Redvale Landfill Expansion Project

Assessment of Effects on the Environment

Prepared for: WM New Zealand

Prepared by: Tonkin & Taylor Ltd

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Executive summary

WM New Zealand (WMNZ) owns and operates the Redvale Landfill and Energy Park (Redvale Landfill) at Dairy Flat, north of Auckland. Redvale Landfill is one of the primary municipal landfills servicing the Auckland region, accepting approximately 600,000 tonnes of waste per annum, or approximately 40% of Auckland's waste. Under its existing resource consents, the landfill is required to cease accepting waste on 31 December 2028.

WMNZ is developing the Auckland Regional Landfill (ARL) as the permanent replacement for Redvale Landfill. However, due to delays in the consenting process, ARL is not expected to be operational until the mid-2030s. Without intervention, Auckland would be left without sufficient disposal capacity for approximately 4 million tonnes of residual waste in the intervening period. Following a multi-criteria options analysis and three phases of public consultation, WMNZ identified the extension of Redvale Landfill as the most appropriate interim solution.

The Redvale Landfill Expansion project was referred into the fast-track approvals process by the Minister on 24 April 2026. Through this substantive application under the Fast-track Approvals Act 2024 (FTAA), WMNZ seeks resource consents to extend the operation of Redvale Landfill until no later than 31 December 2036, or until such earlier time as ARL is open and able to accept waste. This will include the development of approximately 4.56 Mm^3 of additional airspace. This comprises 3.13 Mm^3 of additional Class 1 airspace, achieved by reprofiling the existing Class 1 waste placement area, and a 1.43 Mm^3 Class 2 extension at the location of the decommissioned Managed Fill and Pond 6. Several ancillary activities will be relocated to the south of the landfill, and the works are otherwise generally contained within the existing landfill footprint.

Resource consent is required as a non-complying activity under the Auckland Unitary Plan, with further consents required under the National Environmental Standards for Freshwater and the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. In accordance with clause 17(1)(b) of Schedule 5 of the FTAA, the application is not subject to assessment under section 104D of the RMA.

This AEE assesses the actual and potential effects of the project on the environment. The project will continue to use the landfill's existing, proven engineering, management and monitoring systems, including the lining and leachate collection systems, landfill gas capture, stormwater and sediment controls, and comprehensive environmental monitoring. The assessment concludes that adverse effects on the environment can be appropriately avoided, remedied or mitigated through the proposed design, management measures and conditions of consent, and that the project will deliver significant positive effects, including the continuity of regionally significant waste infrastructure, renewable energy generation and economic benefits.

Extensive consultation has been undertaken with Auckland Council, Auckland Transport, Tangata Whenua, neighbouring owners and occupiers, community groups and the wider public. Ngāti Manuhiri, Ngāti Rango and Te Kawerau ā Maki, have provided a joint letter of support for the application dated 4 August 2026 (refer Section 8.4).

The project is consistent with the purpose of the FTAA in that it will deliver regionally significant infrastructure benefits, and the relevant statutory tests are met. For the reasons set out in this AEE, it is considered that the approvals sought can be granted, subject to the proposed conditions of consent (Appendix J).

Abbreviations

Abbreviation	Definition
AEE	Assessment of Effects on the Environment
AEP	Annual exceedance probability
AMSL	Above mean sea level
ANZ DGV	Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Default Guideline Values
ARL	Auckland Regional Landfill
ATF	Approved Transitional Facility Pad
AUP	Auckland Unitary Plan – Operative in Part
AUP RPS	Auckland Unitary Plan – Regional Policy Statement
CAA	Civil Aviation Authority
CAR	Civil Aviation Rule
C&D	Construction and Demolition
CVA	Cultural Values Assessment
DFH	Dairy Flat Highway
DOC	Department of Conservation
EIA	Economic Impact Assessment
EIANZ	Ecological Impact Assessment Guidelines (2018) for New Zealand
EPA	Environmental Protection Authority
ESC	Erosion and Sediment Controls
ESCP	Erosion and Sediment Control Plan
FTAA	Fast-track Approvals Act 2024
GD05	Auckland Council Guideline Document 2016/005 (GD05): Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region
HAIL	Hazardous Activities and Industries List
HSNO Act	Hazardous Substances and New Organisms Act 1996
ICAO	International Civil Aviation Organisation
IEMP	Iwi Environmental Management Plan
ITA	Industrial and Trade Activity
LCR	Leachate Cleanout Riser Access Ports
LCS	Leachate Collection Sump
LEU	Leachate Evaporator Unit
LFG	Landfill Gas
LMP	Landfill Management Plan
MCA	Multi-Criteria Analysis
MCI	Macroinvertebrate Community Index
MSW	Municipal solid waste
NES-AQ	Resource Management (National Environmental Standards for Air Quality) Regulations 2004

Abbreviation	Definition
NES-CS	Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NES-F	Resource Management (National Environmental Standards for Freshwater) Regulations 2020
NPS-FM	National Policy Statement for Freshwater Management 2020 (as amended in October 2024)
NPS-HPL	National Policy Statement for Highly Productive Land 2022
NPS-IB	National Policy Statement for Indigenous Biodiversity 2023
NPS-REG	National Policy Statement for Renewable Electricity Generation 2011
NZAA	New Zealand Archaeological Association
NZTM	New Zealand Transverse Mercator (coordinate system)
OLS	Obstacle Limitation Surface
PRP	Peer Review Panel
Redvale or the Landfill	Redvale Landfill
RMA	Resource Management Act 1991
RL	Reduced level
SCPA	Sediment Control Protection Area
SEA	Significant Ecological Area
SH1	State Highway 1
SHRA	Screening Health Risk Assessment
SPL	Species protection level
SRP	Sediment retention pond
tpa	Tonnes per annum
WAC	Waste Acceptance Criteria
WHA	Wildlife Hazard Assessment
WMNZ	WM New Zealand

Glossary

Term	Definition
General terms	
Redvale Landfill and Energy Park	Name of the landfill, including ancillary activities.
Redvale Landfill Expansion	Project name for the proposed expansion and extension of Redvale Landfill.
ARL	Auckland Regional Landfill.
WM New Zealand or WMNZ	Company name of applicant.
Landfill footprint	The area directly impacted by the landfill itself.
Class 1 Landfill expansion	The proposed Class 1 waste expansion on the existing consented waste profiles.
Class 2 extension	The proposed extension to accept waste meeting Class 2 waste acceptance criteria.

Term	Definition
Landholding description	
Western property	The landfill area has been divided into two main sub-areas defined as the East and West Property. The West property is approximately 23 hectares and comprises the western portion of the existing landfill footprint.
Eastern property	The East property is approximately 36 hectares and comprises the eastern portion of the existing landfill footprint.
Northern property	Comprises of the earthfill (Stockpile 6) and the majority of Sediment Retention Pond 3.
South-eastern property	Comprises most of the existing ancillary activities, including the existing site offices and where all ancillary activities will be relocated to.
South-western property	Comprises of the existing Managed Fill site, Stockpile 4 and Sediment Retention Pond 6. Will be the location of the Class 2 expansion.
Project description	
Aftercare	Ongoing management and monitoring activities carried out after waste placement has ceased, to ensure the landfill remains stable and environmental effects (e.g., leachate and gas) are appropriately controlled.
Airspace or airspace volume	The gross volume available between the landfill basegrade and the top of the landfill cap. This volume includes the volume of all materials placed within this space including waste, daily cover, intermediate cover and final cap.
Ancillary facilities	Supporting activities and infrastructure that are necessary for the effective and efficient functioning of the landfill but are not considered the primary activity of waste disposal itself. These include the LEU, LFG energy plant, staff facilities and offices, wheel wash.
Basegrade	The surface at the base of the landfill.
Leachate evaporator unit	An on-site leachate evaporator system that uses heat from landfill gas combustion to evaporate water from leachate. Also referred to as 'BeneVap'.
Bund / perimeter bund	A raised fill embankment constructed around the landfill perimeter which raises the edge of the landfill
Cap	The uppermost layer placed over completed landfill areas to prevent water ingress, control gas emissions and support vegetation.
Class 1 waste	Waste meeting the Class 1 landfill waste acceptance criteria including municipal solid waste (MSW), construction and demolition waste, some industrial wastes and contaminated soils.
Class 1 revised surface profile	The revised profile with the additional waste placed within the existing landfill footprint.
Class 2 extension	Landfill extension for waste that can be accepted in a Class 2 landfill. This will be constructed south-west of the current landfill boundary over the former Managed Fill area.
Class 2 waste	Waste meeting the Class 2 landfill waste acceptance criteria including construction and demolition (C&D) waste, managed fill material, controlled fill and clean fill material. This includes a variety of materials generated from construction and demolition activities, such as rubble, plasterboard, timber, and concrete.
Class 3 waste	Waste meeting the Class 3 landfill (managed fill) waste acceptance criteria including inert waste materials from construction, demolition, and site remediation, along with some contaminated but non-hazardous soils.

Term	Definition
Class 4 waste	Waste meeting the Class 4 landfill (controlled fill) waste acceptance criteria including predominantly natural soil and inert C&D materials.
Daily cover	A thin layer of soil placed on top of waste at the end of each day to manage nuisance conditions such as odour, wind-blown litter, birds and vermin.
Final cover (cap)	A multi-layer cover system placed where waste placement has ceased, intended to minimise infiltration, control gas emissions, and support long-term stability and vegetation growth.
Horseshoe Bush Road	A road which runs along the northern boundary of the landfill.
Intermediate cover	A layer of soil, placed over areas of waste where further waste placement will take place but not for some time.
Landfill Access Road	The existing main access road to the landfill from Dairy Flat Highway.
Renewable Energy Plant	A waste-to-energy system which uses landfill gas to fuel a number of renewable energy initiatives.
Landfill gas or LFG	The gas produced by the anaerobic decomposition of waste comprising predominantly methane and carbon dioxide.
Leachate	The liquid produced when water percolates through the waste and that contains dissolved and/or suspended matter from the waste.
Leachate collection sump	A low-point structure within a landfill cell where leachate is collected for extraction, treatment, recirculation, or offsite disposal.
Lining system	A system of engineered layers (e.g., geosynthetics, compacted soil liner and protective layers) designed to separate the waste mass from and limit leachate migration from the landfill into the surrounding environment.
Managed fill site	An area of the landfill consented to receive Managed Fill material (broadly Class 3 waste). This area forms part of the footprint for the Class 2 extension.
Mana whenua partners	Being Ngāti Manuhiri, Ngāti Rango and Te Kawerau a Maki, as set out in the Letter of Support in Appendix H
Non-putrescible waste	Waste with low biodegradable organic content that does not readily decompose and is less likely to generate odour and landfill gas (e.g., managed fill, controlled fill, contaminated soils and construction and demolition waste).
Phases	The progressive landfill development and associated construction of individual landfill cells.
Putrescible waste	Biodegradable organic waste with high putrescible content that readily decomposes and can generate odour, leachate, and landfill gas (e.g., food scraps and similar rapidly degradable materials).
Sediment retention ponds	Engineered ponds designed to capture and manage sediment-laden runoff from disturbed areas.
Stockpiles	Stockpiles of soil, generally from the excavation of the existing landfill.
Tip face	The place where waste is being disposed daily.
Toe bund	A bund located at the toe (base) of a slope used to provide stability and/or form part of the containment system for waste placement.
Waste acceptance criteria	A set of requirements specifying what wastes can and cannot be accepted, including constraints related to physical and/or chemical properties and operational management.

1 Introduction

1.1 Project overview

WM New Zealand (**WMNZ**) is one of the leading providers of comprehensive waste and environmental services in New Zealand and is a major player in the waste industry across the Auckland region. WMNZ owns and operates the Redvale Landfill and Energy Park (Redvale Landfill) located in Dairy Flat, north of Auckland. In addition, the landfill site also includes several other ancillary activities required for landfilling, such as material stockpiles, workshops, leachate evaporator unit (LEU), Energy Park and offices. WMNZ also own several surrounding properties to the landfill that include vacant land, generally utilised for pastoral use.

On a weekly basis, the Auckland region sends over 28,000 tonnes of waste to landfill resulting in approximately 1.45M tonnes of waste per annum[1]. Disposing of waste in a safe and efficient manner requires facilities designed to manage the effects generated by waste, such as leachate and landfill gas. Modern engineered landfills are designed to manage these impacts, including comprehensive aftercare procedures.

Redvale Landfill is located on the site of a former limestone quarry. The waste disposal facility has been operational since 1993 and is one of the primary municipal landfills servicing the Auckland region. Currently Redvale Landfill takes approximately 600,000 tonnes per annum (tpa) of Auckland's waste or approximately 40%.

Redvale Landfill is currently scheduled to cease accepting waste on 31 December 2028 as required by Condition 8 of its existing resource consent (REG-61341, REG-61342, REG-61343, and REG-61544), with closure and aftercare works at the landfill following this date.

In 2019, WMNZ lodged a resource consent application with Auckland Council for the authorisation of Auckland Regional Landfill (ARL), a permanent replacement for Redvale Landfill. This application was appealed to the Environment Court in 2020, with this process ongoing. Due to delays in the authorisation and establishment of this replacement, if approved, ARL is not expected to be operational until the mid-2030s, resulting in a period of time during which the waste that is currently sent to Redvale Landfill will need to find a disposal option.

WMNZ has undertaken extensive alternatives and options assessments to identify potential opportunities to manage this transition period. As a result of this work, in order to provide critical temporary landfill infrastructure for residual waste disposal in the Auckland Region during the transition period, WMNZ seeks (through this substantive application) resource consents to extend the operation of Redvale Landfill and develop approximately 4.56 Mm^3 in additional airspace. This includes 3.13 Mm^3 in additional Class 1 Landfill expansion on top of the existing Class 1 waste placement area and 1.43 Mm^3 of Class 2 Landfill extension. This will support the ongoing operation of Redvale Landfill and the continued resilience and security of solid waste management in the Auckland Region.

The works to extend the filling at Redvale Landfill are generally limited to the existing landfill footprint, adding volume within the Class 1 landfill through reprofiling. This will be steepened to a maximum grade of 1V:3H, with bunds varying in height from 2 to 6 m, constructed along the eastern and southern boundaries of the existing footprint.

An extension to the southwest at the location of the current decommissioned Managed Fill and Pond 6 is sought to allow for the placement of waste meeting the Class 2 waste acceptance criteria. Excavation and the construction of a lining system will be required to develop this area.

[1] Auckland Council, Auckland's Waste Minimisation and Management Plan 2024: Towards Zero Waste, 2024 at p 8.

In addition to the waste placement at the site, several ancillary activities that support the landfill must be relocated as a result of the expansion of the landfill. This includes the site water tanks, wash bay, light engineering workshop and the ATF pad. These are proposed to be moved to the south of the landfill, around the location of the existing site offices.

This Assessment of Effects on the Environment (AEE) report has been prepared on behalf of WMNZ to support a resource consent application to accompany a substantive application to authorise the development of additional landfill airspace capacity and the ongoing operation of Redvale Landfill until the end of 2036. This AEE sets out the proposed design features and operational measures for the Redvale Landfill and measures proposed to minimise potential adverse effects on the environment.

This report has been prepared in fulfilment of section 43, and Schedule 5 of the FTAA, on behalf of WMNZ. The present application relates solely to the referred project, being Redvale Landfill's proposed expansion and extension which was referred by the Minister on 24 April 2026, namely the Redvale Landfill Expansion.

The project does not involve any ineligible activities (as defined in section 5 of the FTAA), pursuant to section 43(1)(c) of the FTAA or prohibited activities pursuant to section 42(5)(a) of the FTAA.

1.2 Applicant and property details

The below sets out the details of the applicant and application site.

Table 1.1: Applicant and property details

Applicant	Waste Management NZ Limited
Owner of application site	Waste Management NZ Limited
Site address	66 Landfill Access Road, Dairy Flat 0794 44 Richards Road, Dairy Flat 0794 Lot 1 DP 322777, Landfill Access Road, Dairy Flat 0794 125 Horseshoe Bush Road, Dairy Flat 0794
Approximate map reference	NZTM: 1745632, 5941434
Site area	Approximately 168 ha (including the Redvale Landfill site and surrounding WMNZ owned properties)
Legal description	66 Landfill Access Road, Dairy Flat: Lot 2 DP 446482, Lot 1 DP 155355, Lot 1 DP 353568, Lot 2 DP 353568, Lot 1 DP 125471, Section 1 SO 68946 44 Richards Road, Dairy Flat: LOT 1 DP 446482 Landfill Access Road, Dairy Flat: Lot 1 DP 322777 125 Horseshoe Bush Road, Dairy Flat: Lot 2 DP 452672, Lot 1 DP 117463
Record of Title reference	66 Landfill Access Road, Dairy Flat: 218904, 218905, 562515, NA118B/596 44 Richards Road, Dairy Flat: 562514 Landfill Access Road, Dairy Flat: 90886 125 Horseshoe Bush Road, Dairy Flat: 578978
District and Regional Council Plan	Aukland Council (AC) Auckland Unitary Plan – Operative in Part (AUP)

Address for service during consent processing	**Tonkin & Taylor Ltd** PO Box 5271, Victoria Street West, Auckland 1142 Attention: Keeley Clayton Phone: 027 315 9749 Email: KClayton@tonkintaylor.co.nz
Address for service during consent implementation and invoicing	**WM New Zealand** Private Bag 14919, Panmure, Auckland 1741 Attention: Jim Jefferis Phone: 021 720486 Email: jjefferis@wm.nz

1.2.1 Company and Redvale Landfill overview

WMNZ's history traces back to 1894 and since entering the waste industry in 1935, WMNZ has become Aotearoa's leading provider for waste services, focusing on waste recovery, recycling and management. To service the country's waste requirements, WMNZ takes a strategic view of waste needs, carefully assessing requirements for the operation of collection, recycling, composting and waste infrastructure. This includes ensuring New Zealand's waste is managed safely and sustainably.

In early 1988, WMNZ identified the site, now known as Redvale Landfill, as a potential sanitary landfill and began a programme of site investigations and planning studies to confirm its general suitability. Prior to the establishment of the Landfill on the site, the land operated as a Limestone Quarry for over 60 years. The site was then purchased in late 1988 and further design and investigation work was undertaken to prepare planning applications for obtaining consents to operate the Redvale Landfill, making this the first landfill consented under the Resource Management Act 1991 (RMA). The Planning Tribunal issued a decision granting consent for the operation of Redvale in 1992. Waste was first accepted in 1993. When the Landfill began operating in 1993, the Redvale Lime Co Ltd continued to operate the quarrying facility up until 2004, when the quarrying activity finally ceased at the site.

The opening of Redvale set a new standard for modern landfilling in New Zealand, engineered to recover energy from the waste that is securely disposed of to land, with a focus on environmental sustainability. WMNZ remains strongly committed to the safe and responsible management of waste and the protection and enhancement of the environment as well as supporting Aotearoa's journey towards a circular economy.

Redvale Landfill is regionally significant infrastructure that provides essential disposal capacity for the Auckland region. Beyond its day-to-day operation, the Landfill is an important part of the region's resilience to natural hazards and emergency events, providing the capacity to receive and safely manage the large volumes of waste and debris such events can generate. As an example, following the Auckland Anniversary Weekend floods in January 2023, Redvale Landfill received and disposed of substantial volumes of flood-generated debris, supporting the region's clean-up and recovery. The ongoing availability of this infrastructure is important to ensuring Auckland can respond to, and recover from, future natural hazard and disaster events.

WMNZ's commitment to environmental and sustainable outcomes is shown at WMNZ's Redvale Landfill facility, where landfill gas (LFG), which is approximately 50% methane, is used to fuel a number of renewable energy initiatives. These include electricity generation and providing a source of heating and carbon dioxide to a neighbouring Aubergine greenhouse complex. WMNZ extracts approximately 36 Mm^3 of methane from the landfill per annum, converting it into electricity, which contributes to the reduction of greenhouse gas emissions. As the Landfill is progressively filled, the generation of LFG will continue to increase. Currently, Redvale Landfill's energy generation can produce enough to power the equivalent of 14,000 homes on the local grid making it Auckland's

largest renewable energy source. It is estimated that the landfill could power up to 16,000 homes by 2028.

In addition to Redvale Landfill, WMNZ owns or operates several landfills and energy parks across New Zealand, including:

- Whitford Landfill: 301 Whitford-Maraetai Road, Whitford (operated as a joint venture with Auckland Council).
- Tirohia Landfill: 5 Quarry Road, Tirohia.
- Kate Valley Landfill & Gareth James Energy Park: 554 Mount Cass Road, Teviotdale.

WMNZ also operates several other landfills on behalf of Councils and through joint ventures in New Zealand. WMNZ employs over 1,900 team members at 70 locations across the country.

1.3 Overview of resource consents requirements

The resource consents sought to enable the proposal are assessed in Section 6 and listed in Table 1.2, Table 1.3 and Table 1.4. It is understood that no additional consents are required; however, if further consent matters are identified post-lodgement of the application, these should also be considered as forming part of the application.

Overall, resource consent is required as a **non-complying activity** under the Auckland Unitary Plan – Operative in Part (AUP) but is not subject to a s104D RMA assessment as set out in clause 17(1)(b), Schedule 5 of the FTAA.

Table 1.2: Summary of resource consents required under the AUP (in order of AUP chapters)

Rule reference / description	Activity status
E4.4.1 (A15) – Discharge of water and contaminants (including washwater) onto or into land and/or into water not complying with the relevant standards or not otherwise provided for by a rule in the Plan	Discretionary
E7.4.1 (A20) – Dewatering or groundwater level control associated with a groundwater diversion authorised as a restricted discretionary activity under the Unitary Plan, not meeting permitted activity standards or is not otherwise listed	Restricted discretionary
E7.4.1 (A28) – Diversion of groundwater caused by any excavation (including trench) or tunnel that does not meet the permitted activity standards or is not otherwise listed	Restricted discretionary
E7.4.1 (A35) – Dams not otherwise listed or not meeting the permitted activity standards or controlled activity standards	Discretionary
E8.4.1 (A10) – All other diversion and discharge of stormwater runoff from impervious areas not otherwise provided for	Discretionary
E11.4.1 (A8) – Land disturbance greater than 2500 m^2 where the land has a slope equal or greater than 10 degrees	Restricted discretionary
E11.4.1 (A9) – Land disturbance greater than 2500 m^2 within the Sediment Control Protection Area (SCPA)	Restricted discretionary
E12.4.1 (A6) – Land disturbance of greater than 2500 m^2	Restricted discretionary
E12.4.1 (A10) – Land disturbance of greater than 2500 m^3	Restricted discretionary
E13.4.1 (A10) – Discharges from an operative landfill	Discretionary

Rule reference / description	Activity status
E14.1.1 (A2) – Discharge of contaminants into air from activities not provided for in other rules in Table E14.4.1 with respect to activities not meeting the permitted activity standards and not provided for by any other rule	Discretionary
E14.1.1 (A54) – Combustion activity not meeting the permitted, controlled or restricted discretionary activity standards	Discretionary
E14.4.1 (A160) – Discharge of contaminants into air from waste processes that do not comply with restricted discretionary or discretionary activity standards	Non-complying
E15.4.1 (A17) – Vegetation alteration or removal within 10 m of rural streams in the Rural – Mixed Rural Zone	Restricted discretionary
E26.2.3.1 (A63) Other electricity generating facilities in Rural Zones	Discretionary
E30.4.1 (A7) Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1	Discretionary
E33.4.1 (A7) – Use of land for an existing industrial or trade activity listed as high risk in Table E33.4.3 (after the Table E33.4.3 timeframe expires)	Controlled
E33.4.1 (A8) – Use of land for a new industrial or trade activity listed as high risk in Table E33.4.3	Controlled
E33.4.1 (A9) – Any industrial and trade activity in Table E33.4.1 that does not meet the relevant permitted or controlled land use standards	Discretionary
E33.4.2 (A12) – Discharge of contaminants from an existing or new ITA area not listed in Table E33.4.3 where the permitted discharge standards are not met	Controlled
E33.4.2 (A23) – Discharge of contaminants from an existing ITA listed as high risk in Table E33.4.3 (after the Table E33.4.3 timeframe expires)	Discretionary
E36.4.1A (A107) – All other infrastructure in flood hazard areas not otherwise provided for	Restricted discretionary
Table E36.4.1C (A133) – All other infrastructure in landslide susceptibility assessment areas not otherwise provided for	Restricted discretionary
H19.8.1 (A67) – Landfill in the Rural – Mixed Rural Zone.	Non-complying

Table 1.3: Summary of resource consents required under the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F)

Rule reference / description	Activity status
Regulation 45B (3) – Earthworks or land disturbance outside a 10 m, but within a 100 m, setback from a natural inland wetland is a discretionary activity if it – • is for the purpose of constructing or operating a landfill or a cleanfill area; and • results, or is likely to result, in the complete or partial drainage of all or part of the wetland.	Discretionary
Regulation 45B (4) – The taking, use, damming, or diversion of water within, or within a 100 m setback from, a natural inland wetland is a discretionary activity if – • the activity is for the purpose of constructing or operating a landfill or a cleanfill area; and • there is a hydrological connection between the taking, use, damming, or diversion and the wetland; and • the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland.	

Rule reference / description	Activity status
Regulation 45B (5) – The discharge of water into water within, or within a 100 m setback from, a natural inland wetland is a discretionary activity if – • the discharge is for the purpose of constructing or operating a landfill or a cleanfill area; and • there is a hydrological connection between the discharge and the wetland; and • the discharge will enter the wetland; and • the discharge will change, or is likely to change, the water level range or hydrological function of the wetland.	

Table 1.4: Summary of resource consents required under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES-CS)

Rule reference / description	Activity status
Regulation 11 - This regulation applies to an activity described in any of regulation 5(2) to (6) on a piece of land described in regulation 5(7) or (8) that is not a permitted activity, controlled activity, or restricted discretionary activity.	Discretionary

1.4 Bundling

As the landfill and associated activities will operate as one integrated site, and all components of the landfill operations that require consent are interconnected, it is appropriate that the consents are bundled for the application and assessment purposes and that an overall assessment of the application is made as a **non-complying activity**. However, as noted above, whilst the proposal is a non-complying activity, under Clause 17(1)(b), Schedule 5 of the FTAA, a s104D RMA assessment is not required.

1.5 Consent duration

The Project's objective is to offer a short-term solution until Redvale Landfill's replacement, ARL, is operational, which would ensure the resilience and security of solid waste disposal in the Auckland Region is upheld. The short-term nature of the present consent application is to provide continuity of waste disposal until the end of 2036 at the latest, or at such a time that ARL is open and able to accept waste, if that occurs prior to 2036. Therefore, a maximum consent term of 31 December 2036 is sought for active waste placement, with any activities occurring after this date being closure and aftercare activities only.

1.6 Lapse date

A lapse date of 1 March 2029 is sought for the consents.

1.7 Report structure

The purpose of this AEE is to describe the proposed works associated with the ongoing operation of Redvale Landfill and the construction of the proposed landfill extension, including assessing the potential effects on the environment. The report also assesses the proposal against the relevant statutory documents.

Table 1.5 outlines the structure of this report, including the associated technical reports and drawings.

Table 1.5: Report structure

Redvale Landfill – Assessment of Effects on the Environment		
Volume 1	**Assessment of Effects on the Environment**	
	Appendix A	Code of Conduct
	Appendix B	AEE drawing set
	Appendix C	Adjacent landowners and occupiers
	Appendix D	Existing Consents
	Appendix E	Permitted Activity Assessment
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	Technical Report A	Landfill Engineering
	Technical Report B	Geotechnical
	Technical Report C	Geotechnical Dam Assessment
	Technical Report D	Air Quality and Odour Technical Assessment
	Technical Report E	Health Risk Assessment
	Technical Report F	Hydrogeology Assessment
	Technical Report G	Stormwater, ITA and Sediment Assessment
	Technical Report H	Waste Acceptance Criteria
	Technical Report I	Bond
	Technical Report J	Ecology Values Assessment
	Technical Report K	Ecology Impacts Assessment
	Technical Report L	Economics Assessment (NZIER)
	Technical Report M	Economics Assessment (NERA)
	Technical Report N	Noise Assessment
	Technical Report O	Traffic Assessment
	Technical Report P	Aviation Assessment
	Technical Report Q	Landscape & Visual Assessment

1.8 Section 43 FTAA requirements

Section 43 of the FTAA sets out the requirements for a substantive application. Table 1.6 identifies each requirement and where it is addressed within this application.

Table 1.6: FTAA s43 requirements and where these are addressed within this application

Reference	Requirement	Comment and where addressed
s 43(1)(a)	The application must be lodged in the form and manner approved by the EPA.	The substantive application has been prepared and lodged in the form and manner approved by the EPA, comprising the application form, this AEE and the supporting technical assessments (refer Section 1.7).
s 43(1)(b)	The application must explain how the project is consistent with the purpose of the FTAA (or, for a project referred under section 21(1)(a), how the stage and the whole project are consistent, and the likelihood of later stages being completed).	Sections 1.1 and 2 (project need and context), Section 9 (statutory assessment) and Section 11 (conclusion). The application relates to the whole project rather than a stage, so section 43(1)(b)(ii) does not apply.
s 43(1)(c)	The application must demonstrate that the project does not involve any ineligible activities.	Section 1.1. The project does not involve any ineligible activities as defined in section 5 of the FTAA.
s 43(1)(d)	If lodged by more than one authorised person, the application must state the proposed approval to be held by each person.	Not applicable. WMNZ is the sole authorised person and applicant (Section 1.2).
s 43(1)(e)(i)	The application must comply with any information requirements specified by the Minister under section 27(3)(b)(ii).	Any information requirements specified in the referral notice have been addressed in the substantive application (refer application form).
s 43(1)(e)(ii)	The application must comply with the requirements listed in section 43(3) that apply to the approvals sought.	Refer s 43(3)(a) below.
s 43(1)(f)	If a determination under section 23 or 24 has been applied for under section 39, the application must include a copy of the notice under section 39(4).	Not applicable. No application under section 39 has been made.
s 43(1)(g)	If an approval is sought for an activity subject to a determination under section 23, the application must set out the steps taken to secure the agreement referred to in section 5(1)(a).	Not applicable.
s 43(1)(h)	The application must state whether it relates to a priority project and, if so, confirm there are no competing applications.	The application does not relate to a priority project (refer application form).
s 43(1)(i)	The application must be made by the deadline specified in the notice under section 28(3)(d).	The application has been lodged within the deadline specified in the referral notice.
s 43(1)(j)	A substantive application must not be lodged unless any fee, charge, or levy payable under regulations is paid.	All fees, charges and levies payable in respect of the application have been paid.
s 43(2)	Additional information requirements for listed projects.	Not applicable – the Redvale Landfill Expansion is a referred project (referred by the Minister on 24 April 2026), not a listed project.

Reference	Requirement	Comment and where addressed
s 43(3)(a)	For a resource consent, the information requirements set out in clauses 5 to 9 of Schedule 5.	Addressed throughout this AEE: description of the project and site (Sections 1 to 5), consents sought (Section 6), assessment of effects (Section 7), consultation (Section 8 and Appendix F), statutory assessment (Section 9 and Appendix I), permitted activity assessment (Appendix E) and proposed conditions of consent (Section 10 and Appendix J).
s 43(3)(b)–(m)	Information requirements for other approval types (change or cancellation of consent conditions, certificates of compliance, designations, concessions, land exchanges, conservation covenants, wildlife approvals, archaeological authorities, freshwater fisheries approvals, marine consents, access arrangements and mining permits).	Not applicable. Resource consents (section 42(4)(a)) are the only approvals sought.

2 Project context

The waste network in Aotearoa relies on landfills to manage residual waste that cannot be reused or recycled. This section provides an overview of the waste sector and waste flows, and how Redvale Landfill, as well as other landfills within the country, play this crucial role.

2.1 Waste sources and trends

Waste in the Auckland Region comes in many forms and from various sources. Municipal solid waste can typically be categorised into residential, commercial and industrial, construction and demolition, and special wastes. Auckland's Waste Assessment 2023[2] identified the following trends in Auckland:

- In 2022, it was estimated that at least one third of all reported tonnes to Class 1 landfills from Auckland are from construction and demolition related activities. This includes a high proportion of timber.
- Soils are one of the single largest waste streams disposed of to landfills.
- In 2022, food scraps comprised 10% of the total tonnes to Class 1 landfill and accounted for 26% of landfill emissions.
- Tonnes of domestic kerbside waste sent to landfill have declined since 2010, despite population growth.
- Commercial waste increased significantly between 2010 and 2016. It has since declined but still remains above 2010 levels.
- Organic waste remains a significant component of commercial and domestic waste to landfill.

Despite decreasing volumes on a per household basis, the population of the Auckland Region has historically been growing at a high rate, and based on this continued level of growth, it is expected by 2040 there will be 2.027 million people living within the Auckland Region[3]. This population growth places pressure on regional infrastructure and puts greater emphasis on ensuring that the region has adequate landfill capacity to meet demand.

2.2 Waste pathways

Taking a high-level view of the waste pathways once it is generated at the waste producer site, and depending on the type of waste, waste is:

- Collected at the waste producer's property and hauled direct to landfill;
- Collected at the waste producer's property and hauled to a transfer station / resource recovery facility where as much as is technically feasible is recovered for reuse or recycling before the remaining "residual waste" is consolidated and hauled to a disposal site, such as a landfill; or
- Delivered to a transfer station / resource recovery facility or direct to landfill by the waste producer themselves instead of by a collection contractor.

Refuse transfer stations and resource recovery facilities play a key role in the recovery of valuable resources from the waste stream and the reduction of residual waste to landfill. Unless the customer elects to undertake recycling and recovery on their own site prior to collection, a transfer station /

[2] Auckland Council, 2023, Auckland's Waste Assessment https://www.aucklandcouncil.govt.nz/content/dam/ac/docs/plans/waste-strategy/waste-assessment-2023.pdf
[3] Auckland Council, 2023, Auckland's Waste Assessment https://www.aucklandcouncil.govt.nz/content/dam/ac/docs/plans/waste-strategy/waste-assessment-2023.pdf

resource recovery centre is the only opportunity once waste has been generated to reduce / recover waste prior to disposal at the landfill.

In the Auckland region there are a number of Refuse Transfer Stations and Resource Recovery Facilities that form an important part of the waste pathway. The locations of these facilities and Landfill facilities are shown in the Figure 2.1.

Figure 2.1: Waste facilities within the Auckland Region.

2.3 Role of landfills in the waste cycle

A Class 1 landfill is a disposal site that accepts municipal solid waste (MSW). A Class 1 landfill generally also accepts construction and demolition waste, some industrial wastes and contaminated

soils. Class 1 landfills often use managed fill and cleanfill materials they accept as daily cover. Redvale Landfill is a Class 1 landfill as defined by this definition[4].

In New Zealand, a number of trends (paralleling overseas practice) have emerged in relation to Class 1 landfills. These include a tendency towards centralisation of landfill facilities and an increase in waste transfer to fewer, larger (mostly regional) facilities[5].

Furthermore, the introduction of the Waste Minimisation Act 2008 and the Climate Change Response Act 2002, and associated Regulations, have led to changes in waste disposal practices. There is now more waste segregation prior to landfilling and a further trend towards more specialised facilities, designed specifically for the types of fill material/waste being disposed[6].

Municipal landfills are included in the definition of infrastructure in the AUP[7] as they are the final destination for municipal solid waste that cannot be recycled and are essential in the everyday functioning of a city. They contribute to the social, economic and environmental wellbeing of people and communities in Auckland and have a vital role to play in achieving sustainable management.

