;
    e) any significant adverse effects on aquatic life.
    f) an increase in the temperature of the Puremu Stream by more than 2.0° Celsius

14. The discharge shall not be shown to reduce the quality of the Puremu Stream at or beyond the mixing zone below the following criteria:

constituent	**maximum concentration or level**	
aluminium	5.0	mg/l
arsenic	0.1	mg/l
beryllium	0.1	mg/l
boron	0.5	mg/l
cadmium	0.01	mg/l
chromium	0.1	mg/l
cobalt	0.05	mg/l
copper	0.2	mg/l
fluoride	1.0	mg/l
iron	5.0	mg/l
lead	0.1	mg/l
manganese	1.0	mg/l
nitrate + nitrite (NO_3-N + NO_2-N)	100	mg/l
nitrite -N	5.0	mg/l
selenium	0.02	mg/l
vanadium	0.1	mg/l
zinc	2.0	mg/l
ammoniacal nitrogen	2.5	mg/l
pH	6.5 - 8.5	
sulphate	500	mg/l

Note: levels of trace metals expressed as total recoverable metals

15. The discharge shall not be shown to reduce the concentration of dissolved oxygen in the Puremu Stream below 5 mg/litre, beyond the mixing zone specified in special condition 12 above.

16. The discharge shall not, in the opinion of the Chief Executive, Taranaki Regional Council, contain substances or constituents other than those listed in condition 14, nor pathogenic organisms, which would render the water of the Puremu Stream, beyond the mixing zone specified in condition 12 above, unpalatable or unfit for stock consumption purposes.

17. The maintenance, management and operation of the leachate and collection and treatment systems shall be to the satisfaction of the Chief Executive, Taranaki Regional Council, to ensure that the conditions attached to this consent can be met.

18. 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 2004 and/or June 2006 and/or June 2008 and/or June 2014 and/or June 2020, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 20 July 2004

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

TRK994619

DISCHARGE PERMIT

Pursuant to the RESOURCE MANAGEMENT ACT 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	NEW PLYMOUTH DISTRICT COUNCIL PRIVATE BAG 2025 NEW PLYMOUTH
Consent Granted Date:	21 March 1999

CONDITIONS OF CONSENT

Consent Granted:	TO DISCHARGE UP TO A MAXIMUM OF 675 LITRES/SECOND OF TREATED STORMWATER AND MINOR AMOUNTS OF LEACHATE FROM AREAS B1, B2, C1 AND C2 OF THE COLSON ROAD LANDFILL TO GROUNDWATER IN THE VICINITY OF AND INTO THE PUREMU STREAM A TRIBUTARY OF THE MANGAONE STREAM IN THE WAIWHAKAIHO CATCHMENT AT OR ABOUT GR: P19:074-372
Expiry Date:	1 June 2025
Review Date[s]:	June 2006, June 2012, June 2018 and/or within six months of the first exercise of this consent
Site Location:	COLSON ROAD LANDFILL, COLSON ROAD, NEW PLYMOUTH
Legal Description:	SEC 223 HUA DIST BLK VI PARITUTU SD
Catchment:	WAIWHAKAIHO 392.000
Tributary:	MANGAONE 392.010 PUREMU 392.012

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

TRK994619

General conditions

a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the water quality in the Manganaha Stream above its confluence with the Mangaone Stream shall not be changed as a result of this discharge.

2. THAT the exercise of this consent shall not cause the water quality of the Puremu Stream at the northern boundary of the site to exceed the following criteria:

Component	**Criteria**
pH	range within 6.5-8.5
Dissolved oxygen	maximum reduction of 1.0 gm^{-3} in the upstream dissolved oxygen concentration
Ammoniacal nitrogen	2.0 gm^{-3} for pH below 7.75 1.3 gm^{-3} for pH between 7.75-8.00 1.0 gm^{-3} for pH between 8.00-8.50
Nitrate	10 gm^{-3} as nitrogen
Nitrite	0.06 gm^{-3} as nitrogen
Faecal coliforms	1000/100 mL
Sulphate	1000 gm^{-3}
Oil and grease	10 gm^{-3}
Suspended solids maximum permitted increase in instream concentration	
[dry weather conditions]	10 gm^{-3}
[wet weather conditions]	10% of upstream concentration

