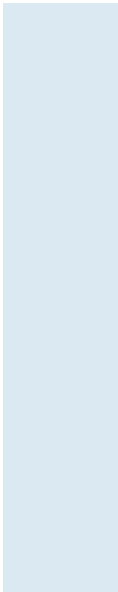


Technical Report I

Bond



Bond Assessment Report

Redvale Landfill Expansion

Prepared for: WM New Zealand

Prepared by: Tonkin & Taylor Ltd

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1 Introduction

1.1 General

Tonkin & Taylor Ltd (T+T) has been engaged by WM New Zealand (WMNZ) to provide technical assessments to understand the effects from a proposal to extend the use of Redvale Landfill, north of Auckland (the Project). This report forms a suite of technical reports prepared for WMNZ for inclusion in a substantive application for resource consent under the Fast-Track Approvals Act 2024.

This report assesses the current status of the financial bond (**Bond**) that is in place at the site and determines whether any change is required to the current Bond structure or amount in order to cater for the proposed extension. This review is provided in support of the Assessment of Environmental Effects (AEE).

1.2 Site description

The Redvale Landfill is located in Dairy Flat, to the north of Auckland, approximately 9 km northwest of Albany and 1 km west of State Highway 1. Redvale Landfill, including the existing landfilling area and buffer zones, occupies approximately 88 ha in area. The landfill is divided into five main sub-areas for the purpose of describing the work within this application, known as the Northern, Eastern, Western, South-Western and South-Eastern Property.

The Landfill is accessed from the south-east along Landfill Access Road off Dairy Flat Highway, with Horseshoe Bush Road running along part of the northern boundary of the Landfill area. A tributary of the Rangitopuni Stream runs eastwards along the northern and eastern site boundaries towards the Dairy Flat Highway. A full description of the site is provided in the AEE prepared for the project.

1.3 Project description

Redvale Landfill is one of only two landfill sites in the Auckland region that can receive 350,000 or more tonnes of waste annually to service the approximately 1.5 million tonnes of waste that the Auckland Region produces each year. Redvale Landfill is currently scheduled to cease accepting waste in December 2028. Due to a delay in obtaining the resource consents required for the establishment and operation of the replacement Auckland Regional Landfill (ARL), WMNZ considers a transition plan is required. To address this potential gap in critical landfill infrastructure for residual waste disposal in the Auckland region, WMNZ is proposing to extend the operation of Redvale to the end of 2036 by developing some 4.56 Mm³ of additional airspace at the existing facility. This includes 3.13 Mm³ of additional Class 1 Landfill expansion on top of the existing Class 1 refuse placement area, and 1.43 Mm³ of Class 2 Landfill extension.

The proposed works include the following:

- **Class 1 landfill expansion:** placement of waste within the existing landfill footprint, involving the removal of final cover and steepening of the final cap slope to accommodate additional waste.
- **Class 2 footprint extension:** extension of the existing landfill to the southwest to accommodate disposal of waste meeting Class 2 landfill waste acceptance criteria (WAC).
- **Relocation of ancillary activities:** the relocation of ancillary activities to allow for the placement of waste.
- **Sediment Retention Ponds:** the removal and filling in of Sediment Retention Pond 6 and the Office Pond while enlarging Pond 1 to capture and treat the stormwater from these catchments.

1.4 The original Bond

The original Bond structure was set up at the time consents were originally granted in 1992, based on a condition of consent that required a Bond to be put in place. At the time this was the first time that this type of Bond was required for a landfill in New Zealand.

A Bond has been maintained in favour of Auckland Council over the period since the landfill commenced operations. The original Bond consent condition was conservative but is similar to the structure of the Bond conditions recently proposed for the planned Auckland Regional Landfill (ARL). In New Zealand, the original Redvale Bond condition has formed the technical basis for similar conditions at other sites including Kate Valley, BlueScope Steel and others; albeit the nuance of Bond structures have evolved over the past 30 years based on both local and international precedent.