Furthermore, the Government has recently introduced the National Policy Statement for Infrastructure 2025. This document provides national direction to guide the efficient development, management and upgrading of infrastructure across New Zealand. It recognises infrastructure as nationally significant and aims to support community wellbeing, health and safety, while ensuring environmental impacts are appropriately managed. In this NPS, resource recovery and waste disposal facilities are included in the definition of infrastructure, giving facilities such as Class 1 landfills policy support under this national direction.

2.4 Auckland Regional Landfill proposal

In 2019, WMNZ applied for resource consents to construct and operate a new landfill (ARL) located north of Auckland between Warkworth and Wellsford. This landfill was proposed as a replacement for Redvale Landfill and is expected to pick up the tonnage that Redvale currently accepts, which is approximately 600,000 tonnes per annum. Approximately 30% of the waste accepted at Redvale is potentially suitable for placement in a Class 2 section of the landfill with the remaining amount only being suitable for Class 1 disposal.

The key legal milestones in consenting ARL to date are:

- On 11 June 2021, WMNZ's application for resource consents was granted subject to conditions by a majority (4-1) of Independent Hearing Commissioners on behalf of Auckland Council.
- On 21 December 2023, following appeals, the Environment Court found that WMNZ's application for resource consents was capable of meeting relevant requirements of the RMA if certain modifications were made. This was in the context where the Court was clear from the outset of the appeals that an interim decision was highly likely, and the Court would not be in a position to grant final consents without a subsequent hearing process on conditions. An interim decision on ARL was issued by the Environment Court in December 2023.
- The interim decision was appealed to the High Court, with a decision dismissing the appeal issued by the High Court on 19 December 2024.

[4] Waste Management Institute New Zealand, September 2023, Technical Guidelines for Disposal to Land, Revision 3.1
[5] Waste Management Institute New Zealand, September 2023, Technical Guidelines for Disposal to Land, Revision 3.1
[6] Waste Management Institute New Zealand, September 2023, Technical Guidelines for Disposal to Land, Revision 3.1
[7] AUP Chapter J – Definitions "Infrastructure".

- A further Environment Court hearing was held in October 2025, with an interim decision issued on 26 February 2026. This interim decision concluded that consent can be granted on modified conditions.
- A request was made by Forest & Bird to the Court of Appeal for a hearing on a narrow appeal relating to Policy E3.3(18) of the AUP and NPS-FM relating to loss of river extent. The Court of Appeal issued a decision on 3 March 2026, granting leave to appeal on this policy provision only and its application. A hearing has been set down for August 2026.

With the delays to the consenting process, the time required to develop and open the new landfill will extend beyond the current land use consent condition for Redvale Landfill requiring waste acceptance to cease at the end of December 2028. Once Redvale stops landfilling waste in December 2028, an acceptable facility will be needed to dispose around 600,000 tonnes of waste per annum, or approximately 4 million tonnes until the time ARL becomes operational. Although WMNZ is actively developing ARL as a permanent replacement for Redvale Landfill, a significant timing gap exists as ARL isn't expected to be operational until mid-2030s. This creates a critical time period where Auckland needs reliable and sustainable solutions for managing its residual waste until ARL is ready to accept waste.

WMNZ has undertaken a multi criteria options analysis to address the problem faced and undertaken significant community consultation on the options. The option now sought through this application is consenting a modest amount of new landfill space at Redvale to bridge the gap between the closure of Redvale and opening of ARL. The proposal will extend the operational life of Redvale Landfill to no later than 31 December 2036, thus increasing the total consented airspace of the landfill beyond what is currently consented.

3 Existing environment

3.1 Site location

The site is located at 66 Landfill Access Road, Dairy Flat, north of Auckland as shown in Figure 3.1. WMNZ owns approximately 168 ha of land, including the landfill operation, ancillary activities, and buffer zones. The site is approximately 9 km northwest of Albany and approximately 1 km west of State Highway 1. The site is accessed off Dairy Flat Highway via Landfill Access Road. The site is in an area of low, rolling hills with elevations ranging from approximately 30 to 150 m above sea level. The Rangitōpuni Stream runs eastwards close to the northern boundary and eastern site boundary towards Dairy Flat Highway.

Land use in the area is predominantly rural-residential lifestyle blocks, with some horticultural and pastoral farming activities. This has been slowly changing over the lifetime of the activity as the urban extent of Auckland has moved further north and resulted in intensification of urban activities within the wider catchment. In the broader area is the Dairy Flat Primary School located directly off the Dairy Flat Highway, the North Shore Airport is approximately 2 km to the east of the site. There are also new developments including the Auckland Surf Park Stage 1 under construction.

Figure 3.1: Redvale Landfill location map.

3.2 Site description

The WMNZ landholdings, as shown in Figure 3.2 and included in Appendix B, covers an area of approximately 168 ha. For ease of reference, the landholdings have been split into five areas, as shown in Figure 3.2. The site is bounded by Richards Road to the south and Horseshoe Bush Road to the north.

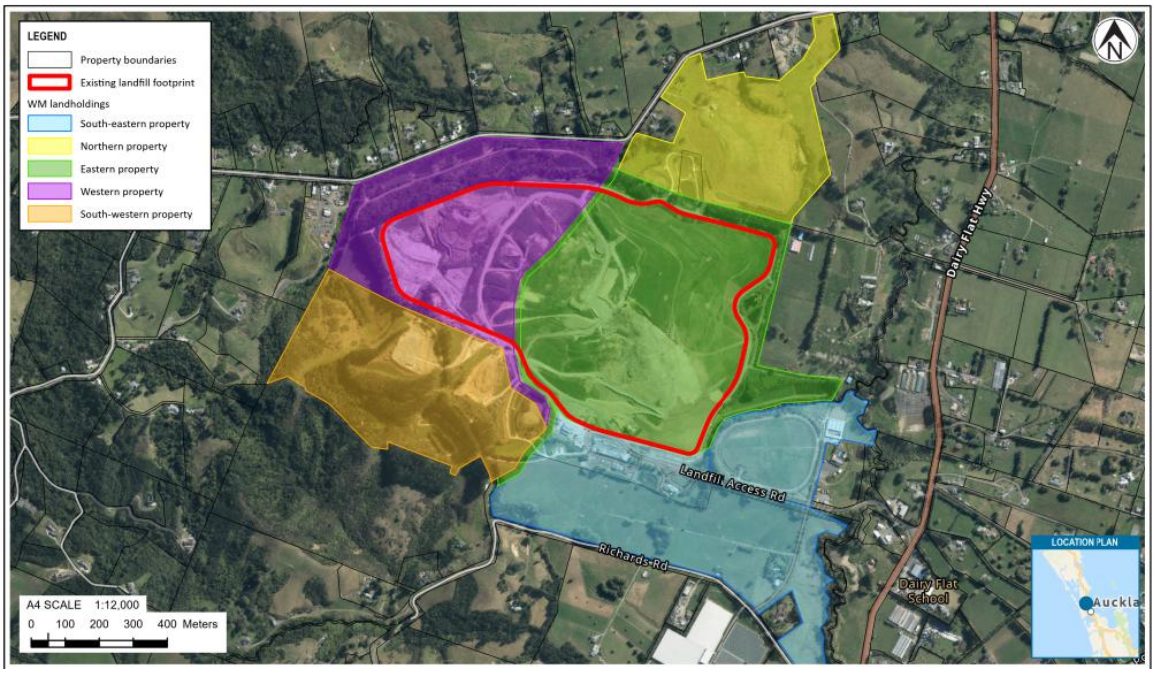

Figure 3.2: Redvale Landfill site areas.

These areas are:

- **Northern Property**: Comprises of the earthfill (also known as Stockpile 6) and part of Sediment Retention Pond 3.
- **Eastern Property**: Primarily includes landfilling activities. The area is appropriately lined for Class 1 materials and typically accepts Class 1 materials. A portion of this area has completed filling to its final profile and has had final cap completed. Within the footprint also includes Sediment Retention Ponds 1 and 2, the LEU and ATF pad.
- **Western Property**: Primarily includes landfilling activities. The area is appropriately lined as a Class 1 facility, however, currently is used for the disposal of Class 2 materials. Sediment Retention Pond 4 is also included within this area.
- **South-western Property**: Comprises of Stockpile 4, the decommissioned Managed Fill Area and Sediment Retention Ponds 5 and 6.
- **South-eastern Property**: Generally, comprises ancillary landfilling activities inclusive of the landfill offices, weighbridge and wheel wash, Energy Park and workshops. This area also includes Southern Stockpile 2 and the trotting track. WMNZ also owns the vacant land along the south which acts as a buffer for the landfill from the neighbouring properties.

3.3 Landfill footprint and closure profile

Based on the existing design and consent that Redvale Landfill is operating under, at closure the landfilled area is expected to cover an area of approximately 69 ha with a total waste volume of 20 Mm^3, inclusive of final cover, with a maximum height of RL 120 m.

3.4 Existing consents

Redvale Landfill became operational in 1993 and was the first modern landfill to be consented under the RMA. The activities at the site are authorised by several resource consents, which are fully detailed within the table included in Appendix D. The resource consents generally authorise the following activities:

- The establishment and operation of a Landfill activity and associated ancillary activities in the Rural – Mixed Rural Zone (use of land).
- General earthworks for the establishment and on-going operation of the landfill including Stockpile 4.
- On-going presence and use of Stockpile 4.
- Diversion and discharge of stormwater.
- Discharge of contaminants to land from a solid waste landfill and a managed fill facility.
- Discharge of contaminants from an Industrial Trade Activity.
- Diversion and take of groundwater.
- Operation of a Managed Fill facility in the Rural – Mixed Rural Zone.
- Air discharges associated with the landfilling operation including the leachate evaporator.
- Operation of a leachate evaporator unit within the Rural – Mixed Rural Zone.
- Diversion of sediment laden water within 100 m of a natural wetland near Stockpile 4.
- Stormwater management and operation, inclusive of damming of an unnamed tributary of Rangitōpuni Stream.

This application will incorporate all ongoing operations at the site, inclusive of ancillary activities, and the proposed activities for which resource consent is sought. These consents will replace the existing consents for the ongoing operation of the landfill when they are given effect to.

3.5 Planning overlays

The site is located within the Auckland Region, within the jurisdiction of Auckland Council. Table 3.1 sets out the Planning notations included in the AUP.

Table 3.1: AUP zoning and notations

Zoning / Overlay or other planning limitation	Comment
Zone	<
Rural – Mixed Rural Zone	The Mixed Rural Zone is the underlying zone of the whole site.
Overlays	
Natural Resources – Significant Ecological Areas Overlay – SEA_T_2194	The terrestrial SEA overlay is identified within a small portion on the south-western side of the Redvale Landfill. No works for this application are proposed within the SEA overlay onsite.
Infrastructure: Airport Approach Surface Overlay – North Shore Airport	Majority of the Redvale Landfill is located within the Airport Approach Surface Overlay of North Shore Airport. This overlay restricts activities that can occur in the Airport Approach path and places height restrictions on activities located within 2.6 km of North Shore Airport to 45 m above the average runway ground level or RL 106.7 m.; While the existing consented design of the landfill exceeds the RL 106.7 m, the proposed expansion will be formed at a maximum height of RL 106 m post settlement to comply with the Airport Approach Surface Overlay.

Zoning / Overlay or other planning limitation	Comment
Zone	<
Highly productive land – Transition definition from the National Policy Statement for Highly Productive Land 2022	Majority of the Class 1 Landfill site at Redvale falls within the transition definition of 'highly productive land' in the NPS-HPL. References to 'highly productive land' mean land that is zoned general rural or rural production and includes land that meets LUC 3 class with moderate limitations.
Controls	
Controls: Macroinvertebrate Community Index – Exotic	This control applies to the exotic plantation forest at the Stockpile 4 site located on the south-western side of Redvale Landfill. The Macroinvertebrate Community Index (MCI) is a guideline for freshwater ecosystem health associated with different land uses within catchments. Surface and sediment-laden water from the Landfill discharges into Rangitōpuni Stream that runs eastwards close to the northern boundary and eastern site boundary towards Dairy Flat Highway.
Controls: Macroinvertebrate Community Index - Native	This control applies to the vegetation area that is subject to the SEA overlay located at the south-western side of the Redvale Landfill.
Controls: Macroinvertebrate Community Index – Rural	This control applies to majority of the Redvale Landfill.
Auckland Council GeoMaps and other relevant notations[1]	
Overland flow paths	Auckland Council GeoMaps shows a number of overland flow paths within the Redvale Landfill footprint and across the WMNZ landholdings.
Flood Hazard Areas: Very High to Low Hazard Areas	Plan Change 120 includes updated Flood Hazard Areas, identifying areas of Very High to Low hazard area over Redvale Landfill. There is one larger extent of a Very High hazard area to the north-west of the landfill, within the current Class 2 area with other areas focused around existing ponds. Other areas of Flood Hazard areas are concentrated around the area of the ancillary activities associated with the landfill to the south.
Landslide Susceptibility areas	Plan Change 120 includes landslide risk overlays, identifying areas of High to Very Low landslide susceptibility (both shallow and large scale) over Redvale Landfill. There are some areas of High to Very High landslide susceptibility areas concentrated within the south-western corner of the landfill.
Statutory acknowledgment area	The Redvale site is a statutory acknowledgment area for Te Kawerau ā Maki.
Mana whenua areas of interest	The Redvale site is an area of interest to the following mana whenua groups:; Ngāti Manuhiri; Ngāti Whātua Ōrākei; Ngāi Tai ki Tāmaki; Ngāti Pāoa; Ngāti Whātua o Kaipara; Te Kawerau ā Maki; Ngaati Whanaunga; Ngāti Maru; Ngāti Te Ata; Te Ākitai Waiohua; Ngātiwai; Te Rūnanga o Ngāti Whātua

3.6 Natural environment

3.6.1 Topography

The WMNZ landholdings has variable terrain, with the highest point of approximately RL 136 m in the northern portion of the existing Stockpile 4 site and the low point of approximately RL 46 m in the area around the Sediment Retention Ponds (SRPs) adjacent to the Dairy Flat Country Club (Figure 3.3).

The waste filling profile within the existing Class 1 landfill follows the anticipated filling regime at the site with the highest point being off centre to the west, gradually dropping around the edges of the landfill.

Figure 3.3: Existing topography at Redvale Landfill.

The site is set within a wider topography on the end of a ridgeline between two localised valleys (Figure 3.4). A larger valley runs from approximately north to south to the east of the site.

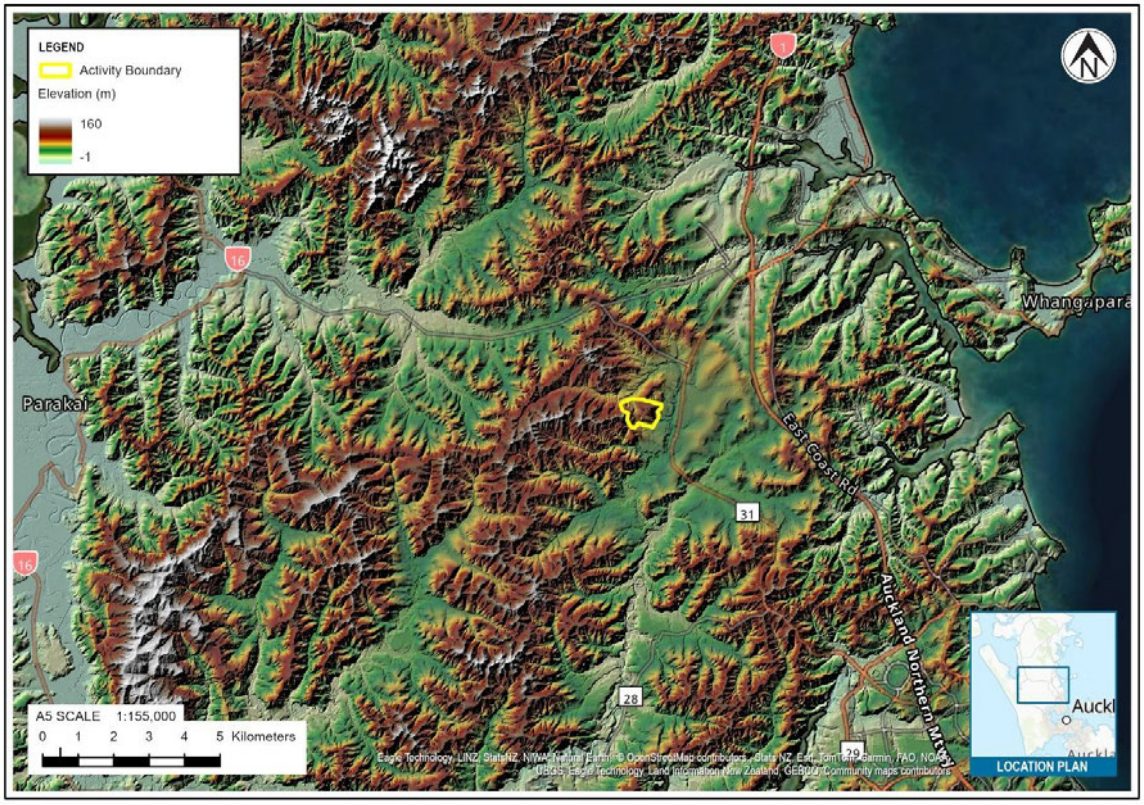

Figure 3.4: Topography surrounding the site, yellow footprint indicated current and proposed landfilling activities.

3.6.2 Geology

The geology of the landfill is described in detail in the Geotechnical Assessment (**Technical Report B**). Extensive geotechnical investigations have been undertaken at the site since 1988 enabling a comprehensive understanding of the underlying material at the landfill.

Prior to the landfilling activities and the limestone quarry operations the site was low relief, sloping gently northwards and eastwards. These lower areas were underlain by Northern Allochthon materials. On the areas of higher elevation, which typically formed ridgelines, areas were underlain with Waitemata Group sediments.

A limestone quarry was established at the site prior to the landfilling activities. These operations were focused on the centre of the existing landfilling area and continued for a period in parallel with landfilling operations.

The landfill was established in areas predominantly underlain by Northern Allochthon. The Northern Allochthon units below Redvale Landfill comprise Mahurangi Limestone and Hukerenui Mudstone. To the south-west of the landfill site are areas comprised of East Coast Bays Formation Siltstones and Sandstones which are part of the Waitemata Group. This has been confirmed with further specific details within a geotechnical model developed for the site, as discussed in the Geotechnical Assessment.

Developments at the site have included excavation of materials for both quarrying and to ensure that the area is suitable for the establishment of the landfill lining system, as well as other activities on the site, such as the stockpiles at the site. The development of the landfill is described in detailed in Section 4 below. In relation to the underlying geology, the landfilling area has been excavated to the designed base grade with the construction of the Phase 10 bund along the northern edge of the

landfill footprint. Where fill has been placed for construction, this has comprised of various engineering fill that meet required Technical Specifications on the site. These materials typically comprise of site won material deriving from Northern Allochthon mudstones and silt stones with minor limestone in some instances.

As part of the landfill development, there has also been engineered fill placed below the landfill. This was generally material won on site that was derived from Northern Allochthon mudstones/siltstones and a lesser extent limestone.

3.6.3 Meteorology

There are two meteorological stations used to understand the climate at this site, including:

- WMNZ station within the Site. Mast height of 10 m.
- North Shore Airport station, approximately 2 km east of the Site. Mast height of approximately 2.5 m.

3.6.3.1 Wind

The Air Quality and Odour Technical Assessment (**Technical Report D**) includes details on wind direction in the area. The wind roses in Figure 3.5 and Figure 3.6 below detail the average wind directions and speed calculated over the years or 2022-2023. Wind direction patterns are consistent with general patterns in the Auckland region, with a predominance of south-westerly and northeasterly winds.

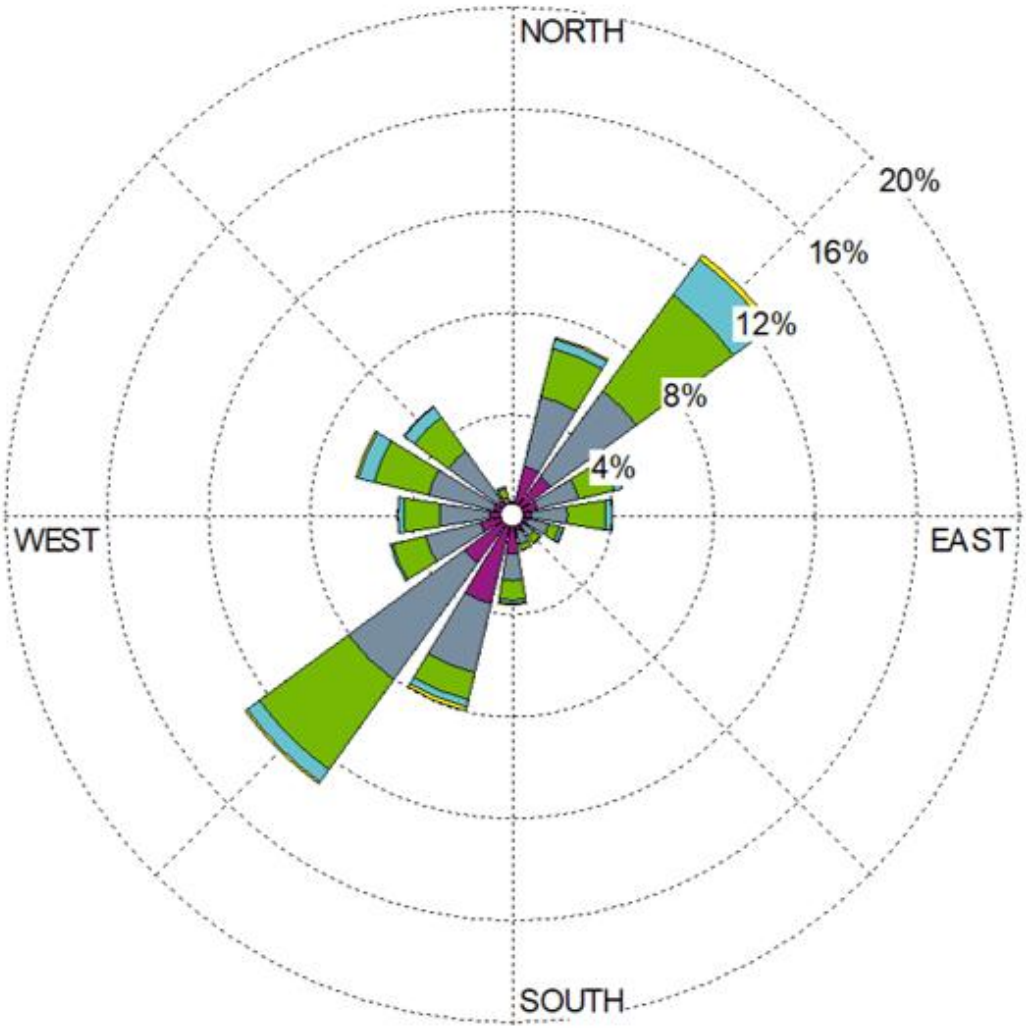

Figure 3.5: Wind rose showing average wind speeds and direction generated from the WMNZ meteorological station for 2022 – 2023.

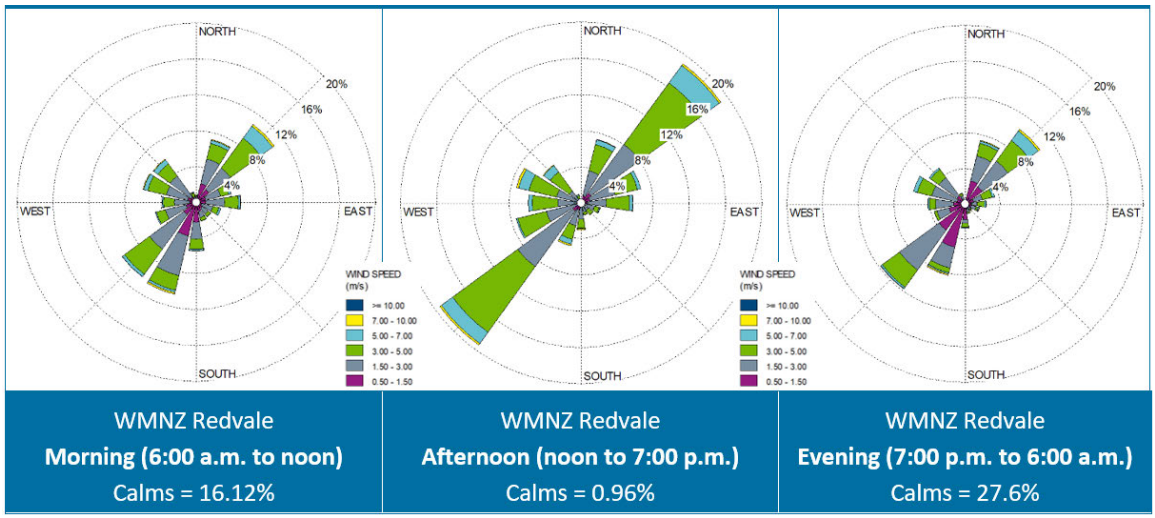

Figure 3.6: Wind roses for morning, afternoon and evening generated from the WMNZ meteorological station for 2022 – 2023.

Calm or light wind speed conditions at the site predominantly occur overnight and can persist into the early morning.

3.6.3.2 Rainfall

The annual rainfall at the site is shown in Figure 3.7 below and is based on the Awanohi Rainfall at Okura meteorological station, approximately 7 km east of Redvale Landfill.

Figure 3.7: Annual rainfall from 2016 to 2024 recorded at Awanohi Rainfall at Okura.

3.6.3.3 Background air quality

The existing receiving environment is characterised by low background contaminant concentrations, intermittent rural odour sources, and limited dust-generating activities, providing an appropriate baseline against which the effects of the proposal can be assessed.

The Site is located within a rural environment with potential background sources of combustion-related air pollutants in the surrounding area, including traffic on Dairy Flat Highway and local roads, domestic solid-fuel heating during winter, agricultural activities (including occasional vegetation burning), and coal-fired boilers associated with nearby commercial glasshouse operations. Generally, background air quality is expected to be good with contaminants of interest associated with existing and proposed activities, including particulate matter (PM_{10} and $PM_{2.5}$), nitrogen oxides (particularly NO_2), sulphur dioxide (SO_2), and carbon monoxide (CO).

In the absence of site-specific background monitoring data, background air quality has been characterised using default rural values recommended in the Ministry for the Environment's Good Practice Guide for Assessing Discharges to Air from Industry. These values are considered representative of the receiving environment. The nearest operational ambient air quality monitoring station is located at Silverdale; however, data from this site is influenced by urban sources and is not considered directly representative of conditions at the Site.

With respect to odour and dust, the surrounding rural environment includes a range of activities that can intermittently generate odour and dust, such as farming practices and commercial operations.

While some rural odours (e.g. silage or manure) may be similar in character to waste odour, they are generally distinguishable. Other identified localised sources of odour and/or dust include a portaloo servicing yard and green waste mulching activities on Horseshoe Bush Road, as well as topsoil screening associated with the nearby Surf Park construction site.

3.6.4 Hydrogeology

Groundwater is described in detail within the Hydrogeology Assessment (**Technical Report F**). The groundwater system within and wider from Redvale Landfill is unconfined and is hydraulically connected to the Rangitōpuni Waitemata sub-aquifer zone, as identified on Auckland Council's GeoMaps and utilised as a groundwater catchment for allocation purposes.

Groundwater contours across the existing landfill are shown in Figure 3.8 below. These have been derived from the existing monitoring wells, as shown. These contours indicate that groundwater recharge at the site occurs to the west-southwest on higher ground, which is likely from rainfall. It is noted within the Hydrogeology Assessment that due to sparse data, this carries greater uncertainty; however, this is generally representative of the groundwater levels as detailed in the summer and winter contour maps that have been prepared.

To understand the Class 2 extension, a monitoring well was drilled in 2024. Monitoring within this monitoring well over the 2024/2025 period demonstrated the lowest groundwater level as 5.64 m bgl in April 2025 and the highest groundwater level of 4.69 in December 2024.

Figure 3.8: Groundwater contours for November 2024. Source: LINZ (cc-BY-4.0).

Hydraulic conductivity is also discussed within the Hydrogeology Assessment to help inform the fate and transport modelling undertaken and discussed further on within this report. The hydraulic conductivities beneath the existing landfill are low (ranging between 3 x 10-8 m/s for limestone to <5 x10-10 m/s for mudstone), with groundwater flow rates considered to be slow. The Class 2 footprint extension area is within the Northern Allochthon mudstone and therefore has a

representative hydraulic conductivity of <5 x10-10 m/s with groundwater flowing from higher ground in the northwest towards the southeast, including the existing Sediment Retention Pond 6.

Groundwater testing over the last 10 years has been undertaken to identify any impacts from the landfill on groundwater quality and to understand groundwater levels and flows, as described above. The ongoing testing locations are shown in Figure 3.8. There is no evidence of leachate contamination within the groundwater as the groundwater quality has not changed over this time period.

3.6.5 Surface water

A description of the surface water at the site, inclusive of existing stormwater treatment, is included in the Stormwater, ITA and Sediment Assessment Report (**Technical Report G**) and the Ecological Values Assessment (**Technical Report J**).

3.6.5.1 Catchments

Redvale Landfill is located within the Rangitōpuni Stream catchment, which is approximately 9,000 hectares in area, as shown in Figure 3.9. All current surface water discharges from the site are discharged to the Rangitōpuni Stream and its tributaries from the clean water diversions and Sediment Retention Ponds shown across the site.

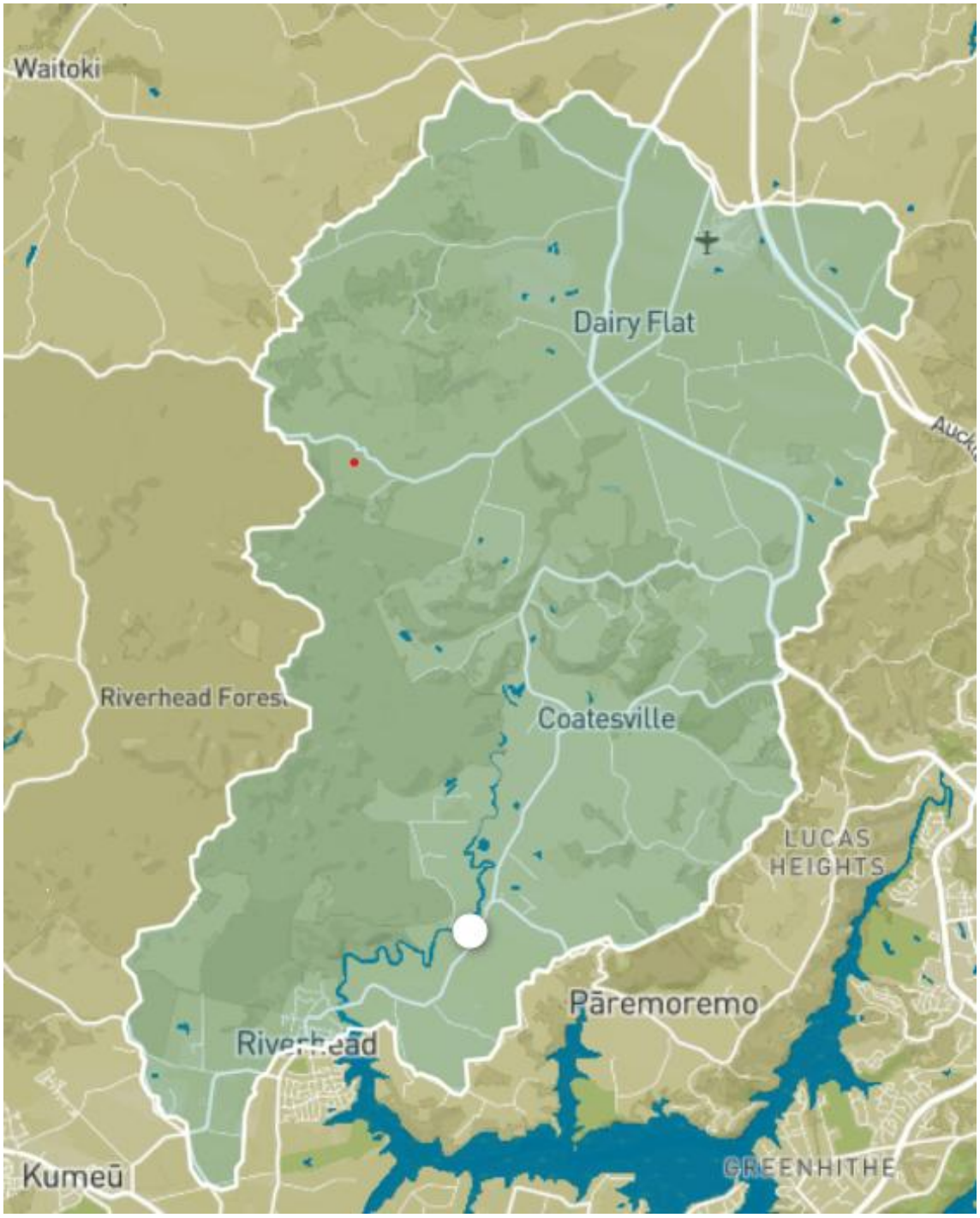

Figure 3.9: Rangitōpuni Stream catchment and landfill location Source: Mapbox & OpenStreetMap.

Site-specific catchments are shown in Figure 3.10. The management of stormwater on the site is further described in Section 4.8 relating to the landfilling operations.

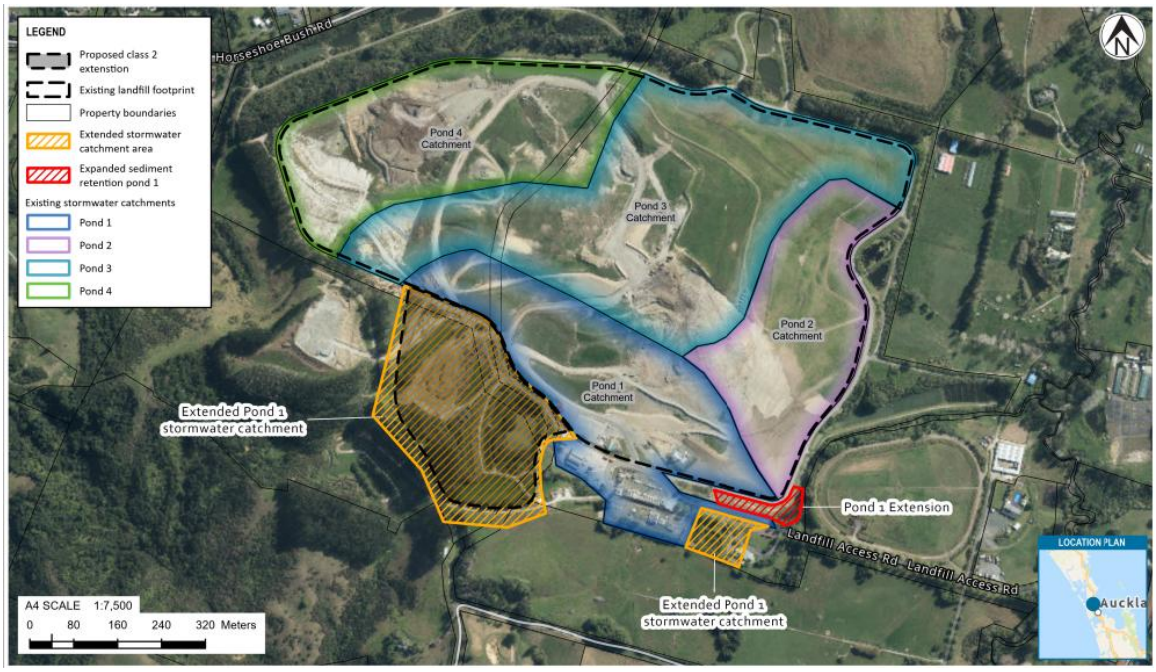

Figure 3.10: Site-specific catchments within Redvale Landfill.

