South Taranaki District Council

Eltham Central Landfill
Baseline Monitoring Programme

Annual Report

2016-2017

Technical Report 2017-36

ISSN: 1178-1467 (Online)

Document: 1872994 (Word)

Document: 1919218 (Pdf)

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STRATFORD

October 2017

Executive summary

In 1996 the South Taranaki District Council (STDC) instigated plans to establish a large landfill in the Eltham area. The (proposed) Eltham Central landfill site is situated in the Waingongoro catchment on Rotokare Road approximately two kilometres south of Eltham The purpose of this site was originally to accept waste from the South Taranaki and Stratford Districts. The plan was changed to allow for a regionalised approach to waste disposal and the site is now currently a proposed option as the replacement regional landfill once the facility at Colson Road, New Plymouth has reached capacity. As it is now expected that the Colson Road landfill will be closing at the end of June 2019, detailed planning has started for the facility. This report for the period July 2016 to June 2017 describes the baseline monitoring programme implemented by the Taranaki Regional Council (the Council).

The STDC holds a total of five consents which contain a total of 77 special conditions. These consents cover all aspects of the construction and operation of the landfill. At present none of the consents held by STDC in relation to landfill construction and operation have been exercised. The consents have extended lapse periods to allow for an interim period prior to exercise.

Consent conditions specify that baseline monitoring of the ground and surface receiving waters are to be undertaken to obtain data for comparison to that gathered from compliance monitoring surveys when the landfill has commenced operations. To date the baseline monitoring has included some biological (macroinvertebrate) investigations, determination of a range of indicator physicochemical parameters in the groundwater and surface waters, and gathering some groundwater level data.

During the monitoring period, the environmental performance of STDC at the Eltham Central Landfill was not assessed as the consents are yet to be exercised.

Consent conditions specify that baseline monitoring of the ground and surface receiving waters are to be undertaken to obtain data for comparison to that gathered from compliance monitoring surveys when the landfill has commenced operations. This report outlines all of the consents held by the STDC, reports on the baseline monitoring activities carried out in the 2016-2017 period, and discusses these results along with the previously obtained groundwater monitoring results.

As some baseline monitoring had been undertaken for a number of years, and there had been uncertainty around if and when the consents might be exercised, monitoring had been scaled back to consist of the collection and analysis of six surface water samples per year since the 2014-2015 year.

The monitoring has shown that surface water quality is comparable to that found during previous monitoring periods and was indicative of good water quality when compared to that expected in similar streams in the area. The only exception to this is the occasional high faecal coliform count. During the year under review, a high faecal coliform result was recorded in February 2017; an investigation could not identify the source of the elevated result. No incidents were recorded by the Council in regards to the consents included in this programme during the period under review.

During the monitoring year the Council liaised closely with STDC around the detailed requirements of the consent, and how these requirements can be accommodated through the landfill design. Consideration must also being given to changes in legislation and current best practice. This work is predominantly considered to be outside the scope of the baseline monitoring programme, however where there are resultant changes to the baseline monitoring programme, they have been included in this report.

STDC demonstrated a high level of administrative compliance with its resource consents. No rating is given for environmental effects as none of the consents included in this programme have been exercised.

For reference, in the 2016-2017 year, 74% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance

with their consents, while another 21% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2017-2018 year, including recommendations regarding additional baseline monitoring, now that landfilling at the site is expected to commence around the end of the 2018-2019 monitoring 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 2016 to June 2017 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by South Taranaki District Council (STDC) for a proposed regional landfill. STDC has consents to establish and operate a landfill situated on Rotokare Road, two kilometres south of Eltham in the Waingongoro catchment.

This report covers the results and findings of the baseline monitoring programme implemented by the Council in respect of the resource consents held by STDC that relate to damming, diverting and installing structures in tributaries of the Waingongoro Stream, discharges to water, air and land associated with the establishment and operation of a proposed regional landfill in the Waingongoro catchment. It is noted that this report is for baseline environmental monitoring of the existing environment at the site as none of the consents associated with the landfill have been exercised.

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 condition of the existing environment prior to any environmental effects from the Eltham Central landfill's use of water, land and air, and is the ninth combined annual report by the Council for the STDC.

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 STDC for the Eltham Central landfill;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in Waingongoro catchment.

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

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

Section 4 presents recommendations to be implemented in the 2017-2018 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 STDC, 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 STDC'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 interpretations, are as follows:

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

High: The administrative requirements of the resource consents were met, or any failures 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 2015-2016 year, 71% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 24% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Process description

STDC has identified a proposed landfill site in Eltham at Rotokare Road, on the east side of State Highway 3, approximately two kilometres south of the Eltham Township. The site of the proposed landfill is a 92 ha farm that is owned by STDC and will continue to be farmed until construction of the landfill commences. The original concept was that the landfilling operation would utilise approximately 5 ha of the site at any one time and the site was estimated to have a capacity of 2,200,000 m^3. Access to the site is proposed to be from Rotokare Road. The concept was that the proposed landfill would be a fully engineered facility with a 1.5 mm high density poly ethylene (HDPE) liner laid over a 600 mm layer of compacted clay. Leachate will be collected by leachate lines and transferred to the sewer pipeline that runs between the Eltham oxidation ponds and the Hawera waste water treatment plant (WWTP).

Consents 5347, 5348, 5349, 5350, and 5351 were granted on 15 March 2000 with the expectation that, within three years, landfill space available to STDC at other landfill sites in the district would be full and that

the Eltham site would commence operation (exercise of consent) within the five year lapse period set in the consents for the site.

However, during the intervening period, a plan was developed and agreed on by the three district councils in the region that saw a regionalised approach to waste management being implemented by the district councils. Part of this plan was to route all municipal waste in the region to Colson Road landfill in New Plymouth, with the eventual closure of all other municipal landfills in the region. When the Colson Road landfill approaches its projected capacity the plan calls for Eltham Central landfill to be commissioned to take over as the regional landfill for Taranaki.

In July 2005 the STDC was granted changes to consent conditions to increase the consent lapse periods from 5 years to 20 years. These changes allowed for the extended timeframes resulting from the change of designation from proposed district to proposed regional landfill.

During the year under review, Council was advised that planning for the establishment of the new landfill was commencing.

The site itself consists of a large bowl shaped valley, which makes it well suited to use as a landfill site. The proposed landfill foot print also in the shape of a horseshoe and contains the headwaters of two unnamed tributaries that eventually feed into the Waingongoro River, approximately two kilometres northwest of the site. The northern landfill tributary is permanently flowing and has some established riparian planting. The southern tributary is currently ephemeral and the sediment ponds serving the stage one and two areas will be at the headwaters of this landfill tributary. Several groundwater bores and freshwater sampling sites have been established for the purposes of baseline monitoring.

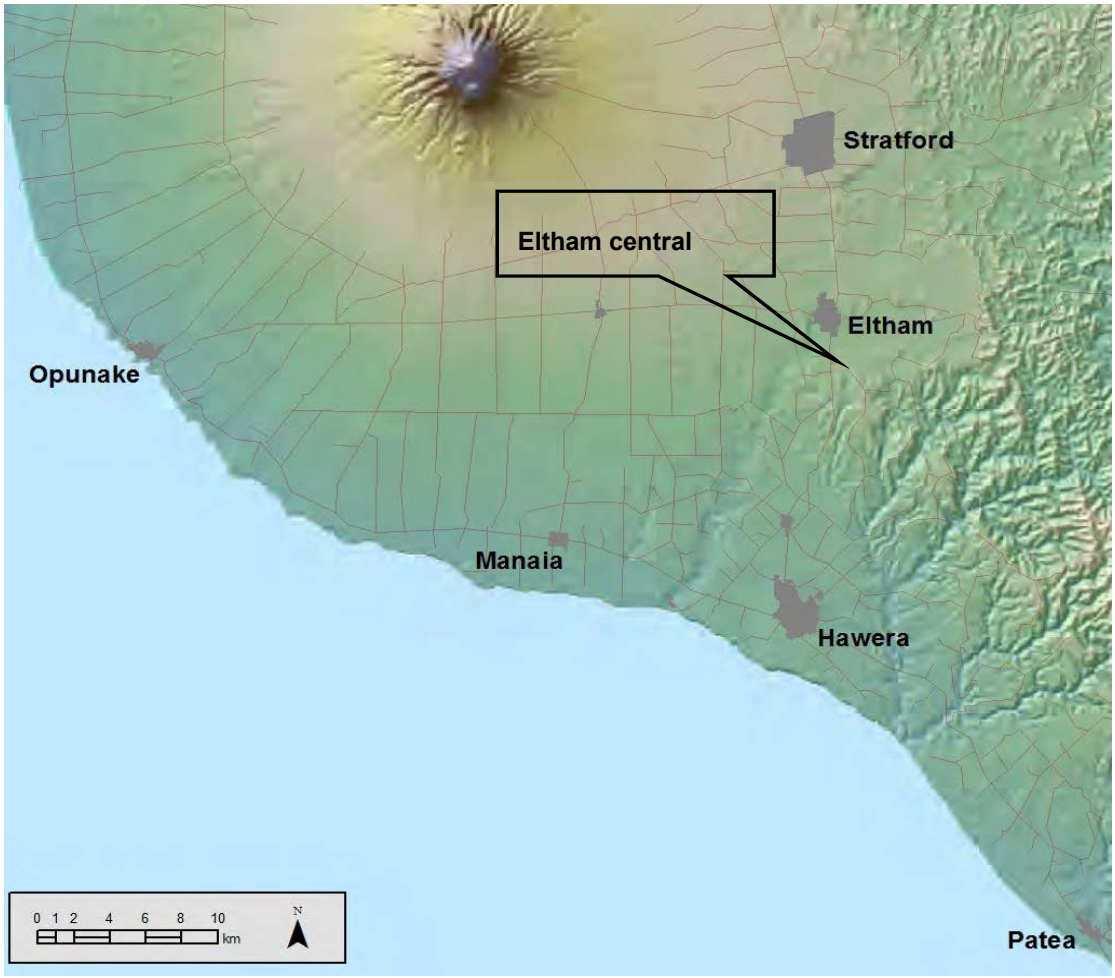

Figure 1 Regional map of Taranaki showing the location the Eltham Central landfill site

Photo 1 Eltham Central landfill site (north westerly view from the east side of the site)

Photo 2 Eltham Central landfill site (westerly view from the east side of the site)

Photo 3 Eltham Central landfill site (south westerly view from the east side of the site)

1.3 Resource consents

The STDC holds a total of five consents relating to a regional landfill that will be developed at the corner of Rotokare Road and State Highway 3, just south of Eltham. The consents, originally granted on 15 March 2000, provided for a landfill catering to the South Taranaki and Stratford Districts, but were changed in July 2005 to allow for the landfill to become a regional facility also taking wastes from the New Plymouth District. The resource consents are summarised in Table 1.

Table 1 Summary of resource consents held by the STDC for the Eltham Central landfill

Consent	Description	Review dates	Expiry
5347-1	To discharge contaminants onto and into land	June 2017 June 2023 June 2029 Within 18 months of the exercise of the consent	June 2034
5348-1	To discharge emissions into the air		
5349-1	To discharge stormwater		
5350-1	To dam and divert water		
5351-1	To erect, place and maintain structures in the beds of the unnamed tributaries		

In the 2016-2017 annual report, the recommendation in relation to the June 2017 review opportunity was that no review was required as the consents are yet to be exercised. However, during the year under review the Council was informed that the landfill would be established in time to take over from Colson Road when it closes in June 2019, with preparations beginning in the 2016-2017 year. A re-evaluation of the suitability of the current conditions on the consent was therefore undertaken prior to June 2017. It was recognised that:

- Conditions 27, 19, 19, 10, and 12 of the respective consents provided for the Council to review consent conditions for the purpose of assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharges of contaminants permitted by these consents.
- The original consents were issued based on an Assessment of Environmental Effects and draft Management Plan compiled in May 1998. Although the most recent versions of the consents were granted in July 2005, only the potential effects of the variation sought at this time (expanding the area from which the refuse would originate from) were able to be considered.
- Council was aware that there were likely to be a number of changes to the design, construction and operation of the landfill that had not yet been finalised.
- There have been new National Environmental Standards[1] and disposal to land guidelines[2] released since the consent conditions were drafted.
- There is no General Condition (d) on any of the consents so references to it are not needed.

The Council therefore determined that the current conditions on the consents may not be adequate to deal with potential adverse effects on the environment. Also that they may not be aligned with current best practice and expected levels of environmental performance. The consent conditions provided for a notice of review to be served during June 2017 but all the information required to undertake the review was not yet available. STDC was therefore advised that the Council would be reviewing the consents to provide additional review opportunities, allowing for reviews to be undertaken in an appropriate and timely manner as the landfill design progresses. The proposed additional review opportunities were December 2017, June 2018 and June 2019.

The permits are discussed further in sections 1.3.1 to 1.3.5 below, with the discussion including a summary of the conditions on each of the consents. The summary may not reflect the full requirements of each consent condition, but these can be found in full in the resource consents, which are appended to this report (Appendix I).

Two additional permits were issued to STDC in May 2017, one to allow for the extension of a culvert in the tributary of the Waingongoro Stream tributary (**10428-1**), and one to allow for the discharge of stormwater from the earthworks (**10418-1**). These consents both relate to the road widening and re-alignment required by the New Zealand Transport Agency to provide safe access to Rotokere Road, rather than to the development of the landfill site itself. The consents themselves are not covered in this annual report, as they are monitored under the short term culvert/earthworks monitoring rounds, rather than being included in this compliance monitoring programme. However, any issues occurring that may have the potential to affect the baseline conditions in the receiving waters will be discussed in this report.

1.3.1 Water permit

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.

[1] Resource Management (National Environmental Standards for Air Quality) Regulations 2004)

[2] Waste Management Institute of New Zealand (April 2016): Technical Guidelines for Disposal to Land

Maintaining sufficient volumes of water within streams and rivers to protect aquatic habitat is a primary concern of the Council with respect to water permits.

The STDC holds consent **5350-1** to dam and divert water around the Central landfill and into the headwaters of the Waingongoro River. This permit was issued by the Council on 15 March 2000 under Section 87(d) of the RMA. It is due to expire on 1 June 2034.

Condition 1 requires the submission of a Landfill Management Plan three months prior to the exercise of the consent and states that this plan must be adhered to at all times.

Conditions 2 and 3 relate to stormwater control and diversion to prevent or minimise erosion and land instability.

Condition 4 requires the rehabilitation of land destabilised or eroded by earthworks and construction.

Condition 5 requires an Annual Monitoring Plan to be provided by the consent holder, with the initial plan to be provided to the Council at least six months prior to any dam construction.

Condition 6 stipulates that all structures and earthworks are to be certified by a registered engineer, with a copy of the certificates provided to the Council.

Condition 7 sets out the requirements for a Neighbourhood Liaison Committee.

Condition 8 specifies that the consent will lapse after a 20 year period if the consent is not exercised.

Condition 9 restricts the matters for which variations to the consent maybe sought.

Condition 10 contains review provisions.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent(s) which is/are appended to this report.

1.3.2 Water discharge permit

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.

The STDC holds consent **5349-1** to discharge up to 15,000 m^3/day of uncontaminated stormwater and 4,000 m^3/day of treated stormwater onto and into land and into an unnamed tributary of the Waingongoro River. This permit was issued by the Council on 15 March 2000 under Section 87(e) of the RMA. It is due to expire on 1 June 2034.

Condition 1 requires the submission of a Landfill Management Plan three months prior to the exercise of the consent and states that this plan must be adhered to at all times.

Condition 2 prohibits the discharge of any leachate.

Conditions 3, 5, 6 and 15 deal with the management and certification of the on site stormwater systems and prohibit the direct discharge of contaminated stormwater.

Condition 4 requires the adoption of the best practicable option to prevent or minimise effects.

Conditions 7 and 8 specify the mixing zone, prohibit specific effects and give parameter limits for certain components in the receiving waters.

Conditions 9, 10 and 11 relate to the minimisation of disturbance of vegetation, and erosion and destabilising of land, due to construction and stormwater runoff. These conditions also require remediation if necessary.

Conditions 13 and 14 relate to site monitoring. These conditions require that an Annual Monitoring Plan be provided by the consent holder, with the initial plan to be provided to the Council at least six months prior to exercise of the consent. The results must also be provided to the Council by 31 August each year.

Condition 16 sets out the requirements for a Neighbourhood Liaison Committee.

Condition 17 specifies that the consent will lapse after a 20 year period if the consent is not exercised.

Condition 18 restricts the matters for which variations to the consent maybe sought.

Condition 19 contains review provisions.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent(s) which is/are appended to this report.

1.3.3 Air discharge permit

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.

The STDC holds consent **5348-1** to discharge emissions into the air from landfilling activities. This permit was issued by the Council on 15 March 2000 under Section 87(e) of the RMA. It is due to expire on 1 June 2034.

Condition 1 requires the submission of a Landfill Management Plan three months prior to the exercise of the consent and states that this plan must be adhered to at all times.

Condition 2 requires the adoption of the best practicable option to prevent or minimise effects.

Conditions 3, 4 and 5 specify the nature of prohibited discharges to air and require that dust is controlled.

Conditions 6 and 7 prohibit burning and composting on the site.

Condition 8 relates to gas venting and extraction, prohibiting this to occur within 200 m of the site boundary.

Condition 9 requires all practicable steps be taken to minimise the discharge of contaminants from the site, and includes specific requirements in relation to the method of disposal, compaction and daily cover.

Conditions 10, 11, 12, 14 and 15 relate to monitoring and record keeping. Amongst other things, these conditions:

- require that an Annual Monitoring Plan be provided by the consent holder, with the initial plan to be provided to the Council at least six months prior to exercise of the consent,
- specify the minimum monitoring required,
- require the installation of meteorological station be installed along with specifying the timing of the installation and parameters to be recorded, and
- specify the records that are to be kept, their availability and the reporting of them to the Council.

Conditions 13 and 16 relate to the handling of complaints and the formation of a Neighbourhood Liaison Committee.

Condition 17 specifies a lapse period of 20 years if the consent is not exercised.

Condition 18 restricts the matters for which variations to the consent maybe sought.

Condition 19 is a review condition.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent(s) which is/are appended to this report.

1.3.4 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.

The STDC holds consent **5347-1** to discharge contaminants onto and into land. This permit was issued by the Council on 20 July 2000 under Section 87(e) of the RMA. It is due to expire on 1 June 2034.

Conditions 1 and 2 require the submission of a Landfill Management Plan three months prior to the exercise of the consent and state that this plan must be adhered to at all times.

Condition 3 requires that the consent holder meets the costs of the Council retaining a Technical Advisor, and outlines the work that the Advisor may be contracted to undertake on the Council's behalf.

Conditions 4 and 5 relate to landfill construction.

Conditions 7, 8, 9, 10, 11, 12 and 13 specify the types of waste that may and may not be accepted, and the way in which certain waste materials must be managed.

Conditions 14, 15 and 16 relate, in general terms, to the manner in which the wastes are to be discharged and managed.