Calculation of the original Bond amount was based on considering the possibility of some sort of catastrophic failure that resulted in an early closure of the landfill and abandonment of the site by the consent holder. At the time such a scenario could only be envisaged as the result of a major geotechnical failure occurring in the early to middle stages of site development when the landfill involved internal and external batter slopes of considerable height and extent. A significant failure of one of these slopes and part of the landfill waste mass, unlikely as it was, informed cost estimates for early closure of the site and it was also conservatively assumed that such a failure would lead to abandonment of the site by the consent holder in circumstances where no other third party took over the site, repaired the damage, and continued with the landfill operation. This was a very conservative approach and results, in what amounts to an all or nothing type of Bond.

In practice, the Bond is in place for the circumstance where the site is abandoned and the regulator is left with the task of managing site closure and any ongoing aftercare. Unless that circumstance occurs and triggers release of the Bond, the Bond is never paid out.

Over the life of the landfill to date there has been no call on the Bond.

2 Risk context

2.1 Historical risk

When the Bond was first developed, ahead of the landfill commencing operation, a number of worst-case scenarios were postulated. These related mainly to the risk of a significant geotechnical failure leading to early closure of the site.

Several decades of landfill operation have now passed and none of the postulated worst-case scenarios, which were assessed as possibilities when formulating the Bond, have eventuated. Development of the landfill has proceeded conventionally and the significant financial Bond that was provided, has not been drawn upon in any way. Incidences of slope instability during development have been localised and readily able to be managed with conventional engineering solutions. There have been no slope failures that would be deemed significant enough to potentially impact on the viability of ongoing landfill operation.

2.2 Implications of the project on risk

A full description of the proposal is included in the AEE prepared for the project.

WMNZ now proposes to extend the life of the landfill by constructing sidling fills over the existing footprint as well as an ancillary fill. The sidling fills represent a continuation (vertical extension) of the original landfill within the existing footprint and will be formed by stripping back existing cover and placing additional waste to a depth of up to around 10 m. In some areas of the eastern

footprint, this will be achieved through the use of starter bunds and by slight steepening of the original landfill outer slopes.

In assessing the requirement to amend the Bond, the relevant aspects of the proposed landfill extension are:

- **The revised final surface profile of the landfill and whether this significantly changes geotechnical risk**

The current final design landfill ground profile varies but is less than 1V:3H. The ground profile will be steepened to a maximum grade of 1V:3H to allow placement of additional waste within the existing landfill footprint. Along the Eastern and Southern boundaries, bunds varying from 2 to 6 m high, will be constructed along the current landfill perimeter to allow the required additional waste volumes to be achieved. The required bunds and the overall completed landfill slopes can all be completed using standard geotechnical engineering as undertaken at the site previously. The completed maximum grades of 1V:3H will ultimately settle back to slightly flatter slopes and will meet all usual stability requirements.

- **Class 2 footprint extension**

The landfill is proposed to be extended to the south-west of the current landfill boundary, below the area of the now decommissioned Managed Fill and to the east of Sedimentation Pond 6, which has an underlying shear key. Shear keys are also associated with construction of the North and South Haul Roads for Stockpile 4, located to the north-west and south-west of the proposed extension area respectively. The Class 2 footprint extension will comprise the excavation and lining of a new landfill cell, to allow placement of Class 2 waste, which will be constructed in a similar manner to the already constructed cells within the current landfill. All of this can be achieved with standard geotechnical engineering as undertaken at the site previously.

In summary, the proposed expansion will result in limited areas where final contours will increase, and slightly steeper cap slopes will be required up to 1V:3H in the short to medium term. All of the development as proposed remains within normal landfill design parameters, and the risk of catastrophic failure of the landfill that might trigger early closure remains unchanged and minimal. The previously assessed worst case scenario of slope movement of limited extent impacting on the landfill cap also remains unchanged, with such movement readily able to be repaired and the operation would continue.

In summary, given the findings of the engineering report in the associated geotechnical assessment of the extension fill envelope, demonstrates that the proposed landfill extension and limited lateral expansion changes does not change the risk profile. Hence there is no requirement to adjust the Bond structure.