3.6.5.2 Waterways

The site includes two natural waterways, as shown in Figure 3.11 below. These include:

- One stream located to the south of Stockpile 4 along its base (annotated below as the 'Stockpile 4 Stream'), approximately 75 m long within the WMNZ landholdings. This flows from down through the vegetation, through a natural inland wetland described below, around Sediment Retention Pond 5 and discharges off-site to the south. This channel has been modified to allow for diversion of the water around the pond, including an established slipway. This is classified as an intermittent stream.
- The other stream is located to the east of the site, partly within WMNZ landholdings and partly located off-site, and flows alongside the trotting track and Sediment Retention Pond 1 (annotated below as the 'Site 4 Tributary'). This is approximately 430 m in length within the WMNZ property and discharges into the Rangitōpuni Stream to the east of the site. This is also a modified watercourse that diverts clean water from the site.

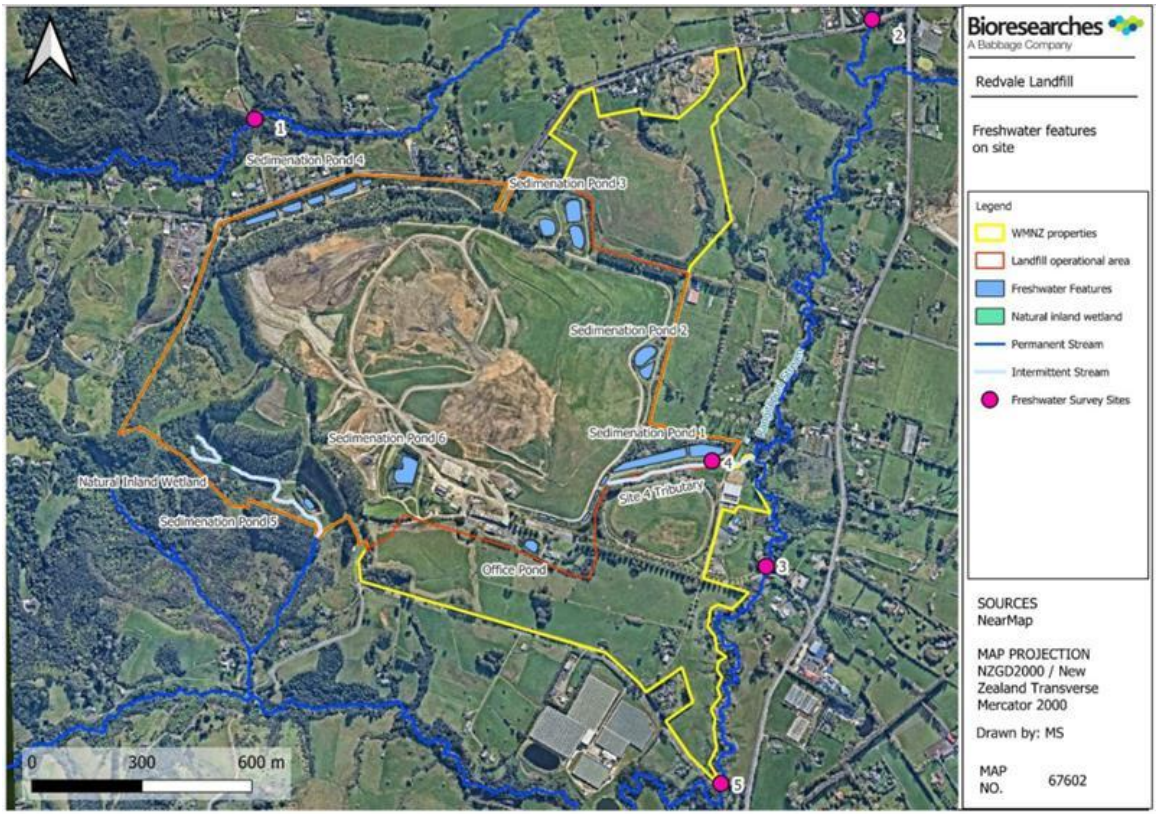

Figure 3.11: Identified natural streams on site.

3.6.5.3 Wetlands

One natural inland wetland (as defined in the NES Freshwater), is located to the south of Stockpile 4 and is shown in Figure 3.11. The wetland is approximately 320 m2 and is formed through the presence of overland flow and discharges to the narrow-incised stream, as described below. This is located within the modified environment of Stockpile 4, inclusive of a planted pine forest.

The Rangitōpuni Stream is located to the east of the WMNZ landholdings, as shown in Figure 3.12. Discharges occur into this stream from Sediment Retention Pond 1.

3.6.5.4 Offsite surface water quality

Surface water quality is measured at four sites within the Rangitōpuni Stream and tributaries, offsite from the landfill. This is required under the existing resource consent conditions to monitor any impacts on surface water from discharges from the landfill. The existing monitoring locations include:

- Site 1: Upstream of Pond 4 discharge, located in a tributary of Rangitōpuni Stream.
- Site 2: Upstream of Pond 1, 2 and 3 discharge points located in the Rangitōpuni Stream.
- Site 3: Downstream of all discharges from the landfill into the Rangitōpuni Stream.
- Site 4: Upstream of Pond 1 discharges, located in a tributary of Rangitōpuni Stream.

These are shown on Figure 3.12.

Figure 3.12: Surface water monitoring locations.

As described in the Stormwater Assessment, the water quality in Rangitōpuni Stream is generally good and typical of the streams within the rural/urban boundary within the Auckland Region, this is based on data collected since prior to the establishment of the landfill and continued through the current resource consent conditions at the site (Conditions 115, 123 and 147 of REG-61342). The suite of parameters that have been analysed at the site are at similar levels at the monitored control sites and outlets which demonstrates that the landfill does not have a significant impact on the downstream water quality at the site. This conclusion is derived from the following findings at the monitoring sites:

- Site 1: Water quality parameters are generally below the Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Default Guideline Values (ANZ DGV) for 95% species protection level (SPL) with the exception of metals, including zinc, manganese and copper, which exceed the 80 % SPL.
- Site 2 and 3: Show similar patterns to Site 1, but with a slightly higher frequency of elevated dissolved copper concentrations at Site 2 and some exceedances of the 95 % SLP for Total ammoniacal nitrogen and dissolved cadmium and chromium at Site 2 and aluminium, lead, zinc and manganese at Site 3. Statistical analysis to understand paired differences between individual sites shows that the difference between Sites 2 and 3 for ammoniacal nitrogen, total zinc and manganese, are not significant.
- Site 4: Does not include a regular flow and therefore results are not indicative of water quality during flow conditions and interpreting the results in terms of potential effects is difficult. However, monitoring data that has been undertaken shows elevated metal concentrations including dissolved coper, zinc and manganese regularly exceeding the 80% SPL.

For other monitoring parameters, the following was identified:

- Non-parametric Kruskal Wallace test results show significant difference across the four sites for ammoniacal N, nitrogen, zinc, lead and manganese.
- Test results for chromium, copper, aluminium and cadmium do not show any significant differences between the sites.

Discussion on habitat features of the waterways are discussed below in Section 3.6.6.2.

3.6.6 Ecological values

The ecological values of the site are described in the Ecological Values Assessment (**Technical Report J**). These are based on extensive desktop reviews and fieldwork to establish what is located at the site.

3.6.6.1 Terrestrial ecology

Vegetation

Vegetation at the site generally comprises planting required for landscape and visual purposes. A plan showing the existing landscape and visual planting is included within the Landscape & Visual Assessment (Technical Report Q) and is reproduced below (Figure 3.12). There are 12 At-Risk and Threatened plant species located across the site, including a mix of indigenous and non-indigenous to the Auckland region. Due to this mix, the planting is considered to have low floristic value.

One Significant Ecological Area (SEA) is identified at the site, south of Stockpile 4. This is a terrestrial SEA, and the factors for its inclusion are representativeness, threat status, rarity and diversity. This vegetation is identified as mixed native exotic with an associated negligible value. The proposed works do not interfere with this SEA area.

Areas of exotic vegetation include existing shelter belts and the pine plantation located on Stockpile 4. The values associated with these areas of planting are low.

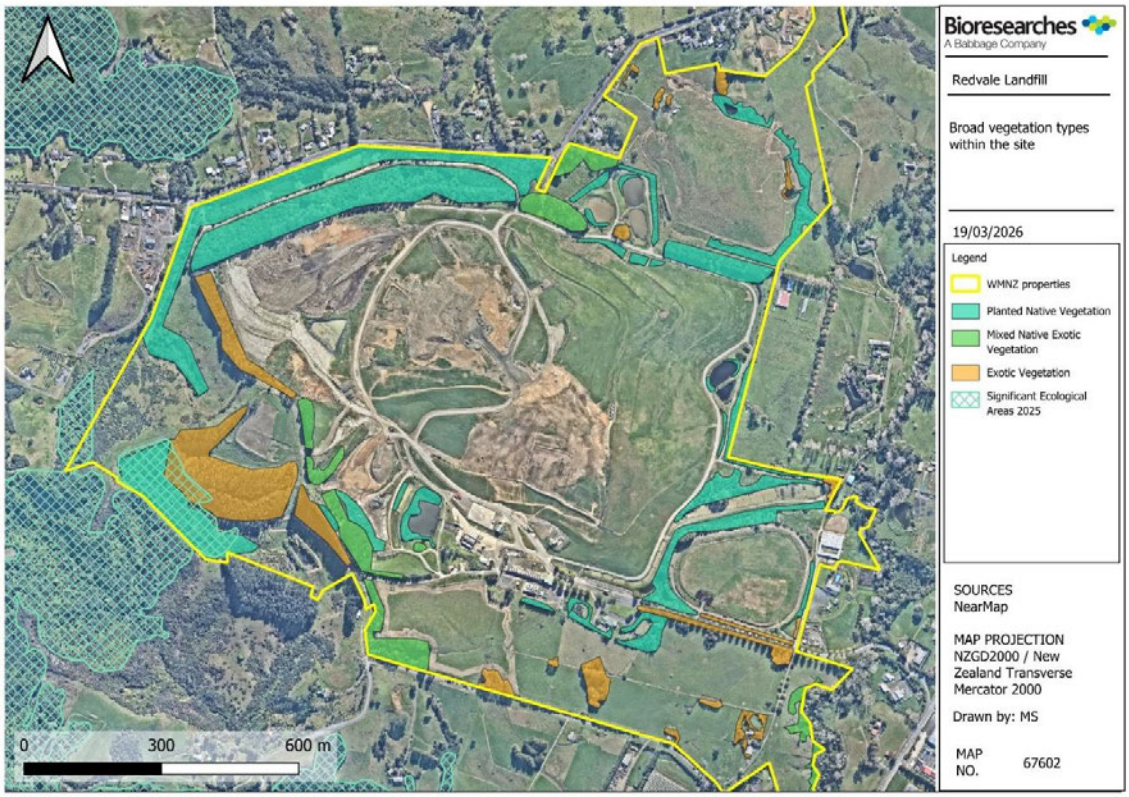

Figure 3.13: Vegetation types within the WMNZ landholdings.

Avifauna

The avifauna assessment included a mix of desktop and on-site assessments to understand the avifauna located within the wider ecological area and those located within the site boundary. While there were 33 avifauna species detected within 10 km from the site, the habitat on site is suitable for nineteen of the species, and sixteen were recorded on site during surveys.

Four species recorded on site were listed as being Threatened. This included the little black shag, black shag, red-billed gulls and dab chicks, including a breeding pair of the latter on Sediment Retention Pond 6.

Habitat for avifauna at the site is generally limited to the more naturalised features being the planting on site and the established ponds. While the waste area itself provides a food source for seagulls and myna birds, this is actively discouraged at the site through pest control.

Herpetofauna

Surveys were undertaken on site to survey for herpetofauna using Artificial Cover Objects (ACOs). The findings from these surveys were limited to three copper skinks, which were located within the Eastern Property near Sediment Retention Pond 3 and to the west of the trotting track, near Sediment Retention Pond 1. All of the findings were in areas outside of the active working part of the landfill.

Copper skinks have a conservation status of At Risk – Declining; however, they are known for being capable of recolonising in heavily modified and degraded environments. The survey undertaken found a gravid female which indicates the likely presence of other copper skinks across the site in suitable habitat. Suitable habitat across the site is outside of active working areas and includes areas where appropriate shelter for skinks exists within vegetation and surface debris.

Bats

An extensive acoustic monitoring programme was undertaken to detect long tail and short tail bats at the site over 2007 nights. The results indicate that there is no evidence of these being present at the site. Due to this species being highly mobile there is always the potential that these may be present on site in the future, however the site currently does not provide adequate habitat for bats, so the likelihood is low.

3.6.6.2 Freshwater ecology

The water quality at the site is described in Section 3.6.5 above. Habitats on the site are very limited due to the nature of the landfilling operation and the freshwater habitats impacted by the works offsite are limited to the Rangitōpuni Stream and some of its tributaries. As part of the survey work undertaken on site, netting and trapping of freshwater fish was carried out on site within the Sediment Retention Ponds, the Rangitōpuni Stream and a tributary of the Rangitōpuni Stream. The following were captured at each site:

- Sediment Retention Ponds: Shortfinned eels were present within the sediment retention ponds, with the highest population appearing in Pond 1. These ranged from elvers (180 mm) to large adults (800 mm).
- Rangitōpuni Stream: Shortfin and long fin eel (both juvenile and adults), common and Crans bully (ranging 31 to 90 mm) and banded kokopu were found within the Rangitōpuni Stream.

Habitat characteristics of Rangitōpuni Stream indicated that the area was generally modified, with limited shading. Vegetation around the stream was predominantly exotic, with limited native species identified. The depth of the stream ranged from 0.11 to 0.8 m, with some deeper pools and

generally a continuous flow. It was noted that some areas of the stream where sampling was occurring were dry during autumn.

The freshwater macroinvertebrates within Rangitōpuni Stream showed poor diversity. Results from the Macroinvertebrate Community Index (MCI) and Semi-Quantitative Macroinvertebrate Community Index showed poor quality habitat at the sampling sites. No investigation of macroinvertebrates was required to be undertaken on site, as no natural habitats on site will be impacted.

3.7 Human environment

3.7.1 Land uses

Prior to redevelopment as a landfill, the site was used as a limestone (limerock) quarry operated by Redvale Lime Company Ltd, who excavated and crushed the limestone for use as aggregate and agricultural and industrial lime. The quarry works were primarily in the central part of the overall Landfill site, with minor extraction from a smaller source in the western area. The Redvale Landfill and quarrying operations co-existed from commencement of the Landfill construction in 1992 to when Redvale Lime Company Ltd vacated the site in 2004. By this time, the main quarried area was approximately 10 ha in extent with excavation depths up to about 30 m below the original ground level, corresponding to base levels of about RL 40 m.

3.7.2 Adjacent land uses

Adjacent land uses in the area are predominantly rural-residential lifestyle blocks, with a mix of horticultural and pastoral farming. These properties are generally located to the north south and west of the WMNZ landholdings. Other land uses in close proximity to the site include:

- **Dairy Flat Country Club:** located to the east of the site and trotting track. This includes a restaurant and function facilities.
- **Massimo's Italian Cheese:** located to the east of the site, at the entry to Landfill Access Road. This site includes the manufacturing of cheeses.
- **Dairy Flat School:** located to the east of Dairy Flat Highway, across from Landfill Access Road with a total roll of approximately 300.
- **Auckland Surf Park:** located approximately 0.7 km to the north-east of the site, the Auckland Surf Park is currently in the early stages of development and is to include a surfing facility, commercial land uses and accommodation.
- **North Shore Airport:** located approximately 2 km to the north-east. The North Shore Airport operates smaller scheduled and charter flights and flight training.

3.7.3 Landscape and visual character

The Landscape & Visual Assessment (Technical Report Q) details the landscape and visual characteristics, attributes and values of the site and surrounding area. The wider context of the area has two distinct characters being:

- Higher elevated hill country with forest ridgelines and smaller native vegetated stream and gullies to the west; and
- Gently rolling hills containing small-scale pastoral use, inclusive of fencelines and shelterbelts, with an increased density of residential dwellings to the east.

Rangitōpuni Stream, located adjacent to the site is generally enclosed by dense, exotic vegetation. The wider Dairy Flat settlement is mainly rural residential lifestyle blocks, but also includes

established greenhouses, the North Shore Airport and the Auckland Surf Park, which is in the early stages of construction of stage 1 of the development. The Redvale Landfill site itself is dominated by the landfill development and ancillary infrastructure. The existing landfill footprint is dominated by grassed slopes, with filling either completed or temporarily suspended. This is interrupted by the active landfill areas where waste placement is currently occurring. Planting for visual purposes has been implemented across the site, as required under the current resource consent. The details shown in the Landscape and Visual Assessment are included on Figure 3.14. The baseline for the existing environment, as it relates to the landscape and visual character, is that this planting has been established as required by Redvale Landfill's current 2028 closure period.

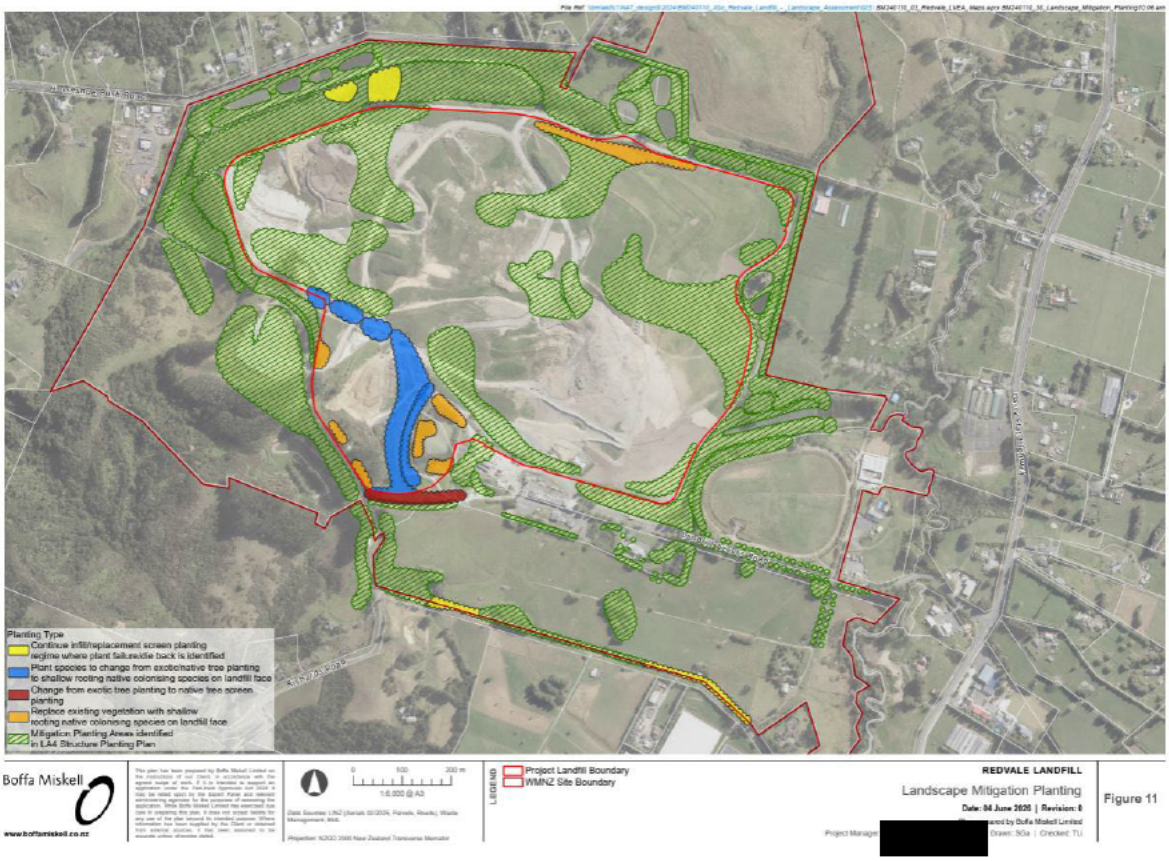

Figure 3.14: Landscape Mitigation Plan.

Visibility of the site is generally limited to private land, with the majority of the visual catchment being projected across farmland. Where the landfill increases in height to the east, the landfill is visually screened by planting or viewing distances that are very distant. Additionally, the landfill is well screened by intervening vegetation from the traffic along Dairy Flat Highway. This is demonstrated in the visual simulations attached to the Landscape and Visual Assessment.

3.7.4 Noise

A Noise Assessment (Technical Report N) has been conducted to assess the existing noise environment and the impacts of the proposal. The existing noise within the Dairy Flat environment includes traffic, wildlife and the existing landfilling operations (inclusive of the Energy Park).

To understand the existing noise at the site, two monitoring methods were used:

- A series of attended measurements undertaken along Richards Road to gather derived noise levels for the notional boundaries of the properties located along this road; and

- Deployment of two level loggers to the south and northwest of the site to measure noise levels in 1-second intervals, as shown in Figure 3.15.

Figure 3.15: Location of noise level loggers.

Based on this monitoring, it was determined that no sound containing special audible characteristics is likely to have occurred at Richards Road. The ambient average and background noise are included in Table 3.2.

Table 3.2: Average and background noise levels

Location	Time	Ambient average (dB LAEQ)	Background averages (dB LA90)
North	7am to 10pm	57	55
	10pm to 7am	49	45
South	7am to 10pm	59	57
	10pm to 7am	39	37

3.7.5 Traffic

The Traffic Assessment (Technical Report O) includes full details of the roading network and existing traffic environment around Redvale Landfill.

3.7.5.1 Roading network

All vehicle access to and from the landfill occurs via Landfill Access Road, which connects to Dairy Flat Highway (DFH) at its eastern end. Landfill Access Road is a public road, which is managed and maintained by WMNZ. This road serves the vehicle access needs of Redvale Landfill and the Dairy

Flat Country Club located toward its eastern end. The site also has legal road frontage to Horseshoe Bush Road along its northern boundary. However, all vehicle access relating to both landfill operational movements and ancillary activities supporting Redvale Landfill occurs via Landfill Access Road.

Dairy Flat Highway is a regional arterial route that connects the site to Albany in the south and the State Highway (SH1) Silverdale Motorway Interchange to the north. The cross-section of DFH in the vicinity of Landfill Access Road typically consists of one 3.5 m wide traffic lane in each direction, with sealed shoulders on both sides and separated by a 3.5 m wide flush median/right turning bay. A kerbside parking lane is also available along the eastern kerb line of the road for school parents/caregivers, as well as other casual parking. Dairy Flat School is located approximately 100 m south of the intersection of Landfill Access Road on the eastern side of DFH.

The intersection between Landfill Access Road and DFH was upgraded prior to the Landfill commencing operations in order to safely accommodate the expected nature and scale of waste-related truck movements. The intersection provides a dedicated right-turn bay for turns towards the landfill, a separate left-turn slip lane for turns from the east, and a flush, painted median connecting the right-turn bays for Landfill Access Road and that associated with the Dairy Flat School intersection.

The measured sight distance to the north of the Landfill Access Road intersection is a minimum of 220 m and to the south is over 300 m. These available sight distances exceed the minimum standards set out in the Austroads Guide (and as adopted widely by roading authorities throughout New Zealand including Auckland Transport), and are expected to continue to provide safe, appropriate and adequate driver sight distances to and from the Landfill Access Road in support of the Landfill for the proposed extension period.

3.7.5.2 Existing traffic count

Traffic counts were undertaken for a seven-day period in July 2025 to understand the existing traffic movements on the highway. This includes the landfill being fully operational at this time. The average (two-way) weekday traffic average of 8,109 vehicles per day, with a seven-day average of 7,338 vehicles per day.

3.7.6 Aviation

Aviation features relating to the site are described in detail within the Aviation Assessment (Technical Report P) and summarised below.

North Shore Airport is located approximately 2 km north-east of the Site. The airport provides for a range of aircraft activities including general aviation (private), and commercial operations. The airport has two runways:

- RWY 03/21 which has an instrument approach and departure.
- RWY 09/27 which is used for day visual operations.

Redvale Landfill is located within the Airport Approach Surface Overlay – North Shore Airport overlay in the AUP, with published heights and dimensions that appear to reflect the Obstacle Limitation Surface (OLS) dimensions for the current airport operations in accordance with Civil Aviation Rule (CAR) Part 139 and the Civil Aviation Authority (CAA) Advisory Circulars. The site is located outside the approach and take-off surfaces for either runway but is located within the horizontal surface overlay which has a height specification of RL 106.7 metres at Redvale. The existing consent for the landfill has a maximum height limit of RL 120 metres which has been consented and approved. The proposed changes to the landfill contours considered through this application do not infringe the surface overlay control of RL 106.7.

3.7.7 Tangata Whenua

Ngāti Manuhiri, Ngāti Rango and Te Kawerau ā Maki have advised they are mana whenua partners for the Redvale site and the wider Dairy Flat area and have provided a joint letter of support for the application (refer Section 8.4 and Appendix H). A summary of the engagement undertaken with Tangata Whenua for the project is provided in Section 8.4.

Based on the Auckland Council GeoMaps database, the following groups are identified within the Mana Whenua Areas of Interest:

- Ngāti Manuhiri
- Ngāti Whātua Ōrākei
- Ngāi Tai ki Tāmaki
- Ngāti Pāoa
- Ngāti Whātua o Kaipara
- Te Kawerau ā Maki
- Ngaati Whanaunga
- Ngāti Maru
- Ngāti Te Ata
- Te Ākitai Waiohua
- Ngātiwai
- Te Rūnanga o Ngāti Whātua

A statutory acknowledgement is an acknowledgement by the Crown that recognises the mana of a Tangata Whenua group in relation to specified areas. In particular, statutory acknowledgements recognise the cultural, spiritual, historical and traditional associations with an area. Te Kawerau ā Maki have a statutory acknowledgment for the Rangitōpuni Stream and tributaries which applies to the site.

3.7.8 Archaeology

There are no recorded archaeological sites in close proximity to the works as identified on the Heritage New Zealand Pouhere Taonga (HNZPT) 'New Zealand Heritage List / Rārangi Kōrero', the New Zealand Archaeological Association (NZAA) 'Archsite' and Auckland Council's Cultural Heritage Inventory online database.

Limited historical features have been identified in the wider area, these include:

- A historic whare site (ArchSite ID: R10/1540) identified on an 1898 survey plan, is recorded on NZAA Archsite at 1247 Dairy Flat Highway (Figure 3.16). This archaeological site is located approximately 200 m east from the nearest landfill boundary.
- Two structures, located at 1338 and 1350 Dairy Flat Highway, Dairy Flat, are recorded on Auckland Council's Cultural Heritage Inventory as heritage dwellings. These structures are located approximately 700 metres to the northeast of the nearest Landfill boundary.

The proposed works will be contained within the Redvale Landfill site and WMNZ landholdings. Therefore, the works will not result in the modification or destruction of the identified historical features. As such, it is anticipated that the proposed works will not require an authority from HNZPT.

Figure 3.16: Map of archaeological sites within a 500-metre radius of the site as recorded on ArchSite. Source: NZAA, 2026.

4 Existing landfill

4.1 Introduction

This section provides an overview of the current landfill and operations at Redvale Landfill. It describes how the Landfill is designed and how it currently operates, which has formed the basis of much of the assessment. In general, the Landfill will continue to operate as it does now but with some improvements to the overall operation at the site.

The existing landfill operation at the site is undertaken in accordance with the Landfill Management Plan (LMP) and consent conditions which detail how the landfill must be operated in accordance with the relevant resource consents the site holds. It is proposed that the LMP is updated as part of this resource consenting process. The updated LMP is attached as Appendix K. The current landfilling operations are detailed within this section, with the relevant environmental controls detailed further down.

4.2 Landfill design

Modern landfills such as Redvale Landfill, are designed and managed to mitigate the impacts from waste disposal to land, as discussed throughout this section. The landfill design at Redvale Landfill, since its establishment, has followed best practice standards for landfilling in New Zealand, updating this over time wherever possible.

4.2.1 Landfill development, design and filling

The filling of Redvale Landfill began in 1993. Prior to this the site was exclusively a limestone quarry at the site. At the time waste began to be accepted, the landfill and quarrying development happened concurrently. The site has since been developed in stages across the site, as shown in Drawing 1092369.3000-C11 in the Landfill Engineering Report (Technical Report A).

Construction on the site over the years has been carried out in accordance with engineering design plans and overseen by qualified engineers in accordance with relevant New Zealand standards. Soils are excavated from undeveloped areas of the site and are either taken directly to the tipping zone for use as cover or held in stockpiles. Construction of new phases involves heavy mobile machinery and materials to construct earth fills, lining systems and leachate drainage. Over the life of the landfill to date, the construction of new phases has typically been undertaken during earthworks seasons (summer) to prepare the landfill for future waste placement. The landfill has now completed the establishment of all phases originally proposed as part of the existing consents held for the site.

Filling of the landfill is completed to ensure it meets the final landfill profile as set down through the existing consents. The current consented profiles are shown below in Drawing 1092369.3000-C11 in the Landfill Engineering Report (Technical Report A).

4.2.2 Landfill lining system

The landfill development included establishing a lining system at the site. The lining system provides a barrier to minimise the potential for leachate to leak from the landfill, and a soil layer with good chemical attenuation properties beneath the barrier to reduce the potential effect of any leakage that does occur through the lining system. The soil layer also has low permeability to provide a further barrier to any seepage that may occur through the primary liner. All components of the lining system work together to contain leachate within the landfill and prevent leachate seepage from it.

This is described in detail within the Landfill Engineering Report (**Technical Report A**). The lining system generally comprises of (from bottom to top):

1 A low permeability liner of 900 mm minimum of compacted low permeability material, such as mudstone with a permeability of less than 1 x 10-9 m/s1.

2 A secondary 150 mm cover of limestone rubble to form a protective layer.

The material for the establishment of the lining system is won on site from either excavation or previously stockpiled material.

The construction of the landfill lining system follows a specific procedure set out in the LMP with quality control checks throughout establishment and must be overseen by the Liner Review Team and an appropriate engineer.

4.2.3 Landfill cover

Landfill cover comprises of different cover types depending on the length of time the cover will be in place and the level of completion of each of the phases. Cover is used to reduce nuisances (birds, vermin, litter, odour, dust), to reduce gas emissions, manage odour and to reduce infiltration of stormwater which generates leachate. The current landfill cover procedures are detailed below.

- **Daily cover:** Daily cover comprises of natural earth material or a suitable alternate material with a thickness of 150 mm. This is spread by bulldozers at the end of each day. Daily cover slopes are no steeper than 1V:3H. Materials to be used are stockpiled at the site to ensure that adequate material is available daily. In the morning, prior to continuing to place waste in the active tipping area, daily cover is stripped back approximately 15 to 30 minutes prior to the waste placement at the site.
- **Intermediate cover:** Intermediate cover is applied to areas where waste placement has not ceased but it is anticipated that the area will not be utilised for an extended period. This cover is at least 300 mm thick and comprises earth materials compacted to achieve low permeability (typically < 1 x 10-8 m/s). The purpose of this cover is to minimise water infiltration, reduce leachate generation, minimise fugitive gas emissions, reduce odour and minimise air intrusion. Where areas are not utilised for more than 6 months the area will be grassed.

4.3 Final cover

Final cover is placed where waste placement has ceased within a cell and this has reached the final level. Final cover is generally soil but may also be a non-soil alternative where it can be demonstrated that this would achieve a comparable level of control. Where final cover is soil, this will comprise 1 m of compacted clay soil and 0.15 m of topsoil. The topsoil is then grassed. This cover helps to minimise stormwater infiltration, minimise gas and odour emissions and optimise the gas extraction to the Energy Park. Following grassing, the cover can be planted with vegetation for stability and landscape and visual purposes as shown on the final Landscape Plan shown in Figure 3.14.

4.4 Waste acceptance

Waste accepted at Redvale Landfill is set out in the Waste Control chapter of the LMP. As a Class 1 landfill, Redvale Landfill is able to accept all waste material that can be accepted at Class 1 to Class 5 landfills, as described below. Waste acceptance is important to a landfill as it determines the design requirements, such as the designed landfill lining system and cover material. It also impacts material decomposition, helping to determine the settlement to be allowed and the potential ongoing maintenance of facilities. Waste Acceptance Criteria (WAC) is also important to the landfill as the discharges, including odour, leachate and LFG, are determined by the materials within the landfill. Through the implementation of WAC, the impacts from these discharges can be minimised.

4.4.1 Class 1 waste

Redvale Landfill is consented to accept material that meets Class 1 landfill waste acceptance criteria. Waste that can only be accepted at a Class 1 landfill includes residential, commercial and industrial wastes which are restricted by the WAC as approved through the resource consents and included in the LMP. The WAC details waste that is:

- **Acceptable** – Includes general domestic and commercial wastes and other wastes compliant with the Redvale Landfill WAC and which do not require special disposal.
- **Prohibited/unacceptable** – Includes liquid wastes and wastes that do not comply with the Redvale Landfill WAC.
- **Special disposal waste** – Includes wastes which are acceptable but which due to their physical and/or chemical nature require specific disposal management such as sewage and other sludges, asbestos containing materials, animal carcases, green wastes, used tyres and cleanfill.

Different types of waste have the potential to generate different levels of effects and therefore the method of disposal is not necessarily uniform.

4.4.2 Class 2 waste

Redvale Landfill, while consented as a Class 1 facility, operates a 'Class 2 cell' which separates the waste that meets the Class 2 Landfill waste acceptance criteria from the remainder of the landfill. This is located in the western area of the landfill. Class 2 material generally consists of construction and demolition waste, which is considered to have less adverse impacts being non-putrescible. There are no specific Class 2 WAC criteria including in the existing consents for Redvale Landfill and therefore the material that can be placed in this area is determined by the Class 2 Landfill WAC included in the WasteMINZ Technical Guidelines for Disposal to Land[8] (WasteMINZ Technical Guidelines).

4.4.3 Class 3 (Managed fill)

Redvale Landfill also includes a consented Managed Fill area. While this area is consented to accept waste that meets the Class 3 Landfill WAC, this area has been decommissioned and is no longer in use.

4.4.4 Class 4 and 5 waste

Redvale Landfill is also able to accept Class 4 (controlled fill) and Class 5 (cleanfill) material. These materials are as follows:

- Class 4 comprise predominantly natural soil and inert construction and demolition materials; and material acceptable in Class 5 Clean Fills; and
- Class 5 comprise Virgin Excavated Natural Material (VENM) such as clay, soil and rock that are free of combustible, putrescible, degradable or leachable components.

4.4.5 Waste acceptance management

Waste accepted at Redvale Landfill includes waste which comes directly from WMNZ facilities as well as external operators. In order to meet the required waste control as detailed above, the waste to be accepted at the landfill goes through a pre-acceptance procedure. This procedure includes:

[8] Waste Management Institute New Zealand (WasteMINZ) September 2023. Technical Guidelines for Disposal to Land Revision 3.1.

- Screening at the point of waste generation, transfer stations, gatehouse, onsite testing and the tip face.
- Screen testing through samples of special waste on arrival.
- Video surveillance at the gatehouse.
- Periodic waste surveys.

Waste that does not meet the waste control requirements, including hazardous waste or overly odorous loads are rejected by Redvale Landfill.