Conditions 17 and 18 specify monitoring requirements. The consent holder is required to submit an Annual Monitoring Plan to the Council at least six months prior to exercise of the consent. These conditions specify the minimum level of monitoring that must be undertaken and stipulate who the results must be reported and/or made available to. Amongst other things, the Annual Monitoring Plan must include:

- any further baseline monitoring required prior to commencement of filling, and
- guidelines for determining whether or not contamination is occurring, including "alert" and "response" levels for individual contaminants

Conditions 19, 20, and 21 control the areas from which stormwater may be discharged, leachate containment and require on site monitoring.

Conditions 22 and 23 relate to record keeping and notification.

Condition 24 sets out the requirements for the set up of a Neighbourhood Liaison Committee.

Condition 25 specifies that the consent will lapse after a 20 year period if the consent is not exercised.

Condition 26 restricts the matters for which variations to the consent maybe sought.

Condition 27 contains review provisions.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent(s) which is/are appended to this report.

1.3.5 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.

The STDC holds consent **5351-1** to erect, place and maintain structures in the beds of unnamed tributaries of the Waingongoro River for construction and maintenance. This permit was issued by the Council on 20 July 2005 under Section 87(e) of the RMA. It is due to expire on 1 June 2034.

Condition 1 requires the submission of a Landfill Management Plan three months prior to the exercise of the consent and states that this plan must be adhered to at all times.

Conditions 2 sets outs the environmental effects that the exercise of this consent shall not give rise to.

Conditions 3, 4 and 5 deal with the minimisation of erosion, land instability and require rehabilitation at the site if necessary.

Condition 6 requires an Annual Monitoring Plan to be provided by the consent holder, with the initial plan to be provided to the Council at least six months prior to the exercise of the consent.

Condition 7 specifies that the works be certified by a registered engineer and that copies of the certification documents are to be provided to the Council.

Condition 8 requires removal and reinstatement when structures are no longer required.

Condition 9 sets out the requirements for the set up of a Neighbourhood Liaison Committee.

Condition 10 specifies a lapse period of 20 years if the consent is not exercised.

Condition 11 restricts the matters for which variations to the consent maybe sought.

Condition 12 contains review provisions.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent(s) which is/are appended to this report.

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 Eltham site in the 2016-2017 year consisted of sampling of the surface waters and one biomonitoring survey.

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 reviews;
- renewals;
- new consents;

- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

Site inspections were only scheduled to be carried out to monitor landfill construction and operation. As these have been delayed, routine compliance monitoring inspections have been put in abeyance until preparations for construction begin.

1.4.4 Chemical sampling

The Council undertook baseline monitoring of the receiving waters below the proposed landfill site.

The programme included the sampling of three surface water sites on two occasions.

1.4.5 Biomonitoring surveys

The road re-alignment work required to alter the Rotokare Road- State Highway 3 junction, to allow safer access to the landfill, commenced in the second half of the year under review. An unscheduled, pre-roading survey was undertaken in December 2016. Prior to this, biomonitoring was undertaken last in May 2012.

In summary, that survey found that overall, the results were indicative of poor to fair preceding water quality but were well within the recorded historical range for each site, and also within the range of results for 'control' sites in similar streams at altitudes between 200 and 249 m above sea level. These results were reflective of the nature of this seepage fed, weedy, soft bottomed slow flowing stream.

The survey further extended macroinvertebrate fauna data providing baseline information for future evaluation of the effects of the proposed Central landfill at Eltham, near the headwaters of a small, spring fed tributary toward the middle of the Waingongoro River catchment.

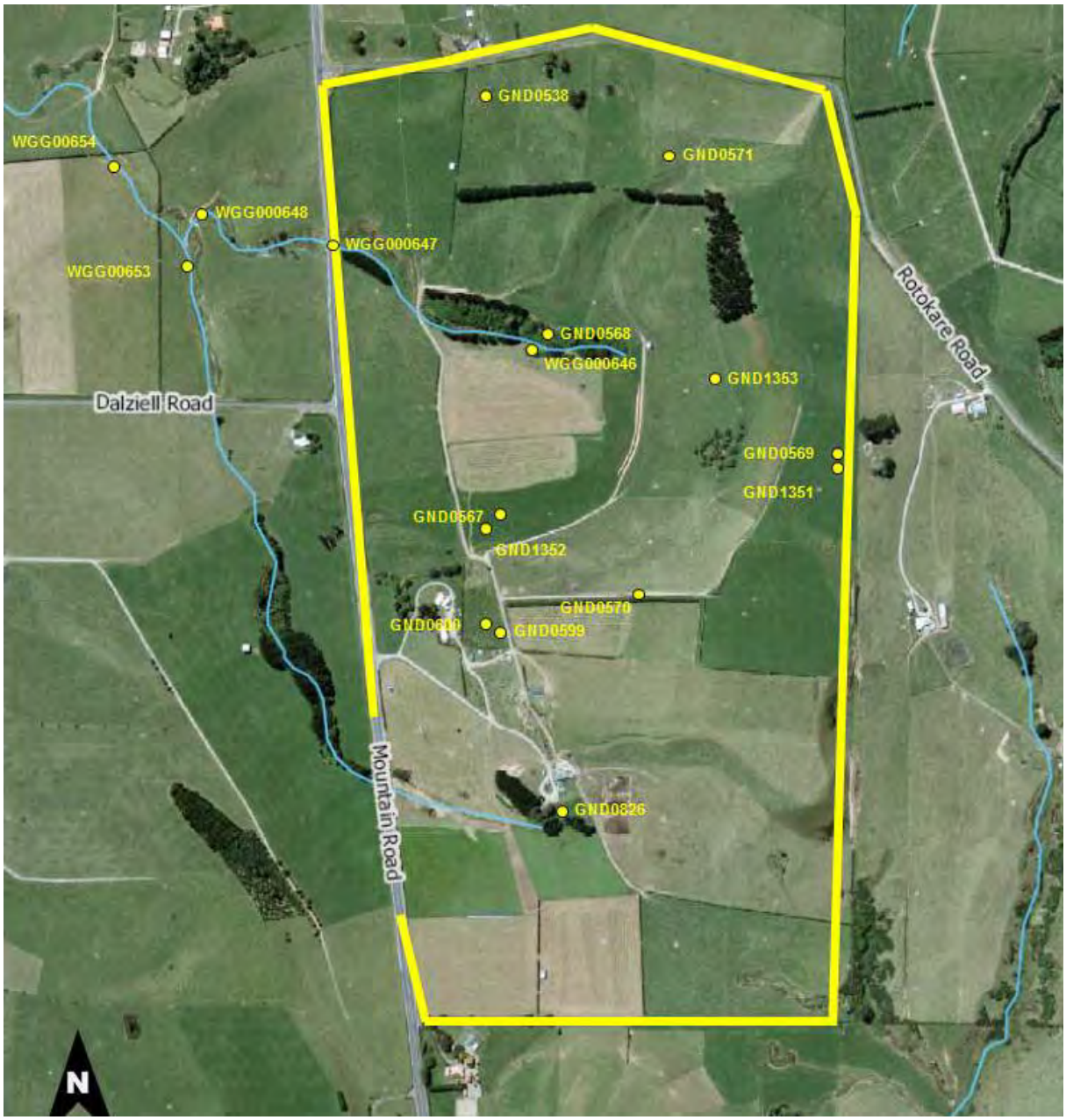

Figure 2 Aerial view of the Eltham Central landfill site and sampling points

2 Results

2.1 Water

2.1.1 Inspections

No formal inspections were undertaken during the monitoring period as the consents have not being exercised. However, the area downgradient of the proposed landfill site was visited on three occasions during surface water sampling and no issues were noted.

2.1.2 Results of surface water monitoring

Sampling of three sites was undertaken on two occasions (28 February 2016 and 29 June 2017). The results of the surveys are presented in Table 2 and Table 3.

The results for most of the surface water are as expected for the site in its current use (dairy farming). The exception to this was the levels of faecal coliforms found in the main tributary on 28 February 2017. This result follows elevated results found during the 2015-2016 year, and was logged as an unauthorised incident. The investigation did not identify the source of this particular discharge however, some recommendations were made to neighbouring farms to minimise the effects of the agricultural land use.

The levels of zinc, copper, and dissolved reactive phosphorus are low and stable, as are the levels for alkalinity, conductivity and filtered carbonaceous biochemical oxygen demand (BODCF). The results from this monitoring period are, for the most part, comparable to those found over previous monitoring periods and generally indicate typical water quality for this type of waterbody.

Table 2 Results of surface water sampling at the Eltham Central landfill, 28 February 2017

Parameter	Unit	28 February 2017		
		WGG000653 u/s landfill trib	WGG000647 landfill trib d/s of site	WGG000654 d/s landfill trib
Alkalinity	g/m^3	63	58	61
BODCF	g/m^3	<0.5	<0.5	<0.5
Conductivity	mS/m	22.0	22.4	21.9
Acid soluble copper	g/m^3	0.003	0.010	0.001
Dissolved oxygen	g/m^3	5.09	8.59	5.4
Dissolved reactive phosphorus	g/m^3	0.017	0.026	0.015
Faecal coliforms	per/100ml	3700	470	1200
Acid soluble iron	g/m^3	1.87	7.4	0.1
Hardness	g/m^3-$CaCO_3$	71	63	67

Parameter	Unit	28 February 2017		
		WGG000653 u/s landfill trib	WGG000647 landfill trib d/s of site	WGG000654 d/s landfill trib
Unionised ammonia	g/m^3-N	0.00006	<0.00001	0.00002
Ammoniacal nitrogen	g/m^3-N	0.015	<0.003	0.004
Nitrate/nitrite nitrogen	g/m^3-N	3.35	3.45	2.37
Nitrite nitrogen	g/m^3-N	0.014	0.007	0.009
pH	pH	7.1	7.3	7.1
Suspended solids	g/m^3	4	23	<2
Temperature	Deg C	14.1	13.9	14.5
Acid soluble zinc	g/m^3	0.009	0.012	<0.005
Dissolved zinc	g/m^3	<0.005	<0.005	<0.005

Table 3 Results of surface water sampling at the Eltham Central landfill, 29 June 2017

Parameter	Unit	29 June 2017		
		WGG000653 u/s landfill trib	WGG000647 landfill trib d/s of site	WGG000654 d/s landfill trib
Alkalinity	g/m^3	62	52	56
Conductivity	mS/m	26.5	23.3	24.0
Hardness	g/m^3-$CaCO_3$	84	69	74
Unionised ammonia	g/m^3-N	0.00008	0.00007	0.00013
Ammoniacal nitrogen	g/m^3-N	0.033	0.027	0.033
pH	pH	7.1	7.1	7.3
Suspended solids	g/m^3	22	37	160
Temperature	Deg C	7.4	8.2	8.2
Acid soluble zinc	g/m^3	<0.005	<0.005	0.018
Dissolved zinc	g/m^3	<0.005	<0.005	<0.005

Historical surface water data for the proposed landfill site for selected parameters is shown in Figures 3-6.

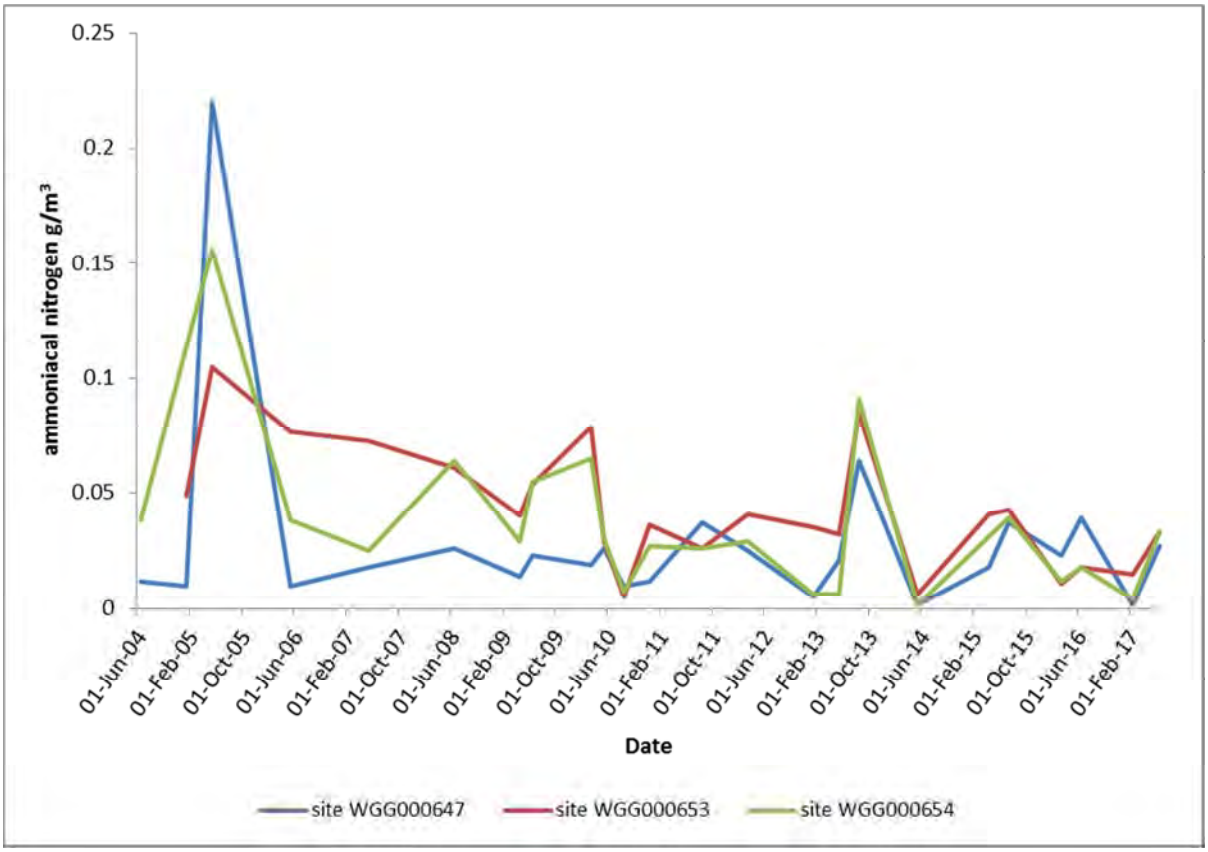

Figure 3 Ammoniacal nitrogen levels found in surface water at the Central landfill site, 2004-2017

Figure 3 illustrates comparative fluctuations in the levels of ammoniacal nitrogen at all sites. All the results are for surface water sites in pastoral areas, and when taken in conjunction with pH and temperature measurements, the highest level of free ammonia found to date at any of the sites was 0.0012 g/m^3 (WGG000653, January 2013) . This is well within the 0.025 g/m^3 guideline for aquatic ecosystem protection.

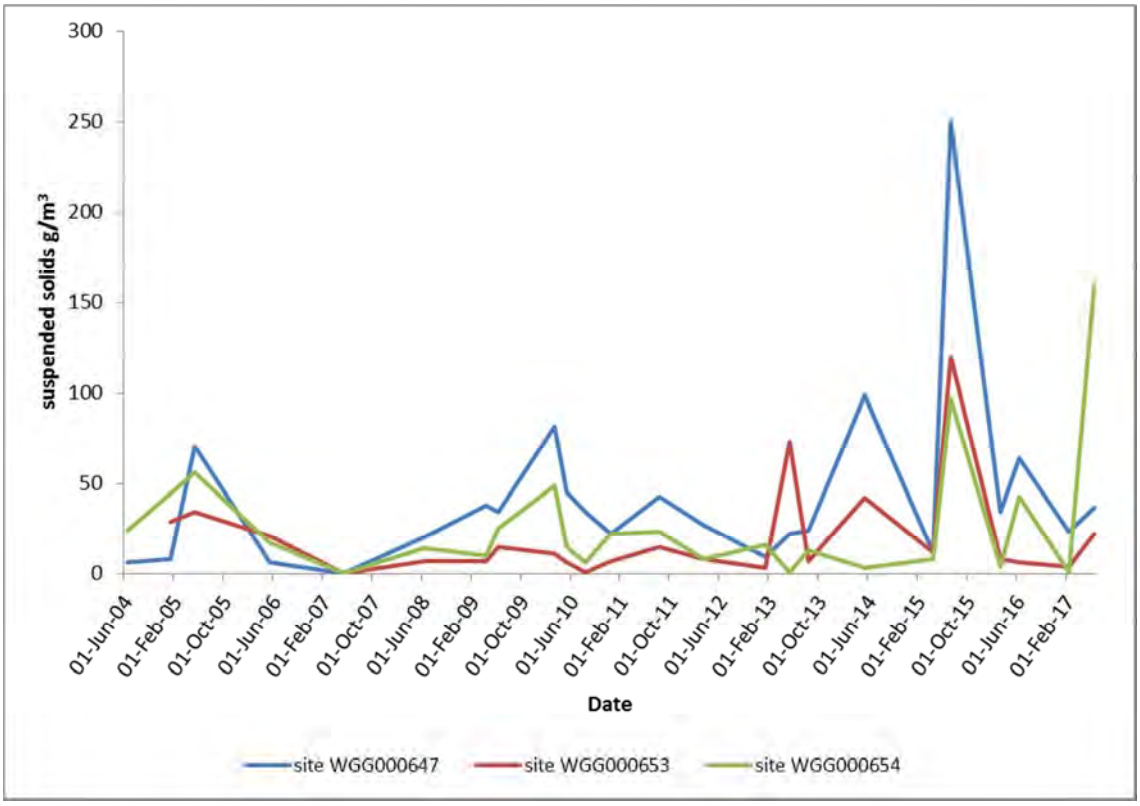

Figure 4 Suspended solids levels found in surface water at the Central landfill site, 2004-2017

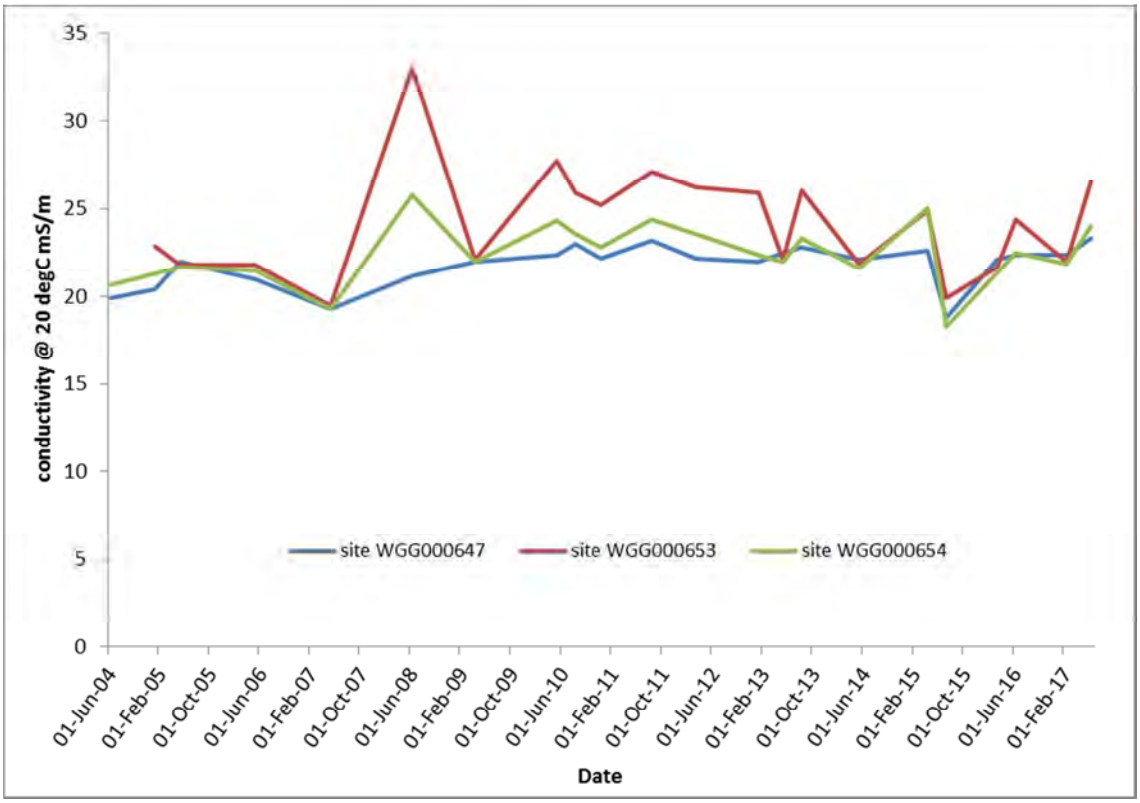

Figure 5 Conductivity levels found in surface water at the Central landfill site, 2004-2017

The level of suspended solids also fluctuate over time with a range of <2 to 250 g/m^3 recorded over all the sites. The unnamed tributaries on this site are generally small, clear running, low energy brooks with silty beds. With increased rainfall the suspended solids level in these tributaries can rise quite quickly as silt is stirred up from the beds and edges of the streams entraining it in the flow. Overall the level of suspended solids indicates good water quality in the stream system.