	Maximum instream concentration Total Recoverable Metals gm^{-3}	Maximum permitted increase in concentration Filtered Metals gm^{-3}
Aluminium	5.0	0.1
Arsenic	0.2	0.05
Beryllium	0.1	n/a
Boron	5.0	n/a
Cadmium	0.05	0.001
Chromium	1.0	0.02
Cobalt	1.0	n/a
Copper	0.5	0.002
Iron	10.0	0.3
Lead	0.1	0.002
Manganese	5.0	n/a
Selenium	0.05	0.001
Vanadium	0.1	n/a
Zinc	2.4	0.03

3. THAT the discharge authorised by this consent, in conjunction with the exercise of any other consent associated with the landfill property, shall not give rise to any of the following effects in the Puremu Stream at the northern boundary of the site:

   a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials [other than storm debris and suspended solids as permitted under condition 2 above];
   b) any conspicuous change in the colour or visual clarity;
   c) any emission of objectionable odour;
   d) the rendering of fresh water unsuitable for consumption by farm animals;
   e) any significant adverse effects on aquatic life.

4. THAT this consent shall be exercised in a manner conforming with the relevant requirements of the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan 1994', or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council.

5. THAT the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the General Manager, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.

6. THAT this consent shall lapse on the expiry of six years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional

Council fixes a longer period pursuant to section 125(b) of the Resource Management Act 1991.

7. THAT pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2012, June 2018 and/or within six months of the first exercise of this consent, to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 21 March 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

_____
GENERAL MANAGER

TRK994620

DISCHARGE PERMIT

Pursuant to the RESOURCE MANAGEMENT ACT 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	NEW PLYMOUTH DISTRICT COUNCIL PRIVATE BAG 2025 NEW PLYMOUTH
Consent Granted Date:	21 March 1999

CONDITIONS OF CONSENT

Consent Granted:	TO DISCHARGE UP TO 675 LITRES/SECOND OF UNCONTAMINATED STORMWATER FROM AREAS B1 B2 C1 AND C2 OF THE COLSON ROAD LANDFILL INTO THE PUREMU STREAM A TRIBUTARY OF THE MANGAONE STREAM IN THE WAIWHAKAIHO CATCHMENT AT OR ABOUT GR: P19:074-372
Expiry Date:	1 June 2025
Review Date[s]:	June 2006, June 2012, June 2018 and/or within six months of the first exercise of this consent
Site Location:	COLSON ROAD LANDFILL, COLSON ROAD, NEW PLYMOUTH
Legal Description:	SEC 223 HUA DIST BLK VI PARITUTU SD

Catchment:	WAIWHAKAIHO	392.000
Tributary:	MANGAONE	392.010
	PUREMU	392.012

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

TRK994620

General conditions

a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the water quality in the Manganaha Stream above its confluence with the Mangaone Stream shall not be changed as a result of this discharge.

2. THAT the water quality of uncontaminated stormwater discharged to the Puremu Stream shall meet the following criteria:

pH	6.5-8.5
suspended solids	maximum concentration of 100 gm^{-3}
ammoniacal nitrogen	maximum concentration of 0.5 gm^{-3} as nitrogen

3. THAT no leachate discharge shall be permitted by the exercise of this consent.

4. THAT all stormwater diversion and containment channels shall be designed, constructed and maintained so as to prevent or minimise erosion of the channel in all circumstances.

5. THAT the earthworks and construction associated with the landfill and the composting site and the stormwater diversion and containment channels shall be designed, constructed and maintained so as to minimise instability of the surrounding land.

6. THAT the consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the diversion channels or landfilling operations or composting site associated with the exercise of this consent.

7. THAT the consent holder shall notify the General Manager, Taranaki Regional Council, of any proposal which may alter or affect the areas contributing runoff insofar as may affect the exercise of this consent, other than as advised to the Taranaki Regional Council in the application for this consent, at least two months prior to commencing any such works. The consent holder shall obtain any necessary approvals under the Resource Management Act 1991 prior to commencing any such works.

8. THAT the discharge authorised by this consent, in conjunction with the exercise of any other consent associated with the landfill property, shall not give rise to any of the following effects in the Puremu Stream at the northern boundary of the site:

    a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials [other than storm debris and suspended solids as permitted under condition 2 above];
    b) any conspicuous change in the colour or visual clarity;
    c) any emission of objectionable odour;
    d) the rendering of fresh water unsuitable for consumption by farm animals;
    e) any significant adverse effects on aquatic life, including but not limited to, freshwater fish, eels and watercress.