4.5 Landfill operations

Landfill operations are set out within the Landfill Management Plan. The operations and management of the landfill are set out to both ensure the effective operation of landfilling activities, as well as managing the actual and potential effects.

4.5.1 Existing hours of operation

Landfill operating hours influence truck movements to and from the site, as well as noise generated by on-site activities (such as excavation) and odour effects. In regard to odour impacts, these are specifically impacted during calm conditions that may increase the potential for offsite odour impacts.

The hours of operation at Redvale Landfill are Monday to Saturday, 6:00 am to 6:00 pm with waste accepted from 6:15 am onwards. In the event of an extreme weather event or an emergency declared by the government, WMNZ may request extensions to these times from the Auckland Council.

4.5.2 Leachate management

Leachate is a byproduct of the landfilling process. Water is present within the waste mass in a landfill due to rainwater infiltrating through cover material or the active filling area, and from the waste itself. Leachate is generated when soluble components are dissolved (leached) out of the waste by percolating water. The composition of leachate is a function of the type and age of the waste deposited, together with the physico-chemical and biological processes and water balance in the landfill. To minimise the volume of leachate produced at the site, various management measures and controls are in place including:

- Diverting surface water away from the waste.
- Separating leachate from clean runoff.
- Minimising rainfall infiltration through the use of cover systems, surface slopes, and drainage.
- Concrete lining of drains on the intermediate covered areas.

The drainage system at the site appropriately manages generated leachate. Leachate flows within the landfill are diverted through the base-grade system, with leachate-collection drains spaced at 120 m intervals. This is then directed to one of four leachate collection sumps (LCS), as shown on Drawing 1092369.3000-C12 in Technical Report A. Leachate is then collected for treatment or disposal at an appropriately licensed facility.

Leachate is managed following this process through the following processes:

- **Leachate Evaporator Unit:** Operation of the LEU is located on the existing landfilling area and treats leachate via evaporation. Water in the leachate is evaporated using heat from the combustion of LFG. The capacity of the LEU is approximately 50 m^3/day. The byproducts of this process (sludge) are disposed of within the landfill.

- **Tankering:** Approximately 80% of leachate from the landfill is pumped directly from the sumps and taken off-site to a facility appropriately authorised to accept it.

4.5.3 Landfill gas management

As organic waste breaks down (primarily by bacteria) LFG is produced, which is comprised mainly of methane and carbon dioxide and smaller amounts of odorous reduced sulphur compounds (including hydrogen sulphide). Methane is highly flammable so LFG is controlled to minimise the flammable risk by capturing and destroying the methane and other organic compounds by combustion. Generally, if not controlled, there is the risk of LFG being emitted through:

- Migration into the adjacent soils and underground structures.
- Discharges directly from the landfill surface.

The LFG collection system has been developed at the site to capture landfill gas and mitigate the risk of lateral migration and uncontrolled discharges. A vacuum is applied to the collection system which includes a series of interconnecting pipework and vertical extraction wells progressively placed within the waste mass. The system comprises a combination of vertical wells with horizontal wells located radially from the vertical wells ("Norfolk Pine" design). The vertical extraction wells are installed at no more than 100 m spacing. The locations of these wells are shown on Drawing 1092369.3000-C40. These wells are connected to sub-headers which convey the LFG to the Energy Park.

The existing Energy Park incorporates flares and generators for the utilisation and destruction of LFG. There are currently 15 generators and three flares installed at the site. The generator units are each housed in a standard shipping container and fully enclosed. These units exhaust via individual stacks that are 6.4 or 10 m high. The flares have a maximum capacity of 2,500 to 3,500 m^3/hr. The enclosed flares are fully compliant with the NES-AQ requirements for a 'principal flare'. The three flares together ensure that there is adequate flaring capacity on site to destroy LFG in the event that a number of generators are unavailable.

4.5.4 Odour management

A range of odour management measures are implemented at the Landfill to minimise odours from waste delivery and placement. These measures are set out in the current LMP, some of which are required by resource consent conditions, and others that have been implemented to further minimise offsite impacts. These include:

- Waste acceptance controls.
- Management of the tipping face, including minimising the area of open working face, the mixing and burying of waste and special procedures for odorous waste.
- The use of daily cover so that no waste is left exposed overnight.
- Capture of LFG emissions including the extraction, collection and destruction of the LFG by combustion.
- The use of odour neutralising sprays.

4.5.5 Dust management

Dust is controlled onsite and as detailed in section 3.13 of the LMP. Dust from landfill operations can be present both during the excavation and construction of new cells where virgin material is disturbed and where waste is moved in and around site. This can particularly be an issue during dry conditions. The mitigation methods employed at Redvale Landfill to control dust include:

- Speed Control: a speed limit of 30 km/hr applies at all places on the site.

- Road Washing: during and after wet weather, muddy sealed roads at the site are washed down.
- Road Watering: during dry dusty periods, water trucks are used at the site to spray water onto the surface of roads as a dust suppressant.
- Grass Cover: areas are grassed over as soon as is practicable.
- Wheel wash: vehicles leaving the site are required to exit through a wheel wash.
- Rumble strips: vehicles leaving the site are required to go through rumble strips to facilitate removing mud/dirt sticking to the wheels, wheel arches and mud flaps of the vehicles.

4.5.6 Litter control

Litter has the potential during landfilling activities to become windblown, being deposited both around the site and offsite. Litter is managed on site in accordance with the LMP. Specific controls put in place include:

- Recovery of litter by staff on site on a daily basis through collections.
- Litter fences (already established) around the landfill to catch wind-blown litter.
- Litter patrols along the Dairy Flat Highway on a weekly basis (and other public roads as required).
- Litter originating from a landfill source will be collected from neighbours' properties upon request.

4.5.7 Ancillary activities

Landfilling also requires a number of ancillary activities that support the landfilling operations. The site also includes several ancillary activities that support the landfill operations, these are shown on the Figure below. These activities include:

- **Wheel wash:** Two wheel washes are located at the site. The purpose of these washes is to wash the wheels and undercarriage of vehicles leaving the site to avoid contamination and sediment being tracked offsite.
- **Site offices:** Administration offices are located at the entrance of the landfill.
- **Workshop:** There is a workshop located at the site for the maintenance of machinery utilised at the site.
- **Approved Transitional Facility (ATF) Pad:** Temporary storage area designated for containers of imported waste. Containment and management of imported waste, cleaning and decontamination processes are undertaken on the ATF pad in accordance with Ministry for Primary Industries biosecurity requirements.

4.6 Waste haulage

Waste is hauled on public roads prior to reaching site as well as on site roads to reach the phase being filled. Redvale Landfill is located off Dairy Flat Highway, which serves several other businesses and industrial activities within the area.

4.6.1 Waste transport

WMNZ operates a large fleet of waste collection and compactor vehicles. Other collection companies are also able to utilise the landfill, provided they comply with WMNZ requirements and resource consent conditions. These vehicles are used to transport residential waste from transfer stations and commercial waste directly from commercial operators. Vehicles carrying waste must be fully enclosed to gain access to the landfill. This is to prevent the escape of waste, litter and

excessive odour from the vehicles. Vehicles enter the active landfill area via a weighbridge. Existing resource consents limit the number of vehicle movements to and from the landfill to 650 per day (e.g. a return trip is comprised of two vehicle movements).

4.6.2 Onsite access and haul roads

Temporary haul roads are constructed and maintained to allow waste trucks to move between the permanent road system and the current tipping face. These roads are designed taking into account gradient, traction, safety and potential for mud transport and dust.

An access road has been developed around the perimeter of the existing landfill throughout various stages of landfill development. A series of temporary access (haul) roads have been formed across the landfill waste mound to provide access to the landfill top faces. These roads are removed and reconstructed as filling progresses.

4.7 Earthworks and spoil management

Landfilling operations require large amounts of earthworks for the excavation of materials to reach the designed base grade of a landfill, stockpiling excess excavated material for future use, the establishment and capping of cells and ongoing movement of waste products across the site. Left unmanaged, this can cause unstable areas to erode and uncontrolled discharges of sediment into the surrounding environment, notably waterways. These are managed at the site of the earthworks, which are the measures detailed in this section, and the Sediment Retention Ponds, which are described below in Section 4.8.3.

4.7.1 Erosion and sediment control

The existing approach to erosion and sediment control on the site is described in detail in the Stormwater, ITA and Sediment Assessment Report (**Technical Report G**), with a summary included below. The site has a detailed Erosion and Sediment Control Plan which is included in the LMP and applies to all earthworks on the site.

The proposed strategies fall into two main categories: erosion control and sediment control. Erosion control seeks to prevent sediment from becoming mobilised in the first instance and sediment control provides measures to retain sediment generated on the site.

The main principles of erosion and sediment management are to minimise surface erosion, promote sedimentation of suspended solids before water leaves the site and control flows to minimise adverse effects of discharge water on downstream biota.

The key controls for minimising effects from erosion and sedimentation include:

- Minimising land disturbance.
- Stage construction.
- Protect steep slopes.
- Protect water courses.
- Stabilise exposed areas rapidly.
- Install perimeter controls.
- Employ detention devices.
- Train staff and contractors.
- Inspect, monitor and maintain the controls.
- Update the Erosion and Sediment Control Plan.
- Take response actions described in the monitoring and contingency sections.

All erosion and sediment control structures are inspected regularly, and maintenance is undertaken as required.

4.7.2 Stockpiling

Soils are excavated from undeveloped parts of the site and are carted either directly to the tipping zone for use as cover or to the phase construction area for structural earth fill and liner. Due to the surplus of soil on the site, some of the soil is held in stockpiles. The on-site soil cartage operations are designed to avoid double handling and to keep haul routes as short as practical to maximise efficiency.

4.8 Surface water management

Water from the site is required to be managed to ensure that sediment or contaminants are not discharged into the surrounding environment. Stormwater management is required to:

- Identify areas of clean water to divert and discharge directly into the stream to ensure that the treatment systems are not overwhelmed.
- Identify areas within the operations, such as the landfill itself or the ancillary activities, that may contain potential contaminants and divert them to appropriate treatment.

4.8.1 Surface water drainage

There is an existing landfill surface-water drainage system in place to manage surface water at the site. The surface water drainage at the site is described within the LMP and Stormwater, ITA and Sediment Assessment (**Technical Report G**) and follows the following four objectives:

- Stormwater run-off which is in contact with waste is kept separate from stormwater from all other places and is treated as leachate. This run-off is collected as part of the leachate collection system and is not discharged to the environment.
- Stormwater run-off from the landfill footprint and ITA Activity Area is controlled to avoid erosion and passed through treatment ponds to reduce sediment and contaminant discharges. This includes stormwater from the landfill footprint, including earthworks construction areas, as well as the workshop, Energy Park, and water from the wheel wash.
- Clean stormwater run-off from neighbouring land and land within the site including buffer zones which are outside the landfill or ITA Activity Area is diverted through separate drainage systems which then go direct to off-site receiving waters.
- Stormwater from completed landfill areas (finished contours with final cover in place) is controlled by permanent drainage systems and by practices such as grassing to minimise erosion. Run-off is passed through the treatment ponds until closure.

Management of Stockpile 4 is separate to the other areas of the landfill. During construction the stormwater management for Stockpile 4 is separate to the remainder of the site as this includes a separate Erosion and Sediment Control Plan. The Sediment Retention Pond constructed at the time of establishment of Stockpile 4 is being utilised for sediment management with an additional forebay at the base of the stockpile. All works are in accordance with Auckland Council's GD05 Guidance Document.

4.8.2 Stormwater channels

The stormwater channels that contribute to the diversion of flow include the following:

- Offsite water channel: Located to the south of the landfill this channel intercepts water from the south and diverts the flow to the Rangitōpuni Stream.

- On-site water channels: Located across the landfill area the on-site water channels direct the surface water from areas of the site into the relevant Sediment Retention Pond. These are permanent structures that are designed to slow water velocities minimise any potential erosion to the inverts.
- Contour drains: Located on the final profile of the landfill, these are designed with a minimum 2% slope and adequate freeboard. Drains located on the landfill profile will be sufficient to cope with settlement of the landfill and designed to avoid erosion impacts.

4.8.3 Sediment Retention Ponds

There are six Sediment Retention Ponds at the site (Figure 3 in Appendix A). A summary of catchment and pond size is included in Table 4.1.

Table 4.1: Summary of Sediment Retention Ponds

Pond	Catchment area (ha)	Pond size (m^3)
1	30.5	9,920
2	7.9	9,100
3	23.4	17,740
4	17.9	9,760
5	12.1	4,800
6	11.5	11,500

The four primary ponds are those located at the discharge points on the site (Sediment Retention Ponds 1 to 4). These ponds are designed and operated with the following principal components:

- Floating decant outlets to provide slow discharge from the upper settled zone of the pond water under most conditions.
- Overflow spillways designed to handle the maximum discharge flow rate.
- Shut-off slide gate valves in the overflow spillway to isolate the pond if evidence of contamination occurs.
- Emergency spillways capable of passing the 1% AEP event while maintaining 300 mm freeboard below the dam crest or bunds.
- Structures for continuous monitoring of flow rate, conductivity, temperature and turbidity.
- Planting of the pond batters and buffer zones around the ponds which has integrated them with the wider environment.

The relevant guidelines and assessment of these ponds is included in the Stormwater, ITA and Sediment Assessment (**Technical Report G**). The purpose of these ponds is to provide treatment of contaminants, manage and control sediment and water quality controls during high rainfall.

4.8.4 Water take

Water is currently taken from the Sediment Retention Ponds 5 and 6for operational use on-site including machinery washing and dust suppression. These ponds are considered off-stream ponds.

4.8.5 Dams

The dams are shown on Figure 3 in Appendix A. There are two existing earthfill dams on the site, Dam 5 and Dam 6, which form Pond 5 and 6 and are described in the Geotechnical and Dam Assessment report prepared by PDP (Technical Report C). Pond 5 is retained by an approximately 8

m high embankment and has a storage volume of approximately 4,800 m^3. Pond 6 is retained by an approximately 6.7 m high embankment and holds a storage volume of 11,500 m^3. Routine inspections and geotechnical assessments confirm that the dams and associated structures remain in good condition with no evidence of cracking, instability or seepage issues.

Neither dam meets the definition of a classifiable dam under the Building (Dam Safety) Regulations 2022, as although both dams are greater than 4 m in height the retained water is less than 20,000 m^3. Although these dams are not subject to mandatory dam safety regulations, assessments have still been conducted for safety and performance as set out in the Geotechnical and Dam Assessment report (Technical Report B and C).

4.9 Existing monitoring

Monitoring is the collection and assessment of environmental and discharge information gathered at and around the site. An extensive environmental monitoring programme has been implemented since 1993, which is proposed to continue throughout the period of continued landfill operations. The existing monitoring undertaken at the site is generally set out in the LMP, as required by the existing conditions of consent.

4.9.1 Surface water

The surface water monitoring programme is detailed in section 4 of the LMP. The Sediment Retention Ponds on site are monitored for conductivity, turbidity, flow rate and discharge samples. A permanent electrical conductivity meter is installed at the inlet of each of the four main Sediment Retention Ponds. The purpose of the conductivity measuring is to provide an early warning of any contaminant carried in the water. A turbidity meter is installed in each pond outlet and measures the amount of suspended solids in the water. Surface water monitoring is also undertaken at four locations within the Rangitōpuni Stream, upstream and downstream of the Landfill location. This involves water quality sampling undertaken on a three-monthly basis across a suite of contaminants.

The results of the monitoring are reported to the Auckland Council on a quarterly basis. The reporting includes details on the following:

- Conductivity readings
- Flow rate readings
- Turbidity readings
- Pond water quality sampling
- Pond water abstraction records
- Continuous flow rates
- Stream water quality sampling and analyses results

4.9.2 Dams

The existing dam structures are subject to ongoing monitoring and maintenance as set out in the Geotechnical Dam Assessment (Technical Report C) prepared by PDP. Existing monitoring involves annual visual inspections of Dam 5 and 6 and the associated spillways, with additional inspections following significant storm and seismic events. Regular maintenance is also currently undertaken to remove vegetation and debris from spillways and to prevent tree growth on embankments.

4.9.3 Groundwater

The current groundwater monitoring regime is detailed in section 4.5 of the LMP.

There are a number of monitoring wells installed around the perimeter of the landfill footprint which measure groundwater levels and quality across a number of parameters. These wells are monitored quarterly to detect changes in groundwater levels and quality as a result of landfilling activities. Leachate levels are monitored in several monitoring wells located in the South-eastern corner of the existing landfill footprint. WMNZ also tests leachate quality from the existing landfill quarterly, although this not required by the current consent conditions.

There are specified trigger levels for the monitored parameters, which if exceeded, require a course of action to be taken. This involves investigation and reporting if a lower trigger level is exceeded and urgent remedial actions, notification of authorities and prompt investigations if an upper limit is exceeded.

Piezometers are installed and maintained in operating condition to measure ground water levels around the perimeter of the Landfill footprint. The aim of monitoring is to confirm that the elevation of the surrounding groundwater is higher than the elevation of the leachate within the landfill. If ground water levels rise above the trigger levels, or groundwater seepage rates are identified to be of concern, then contingency measures are required to be implemented. These generally include increasing the frequency of groundwater monitoring and observations or installing drainage works.

The results of groundwater monitoring including details of groundwater quality analyses and ground water levels are reported to Auckland Council.

4.9.4 Leachate breakout

There are existing procedures undertaken to monitor and identify potential leachate breakouts or contamination of surface water. These include:

- Weekly inspections of the landfill surface to identify potential leachate breakouts or contamination of surface water.
- Continuous monitoring of conductivity at inlet to ponds as specified above as an indicator of the leachate in surface water. This involves automated notification from site operated telemetry system if pond inlet conductivity exceeds the trigger limits.
- Monitoring of contaminants at pond outlets.

If a leachate breakout is identified, or leachate is identified in surface water, the site has contingency procedures in place which are included in the LMP and the Emergency Management Plan.

4.9.5 Landfill gas

The monitoring of LFG emissions is set out in section 3.7 of the LMP. Stack exhaust emissions from the generators are monitored every three years on three of the generators, on a rotating basis.

Surface emission monitoring is undertaken monthly on areas of intermediate cover and quarterly on areas of final cap to detect any fugitive LFG emissions. Weekly visual inspections are also carried out on areas of intermediate and final cap to detect any visible cracking or drying out of the cap and LFG odours. If areas are identified during monitoring where the surface methane concentration exceeds 5,000 ppm, the cover is repaired/remediated as appropriate and retested.

4.9.6 Noise

Noise levels are routinely measured on site. Noise levels are measured and assessed in accordance with New Zealand Standards NZS 6801: 2008, ‘Acoustics – measurement of Environmental Sound’, and NZ 6802: 2008 ‘Acoustics – Environmental Noise’. Construction noise is measured and assessed in accordance with NZS 6803: 1999 ‘Acoustics – Construction Noise’. Results from noise monitoring are submitted to Auckland Council and the Peer Review Panel (PRP) on request.

4.10 Landfill bond

As part of the original consent that was granted for the operation of Redvale, a financial bond (Bond) was put in place and has been maintained in favour of the Auckland Council. The Bond was set up to provide for costs associated with early closure, environmental remediation, post-closure care, and other activities associated with compliance with performance and monitoring standards as required by resource consents in the very unlikely event that the consent holder defaulted on their obligations.

The Bond was reviewed in 2013 as part of the reconsenting process and was considered appropriate at that time.

5 Proposed expansion and operation

Redvale Landfill is currently scheduled to cease accepting waste in December 2028 in accordance with condition 8 of the existing land use consent[9]. To enable Redvale Landfill to continue accepting waste as part of a wider transition plan, WMNZ proposes to extend its operation until 2036 and to develop 4.56 Mm^3 of additional airspace at the existing site. This includes approximately 3.13 Mm^3 in additional Class 1 Landfill expansion on top of the existing Class 1 waste placement area and 1.43 Mm^3 of Class 2 Landfill extension.

The proposal involves physical works to enable the expansion of the landfill, while operational changes are proposed to optimise landfill operations and improve mitigation measures at the site. The changes to landfill operations have been carefully developed by reviewing all practices in light of any updated best practices that can be adopted, as well as in response to specific concerns identified through consultation, as detailed in Appendix F.

5.1 Proposed expansion development

To enable this expansion works the following changes will be made to the landfilling area. Where there are no changes proposed, the existing operations detailed in Section 3 will remain in place at the site.

5.1.1 Class 1 expansion landform

The proposed Class 1 expansion will be entirely within the existing landfill footprint. This has been a deliberate design choice to ensure that the Class 1 landfill extent is not increasing beyond what is already in place at the site. This design includes the steepening of the outside slopes from the previously consented and designed maximum of 1V:4H to 1V:3H with a minimum grade of 5% to provide for the additional volume (**Error! Reference source not found.**).

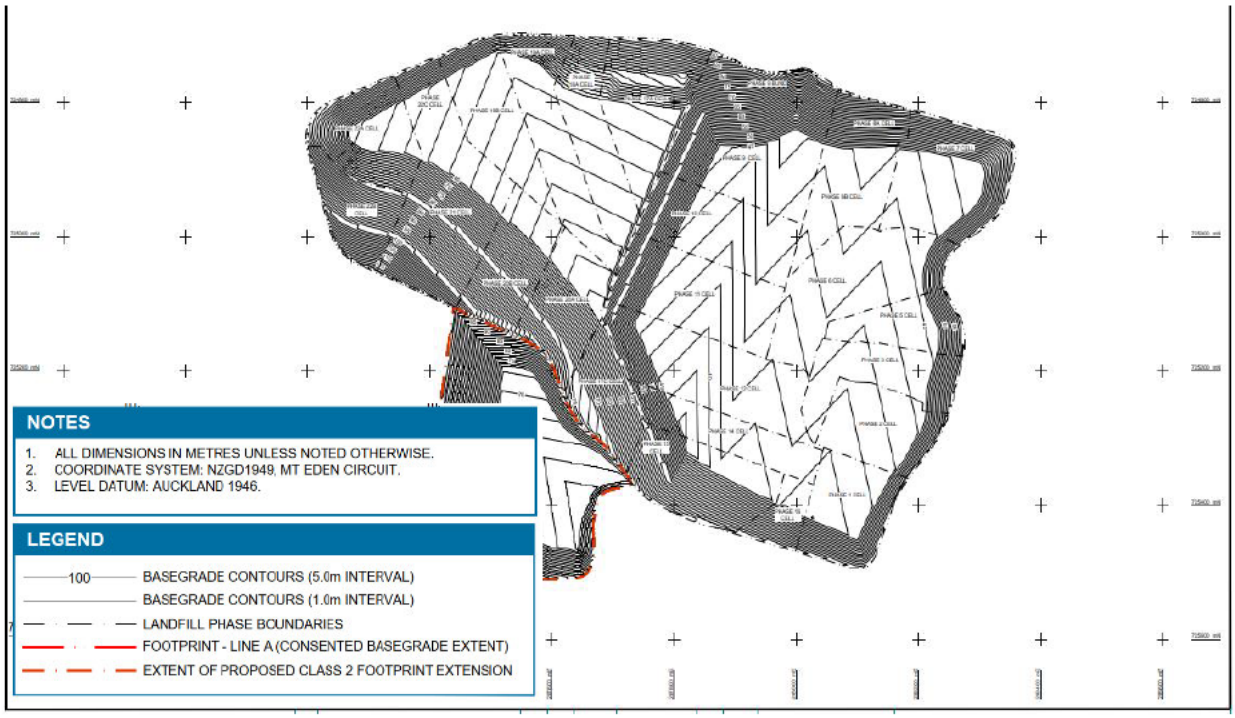

Figure 5.1: Class 1 expansion location and contours (Class 2 extension also shown).

[9] [2016] NZEnvC043

As shown in **Error! Reference source not found.** the final landform of the proposed expansion area will not exceed RL 106.7 m in height to comply with the Airport Approach Surface Overlay in the AUP.

5.1.1.1 Class 1 expansion area construction

To enable the placement of additional waste within the existing landfill footprint, the existing cap material is required to be removed and will be stockpiled for reuse, if appropriate. This minimises the risk of potential slip surfaces being created between the existing cap and the new waste placement.

To minimise the release of landfill gases, the removal of the cap will be undertaken immediately prior to the placement of waste. This will also assist with any release of odour from the exposing of waste. The process of removing the waste is shown in Figure 5.2 and will include the following:

- At the beginning of the week, the area that will be filled during that week will have the final cap removed to a depth of 300 mm (i.e. similar to the former requirement for intermediate cover).
- Only the area that will be filled on that day will be fully stripped to expose the old waste, and waste placed on top.

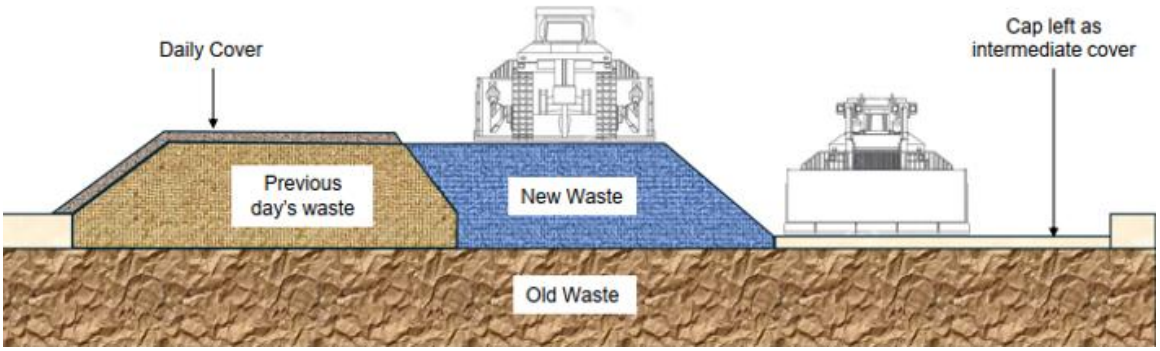

Figure 5.2: Progressive removal of final capping for placement of new waste. (Image provided by WMNZ).

The construction sequence of the Class 1 expansion will depend on a number of factors and will be phased, as set out in the indicative phasing shown in Figure 5.4 below. Construction will commence adjacent to the landfill perimeter and work towards the top of the landfill. Generally, the sequence will include:

3 Decommission or relocate the perimeter road and any facilities or services in the vicinity of the perimeter bund.

4 Construct the perimeter bund, leachate perimeter drainage, and new perimeter access road.

5 Strip intermediate cover and/or final cap from the area adjacent to the perimeter bund.

6 Install perimeter leachate collection strip drains where required.

7 Fill waste over stripped areas – working uphill and only stripping cover/cap immediately prior to placing waste.

The Class 1 expansion area will be managed in such a way as to separate putrescible waste from non-putrescible waste in order to mitigate potential odour effects. Waste placement is described in Section 5.4 and the LMP (Appendix K).

5.1.1.2 Perimeter bund

To allow for an increase in available airspace at the site, a perimeter bund is proposed to create height in the eastern and western perimeter of the landfill. The location of this perimeter bund is shown in **Error! Reference source not found.**. The bund provides for stability at the landfill and allows waste to be placed higher and to a steeper slope.

On average, the perimeter bund will be 2 m high with a maximum height of 6 m. The bund will be constructed by undercutting the Pleistocene sediments and replacing them with a shear key to allow for the stability requirements.

The top of the bund will provide for an access road around this section of the site with a 5.5 m wide pavement constructed on top to provide for single lane traffic.

5.1.1.3 Stormwater drainage

The stormwater drainage within the Class 1 area will be conveyed to a perimeter drain via a revised layout of cap contour drains and downspouts. These are shown in Drawing 1092369.3000-C14 in the Landfill Engineering Report (Technical Report A). The design of the stormwater drains will be consistent with those already on site, including a minimum post-settlement grade of 2 % and freeboard of 300 mm.

The stormwater will be drained into the four Sediment Retention Ponds at the site for management. The details of changes to these Sediment Retention Ponds are included below in Section 5.1.3.

5.1.1.4 Landfill gas

The existing LFG vertical extraction wells within the landfill footprint will need to be extended where additional waste placement is proposed. This will be undertaken through installation of additional lengths of vertical riser and horizontal collectors (referred to as the “Norfolk Pine” design) where required.

5.1.2 Class 2 extension

The Class 2 extension to the south of the existing footprint will involve the creation of a new landfilling area to accommodate waste meeting the Class 2 landfill WAC. This extension will be located where the Managed Fill facility was located and therefore largely occupies an area that was already modified and subject to filling. The Class 2 extension will be filled from the low point and will then work westwards and north to tie-in with the existing landfill. The construction sequence will include:

1 Decommissioning and removal of any remaining soils in the Managed Fill Site.
2 Decommissioning and removal of Sediment Retention Pond 6, retaining the pond dam.
3 Reconfiguration of the pond dam to act as a toe bund for the waste fill.
4 Staged excavation of soils beneath the Managed Fill Site and Sediment Retention Pond 6 to form the landfill basegrade.
5 Formation of the lining system in stages.
6 Installation of the leachate extraction system.
7 Staged installation of the leachate drainage system.

5.1.2.1 Base containment system

The Class 2 area will involve the excavation of material to form a basegrade geometry and installation of a new lining system. The basegrade is shown on Drawing 1092369.3000-C11 in the

Landfill Engineering Report (Technical Report A). The geometry will be a general bowl shape which will include:

- A flat floor graded at 3% towards the central valley, with a centreline of the valley itself having a minimum grade of 2%.
- Side slopes graded to 1V:3H. These side walls will vary in height from 30 m to the northwestern side to 2 m at the eastern corner.

The lining system will be a 900 mm thick compacted cohesive soil liner with a maximum permeability of 1 x 10-8 m/s, compacted in layers no thicker than 150 mm overlain by a leachate drainage blanket.

5.1.2.2 Leachate collection system

To collect leachate generated within the Class 2 area a drainage blanket will be placed above the soil liner. This drainage blanket will consist of 300 mm of drainage aggregate (or tyre derived aggregate), or a suitable geosynthetic drainage layer.

The leachate will be directed using HDPE leachate collector and header pipes towards a leachate collection sump. This will include:

- A centrally located leachate header pipe positioned along the central valley in the landfill floor.
- Collection pipes at the toe of all sidewalls along with non-perforated leachate cleanout risers to flush out header pipes as required.
- A series of lateral leachate cut-off pipes located at nominal 70 m intervals across the floor.

The leachate collection sump will be located at the low point of the system and will consist of an inclined HDPE pipe suitably sized to allow a submersible pump on a trolley to be located within the sump and installed down the side wall.

The above system is proposed to maintain the leachate head below 300 mm, with the exception of the leachate sump, which will need a greater depth than this to operate effectively.

5.1.2.3 Stormwater drainage

Stormwater drainage within the Class 2 extension will be conveyed via cap contour drains designed with a minimum post-settlement grade of 2% and freeboard of 300 mm to allow for differential settlement of the final landfill surface. The stormwater will flow towards a perimeter drain and be discharged towards Pond 1, which is to be increased in size, as further described below.

5.1.2.4 Groundwater management

Groundwater drainage will be required within the Class 2 extension to manage potential damage to the lining system until sufficient waste is placed.

It is estimated that the maximum daily flows will be 102 m^3/day reducing to a steady state flow of approximately 19 m^3/day (assuming a winter high groundwater level in the area of RL 82 m). The temporary inflows will be managed using the stormwater drainage system where possible.

Where seepage zones are located below the lining system, a temporary groundwater drainage system will be established. Flows will be collected via perforated subsoil drains and directed out into the surface water system to the east of the extension (in the vicinity of the leachate sump) via a non-perforated pipe. The groundwater drainage system will be designed to be grouted up once sufficient waste is in place to resist lining system uplift pressures.

5.1.2.5 Landfill gas

A landfill gas extraction system is not proposed within the Class 2 footprint due to the low organic content in the waste material.

5.1.2.6 Final landform and cap

The Class 2 area is designed with a maximum grade of 1V:3H and a maximum slope of 5%. The crest of the ridge is limited to RL 106.7 m pre-settlement, which is approximately RL 105 m post-settlement.

The final cap thickness will be consistent with the existing design and will comprise 150 mm of topsoil overlying 1,000 mm of clay with a maximum permeability of 1 x 10-8 m/s.

5.1.3 Sediment Retention Ponds

5.1.3.1 Sediment Retention Pond 1

Sediment Retention Pond 1 is proposed to be extended as it will now pick up a larger catchment area. This is because the catchment area that currently goes to Pond 6, will now need to be redirected to Pond 1, as Pond 6 is being decommissioned to make way for the Class 2 extension. Sediment Retention Pond 1 will be increased to 13,500 m^3 from its current size of 9,920 m^3. To construct the changes to this pond, the following is generally proposed:

- The Native Fish Capture and Relocation Plan will be implemented to manage any freshwater fauna in the pond.
- Three of the upstream ponds which comprise the Sediment Retention Pond 1 will be, progressively, dewatered and desilted.
- Once desilted, each pond, in turn, will be expanded southwards using an excavator to excavate material.
- All excavated materials will be retained and disposed of on site.

5.1.3.2 Decommissioning of Sediment Retention Ponds

Sediment Retention Pond 6 and the Office pond will be decommissioned for the Class 2 extension and for the relocation of ancillary activities.

The Sediment Retention Pond located to the west of the office does not currently formally service any of the stormwater catchments on site, however it needs to be decommissioned to allow for the relocation of ancillary activities, as detailed below. No works on catchment areas is required.

Sediment Retention Pond 6 currently services the managed fill area. To ensure that stormwater from the area is still appropriately managed, prior to works on Sediment Retention Pond 6 stormwater will be diverted from this area to discharge into the enlarged Sediment Retention Pond 1.

For the decommissioning of the ponds, the following works will be undertaken:

- Where appropriate the Native Fish Capture and Relocation Plan will be implemented to manage any freshwater fauna in the stream.
- The pond will be progressively drained at a rate to ensure that stability of either the sides or dams are not compromised.
- The office pond will be infilled and material compacted to allow for the establishment of the relocated ATF pad.
- The dam crest of Sediment Retention Pond 6 will be utilised as a bund for the Class 2 expansion while the pond and surrounding area will be excavated for the Class 2 expansion.

5.1.3.3 Freshwater fish management

During the upgrading and extension of Sediment Retention Pond 1, any protected freshwater species that are present in the pond will be captured and relocated. Fish Survey work undertaken at the site as part of ecological surveys, show the only species of note present in Sediment Retention Pond 1 is short-finned eel, which will require management. A Native Fish Capture and Relocation Plan is proposed to ensure that native fish are appropriately relocated. A draft of this plan is included in Appendix K as part of the LMP and details include:

- Fish capture methodology: This will be undertaken using the New Zealand Fish Sampling Protocols. This includes the use of nets and trapping of species within the ponds. An ecologist will be present on-site during dewatering to capture any additional fish if required.
- Fish relocation: Following capture, ecologists will relocate species within the adjacent Rangitōpuni Stream between Richards Road and Landfill Access Road. Transport of fish will be in enclosed containers with appropriate quantities of temperature controlled water, and battery powered oxygen bubblers.

5.1.3.4 Water take

WMNZ proposes to increase the maximum daily water take from 150 to 300 m^3 per day from Sediment Retention Pond 5 and 6, while retaining the existing annual limit of 30,000 m^3 from Sediment Retention Pond 5 and 60,000 m^3 from Sediment Retention Pond 6. This includes increasing the proportion of the existing take allocated for potable water supply from 3,400 litres per day to 8,600 litres per day, to meet the needs of up to 100 people on site. Noting that the water take from Sediment Retention Pond 6 will cease when this is decommissioned.