Apart from a slight comparative spike in conductivity levels in the results for June 2008 in the downstream sites, the overall levels are quite stable. All but two results are in the 18-27 mS/m range, which indicates that there are only moderate to low levels of dissolved metals in this stream system.

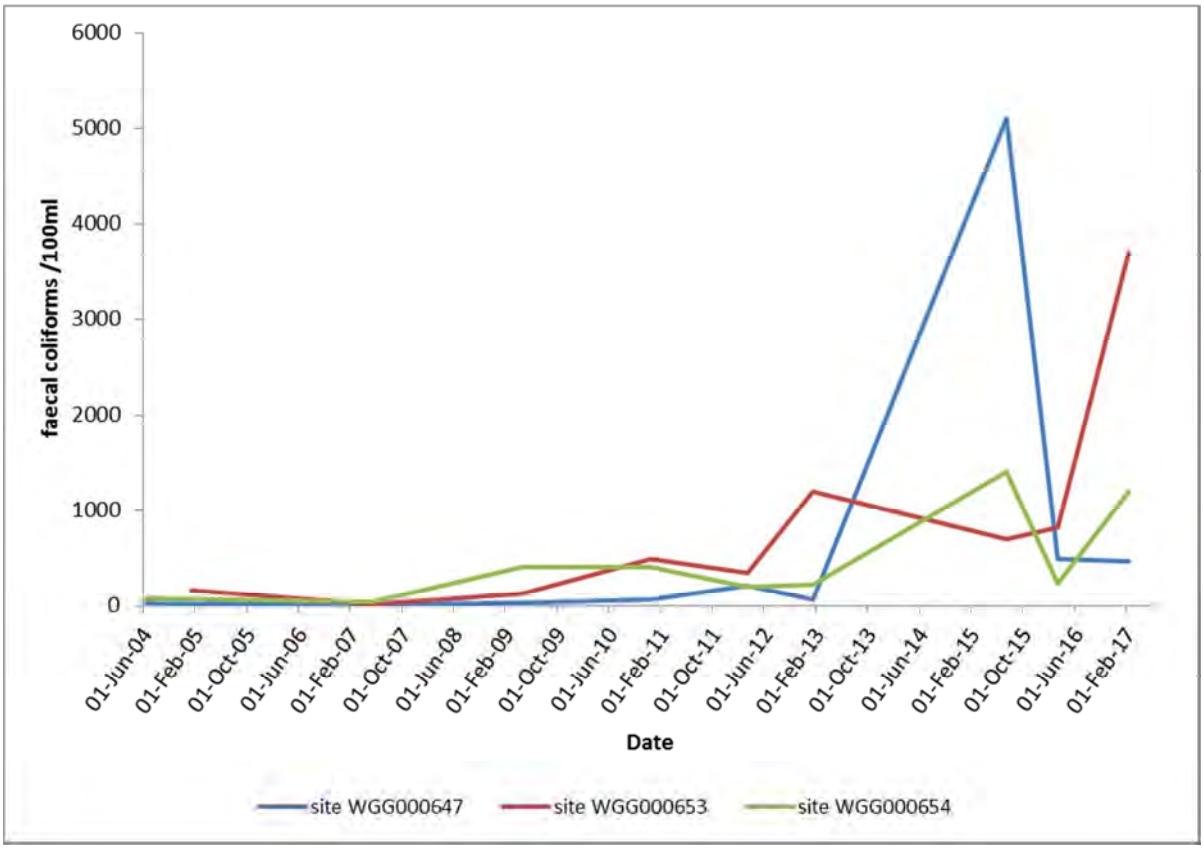

Figure 6 Faecal coliform counts found in surface water at the Central landfill site, 2004-2017

Overall water quality downstream of the proposed landfill site is quite good and is comparable to that expected in similar streams in the area. The concentrations of ammoniacal nitrogen, conductivity and faecal coliforms are generally found to be higher at site WGG000653, upstream of the northern landfill tributary (with the exception of the faecal coliforms in the northern landfill tributary in July 2015). There also appears to be an emerging trend of increasing conductivity and faecal coliforms. It is noted that currently the baseline monitoring is all downstream of the southern ephemeral landfill tributary through which the treated stormwater from the earlier southern stages of the landfill will drain. It is therefore proposed that additional monitoring sites be added to the programme to ensure that both the baseline, and on-going monitoring of the landfill's effects on surface water, take account of the discharges that will occur to the main tributary approximately 120 metres upstream of Dalziell Road.

2.1.3 Groundwater monitoring

This monitoring was put in abeyance until the two years prior to construction activities commencing at the site. As it is anticipated that the landfill would be accepting waste some time just prior to June 2019,

discussions occurred during the year under review around the consent requirements for groundwater monitoring.

Consent 5347 requires quarterly monitoring of the bores shown in the application documentation, with an additional bore to be installed down gradient of the leachate pond. The application documentation was reviewed and it was identified that this amounted to a minimum of 15 bores. The consent is also specific about the parameters that need to be monitored on a quarterly and/or annual basis. Further work was undertaken during the year under review in an attempt to locate all of the bores specified in the application and assess their condition. This is discussed further in section 2.1.3.3, with the results of the background groundwater monitoring undertaken to date discussed in sections 2.1.3.1 and 2.1.3.2.

2.1.3.1 Groundwater level and flow

Groundwater level readings were last taken at six bores in the 2013-2014 period. There have been a total of 151 readings taken from up to nine bores since 2005. Over time some of the bores have fallen into disrepair and could not be sampled.

The data collected to June 2014 is shown in Figure 7.

Figure 7 shows that the level of groundwater for each bore has been relatively stable with no significant seasonal variations.

In Figure 8 a vector model is presented that uses two surfaces generated from the average water levels of two bore sets selected from the shallower bores on the site. The two sets of bores used to generate the vector surfaces are shown in Table 4. It is noted that this vector model was constructed in 2009 and is a very crude model that gives only a simplified indication of shallow groundwater flow direction from the limited data available at that time.

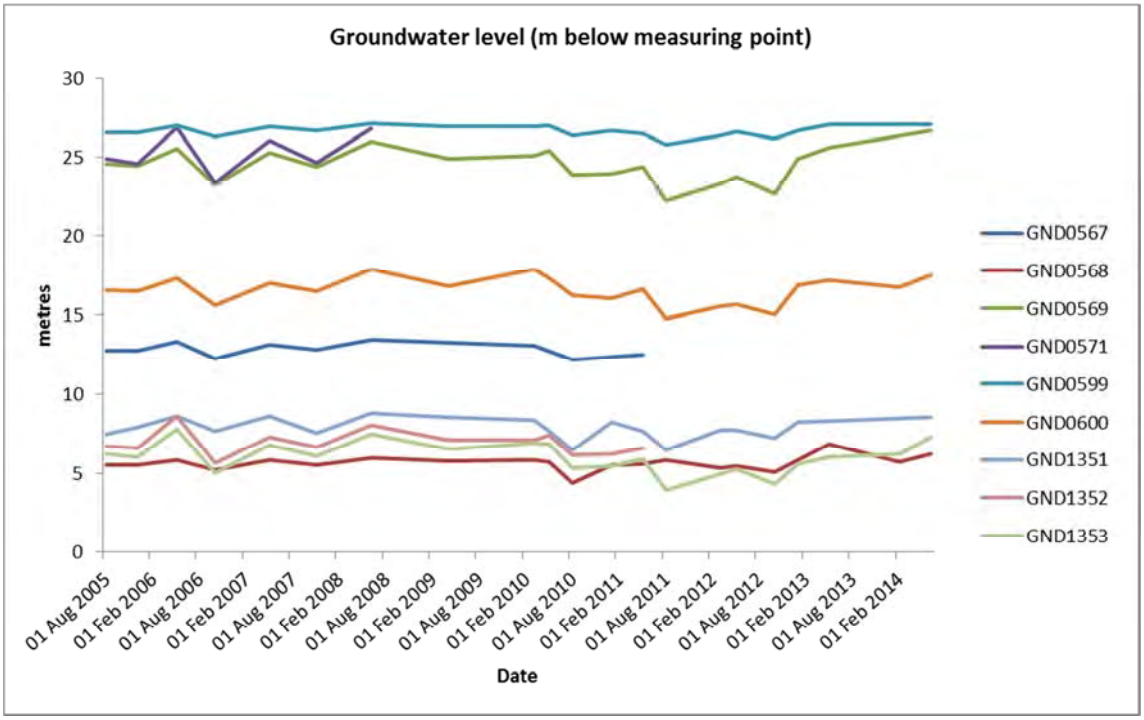

Figure 7 Groundwater levels found at the Eltham Central landfill, 2005-2014

Table 4 Data sets used to generate the groundwater flow vector model

Northern Surface			Southern Surface		
Bore	Bore elevation(m)	Average water level above Datum (m)	Bore	Bore elevation (m)	Average water level above Datum (m)
GND0571	92	66.166	GND1351	91.9	83.54
GND0568	69.7	63.95833	GND0600	125	107.9767
GND1353	80	73.18	GND1352	71.5	64.10667
GND1351	91.9	83.54			

This simple model agrees with the information supplied with the original application, which stated that the shallow groundwater flow within the landfill is largely affected by topography and generally drains toward the headwater of the unnamed tributary of the Waingongoro Stream (shown in blue). Bore GND1351 is very close to the boundary of the Tangahoe Catchment, and groundwater at this location may tend to drain south east to the headwaters of the nearby Tawhiti Stream. Overall, it would appear that most of the shallower groundwater flow from within the landfill basin area will tend to flow west toward State Highway 3 (Mountain Road) feeding the Waingongoro tributary system and the shallow aquifer immediately west of the highway.

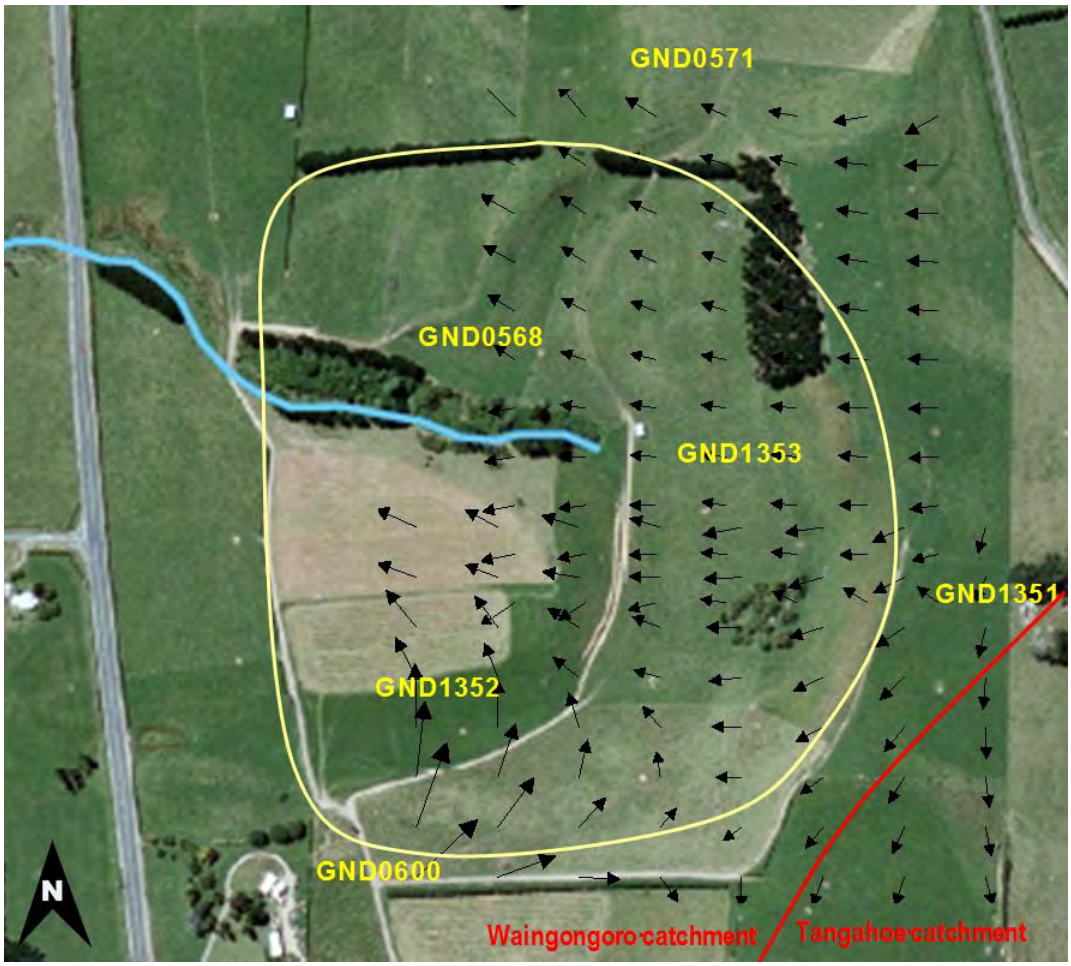

Figure 8 Simplified groundwater flow direction models at the Eltham Central Landfill site

2.1.3.2 Chemical parameters

Chemical monitoring of the groundwater has also been put in abeyance until two years prior to the construction activities commencing.

The last time chemical monitoring of the groundwater was undertaken at this site was in the 2013-2014 year. The graphs provided in Figures 9-13 illustrate the trends over time for a number of selected parameters. The data collected so far is baseline data prior to any consented activity at the site. The variations in groundwater quality can therefore be considered as natural, or at most, the results of subtle pressures exerted on groundwater quality by the grazing and dairying activities currently undertaken at the site. However, further evaluation of the effect of recharge flow from the surrounding hills and of the vertical component of groundwater maybe needed in order to enhance the understanding of the distribution of groundwater quality prior to the exercise of the consents.

Conductivity levels over the whole site range between 15 and 35 mS/m. This indicates that the groundwater has relatively low levels of dissolved solids and that groundwater quality is quite good in this regard. Over the period that the groundwater has been monitored, the conductivity level for each bore also appears to be quite stable (Figure 9). The only exceptions to this are bores GND0600 and GND0567 which have exhibited a tendency to increase over time. Bore GND0567 is no longer sampled due the deteriorated physical condition of the bore so it is not known if this rise has continued.

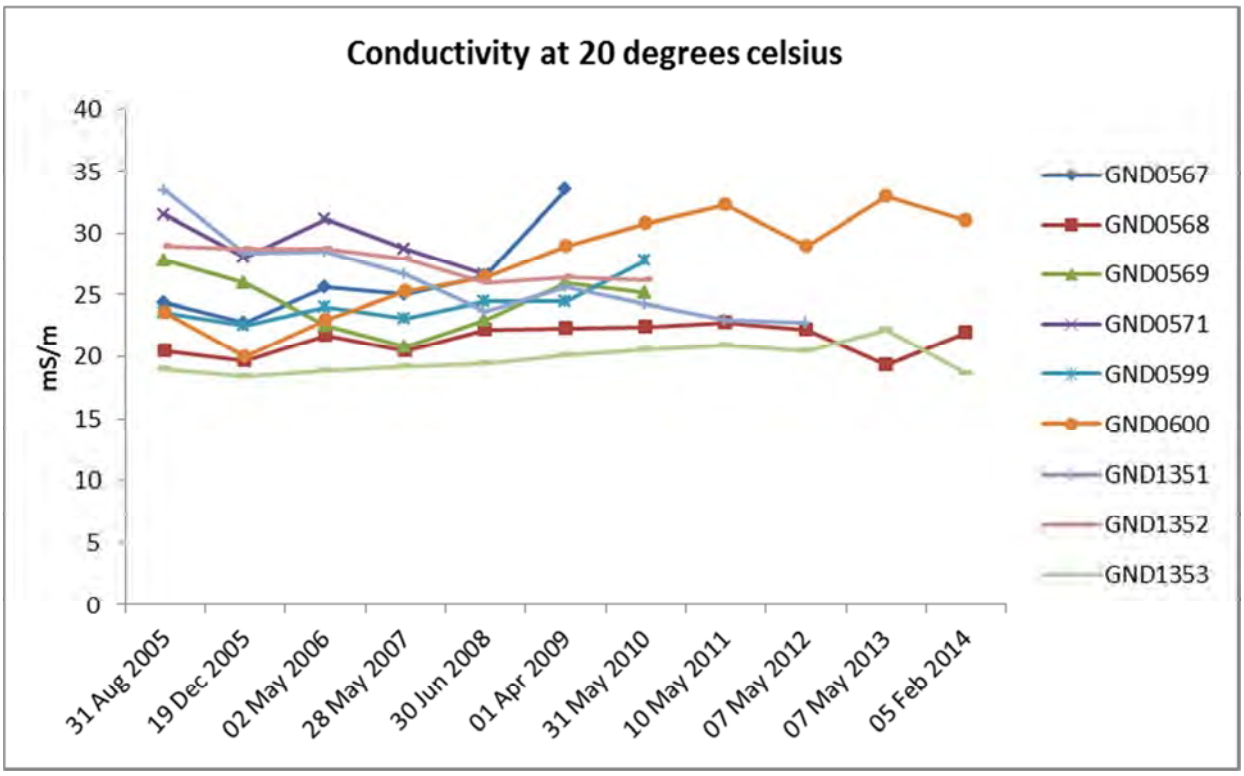

Figure 9 Conductivity found in the groundwater at Eltham Central landfill

Nitrite and nitrate levels show some variability with some sites showing slight increases and others showing decreases in concentration (Figure 10). Bore GND0599 is the exception and groundwater from this bore has had very low and stable levels of nitrite/nitrate (and a higher pH) when compared to the other sites. However this bore is far deeper than the others (83 m) and reaches into the Tangahoe formation, which may explain these differences in nitrite/nitrate levels. All the other bores are between 9 and 36 metres deep and draw water from an aquifer in the shallower volcanic layers, and are therefore more likely to be affected by current surface activities such as the application of fertiliser and grazing. The highest nitrate/nitrite nitrogen concentration was found in bore GND0600, which was above the calculated maximum acceptable value for

drinking water of 11.3 g/m^3 from April 2009 onwards. This bore is located south west of the landfill footprint and is of a moderate depth. The baseline monitoring therefore showed some impact from the agricultural activities occurring up gradient of the bore, however there are no known drinking water bores in the immediate vicinity of this monitoring location.