3 Bond assessment

3.1 Historical Bond reviews

The current Bond in place for the landfill has been reviewed at a number of points over the operating life of the facility.

A full review of the Bond structure was completed by T+T in December 2013. That review concluded that at that time even the most conservatively assessed risk scenario possible over the (then) remaining life of the facility was of insufficient magnitude to lead to site closure and commercial failure of the consent holder.

Key points from the conclusions of the 2013 review were:

- The landfill had progressed significantly as a project since the original landfill Bond was agreed in 1992 and was by then well past the point of greatest assessed risk of early closure as envisaged when the Bond was originally formulated.
- Development of the landfill has progressed without significant incident, and by 2012 the overall technical risk profile of the site was very low.
- Potential scenarios that might cause significant disruption to the site from 2012 through until closure were considered very unlikely to occur.
- The geotechnical risk profile of the site at that time and through until site closure was demonstrably low, and much lower than when first assessed in 1992.
- The value and reliability of the installed LFG extraction and electricity generation infrastructure then in place was significant.
- The residual value of the airspace at the site at the modelled point of possible future closure was assessed as high and as likely to be higher in the future as available landfill airspace in the Auckland region reduces over time.

In accordance with the original Bond condition and based on the most conservative assumption that a worst-case failure mode did occur and this led to early closure and abandonment of the site by the consent holder, the expected worst case capital cost of closure and remaining aftercare was assessed as being in the order of \$22m (2013 dollars). The review noted that this amount was approximately one third of the assessed combined value of the residual airspace and the modelled LFG electricity generation revenues and was also less than the Bond amount provided at that time.

It was clear at the time of the 2013 review that the site had been developed to the point where the residual value of the cash flows from electricity generation and from completion of filling to the consented contours was such that under any conceivable scenario the site would continue operating until it was filled to the approved contours. The 2013 review noted that one circumstance that might require further consideration is the scenario closer to final closure when the dollar value of the residual airspace reduced. However, at that point the cost of early closure was also forecast to reduce, along with the cost of remaining final capping and aftercare and at a point in time close to the point of final site closure, the NPVs of remaining aftercare would be offset by the NPV of the residual electricity generation asset. This would likely obviate the need for any ongoing Bond provision. That circumstance has yet to be reassessed.

3.2 2016 consent condition

Subsequent to the 2013 Bond review, WMNZ applied for consents to allow the ongoing operation of the landfill. On 11 March 2016 the Environment Court allowed WMNZ's final appeals in relation to those consents and finalised updated consent conditions which included Condition 34 - Bond, which states:¹

34. The consent holder shall maintain the bond existing as at 31 December 2013 (\$24,940,082 – this figure is derived from the provisions of Condition 31 of Environment Court decision W71/92), or an equivalent bond in terms satisfactory to the Council, to provide for early closure, environmental remediation, post-closure care and to ensure compliance with both performance and monitoring standards and the terms of any resource consents applying to the landfill operation. Any bond shall be in favour of the Council and shall include (in 1990 dollars) an increase of \$2.90 per tonne of refuse deposited in the landfill, up to a total of \$12,200,000. Both the bond fund and the increments shall be inflated annually according to the Works Construction Cost Index, or an appropriate replacement index. For the avoidance of doubt, the \$24,940,082 quantum reflects these calculations as at 31 December 2013. The

¹ *Waste Management NZ Limited v Auckland Council* [2016] NZEnvC 043 at 12.

bond shall be reviewed by the Council at five yearly intervals. A review of the purpose and quantum of the bond, and of the appropriate index, shall be commenced by the Council within three months of the grant of this consent.

(emphasis added)

3.3 Current Bond

The current Bond is provided by way of an Irrevocable Letter of Credit (ILC) from MUFG Bank Ltd (Ref. LG0900291) dated 30 April 2025 in favour of Auckland Council for the sum of **\$34.977 million**. This represents the inflation adjusted amount derived from the Bond total when it was reviewed and re-calculated in 2013.