5.1.3.5 Relocation of ancillary activities

In order to accommodate the proposed expansion at Redvale, existing ancillary activities on site will need to be relocated. The revised layout of the ancillary activities is shown in Figure 5.3. This work will include:

- Roading/access: The existing one way circuit that is currently set up for the landfill will be changed during construction to develop a two way system when the perimeter bund is being established and to relocate around the Class 2 landfill footprint.
- LEU: The LEU will continue to operate until waste filling moves into the area occupied by the LEU. At this stage the LEU will be decommissioned and removed from the site.
- Approved Transitional Facility: The ATF pad will be relocated to the area immediately west of the WMNZ site office. The ATF will be set up as it currently is with an impervious surface developed, inclusive of drainage. Stormwater runoff from the ATF pad will be directed into Sedimentation Pond 1.
- Light engineering workshop: The light engineering workshop will be relocated from its current position to south of the main workshop.
- Secondary wheel wash: The secondary wheel wash will be decommissioned and removed from the site.

Figure 5.3: Relocation of site facilities.

5.2 Operational and monitoring changes

The operation of the Class 1 Landfill and ancillary activities will generally continue in accordance with the operation as set out above in Section 4. Changes to the operation, where proposed are included below.

5.3 Waste acceptance

The proposed WAC are set out in the Waste Acceptance Report (**Technical Report H**). The changes to the Class 1 waste are generally to reflect these updated guidelines, with the key updates being to Boron, Copper, Cyanide, Molybdenum, Nickel and Vanadium.

The current design and operation of Redvale Landfill is as a Class 1 facility and therefore Class 2 WAC have not been required. As the expansion will involve the establishment of a Class 2 area, new Class 2 WAC have been developed. Class 2 waste material is described in Section 4.4.2. The proposed WAC for the Class 2 expansion are those set out within the WasteMINZ Technical Guidelines for Disposal to Land. The maximum incidental or attached biodegradable material (e.g., vegetation) must be no more than 5% by volume per load.

5.4 Waste placement

The current waste placement on site follows a typical staging plan within the landfilling area. As part of the proposed expansion additional separation of wate into three categories, primarily to mitigate odour at the site.

Specifically, waste placement as part of this proposal has been split into three categories being:

- Class 1 Putrescible Waste.
- Class 1 Non-putrescible Waste.
- Class 2 Waste.

The WAC focuses on the technical requirements for waste criteria such as concentration of contaminants. While WAC does have influence on impacts such as odour, this is not the predominant focus. For the proposed work at Redvale, putrescible has been defined as:

Biodegradable organic waste with a high putrescible content that readily decomposes under anaerobic conditions and produces odorous gases, leachate, and landfill gas. This includes food scraps, garden organics, biosolids, and similar high-moisture, rapidly degradable materials. It does not include inert or slow-degrading organic matter such as untreated timber, paper, or cardboard unless mixed with putrescible wastes

To determine what constitutes putrescible waste WMNZ will utilise the existing processes for classifying wastes prior to the waste arriving at the site through pre-acceptance procedures. Under current practices, waste collectors classify waste using specific codes depending on the waste type, for example, food waste, kerbside collection, construction and demolition. Dependant on the codes waste is will be directed to the correct tip face at site.

An example of primary sources of putrescible waste include domestic households, commercial kitchens, food processing/production companies, food markets, garden care/arborist contractors and wastewater treatment works (biosolids). Putrescible waste will not be placed within 500 m of any current sensitive receptors. An indicative staging plan for the proposed extension activities is included below in Figure 5.4. This is subject to change subject to detailed design.

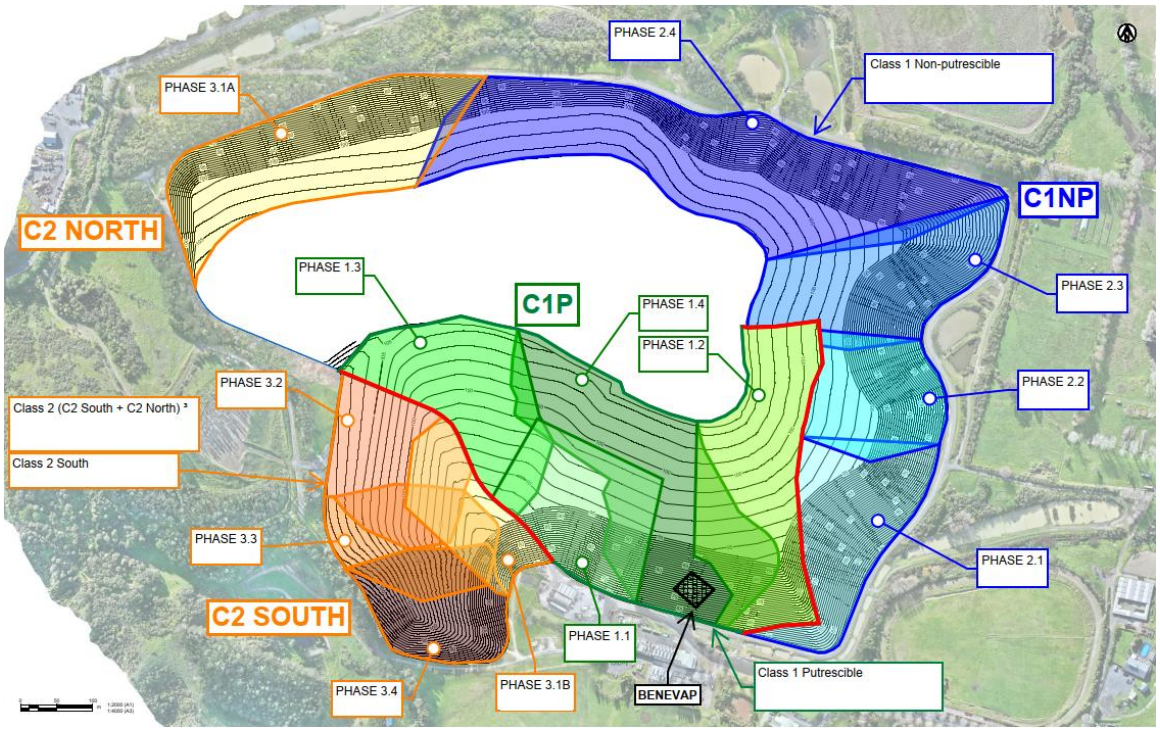

Figure 5.4: Indicative staging plan showing Class 1 putrescible waste, Class 1 Non-putrescible waste and Class 2 waste placement.

5.4.1 Working face

Under the current resource consents, the tip face (open working area) must be kept to a practicable minimum and is restricted to a maximum size of 50 m wide and 4.5 m deep (Condition 61 of LAN-61338). However, currently the working face limit is set to 1,200 m2 as set out in the LMP with no limit on the number of active working faces open at one time. This limit was self-imposed by WMNZ since early 2025 to minimise the impacts from the larger tipping faces, notably odour. The management of the tip faces will change under the proposal to further manage odour at the site, by restricting the putrescible working face to minimise the potential impacts of odour.

There will be three working faces under the current proposal being:

- Class 1 putrescible limited to 900 m2;
- Class 1 non- putrescible limited to 2,500 m2; and
- Class 2 limited to 2,500 m2.

5.4.2 Cover

The current cover requirements are detailed above in Section 4.2.3. While the material of daily cover is not proposed to change, it is proposed to thicken this cover material to:

- Daily: Minimum of 300 mm thickness
- Intermediate: Minimum 450 mm thickness

The operation of stripping daily cover will also change to manage times of calm conditions. It is proposed that the stripping of daily cover of Class 1 material will not be prior to 7:15 am between May to August, with the first waste placement being 7:30 am. This will assist in management of potential odour discharges, discussed further in Section 7.7.3.

5.4.3 Leachate levels

The leachate levels within the landfill are currently monitored in monitoring wells LM1 and LM1A located in the south-eastern corner of the Class 1 area and are required to maintain a level not exceeding RL 51 m.

5.4.4 Landscape planting

The site has an existing landscape plan that was approved as part of the original consent process. As part of this application the proposed landscape planting across the site will be refined and updated to provide adequate screening planting around the site for both the existing and new landfill areas. Plant types will be sourced to ensure that these establish on site and are able to adapt to the local conditions.

The plan of the proposed planting is shown in Figure 5.5 and within the Landscape and Visual Assessment included in Technical Report Q.

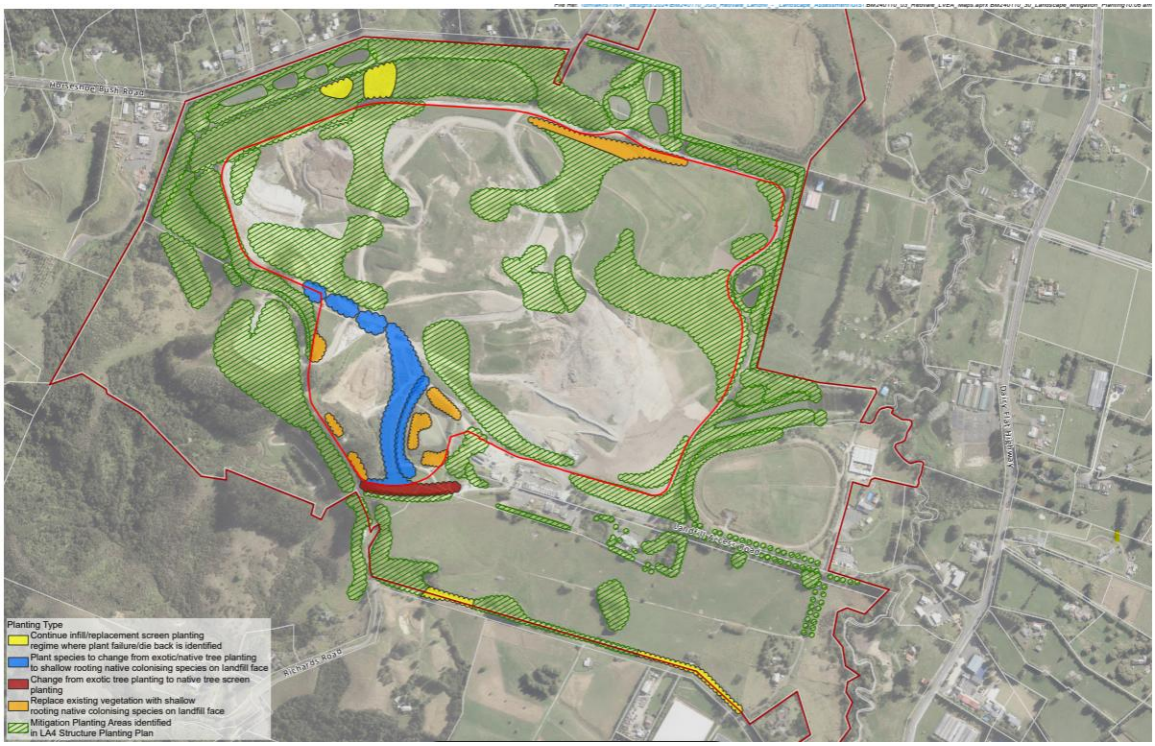

Figure 5.5: Proposed planting plan at Redvale Landfill.

5.5 Monitoring

This section describes the environmental monitoring proposed for the continued operation of the Redvale Landfill, including the proposed Class 1 landfill expansion and the Class 2 footprint extension. Monitoring at Redvale is a long-established and continuous programme. The intent is to continue the existing programme, supplemented and updated as recommended by the technical assessments to reflect the ongoing operations and proposed expansion.

5.5.1 Existing Class 1 groundwater monitoring

Groundwater is monitored around the full perimeter of the landfill to confirm that an inward hydraulic gradient is maintained and to detect any leachate contamination. The Hydrogeology Assessment confirms that the existing groundwater monitoring framework, including the established

Class 1 trigger levels and reporting requirements, will continue to be used, supplemented by additional monitoring wells and new trigger levels derived from Class 2 baseline data.

The existing monitoring network is described in Section 4.9.3. The existing programme of quarterly sampling of the perimeter quality wells, piezometer readings, and two-tier trigger level reporting to Auckland Council will continue unchanged for the Class 1 area.

5.5.2 Class 2 baseline

For the Class 2 footprint extension, the existing Schedule One network will be extended to provide upgradient, downgradient (near-toe and boundary) and cross-gradient coverage. The proposed additional monitoring wells are W69 (upgradient), WL2S/WL2D (downgradient, near the toe), M7A (downgradient, near the boundary) and W67AS (cross-gradient), with further wells installed as required. New or replacement bores will be drilled within one month of decommissioning, or of being identified as required, and Schedule One and the LMP will be updated within one month of drilling.

Baseline monitoring of the Class 2 footprint extension will be undertaken over at least ten monitoring rounds prior to waste placement, no less frequently than monthly and no more frequently than quarterly, to capture seasonal variability and provide a robust dataset for deriving trigger levels. The baseline and operational analytical suite is summarised in Table 5.1.

Table 5.1: Groundwater monitoring parameter suite

Group	Determinants
Field parameters	pH, electrical conductivity (EC), temperature
General chemistry	Alkalinity, total hardness, sulphate
Indicator parameters	Total ammoniacal nitrogen, nitrate-nitrogen, chloride, EC
Dissolved metals	Arsenic, copper, lead, nickel, iron, manganese, magnesium, zinc
Total metals	Boron, calcium, potassium, sodium
Organic indicators	Chemical oxygen demand (COD)

5.5.3 Ongoing operational monitoring

During operation of both the Class 1 landfill and the Class 2 footprint extension, groundwater levels and groundwater quality will be monitored quarterly, and leachate quality will be sampled quarterly (consistent with current Class 1 monitoring). Groundwater levels are measured from the top of casing to the nearest 0.01 m, with the bore not having been pumped for at least 24 hours beforehand. Results are evaluated against the baseline dataset and relevant guideline values, assessed for spatial and temporal trends, and reviewed against the well-specific Trigger Level 1 (TL1) and Trigger Level 2 (TL2) values.

Trigger levels are well-specific and were derived from baseline monitoring results and the guideline values for the protection of 95% of freshwater species (or other standards approved by Auckland Council). Trigger levels in the Class 1 area will remain unchanged to the current parameters. New trigger levels for the Class 2 monitoring wells will be established from the Class 2 baseline dataset and cross-checked against the same guideline basis, with the more protective value adopted. Trigger levels will be reviewed annually and updated as the dataset grows.

A tiered response framework will apply to operations if trigger levels are exceeded. This will include the following:

- TL1 exceedance triggers an early-warning response, including verification of sampling within four weeks, trend assessment, and a brief investigation note recommending next steps.
- TL2 exceedance triggers a management response, including immediate notification to Auckland Council and the PRP, consultation with the Specialist Adviser to determine whether a significant leachate-related change has occurred, targeted investigation, and corrective actions (which may include increased leachate extraction, additional monitoring wells, cut-off measures, in-situ remediation, or liner/drainage review).

Groundwater quality and level data are reported quarterly to Auckland Council and incorporated into the monthly reports to the PRP. Groundwater levels for the year ending 31 March are reported to Auckland Council by 30 April each year, including all data recorded since installation of each monitoring point. Electronic records are maintained for the life of the landfill.

5.5.4 Leachate monitoring

Leachate monitoring asses leachate level (head) on the lining system, leachate quality, and the volumes generated, removed and discharged. The overriding containment objective is to maintain the leachate level within the landfill below the surrounding groundwater level, preserving the inward hydraulic gradient that prevents leachate escape.

5.5.4.1 Leachate level

The Landfill Engineering Report sets the design requirement that the leachate collection system keep the leachate head on the lining system below 300 mm (other than at the leachate sump, where greater depth is required for pump operation). Leachate is monitored above the lining system near the leachate sump to control pump operation and limit head build-up, which is pumped back below 300 mm depth as quickly as practicable following heavy rainfall.

Leachate levels are monitored through one reading per day via submersible datalogger at dedicated leachate monitoring wells in the Phase 1 area, supported by bubbler-type head-measurement systems. Well LM1 will maintain a leachate level at a maximum of 51 m RL. Leachate levels are compared monthly against groundwater levels in the nested WL3 wells, and the records are reported to Auckland Council quarterly.

5.5.5 Stormwater and surface water monitoring

The surface water monitoring programme continues and extends the existing programme described in Section 4.9.1, as detailed in the Stormwater, ITA and Sediment Assessment (Technical Report G). The updated programme is summarised in Table 1.2.

Table 5.2: Surface water monitoring programme

Location	Parameters	Frequency	Purpose
Pond 1 to 4 inlets	Conductivity	Continuous (telemetric)	Early warning of elevated contaminants or leachate break-out
Pond 1 to 4 discharge	Turbidity	Continuous (telemetric)	Ensure excessive silt is not carried into receiving waters
	Flow rate	Continuous (telemetric)	Ensure discharge flow rates are not exceeded
	Suite of contaminants	Fortnightly / bi-monthly	Assess effects and evaluate against trigger levels

Location	Parameters	Frequency	Purpose
Wheel wash	Suite of contaminants	Prior to release to Sediment Retention Ponds	Confirm water meets trigger levels before discharge
Rangitopuni Stream	Suite of contaminants	Every 3 months	Assess effects and evaluate against trigger levels

The receiving-environment monitoring uses four stream sites:

- Site 1 (upstream of the Pond 4 discharge, in a tributary).
- Site 2 (upstream of the Pond 1, 2 and 3 discharge points, in the Rangitōpuni Stream).
- Site 3 (downstream of all landfill discharges).
- Site 4 (upstream of the Pond 1 discharges, in a tributary).

Monitoring at these sites commenced before the landfill was established, providing a long-term dataset against which to evaluate any change. The current programme includes 36 individual parameters which are detailed in the LMP and will continue to be monitored.

Continuous conductivity monitoring at the pond inlets provides an early indication of any leachate break-out, with automated notification from the site-operated telemetry system if pond inlet conductivity exceeds the trigger limits. Results are assessed against the two-tier trigger levels (TL1 and TL2) defined in the LMP for the ponds and the stream, which are based on the relevant guideline values for the protection of 95% of freshwater species. The following actions will be undertaken during a trigger exceedance:

- A TL1 exceedance requires investigation and reporting.
- A TL2 exceedance requires urgent action, immediate notification to Auckland Council, investigation (including consultation with the Specialist Adviser), and implementation of corrective actions in accordance with the stormwater contingency plan.

During construction and earthworks, erosion and sediment control will be undertaken in accordance with an Erosion and Sediment Control Plan and site-specific plans prepared to the standard of Auckland Council guideline GD05, with treatment provided by the sediment and stormwater ponds. The proposed works include filling Sedimentation Pond 6 and enlarging Pond 1 to capture and treat the affected catchments.

5.5.6 Landfill gas monitoring

Landfill gas monitoring continues and extends the existing programme described in Section 4.9.5, to identify surface emissions, detect any sub-surface migration, and confirm the performance of the gas collection and destruction system. The updated programme, as described in the Air Quality and Odour Assessment, is summarised in Table 5.1.

Table 5.3: Landfill gas monitoring programme

Element	What is monitored	Frequency
Surface walkover inspections	Odours, staining, distressed vegetation, leachate break-outs, cover condition	Weekly (areas of intermediate cap)
Instantaneous surface monitoring (ISM)	Surface methane on intermediate cover	Monthly

Element	What is monitored	Frequency
Instantaneous surface monitoring (ISM)	Surface methane on final cover	Quarterly
Drone methane survey	Plume / hotspot detection for follow-up	Periodic (additional to ISM)
Perimeter probe monitoring	Sub-surface methane migration	Detailed in LMP
Wellhead monitoring	Gas extraction performance; CO, O_2, temperature	Routine (well-field balancing)
LFG composition at Energy Centre	CH_4, CO_2, O_2	Approximately daily
LFG laboratory analysis	Key constituents (including H_2S)	6-monthly

The surface methane trigger is 5,000 ppm. Where this is exceeded the cover is repaired or remediated and retested. Methane in the perimeter probes is maintained below the lower explosive limit. The flare system is operated to comply with the consent requirements for flare temperature and gas retention time, with back-up flares provided.

Because Class 2 waste is limited to inert materials and soils with no more than 5% incidental biodegradable content by volume per load, the gas-generation potential of the Class 2 footprint extension is low and landfill gas infrastructure is not expected to be required. If gas collection becomes necessary in future, near-surface horizontal collector pipes will be installed. Landfill gas reporting comprises daily monitoring results at the flare site, monthly well-field results, and quarterly surface-emission results.

5.5.7 Generator monitoring

Generator stack emissions are tested every three years on three of the generators on a rotating basis, for PM_{10}, oxides of nitrogen, carbon monoxide and sulphur dioxide.

5.5.8 Odour monitoring

Odour is managed through an intensive observation programme: daily odour patrols by the site Odour Technician (at least twice, and usually three times, each weekday), a daily 15-minute formal odour observation at the location most likely to be affected, monthly to quarterly independent third-party field observations, and an annual independent odour review reported to Auckland Council. Observations are assessed using the FIDOL framework (frequency, intensity, duration, offensiveness and location), with odour intensity recorded on a standard 0 to 6 scale, and are supported by complaint investigation and the quarterly Community Liaison Committee.

Dust is managed by physical controls (water carts, a 30 km/h speed limit, wheel washing, progressive grassing and separation distances); the Air Quality Assessment concludes that dust effects are negligible and that quantitative dust (deposition-gauge) monitoring is not warranted.

5.5.9 Geotechnical monitoring

The Geotechnical Assessment recommends that geotechnical monitoring continue during, and after, construction of the expansion, comprising groundwater levels and pressures and the ground movements of cut and fill slopes. Slope stability at the site is highly sensitive to groundwater assumptions, so groundwater monitoring continues in a similar manner and at a similar frequency to the current programme.

Monitoring uses the vibrating-wire piezometers installed in October 2024 (instruments PZ40 to PZ45 in boreholes W135 to W138), the existing standpipe piezometers, and survey pins for surface displacement (earlier inclinometers having been decommissioned). It comprises ongoing review of

piezometer data against the design groundwater levels and piezometric pressures used in the stability analyses, and the recording and monitoring of any groundwater seepages observed during construction. Acceptable design groundwater levels and ground displacements act as trigger levels; if monitoring identifies values exceeding these levels, pre-determined contingency measures are implemented. This may include:

- Increasing the monitoring frequency.
- Modifying construction procedures or programme.
- Installing additional drainage or piezometers.

Construction will be regularly inspected and mapped by an experienced engineering geologist or geotechnical engineer to confirm the design assumptions. The stability criteria against which the monitoring is assessed include:

- Minimum factors of safety: 1.3 to 1.5 static, depending on case; and
- Maximum seismic displacements: liner less than 0.3 m and capping less than 1.0 m under the design basis earthquake; liner less than 1.0 m and capping less than 3.0 m under the maximum credible earthquake.

5.5.10 Noise monitoring

Noise monitoring continues as described in Section 4.9.6. New plant (generators, evaporators, blowers and flares) is measured on commissioning to confirm compliance, with operation suspended until any non-compliance is mitigated. A noise complaints register and a separate gas-flare low-frequency-noise register are maintained, with annual compliance results reported to Auckland Council.

5.5.11 Ecological monitoring

Ecological monitoring is set out in the proposed Ecological Management Plans. This monitoring is associated with the construction works rather than ongoing operation.

5.5.11.1 Avifauna

During any works within the New Zealand dabchick breeding season (1 June to 31 March), the works area (Pond 6 and the Office Pond and their margins) will be monitored weekly for prospecting or nesting birds. Trail cameras and weekly observations by a suitably qualified person are used at any active nest until chicks fledge, deterrence is applied if birds prospect, and a completion report is provided at the end of each breeding season. This monitoring applies for the works period only.

5.5.11.2 Lizards

Where lizard salvage is undertaken during vegetation clearance and monitoring is trigger-based, as follows:

- If 10 or more native lizards or two or more species are relocated, pest control operates for at least five years (bait stations at 50 m × 50 m across the release area plus a 50 m buffer, four pulses per year) with annual reporting of effectiveness.
- If 20 or more lizards are relocated, relocation success is also monitored through five annual pitfall-trapping surveys over the five-year period.

A completion report is provided to Auckland Council within one month of clearance.

5.5.11.3 Native fish

A one-off capture and relocation will be carried out during dewatering of Pond 1, Pond 6 and the Office Pond, supervised by a freshwater ecologist; no ongoing post-relocation monitoring is required. A report is provided to Auckland Council within 15 days of dewatering and records are lodged with the New Zealand Freshwater Fish Database.

5.5.12 Landscape and vegetation

Landscape and revegetation planting (structure, replacement and supplementary planting) is implemented and maintained under the Landscape Management Plan, with survival and maintenance requirements to be defined in the updated plan.

5.5.13 Post-closure monitoring

Environmental monitoring of groundwater, leachate, surface water and landfill gas will continue into the post-closure period in accordance with the Post-Closure Management Plan and the relevant consent conditions, with records maintained for the operating life of the landfill and beyond as required.

5.5.14 Reporting and review

Monitoring results are reported and reviewed on a consolidated basis, as summarised in Table 5.4.

Table 5.4: Summary of monitoring reporting

Frequency	Reporting
Continuous / telemetric	Pond inlet conductivity, pond discharge turbidity and flow, leachate levels — with automated trigger-level notification
Monthly	Groundwater and surface water data provided to the Peer Review Panel; leachate level comparison against groundwater
Quarterly	Groundwater quality and levels, leachate levels and surface water results to Auckland Council; landfill gas surface-emission results
Annual	Groundwater levels (year ending 31 March) to Auckland Council by 30 April; annual environmental monitoring report to Auckland Council and the PRP; annual independent odour review; annual noise compliance results; annual lizard pest-control report (if triggered); annual review of the LMP
Works-based	Avifauna breeding-season completion report; lizard clearance completion report (within one month); native fish relocation report (within 15 days of dewatering)
Three-yearly	Generator stack emission testing; periodic stormwater monitoring review

All monitoring records are maintained electronically for the life of the landfill, or longer where required by the post-closure plan.

6 Resource consent requirements

6.1 Auckland Unitary Plan

The requirements for resource consents are determined by the rules in the AUP. The rules which apply are determined by the zoning of the site, any identified notations in the AUP and the nature of the activities proposed.

The general zoning and planning limitations that apply to the site under the AUP are set out in Table 3.5 in Section 3.

Resource consents are being sought to enable the project works as described in this report and the application intends to include all necessary consents for those activities to occur, even if not specifically identified in Table 6.1. Therefore, the consent requirements set out below may not be an exhaustive list and if further consent matters are identified, including post lodgement of the application, these should also be considered as forming part of the application.

There are several activities which have been identified as permitted activities under the AUP. Appendix E contains a compliance table setting out the permitted activities and compliance with the relevant rules and standards.

Overall, resource consent is required as a non-complying activity under the AUP but is not subject to an assessment under section 104D of the RMA, as set out under clause 17(1)(b), Schedule 5 of the FTAA.

Table 6.1: Resource consent requirements under the AUP

Proposed activity	Rule reference/ description	Comment	Activity status
E4 – Other discharges of contaminants			
The placement of sludge from the leachate evaporator back into the landfill.	• Rule E4.4.1 (A15) [rp] • Discharge of water and contaminants (including washwater) onto or into land and/or into water not complying with the relevant standards or not otherwise provided for by a rule in the Plan.	The proposal will involve the placement of sludge from the leachate evaporator back into the landfill, comprising approximately 5 m^3 per day. Accordingly, consent is sought as a discretionary activity under Rule A15.	**Discretionary**
E7 - Taking, using, damming and diversion of water and drilling			
Groundwater diversions for the construction and ongoing operation of the landfill	• Rule E7.4.1 (A20) [rp] • Dewatering or groundwater level control associated with a groundwater diversion authorised as a restricted discretionary activity under the Unitary Plan, not meeting permitted activity standards or is not otherwise listed.	A temporary groundwater take of 11 m^3/day to 35 m^3/day of groundwater for ground dewatering is proposed during construction of the Class 2 extension area as described in Technical Report E, Volume 2. Accordingly, resource consent is sought as a restricted discretionary activity under Rule A20.	**Restricted discretionary**

Proposed activity	Rule reference/ description	Comment	Activity status
Groundwater diversions	• Rule E7.4.1 (A28) [rp] • Diversion of groundwater caused by any excavation (including trench) or tunnel that does not meet the permitted activity standards or is not otherwise listed.	The landfill development will require excavations which exceed 1 ha in area for a duration of more than 10 days, and therefore the permitted activity standards are exceeded. Resource consent will be required for the diversion of groundwater associated with excavations as a restricted discretionary activity under Rule A28.	**Restricted discretionary**
Temporary use of the off-stream Pond 6 (prior to decommissioning) and the continued use of Pond 5	• Rule E7.4.1 (A35) [rp] • Dams not otherwise listed or not meeting the permitted activity standards or controlled activity standards	The project involves the continued operation of dams not otherwise listed within the activity table E7.4.1. Accordingly, consent is sought as a discretionary activity under Rule A35.	**Discretionary**
E8 - Stormwater - Discharge and diversion			
Diversion and discharge of stormwater from impervious surfaces following treatment in Sediment Retention Pondss	Rule E8.4.1 (A10) [rp] All other diversion and discharge of stormwater runoff from impervious areas not otherwise provided for.	Stormwater from impervious surfaces required for landfill operations will require diversion and treatment. The diversion and discharge of stormwater from impervious areas exceeding 1,000 m2 in size across the site. Accordingly, consent is sought as a discretionary activity under Rule A10.	**Discretionary**
E11 Land disturbance - Regional			
Earthworks for construction and ongoing operation of the landfill	• Rule E11.4.1 (A8) [rp] • Land disturbance greater than 2500 m2 where the land has a slope equal or greater than 10 degrees.	Earthworks required for landfill development and operation will exceed 2,500 m2 where the land has a slope equal to or greater than 10 degrees. Land disturbance within the Sediment Control Protection Area is also proposed. Accordingly, consent is sought as a restricted discretionary activity under Rule A8 and A9.	**Restricted discretionary**
	Rule E11.4.1 (A9) [rp] Land disturbance greater than 2500 m2 within the Sediment Control Protection Area (SCPA).[^11]		**Restricted discretionary**
E12 Land disturbance - District			
Earthworks for construction and ongoing operation of the landfill	Rule E12.4.1 (A6) [dp] Land disturbance of greater than 2500 m2.	Earthworks required for the development and ongoing operation of Redvale will exceed 2,500 m^2 and 2,500 m^3. Accordingly, consent is sought as a restricted discretionary activity under Rule A6 and A10.	**Restricted discretionary**
	Rule E12.4.1 (A10) [dp] Land disturbance of greater than 2500 m2.		**Restricted discretionary**
E13 Cleanfills, managed fills and landfills			
Landfill discharges	Rule E13.4.1 (A10) [rp] Discharges from an operative landfill.	Discharges from an operative landfill will require resource consent as a	**Discretionary**

Proposed activity	Rule reference/ description	Comment	Activity status
		discretionary activity under A10, regardless of the size of the landfill.	
E14 Air quality			
Leachate evaporation	Rule E14.1.1(A2) Activities not meeting the permitted standards and not provided for by any other rule.	Leachate is proposed to be evaporated on-site for a period of time through the LEU, Evaporation of leachate is not provided for by any other rule, and as such consent is required.	**Discretionary**
Combustion of landfill gas within generators and flare	Rule E14.1.1 (A54) [rp] Combustion activity not meeting the permitted, controlled or restricted discretionary activity standards.	Combustion of landfill gas will be undertaken by the gas energy plant for electricity generation, as well as through the flare. Accordingly, consent is sought as a discretionary activity under Rule A54.	**Discretionary**
Air discharges associated with the ongoing operation of the landfill	E14.4.1 (A160) [rp] Discharge of contaminants into air from landfills that do not comply with restricted discretionary or discretionary activity standards.	Discharges to air from the existing Landfill do not meet the restricted discretionary standards in E14.6.3 or discretionary activity standards in E14.6.4. Accordingly, consent is sought as a non-complying activity under Rule A160.	**Non-complying**
E15 Vegetation management and biodiversity			
Limited vegetation removal around ponds, and for the expansion works	Rule E15.4.1 (A17) [rp/dp] Vegetation alteration or removal within 10 m of rural streams in the Rural – Mixed Rural Zone.	Vegetation clearance is proposed within 10 m of streams within the Rural – Mixed Rural Zone. Accordingly, consent is sought as a restricted discretionary activity under Rule A17.	**Restricted discretionary**
E26 Infrastructure			
Operation of the gas energy plant	Rule E26.2.3.1(A63) Other electricity generating facilities in Rural Zones.	The energy plant will generate electricity from burning landfill gas, which will be exported to the national grid. Accordingly, consent is sought as a discretionary activity under Rule A63.	**Discretionary**
E30 Contaminated Land			
Earthworks within the existing landfill movement and decommissioning of the Managed Fill, including the removal of material	• Rule E30.4.1 (A7) • Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1	The controlled activity standards will not be met as the area will not include remediation, and therefore a Remedial Action Plan will not be prepared. Accordingly, consent is sought as a discretionary activity under Rule A7.	**Discretionary**
E33 Industrial and trade activities			
Operation of the landfill	Rule E33.4.1 (A7) [rp] Use of land for an existing industrial or trade activity listed as high risk in Table	All landfills regardless of size are deemed to be a high risk activity. Accordingly, consent is sought for the	**Controlled**

Proposed activity	Rule reference/ description	Comment	Activity status
	E33.4.3 (after the Table E33.4.3 timeframe expires).	existing landfill as a controlled activity under Rule A7 and A8.	
	E33.4.1 (A8) – Use of land for a new industrial or trade activity listed as high risk in Table E33.4.3		**Controlled**
Discharges from areas which have been assessed as ITA, including access road, gas energy plant, wheel wash and workshops.	Rule E33.4.1 (A9) [rp] Any industrial and trade activity in Table E33.4.1 that does not meet the relevant permitted or controlled land use standards.	The project includes a number of areas which have been assessed as ITA, including access roads, gas energy plant, wheel wash and workshops. These areas are not listed in Table E33.4.3. Measures to manage the ITA areas of the site are described in Technical Report G. Accordingly, consent is sought as a discretionary activity under Rule A9 and as a controlled activity under A12.	**Discretionary**
Discharge of contaminants associated with ITA	E33.4.2(A12) [rp] Discharge of contaminants from an existing or new ITA area not listed in Table E33.4.3 where the permitted discharge standards are not met.		**Controlled**
	E33.4.2(A23) [rp] Discharge of contaminants from an existing ITA listed as high risk in Table E33.4.3 (after the Table E33.4.3 timeframe expires)	Landfills are classified as a high-risk activity in Table 33.4.3. Resource consent will be required as a discretionary activity under rule E33.4.2(A23).	**Discretionary**
E36 Natural hazards and flooding – Plan Change 120[^12]			
Construction and operation of the landfill and the relocation of ancillary activities within Very High and High Flood Hazard Areas	• Activity Table E36.4.1A (A107) • All other infrastructure in flood hazard areas not otherwise provided for	The proposal will involve the construction and operation of a landfill and the relocation of buildings within Very High and High Flood Hazard Areas. Accordingly, consent is sought as a restricted discretionary activity under Rule A107.	**Restricted Discretionary**
Construction and operation of the landfill within high landslide susceptibility areas.	• Table E36.4.1C (A133) • All other infrastructure in landslide susceptibility assessment areas not otherwise provided for	The landfill and ancillary infrastructure is located on land within high landslide susceptibility assessment areas as identified on GeoMaps. Accordingly, consent is sought as a restricted discretionary activity under Rule A133.	**Restricted Discretionary**
H19 Rural zones			
Landfilling activities	Rule H.19.8.1 (A67) [dp] Landfill in the Rural – Mixed Rural Zone.	The overall Landfill activity is not provided for within the Rural – Mixed Rural zone. Therefore consent is required as a non-complying activity under Rule A67.	**Non-complying**

Overall, resource consent will be required as a non-complying activity under the AUP.