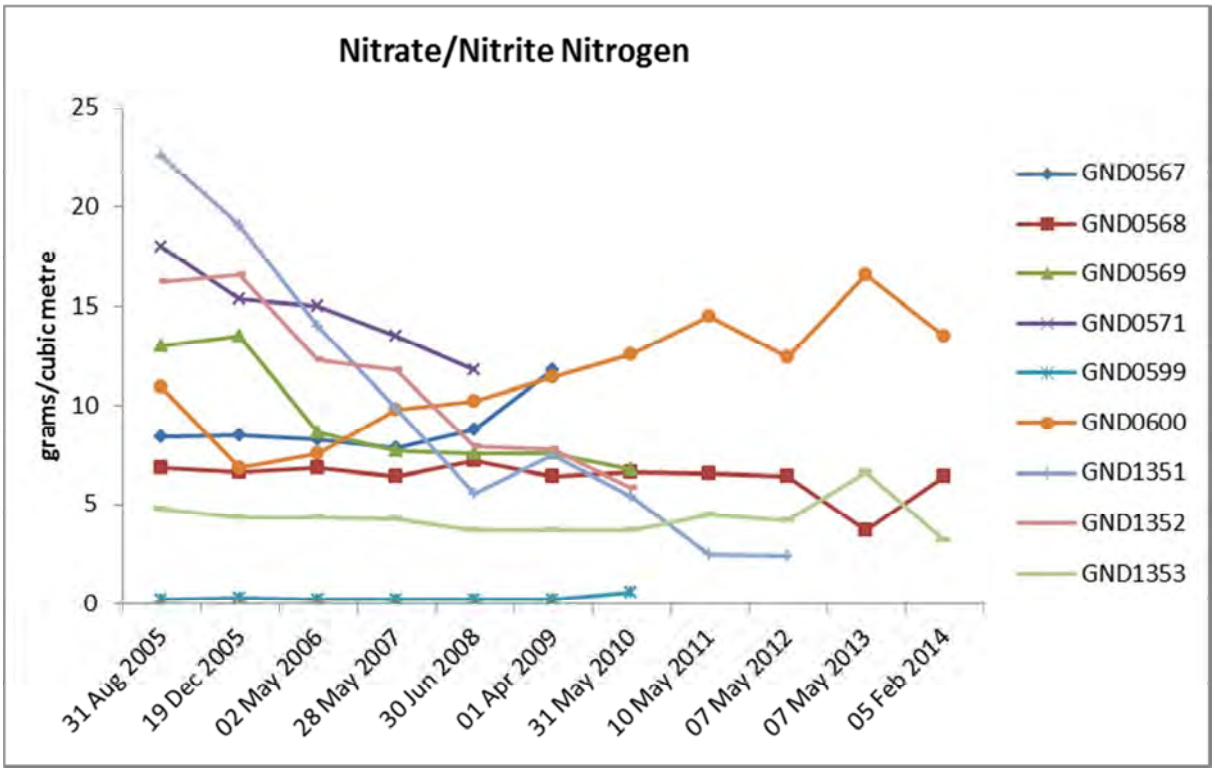

Figure 10 Nitrate/nitrite levels found in the groundwater at Eltham Central landfill

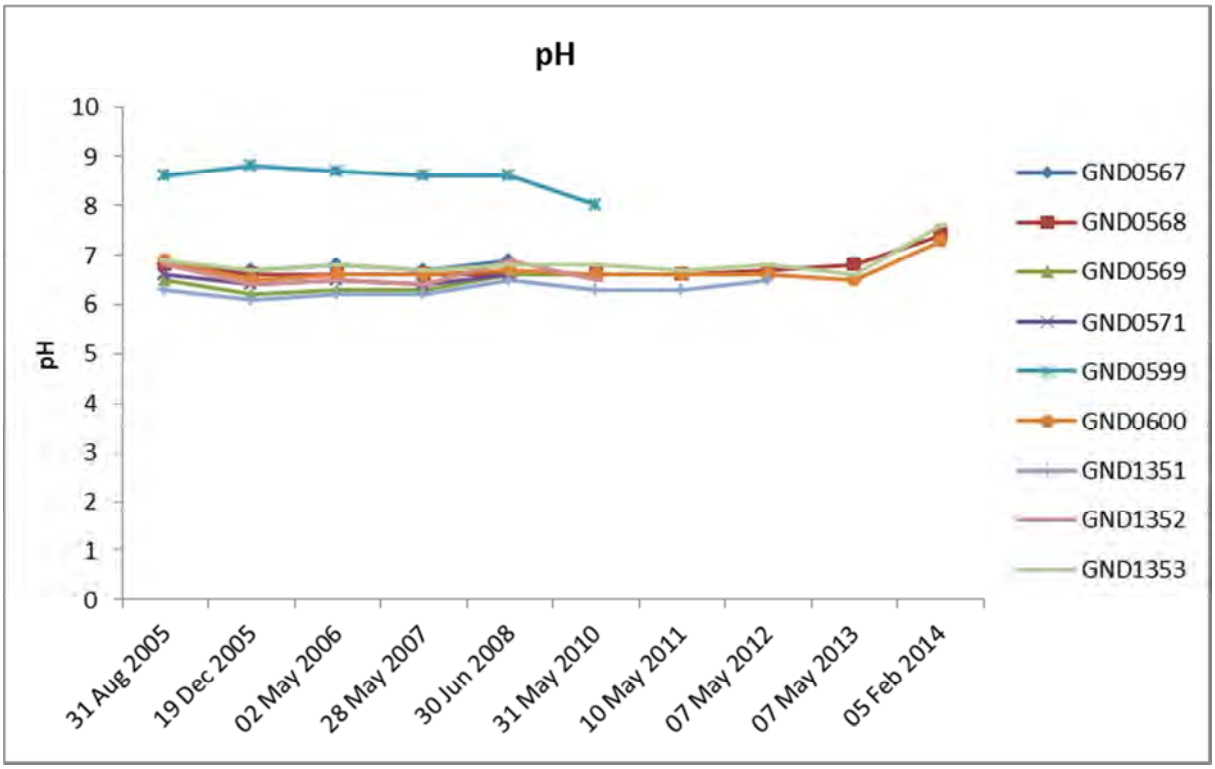

Figure 11 pH found in the groundwater at Eltham Central landfill

As the graph in Figure 11 shows, the pH level of the shallow aquifer appears stable over time. Also noted is that across all bores the pH level is very similar with an overall average across all sites over the 2005-2014 period being 6.8. The deeper Tangahoe formation bore (GND0599) exhibits a significantly higher pH with an average of 8.6. The pH for this bore also appears to be relatively stable over time.

Chlorides and hardness are in the normal ranges for Taranaki groundwater (Figure 12). As with other parameters, the deeper Tangahoe formation bore (GND0599) exhibits slightly more stability than the shallower bores.

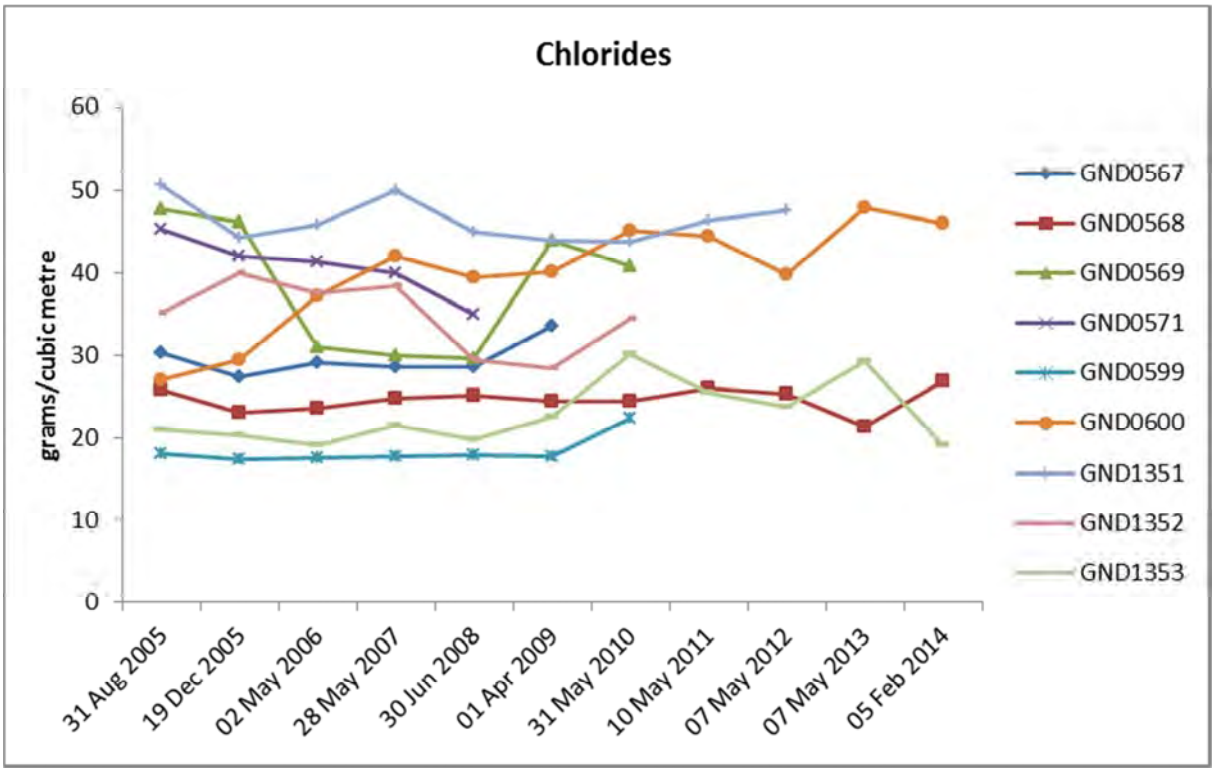

Figure 12 Chloride levels found in the groundwater at Eltham Central landfill

The fluctuations in acid soluble iron are quite pronounced in bores GND0569, 0571 and 1351 (Figure 13). However, due to the naturally high iron concentration in the soils on site, this analytical method is sensitive to variation in the amount of suspended solids included in the sample that would otherwise be immobile in the groundwater. Including analyses for dissolved iron, as well as acid soluble iron when this monitoring is recommenced may clarify the reason for the spikes in concentration.

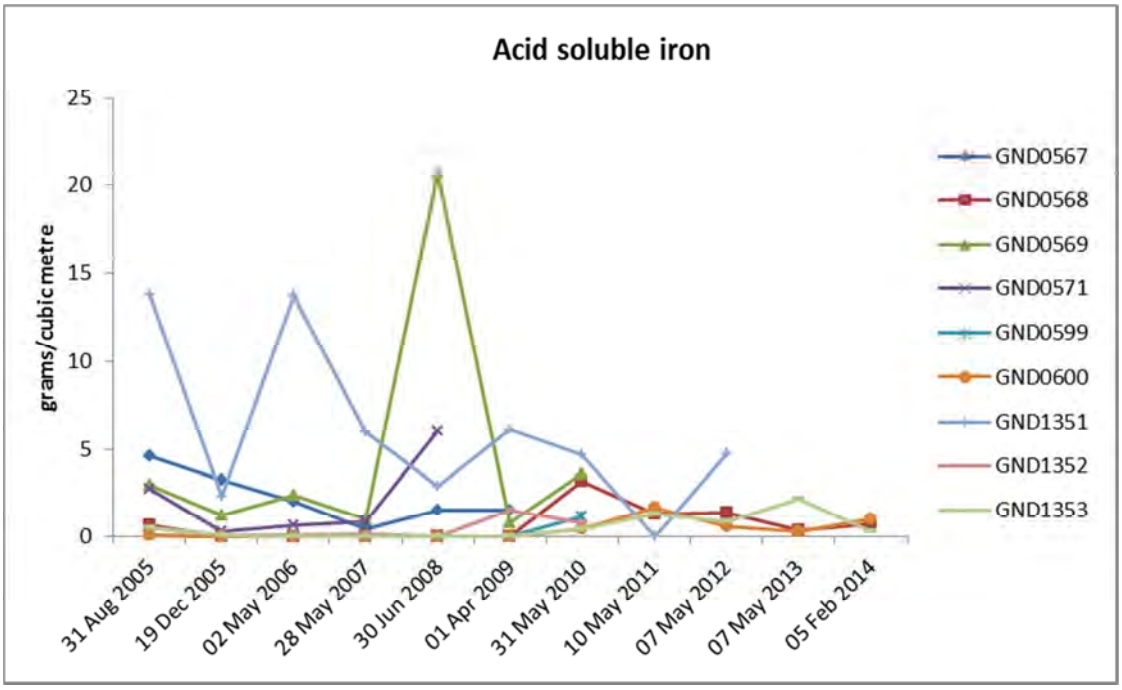

Figure 13 Acid soluble iron levels found in the groundwater at Eltham Central landfill, 2005-2014

2.1.3.3 Ongoing groundwater monitoring requirements

These groundwater monitoring bores were originally installed for geotechnical and engineering purposes such as groundwater level and flow direction, and it was previously considered that there may have been be sufficient water level data collected already to serve this purpose. For a number of years, it was considered that the existing bores could, in the short term, remain in their current state and be dealt with once it was confirmed that the site would be developed for landfilling.

In previous annual reports it was noted that, prior to the exercise of the consents, many of the bores require maintenance and in some cases may need to be relined or re-drilled. It is noted that many of the bores are likely to be sitting within the proposed landfill footprint and will have to be retired appropriately to prevent them becoming a potential conduit for contaminants to enter groundwater.

Condition 17 of consent 5347 requires that all 14 bores identified in the application information (Appendix III), and at least one additional bore down gradient of the leachate storage pond, are monitored. During the year under review, the site was visited to reassess the condition of the bores and to attempt to locate all 14 bores. The consent requirements and recommendations contained in previous annual reports were also evaluated. Only seven of the original bores were located that were, or could easily be made, fit for the purpose of monitoring groundwater levels and quality. Some of the bores would require some maintenance to make them useable. The proposed bores to be included in the monitoring programme are summarised in Table 5, with their locations shown in Figure 14. The highlighted bores are those that require some form of maintenance before they are fit for purpose. During construction of the landfill, the bores that could not be located at the site visit need to be found, so that they can be appropriately retired, thereby avoiding a direct pathway to groundwater should a liner leak occur. This also applies to the bores that were found to be damaged beyond repair. The bores that need to be appropriately retired are listed in Table 6.

Table 5 Recommended groundwater and air monitoring bore locations, and their status

Bore Name	STDC Name	Coordinates (NZTM) (Taradise)		Status	Depth	Screened/slotted interval	Depth Range
		Eastings	Northings		m	m	
Bores for monitoring required by consent 5347-1							
GND0826	-	1712142	5630866	Usable	24.2*	-	Moderate
GND0599	BH7	1712050	5631128	Usable	83	78.5-81.5	Deep
GND0600	BH7a	1712046	5631130	Usable	20.1	16.3-19.3	Moderate
GND1351	BH1a	1712534	5631349	Usable	12	3.0-12.0	Shallow
GND0569	BH1	1712534	5631349	Usable	35.6	27.5-35.0	Moderate
GND1353	BH6	1712331	5631460	Usable	13	9.2-12.2	Shallow
GND0568	BH2	1712127	5631551	Usable	10.1	4.2-10.1	shallow
Bore 1	-	1711888	5631716	Multi-piezo to be drilled	12 40 80	6-12 36-40 74-80	Shallow/Moderate/ Deep
Bore 2	-	1712488	5631685	Multi-piezo to be drilled	12 40 80	6-12 36-40 74-80	Shallow/Moderate/ Deep
Bore 3	-	1711996	5631384	Multi-piezo to be drilled	12 40 80	6-12 36-40 74-80	Shallow/Moderate/ Deep
Bore 4	-	1712479	5631118	Multi-piezo to be drilled	12 40 80	6-12 36-40 74-80	Shallow/Moderate/ Deep
Bores for monitoring required by consent 5348-1							
GND0569	BH1	As above					
GND0567	BH3	1712087	5631271	PVC loose and silted up	-	-	24.0

Key: * - to be confirmed

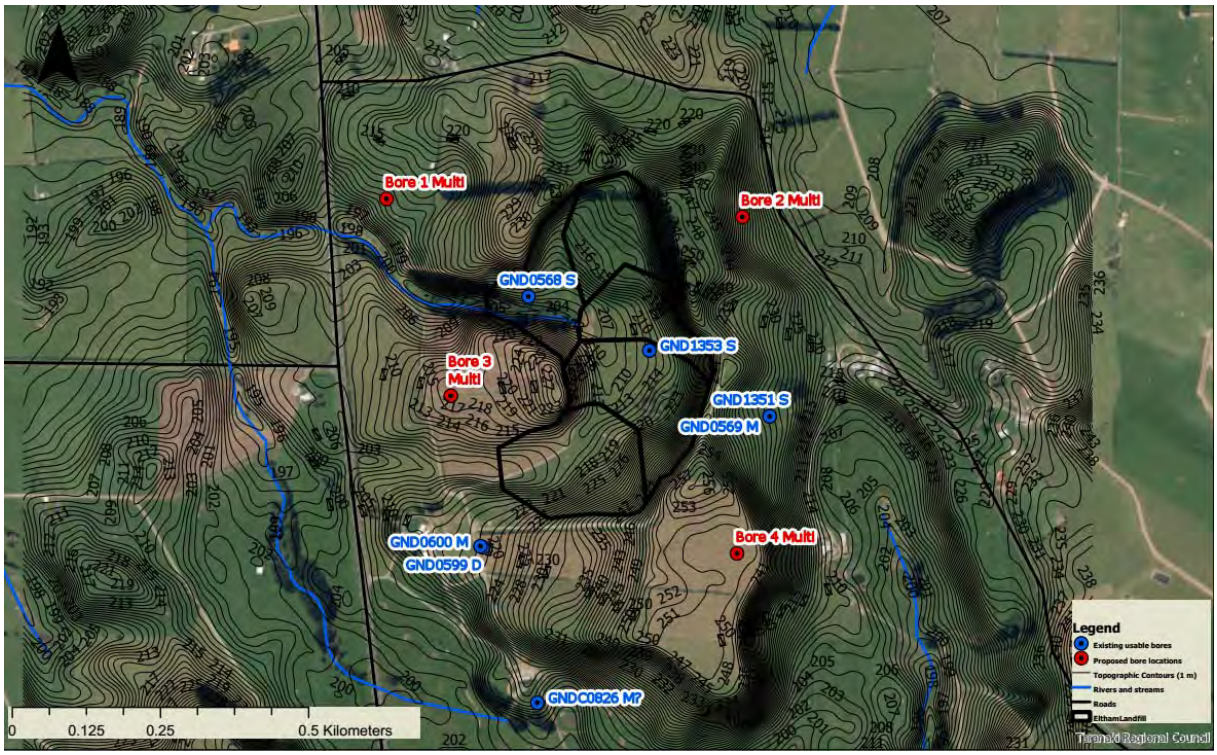

Figure 14 Location of existing (useable) and proposed groundwater monitoring bores