9. THAT there shall be no excavation or earthworks or other landfilling-related activities or composting activities in any area if any runoff of water containing suspended solids or any other contaminant arising from such activities might by reason of land topography or engineered works enter the Manganaha Stream, and in the event of any runoff water entering the Manganaha Stream contrary to this consent the consent holder shall immediately undertake such works as may be necessary to cease the discharge and to prevent a recurrence.

10. THAT this consent shall be exercised in a manner conforming with the relevant requirements of the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council.

11. THAT the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the General Manager, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.

12. THAT this consent shall lapse on the expiry of six years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(b) of the Resource Management Act 1991.

13. THAT pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2012, June 2018 and/or within six months of the first exercise of this consent, for the purpose of reviewing the best practicable option or options available to reduce or remove any adverse effects on the environment, or to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 21 March 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

_____

GENERAL MANAGER

Discharge Permit

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

Name of Consent Holder:	New Plymouth District Council Private Bag 2025 NEW PLYMOUTH 4342
Change To Conditions Date:	19 January 2010 [Granted: 21 March 1999]

Conditions of Consent

Consent Granted:	To discharge up to 500 tonnes/day of contaminants onto and into land in areas B1, C1 and C2 at the Colson Road landfill at or about (NZTM) 1697313E-5675450N
Expiry Date:	1 June 2025
Review Date(s):	June 2012, June 2018
Site Location:	Colson Road Landfill, Colson Road, New Plymouth
Legal Description:	Sec 223 Hua Dist Blk VI Paritutu SD
Catchment:	Waiwhakaiho
Tributary:	Puremu

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the consent holder shall install and maintain to the satisfaction of the Chief Executive, Taranaki Regional Council, a further groundwater monitoring piezometer approximately equidistant between the bores designated as AH9 and L2, and shall maintain to the satisfaction of the Chief Executive, Taranaki Regional Council, groundwater monitoring piezometers and bores at the sites designated as WQA, WQB and WQC, as AH1, AH2, AH3, AH5, AH6, AH7, and as L1, L2, L5, L7 and L8. [Bore designations are those in Appendix A2, Figure 1, in the Assessment of Effects on the Environment prepared by Woodward-Clyde for New Plymouth District Council, July 1994].

2. THAT the consent holder shall prevent surface runoff of water or contaminants to the Manganaha Stream from any surface area being used or previously used for the deposition of refuse, or for extraction of soil, clay, or other cover material, or prepared for the deposition of refuse, unless such surface area has been covered and rehabilitated to the satisfaction of the Chief Executive, Taranaki Regional Council.

3. THAT prior to commencing any use of any part of Area B, C1 or C2 for the deposition of refuse or for composting activities, the consent holder shall demonstrate to the satisfaction of the Chief Executive, Taranaki Regional Council, that drainage channels, bunds, surface contouring, or other engineering and landscaping works associated with an Area or part of an Area have been undertaken and completed to the extent that compliance with condition 2 above will be achieved.

4. THAT the construction, installation, placement, integrity and performance of groundwater drainage systems, landfill lining systems, and leachate interception, collection, holding, recirculation, and discharge systems in any part of Areas B1, B2, C1 and C2 of the Colson Road Landfill as described in the 'Colson Road Landfill Assessment of Effects on the Environment' July 1994 and the 'New Plymouth District Council Colson Road Landfill Management Plan' July 1994 be certified by a registered engineer prior to any discharge of solid wastes in such part of those areas.

5. THAT should groundwater quality be significantly affected by activities or processes associated with the landfill or composting, then the consent holder shall implement such measures as are necessary to remedy or mitigate and if practicable to prevent the continuation of any effect upon quality of the groundwater. 'Significantly affected' for the purposes of this condition is defined as a change greater than the maximum natural variation in any parameter for water in any piezometer, bore, or spring, and the criteria for this shall be set out in the monitoring programme under condition 6.

6. THAT the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the Chief Executive, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.

7. THAT the disposal of wastes shall be carried out in a manner conforming with the relevant requirements of the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the Chief Executive, Taranaki Regional Council.

8. THAT the acceptance and disposal of waste types at the landfill for disposal shall conform to Section 2.5, Section 5.6 and Appendix E [or their equivalent] of the Landfill Management Plan referred to in condition 7 above, and in particular shall conform to the following:

    Table 11.2 'Criteria for calculating landfill potentials' Hazardous Waste Management Handbook, Ministry for the Environment, 1994;

    and

    Chapter 5 of the 'Draft Health and Environmental Guidelines for Selected Timber Treatment Chemicals', Ministry for the Environment / Ministry of Health, September 1993, in compliance with the requirement for a Class 2 landfill.