6.2 Resource Management (National Environmental Standards for Freshwater) Regulations 2020

The reasons for consent under the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 are included in Table 6.2.

Table 6.2: Resource consent requirements under the NES-F

Proposed activity	Regulation reference / description	Comment	Activity status
Earthworks and vegetation clearance associated with Stockpile 4	• **Regulation 45B (3)** • Earthworks or land disturbance outside a 10 m, but within a 100 m, setback from a natural inland wetland is a discretionary activity if it— • (a) is for the purpose of constructing or operating a landfill or a cleanfill area; and • (b) results, or is likely to result, in the complete or partial drainage of all or part of the wetland.	• There is one natural inland wetland located south-west of Stockpile 4 within the site. • Earthworks are proposed within the Stockpile 4 area associated with the stockpiling and removal of earth for use in association with landfill activities. • Additionally, the diversion and discharge of sediment laden water and clean water will also be undertaken within 100 m of the wetland located on-site. • Accordingly, consent is sought as a discretionary activity under Regulation 45B.	**Discretionary**
Diversion and discharge of sediment laden water	• **Regulation 45B (4)** • The taking, use, damming, or diversion of water within, or within a 100 m setback from, a natural inland wetland is a discretionary activity if— • (a) the activity is for the purpose of constructing or operating a landfill or a cleanfill area; and • (b) there is a hydrological connection between the taking, use, damming, or diversion and the wetland; and • (c) the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland.		**Discretionary**
	• **Regulation 45B (5)**		**Discretionary**

Proposed activity	Regulation reference / description	Comment	Activity status
	• The discharge of water into water within, or within a 100 m setback from, a natural inland wetland is a discretionary activity if— • (a) the discharge is for the purpose of constructing or operating a landfill or a cleanfill area; and • (b) there is a hydrological connection between the discharge and the wetland; and • (c) the discharge will enter the wetland; and • (d) the discharge will change, or is likely to change, the water level range or hydrological function of the wetland.		

6.3 Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

The reasons for consent under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 are included in Table 6.3.

Table 6.3: Resource consent requirements under the NES-CS

Proposed activity	Regulation reference / description	Comment	Activity status
Activities on a 'piece of land' with identified activities under the HAIL and exceeding 2 months in duration and is without a Detailed Site Investigation	• **Regulation 11** • This regulation applies to an activity described in any of regulation 5(2) to (6) on a piece of land described in regulation 5(7) or (8) that is not a permitted activity, controlled activity, or restricted discretionary activity.	As the Redvale Landfill is an existing operative landfill, the whole site falls under Category G of the HAIL by Ministry for the Environment. The earthworks duration proposed for the ongoing operation of Redvale Landfill will exceed 2 months. Accordingly, consent is sought as a discretionary activity under Regulation 11.	**Discretionary**

6.4 Other consents and approvals required

No approvals under any other legislation are sought as part of this application.

7 Assessment of effects on the environment

7.1 Introduction

The following assessment identifies and assesses the types of effects that may arise from the proposed works in accordance with Schedule 5 of the FTAA. This includes both reference to the positive effects, or benefits from authorising the project and any adverse effects that may arise. The conclusions in the following subsections have been drawn from the technical reports contained in Volume 2. This section refers to and details measures that the applicant proposes to avoid, remedy or mitigate any potential adverse effects on the environment.

This effects assessment is based on the existing environment and landfill operations as set out in Section 3 and 4 above. This includes the filling of the landfill, as authorised by the existing consent being fully implemented.

7.2 Positive effects

7.2.1 Provision of regionally significant waste infrastructure

Waste disposal facilities, or landfills, are recognised within both the AUP and the National Policy Statement for Infrastructure 2025 (NPS-I) as a vital piece of national and regional infrastructure. Redvale Landfill is an important component of the waste management system within the Auckland region, serving as the final point of disposal for residual waste that cannot be reduced, reused, or recycled. Currently Redvale Landfill takes approximately 40% of Auckland's residual waste. The ongoing operation of Redvale Landfill allows the facility to continue serving the existing need for waste disposal until such time a larger facility for the Auckland region (i.e. ARL) is available for waste placement.

Auckland is a growing region, both in population and physical development. Waste is generated by residential households, businesses, and the construction industry. To support this ongoing growth, waste infrastructure is required to handle the resulting waste. As detailed above in Section 2, there is a need to provide for safe and reliable waste disposal infrastructure while ARL is being established to ensure that there is no gap in the ability for Auckland to safely dispose of its waste. In the absence of this additional capacity at Redvale, an unfair burden would potentially be placed on other regions to be responsible for Auckland's waste. The economic analysis undertaken for WMNZ by NERA (Technical Report M) concludes that, in the absence of the additional capacity at Redvale, annual demand for landfill waste disposal from Auckland would be likely to materially exceed the available annual capacity of the three remaining landfills able to receive Auckland's waste (Whitford, Hampton Downs and Puwera), only one of which is located within the Auckland region. A burden would also be placed on other regions to be responsible for Auckland's waste, with the resulting price and capacity effects extending to landfill users in Northland, Waikato and the Bay of Plenty (refer Section 1.2.2 below). This is a temporary measure of eight years to provide for this transition.

As a secondary benefit, Redvale also fulfils a role in supporting and enabling the construction and development of nationally significant projects and infrastructure, as well as primary industries. This includes, but is not limited to, projects associated with the national transport network, marine and port infrastructure, and electricity transmission infrastructure. These projects require a location to dispose of their waste streams as part of development and operation. According to Auckland Council's Waste Assessment 2023[10], there has been an increase in commercial waste (including C&D waste) by approximately 0.3 million tonnes between 2010 and 2022, with commercial waste

[10] Auckland Waste Assessment 2023. Auckland Council.

accounting for 84% of all waste sent to landfill. In 2022, it was estimated that at least one third of all reported tonnes to Class 1 landfills from Auckland are attributable to C&D waste.

Modern landfills, such as Redvale, are designed to manage the actual and potential effects of waste disposal through the implementation of engineered lining and capping systems and proactive on-site management of landfill gas, leachate, and stormwater, as further described in the activity above and in the effects management below. Without this management of effects in place, waste degradation can cause environmental and human impacts through uncontrolled discharges. Providing a properly engineered facility for waste disposal has the potential to minimise uncontrolled waste disposal, thereby avoiding these effects.

In addition to this management, Redvale Landfill includes an existing energy centre. Landfill gas (LFG) is an unavoidable by-product of the decomposition of organic material, and this sophisticated system enables the capture of LFG and the conversion of it's energy potential into electricity. The current electricity generation from the renewable energy centre currently produces enough electricity to power up to 16,000 homes. The increase in waste within the Class 1 landfill will continue to feed the energy centre and in turn the national grid.

7.2.2 Economic benefits

The project is projected to deliver significant regional and national economic benefits. These are detailed in the Economics Assessments included as Technical Reports L and M, prepared by NZIER (July 2026) and NERA (July 2026) respectively. The NERA assessment addresses the effect on landfill gate prices if Redvale were to close before the ARL opens, while the NZIER assessment addresses the wider economic impact of diverting Redvale's waste volumes on the Auckland transport network and the Auckland and New Zealand economies. The benefits of the project are primarily realised through the avoidance of substantial adverse economic impacts that would occur if Redvale was to cease accepting waste after December 2028, prior to the ARL becoming operational. The continuation of waste acceptance at Redvale maintains stability in the region's waste management infrastructure, preventing significant cost increases and market disruption for Auckland and surrounding regions.

A critical economic benefit of this project is the prevention of a material increase in landfill gate prices. As detailed in the NERA assessment (Technical Report M), if Redvale had to cease accepting waste at the end of December 2028, annual demand for landfill waste disposal from Auckland would be likely to materially exceed the available annual capacity of the three remaining nearby landfills (Whitford, Hampton Downs and Puwera), and the very high barriers to building a new landfill, or expanding existing landfills, within the relevant timeframe mean that competitors could not readily increase capacity in response. NERA estimates that this supply shortfall would increase landfill gate prices by between 10% and 83.3%, and considers a price increase of around 30% to be plausible. A price increase of approximately 30% (equating to $42.60 per tonne), applied across the approximately one million tonnes able to be accepted by the remaining landfills, would impose an additional cost of approximately $42.6 million per year on waste disposal services. NERA notes that even the bottom of this range (10–15%) would generally be considered by competition regulators to constitute a substantial lessening of competition. Furthermore, the closure would create a supply shortfall of approximately 400,000 tonnes per annum (almost 30% of Auckland's waste to Class 1 landfills) that the remaining landfills could not take, which would need to be managed through other costly means. This project directly avoids these significant price shocks and capacity constraints, providing cost certainty for residents and businesses.

A sensitivity analysis was also undertaken by NERA to assess the economic impacts if Hampton Downs landfill could accept an additional 500,000 tonnes of waste per year following Redvale's closure (Technical Report M, Section 5). This analysis concluded that, even with this additional capacity, closing Redvale would lead to a substantial lessening of competition and a material

increase in market concentration. With the other remaining landfills (Whitford and Puwera) quickly reaching capacity, Hampton Downs would in effect become a monopolist for a material portion of Auckland's demand. Consequently, this scenario would still be expected to result in a price increase of at least 10–15%.

The project also delivers economic benefits by maintaining the most cost-effective and efficient transport logistics for a large portion of Auckland's waste. NZIER's economic modelling demonstrates that the status quo, with Redvale operational, is the lowest-cost option for waste transportation, with estimated direct transport costs of approximately $20.2 million to $25.7 million per year. Diverting waste to Whitford and Hampton Downs following Redvale's closure would be the most costly option, at approximately $37.2 million to $47.3 million per year – an increase of approximately $17 million to $21.6 million per year (Technical Report L). Beyond these direct costs, NZIER's wider economic impact assessment estimates that this diversion would result in Auckland road users spending, in aggregate, an additional 1.9 million hours in traffic each year, with waste truck trips across the Auckland Harbour Bridge – already a major chokepoint in the Auckland roading network – increasing from 37 per day to approximately 150 per day. The resulting congestion is estimated to reduce Auckland's gross domestic product (GDP) by $623 million (0.4%) per annum and New Zealand's GDP by $447 million (0.1%) per annum, amounting to a $3.6 billion loss to the Auckland economy and a $2.6 billion loss to the New Zealand economy over the eight-year transition period in net present value terms (Technical Report L). By continuing operations at Redvale, the project avoids these direct and indirect costs.

The project supports the stability of Auckland's economy by supporting essential waste infrastructure. It averts a substantial lessening of competition in an already highly concentrated market that would otherwise result from Redvale's closure. It also avoids the airspace at the remaining landfills being consumed more quickly, which would bring forward the need to incur the costs of expanding those landfills or developing replacement disposal capacity (Technical Report M). The significant economic benefits are therefore delivered through the avoidance of multi-million dollar annual increases in gate prices and transport costs, the prevention of negative impacts on regional and national productivity from increased congestion, and the maintenance of a stable and competitive market for essential waste services. These benefits will be realised not only by Auckland but also by the neighbouring Waikato, Northland and Bay of Plenty regions, making this a benefit of national significance.

7.2.3 Conclusion

The Redvale Landfill extension will result in a range of positive effects, including:

- Provision of an existing, well operated disposal location for Auckland's waste, avoiding potentially significant adverse effects associated with uncontrolled disposal of waste.
- Provision of landfill capacity for the transitional period of eight years while ARL is being established to continue to support Auckland's population growth and development.
- Economic benefits, providing for effective disposal, cost efficient transport and an economically resilient waste system.
- Positive use of biomass, to continue generating renewable energy and feeding this back into the national grid, as well as providing free EV chargers to vehicles at the landfill.

Overall, the project will result in significant positive effects, and regional and national benefits.

7.3 Geology

7.3.1 Overview

A Geotechnical Assessment (Technical Report B) was completed to assess the actual and potential effects on site suitability and slope stability. Redvale Landfill has been the subject of extensive geotechnical investigations since 1988, when initial investigation work was undertaken at the site. This investigation has included boreholes, piezometers, survey pins and inclinometers. In 2024, additional monitoring was established to understand the effects of the proposed extension of the landfill. The most recent assessment utilises the previous investigations and assessments to provide a comprehensive understanding and analysis of the site.

7.3.2 Site suitability

The ground investigations conclude that the continued use of Redvale Landfill, including extension works are suitable from a geotechnical perspective. This is contingent on a continued robust, detailed design and appropriate monitoring of the landfill.

To date, the development of the landfilling area has followed appropriate geotechnical investigation, monitoring, design and construction. The resulting development has been a safe and consent-compliant activity. Based on this monitoring, the current landfilling area is considered appropriate for the expansion activities.

The proposed Class 2 extension area is also considered suitable for development, provided that the correct design criteria are applied. These design criteria will be based on the understanding of the geology of the area and the requirements to construct a Class 2 lining system. This design work will be undertaken during detailed design and confirmed through the Peer Review Panel (PRP) to ensure that effects are mitigated and managed.

7.3.3 Seismic risk

The landfill site is in an area of relatively low seismicity compared to the rest of New Zealand. The slope stability analysis outlined in the Geotechnical Assessment takes into account seismic risk. For seismic design, Design basis earthquake (DBE) and Maximum credible earthquake (MCE) peak ground acceleration (Pga) of 0.19g and 0.28g, respectively, have been used for the long-term slope stability analyses for the Redvale Landfill. The stability analyses indicate that the proposed works will meet the target Factor of Safety values for seismic loads.

7.3.4 Slope stability

The construction and operation of a landfill relies on having a safe and efficient development with good slope stability. The absence of good slope stability can lead to adverse effects, including uncontrolled movements and compromised lining systems. Stability of the slopes within the existing landfill area and the Class 2 extension are discussed separately below.

7.3.4.1 Existing landfill area

Assessment of the existing landfilling area has been undertaken and based on previous as-builts, data and knowledge of the performance of the existing landfill. This includes:

- The existing landfilling footprint and underlying material.
- The existing Phase 10 Bund, located on the northern perimeter of the landfill.
- The proposed perimeter bund to be constructed to enable the extended filling.

The landfill was developed within a historic quarry, utilising the void space that was created by these activities. Where required, additional excavations were undertaken to remove unsuitable material prior to a lining system being established. The underlying geology under the landfill is set out above in Section 3.6.2. This material is considered stable and appropriate for continued landfilling operations with the lining system in place.

To achieve the appropriate airspace for the landfill, a bund, known as the Phase 10 Bund and described in Technical Report B and in Section, was constructed along the northern boundary of the site. This remains in place and is not proposed to be altered for the landfill extension. A slope stability analysis of this bund has been undertaken taking into account the calculated Factors of Safety and a seismic analysis of the bund. This analysis was further confirmed through additional piezometers installed in 2024 to undertake additional groundwater monitoring data. The analysis confirmed that the Phase 10 Bund will meet the required stability criteria for ongoing use.

Along the eastern and southern boundary, a proposed perimeter bund, as discussed in Section 5.1.1.2 above will be constructed. This will allow for new waste to be placed within the bund, enabling more waste placement and a steepening of the side slopes. An assessment of the Factors of Safety in relation to the proposed design has been undertaken and confirmed that this meets the relevant requirements.

In summary, an analysis of the existing landfilling area, inclusive of the proposed Class 1 expansion is considered to be geotechnically stable for landfilling operations.

7.3.4.2 Class 2 extension

The Class 2 slope stability analysis assesses the proposed development, including the excavation of managed fill material and natural material to create additional void space for Class 2 filling. The analysis of three cross-sections of the extension concludes that the base-grade slopes and waste slope profiles satisfy design criteria for the elevated groundwater and seismic loads.

7.3.5 Dam stability

There are two dams located at Sediment Retention Pond 5 and 6 on site. These are assessed within the Redvale Ponds 5 and 6 Geotechnical and Dam Assessment Report (Technical Report C). The report assesses the dam safety requirements as well as the geotechnical stability of the dams for on-going use.

Neither of the dams on site are considered a classifiable dam and therefore they are not subject to the building (dam safety) regulations as per the New Zealand Society of Large Dams (NZSOLD) New Zealand Dam Safety Guidelines 2024. However, for the purposes of assessing these dams, the global stability and seepage effects of the dam structures for the different loading conditions based on NZSOLD New Zealand Dam Safety Guidelines 2024 was applied. This assessment included seismic events and the unlikely occurrence of rapid drawdown.

The seepage and stability analysis was focused on four scenarios including:

- Case 1 – Where the ponds were at full stored pond water level condition which is approximately RL 75.5 m for Pond 5 and RL 67.9 m for Pond 6.
- Case 2 – Water drawdown at a rate of 2.0 m/day.
- Case 3 – Water drawdown at a rate of 1.0 m/day.
- Case 4 – Water drawdown at a rate of 0.1 m/day.

Using the appropriate geotechnical parameters of materials used for the construction of the dams impacts of these drawdown scenarios were assessed. The potential for seepage drawdown from the

dams is low due to the low permeability of the materials, and no seepage was observed during the site walkover.

Rapid drawdown of the water within the dams is highly unlikely, however if this occurs then this can have a negative impact of the stability of the dam structures. The NZSOLD Guidelines Factor of Safety (FOS) requirements set out a minimum FOS of 1.2. The FOS for the ponds were generally met in the scenarios set out, with the exception of Case 2 for Pond 5. It is noted that this is not in relation to the normal operation of the landfill and is not anticipated to occur.

An analysis of the seismic stability of the dams was undertaken to determine the global stability of the dams under seismic loading. A conservative approach evaluating drained parameters was undertaken in the assessment to provide a more robust review and analysis of the dam structures resilience during seismic events. The assessment determined the seismic events are not likely to cause either dam to fail catastrophically, releasing the impounded water from the ponds downstream.

It is proposed that to ensure that the performance of the dams is maintained, regular monitoring is undertaken. This is detailed in Section 4.9.2 and includes:

- Yearly visual monitoring inspections, as well as additional monitoring following significant natural hazard events which may compromise the function or integrity of the ponds; and
- Maintenance plans.

This assessment and associated recommendations apply to Pond 5 for the full consent duration requested and for Sediment Retention Pond 6 for the period while it is still operational as a Sediment Retention Pond before decommissioning. As set out above, it is intended that the dam associated with this pond will be utilised as the toe bund for the Class 2 area after decommissioning. This is assessed within the Geotechnical Assessment (Technical Report B) and discussed above.

7.3.6 Earthworks and construction considerations

During earthworks and development of the landfill expansion, as well as the proposed perimeter bunds particular geotechnical considerations are required. If left unmonitored or undertaken without technical specifications, developments can be undermined, causing construction risk. In order to mitigate these risks the following is proposed:

- Undertake the works in accordance with the Technical Specifications set out in the Geotechnical Assessment.
- Use of fill types meeting the requirements of the technical specifications, this will typically be won on site from excavations or previously stockpiled material.
- Undertake quality control testing by a suitably qualified geotechnical engineer to confirm quality control of the above is met.

7.3.7 Conclusion

Overall, the Geotechnical Assessment Report has confirmed that the underlying geology within the existing landfill footprint and Class 2 extension is suitable for landfill operation and development. Given the continued adoption of the geotechnical procedures and processes used to date at the landfill for the design and construction of the proposed extension works, potential risks and associated adverse effects of the underlying geology on landfill integrity and seismic risk are appropriate for the landfill's use and development.

7.4 Groundwater

7.4.1 Overview

A Groundwater Assessment (Technical Report F) has been undertaken to understand the actual and potential effects on groundwater from the continued use of the landfill and the proposed development. Extensive investigations over time and ongoing monitoring have been undertaken at the site which has helped to inform this effects assessment. The groundwater regime at the site is well understood. Actual and potential effects on groundwater have been considered which include:

- Groundwater drawdown as a result of the excavation for the construction of the proposed Class 2 footprint extension.
- Effects on regional groundwater resources, including neighbouring groundwater users.
- Surface water and stream depletion effects.
- Potential for saline intrusion.

Potential discharge of contaminants into ground and groundwater from leachate seepage through the landfill lining system.

7.4.2 Construction and expansion impacts

Excavation of the proposed Class 2 extension is anticipated to be up to 16 m below the groundwater table at the deepest point. To control groundwater during construction, subsoil drains will be installed to divert this water into the surface water system for appropriate management prior to discharge. This diversion has the potential to create wider drawdown effects within the groundwater table.

A groundwater dewatering assessment was conducted to estimate dewatering inflow rates and the resulting drawdown. This included the radius of impact and the anticipated timeframes over which this would be experienced. It is anticipated that dewatering will be required during the first stages of excavation, with the rates ranging from 11 m^3/day to 35 m^3/day. The effects from this drawdown will be limited to the WMNZ property during construction. Upon completion of construction and grouting of the subsoil drains, it is anticipated that the groundwater will return to pre-excavation levels.

The impacts from this groundwater diversion are anticipated to only extend 100 m from the floor of the excavation avoiding impacts on the Rangitōpuni Stream. In addition, the area of the extension will reduce the area for recharge of the groundwater catchment from rainfall. This is anticipated to only be 0.5% of the catchment and is negligible.

7.4.3 Groundwater quality

Redvale Landfill is designed with a lining system to capture and retain leachate. This system has the objective of providing a barrier which prevents leachate escaping into the wider environment. Despite the design of the liner system, which is a containment system, landfills still have the potential to cause groundwater impacts if leachate manages to seep through the lining system. For this reason, worst case scenario fate and transport modelling has been undertaken for the existing landfill footprint and for the proposed extension to understand the impacts in the unlikely event that leachate escaped the containment system. It is noted that since groundwater monitoring was established at the landfill in 1993 there has been no detected sign of leachate contamination within groundwater.

7.4.3.1 Class 1 landfill

For the modelling, the potential impacts from the existing landfill were assessed based on seepage occurring towards the Rangitōpuni Stream to the southeast of the landfill. The impacts on ecological effects and the irrigation of tomato plants were considered. The following guideline values were adopted to assess the contaminants of concern:

- ANZG (2018) default guideline values for the protection of 95% of freshwater species for the assessment of effects to ecological receptors in the Rangitōpuni Stream.
- ANZG (2023) water quality for irrigation and general water uses: guidelines for the assessment of effects for irrigation use

The assessment concluded that the contaminant concentrations would not exceed the relevant guideline values in the highly unlikely event that seepage were to occur. In addition to this, Redvale Landfill has an inward hydraulic gradient with groundwater levels outside the landfilling area typically lower than the leachate levels that are required to be maintained within the site. This inward hydraulic gradient reduces the potential impact of seepage if this were to occur.

7.4.3.2 Class 2 extension

The waste placed in a Class 2 landfills is different to that placed in a Class 1 landfill, resulting in a different leachate contaminants and concentrations The WAC adopted for the Class 2 footprint extension are such that contaminants derived from the waste are protective of aquatic life in the nearby Rangitōpuni Stream. This means that if the seepage of leachate occurs through the Class 2 footprint extension lining system, adverse effects on the potential receptors are considered to be negligible.

7.4.3.3 Groundwater management

Regardless to mitigate any potential impacts from the discharges of contaminants into groundwater, the monitoring set out within Section 4.9 and 5.5 is proposed. This includes the required actions as set out in the LMP if any of the trigger monitoring levels are identified.

The extensive groundwater monitoring programme of monitoring wells located around the landfill perimeter will continue to measure water quality, levels and leachate levels. This will include monitoring of additional bores in close proximity to the new Class 2 extension area. Ongoing monitoring will enable early detection of any change in groundwater quality potentially attributable to landfill activities and enable investigations to be undertaken of potential contamination and the appropriate remedial actions to be implemented depending on the results of investigations. This is set out in Section 5 as a tiered trigger response which includes early triggers requiring additional monitoring and investigation to understand the impacts on groundwater quality and a second trigger level that requires specific remedial actions to be developed with the relevant parties in response to an event.

7.4.3.4 Conclusion

Overall, the Hydrogeology Assessment Report has confirmed that the impacts of the proposed groundwater diversions during construction and ongoing groundwater quality from the ongoing operation and proposed expansion of Redvale Landfill will be appropriately managed to mitigate effects. This is supported by existing groundwater monitoring, which has indicated that contaminant concentrations in groundwater are below guideline values and no substantive change in groundwater quality has occurred as a result of landfill operations.

7.5 Erosion and sedimentation

7.5.1 Overview

Earthworks and on-site activities associated with the project will increase the risk of sediment loads in the surrounding waterways. Increased sediment loads can have adverse effects on freshwater ecology and channel morphology. These effects are set out in the Stormwater, ITA and Sediment Assessment (Technical Assessment G).

Earthworks are ongoing at Redvale Landfill. This includes the development of the site and ongoing landfill operations. The proposed works will also include additional earthworks for the establishment of the Class 2 area, construction of the bunds and the continued use of Stockpile 4.

7.5.2 Landfill operations and development

The sediment discharged from the site is managed through the existing stormwater treatment system, as described above in Section 4.8. This includes several Sediment Retention Ponds that are in place to manage sediment on site prior to discharge. Additionally, silt fences and clean-water diversion drains are used to minimise water entering the system.

The proposed changes to the ponds include diverting the catchment currently managed by Sediment Retention Pond 6 to Sediment Retention Pond 1. Sediment Retention Pond 1 is proposed to be expanded to provide this additional capacity. This change in regime is not anticipated to have an effect on the ability for the site to manage its sediment, as the overall capacity of the Sediment Retention Ponds will remain unchanged. Stormwater management will therefore remain on site with no change to discharge quality.

Total Suspended Sediment (TSS) is monitored at each of the discharge points at the site. Monitoring is currently undertaken through the existing monitoring regime developed as part of the previous resource consent process and detailed in conditions. These conditions set monitoring limits to manage sediment discharges offsite. Under the current consent, total suspended solids concentrations are subject to a limit of 50 g/m^3 over 95% of samples. Monitoring levels have been assessed regarding their appropriateness for the ongoing development of Redvale Landfill. They are considered appropriate for the continued operation and development of the landfill as the operation of the landfill remains well within these limits and there are no discernible impacts on the receiving environment.

7.5.3 Stockpile 4

Stockpile 4 will continue to be excavated, and material will be utilised for liner and cover material as appropriate. This is considered separately from the wider landfill management as the stormwater and sediment are managed as part of its own catchment. This includes a separate management regime and pond for the works.

There is one waterbody to the west of the stockpile, including a wetland and a small waterway. Based on the design and the catchment of Stockpile 4, potential sediment-laden water will not drain towards this waterbody. An ESCP is in place for Stockpile 4 and is proposed to be utilised as part of the continued use. This is attached in the LMP. This erosion and sediment management is in accordance with the Auckland Council's Guideline Document 2016/005, "Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region" (GD05). Subsequent Site-Specific Erosion and Sediment Control Plans are proposed for each phase of the works and will be certified via the PRP review processes.

7.5.4 Channel stability and erosion

Surface water, including clean surface water and treated water from the Sediment Retention Ponds from the site is discharged into the Rangitōpuni Stream. Many of these discharges have occurred since the operation of the limestone quarry at the site and are considered part of the existing flow regime of the stream. As the landfill will continue to manage water on site using the Sediment Retention Ponds, its discharges into the stream will not change, and therefore the impacts from the ongoing operation and proposed expansion of Redvale Landfill will be negligible.

7.5.5 Conclusion

Earthworks and ongoing landfill operations at Redvale Landfill have the potential to generate sediment; however, these effects are appropriately managed through the existing stormwater and sediment control framework. Sediment-laden runoff is treated on site via the established network of Sediment Retention Ponds, supported by clean-water diversions, silt fencing and site-specific erosion and sediment control measures. The proposed changes to the stormwater management regime, including the reconfiguration and expansion of Sediment Retention Pond 1, will maintain the existing level of treatment and are not expected to result in any change to discharge quality.

Ongoing surface water monitoring at the discharge locations of Sediment Retention Ponds 1 - 4 and within the Rangitopuni Stream, up-stream and downstream of the landfill location, will continue be undertaken throughout the extended operational period. Monitoring of water quality will provide for an adaptive approach to managing sediment quantity and maintaining freshwater quality. Additional controls or measures will be implemented where monitoring indicates that additional controls are required.

Monitoring of Total Suspended Sediment demonstrates that discharges remain well within consented limits, with no discernible adverse effects on the Rangitōpuni Stream or the receiving environment. Stockpile 4 is managed within its own catchment and is subject to a dedicated ESCP prepared in accordance with Auckland Council guidelines, ensuring sediment effects are appropriately avoided or minimised. As discharge volumes and locations will remain unchanged and form part of the established flow regime, effects on channel stability and erosion are considered negligible.

Considering the points above, including the taking of an adaptive approach to management, and assuming best practice erosion and sediment control, any potential effects on the environment arising from erosion and sedimentation will be minimised and will not result in impacts on the receiving waters.

7.6 Stormwater and Industrial and Trade Activities

7.6.1 Overview

Stormwater, ITA and sediment effects are discussed within the Stormwater, ITA and Sediment Assessment (Technical Assessment G). This includes a discussion of the effects on water quality, catchment changes, and erosion and sedimentation. Impacts on water quality can result in ecological effects and these are also considered. Stormwater and ITA activities are considered separately from leachate which includes and any water that comes into contact with waste at the site.

7.6.2 Catchment impacts

The catchments at the landfill are shown in Section 5.1.3 above. These catchments are managed on site through stormwater drains and Sediment Retention Ponds. The existing flow regime was based on peak flow buffering from the site for specific rainfall events. Updated catchment calculations for

pre and post development are described in the Stormwater, ITA and Sediment Assessment. This assessment was based on the assumption that the pre-development situation was undeveloped farmland, making for a highly conservative analysis as the site had previously been a limestone quarry.

Calculations for pre-and post- development stormwater flows from the site have been undertaken for the 2-year, 10-year and 100-year ARI events. The pre-development calculations indicate that the peak pre-development flows are much higher than those determined at the time of the original application but for all three return periods, peak flows from the four existing ponds are less than the pre-development peak flows. This demonstrates that the landfill is not having any impact on peak flows in the stream and therefore, downstream flooding.

7.6.3 Water quality

Water quality monitoring has been undertaken within receiving environments extensively throughout the landfilling operations. This is set out above in Section 3.6 and includes upstream and downstream water quality as well as the point of discharge into the Rangitōpuni Stream.

Surface water at the site is managed in two ways; either through the clean water diversions discharged directly into the Rangitōpuni Stream or through diverting areas of potential contaminants (e.g. ancillary landfilling areas) to the Sediment Retention Ponds on site.

Contaminants derived from active work areas have the potential to enter waterways include heavy metals, hydrocarbons and sediment. The stormwater discharged from these areas is treated through the Sediment Retention Ponds, as set out in Section 3.6 above. Existing consent conditions and the LMP include trigger levels to manage the impacts of on-site discharges. Monitoring from the stormwater treatment system shows:

- Ammoniacal nitrogen concentrations from Ponds 1 and 4 do exceed the ANZECC 95% Species Protection Level (SPL) on occasion (37 out of 1900 monitoring results), although the mean and median are below the DGV, and the 95th percentile is below the 80% SPL with no allowance for mixing.
- The mean, median and 95 percentiles concentrations of metals are all below the relevant guidelines with the exception of the 95th percentile for dissolved copper.
- There have been only two occasions where conductivity has exceeded the trigger level 2 values with no exceedances since 2020.
- Total suspended solids concentrations have complied with the current consent of 50 g/m^3 over 95% of samples.

Monitoring results show that discharges are generally compliant with the existing trigger levels and guideline values. Exceedances are occasional and include ammoniacal nitrogen, copper and conductivity. Exceedances, however, are not out of the context of the wider environment which also demonstrates similar exceedances upstream from the discharge point. The proposed expansion works at the landfill do not introduce any new activities that could introduce new contaminants into the system and therefore the existing contaminants is appropriate to assess the impact that continued operations or expansion may have. While the expansion will see an increase in landfilling with the Class 2 extension, water from this surface will be treated as leachate and managed separately. The proposed changes to the Sediment Retention Pond will not have an impact on the surface water treatment or quality, as while Sediment Retention Pond 6 will be infilled, Sediment Retention Pond 1 will be expanded and the capacity of the system to treat surface water will remain unchanged.

Based on the above, the existing monitoring data does not show any evidence of any statistically significant change in water quality downstream of the site discharges following discharges from the

landfill. As the treatment capacity and the proposed activities remain the same, reliance on this data is considered appropriate and therefore effects on the downstream water quality from the works are anticipated as being low.

7.6.4 Industrial and trade activities

The site includes several industrial and trade activities being the wheel wash, energy centre, LEU and maintenance workshop. All activities include the use of hazardous substances potential spill responses (when required).

The key method for addressing this issue is to prepare and implement site specific environmental management plans, which identify the environmentally hazardous substances associated with a particular ITA activity. The plans set out methods to avoid, remedy or mitigate discharges and describe the use of stormwater treatment or monitoring. Redvale Landfill has operated under the LMP with proven success. It is considered that the LMP remains adequate to continue managing any potential effects of the activity. While the ITA activities are moving on site, the activities themselves remain the same. The proposed management of these areas is to replicate what is on site in their original locations. With this considered, the management set out within the LMP will continue to be appropriate for the works, as these have proven to be effective to date.

7.6.5 Conclusion

There are a number of potential adverse effects on catchments, water quantity and water quality associated with the project. As discussed above, while there are changes to catchments and the location of activities, management and capacity of water treatment will remain the same and has been assessed and considered appropriate. A range of measures are proposed to avoid and mitigate for adverse effects on water quality. The proposed controls are consistent with best practice and have proven success through the current operation at Redvale Landfill.

7.7 Air quality

7.7.1 Overview

The potential air quality effects of a landfill generally fall into two categories – amenity effects associated with odour and dust, and potential human health effects associated with landfill gas generation and combustion. The following sub-sections describe the nature of discharges to air from the project and the proposed controls to minimise these discharges and mitigate effects.

An Air Quality and Odour Technical Assessment (Technical Report D) has been undertaken to assess the actual and potential effects in relation to dust, odour and contaminant emissions.

7.7.2 Dust

The degree of dust generation during landfilling operations is generally related to traffic movements on the site and access roads, particularly any unsealed sections of road, areas of exposed earthworks and the actual tipping of dusty loads of waste at the working face under windy conditions. The majority of dust particles generated from earthworks activities, the movement of machinery and trucks on unpaved roads and placement of waste and cover material are larger “settleable” particles (typically greater than 50 µm in diameter). Particles of this size have the potential to create nuisance effects due to soiling of surfaces and potentially irritating the eyes and nose. Large dust particles usually settle from the air within a short distance (approximately 100 to 200 m) from the source without any mitigation in place.

Measures for managing dust are set out in Section 4.5.5. These controls include sealed roads, cattle grids, wheel washes and speed restrictions for traffic and water carts for dampening and grassing

areas of intermediate and final cover. We note that while the secondary wheel wash at the site will be removed the use of the remaining wheel wash will still be required for trucks travelling off the site, meaning that this specific management measure will remain unchanged.

These measures are considered to be appropriate for the activities detailed above and will manage dust emissions to be limited to the property boundary. As the closest sensitive receiver is 140 m away, it is considered that there will be no discernible adverse effects beyond the boundary.

7.7.3 Odour

The main potential sources of odour at the landfill are from the waste itself or from LFG which contains trace amounts of odorous gases. LFG and waste odours are intrinsically offensive in character and could potentially cause adverse amenity effects for surrounding receivers.