Table 6 Groundwater bores to be appropriately retired

Bore Name	STDC Name	Estimated Coordinates (NZTM)		Shown in consent application documentation (appendix 10 Figure 4 of AEE)	Depth Range	Comments
		Eastings	Northings			
GND0570	BH4	1712142	5630866	Yes	20.3	Bore couldn't be found as it is located in a very overgrown area. Headworks may have been destroyed
-	-	Refer to Appendix III		Yes	Unknown	Couldn't find a bore in this location. Figure 4 shows the bore about 40 m to west of BH4
-	-	1712396	5630956	Yes	Unknown	Couldn't find a bore in this location
-	-	1712299	5631174	Yes	Unknown	Couldn't find a bore in this location. Figure 4 shows located in stage 3, south of borrow area

Bore Name	STDC Name	Estimated Coordinates (NZTM)		Shown in consent application documentation (appendix 10 Figure 4 of AEE)	Depth Range	Comments
		Eastings	Northings			
GND1352	BH3a	1712093	5631275	Yes	Deep	Appears to have been damaged by vehicle as the pipe is bent just below ground level
Unknown	-	Inside landfill footprint		No	Unknown	Tidy, closed and capped bore not on map or recorded in TRC database. Will require abandonment
GND0538	-	1712043	5631837	No	37.3 m	In a turnip field, determined it would probably have been destroyed during ploughing, or may be incorrect coordinates on GIS
GND0571	BH5	1711888	5631716	Yes	28.0 m	Damaged. Not useable
-	-	Refer to Appendix III		Yes	Unknown	On figure 4 –stage 5/6 border towards the south west of stage 5, in the borrow area. A pipe/hose was found going into the ground, but no sign of the bore

The nature of the baseline monitoring that needs to be undertaken to add to the baseline data already collected was assessed as follows:

- Parameters for baseline monitoring should include those listed in the consent for on-going monitoring, those deemed necessary for groundwater characterisation, and those identified as possible landfill contaminants. Baseline monitoring should be carried out as early as feasible and be carried out during summer and winter to capture any seasonal differences.
- All bores should be surveyed to provide accurate ground reduced levels (GRL) and casing heights. This will allow for ongoing groundwater flow monitoring in the target aquifers.
- Water level monitoring should be undertaken at least quarterly in the majority of bores to monitor seasonal effects and at 15 minute intervals, using downhole loggers, in at least three (shallow, moderate, deep) bores to provide a more comprehensive dataset.

Once consent 5347 is exercised the monitoring of the groundwaters will need to be undertaken on a quarterly basis as per good practice guidelines and condition 17 of this consent.

2.2 Air monitoring

No air monitoring or inspections were carried out during the 2016-2017 year as the landfill was not in operation. Once the Eltham Central landfill commences operations an air quality monitoring programme will be implemented to monitor dust deposition, particulate matter, methane levels, hydrogen sulphide levels and odour. However, it is noted that the consent holder is required to undertake landfill gas dispersion modelling prior to the discharge consents being exercised. To support this modelling, STDC has had a weather station in place at the site since 2000. However, it has been ascertained that this data may not be suitable for the purpose of odour dispersion modelling, as the weather station was only serviced once per year. This matter has been raised with the consent holder and they have undertaken to collect more robust data prior to the site being developed, as per condition 11 of consent 5348-1. The proposed location for the new station was confirmed as acceptable to the Council in July 2014. A new weather station was installed as proposed, however this was subsequently struck by lightening. During the year under review, STDC consulted with Council regarding the specifications required for the data collection from a further new weather station, and the installation was completed in October 2016. Council has ben advised that annual calibration of the site is undertaken by their consultants, and that routine maintenance is undertaken by the Rural Fire Service. It is proposed that the monitoring programme be updated to include a review of the data collected and an annual inspection of the weather station to confirm that it is being adequately maintained.

It is however noted, that since the consents were granted an Air Quality National Environmental Standard has come into effect. This standard requires that the landfill gas generated from a landfill of this size is collected and either flared, or used as a fuel for generating electricity. This requirement impacts on both the design concept provided to Council at the time of the consent application, and the assessment of environmental effects. As such, the conditions of the current consent will need to be reviewed and/or changed prior to the exercise of the consent.

2.3 Investigations, interventions, and incidents

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 STDC. 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 courses of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where the consent holder concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

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 company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2016-2017 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the conditions in STDC's landfill resource consents or provisions in Regional Plans.

It is noted t6hat there were two non-compliances associated with the road re-alignment consents, however these were attributed to Warner Construction Ltd, the contractor undertaking the work, and not the consents contained in this monitoring programme.

3 Discussion

3.1 Discussion of site performance

The Eltham Central landfill site baseline results are not remarkable in themselves. Surrounding farming activities exert subtle and varying pressures on surface water and groundwater quality as would be expected. The results show that there are no unusually high values for any given water quality indicator, with the exception of the occasional high faecal coliform count. Water quality overall is good for the headwaters of a small stream tributary in a dairying catchment, however, there may be an emerging trend of increasing conductivity and faecal coliform counts upstream of the northern landfill tributary.

3.2 Evaluation of performance

A tabular evaluation of performance is given in Tables 7 to 11. As the consents have not been exercised many of the conditions are not applicable.

Table 7 Summary of performance for discharge to land consent 5347-1

Purpose: ***To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare a landfill management plan	Review of Council records – to be provided three months prior to exercise of consent	Plan provided with application- will be updated prior to exercise
2. The consent holder and all staff shall adhere to a management plan	Inspection and liaison with consent holder – consent not exercised	N/A
3. The consent holder shall meet cost of a technical advisor on development and operations	Technical Adviser provided	Yes
4. The consent holder shall construct a landfill liner to certain specifications	Site inspection – consent not exercised	N/A
5. The landfill liner must be certified by a registered engineer	Review of Council records, certification documents to be provided to the Council – consent not exercised	N/A
6. The consent holder shall keep records of wastes accepted	Inspection and liaison with consent holder – consent not exercised	N/A
7. Certain wastes to be handled by specified guidelines.	Inspection and liaison with consent holder – consent not exercised	N/A
8. Contaminated soils accepted at site shall be covered as soon as practical	Inspection and liaison with consent holder – consent not exercised	N/A
9. Appointment of person to control entry of waste to the site	Inspection and liaison with consent holder – consent not exercised	N/A

Purpose: *To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
10. Certain wastes not to be accepted	Inspection and liaison with consent holder – consent not exercised	N/A
11. Other special wastes to meet certain criteria	Inspection and liaison with consent holder – consent not exercised	N/A
12. Wastes that do not meet TCLP test or exceed certain contaminant limits not to be accepted	Inspection and liaison with consent holder – consent not exercised	N/A
13. Special waste to handled as specified	Inspection and liaison with consent holder – consent not exercised	N/A
14. Prevent contaminants entering surrounding land	Inspection and liaison with consent holder – consent not exercised	N/A
15. Compact and cover waste to certain specifications	Inspection and liaison with consent holder – consent not exercised	N/A
16. Supply report on stage closure	Inspection and liaison with consent holder – consent not exercised	N/A
17. Provide, comply with and maintain an STDC annual monitoring plan	Review of Council records – to be provided at least six months prior to exercise of consent. Baseline monitoring requirements reviewed with changes proposed for 2017-2018. The Technical Advisor has also been appointed	Baseline monitoring in progress
18. Results of STDC monitoring to be supplied	Review of Council records – consent not exercised	N/A
19. Prevent surface run-off into tributaries	Inspection and liaison with consent holder – consent not exercised	N/A
20. Undertake review and remedial actions should leachate cause contamination	Inspection and liaison with consent holder – consent not exercised	N/A
21. Inspect landfill for leachate breakout at least once a month	Inspection and liaison with consent holder – consent not exercised	N/A
22. Keep records on any remedial actions taken	Inspection and liaison with consent holder – consent not exercised	N/A
23. Keep records on any investigations and engineering works	Site specific monitoring programme – programme management	N/A
24. Liaise and meet with Neighbourhood Liaison Group	First meeting to be held one month prior to exercise of consent. Consent not due to be exercised yet, however meetings are now being held at more than the required frequency	N/A
25. Lapse provision	Lapse not due until 2020	N/A

Purpose: *To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
26. Limits areas from which refuse can originate from. Taranaki including Mokau and Awakino	Inspection and liaison with consent holder – consent not exercised	N/A
27. Review condition	Next optional review in December 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administrative performance in respect of this consent		**High**

Table 8 Summary of performance for air discharge consent 5348-1

Purpose: *To discharge emissions into the air from landfilling activities at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare a landfill management plan	Review of Council records – to be provided three months prior to exercise of consent	Plan provided with application- will be updated prior to exercise
2. The consent holder shall adopt best practical option	Inspection and liaison with consent holder – consent not exercised	N/A
3. Discharges not to result in objectionable or offensive odours or airborne contaminants beyond the boundary	Inspection and liaison with consent holder – consent not exercised	N/A
4. Discharges not to result in objectionable or offensive levels of dust, beyond the boundary	Inspection and liaison with consent holder – consent not exercised	N/A
5. Dust suppression on roads to used	Inspection and liaison with consent holder – consent not exercised	N/A
6. No burning at site	Inspection and liaison with consent holder – consent not exercised	N/A
7. No composting at site	Inspection and liaison with consent holder – consent not exercised	N/A
8. No extraction venting of landfill gas within 200 metres of site boundary	Inspection and liaison with consent holder – consent not exercised	N/A
9. Avoid discharges entering surround environment	Inspection and liaison with consent holder – consent not exercised	N/A
10. Provide, comply with and maintain an STDC annual monitoring plan	Review of Council records – to be provided at least six months prior to exercise of consent	Baseline monitoring in progress

Purpose: *To discharge emissions into the air from landfilling activities at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
11. Establish meteorological site and use data to develop gas dispersion model for hydrogen sulphide	Inspection and liaison with consent holder – 12 months data required commencing within one year of exercise of consent. Consent not exercised	Weather station replaced and relocated. Data quality to be assessed. More data required
12. Modelling to be done to parameters supplied in appendix 10 of the application	Review of Council records – 12 months data required commencing within one year of exercise of consent. Consent would not be exercised with the 2017-2018 year, but will be exercised within the 2018-2019 year	N/A-modelling not done yet
13. Keep records on any complaints received	Inspection and liaison with consent holder – consent not exercised	N/A
14. Provide results of monitoring plan	Review of Council records – consent not exercised	N/A
15. Keep records of any site investigations and engineering works	Inspection and liaison with consent holder – consent not exercised	N/A
16. Liaise and meet with Neighbourhood Liaison Group	Inspection and liaison with consent holder – consent not exercised, however meetings are now being held at more than the required frequency. The Technical Advisor has also been appointed	N/A
17. Lapse provision	Lapse not due until 2020	N/A
18. Limits areas from which refuse can originate from. Taranaki including Mokau and Awakino	Inspection and liaison with consent holder – consent not exercised	N/A
19. Review condition	Next optional review in December 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administrative performance in respect of this consent		**High**

Table 9 Summary of performance for stormwater discharge consent 5349-1

Purpose: *To discharge up to 15,000 m^3/day of uncontaminated stormwater and 4,000 m^3/day of treated stormwater from the South Taranaki District Council Central Landfill, Eltham, onto and into land and into an unnamed tributary of the Waingongoro River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare a landfill management plan	Review of Council records – to be provided three months prior to exercise of consent	Plan provided with application-will be updated prior to exercise

Purpose: ***To discharge up to 15,000 m^3/day of uncontaminated stormwater and 4,000 m^3/day of treated stormwater from the South Taranaki District Council Central Landfill, Eltham, onto and into land and into an unnamed tributary of the Waingongoro River***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. No leachate to be discharged	Inspection and liaison with consent holder – consent not exercised	N/A
3. Leachate storage lagoon bunded to prevent stormwater infiltration	Inspection and liaison with consent holder – consent not exercised	N/A
4. Adopt best practical option	Inspection and liaison with consent holder – consent not exercised	N/A
5. No direct discharge of contaminated stormwater to receiving waters	Inspection and liaison with consent holder – consent not exercised	N/A
6. Stormwater holding be installed	Inspection and liaison with consent holder – consent not exercised	N/A
7. Discharge not give rise to certain effects in receiving waters	Inspection and liaison with consent holder – consent not exercised	Baseline monitoring in progress
8. Contaminants in receiving waters not to exceed certain limits	Inspection and liaison with consent holder – consent not exercised	Baseline monitoring in progress
9. System designed to minimise erosion in channels	Inspection and liaison with consent holder – consent not exercised	N/A
10. System designed to minimise land instability	Inspection and liaison with consent holder – consent not exercised	N/A
11. Rehabilitation of any land made unstable	Inspection and liaison with consent holder – consent not exercised	N/A
12. Minimise disturbance of riparian plants and undertake planting as set out in application.	Inspection and liaison with consent holder – consent not exercised	N/A
13. Provide, comply with and maintain an STDC annual monitoring plan	Review of Council records – to be provided at least six months prior to exercise of consent Baseline monitoring requirements reviewed with changes proposed for 2017-2018 The Technical Advisor has also been appointed	Baseline monitoring in progress
14. Results of STDC monitoring to be supplied	Review of Council records – consent not exercised	N/A
15. Design and construction of system to certified by registered engineer	Inspection and liaison with consent holder – consent not exercised	N/A
16. Liaise and meet with Neighbourhood Liaison Group	Inspection and liaison with consent holder – consent not exercised, however meetings are now being held at more than the required frequency	N/A
17. Lapse provision	Lapse not due until 2020	N/A

Purpose: *To discharge up to 15,000 m^3/day of uncontaminated stormwater and 4,000 m^3/day of treated stormwater from the South Taranaki District Council Central Landfill, Eltham, onto and into land and into an unnamed tributary of the Waingongoro River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
18. Limits areas from which refuse can originate from. Taranaki including Mokau and Awakino	Inspection and liaison with consent holder – consent not exercised	N/A
19. Review condition	Next optional review in December 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administrative performance in respect of this consent		**High**

Table 10 Summary of performance for dam and diversion consent 5350-1

Purpose: *To dam and divert water around the South Taranaki District Council Central Landfill, Eltham, in the headwaters of an unnamed tributary of the Waingongoro River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare a landfill management plan	Review of Council records – to be provided three months prior to exercise of consent	Plan provided with application- will be updated prior to exercise
2. System designed to minimise erosion in channels	Inspection and liaison with consent holder – consent not exercised	N/A
3. System designed to minimise land instability	Inspection and liaison with consent holder – consent not exercised	N/A
4. Rehabilitation of any land made unstable	Inspection and liaison with consent holder – consent not exercised	N/A
5. Provide, comply with and maintain an STDC annual monitoring plan	Review of Council records – to be provided at least six months prior to exercise of consent	Baseline monitoring in progress
6. Design and construction of system to be certified by registered engineer	Review of Council records – consent not exercised	N/A
7. Liaise and meet with Neighbourhood Liaison Group	Inspection and liaison with consent holder – consent not exercised, however meetings are now being held at more than the required frequency The Technical Advisor has also been appointed	N/A
8. Lapse provision	Lapse not due until 2020	N/A
9. Limits areas from which refuse can originate from. Taranaki including Mokau and Awakino	Inspection and liaison with consent holder – consent not exercised	N/A
10. Review condition	Next optional review in December 2017	N/A

Purpose: *To dam and divert water around the South Taranaki District Council Central Landfill, Eltham, in the headwaters of an unnamed tributary of the Waingongoro River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administrative performance in respect of this consent		**High**

Table 11 Summary of performance for structures consent 5351-1

Purpose: *To erect, place and maintain structures in the beds of unnamed tributaries of the Waingongoro River for the construction and maintenance of the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare a landfill management plan	Review of Council records – to be provided three months prior to exercise of consent	Plan provided with application- will be updated prior to exercise
2. Construction and maintenance not give rise to certain effects	Inspection and liaison with consent holder – consent not exercised	N/A
3. Structures designed to minimise land instability	Inspection and liaison with consent holder – consent not exercised	N/A
4. Rehabilitation of any eroded areas	Inspection and liaison with consent holder – consent not exercised	N/A
5. Minimise disturbance of riparian plants and undertake planting as set out in application.	Inspection and liaison with consent holder – consent not exercised	N/A
6. Provide, comply with and maintain an STDC annual monitoring plan	Review of Council records – to be provided at least six months prior to exercise of consent	Baseline monitoring in progress
7. Design and construction of system to certified by registered engineer	Inspection and liaison with consent holder – consent not exercised	N/A
8. Removal of structures and reinstatement when structures no longer required.	Inspection and liaison with consent holder – consent not exercised	N/A
9. Liaise and meet with Neighbourhood Liaison Group	Inspection and liaison with consent holder – consent not exercised, however meetings are now being held at more than the required frequency The Technical Advisor has also been appointed	N/A
10. Lapse provision	Lapse not due until 2020	N/A
11. Limits areas from which refuse can originate from. Taranaki including Mokau and Awakino	Inspection and liaison with consent holder – consent not exercised	N/A
12. Review condition	Next optional review in December 2017	N/A

Purpose: *To erect, place and maintain structures in the beds of unnamed tributaries of the Waingongoro River for the construction and maintenance of the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administrative performance in respect of this consent		**High**

STDC demonstrated a high level of administrative compliance with its resource consents as defined in Section 1.1.4. No rating is given for environmental effects as no discharges, or stream works authorised by consents 5350 and 5351, have occurred.

3.3 Recommendations from the 2015-2016 Annual Report

In the 2015-2016 Annual Report, it was recommended:

1. THAT in the event that the proposals to construct a Central landfill site at Eltham are confirmed, that STDC immediately implement the recommendations on bore remediation given in Table 6 of the 2015-2016 report and that groundwater monitoring resumes.
2. THAT in the event that it is likely the landfill will become operational, biomonitoring shall recommence with at least one survey to be undertaken prior to operations commencing.
3. THAT at least 18 months prior to the landfill commencing operations, the weather station installed by the consent holder be verified as complying with consent 5348-1.
4. Baseline monitoring of the Eltham Central landfill site in 2016-2017 be continues as programmed for 2015-2016 unless Council is advised that the proposals to construct a Central landfill site at Eltham are confirmed and the timing of the works dictate otherwise.
5. THAT the option for a review of resource consents 5347-1, 5348-1, 5349-1, 5350-1, and 5351-1 in June 2017, as set out in conditions 27, 19, 19, 10 and 12 of the consents, not be exercised, on the grounds that the consents are yet to be exercised.