9. THAT this consent shall lapse on the expiry of six years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(b) of the Resource Management Act 1991.

10. THAT pursuant to section 128(1) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2102, June 2018 and/or within six months of the first exercise of this consent, to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 19 January 2010

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

TRK994622

TARANAKI REGIONAL COUNCIL

PRIVATE BAG 713
47 CLOTON ROAD
STRATFORD
NEW ZEALAND
PHONE 0-6-765 7127
FAX 0-6-765 5097

DISCHARGE PERMIT

Pursuant to the RESOURCE MANAGEMENT ACT 1991 a resource consent is hereby granted by the Taranaki Regional Council

Name of Consent Holder:	NEW PLYMOUTH DISTRICT COUNCIL PRIVATE BAG 2025 NEW PLYMOUTH
Consent Granted Date:	21 March 1999

CONDITIONS OF CONSENT

Consent Granted:	TO DISCHARGE EMISSIONS INTO THE AIR FROM COMPOSTING AND ANCILLARY ACTIVITIES AT THE COLSON ROAD LANDFILL AT OR ABOUT GR: P19:074-372
Expiry Date:	1 June 2025
Review Date[s]:	June 2006, June 2012 and June 2018
Site Location:	COLSON ROAD LANDFILL, COLSON ROAD, NEW PLYMOUTH
Legal Description:	SEC 223 HUA DIST BLK VI PARITUTU SD

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

TRK994622

General conditions

a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the consent holder shall at all times adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the composting operation. 'Best practicable option' [as defined in section 2 of the Act] shall be determined by the Taranaki Regional Council, following review of the conditions of this consent as set out under condition 9 of this consent.

2. THAT the discharge of contaminants into the air from the composting operation shall not result in offensive or objectionable odours or dust or dangerous or noxious ambient concentrations of any airborne contaminant in the opinion of an enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the site.

3. THAT the discharges authorised by this consent shall not give rise to any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna.

4. THAT the nature of materials accepted for composting and the operation of the composting activities shall give effect to the 'Assessment of Discharges to Air' July 1994, prepared for the New Plymouth District Council by Woodward-Clyde [in particular, but not exclusively, section 2.2.2] and the New Plymouth District Council Colson Road Landfill Management Plan July 1994 [in particular, but not exclusively, section 5.9.6 and Figure 1 of Appendix A] or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council.

5. THAT any composting pile or windrow shall be located at least 300 metres from any dwellinghouse existing as of 21 March 1999.

6. THAT the maximum proportion of a composting windrow or pile comprising other than plant-derived material shall not exceed 5% by weight.

7. THAT the composting operation shall initially be undertaken on a trial basis. After at least six, but not more than nine, months of operation, the consent holder shall report to the Taranaki Regional Council on trial, noting particularly the results of operation and effects-based monitoring, and recording any complaints received about odour from composting. Upon receipt of that report, the Taranaki Regional Council may either approve the continuation of composting, or require a review of this consent pursuant to section 128(1)(a) of the Resource Management Act 1991.

TRK994622

8. THAT this consent shall lapse on the expiry of six years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(b) of the Resource Management Act 1991.

9. THAT pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2012, June 2018, for the purpose of reviewing the best practicable option or options available to reduce or remove any adverse effects on the environment, or to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 21 March 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

GENERAL MANAGER

Discharge Permit

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

Name of Consent Holder:	New Plymouth District Council Private Bag 2025 New Plymouth 4342
Decision Date (Change):	24 January 2017
Commencement Date (Change):	24 January 2017 (Granted Date: 21 March 1999)

Conditions of Consent

Consent Granted:	To discharge contaminants into the air associated with operation of the municipal landfill at Colson Road, New Plymouth
Expiry Date:	1 June 2025
Review Date(s):	June 2018 and in accordance with special condition 14
Site Location:	Colson Road, New Plymouth
Grid Reference (NZTM)	1697239E-5676071N (approx. centre of landfill) 1697127E-5676249N (approx. location of flare)

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. Within 3 months of the first operation of any landfill gas flare, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a measurement of the temperature of the flare together with a measurement of the concentrations of methane and of hydrogen sulphide in the flare feedstock. Thereafter the consent holder shall annually provide updated information on flare temperature and feedstock composition.

2. Within 3 months of the first operation of any landfill gas flare, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a copy of 'as built' drawings for the flare, including a figure to scale showing the location of the flare relative to the boundaries of the landfill property, and a copy of the supplier's or manufacturer's operating instructions.