The Air Quality Assessment includes an assessment of the potential offensive and objectionable odours that may be caused by the landfilling activity. In particular to the proposal, the following are the potential activities that may be a source of odour:

- The active tip face of the landfill, considered to be the main source of odour at the site.
- Inbound odorous loads (still in the truck).
- Stripping of previous cover material to allow for the continued filling within the expansion area.
- Excavation into older waste (for burial of odorous loads or installation of LFG collection or other infrastructure).
- Leakage around penetrations through the cap, for example at gas wells, or damage to the LFG collection system.
- Any areas of impaired cap integrity, such as cracking or erosion.
- The LEU which is a continuous source of odour due to the stripping of ammonia and other volatile compounds from the leachate. Due to this process this has a different odour profile than that from the other landfilling activities noted above.

As leachate is collected and stored in closed tanks at the site, it is not anticipated to be a cause of odour whilst in the tanks.

An odour assessment was undertaken using techniques set out in the Ministry for the Environment's Good Practice Guide for Assessing and Managing Odour. As the site has been an operating landfill since 1993 sources of information to inform this assessment are vast and include community consultation, complaints records, industry and council experience, dispersion modelling and site management and contingency plans.

The community liaison and complaints investigations have found patterns in odour complaints, including odour types and environmental factors. Odour complaints identify that these were typically present during working hours at the landfill, with a higher concentration of complaints in the early morning under cool, calm conditions. Complaints also coincided with humid weather conditions, weather changes, operational changes or equipment failure.

Field odour observations are undertaken by WMNZ daily as well as independent walkovers undertaken by Watercare on an annual basis. Daily odour observations are guided by weather factors such as wind direction where staff will go to the areas that are most likely to experience odour while Watercare's observations are undertaken through annual walkovers in appropriate conditions. These are further described in the air quality assessment. Observations typically found that the odour was of low intensity during walkovers and at a low frequency during daily observations.

Odour dispersion modelling was undertaken to understand the impacts of weather patterns and terrain on where odours are likely to travel and compare the existing operation with the proposed operations. There is a correlation identified between odour complaints and the modelling which is described in the Air Quality Assessment. This identifies that odours under the current operation have, in some limited instances, travelled approximately 1,500 m from the active landfill tipping face. Odour dispersion modelling with the proposed management measures is discussed below.

The LEU produces a distinct odour profile described as a burnt, chemical smell and was assessed separately to understand how this contributes to the overall effects from the landfill processes. Odour detected from the LEU is much lower than the other landfilling operations. During odour observations, any observations of the LEU odours are considered very weak intensity, with the occasional weak intensity. There were no detections of LEU odour during daily patrols in 2023 or 2024. Complaints have also shown a reduction over time, with one record in 2024 (to the end of Q3).

A comprehensive description of the odour management proposed at Redvale Landfill is set out above in Section 4.5.4 and within the LMP. The current management at Redvale Landfill is considered best practice, however as it is not possible to eliminate odour emissions additional measures have been proposed by WMNZ which exceed these best practice standards to assist in managing odour at the site. The odour management measures proposed at the site (both to continue and to be implemented) have been developed in response to the assessment that has been undertaken, particularly the FIDOL assessment as described within the Air Quality Assessment. These include:

- Waste acceptance processes that identify highly odorous loads which may require additional treatment
- Use of odour suppressant sprays around the working face
- Actively collecting LFG and treating it through combustion to destroy odorous compounds
- Storage of leachate in enclosed tanks or pipes
- Limiting the placement of putrescible waste to maintain a minimum separation distance of 500 m to occupied existing dwellings, compared to the current minimum distance of approximately 140 m
- Reducing the size of the working face for putrescible waste, from the current area of approximately 1,200 m² to a maximum area of 900 m²
- Increasing the thickness of daily and intermediate cover from 150 mm and 300 mm, up to 300 mm and 450 mm, respectively
- Shifting the earliest time that putrescible waste can be accepted on site by an hour during the winter to minimise overlap with poor dispersive conditions
- Decommissioning the LEU rather than relocating once waste placement is located in this area

With the additional management in place, as set out above, the resulting odour from landfilling activities is expected to be brief, transient, and at most very weak in intensity. Odour emissions from the LEU are considered minor and generally confined to the site, as discussed above.

7.7.4 Contaminant emissions

Contaminant emissions at the site include two potential sources being the combustion of LFG in the Renewable Energy Centre and the evaporation of leachate in the LEU. These have been assessed separately.

Health risk impacts from the emissions are assessed separately within the Health Risk Assessment (Technical Report E) and included below in Section 7.8.

7.7.4.1 Energy centre

LFG is managed at the site through the Energy Centre generators with the option of flares operating as required. The Air Quality Assessment has considered the following scenarios:

- Operation of 15 generators, each burning approximately 670 m³LFG/hour (assuming 50% methane), representing emissions in the worst-case year.
- Operation of three flares, representing conditions that may occur in the event of a power failure or other outage affecting all of the generators.

These are considered conservative approaches for the purpose of the assessment, particularly as the flares are only required if the generators involve an outage.

The SO2 and NO2 emissions assessed from the energy centre were compared to the following standards and guidelines to understand the potential impacts from these:

- Ambient air quality standards set in the National Environmental Standards for Air Quality (NES-AQ).
- The National Ambient Air Quality Guidelines (AAQG).
- The Auckland Ambient Air Quality Targets (AAAQT) from (Table E14.3.1 in the AUP).

Locations of these assessments were based on where people may be exposed (outside the WMNZ property) and on whether the relevant exposure is short-term or longer-term. Additionally, a comparison with the more stringent World Health Organisation (WHO) 2005 air quality guidelines was undertaken; however, these do not have legal standing in New Zealand.

Dispersion modelling results indicate the following:

- Predicted concentrations of all pollutants are below the New Zealand ambient air quality standards and guidelines at sensitive receptors.
- The maximum model results for 24-hour average SO2 and NO2 exceed the WHO 2021 guideline.

In regard to the WHO guidelines, it is noted that the highest measured concentrations of ambient SO2 within the landfill are below the WHO, suggesting that the model is highly conservative in its approach. To confirm similar conservatism for NO2, further testing has been commissioned by WMNZ.

7.7.4.2 Leachate evaporator unit

The discharges to air from the LEU comprise mainly water vapour and a mixture of combustion gases (NOx, CO, SO2, ammonia and trace quantities of VOC). The emissions from the LEU are less than those from a single generator located at the energy centre, as described above.

The dispersion modelling demonstrates that predicted concentrations of both ammonia and benzene are well below the relevant New Zealand ambient air quality guidelines:

- Ammonia: Maximum predicted annual average concentration at the Site boundary is well below the critical level of 8 µg/m³ recommended for the protection of ecosystems.
- Benzene: Maximum predicted annual average concentration at the most impacted receptor is 0.00023 µg/m³, which is less than 0.01% of the AAQG of 3.6 µg/m³.

Given these very low predicted concentrations, the effects of ammonia and VOC emissions from the LEU are assessed as negligible. It is also noted that the operation of this is limited, as the LEU will not be relocated and will be removed once landfilling reaches its location.

7.7.5 Conclusion

Overall, the Air Quality Assessment has concluded that:

- Dust effects can be appropriately managed and will not cause any effects beyond the boundary.
- Odour controls that have been developed based on the outcomes from this assessment will be implemented through consent conditions so the potential for odour effects will be brief, transient, and at most very weak in intensity in locations off-site.
- Emissions from onsite combustion activities are anticipated to be compliant with all guidelines applicable to the site, with further testing being undertaken for NO2 to confirm assumptions made.

7.8 Human health effects

7.8.1 Overview

A Screening Health Risk Assessment (SHRA) (Technical Report E) has been undertaken to assess the risk to human health effects of the potential discharge of contaminants from the landfill. The SHRA has been undertaken on a cumulative basis, assessing the combined off-site effects from the existing and proposed expansion of Redvale Landfill. This assessment takes a conservative approach in both the potential exposure pathways and health-based screening criteria.

7.8.2 Exposure and risk assessment

To understand the effects of potential exposure from the landfill the SHRA follows a process of identifying hazard, exposure and risk assessment steps. Contaminants in air and water can result in human health effects if people are exposed to them in sufficient quantities. It is noted that these effects can only occur in circumstances where there is a complete pathway between the contaminants and receptor, which requires:

- A source of contaminants (In this context, the contaminant sources from landfill operations are principally LFG, leachate, dust and contaminants present in stormwater associated with vehicle movements);
- A pathway which the contaminant is transported; and
- A receptor (i.e. someone who is exposed to the contaminant).

The SHRA evaluated multiple potential pathways to determine whether any of these are considered complete, which resulted in two potential exposure pathways being identified:

- Inhalation of airborne contaminants; and
- Potential exposure through the irrigation of a commercial tomato crop using water from Rangitōpuni Stream.

All other pathways were screened out on the basis of the absence of plausible receptors or negligible risk due to very low contaminant concentrations.

For inhalation, emissions from the landfill gas generators, the leachate evaporator and fugitive landfill gas were modelled using conservative assumptions, including the worst-case impacts of each source occurring simultaneously at the same receptor. The potential for both chronic (long-term) and acute (short-term) health effects was assessed as acceptable, with a cumulative chronic Hazard Index of 0.07 (below the negligible threshold of 0.1), a cumulative carcinogenic screening ratio of 0.28 (well below the acceptable value of 1.0), and a cumulative acute Hazard Index of 0.55. The

assessment confirms the risk remains negligible even when a conservative ten-fold additional safety factor is applied for children's sensitivity.

For surface water, conservative modelling of potential leachate seepage through the engineered lining system, groundwater and into the Rangitopuni Stream showed that risks to public health from use of stream water for crop irrigation are negligible (highest Hazard Quotient of 2.55×10^{-5}, against an acceptable value of 1.0). Monitoring shows no statistically significant difference in metal concentrations upstream and downstream of the site discharges, indicating any contribution from the site is not distinguishable from background variability.

The potential for contaminants to deposit on roofs used for drinking water collection was also considered, as a pathway of community concern. The high volatility and low water solubility of the relevant contaminants mean they have negligible tendency to accumulate on roof surfaces or dissolve in rainwater, and the assessment confirms negligible potential for concentrations of concern in roof-collected drinking water.

7.8.3 Conclusion

Overall, the SHRA demonstrates on a conservative screening-level basis that, with current and proposed controls in place, the ongoing operation and expansion of Redvale Landfill will not pose unacceptable risks to human health via any identified exposure pathway.

7.9 Landscape and visual

7.9.1 Overview

A Landscape and Visual Effects Assessment (Technical Report Q) was undertaken to assess the actual and potential effects of the landfills' continued operation and proposed expansion on the surrounding landscape character, including any impacts on visual effects.

7.9.2 Landscape character effects

As set out above in Section 3.7.3, the landscape character of the wider environment is typically rural with a diverse range of activities surrounding the site and within the general area. The continued operation of the landfill, inclusive of the revised surface area has been assessed as it relates to landscape character.

The existing landfill includes mitigation planting to assist in screening the landfill and incorporating it into the wider landscape character of the area. It is proposed that this planting plan is updated, as set out in Section 5.4.4 above. This includes the planting of the landfill footprint on completion, which will form a final grassed mound at the site, integrating with the general pastoral landforms surrounding the site. The effects of the expansion and the final landform on the landscape and character of the surrounding area are assessed as low adverse.

7.9.3 Visual effects

Visual effects from the proposal have been assessed in relation to the surrounding properties. This has been assessed for viewing audiences less than 2 km and more than 2 km from WMNZ landholdings.

The viewing audiences within 2 km from the proposal include:

- Horseshoe Bush Road
- Richards Road
- Austin Road

- Kahikatea Flat Road, Turley Road and Selman Road
- Dairy Flat Highway
- Postman Road
- Blackbridge Road and Jean MacKay Place
- Surf Park Development (visitors and workers)
- Visitors and workers within the general area

The proposed development of the landfill footprint extends the visual impacts of construction from a time period perspective as construction will be visible at times beyond 2028. It also increases the waste placement within the existing footprint, resulting in filled areas being reopened and developed. The effects from this are considered to be temporary and limited to the operational phases of the landfill. Much of the landfill is screened by existing vegetation to obscure visual access to the operation; however, the effectiveness of this planting varies with the audience's position and elevation relative to the landfill. Additionally, the viewing audiences are diverse within this range and include residents with more permanent viewpoints to more transient audiences such as workers and visitors to local businesses, services and amenities. Impacts on the properties within 2 km are considered to be moderate to low during the construction.

The viewing audiences more than 2 km away from the proposal include:

- Aeropark Subdivision
- Wilks Road West
- Kennedy Road, Green Road, Sunnyside Road, Potter Road, and Three Oaks Drive
- Bawden Road, Oregon Park, Bobs Way, Top Road and East Coast Road

These properties will have the same effects duration as those noted above. However, the temporary effects are lower as the works are further away from these audiences and further screened by other surrounding shelterbelt planting. The effects on these locations are generally considered low with one outlier being the Aeropark Subdivision being low-moderate due to the position of the landfill and the proposed steeper slopes.

For all of the visual audiences, following closure, the landfill will be grassed with planting in place around the landfill in accordance with the planting plan detailed in Section 5.4.4 above. This plan has been carefully developed in conjunction with ecologists, to ensure the final planting at the site, serves both a visual amenity purpose as well as an ecological one, by including native species that are local to the area. This will mitigate any long term visual effects by visually screening the final landform and ensuring it integrates into the existing environment.

7.9.4 Lighting effects

The landfill will continue to operate between 6:00 am and 6:00 pm, Monday to Saturday, and artificial lighting will be required during hours of darkness outside daylight periods. Night-time lighting associated with the continued operation and extension to the landfill may result in visual amenity effects relating to light spill, glare and sky glow.

Lighting associated with the site entrance, access road, office area and staff car park will be visually contained by surrounding landform and vegetation, limiting the visibility of light sources from surrounding properties. Lighting at the landfill working face will consist of portable lighting rigs, which will only be used as required and will be designed to downward facing focused on the tipping area. As such, the continued use of low-level lighting at the working face and effective shielding of other light sources at the landfill will minimise adverse effects relating to light spill and glare, while ensuring that contributions to sky glow remain negligible.

7.9.5 Conclusion

Overall the Landscape and Visual Assessment concludes that there may be short term impacts on visual audiences, particularly those who are elevated or have more direct sight lines of the landfill. This could result in less than minor to minor effects depending on the screening currently in place. Long term effects however will be less than minor when the landfill is integrated into the wider landscape. In regard to landscape character effects the landfill is situated within a wider rural environment with a diverse range of land uses, including the landfill itself which has been part of the broader environment for over 30 years. Therefore, the continued operation of the site for an additional 8 years and the proposed final landform does not appear out of character, particularly with the screening already established.

7.10 Noise

7.10.1 Overview

The continued operation of the landfill will result in construction and operational noise effects associated with landfilling activities, electricity generation and leachate evaporation activities. A Noise Assessment (Technical Report N) associated with the ongoing operation and proposed development at Redvale Landfill has been undertaken to determine potential future noise effects. While construction and operational noise at a landfill may be considered similar due to the nature of the activities, the LMP clearly separates these for management and mitigation purposes.

7.10.2 Construction noise

The Noise Assessment considers that all remaining works to be undertaken on site with the exception of new the new Class 2 landfill construction form part of the operating the landfill and therefore have been assessed against the relevant operational noise criteria. The only key activity assessed as meeting the definition of construction works is the establishment and construction of the liner in the Class 2 area.

The construction of the lining system for the Class 2 area within the southern section of the site will result in temporary construction noise effects. Based on past noise surveys of construction activities where compliance was readily demonstrated, construction noise is anticipated to comply with the relevant AUP noise standards and limits in NZS 6803:1999. As such, potential construction noise effects are considered to be negligible.

7.10.3 Operational noise

There will be a number of potential noise sources throughout the operation of the project, including earthworks associated with landfilling, operation of the energy centre, and operations at the landfill's working faces. Noise is generated from the use of plant and machinery on site associated with these activities and may include the use of excavators, loaders, graders, bulldozers, compactors, articulated dump trucks, and water carts. Construction associated with the Class 1 area has been assessed as operational noise rather than construction noise, as site establishment works for this area have already been completed and this is not considered to be 'new' construction.

The Noise Assessment (Technical Report N) undertaken by Marshall Day concludes that the predicted noise levels at receivers under a range of potential scenarios, will comply with the relevant permitted activity standards for the rural zone. Further, for most receivers, noise generated by the project will be the same or less than the ambient noise levels.

Four scenarios have been modelled in the Noise Effects Assessment:

- Scenario 1: Noise modelling of existing landfilling operations until 2028 which forms the basis for the background noise environment.
- Scenario 2: Noise modelling of operations post 2028 if consent is not granted (post-closure activities with landfilling ceasing at the site).
- Scenario 3: Noise modelling of the proposed landfill activities subject to this resource consent application until 2036.
- Scenario 4: Noise modelling of remaining site activities once landfilling has ceased at the site (final cap contours in place) in the aftercare period (post 2036).

A conservative approach has been undertaken to the noise modelling under each scenario. This assumes that the wind is always blowing from the noise source towards all receivers (downwind).

Under Scenario 2, predicted day-time noise levels are expected to be at or below the daytime ambient and background noise environment. Noise levels are predicted to be between 21 to 40 dB LAeq during the daytime. Landfill gas generators will still be operated under this scenario, following the closure of landfill operations. At night, Energy Park noise will be within the range of existing ambient and background noise.

Under Scenario 3, predicted day-time noise levels will be at or below the daytime ambient and background noise environment. Noise levels are predicted to be between 28 to 48 dB L Aeq during the daytime, and 22 to 40 dB LAeq at night-time. At night, Energy Park noise will be within the range of existing ambient and background noise. For Richards Road receivers', noise from landfill activities is predicted to be generally similar to the levels predicted in Scenario 1. For receivers on Horseshoe Bush Road, there will be a perceptible reduction in noise, as a result of landfilling activities primarily occurring at greater setback distances to the south of the site. Site noise during the daytime will be lower than what currently occurs for all assessed receivers and equal to or more than half as loud for many receivers.

The predicted daytime noise levels are expected to be lower under Scenario 4 for all assessed receivers. Under scenario 4, noise levels are predicted to be between 20 to 39 dB LAeq. Site noise under this scenario is anticipated to be perceptibly lower than current noise levels (Scenario 1) due to the landfill being filled to capacity and capped. Post-closure activities will include the operation of eight landfill gas generators and blowers onsite as landfill gas will still be produced. For most receivers on Richards Road and DFH, night-time noise associated with the Energy Park will be perceived as being similar to what presently occurs. For all remaining receivers, there will be a perceptible reduction in noise due to no more daytime operations.

Accordingly, no change in the level of effect will occur from the proposal in comparison to the existing operation at the landfill.

7.10.4 Conclusion

Currently, the landfill operates under existing resource consents that include noise levels at the site. This is detailed in Condition 48 of NZEnvC043. The landfill activities have complied with these noise limits during its years of operations which are more stringent than the AUP standards. Modelling of all of the potential scenarios set out with the noise assessment indicates that the noise levels will comply with the relevant AUP limits at all assessed receiver locations in all periods.

7.11 Traffic

7.11.1 Overview

The Traffic Assessment (Technical Report O) has assessed the effects of the proposal on the surrounding traffic activity and road safety.

7.11.2 Traffic generation

WMNZ proposes to retain the current daily maximum limit of 650 waste transport movements associated with the operation of the landfill. Future truck movements associated with the continued operation of the landfill and extension (inclusive of construction-related traffic movements) are expected to remain at a similar level to the current truck movements. The daily maximum truck volume is lower on average than the consent limit of 650 vehicles per day, but this remains dependent on waste volumes and other factors impacting the economy. During the construction phase of the proposed expansion an additional 20 construction-related heavy vehicle movements per day are anticipated, which will remain within the consent limit.

As described in Section 3.7.5, the landfill is located adjacent to and served by a regional arterial route, Dairy Flat Highway. Landfill traffic currently represents a small proportion (5 to 8%) of the current traffic volumes on DFH. Over the period between 2029 to 2036, there will be natural background growth in traffic activity using DFH. Regional transport modelling for Dairy Flat Highway indicates that traffic growth in this area (between Wilks Road and Richards Road) is predicted to result in an additional 11,000 to 12,000 vpd for the section of DFH to the north of the landfill by 2048.

The Traffic Assessment has considered the potential impacts of continued landfill operations on the surrounding road network, taking into consideration potential future traffic from population growth and nearby development. While traffic volumes are anticipated to grow over the period of proposed continued Landfill activity in the area, Dairy Flat Highway has been assessed as having sufficient capacity to accommodate current and future traffic movements, including those from the landfill. The road corridor and existing intersection layout with dedicated turning facilities is considered to have substantial capacity to safely accommodate both current and future traffic levels over the duration of the extended consent period.

7.11.3 Traffic safety

The proposal was also assessed against transport-related permitted activity standards of the AUP. This assessment has identified that the proposal will comply with relevant standards including vehicle access, parking and loading. The current access to the site via Landfill Access Road is considered appropriate for the size, volume and intensity of vehicles generated by the landfill.

An assessment of reported crash records over the past five years did not identify issues with the existing local road or interaction with other activities surrounding the Landfill including Dairy Flat School. The landfill generated movements contribute to only a small proportion of total and heavy traffic movements past the school.

Continued landfill operations are assessed to have a less than minor adverse effect on traffic safety, including the safety of vehicle operations associated with Dairy Flat School and other activities near the Landfill Access Road intersection with DFH. Consultation has been undertaken with the school as part of this application.

7.11.4 Conclusion

The Traffic Assessment (Technical Report O) has assessed the impacts of the proposed extension to landfill operations on the transport capacity of the local and regional road network and on traffic safety, including effects on neighbouring activities. The proposal will generate a similar level of traffic to that under current landfill operations and the surrounding road network is assessed as having sufficient capacity.

7.12 Aviation

7.12.1 Overview

The Aviation Assessment (Technical Report P) has assessed the effects of the proposal on aviation safety and is summarised below. As described above in Section 3.7.6, the site is located within the Airport Approach Surface Overlay – North Shore Airport overlay in the AUP. The purpose of this overlay is to manage obstructions such as buildings and trees, so that obstructions do not impact the safe and efficient operation of airports or airfields. The proposed Class 1 landfill expansion and the Class 2 extension will have a maximum post-settlement cap elevation of RL 106.7 m which complies with the Airport Approach Surface Overlay limit.

7.12.2 Aircraft operations

Aircraft operating under both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) are expected to remain well clear of the landfill. The landfill location is also not within an area where an aircraft would normally operate to or from the North Shore Airport. Circuit patterns and instrument approach and departure procedures for runways 03/21 and 09/27 indicate that aircraft normally operate to the north-east of the site.

The landfill site is considered to be located in a 'congested area' of Dairy Flat due to existing nearby development comprising of Dairy Flat School and Dairy Flat Village. In accordance with Civil Aviation Rules, aircraft operating above a congested area are required to remain at least 1,000 feet above ground level, unless on the approach or departure tracks. Therefore, any aircraft operating overhead of the site are restricted to much higher altitudes than the existing height of the landfill. In addition, the surrounding terrain around the site includes a 100-metre contour mapped close to the landfill boundary. This terrain effectively shields the site as all aircraft operating in this area would already need to be at a sufficient altitude to avoid the existing terrain.

There is a potential risk of bird strike for aircraft operating overhead and within the vicinity of the landfill. However, there have been no reported bird strike issues relating to the landfill as per data provided by the CAA for the past 7-year period between 2019 - 2025. Furthermore, WMNZ has a comprehensive wildlife and bird management plan in place to deter birds from the site as much as practicable.

7.12.3 Conclusion

The assessment concludes that the proposed landfill expansion will not result in additional aviation safety impacts or impact the regular movement of aircraft and is considered to be in accordance with CAA guidance material regarding OLS intrusions.

7.13 Ecological

7.13.1 Overview

An Ecological Assessment (Technical Report J) has been undertaken to assess the actual and potential effects on ecology.

As the site is an operational landfill and is already highly modified, there is limited habitat and ecological value on site.

7.13.2 Terrestrial

The potential impacts on terrestrial ecology on site are limited as the work is largely outside of terrestrial environments. The assessment of effects are limited to potential effects on the flora and

fauna that has been identified on the site, being vegetation, avifauna and lizards set out in Section 3.6.6.

7.13.2.1 Vegetation

Vegetation removal can cause effects from the loss of the vegetation itself and additionally the habitat it provides for fauna at the site. The proposed vegetation works are limited to approximately 0.8 ha of low value native and exotic vegetation loss at the site. This is further described in Section 3.6.6 above. As the vegetation to be removed is not threatened, is of low value and of a small quantity, the impacts from the removal are assessed as being low.

The removal of vegetation on site may cause potential impacts on highly mobile fauna including long-tail bats and avifauna. As discussed above in Section 3.6.6.1.4, acoustic bat surveys were undertaken for bat activity at the site and after 2007 nights surveys, there were no bats identified within the site or in the immediate vicinity. For this reason, the risk of the presence of long-tailed bats is low. However, where there may be particular trees or vegetation that could provide potential bat habitat, an appropriate vegetation removal protocol will be implemented to ensure that there are no bats present prior to removal.

Avifauna also utilise vegetation as habitat, for foraging and sometimes for breeding purposes. Ecological surveys identified no high-value avifauna located within the vegetation at the site and no high value habitat for native birds. Due to the low value habitat for native birds the impacts are considered low.

Based on the value of the vegetation, the lack of identified species during surveys and the proposed management measures to mitigate any potential effects, the removal of the vegetation on the site will result in a less than minor effect.

7.13.2.2 Avifauna

Avifauna at the site has the potential to be impacted both during construction works and through habitat loss and displacement. The impacts during works are due to works around vegetation and habitat, which is described above.

Regarding habitat loss, there were limited species utilising habitat at the site, with the only notable species being the Dabchick which currently utilise Sediment Retention Pond 1, 2 and 6, as described above in Section 3.6.6. This includes using the ponds as breeding habitat. As part of the proposal Sediment Retention Pond 6 (as well as the Office Pond) will be removed, meaning that these ponds will not be available for breeding habitat. The Ecology Assessment notes that while these ponds will be removed, there are other ponds on the site and within the wider landscape which will provide similar suitable habitat, and it is anticipated that the dabchick will relocate to these ponds when required. The effect of the loss of these ponds on dabchick habitat is therefore considered to have a low level of effect, translating to a less than minor effect.

Little Black Shags and Black Shags have been noted as being located on the site, however the habitat on site is considered to be sub-optimal. Any loss of the potential habitat of these species is considered negligible and these birds will utilise other habitat in the wider area.

7.13.2.3 Lizards

As described in Section 3.6.6.1.3 two Copper Skinks were identified on site during investigations, but outside the proposed works area. Copper skinks are identified as At-Risk Declining. If works are unmanaged there is potential for unintended injury or mortality of lizards. This is particularly relevant in areas of planted and weedy vegetation which has potential habitat for lizards. Management measures for Copper Skinks are detailed within the condition set proposed as part of this application and included within a specific Lizard Management Plan prepared for the site. This

includes timing of vegetation clearance within acceptable seasons and pre-vegetation clearance through manual searching and trapping.

This management is considered to be appropriate to mitigate potential impacts on Copper Skinks, as well as other incidental lizards found on site.

7.13.3 Freshwater

The freshwater ecological effects set out in this section are focused on the loss of potential habitat at the site. Discussions on water quality, inclusive of erosion and sedimentation and its potential impacts are set out above in Section 7.6. During works in freshwater environments, particularly in areas that provide freshwater habitat, such as the Sediment Retention Ponds, there may be adverse impacts on freshwater fauna, including injury or mortality.

The Sediment Retention Ponds are not considered to be natural freshwater habitats, and therefore, there is no reclamation of natural habitat at the site. However, the Sediment Retention Ponds provide limited habitat for the short finned eel, which is a native freshwater species. This species is considered to be a highly tolerant species and is able to be relocated and thrive. Therefore, it is proposed that they will be managed via specific management measures to be set out in a Native Fish Capture and Relocation Plan. With this plan in place the impacts on freshwater species will be low. No other freshwater species of note were present in ecological surveys.

The impacts from construction, including erosion and sedimentation control and catchment changes is described above in Section 5.1.3.

7.13.4 Conclusion

Overall, the Ecological Assessment concludes that the proposal will result in potential effects on terrestrial and freshwater ecology that are limited in scale and extent. Terrestrial effects are largely confined to the removal of approximately 0.8 ha of low value native and exotic vegetation and the potential for short-term disturbance during works. With the implementation of an appropriate vegetation removal protocol (including measures to address any potential long-tailed bat habitat) and standard good practice site management, potential ecological effects associated with vegetation removal will be appropriately managed.

For avifauna, the loss of Sediment Retention Pond 6 (and the Office Pond) will reduce dabchick breeding habitat; however, alternative ponds are available on site and in the wider landscape and dabchick are anticipated to relocate. Potential effects on lizards (including copper skink) will be managed through the proposed species-specific management measures and protocols. Freshwater ecological values on site are limited, and while Sediment Retention Ponds provide some habitat (including for short-finned eel), the implementation of a Native Fish Capture and Relocation Plan will appropriately manage any risk of injury or mortality during works. On this basis, and with the relevant ecological management in place, the ecological effects of the proposal have been appropriately identified and addressed.

7.14 Cultural

7.14.1 Overview

As set out in Section 3.7.7, several iwi groups are mana whenua and have interests over the site. Cultural values which may be impacted by the project are broken down into key themes/interests as identified through consultation undertaken by WMNZ and the Cultural Values Assessment (CVA) (Appendix G). Where this assessment refers to the concerns of mana whenua, this reflects WMNZ interpretation of those concerns expressed in the CVA or during consultation.

The CVA (Appendix G) outlines key cultural values and interests of Mana Whenua. The CVA also includes a review of existing iwi management plans applicable to the project area including:

- Te Kawerau ā Maki – Resource Management Statement 1995
- Hauraki Māori Trust Board – Whaia Te Mahere Taiao a Hauraki: Hauraki Iwi Environmental Management Plan 2004
- Ngāti Whātua Ōrākei – Te Pou o Kahu Pōkere Iwi Management Plan 2018
- Ngaati Whanaunga – Environmental Management Plan 2019
- Ngāi Tai ki Tāmaki – Take Taiaomaurikura 2022

WMNZ will continue to engage with Tangata Whenua to understand and address the potential effects of the project on Māori cultural values, recognising their role as kaitiaki for the area.

7.14.2 Rangatiratanga and Kaitiakitanga

The CVA identifies a shared Mana Whenua value of Rangatiratanga / Mana and Kaitiakitanga. Rangatiratanga is considered to generally relate to the exercise of authority over a defined area and place. Kaitiakitanga is recognised as the role of guardianship and associated values of conservation and/or protection over the environment and areas of cultural significance.

WMNZ has a longstanding partnership with iwi at Redvale Landfill, where open lines of communication are maintained with local iwi who have an interest in the site and surrounding area. Iwi groups were consulted before the opening of Redvale and prior to applications to renew its current resource consents. In particular, this includes the three mana whenua groups who have provided support via the letter attached in Appendix H being Ngāti Manuhiri, Ngāti Rango and Te Kawerau a Maki.

As set out within the letter of support, the engagement with these groups is ongoing to allow for them to exercise their kaitiankitanga, recognising their role of mana whenua as kaitiaki.

7.14.3 Wāhi tapu and cultural heritage sites

A key value and concern for mana whenua is the protection of wāhi tapu and cultural heritage sites. Specifically, the CVA identifies the Rangitōpuni Stream as being of cultural significance to Te Kawerau ā Maki, based on traditional, cultural and spiritual associations. The stream and its tributaries are the subject of a statutory acknowledgement.

In general, the project avoids known heritage sites, places and areas, including those identified in the CVA and those listed within the AUP and Archsite. However, discharges from the site have the potential to impact the water quality of the Rangitōpuni Stream. A range of stormwater management and erosion and sediment control measures will be implemented at the site to manage discharges and avoid effects on the stream as described in Section 7.5 and 7.6 above. These measures include the capture and treatment of surface water in Sediment Retention Ponds prior to being discharged to the Rangitōpuni Stream. Furthermore, the proposed works will not limit cultural use of the Rangitōpuni Stream located beyond the site.

7.14.4 The mauri of waterways, and native flora and fauna

As described in the CVA, waterways, and native flora and fauna hold significant cultural and spiritual value to Mana Whenua, and the associated loss of native biodiversity has been identified as a key concern.

As part of the application, various measures are proposed to manage and minimise effects of the proposed works on the mauri and wellbeing of waterways, native flora and fauna. These include:

- The best practice approach to earthworks and sediment and erosion control, which is designed to minimise the generation of sediment and prevent the discharge of sediment-laden water, which will protect water quality. Similarly, the approach to stormwater detention, retention and treatment is consistent with best practice and will appropriately protect water quality and flows into the Rangitōpuni stream (further discussed above).
- The ecological effects of the project are discussed in Section 7.13 above. The extent of vegetation removal will be limited to approximately 0.8 ha comprising of native and exotic vegetation. Native replanting will be undertaken in consultation with iwi within areas where vegetation is proposed to be removed once final cap contours are in place.
- Ecological management plans including a Native Fish Capture and Relocation Plan and Avifauna Management Plan will set out measures to protect native bird and freshwater species and habitats on the site.
- Ongoing consultation with Tangata Whenua will be undertaken, as discussed in the Cultural Values Assessment (Appendix G) to continue to recognise and provide for mana whenua values and interests as they relate to the project.

7.14.5 Health and environmental risk

The CVA identifies the importance of managing health and environmental risks as a key interest of Mana Whenua. In the context of the project, this includes discharges to air from the landfill and the potential contamination of whenua/land and Rangitōpuni Stream.

The primary sources of contaminants which have a potential to result in adverse health and environmental effects are leachate and landfill gas. Conservative modelling set out in the Air Quality Assessment (Technical Report D) and Health Risk Assessment (Technical Report E) has indicated that potential exposure to all contaminants is well below levels that would pose unacceptable risk to nearby residents and sensitive sites. The following measures are proposed to manage and mitigate potential health and environmental effects of the project:

- The landfill will continue to utilise systems to capture and treat leachate and LFG to ensure that discharges are appropriately managed, so they do not cause adverse effects on the health and safety of people.
- Potential contamination of groundwater and surface water will be avoided through the design of the lining system and measures proposed to contain and safely dispose of leachate as described in Section 4 and 5 of the AEE.
- Ongoing monitoring will continue to be undertaken at several locations along the Rangitōpuni Stream to ensure the health condition of the water bodies and freshwater ecosystems is maintained and not degraded.

7.14.6 Conclusion

The project will adopt a broad range of management and mitigation measures that aim to avoid, remedy and mitigate the potential adverse effects of the project on cultural values. As noted previously, engagement with Mana Whenua will continue as the project progresses through the fast-track process and throughout the life of the project.

Only Mana Whenua can provide a determination of the cultural effects of the proposal. However, based on feedback provided, the minimal impacts on water quality and associated values, and the implementation of measures to avoid adverse effects on the health and safety of people and the environment, it is anticipated that the proposed activity will have less than minor effects on Mana Whenua values.

This conclusion is reinforced by the joint letter of support for the application provided by Ngāti Manuhiri, Ngāti Rango and Te Kawerau ā Maki, dated 4 August 2026 (refer Section 8.4 and Appendix H).

7.15 Overall effects conclusion

This section has identified and assessed the actual and potential effects of the continued operation and proposed extension of Redvale Landfill, in accordance with Schedule 5 of the FTAA. The assessment draws on the suite of technical assessments contained in Volume 2, which are themselves informed by over 30 years of investigation, monitoring and operational experience at the site. The assessment has been undertaken reflecting the existing environment and landfill operations described in Sections 3 and 4, including full implementation of the filling authorised by the existing consent.