Recommendation 1 was not fully implemented during the year under review as the bore condition, consent requirements and current best practice guidelines were re-evaluated. New recommendations were provided to STDC and work is in progress to ensure that the required bores are in place for baseline monitoring to recommence in October 2017.

Recommendation 2 was fully implemented.

Recommendation 3 was partially implemented during the year under review, with the detailed specifications for the new weather station being reviewed and accepted by the Council. At the time of writing this report, the target date for the commencement of landfilling at the site was in approximately 18 months time (April 2019), and approximately 7 months of data was forwarded to Council for review.

Recommendation 4 was implemented with the exception of the additions noted above, and attendance of Council officers at the neighbourhood liaison group meetings. Additional work was also undertaken, liaising with the project team around the detailed requirements of the consent, assessing how these may be impacted during the progression through from concept to final design, with consideration also being given to changes in legislation and current best practice. This work is predominantly considered to be outside the scope of the baseline monitoring programme, however where there are resultant changes to the baseline monitoring programme they have been included in the report.

Contrary to recommendation 5, STDC was given notice of the Councils intent to review the conditions of the consent in June 2017. It was considered that additional review opportunities were required so that the

Council could ensure that the conditions of the consent continued to adequately control the potential adverse effects of the activities as the final design, operation and management plan and annual monitoring plan were developed.

3.4 Alterations to monitoring programmes for 2017-2018

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

- the extent of information made available by previous authorities;
- its relevance under the RMA;
- its obligations to monitor emissions, discharges and their effects under the RMA; and
- to report 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 emitting to the atmosphere and discharging to the environment.

It is proposed that for 2017-2018 the monitoring be amended, as the proposal to construct a Central landfill site at Eltham has been confirmed, and the timing of the works dictates that some aspects of the baseline monitoring recommence and that others are expanded.

3.5 Exercise of optional review of consents

Resource consents **5347-1, 5348-1, 5349-1, 5350-1, and 5351-1** all provide for an optional review of the consent in December 2017 and/or June 2018 and/or within 18 months of the exercise of the consents. Conditions 27, 19, 19, 10 and 12 respectively allow the Council to review the consents, for the purpose of:

i. assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in the Annual Monitoring Plan required by each of the consents; and
ii. assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the:

    - discharge of contaminants to the various media, or
    - the damming and diversion of water, or
    - the construction or maintenance of structures.

Although the consents are yet to be exercised, the detailed designs are being developed. It is considered that the review only be pursued, should there be sufficient information to allow the consent conditions to be aligned with the changes in design, landfill operation and management methodology, National Regulations and current best practice.

4 Recommendations

1. STDC install the additional bores and undertake any necessary maintenance work required on any of the existing bores listed in Table 5 of this report, prior to October 2017.
2. STDC survey all bores to provide accurate ground reduced levels and casing heights.
3. STDC Locate and appropriately retire all groundwater bores from within the landfill foot print that will not be used for monitoring, as identified in Table 6 of this report.
4. The baseline monitoring of the Eltham Central landfill site in 2017-2018 be amended from that of 2016-2017 to include:
    a. Provision for attendance at the neighbourhood liaison group meetings, ad-hoc meetings and liaison/consultation with consent holder.
    b. Additional receiving water sites for physicochemical and biological baseline monitoring in the main tributary upstream of any discharges from the sites, and in the southern landfill tributary, as appropriate and dictated by the timing of the on site works.
    c. Expansion of the physicochemical and biological parameters to include those listed in the consent for on-going monitoring, those deemed necessary for surface water characterisation, and those identified as possible landfill contaminants.
    d. Water level monitoring to be commenced as soon as possible, and undertaken at least quarterly in the majority of bores to monitor seasonal effects, and using downhole loggers in at least three (shallow, moderate, deep) bores, at 15 minute intervals, to provide a more comprehensive dataset.
    e. Recommencement of groundwater physicochemical baseline monitoring in all bores listed in Table 5, on a biannual basis, with the parameters for baseline monitoring including those listed in the consent for on-going monitoring, those deemed necessary for groundwater characterisation, and those identified as possible landfill contaminants. This baseline monitoring is to be commenced in October 2017 and be carried out at times of high and low groundwater levels to capture any seasonal differences.
    f. Baseline monitoring of the neighbours water supplies as identified in condition 17 (h) of consent 5347-1.
    g. Recommencement of biannual macroinvertebrate surveys.
    h. An annual inspection of the weather station and review of the data collected.
    i. Increased time for writing the annual report due to the expanded baseline monitoring programme.
5. THAT the option for a review of resource consents 5347-1, 5348-1, 5349-1, 5350-1, and 5351-1 in December 2017 and/or June 2018 and/or within 18 months of the exercise of the consents, as set out in conditions 27, 19, 19, 10 and 12 of the consents, be exercised if and when there is sufficient certainty regarding the landfill design, and operation and management practices to be implemented at the site, and the potential adverse effects of any changes have been evaluated.

Glossary of common terms and abbreviations

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

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.
BODCF	Carbonaceous biochemical oxygen demand of a filtered sample. A measure of the presence of degradable dissolved 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.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m.
Cu*	Copper.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
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.
GIS	Geographical information system. A system designed to capture, store, manipulate, manage, and present spatial or geographic data. It can be used to visualize, question, analyse, and interpret data to understand relationships, patterns, and trends.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square metres.
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.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
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).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act* 1991 and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
TCLP	Toxicity characteristic leaching procedure is a soil sample extraction method using an appropriately buffered acidic solution. Chemical analysis of the extract is undertaken. This is employed as an analytical method to simulate leaching through a landfill.
Taradise	Council geographical information system.
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 the Council's laboratory.

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Appendix I

Resource consents held by STDC for the Eltham Central landfill

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

Discharge Permit

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

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA
Consent Granted Date	15 March 2000

Conditions of Consent

Consent Granted:	To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham, at or about GR: Q20:222-936
Expiry Date:	June 2034
Review Date(s):	June 2005, June 2011, June 2017, June 2023, June 2029
Site Location:	Central Landfill Rotokare Road Eltham
Legal Description:	Pt Sec 26 Sec 27 Blk XIV Ngaere SD

*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 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 :

a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

b) the Management Plan shall be reviewed and updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

c) the consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. THAT the consent holder shall ensure that:

a) the operation of the landfill and the disposal of wastes shall be carried out at all times in accordance with the requirements of the Landfill Management Plan prepared as required in Condition (1) above or subsequent version of that document which does not lessen environmental protection standards;

b) all site staff working at the landfill are regularly trained on the content and implementation of the Landfill Management Plan, the maximum period between training sessions being 12 months. New staff are to be trained on recruitment and the training record made available to the General Manager, Taranaki Regional Council upon request; and

c) in order to avoid adverse effects arising from the exercise of this consent, all site staff are advised immediately of any revision or additions to the Landfill Management Plan.

3. THAT the consent holder shall meet the reasonable cost of the Taranaki Regional Council retaining a Technical Advisor, suitably qualified and knowledgeable in landfill development and operational procedures, to advise the General Manager, Taranaki Regional Council on aspects of the operation of the landfill related to disposal of solid waste and the installation and maintenance of the leachate collection system, and the ability to achieve compliance with the conditions of consent. Apart from other activities undertaken by the Technical Advisor, the Advisor shall undertake annual reviews, or other such reviews as reasonably determined by the General Manager, Taranaki Regional Council, of the landfill operations for the first 6 years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council, in consultation with the Neighbourhood Liaison Group.

4. THAT the consent holder shall:

a) construct a composite liner in all areas where refuse is to be placed. The liner shall be constructed with a layer of compacted clay with a permeability of less than $1x10^{-8}$ m/sec and a minimum thickness of 600 mm, overlain by a membrane of high density polyethylene HDPE at least 1.5 mm thick. The consent holder may use materials and a specification other than described above, provided that any such materials shall perform to the same or higher standard than those specified and provided further that the consent holder shall first obtain the written approval of the General Manager, Taranaki Regional Council; and

b) provide for collecting leachate from the liner and transferring it to a pond within the landfill property boundary, such pond to be lined with a composite liner as specified in Condition 4(a) above;

c) ensure there is no discharge of refuse or leachate to land or water in any area without the liner as required in Conditions 4a and 4b above; and

d) remove sufficient daily cover and remove at least 20% of the intermediate cover to ensure downward migration of leachate, before placing refuse on an existing cell.

5. THAT the construction, installation, placement, integrity and expected performance of landfill lining systems, groundwater drainage systems, and leachate interception, collection, holding and recirculation systems on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to General Manager, Taranaki Regional Council, prior to discharge of waste in those areas.

6. THAT the consent holder shall maintain a manifest / declaration system that shall record the following information on the waste received for disposal. This information is to be forwarded to the General Manager, Taranaki Regional Council on a 6-monthly basis no later than the 10^{th} working day of the following month:

a) general description in volume or quantity in cubic metres or kilograms per day of domestic, commercial and industrial waste received from other than transfer stations; and

b) general description in volume or quantity (in cubic metres or kilograms) of all waste received at the landfill from transfer stations.

Where the consent holder reasonably considers any information required under this condition is confidential, it may notify the General Manager, Taranaki Regional Council, accordingly so that reasonable measures can be taken to protect confidentiality.

7. THAT the consent holder shall ensure that:

   a) Medical waste is managed in accordance with NZS4304;

   b) Animal parts are buried immediately upon receipt

   c) Asbestos is managed in accordance with the Asbestos Regulations;

   d) Waste that is potentially a health hazard shall be placed in a hole specifically excavated and immediately covered with appropriate cover material. The location of special waste holes shall be recorded by survey.

8. THAT any contaminated soils that are accepted at the landfill and whose contaminant concentration exceeds those levels specified in any New Zealand Standard or guidelines as being appropriate for industrial unpaved sites shall be covered over as soon as practicable such that the risk to human and environmental health is avoided.

9. THAT the consent holder shall appoint a person to control entry of waste into the landfill.

10. THAT the consent holder shall not dispose of waste of an explosive, flammable, reactive, toxic, radioactive, corrosive or infectious nature other than minor quantities of such waste where they are ordinarily part of and found in general wastes. In addition, the consent holder shall not dispose of wastes deemed unacceptable under Conditions 11 and 12.

11. THAT further to Condition 10 of this consent, the wastes which are acceptable or unacceptable are as follows:

   a) General waste is solid waste generated from residential, commercial and industrial sources. General waste covers all waste not otherwise defined below. It is acceptable and may contain minor quantities of special or prohibited waste which are normally part of the waste stream;

   b) Difficult wastes are wastes which are acceptable but due to their physical nature require specific disposal management. These wastes include offal, dead animal bodies, wire rope, documents and bulky items;

   c) Special Wastes contain substances that may adversely affect the final landfill or leachate or landfill gas quality. Their acceptance in the landfill shall be based on an assessment of the nature of the waste and its effects on the landfill and its receiving environment in accordance with the requirements of Condition 12 of this consent;

   d) Liquid wastes shall not be accepted other than those liquids which are in small containers that are impractical to empty ;

   e) Sludges may be accepted, as long as they contain no separated liquids.

12. THAT no waste shall be accepted for disposal which may cause a significant potential or actual adverse environmental effect. In the absence of other criteria, no wastes shall be accepted:

   a) if a TCLP test extract exceeds 2,500 times the level specified in any New Zealand Standard or guideline as being appropriate for stock watering purposes; or

   b) if containing any contaminant exceeding 300 times the level specified in any New Zealand Standard or guideline as being appropriate for soil for agricultural use unless such wastes have been treated so as to comply with conditions as above and are not placed within the top 4 metres lift of refuse beneath any final landfill cap at any point.

13. THAT in order to maintain the integrity of the liner and to minimise the risk of discharge of contaminants, the consent holder shall ensure that special wastes as defined in Condition 11(c) shall not be deposited within 5 metres of the liner or the top 4 metres lift of refuse beneath the final landfill cap at any point or within 10 metres of the edge of the landfill.

14. THAT the consent holder shall take all practicable measures to avoid the discharge of contaminants from within the landfill site to surrounding land. To this end, the consent holder shall ensure:

    a) refuse is spread in thin layers and is compacted on the same day refuse is received;

    b) the amount of refuse exposed at any one time is confined to a practicable minimum; and

    c) exposed refuse is covered regularly with appropriate material and in any case no less frequently than daily.

15. THAT the consent holder shall:

    a) compact refuse to such an extent that post closure settlement is minimised, targeting a compacted refuse density averaging at least 700 kg/m^3 as far as practicable;

    b) progressively, as parts of the landfill are completed, cover exposed refuse with not less than 650 mm of earth material, of which 500 mm is compacted to a permeability of less than $1x10^{-7}$m/sec, and no less than 150 mm comprises topsoil, and establish and maintain pasture on those completed areas at the landfill; and

    c) within two months following the closure of any landfill stage, grade the tipping face to achieve a final slope less than or equal to 1V:3H (1 in 3) on any face.

16. THAT within one month following completion of each stage at the landfill, the consent holder shall report in writing to the General Manager, Taranaki Regional Council of the consent holder's compliance with Condition 15 of this consent.

17. THAT the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The Plan shall describe in detail practices for water and soil chemistry monitoring, shall contain guidelines for the determination of whether contamination is occurring including "alert" and "response" levels for individual contaminants and shall make reference to the Management Plan, to be prepared as required in Condition 1 of this consent. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any discharge of solid wastes authorised by this consent. The initial Monitoring Plan is to include:

    a) further baseline monitoring [biological, chemical and physical] of surface water quality and groundwater prior to commencement of landfilling;

    b) quarterly monitoring of groundwater levels and water quality of each of the existing monitoring bores shown in Figure 4 of the application documentation dated May 1998, plus the installation and monitoring of at least one further bore downslope of the leachate storage lagoon at a site approved by the General Manager, Taranaki Regional Council;

    c) biological, physical and chemical monitoring of surface water quality twice per year in the two unnamed tributaries of the Waingongoro River at site(s) approved by the General Manager, Taranaki Regional Council;

d) measurement of volume of leachate removed from the site monthly;

e) annual testing of leachate for the following components: pH, conductivity, alkalinity, chloride, sulphate, carbonate, bicarbonate, ammonia–N, nitrate-N, reactive dissolved phosphorus; COD, BOD_5; aluminium, arsenic, boron, cadmium, calcium, chromium, copper, iron, magnesium, manganese, mercury, sodium, nickel, potassium, lead, zinc; volatile organic compounds, semi-volatile organic compounds [volatile and semi-volatile organic compound scans to include but not be restricted to benzene, benzo-a-pyrene, phenol, perchlorethylene, and napthalene], organochlorine pesticides screen, organophosphate pesticide screen, and polyaromatic hydrocarbon screen;

f) quarterly testing of leachate for the following components: pH, conductivity, alkalinity, chloride, sulphate, carbonate, bicarbonate, ammonia–N, nitrate-N, reactive dissolved phosphorus; COD, BOD_5; aluminium, arsenic, boron, cadmium, calcium, chromium, copper, iron, magnesium, manganese, mercury, sodium, nickel, potassium, lead, zinc;

g) quarterly sampling and testing of groundwater from on-site bores as noted in Condition 17(b) above as follows: Comprehensive testing (April) - pH, conductivity, alkalinity, chloride, sulphate, carbonate, bicarbonate, ammonia–N, nitrate-N, reactive dissolved phosphorus; COD, BOD_5; aluminium, arsenic, boron, cadmium, calcium, chromium, copper, iron, magnesium, manganese, mercury, sodium, nickel, potassium, lead, zinc, benzo-a-pyrene, benzene, phenol, perchlorethylene, and napthalene; Indicator testing (July, October, January) - pH, conductivity, COD, boron, iron, manganese, chloride, ammonia-N, nitrate-N;

h) annual sampling and testing of surface water supplies and bores on neighbouring properties, located as noted in Appendix 10 of the application documentation dated May 1998, subject to the agreement of the respective owners, as follows: pH, benzene, zinc, alkalinity, conductivity, chloride, ammonia–N, nitrate-N, nitrite-N, boron, COD, iron, manganese; and

i) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured.

18. THAT the results of the Annual Monitoring Programme for the year ending 30 June be provided to the General Manager Taranaki Regional Council by 31 August of each year following the monitoring, and be made available to the Neighbourhood Liaison Group, and to any other interested party.

19. THAT the consent holder shall prevent surface runoff of water or contaminants to the unnamed tributaries of the Waingongoro River 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.

20. THAT where any leachate or other contaminants associated with the consent holder's activities or processes associated with the landfill significantly affect surface and ground water, the consent holder shall:

a) undertake appropriate remedial action as soon as practicable as described in the consent holder's Management Plan required by Condition 1, or other such action reasonably required by the General Manager, Taranaki Regional Council;

b) as soon as reasonably practicable, notify the General Manager, Taranaki Regional Council, of the escape of wastes;

c) shall review the Monitoring Programme and Management Plan and incorporate such reasonable modifications as are considered necessary by the General Manager, Taranaki Regional Council; and

d) where water supplies are significantly affected, immediately provide alternative supplies as reasonably required by the General Manager, Taranaki Regional Council.

"Significantly affected" for the purposes of this condition shall be determined by the General Manager Taranaki Regional Council, by reference to the monitoring data and taking into account the purpose for which the water is to be used.

21. THAT the consent holder shall inspect the landfill for leachate break out, settlement and other adverse environmental effects at least once per month until such time as discharge of refuse to the landfill ceases. Thereafter, the frequency of inspection shall be determined in consultation with the General Manager, Taranaki Regional Council.

22. THAT the consent holder shall record the date, time, observations and any remedial action as a result of Condition 21. The record shall be made available to the Neighbourhood Liaison Group and the General Manager, Taranaki Regional Council on an annual basis.

23. THAT the consent holder shall ensure that records are kept of any site investigations for any engineering works associated with this consent, and that these records are forwarded to the General Manager, Taranaki Regional Council.

24. THAT the consent holder and staff of the Taranaki Regional Council shall meet, with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

(a) one month prior to the exercise of this consent;

(b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

(c) thereafter at one interval of no more than six months; and

(d) thereafter at intervals of no more than twelve months;

unless all parties agree that changes to the intervals are acceptable.

The Technical Adviser may attend one meeting per year for the first six years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council

25. THAT this consent shall lapse on the expiry of 5 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(1)(b) of the Resource Management Act 1991.

26. The consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the results of monitoring, provided that such application may not be made more than once in any twelve month period.

27. THAT the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 17 of this consent; and
ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to land.

The review of conditions may allow for:

a) modification of the Monitoring Programme and methods of implementation outlined in Condition 17 of this consent;

b) deletion, additions or changes to General Condition (d) and Conditions 3, 4, 7, 8, 11, 13, 14, 15 and 20.