3. The first revision of the landfill plan, described in condition 9(c) following installation of any landfill gas flare shall describe, variously, methods of, schedules for, and/or the recording of: observations and inspections of the flare, its operation, and its effects, including downwind odour and smoke plume details; a calibration schedule; records of maintenance; and any complaints. Information gathered under these provisions shall be made available to the Chief Executive, Taranaki Regional Council upon request.

4. That the consent holder shall at all times adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the landfill operation. 'Best practicable option' [as defined in section 2 of the Act] shall be determined by the Taranaki Regional Council, following review of the conditions of this consent as set out under conditions 13 and 14 of this consent and having regard to the requirements of condition 9 of this consent.

5. That the discharge of contaminants into the air from the landfill operation shall not result in any of the following – offensive or objectionable odours; offensive or objectionable dust; or dangerous or noxious ambient concentrations of any airborne contaminant -- as determined by at least one enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the site.

6. That no material is to be burnt at the landfill site with the exception of landfill gas in a flare.

7. That the discharges authorised by this consent shall not give rise to any significant adverse ecological effects on any ecosystem, including but not limited to, habitats, plants, animals, microflora and microfauna.

8. That no extraction venting of untreated landfill gases be located closer than 200 metres to any boundary of the landfill property site.

9. That the operation of the landfill shall give effect to:

   (a) the 'Air Discharge Consent Application Supporting Documentation' July 1995, prepared for the New Plymouth District Council by Woodward Clyde;
   (b) *Variation to Air Discharge Consent – Colson Road Landfill*, prepared by Tonkin & Taylor Ltd and dated December 2016; and
   (c) the New Plymouth District Council Colson Road Landfill Management Plan July 1994 or any subsequent version of that document which does not lessen the standard of environmental protection afforded by that document. The management plan shall be updated at not greater than yearly intervals, to the satisfaction of the Chief Executive, Taranaki Regional Council.

10. That prior to undertaking any alteration to the site or site operations other than as specified and discussed in the application and supporting documentation lodged with the Taranaki Regional Council for this consent, and any subsequent application to change the conditions of this consent, which may significantly alter the nature or quantities of contaminants discharged from the site into the air, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.

11. That the consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least once per year, with the submitters to the consent, and any other interested party at the discretion of the Chief Executive, Taranaki Regional Council, to discuss any matter relating to the exercise of this consent, and in order to facilitate ongoing consultation.

12. That the consent holder shall, within one year of the commencement of this consent, provide a report on the feasibility of collecting, extracting, venting, or combusting of landfill gas at the Colson Road landfill, to the satisfaction of the Chief Executive, Taranaki Regional Council.

13. That pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2012, June 2018 and/or within six months of the first exercise of this consent, for the purpose of reviewing the best practicable option or options available to reduce or remove any adverse effects on the environment, or to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

14. That in addition to the review provisions of condition 13 above, pursuant to section 128(1)(a) of the Resource Management Act 1991 the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review:

    (a) within six months of receipt of the report required by condition 12; and/or
    (b) during June 2001, June 2003, June 2006, June 2012 and/or June 2018; and/or
    (c) within the 6 months following the installation of any landfill gas collection and treatment at the site;

    for the purposes of:

    (i) considering the options of collecting, extracting, venting or combusting landfill gas; and/or
    (ii) monitoring landfill gas combustion and its effects.

Signed at Stratford on 24 January 2017

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Discharge Permit

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

Name of Consent Holder:	New Plymouth District Council Private Bag 2025 NEW PLYMOUTH
Consent Granted Date:	11 June 2003

Conditions of Consent

Consent Granted:	To discharge stormwater [due to earthworks in providing an area for Stage 3 of the municipal landfill] onto land and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment at or about GR: P19:074-372
Expiry Date:	1 June 2020
Review Date(s):	June 2004, June 2006, June 2008, June 2014
Site Location:	Colson Road Landfill, Colson Road, New Plymouth
Legal Description:	Sec 223 Hua Dist Blk VI Paritutu SD
Catchment:	Waiwhakaiho
Tributary:	Mangaone Puremu

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The water quality of uncontaminated stormwater discharge to the Puremu Stream shall meet the following criteria:

pH	6.5-8.5
suspended solids	maximum concentration of 100gm^{-3}
ammoniacal nitrogen	maximum concentration of 0.5 gm^{-3} as nitrogen

2. No leachate discharge shall be permitted by the exercise of this consent.

3. All stormwater diversion and channels shall be designed, constructed and maintained so as to prevent or minimise erosion of the channel in all circumstances.