3.4 Bond review

As provided for by Condition 16, the Bond is to be reviewed by Auckland Council at five yearly intervals. T+T has not been provided with any recent information regarding review of the Bond by Auckland Council. Noting the actual amount of the Bond (as above) and the current development state of the landfill, at this point a significant technical review of the basis for and quantum of the Bond (in the context of the Redvale expansion) does not appear to be warranted because continuing with the project as proposed using the current Bond is conservative. The consent holder is currently providing a Bond that is likely to be significantly greater than required for both the current state and the expansion project. A full technical review would potentially lead to the finding that a significant reduction in the Bond amount could be supported for the period through to the completion of the expansion project.

4 Summary and conclusions

The Bond that is currently in place has been part of the overall management framework at the Redvale Landfill since landfilling commenced in the 1990s. Over the full operational life of the landfill no significant engineering issues with the potential to compromise ongoing use of the site have arisen. None of the worst-case scenarios provided for by the Bond have occurred and as a result the Bond has not been called upon. However, it has been there as a backstop for both the regulator and the community throughout the life of the operation of Redvale Landfill.

Given the advanced state of the landfill project, the current Bond amount of **\$34.977 million** appears to be more than adequate to manage the level of residual engineering and environmental risk. The expansion project will not significantly change the risk profile. Therefore, continuing with the 2016 Bond condition subject to routine Bond review and inflation updates is a sensible approach and would provide a conservative outcome.

An alternative would be for Auckland Council and/or WMNZ to initiate a full technical review of the Bond amount based on:

- the landfill development state and finalised expansion project contours and the implications of the expansion on landfill global stability risk;
- the current state of landfill aftercare (waste in the landfill is now up to 30 years old);
- the current state of site infrastructure; and
- the financial offset now being delivered by electricity generation.

The outcome of such a review would likely be an indicated reduction in the required Bond amount necessary to provide adequate financial assurance to Auckland Council and the public that the Bond was appropriate and current for the landfill in its current state, including the extension project.

5 Applicability

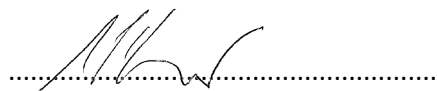
This report has been prepared for the exclusive use of our client WM New Zealand, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application under the Fast-track Approvals Act 2024 and that an Expert Panel as the consenting authority will use this report for the purpose of assessing that application. We understand and agree that this report will be used by the Expert Panel in undertaking its regulatory functions.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

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Appendix A Code of Conduct

Compliance with Environment Court Practice Note 2023

I confirm that, in my capacity as lead author of this report, I have read and abided by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses contained in the Practice Note 2023.

I am a senior Environmental Engineer and Technical Director at Tonkin & Taylor Ltd (T+T), where I have worked since 1 November 1975.

I have 40+ years' experience in the environmental engineering of landfills and environmental engineering, with an extensive background in the development of Bonds for landfills in New Zealand and Australia. I have been involved in the Redvale Landfill project since its inception in the late 1980s. I was the lead engineer during the original consenting and design of the landfill, and I have been involved in various aspects of it throughout its life. I was also the lead engineer for the Kate Valley Landfill in Canterbury, the redevelopment of the Silverstream Landfill in Wellington as well as numerous other waste facilities across New Zealand, Australia and Asia. At a number of these sites, I have been responsible for developing the structure and technical basis for landfill financial bonds – most recently for the proposed ARL project near Wellsford.

I hold the following qualifications – BSc, BE (Hons) and MEnvEngSc (UNSW).

I am a Fellow of both Engineering New Zealand and Engineers Australia. I was a founding member and am a Life Member of the Waste Management Institute of New Zealand and former National Vice President of the Waste Management and Recycling Association of Australia. I am also an Environmental Protection Authority Victoria (EPA Victoria) appointed Environmental Auditor (Industrial Facilities) and lead EPA Victoria's Community of Practice - Landfills.



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Anthony Kortegast
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Together we create + sustain a better world