Signed at Stratford on 15 March 2000

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:	South Taranaki District Council Private Bag 902 HAWERA
Consent Granted Date:	15 March 2000

Conditions of Consent

Consent Granted:	To discharge emissions into the air from landfilling activities at the South Taranaki District Council Central Lanfill, Eltham, at or about GR: Q20:222-936
Expiry Date:	1 June 2034
Review Date(s):	June 2005, June 2011, June 2017, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Legal Description:	Pt Sec 26 Sec 27 Blk XIV Ngaere SD

*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 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:

a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

b) the Management Plan shall be reviewed and updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

c) The consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect that already allowed; and

d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. THAT the consent holder shall at all times adopt the best practicable option [as defined in section 2 of the Act] to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the landfill operation.

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

4. THAT the discharge of contaminants into the air from the landfill shall not result in either dust or other particulate matter that is offensive or objectionable, in the opinion of an appropriately qualified enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the site.

5. THAT the consent holder shall ensure that dust is controlled on access roads and on the landfill as necessary.

6. THAT there shall be no burning of waste at the site.

7. THAT there shall be no composting of waste at the site.

8. THAT there shall be no extraction venting of untreated landfill gases within 200 metres of the boundary of the site.

9. THAT the consent holder shall take all practicable measures to avoid the discharge of waste or contaminants from within the landfill site to the surrounding environment. To this end, the consent holder shall ensure:

   a) refuse is spread in thin layers and is compacted on the same day refuse is received;

   b) the amount of refuse exposed at any one time is confined to a practicable minimum; and

   c) exposed refuse is covered regularly with appropriate material and in any case no less frequently than daily.

10. THAT the consent holder shall maintain and comply with an Annual Monitoring Plan, prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council, and prepared in consultation with the Neighbourhood Liaison Group, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any discharge under this consent. The initial Monitoring Plan is to include:

    a) annual sampling of landfill gas constituents for a period of five years and thereafter at five yearly intervals from a suitable landfill gas well using a tech tube or equivalent method to the satisfaction of the General Manager Taranaki Regional Council. The head space in the water monitoring bores B1 and B3, as shown in Figures 5 and 8 of Appendix 4 of the application documentation dated May 1998, and in the leachate pump chamber shall also be sampled;

    b) samples shall be monitored and analysed for: hydrogen sulphide, methane and carbon dioxide, vinyl chloride, benzene, perchlorethlyene and xylene;

    c) every five years another landfill gas well shall be installed in waste placed in the preceding five years and monitored as in (a) and (b) above;

    d) monitoring of each well shall cease when there is a significant reduction in the level of landfill gas [to the reasonable satisfaction of the General Manager, Taranaki Regional Council];

    e) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured; and

    f) monthly odour surveys around the perimeter of the site or a lesser frequency as agreed to by the Neighbourhood Liaison Group.

11. THAT a meteorological station be established, at a site to the reasonable satisfaction of the General Manager, Taranaki Regional Council, to measure and record, for a period of no less than 12 months commencing within one year of the development of the site, wind speed, wind direction, temperature and net radiation . The results are to be used to undertake dispersion modelling to predict ground level concentrations of hydrogen sulphide or other gaseous or airborne contaminants around the site.

12. THAT in fulfilment of Condition 11 above the meteorological parameters are to be measured as specified in Appendix 10 to the application documentation dated May 1998.

13. THAT the consent holder shall keep a record of any complaints received relating to discharges to air with respect to the landfill activity. The complaints record shall include the following where possible:

    a) name and address of complainant;

    b) nature of complaint;

    c) date and time of the complaint and alleged event;

    d) weather conditions at the time of the event; and

    e) any action taken in response to the complaint.

14. THAT the results of the Annual Monitoring Plan, the complaints record, and the meteorological data, for the year ending 30 June be provided to the General Manager Taranaki Regional Council by 31 August of each year following the monitoring, and be made available to the Neighbourhood Liaison Group, and to the public.

15. THAT the consent holder shall ensure that records are kept of any site investigations for any engineering works associated with this consent, and that these records are forwarded to the General Manager, Taranaki Regional Council.

16. THAT the consent holder and staff of the Taranaki Regional Council shall meet with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

    (a) one month prior to the exercise of this consent;

    (b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

    (c) thereafter at one interval of no more than six months; and

    (d) thereafter at intervals of no more than twelve months;

    unless all parties agree that changes to the intervals are acceptable.

    The Technical Adviser may attend one meeting per year for the first six years and thereafter a frequency determined by the General Manager, Taranaki Regional Council.

17. That this consent shall lapse on the expiry of 5 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(1)(b) of the Resource Management Act 1991.

18. The consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the results of monitoring provided that such application may not be more than once in any twelve month period.

19. THAT the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

    i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 10 of this consent; and

    ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to air.

    The review of conditions may allow for:

    a) modification of the Monitoring Programme and methods of implementation outlined in Condition 10 of this consent; and

    b) deletion, additions or changes to conditions 2, 3, 4 and 9 and General Condition (d).

Signed at Stratford on 15 March 2000

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:	South Taranaki District Council Private Bag 902 HAWERA
Consent Granted Date:	15 March 2000

Conditions of Consent

Consent Granted:	To discharge up to 15,000 cubic metres/day of uncontaminated stormwater and 4000 cubic metres/day of treated stormwater from the South Taranaki District Council Central Landfill, Eltham, onto and into land and into an unnamed tributary of the Waingongoro River at or about GR: Q20:222-936
Expiry Date:	1 June 2034
Review Date(s):	June 2005, June 2011, June 2017, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Legal Description:	Pt Sec 26 Sec 27 Blk XIV Ngaere SD
Catchment:	Waingongoro
Tributaries:	Unnamed

*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 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:

a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

b) The Management Plan shall be updated at not greater than two yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council, and following consultation with the Neighbourhood Liaison Group;

c) The consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

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

3. THAT in order to give effect to Condition 2, the consent holder shall ensure that the leachate storage lagoon is bunded to ensure no entry of stormwater to that lagoon.

4. THAT the consent holder shall at all times adopt the best practicable option [as defined in section 2 of the Act] to keep uncontaminated stormwater separate from contaminated stormwater.

5. THAT no contaminated stormwater be discharged directly to the unnamed tributaries of the Waingongoro River.

6. THAT stormwater holding ponds be installed.

7. THAT after allowing for reasonable mixing in a zone that extends downstream no further than the western boundary of the site ["the mixing zone"], the discharge shall not give rise to all or any of the following effects in the receiving water:

   (a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

   (b) any conspicuous change in the colour or visual clarity;

   (c) any emission of objectionable odour;

   (d) the rendering of freshwater unsuitable for consumption by farm animals; and

   (e) any significant adverse effects on aquatic life.

8. THAT the exercise of this consent shall not cause the water quality of the tributary streams, beyond the mixing zone, to exceed the following criteria:

Parameter	Limit	
pH	6.0-9.0	
Copper (dissolved)	0.01	g/m^3
Iron (dissolved)	1.0	g/m^3
Manganese (dissolved)	0.01	g/m^3
Zinc (dissolved)	0.1	g/m^3
Dissolved reactive phosphorus	0.5	g/m^3
Nitrate nitrogen	10	g/m^3
Ammonia nitrogen	1.8	g/m^3
Suspended solids	100	g/m^3
Faecal coliforms	1000	n/100 ml

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

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

11. 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 associated with the exercise of this consent.

12. THAT the consent holder shall minimise disturbance to riparian vegetation during the exercise of this consent, and shall undertake, at a minimum, planting within the site in accordance with those areas shown in Figures 5a, 5b, 5c, and 5d of the Assessment of Environmental Effects accompanying the application dated May 1998.

13. THAT the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Plan shall describe in detail practices for water monitoring. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is

to be received by the General Manager, Taranaki Regional Council, at least six months prior to any discharge under this consent. The initial Monitoring Plan is to include:

a) biological and water quality monitoring twice per year in the two unnamed tributaries of the Waingongoro River at site(s) to the reasonable satisfaction of the General Manager, Taranaki Regional Council;

b) monitoring of the parameters as set out in Condition 8 above, and also alkalinity, BOD_5, and conductivity; and

c) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured.

14. THAT the results of the Annual Monitoring Programme for the year ending 30 June be provided to the General Manager Taranaki Regional Council by 31 August of each year following the monitoring, and be made available to the Neighbourhood Liaison Group, and to any other interested party, and to the public.

15. THAT the construction, installation, placement, integrity and expected performance of stormwater collection, drainage and holding systems on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to the General Manager, Taranaki Regional Council, prior to and on completion of construction of any such systems, and prior to the disposal of any waste in those areas.

16. THAT the consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least once per year, with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

(a) one month prior to the exercise of this consent;

(b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

(c) thereafter at one interval of no more than six months; and

(d) thereafter at intervals of no more than twelve months;

unless all parties agree that changes to the intervals are acceptable.

The Technical Adviser may attend one meeting per year for the first six years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council.

17. THAT this consent shall lapse on the expiry of 5 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(1)(b) of the Resource Management Act 1991.

18. The consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act to take account of operational requirements or the results of monitoring provided that such application may not be made more than once in any twelve month period.

19. THAT the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 13 of this consent; and

ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to land and water.

The review of conditions may allow for:

a) modification of the Monitoring Programme and methods of implementation outlined in Condition 13 of this consent; and

b) deletion, additions or changes to Conditions 7 and 8 and General Condition (d).

Signed at Stratford on 15 March 2000

For and on behalf of
Taranaki Regional Council

_____

General Manager

Land Use Consent

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

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA
Consent Granted Date:	15 March 2000

Conditions of Consent

Consent Granted:	To dam and divert water around the South Taranaki District Council Central Landfill, Eltham, in the headwaters of an unnamed tributary of the Waingongoro River at or about GR: Q20:222-936
Expiry Date:	1 June 2034
Review Date(s):	June 2005, June 2011, June 2017, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Legal Description:	Pt Sec 26 Sec 27 Blk XIV Ngaere SD
Catchment:	Waingongoro
Tributary:	Unnamed

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

Consent 5350-1

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:

a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

b) the Management Plan shall be reviewed and updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

c) the consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. 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.

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

4. 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 associated with the exercise of this consent.

5. THAT the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any dam construction under this consent. The initial Monitoring Plan shall describe in detail practices and sites for water monitoring.

6. THAT the construction, installation, placement, integrity and expected performance of the damming and diversion systems on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to the General Manager, Taranaki Regional Council, prior to and on completion of the construction of any such systems in those areas.

7. THAT the consent holder and staff of the Taranaki Regional Council shall meet with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

   (a) one month prior to the exercise of this consent;

   (b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

   (c) thereafter at one interval of no more than six months; and

   (d) thereafter at intervals of no more than twelve months;

   unless all parties agree that changes to the intervals are acceptable.

   The Technical Adviser may attend one meeting per year for the first six years and thereafter a frequency determined by the General Manager, Taranaki Regional Council.

8. That this consent shall lapse on the expiry of 5 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(1)(b) of the Resource Management Act 1991.

9. The consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the results of monitoring provided that such application may not be made more than once in any twelve month period.

10. THAT the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 5 of this consent; and

ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the damming and diversion of water.

The review of conditions may allow for:

a) modification of the Monitoring Programme and methods of implementation outlined in Condition 5 of this consent; and
b) deletion, additions or changes to General Condition (d).

Signed at Stratford on 15 March 2000

For and on behalf of
Taranaki Regional Council

_____

General Manager

Land Use Consent

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

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA
Consent Granted Date:	15 March 2000

Conditions of Consent

Consent Granted:	To erect, place and maintain structures in the beds of unnamed tributaries of the Waingongoro River for the construction and maintenance of the South Taranaki District Council Landfill, Eltham, at or about GR: Q20:222-936
Expiry Date:	1 June 2034
Review Date(s):	June 2005, June 2011, June 2017, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Legal Description:	Pt Sec 26 Sec 27 Blk XIV Ngaere SD
Catchment:	Waingongoro
Tributaries:	Unnamed

*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 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:

a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

b) the Management Plan shall be updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

c) the consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. THAT the construction and maintenance authorised by this consent, in conjunction with the exercise of any other consent associated with the landfill, shall not give rise to all or any of the following effects in the unnamed tributaries of the Waingongoro River at the western boundary of the site:

a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

b) any conspicuous change in the colour or visual clarity;

c) any emission of objectionable odour;

d) the rendering of freshwater unsuitable for consumption by farm animals; and

e) any significant adverse effects on aquatic life.

3. THAT the earthworks and construction associated with the erection, placement and maintenance of structures shall be designed, constructed and maintained so as to minimise instability of the stream banks and the surrounding land.

4. THAT the consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the structures.

5. THAT the consent holder shall minimise disturbance to riparian vegetation during the exercise of this consent, and that any areas of such vegetation disturbed shall be reinstated and additional areas planted within the site in accordance with those areas shown in Figures 5a, 5b, 5c, and 5d of the Assessment of Environmental Effects accompanying the application dated May 1998.

6. THAT the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any streambed structure construction under this consent. The initial Monitoring Plan shall describe in detail practices and sites for water monitoring.

7. THAT the construction, installation, placement, integrity and expected performance of the structures in the streambeds on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to the General Manager, Taranaki Regional Council, prior to and on completion of the construction of any structures in those areas.

8. THAT the consent holder shall remove any structure(s) in waterways and reinstate the area if and when any structure(s) is no longer required.

9. THAT the consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least once per year, with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

(a) one month prior to the exercise of this consent;

(b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

(c) thereafter at one interval of no more than six months; and

(d) thereafter at intervals of no more than twelve months;

unless all parties agree that changes to the intervals are acceptable.

The Technical Adviser may attend one meeting per year for the first six years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council.

10. THAT this consent shall lapse on the expiry of 5 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(1)(b) of the Resource Management Act 1991.

11. The consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the results of monitoring provided that such application may not be made more than once in any twelve month period.

12. THAT the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

    i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 6 of this consent; and
    ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the construction and maintenance of structures.

    The review of conditions may allow for:

    a) modification of the Monitoring Programme and methods of implementation outlined in Condition 6 of this consent; and
    b) deletion, additions or changes to General Condition (d) and Condition 2.

Signed at Stratford on 15 March 2000

For and on behalf of
Taranaki Regional Council

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General Manager

Appendix II

Biomonitoring report

To	Job Manager, Lorraine Smith
From	Scientific Officer, Brooke Thomas
Report No	BT068
Doc No	1808347
Date	14 March 2017

Biomonitoring of an unnamed tributary of the Waingongoro River which drains the proposed Eltham Central landfill site, December 2016

Introduction

In 1996, South Taranaki District Council ('STDC') instigated plans to develop a landfill (Central landfill) just south of Eltham Township, for the purpose of accepting waste from Stratford and South Taranaki Districts. More recently, these proposed plans were modified to allow for a regionalised approach to waste disposal which included the acceptance of waste from the New Plymouth District once the existing Colson Road landfill has reached capacity. The site is currently used for stock grazing and is likely to be until such time as the land fill development is ready to begin. Construction for the development of Eltham Central landfill is expected to begin in November 2018.

STDC hold resource consents to authorise discharges to land and to water in relation to the operations of the yet to be developed Central Landfill. The consents of specific interest to this survey are:

- 5347-1 to discharge contaminants onto and into land
- 5349-1 to discharge treated and untreated stormwater to an unnamed tributary of the Waingongoro River;

To date, a total of ten biomonitoring surveys have been undertaken in the vicinity of the site to provide baseline data prior to the establishment of the proposed Central Landfill. Previously biomonitoring in relation to the central landfill was scheduled to occur once every three years, with the last survey carried out in the 2011-2012 period. The current survey was undertaken 13 December 2016 and is the only survey scheduled for the 2016-2017 monitoring year. Results from surveys performed since the 1995-1996 monitoring year are also discussed in this report.

Methods

This biomonitoring survey was undertaken at three established sites in an unnamed tributary of the Waingongoro Stream on 13 December 2016; a site 450m downstream of the central landfill site (N2), a), a site 600m downstream of the central landfill site (N3) and a site further downstream, 20m downstream of the confluence with an unnamed tributary (M1) (Table 1 and Figure 1)

Table 1 Biomonitoring sites in an unnamed tributary of the Waingongoro River related to the Central Landfill

Site No.	Site Code	Location	Sampling method	Altitude (masl)	Time sampled (NZST)	Temperature (°C)
N2	WGG000647	450 metres downstream of Central landfill, upstream of SH3	Vegetation sweep	200	1355	14.6
N3	WGG000648	600 metres downstream of Central landfill	Vegetation sweep	200	1345	16.2
M1	WGG000654	20 metres downstream of confluence with another tributary	Vegetation sweep	200	1330	16.3

The standard '400 ml sweep-sampling' technique was used to sample macroinvertebrates from all three sites in an unnamed tributary of the Waingongoro River (Table 1and Figure 1). The 'sweep-sampling' technique is very similar to Protocol C2 (soft-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate sampling in wadeable streams (Stark *et al*, 2001).

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark *et al*. 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams (MCI). Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1 and 0.1 in hard bottomed and soft bottomed streams respectively. The sensitivity scores for certain taxa found in hard bottomed streams have been modified in accordance with Taranaki experience. After extensive use of the MCI, categories were assigned to the sensitivity scores, to clarify their 'relative' sensitivity e.g. taxa that scored between 1 and 4 inclusive are considered tolerant (see Table 3). A difference of 11 units or more in MCI values is considered significantly different (Stark 1998).

By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value ($SQMCI_s$) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the $SQMCI_s$ is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower. A difference of 0.9 units or more in $SQMCI_s$ is considered significantly different

(Stark, 1998).

Figure 1 Biomonitoring sites in the two unnamed tributaries of the Waingongoro River, below the proposed Eltham central landfill site

Results

Site habitat characteristics and hydrology

This December 2016 survey followed a period of 16 days since a fresh in excess of three times median flow, and 26 days since a fresh in excess of seven times median flow. Water temperatures in the unnamed tributary of Waingongoro River ranged from 14.6 to 16.3 °C. The upstream site (N2) was characterised by an uncoloured, clear, very low and slow flow. This site was partially shaded by vegetation, mainly long grasses. Macrophytes were recorded growing at both the edges and on the bed of the stream. The substrate was predominantly silt with some sand, fine gravel and hard clay. Sites N3 and M1 had a more well-defined channel, with an uncoloured, clear, low and very slow flow. Substrate comprised predominantly hard clay with silt, sand and fine and coarse gravels. Sites N3 and M1 were completely unshaded and bare of any true riparian cover. Macrophytes were

widespread at both N3 and M1. No periphyton mats or filamentous algae were recorded at any of the three sites.

Macroinvertebrate communities

A summary of the results from previous surveys and the current survey is presented in Table 2. The macroinvertebrate fauna recorded by the current survey at each of the three sites are presented in Table 3. Table 4 provides a summary of various macroinvertebrate indices within a specific altitudinal band for 'control' sites situated in smaller (lowland) hill country streams.