4. Any discharge shall not alter to a conspicuous extent the natural colour or clarity of the receiving water in the Puremu Stream.

5. There shall be no significant adverse impact upon natural aquatic life downstream of the landfill as a result of the exercise of this permit.

6. Monitoring of surface waters on or in the vicinity of the site shall be undertaken to the satisfaction of the Chief Executive, Taranaki Regional Council.

7. The consent holder shall prepare and maintain a management plan and site contingency plan for the site and associated activities on the site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

8. The consent holder shall prepare and maintain a site erosion and sediment control management plan for the site and associated activities on the site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

9. The consent holder shall at all times adopt the best practicable option, as defined in the Resource Management Act 1991, to prevent or minimise any or likely adverse effects on the environment associated with the discharges of stormwater from the site, including but not limited to the collection, containment and removal from the site of any discharge of contaminated stormwater.

10. The consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the diversion channels.

11. The consent holder shall maintain stormwater drains, sediment detention ponds, and ground contours at the site, in order to minimise stormwater movement across, or ponding on the site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

12. After allowing for reasonable mixing the consent holder shall ensure that the discharge shall not give rise to any of the following effects in the receiving waters of the Puremu Stream:

    a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;
    b) any conspicuous change in colour or visual clarity;
    c) any emission of objectionable odour;
    d) the rendering of fresh water unsuitable for consumption by farm animals;
    e) any significant adverse effects on aquatic life.
    f) an increase in the temperature of the Puremu Stream by more than 2.0 degrees Celsius.

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2004 and/or June 2006 and/or June 2008 and/or June 2014, 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 11 June 2003

For and on behalf of
Taranaki Regional Council

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Chief Executive

Discharge Permit

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

Name of Consent Holder:	New Plymouth District Council Private Bag 2025 New Plymouth 4342
Decision Date	7 February 2020
Commencement Date	7 February 2020

Conditions of Consent

Consent Granted:	To discharge stormwater and sediment arising from earthworks into an unnamed tributary of the Puremu Stream
Expiry Date:	1 June 2026
Review Date(s):	June 2022, June 2024
Site Location:	76 Colson Road, Waiwhakaiho
Grid Reference (NZTM)	1697110E-5676383N
Catchment:	Waiwhakaiho
Tributary:	Puremu

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. This consent shall be exercised in general accordance with the information provided in support of the original application. If there is conflict between the application and consent conditions the conditions shall prevail.

2. 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 actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.

3. No less than 2 and no more than 20 working days before commencing work the consent holder shall notify the Chief Executive, Taranaki Regional Council ('the Chief Executive'). Notification shall include the consent number, a brief description of the work, and the intended commencement date. Unless the Chief Executive advises that an alternative electronic method is required this notice shall be served by completing and submitting the 'Notification of work' form on the Council's website (http://bit.ly/TRCWorkNotificationForm).

4. During and immediately following earthworks the site shall be managed and any stormwater discharged, shall be in general accordance with the Soil Erosion and Sediment Control Plan provided with the application (Document #2392643).

5. The obligation described in condition 4 above shall cease to apply, and accordingly the erosion and sediment control measures may be removed, in respect of any particular area only when the site is stabilised.

   For the purpose of this consent 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of base course, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Waikato Regional Council's Guidelines for Soil Disturbing Activities, 2009. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.

6. Before commencing any earthworks, the consent holder shall ensure that they (or their representative) meet on site with a Taranaki Regional Council officer who is directly responsible for monitoring compliance with the conditions of this consent. The purpose of the meeting shall be for the consent holder to detail the measures proposed to ensure compliance with the conditions of this consent.

7. The sediment control measures necessary to comply with the conditions of this consent shall be constructed before any additional soil is exposed, except for further earthworks necessary for the construction of any required sediment control measures, and shall remain in place, in respect of any particular area, until that area is stabilised.

8. All earthwork areas shall be stabilised vegetatively or otherwise as soon as is practicable and no longer than 6 months after completion of soil disturbance activities.

9. Any discharge authorised by this consent from the 'large silt pond' (NZTM: 1697110E-5676383N) to the unnamed tributary of the Puremu Stream, in combination with the other discharges at the same location, shall have a suspended solids concentration no greater than 100 gm^{-3}.

10. 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 2022 and/or June 2024, 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 7 February 2020

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management