Table 2 Summary of macroinvertebrate taxa numbers and MCI values for the current survey and previous surveys performed between July 1995 and May 2012

Site	Number of previous surveys	Taxa numbers			MCI values			SQMCI values			
		Range	Median	Current Survey	Range	Median	Current Survey	No. of previous surveys	Range	Median	Current survey
N2	9	8-15	13	16	73-95	81	80	6	3.4-5.2	4.6	4.6
N3	9	10-22	14	6	66-87	76	70	6	3.7-4.8	4.5	4.5
M1	9	10-16	14	9	66-80	74	60	6	3.7-4.8	4.4	4.1

Table 3 Macroinvertebrate fauna of an unnamed tributary of the Waingongoro River in relation to the proposed STDC central landfill, Eltham sampled on 13 December 2017

Taxa List	Site Number	MCI score	N2	N3	M1
	Site Code		WGG000647	WGG000648	WGG000654
	Sample Number		FWB16287	FWB16288	FWB16289
ANNELIDA (WORMS)	Oligochaeta	1	A	-	R
	Lumbricidae	5	R	-	-
MOLLUSCA	*Potamopyrgus*	4	XA	XA	XA
CRUSTACEA	Ostracoda	1	-	C	C
	Paracalliope	5	XA	XA	VA
	Paraleptamphopidae	5	XA	-	-
EPHEMEROPTERA (MAYFLIES)	*Zephlebia group*	7	A	-	-
HEMIPTERA (BUGS)	*Microvelia*	3	R	-	-
COLEOPTERA (BEETLES)	Dytiscidae	5	-	R	-
TRICHOPTERA (CADDISFLIES)	*Hydropsyche (Aoteapsyche)*	4	R	-	-
	Hydrobiosis	5	-	-	R
	Polyplectropus	6	R	-	-
DIPTERA (TRUE FLIES)	*Paralimnophila*	6	R	-	-
	Corynoneura	3	-	R	R
	Orthocladiinae	2	R	-	C
	Paradixa	4	R	-	-
	Empididae	3	R	-	R
	Psychodidae	1	R	-	-
	Austrosimulium	3	C	C	A
ACARINA (MITES)	Acarina	5	C	-	-
		No of taxa	16	6	9
		MCI	80	70	60
		SQMCIs	4.6	4.5	4.1
		EPT (taxa)	3	0	1
		%EPT (taxa)	19	0	11

'Tolerant' taxa | 'Moderately sensitive' taxa | 'Highly sensitive' taxa

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

Table 4 Range and median number of taxa,MCI values and SQMCIs scores for 'control' sites (Taranaki smaller (lowland) hill country rivers/streams at altitudes 200-249 m asl (TRC, 2016).

	No. of taxa	MCI value	$SQMCI_S$ value
No. Samples	188	188	109
Range	5-33	52-108	1.2-6.3
Median	18	79	4.0

Site N2 (WGG000647)

The very weedy habitat at site N2 supported a macroinvertebrate community of moderate richness (16 taxa), slightly above the median richness found by nine previous surveys (Table 2), but slightly below the median richness found at similar sites elsewhere in the region (Table 4).

The MCI score of 80 units indicated a community of 'fair' biological health which was not significantly different (Stark, 1998) to the median value calculated from previous surveys at the same site (median MCI score 81 units; Table 2) and was slightly below the previous survey score (MCI score 86 units) (Figure 2). This MCI score was slightly above the median result for comparable streams at similar altitudes (Table 4).The $SQMCI_S$ score of 4.6 units was the same as the median value calculated from previous surveys at the same site (Table 2) but was slightly above the median $SQMCI_S$ score found at similar sites elsewhere is the region ($SQMCI_S$ score; 4.0 units) (Table 2 and Table 4).

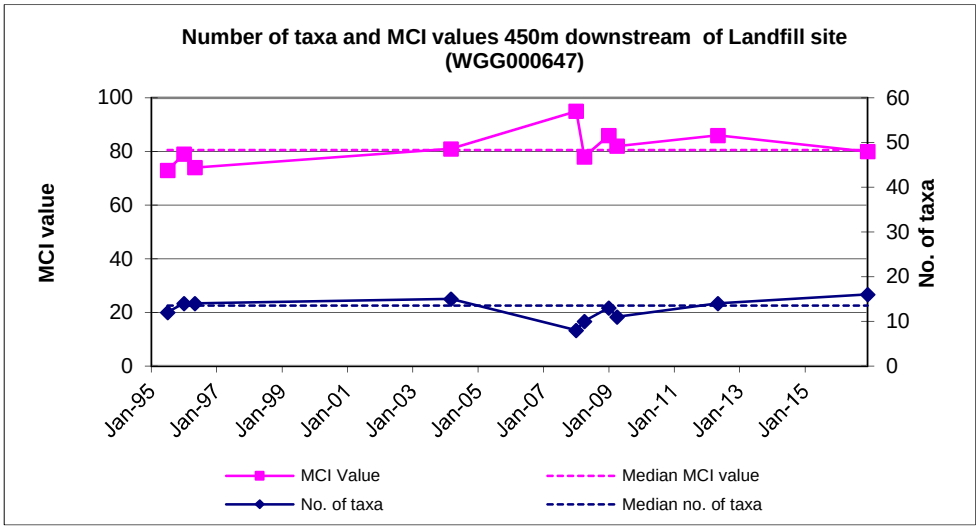

Figure 2 Number of taxa and MCI values 450 metres downstream of landfill site (WGG000647).

The community was dominated by two 'tolerant' taxa [extremely abundant snail (*Potamopyrgus*) and oligochaete worms] and three 'moderately sensitive' taxa [extremely abundant amphipods (*Paracalliope* and Paraleptamphopidae) and mayfly (*Zephlebia*)] (Table, 3).

Site N3 (WGG000648)

This weedy site, with a slightly slower flow, supported a low community richness of 6 taxa, well below the median taxa number previously recorded (Table 2). It was also the lowest number of taxa recorded at any of the three sites to date and substantially lower than the median richness found at similar sites elsewhere in the region (Table 4).

The MCI score of 70 units indicated a community of 'poor' biological health which was not significantly different (Stark, 1998) to the median value calculated from previous surveys at the same site (median MCI score 76 units; Table 2) and not significantly different to the median MCI result for comparable streams at similar altitudes (Table 4). This MCI score was also below the previous survey score (MCI score 76 units) (Figure 2). The $SQMCI_s$ score of 4.5 units was the same as the median value calculated from previous surveys but higher than the median $SQMCI_s$ score found at similar sites elsewhere is the region ($SQMCI_s$ score; 4.0 units) (Table 2 and Table 4).

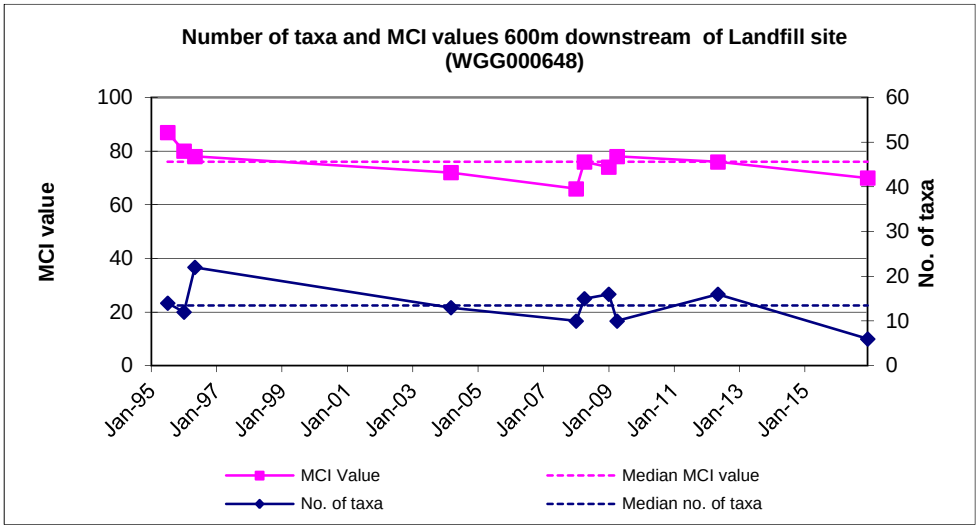

Figure 3 Number of taxa and MCI values 600 metres downstream of landfill site (WGG000648).

The community was characterised by one 'tolerant' taxon [extremely abundant snail (*Potamopyrgus*)] and one 'moderately sensitive' taxon [extremely abundant amphipod (*Paracalliope*)], both taxa commonly associated with soft-bedded, weedy, slower-flowing habitats (Table 3).

Site M1 (WGG000654)

This main tributary site, 20 m downstream of the confluence of the northern and southern tributary streams (Figure 1), had a richness of 9 taxa, the lowest number of taxa recorded at this site to date. This richness was well below the median recorded for the site (14 taxa) (Table 2) and well below the median richness found at similar sites elsewhere in the region (Table 4).

The MCI score of 60 units indicated a community of 'poor' biological health which was significantly lower (Stark, 1998) than the median value calculated from previous surveys at the same site (median MCI score 74 units; Table 2) and was below the previous survey score (MCI score 70 units) (Figure 4). This MCI score was also significantly (Stark, 1998) lower than the median MCI score recorded by similar streams at a comparable altitude (MCI score;

79 units).The $SQMCI_s$ score of 4.1 units was slightly lower than the median value calculated from previous surveys at the same site ($SQMCI_s$ score 4.4 units) (Table 2), but slightly above the median score recorded by similar sites elsewhere in the region (Table 4).

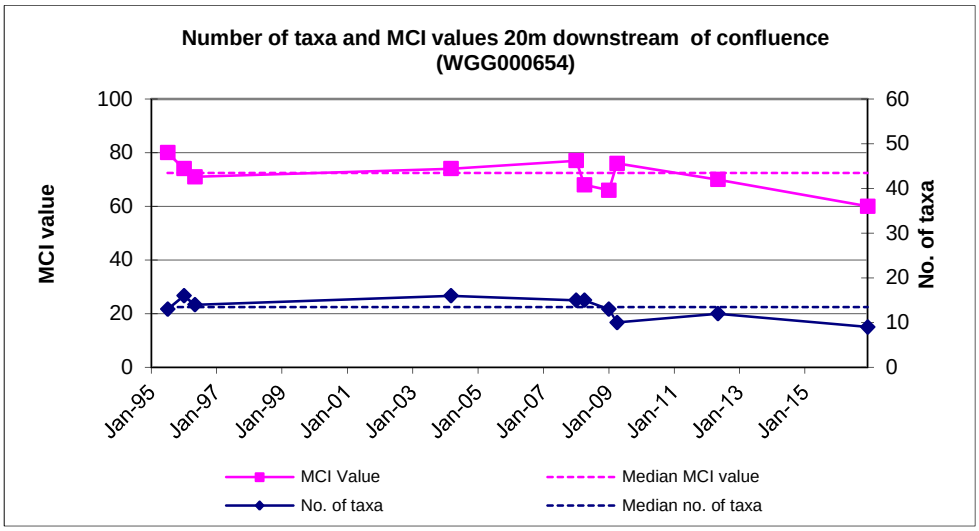

Figure 4 Number of taxa and MCI values 20 metres downstream of confluence (WGG000654).

The community was characterised by two 'tolerant' taxa [(*Potamopyrgus*) snails and blackfly larvae (*Austrosimulium*)] and one 'moderately sensitive' taxon [amphipod (*Paracalliope*)] (Table 3). All these taxa are commonly associated with soft-bedded, weedy, slower-flowing habitats.

Discussion and conclusions

The Council's 'sweep-sampling' technique was used at three sites to collect streambed macroinvertebrates from an unnamed tributary of the Waingongoro River on 13 December 2016. This has provided baseline data to assess any future potential impacts the development of the Eltham Central Landfill has on the macroinvertebrate communities of this stream. Samples were processed to provide number of taxa (richness), MCI, and $SQMCI_S$ scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The $SQMCI_S$ takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in either the MCI or the $SQMCI_S$ between sites will indicate the degree of adverse effects (if any) from the discharges monitored.

This spring, baseline macroinvertebrate survey of the upper reaches of the principal tributary draining the catchment of the proposed STDC consented central landfill, confirmed the results of previous surveys which found communities characterised by lower scoring 'tolerant' and 'moderately sensitive' taxa typical of those found in small, seepage-fed, weedy, softer-bottomed and slower flowing farmland streams.

The taxa richness recorded at site N2 was slightly above the historical median for this site, but slightly below the median (18 taxa) found elsewhere in Taranaki at 'control' sites in similar streams at comparable altitudes (Table 4). Taxa richnesses at site N3 and M1 were both well below historical medians and below the median for 'control' sites at similar streams at comparable altitudes (Table 2 and Table 4). Two macroinvertebrate taxa were recorded as very abundant to extremely abundant at all three sites including one 'tolerant' taxon (snail (*Potamopyrgus*)) and one 'moderately sensitive' taxon (amphipod (*Paracalliope*)) (Table 3).

In this survey, the MCI score recorded at the furthermost upstream site N2 on the unnamed tributary of the Waingongoro River was slightly lower than the median score for this site, and lower than that recorded in the previous survey (Table 2 and Figure 2). The $SQMCI_S$ score however was the same as the median for the site but slightly lower than that recorded by the previous survey. These results were indicative of 'fair' biological health and reflected a macrophyte associated community assemblage, which had been impacted by very slow and low flows.

Site N3 in the unnamed tributary of the Waingongoro River recorded a substantially lower MCI score but only a slightly lower $SQMCI_s$ score, when compared with site N2. Both the MCI and $SQMCI_s$ scores were not significantly different to the historical medians for this site (Table 2). Site M1 however recorded an MCI score significantly (Stark, 1998) lower than the historical median, although the $SQMCI_s$ score was only slightly lower than the historical median. The MCI score recorded at site M1 was also substantially lower than that recorded at N3 (by 10 MCI units) and significantly (Stark, 1998) lower than that recorded at site N2 (by 20 MCI units) which indicated poor physicochemical water quality and/or habitat quality at this site.

Overall, these results were indicative of 'poor' to 'fair' preceding water quality but were within the recorded historical range for each site and also within the range of results for 'control' sites in similar streams at comparable altitudes (TRC, 1999 (updated 2016)). These results were reflective of the nature of this seepage fed, weedy, soft bottomed slow flowing stream. This survey has provided baseline information for future evaluation of the effects of the proposed Central landfill at Eltham, near the headwaters of a small, springfed tributary toward the middle of the Waingongoro River catchment.

References

Internal publications

Fowles CR and Moore SC, 2004: Biomonitoring of two unnamed tributaries of the Waingongoro River which drain the proposed Eltham central landfill site, March 2004. Report CF313.

Fowles CR and Jansma B, 2008a: Biomonitoring of two unnamed tributaries of the Waingongoro River which drain the proposed Eltham central landfill site, January 2008. Report CF458.

Fowles CR and Jansma B, 2008b: Biomonitoring of two unnamed tributaries of the Waingongoro River which drain the proposed Eltham central landfill site, April 2008. Report CF466.

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Appendix III

Groundwater monitoring locations shown in Figure 4 of the application documentation dated May 1998

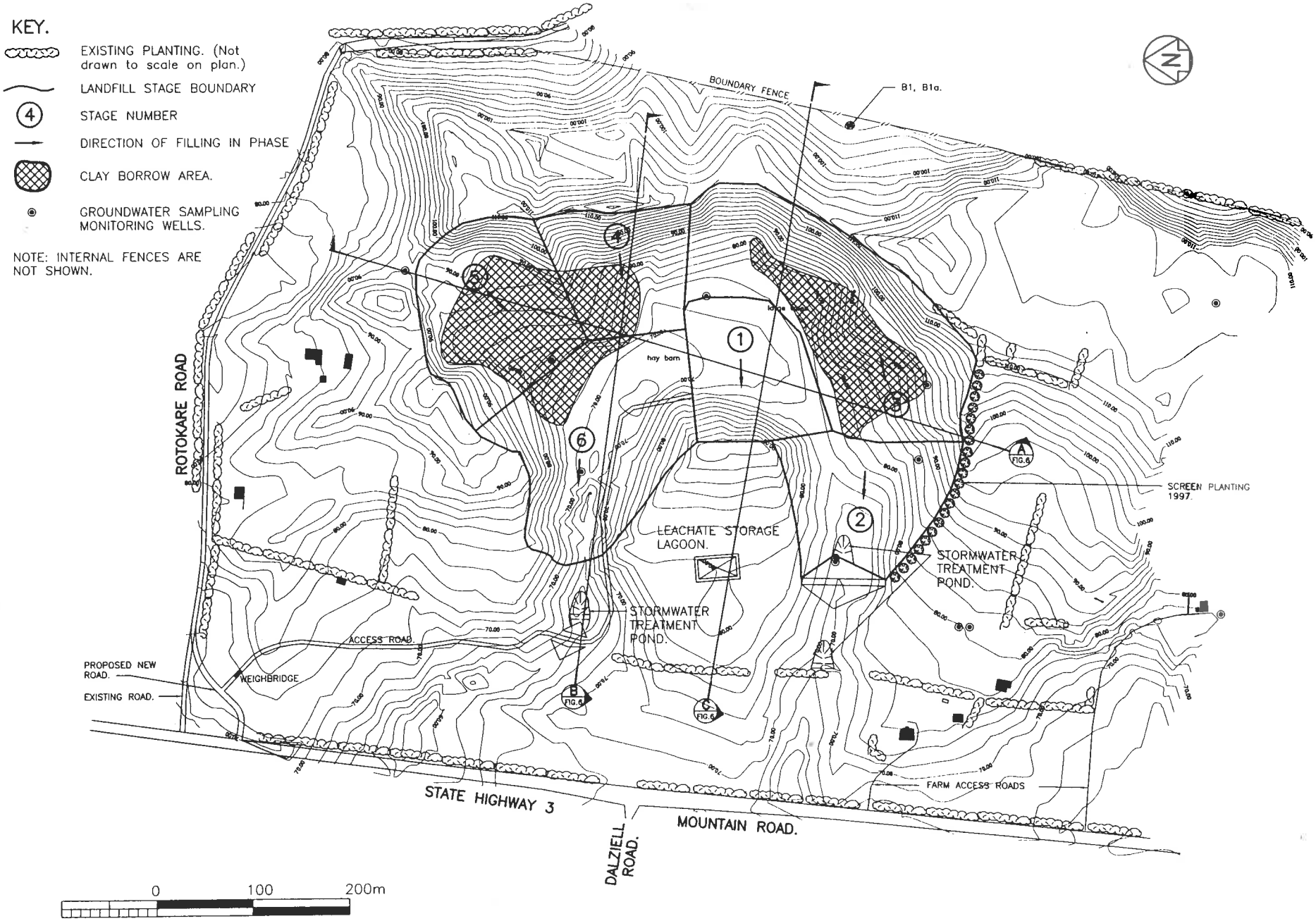
MONTGOMERY WATSON

LANDFILL DEVELOPMENT GENERAL LAYOUT.

FIG. 4

STDC CENTRAL LANDFILL

88553\CAD\DP553002.DWG



LANDFILL DEVELOPMENT GENERAL LAYOUT.

FIG. 4