The project will deliver significant positive effects at both a regional and national scale. It provides for the continued operation of an existing, well-managed and strategically important piece of waste infrastructure, ensuring there is no gap in Auckland's ability to safely dispose of its residual waste during the eight-year transitional period while the ARL is established. The Economics Assessments (Technical Reports L and M) demonstrate that the project avoids material increases in landfill gate prices and transport costs, a substantial lessening of competition in the waste disposal market, and wider productivity losses to the Auckland and New Zealand economies from increased congestion. The project also continues the beneficial recovery of landfill gas for renewable electricity generation into the national grid. These benefits extend beyond Auckland to the Waikato, Northland and Bay of Plenty regions.

The potential adverse effects of the project are well understood, reflecting that this is the continuation and extension of a long-established, consented activity within a highly modified site. The geotechnical and dam safety assessments confirm that the underlying geology, existing landfill area, proposed Class 2 extension and on-site dams are suitable and stable for the proposed works, subject to continued detailed design, quality control and monitoring through the established PRP process. Effects on groundwater, surface water quality and the Rangitōpuni Stream will be appropriately managed through the engineered lining and leachate containment systems, the existing stormwater and sediment control network, and the comprehensive monitoring and tiered trigger-response framework set out in the LMP — an approach whose effectiveness is demonstrated by monitoring records showing no detected leachate contamination of groundwater since monitoring began in 1993 and no discernible adverse effects on the receiving environment.

Discharges to air, including dust, odour and combustion emissions, will be managed through the enhanced suite of controls proposed by WMNZ, which exceed current best practice, such that off-site odour is expected to be brief, transient and at most very weak in intensity, and contaminant concentrations will comply with the relevant ambient air quality standards and guidelines. The Screening Health Risk Assessment confirms, on a conservative basis, that the project will not pose unacceptable risks to human health via any identified exposure pathway. Amenity-related effects on landscape and visual values, lighting, noise and traffic are assessed as being less than minor to minor at most, temporary in nature, and reducing over time as filling is completed and the final grassed and planted landform integrates with the surrounding rural landscape. Effects on aviation safety are appropriately addressed, and ecological effects, both terrestrial and freshwater, are limited in scale and will be managed through species-specific management plans and protocols.

In relation to cultural values, WMNZ acknowledges that only mana whenua can determine the cultural effects of the project. However, based on the CVA, the feedback received through ongoing engagement, the measures proposed to protect the Rangitōpuni Stream and the health of people and the environment, and the joint letter of support provided by Ngāti Manuhiri, Ngāti Rango and Te Kawerau ā Maki, it is anticipated that effects on mana whenua values will be less than minor.

Engagement with mana whenua will continue through the fast-track process and the life of the project.

Overall, the adverse effects of the project are able to be appropriately avoided, remedied or mitigated through design measures, the management and monitoring framework set out in the LMP, and the proposed conditions. When these effects are weighed against the significant regional and national benefits of maintaining Auckland's waste disposal capacity during the transition to the ARL, it is concluded that the project's positive effects outweigh its adverse effects, consistent with the purpose of the FTAA.

8 Consultation

8.1 Introduction

Consultation as part of the Redvale Expansion Project has been ongoing both through the referral application process and as part of developing the substantive application. This is summarised below

8.2 Referral application consultation

As part of the referral application, WMNZ undertook extensive consultation over three phases to understand how to address the management of Auckland's waste following the closure of Redvale, prior to the opening of ARL. These three phases included:

- Phase 1 (17 March to 11 May 2025): focused on raising awareness of the waste-management gap expected after Redvale Landfill's 2028 closure and gathering early input from the public and interested parties on all possible interim options. Phase 1 consultation concluded that only rebalancing waste between existing landfills (Redvale and Whitford) was feasible in the required timeframe
- Phase 2 (28 July to 25 August 2025): involved testing these viable options in more detail and comparing different ways to balance waste between Redvale and Whitford. WMNZ sought public, stakeholder and Mana Whenua feedback on the selected options
- Phase 3 (14 October to 7 November 2025): involved presenting WMNZ's selected interim solution to extend Redvale's operations until 2036 and undertaking consultation with required parties under the Fast-track Approvals Act and further engagement with the community. Phase 3 consultation was informed by the feedback and input received during the earlier phases of consultation undertaken by WMNZ.

For completeness, the report that was submitted with the referral application detailing this consultation is included in Appendix F-1.

8.3 Ongoing consultation

The ongoing consultation has generally been undertaken as set out below:

- **CLC:** Formal meetings on 8 December 2025, 23 March 2026 and 8 June 2026 along with regular correspondence regarding technical reports and complaints.
- **Dairy Flat Community**: A quarterly Dairy Flat Newsletter is published by WMNZ with the latest being May 2026. This summarised the findings of independent air, water and soil monitoring undertaken around the landfill and confirmed that monitoring would continue at Dairy Flat School and surrounding properties.
- **Stakeholders**: Targeted communication was undertaken with the following parties: Community Liaison Committee, Dairy Flat School Principal and Board of Trustees, Redvale Community Trust, Redvale Environmental Protection Society, Auckland Transport, North Shore Airport, Ministry of Education, Whitford Community Liaison Committee, Auckland Council elected members and officers, the Mayor of Auckland, local Members of Parliament, Government Ministers, Auckland Surf Park, customers using Redvale Landfill, previous consultation participants and all submitters (via the WMNZ portal on the referral application).
- **Technical information**: Ongoing sharing of technical information with Mayor of Auckland, Members of Parliament, Auckland Councillors, Auckland Council officers, the Community Liaison Committee, Dairy Flat School and all participants who had previously engaged in the Auckland Regional Landfill transition consultation process.

8.4 Mana whenua consultation

Mana whenua consultation has been ongoing, with the details included in the CVA (Appendix G), with the support from the mana whenua partners included in the letter in Appendix H.

8.5 Auckland Council

WMNZ has had pre-lodgement communications and discussions with the Auckland Council resource consent processing staff during the referral and substantive application process. A pre-application meeting was held on 14 November 2025. Auckland Council provided a set of comments on the lodged referral application which have subsequently been incorporated into the reports for the substantive application. The details, including all records of Auckland Council engagement, are included in Appendix F-3, and an updated table is included below in Table 8.1.

There is some limited ongoing engagement with Auckland Council that is focused on technical clarifications, as noted in the table below. Auckland Council are happy with these minor matters being responded to and closed in parallel with the submission of the application.

Table 8.1: Log of engagement with Auckland Council – Regulatory

Specialist Area	Comments received on draft report	Comments received from	Response prepared for AC	Response prepared by	Meeting	Further comments received and responded to in parallel
Landfill engineering	Yes (27/03/2026)	Walter Starke (Jacobs)	Yes	Andrew Shallard (Tonkin + Taylor)	Yes (29/04/26)	Yes
Geotechnical	Yes (1/04/2026)	Kyle Li (Auckland Council)	Yes	Andrew Stiles (Tonkin + Taylor)	Yes (7/08/26)	Yes
Dam Assessment	N/A		N/A			
Air Quality	Yes (2/07/2026)	Louis Boamponsem	Yes	Jenny Simpson (Tonkin + Taylor)	No	No
Health Risk	Yes (22/07/2026)	Sharon Tang (Auckland Council)	Yes	Jenny Simpson (Tonkin + Taylor)	No	No
Hydrogeology	Yes (1/04/2026)	Stephen Collins (Beca)	Yes	Leon Pemberton (Tonkin + Taylor)	No	No
Stormwater & ITA	Yes (16/04/24)	Hillary Johnston (Tektus)	Yes	Rob Van de Munckhof (Tonkin + Taylor)	No	No

Specialist Area	Comments received on draft report	Comments received from	Response prepared for AC	Response prepared by	Meeting	Further comments received and responded to in parallel
Waste Acceptance	Yes (30/03/2026)	Stanley Howell (Jacobs)	Yes	Penny Kneebone (Tonkin + Taylor)	Yes (24/04/26)	No
Bond	Yes (21/05/2026)	Compliance Monitoring (Auckland Council)	N/A	N/A	N/A	No
Ecology	Yes (13/05/2026)	Jason Smith (Morphum)	N/A	N/A	No	No
Wildlife Hazard Assessment	N/A	N/A	N/A	N/A	N/A	No
Economics	Yes (9/04/26)	Tim Denne (Resource Economics)	Yes (via updated report submitted with this application)	NERA and NZIER	No	No
Landscape & Visual	Yes (20/03/2026)	Peter Kensington (Auckland Council)	Yes	Tom Lines (Boffa Miskell)	No	No
Noise & Vibration	Yes (20/03/2026)	Jon Styles (Auckland Council)	Yes	Mat Cottle (Marshall Day Acoustics)	Yes (10/04/26)	No
Traffic/Transport	Yes (27/03/2026)	• Philips Augustine (Auckland Council) • Neil Stone (Auckland Transport)	Yes	Don McKenzie (Don McKenzie Consulting)	No	No
Aviation	N/A	N/A	N/A	N/A	N/A	N/A

9 Statutory assessment

When undertaking an assessment of this application the requirements and information that must be considered as set out in section 42 – 44 and Schedule 5 of the FTAA include:

- The purpose of the FTAA.
- The provisions of Parts 2, 3, 6, and 8 to 10 of the Resource Management Act 1991 (RMA) that direct decision-making on an application for a resource consent (but excluding section 104D of the RMA).
- The relevant provisions of any other legislation that directs decision making under the RMA.

When considering applications under the FTAA, Schedule 5, Clause 17 states that when considering a consent application, the panel must give the greatest weight to the purpose of the FTAA. Section 3 of the FTAA sets out its purpose which is:

The purpose of this Act is to facilitate the delivery of infrastructure and development projects with significant regional or national benefits.

9.1 Resource Management Act 1991

The provisions of the RMA that are required to be assessed are set out and assessed below.

9.2 Section 104 – Consideration of applications for resource consent

Section 104(1) of the RMA sets out the matters to which a consent authority must have regard to, subject to Part 2 of the RMA, when considering an application for resource consent. With respect to this project, the relevant parts of section 104 include:

- Any actual and potential effects on the environment of allowing the activity;
- Any relevant provisions of a national policy statement, a coastal policy statement, national environmental standard, regional policy statements and plans or proposed plans; and
- Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

These are set out below.

9.2.1 Section 104(1)(a) – Actual and potential effects on the environment

The expansion and continued operation of Redvale Landfill covers a range of activities, which occur during both the construction and operational phases of the Project. The project may result in actual or potential effects on the environment which need consideration and assessment under section 104 of the RMA and clause 6 of schedule 5 of the FTAA. For the purpose of the section 104 assessments, the identification of relevant effects (as proposed to be mitigated) is comprehensively assessed in Section 7 of the AEE.

Although the project gives rise to a range of potential effects on the environment, these can be appropriately managed through design and operational mitigation methods. Overall, the project will result in no more than minor effects on geology, air quality, ecology, human health, landscape and visual amenity, aircraft operations, noise, and traffic. This has been achieved through well engineered landfill design, management and mitigation measures offered as conditions of consent (Appendix J).

9.2.2 Section 104(1)(b) - Relevant provisions of planning documents

9.2.2.1 Introduction

Section 104(1)(b) of the RMA and clause 5(2) of schedule 5 of the FTAA require an application for a resource consent to have regard to any relevant provisions of documents listed in s104(1)(b)(i-vi).

The proposal is subject to a range of planning documents:

- National Environmental Standards for Contaminated Land, Freshwater and Air Quality;
- National Policy Statements for Freshwater Management, Infrastructure, Indigenous Biodiversity, Electricity Generation, Highly Productive Land, and Natural Hazards;
- The Regional Policy Statement (RPS) contained within the AUP; and
- The regional and district components of the AUP.

The Project is assessed against these planning documents in the following sections, and a detailed assessment against the NPS, RPS and AUP provisions is attached in Appendix I. These assessments conclude that the Project is overall consistent with the policy direction set out in these documents and directly supported and enabled by many of the provisions.

The detailed assessment of relevant AUP objectives and policies in Appendix I has been structured on a provision-by-provision basis and provides detailed comments on how Project elements engage with the relevant policy direction. The following assessment provides a summary of this assessment with a particular focus on the policy sets that apply to key Project activities and taking a fair appraisal of the relevant objectives and policies, read holistically, interpreting them in their context.

For the project, the provisions of the NPS Infrastructure, AUP and RPS which enable infrastructure need to be considered alongside protections provided to freshwater systems, indigenous biodiversity, and cultural values as well as the NPS-FM and NPS-IB.

9.2.3 National environmental standards

National Environment Standards prescribe standards for environmental matters in accordance with section 43 of the RMA. Each local authority must enforce the National Environmental Standards. Where specified, a local authority can impose stricter or more lenient standards than those set out in a National Environmental Standard. The relevant National Environmental Standards are set out below.

Overall, the proposal requires consent under several National Environmental Standards as set out in Section 6. These consents are included and assessed within this application and the Project can meet the requirements set down to enable the grant of consent.

9.2.3.1 National Environmental Standards for Contaminated Land 2011

The NES for Contaminated Land 2011 (NES-CS) came into effect in 2012. The NES applies to assessing and managing the actual or potential adverse effects of contaminants in soil on human health from five activities, including soil disturbance. The NES-CS applies to specific activities on land where a HAIL activity has or is more likely than not to have occurred.

As the Redvale Landfill is an existing operative landfill, the whole site falls under Category G of the HAIL by the Ministry for the Environment. The proposed development involves the expansion of the current landfill facility, meaning that the impacts of any contaminated land will be limited and localised to within the current landfill site. Contaminated land effects will be managed through engineered design and existing landfill operational procedures to protect workers and manage environmental effects to ensure they do not pose a risk to human health. As set out in Section 7 above, resource consent is sought under Regulation 11 of NES-CS.

The management of risk from the contaminated land is detailed within the Landfill Management Plan (LMP) provided at Appendix K, which includes measures regarding the exposure of waste, health and safety at the site and general management of erosion and sediment tracking to ensure that impacts are limited to the site itself.

9.2.3.2 National Environmental Standards for Freshwater 2020

The NES for Freshwater (NES-F) came into force in 2020 and is relevant as one natural inland wetland has been identified on the site, adjacent to Stockpile 4. Although there are no proposed works within the wetland, earthworks are proposed within a 100 m setback of the natural inland wetland. To manage potential discharges of sediment, the diversion of water will also occur within a 100 m setback from the natural inland wetland. Accordingly, WMNZ is seeking resource consent as a discretionary activity under Regulation 45B of the NES-F.

In accordance with Regulation 45B(6) of the NES-F, a resource consent must not be granted unless the consent authority is satisfied that the landfill or cleanfill area will provide significant national or regional benefits; there is no practicable alternative location for the landfill or cleanfill area in the region; or every other practicable alternative location in the region would have equal or greater adverse effects on a natural inland wetland; and applied the effects management hierarchy. This has been demonstrated through the assessment of national and regional benefits, as detailed above in Section 7.2. Additionally, the options analysis undertaken, which assesses the requirements for the short-term operation of the landfill as a temporary approach while ARL is established and the requirements for an alternative facility over this time, identified that extending the duration of Redvale Landfill's operation is the only practicable option.

As discussed in Section 4 and 5 of the AEE, earthworks and the diversion of water is for the operation of the landfill. As discussed in Section 7.2 of the AEE and in the Economic Assessment in Technical Reports L and M, the extension to landfill operations at Redvale will provide significant regional benefits and is vital for the growth and maintenance of the region.

The proposed extension works have been designed and located to specifically avoid adverse effects on natural features, including avoidance of the one natural inland wetland located to the south-west of Stockpile 4 within SEA_T_ 2194 as scheduled under the AUP. The proposal has applied the effects management hierarchy.

9.2.3.3 National Environmental Standard for Air Quality

The National Environmental Standards for Air Quality (NES-AQ) came into effect in 2004. The NES-AQ sets out the ambient air quality standards for a number of contaminants for the protection of human health.

Regulations 26 and 27 of the NES-AQ apply to landfills with more than 200,000 tonnes of waste in place and a design capacity of greater than 1 million tonnes to collect landfill gas and either flare it (to minimum standards) or use it as a fuel to produce energy. The NES applies to landfills where the waste in or to be included in the landfill is likely to consist of 5% or more (by weight) of matter that is putrescible or biodegradable. The applicable regulations and their requirements are:

- Regulation 26 of the NES-AQ requires landfills to have a system for the collection of LFG, which is designed and operated to ensure that the concentration of gas at the surface of the landfill does not exceed 5,000 ppm methane, in which the gas must be flared in accordance with regulation 27.
- Regulation 26 also requires the collected gas at a landfill to be flared or used as a fuel or for generating electricity.

The site has an existing landfill gas collection system, which collects landfill gas and converts it to renewable energy through generators. The site also has a flaring capacity, which destroys LFG if a number of generators are unavailable as a result of an unscheduled breakdown or network outage. The proposed expansion will extend the relevant gas extraction wells to enable the existing infrastructure to continue to operate. As discussed above in Section 7 and the Air Quality Assessment, the management of LFG is considered appropriate for the ongoing use and expansion of the landfill. Accordingly, the proposal meets the requirements of the NES-AQ.

9.2.3.4 Resource Management (Measurement and Reporting of Water Takes) Regulations 2010

The proposal includes an application for a water take permit, which will not exceed a rate of 3.5 litres/second. The Water Take Regulations must be considered if the water permit is 5 litres/second or greater. Therefore, the regulations are not considered relevant to the proposal.

9.2.3.5 National policy statements

Overall, the proposal is considered consistent with the relevant National Policy Statements, a summary of this assessment is included below with a full assessment included in Appendix I.

National Policy Statement for Infrastructure

The National Policy Statement for Infrastructure 2025 (NPS-I) came into effect 15 January 2026, which recognises infrastructure as nationally significant and aims to support community wellbeing, health, and safety, while ensuring environmental impacts are appropriately managed. For the purposes of these provisions, resource recovery or waste disposal facilities are included in the definition of “additional infrastructure” and therefore falls within the NPS-I definition of “infrastructure”.

The overarching objective of the NPS-I is to:

a ensure the national, regional and local benefits of infrastructure are provided for;

b enable infrastructure to support the social, economic and cultural wellbeing of people and communities and their health and safety;

c enable infrastructure to support the development and change of urban and rural environments to meet the diverse and changing needs of present and future generations;

d ensure infrastructure is well-functioning, resilient and compatible, as far as practicable, with other activities; and

e ensure infrastructure is delivered in a timely and efficient manner while managing adverse effects from or on infrastructure.

It is considered that the project is enabled and directly supported by the relevant objective and policies of the NPS-I for the following reasons:

- The project provides significant regional and local benefits by providing a controlled disposal location for the region's waste through a modern engineered landfill. This controlled disposal helps to prevent the significant adverse effects that come with uncontrolled waste disposal such as uncontrolled leachate or gas discharges from waste decomposition.
- Landfills play a crucial support role in the growth and development of Auckland. Auckland's ongoing population growth and associated development of housing, infrastructure and business requires a place for construction and demolition waste to be disposed of. The continued operation of Redvale Landfill, along with the expansion of the Class 2 area, will provide for the ongoing efficient disposal north of Auckland City until Auckland Regional Landfill becomes operational.

- As discussed in Section 7, the proposed expansion of Redvale Landfill has been designed to avoid, remedy or mitigate effects on natural and physical resources. The landfill has been designed to industry best practice and continues to improve operations to respond to change, new technologies or issues that arise. This practice helps to effectively manage emerging risks and effects from landfilling operations.
- Redvale is an existing landfill with well-established ancillary infrastructure to support landfilling operations. The site is well-functioning, resilient and equipped to incorporate the proposed expansion.
- As the site is an existing well established operation, the expansion will be able to be delivered in a timely and efficient manner while managing adverse effects, as discussed above.
- The landfill and ancillary activities are already well-functioning and resilient. Based on the assessment of this infrastructure, it will remain as such throughout the extended timeframes and with the extension. The proposal also takes into account the surrounding land uses within Dairy Flat, noting that the area includes other commercial and industrial activities. To ensure effects are appropriately managed for sensitive receptors, mitigation measures, such as placing putrescible waste at least 500 m away from these receptors have been adopted into the proposal.

National Policy Statement for Freshwater Management 2020

The National Policy Statement for Freshwater Management 2020 (NPS-FM) came into force on 3 September 2020 and provides direction on how local authorities should manage freshwater (including groundwater) under the RMA.

The central concept of the NPS-FM is ‘Te Mana o te Wai’ which "is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.”

The Resource Management (Freshwater and Other Matters) Amendment Act was passed in October 2024 which amends sections 92, 104 and Schedule 4 of the RMA to remove the requirement to consider the hierarchy of obligations contained in clauses 1.3(5) and 2.1 of the NPS-FM from resource consent applications, and resource consent decisions.

The NPS-FM has relevance to the proposal as the ongoing operation at Redvale Landfill ultimately results in ongoing discharges to the Rangitōpuni Stream as part of its operational practices.

The project addresses the NPS-FM and is consistent with its overall policy direction, including Te Mana o te Wai, because:

- The operation and expansion will be managed to maintain the health and well-being of waterbodies and freshwater ecosystems, with contaminants managed through containment (leachate captured and removed offsite) and Sediment Retetnion Ponds.
- Human health needs are not adversely affected as set out in Section □ above, and as addressed in the Health Risk Assessment, and there are no nearby drinking water bores as set out in the Hydrogeology Assessment.
- The project provides significant regional benefit by maintaining essential waste disposal capacity to support Auckland’s growth until the new ARL facility is operational, which is further detailed in Section 7.2.1 above in relation to the purpose of the FTAA.
- Te Mana o te Wai is given effect through measures to avoid, minimise or manage effects on freshwater, including robust sediment controls, and iwi consultation with a focus on water protection.

- Tangata whenua values are recognised through a Cultural Values Assessment (CVA) and incorporation of design measures and mitigation outlined in the technical reports.
- The proposal avoids any loss of natural inland wetlands, avoids impacts on natural streams/rivers (including the Rangitōpuni Stream) and provides for indigenous freshwater species protection (including a fish relocation plan).

National Policy Statement for Indigenous Biodiversity 2023

The National Policy Statement for Indigenous Biodiversity 2023 (NPS-IB) came into force on 4 August 2023. It provides increased clarity and direction to councils on their roles and responsibilities for identifying, protecting and maintaining indigenous biodiversity under the RMA. An assessment of the proposal against the relevant provisions of the NPS-IB is set out below.

Specifically, Policy 7 provides direction around the protection of Significant Natural Areas (SNAs) by "avoiding or managing adverse effects from new subdivision, use and development." There is one terrestrial SEA identified on the site near the Stockpile 4 area. SEA overlays protect areas of ecological significance, including vegetation which have been identified as having particular characteristics and are afforded a higher level of protection by the AUP. WMNZ has sought to protect indigenous biodiversity by designing the proposed works on the site to avoid areas of significant indigenous biodiversity value (such as SEAs). Policy 8 requires the importance of maintaining indigenous biodiversity outside of SNAs to be provided for. The proposal may involve the removal of some native vegetation outside of the scheduled SEA on the site. Where indigenous biodiversity values are affected, vegetation of significance will either be retained or maintained through replanting.

The Project is consistent with relevant provisions of the NPS-IB, and therefore consistent with the NPS-IB's overall policy direction.

National Policy Statement for Renewable Electricity Generation 2011

The National Policy Statement for Renewable Electricity Generation 2011 (NPS-REG) provides for the development, operation, maintenance and upgrading of new and existing renewable electricity generation activities throughout New Zealand. It recognises the importance of renewable energy contributed towards New Zealand's target of 90% of electricity from renewable energy sources by 2025.

Redvale has a Landfill Gas Energy Plant (also known as the Energy Park) with 15 existing generators, which utilise the landfill gas extracted from the landfill to generate electricity and feed it back to the grid. It is considered that the project is consistent with the relevant objective and policies of the NPS-REG for the following reasons:

- WMNZ generates electricity using existing generators to fuel several renewable energy initiatives, including electricity generation and providing a source of heating and carbon dioxide to a neighbouring Aubergine greenhouse complex. As the Landfill is progressively filled, the generation of landfill gas will continue to increase. Currently, Redvale’s energy generation had the capacity to power 15,000 homes on the local grid making it Auckland’s largest renewable energy source. It is estimated that each generator can power up to 1,000 homes.
- The proposal helps increase the security of electricity supply at local and regional levels by diversifying the type and location of electricity generation while reducing greenhouse gas emissions.
- The proposal will support the national target for the generation of electricity from renewable resources for the duration of the project; and

- Appropriate mitigation measures are in place around the generators, specifically in relation to reverse sensitivity, with landscaping and noise barriers incorporated around the Landfill Gas Energy Plant site to mitigate the noise and ensure their integration with the wider Landfill site and surrounding environment.

Based on the above assessment, it is considered that Redvale is consistent with the objective and policies of the NPS-REG.

National Policy Statement for Highly Productive Land 2022 (NPS-HL)

The National Policy Statement for Highly Productive Land 2022 (amended December 2025) (NPS-HPL) came into force on 17 October 2022. It provides direction to protect highly productive land from inappropriate subdivision, land use and development under the RMA. The NPS-HPL is limited to land that meets the transitional definition of 'highly productive land', being land zoned as rural or rural production and classified as Land Use Capability (LUC) 1 - 3.

Land in the western portion of the site has been classified as highly productive land as per the classification system set out in the NPS. However, the project is an extension of an existing landfill, which is considered to be "specified infrastructure" as set out in the NPS. The NPS identifies that specified infrastructure includes infrastructure that is recognised as regionally or nationally significant in a national policy statement. As identified above, landfills are identified as such under the National Policy Statement for Infrastructure.

Under section 3.9 of the NPS-HL, which relates to protecting highly productive land from inappropriate use and development, there is an exclusion for specified infrastructure. The relevant provision states that use or development of highly productive land is inappropriate except where:

- it is associated with the development or operation of specified infrastructure, including but not limited to its construction, maintenance, upgrade, expansion, replacement or removal; and
- there is a functional or operational need for the use or development to be on highly productive land.

Any use or development on highly productive land must also:

- minimise or mitigate any actual loss or potential cumulative loss of the availability and productive capacity of highly productive land in their district; and
- avoid if possible, or otherwise mitigate, any actual or potential reverse sensitivity effects on land-based primary production activities from the use or development.

As the proposal is the construction, operation and expansion of specified infrastructure and is located within the existing landfill footprint, so has an operational need to be in that location. It is considered that the proposal is consistent with the NPS-HL based on the assessment included in Appendix I and because the AUP also includes the necessary measures that minimise and mitigate the cumulative effect on HPL. The proposed works will minimise the additional loss of available highly productive land by locating the proposed extension within the existing landfill facility.

National Policy Statement for Natural Hazards 2025

The National Policy Statement for Natural Hazards (NPS-NH) 2025 came into force on 15 January 2026. This NPS manages natural hazard risk and applies to all activities managed under the Act, except for infrastructure as defined in the RMA and primary production.

9.2.4 Auckland Unitary Plan

The AUP is a combined regional and district plan as provided for under section 80 of the RMA and also includes the regional policy statement. FTAA, Schedule 5, clause 17(1)(b) requires Part 6 of the RMA (resource consents) to be taken into account and clause 5(2) requires an application for a resource consent to have regard to any relevant provisions of documents listed in s104(1)(b)(i-vi). Under section 104(1)(b)(vi) of the RMA, which is included in Part 6 of the RMA, an assessment of the AUP is required. The plan is set out in a clear hierarchy of provisions, beginning with the regional policy statement provisions first. These objectives and policies set the high-level framework and give the overview of the issues of the region. The subsequent objectives and policies within the regional and district provisions must give effect to these. In other words, the AUP is deliberately a vertically integrated plan, which is intended to be read and applied as such.

A provision-by-provision analysis of the Project against the RPS and AUP is contained at Appendix I.

9.2.4.1 Auckland Unitary Plan Regional policy statement

The AUP RPS is required by section 59 to 62 of the RMA, to provide overview of the resource management issues of the region and policies and methods to achieve integrated management of the natural and physical resources of the whole region. The AUP RPS must also give effect to any NPS. It also has a relationship with the Auckland Plan, which is prepared under sections 79 and 80 of the Local Government (Auckland Council) Act 2009 and sets out a long-term strategy for Auckland's growth and development.

The AUP RPS provisions set out a number of issues of regional significance, creating an over-arching framework which is given effect to in the regional and district plan sections of the AUP. The AUP RPS objectives and policies are concerned with managing effects, but also with supporting and enabling regionally significant infrastructure to operate efficiently to support the population. Of particular significance to this proposal are the following sections of the AUP RPS:

- Urban growth and form – Auckland's growing population increases demand for housing, employment, business, infrastructure, social facilities and services. Growth needs to be provided for, including the provision and use of infrastructure in a way that is efficient, effective and timely.
- Infrastructure, transport and energy – the quality of the environment and the well-being of people and communities are affected by the management of and investment in infrastructure.
- Natural heritage – outstanding natural features and landscapes are identified and protected, ancestral relationships of Tangata Whenua and their culture and traditions with the landscapes are recognised and provided for.
- Natural resources – the combination of urban growth and past practices have placed pressure on land and water resources, including habitats and biodiversity, reduced air quality and increased demand for mineral resources.
- Issues of significance to Tangata Whenua – recognising Treaty of Waitangi, protecting Tangata Whenua culture and landscapes and recognising the interests, values and customary rights.

Analysis of the proposal against the key RPS themes outlined above, alongside the associated regional plan and district plan provisions of the AUP is provided in the Table below. A detailed assessment of the proposal against the specific objectives and policies of the AUP is provided in Appendix I.

Table 9.1: Key themes

Theme	Relevant objectives and policies	Comment
Urban growth and development		
Providing for population growth	B2.2.1(1A); B2.2.1(1); B2.3.1(1)	The population of the Auckland region is expected to grow by approximately one million people (400,000 households) by 2040.; Providing additional landfill capacity will help to cater for the growth in population and the associated landfill waste generated by this expected population growth prior to ARL being operational.; The continuation of landfilling services within the Auckland region will ensure that the standard of living for the Auckland community remains high by allowing for safe ongoing waste collection and disposal within the Auckland region.
Health, safety and wellbeing of communities	B2.3.1(3); B3.2.1(2)	Landfills are essential in the everyday functioning of a city, contributing to the health, safety and wellbeing of people and communities. The expansion at Redvale Landfill will be designed and constructed to ensure that residual solid waste is appropriately disposed of in a safe and sanitary manner.; There is no public access to the landfill, with only trained operators working within the landfill and there are no significant off-site health and safety effects.; The landfill has systems to capture and treat leachate, LFG and sediment. This will manage discharges from the operation so they do not cause adverse effects on the health and safety of people.; Potential adverse effects will be avoided, remedied or mitigated through the implementation of appropriate management and operational measures.
Infrastructure		
Enabling infrastructure	B3.2.1(1) B3.2.1(3); B3.2.2 (1); B3.2.2 (2); B3.2.2 (9); B7.4.2(1) B7.5.1(2) E26.2.1(3) E26.2.1(4) E26.2.1(8)	Infrastructure is enabled within the RPS provisions of the AUP. This is because it is recognised that infrastructure has an important role to play in a resilient and well-functioning city.; Redvale Landfill is recognised as infrastructure within the AUP, as well as by higher order documents, including the NPS-Infrastructure. Therefore the provisions directly support the operation of the landfill and the on-going role it has to play in supporting the Auckland region.; A key aspect of the enabling of infrastructure, is that the AUP seeks to manage effects of establishing and operating infrastructure rather than seeking to avoid effects. This is important and supports the enabling provisions which recognise the vital role infrastructure has to play. It provides direct recognition of the importance of infrastructure and recognises that infrastructure can result in unavoidable adverse effects.
Managing adverse effects	B3.2.1(3); B3.2.1(8); E26.2.1(9); E26.2.2(4)	The directive through the objectives and policies relating to the development and operation of infrastructure, is to avoid, remedy or mitigate adverse effects, rather than avoid solely. This is consistent with the objectives around the enablement of infrastructure and the recognition of it.; The project has been designed to avoid, remedy or mitigate effects on natural and physical resources as well as avoiding and mitigating effects on the health and safety of communities. This has been

Theme	Relevant objectives and policies	Comment
		achieved through careful design, including the strategic placing of different waste types into different areas to manage effects; the design of the capping and collection systems; proposed landscaping and visual treatment and proposed consent conditions.
Positive benefits and enabling of infrastructure	B3.2.1(2); E26.2.1(1); E26.2.2(1)	The continued operation of essential infrastructure results in important positive benefits to the safe and efficient functioning of the Auckland region. Municipal landfills form part of this essential infrastructure as they provide a necessary service to businesses and residents, by providing for the safe disposal of residual waste.; While waste in itself is not a positive benefit, it is a modern day reality and requires safe and engineered disposal. The existing landfill at Redvale provides such a facility and will continue to be constructed and operated in a way that it is managed appropriately, so that adverse effects are avoided or mitigated and positive benefits arise from the provision of this essential infrastructure.
Mana Whenua		
Recognition of the Treaty of Waitangi and Mana Whenua values	B6.2.1 (1); B6.2.1 (2); B6.2.2 (1); B6.3.1 (1); B6.3.1 (2); B6.3.2 (2); B6.3.2 (3); B6.3.2 (4); B6.3.2 (6)	WMNZ has undertaken consultation with iwi in the region and continues to undertake consultation to ensure that their views regarding the proposal can be taken into account, are recognised and addressed where possible. The AUP and ArchSite do not specifically identify any known sites of cultural significance in the vicinity of the landfill. However,; these two mechanisms do not provide a complete picture about the cultural landscape or mana whenua values. It is recognised by WMNZ that this can only be obtained through engagement and discussion with iwi and those with mana whenua.; A CVA (Appendix G) has been prepared by Whetu Consulting Group to outline key shared cultural values of Mana Whenua.; WMNZ has an existing relationship with and has been working closely with Ngāti Rongo.; In order to ensure that all potential cultural values are identified and recognised, the following iwi and hapu groups have been contacted by WMNZ in relation to the project:; Ngāti Pāoa; Ngāti Te Ata; Ngati Whanaunga; Te akitai Waiohua; Ngati Whatua Orakei; Ngato Wai; Ngati Whatua o Kaipara; Ngati Manuhiri; Ngati Maru; Te Kawerau a Maki; Ngai Tai ki Tamaki; Te Rūnanga o Ngati Whatua; This engagement has occurred via hui, meetings, visits to Redvale Landfill and discussions, and will continue throughout the consent process.
Protection of Mana Whenua cultural heritage	B6.5.1 (1); B6.5.1 (2); B6.5.1 (3); B6.5.2 (2); B6.5.2 (8)	The CVA prepared by Whetu Consulting discusses the overall site and locality and potential areas of significance to Mana Whenua.; A particular site of significance within the locality includes the Rangitōpuni Stream, an area which is subject to a statutory acknowledgement. Discharges from the site have been assessed in Technical Report F as having no impact on the downstream quality of the Rangitōpuni Stream. Measures will be implemented at the site to avoid effects on the stream and on associated cultural values.
Natural Resources		

Theme	Relevant objectives and policies	Comment
Stormwater management	B7.4.1(4); B7.4.2 (9); E1.3(8); E1.3(10); E1.3(11); E1.3(13)	The management and treatment of stormwater on the site during the operation of the landfill is vital for managing effects on freshwater systems.; The site will be managed to ensure that any stormwater in contact with waste is treated as leachate and is captured through the leachate collection system, and that all other stormwater will be passed through the Sediment Retention Ponds to ensure treatment. These ponds have been assessed as having sufficient capacity in the Stormwater, ITA, and Sediment Assessment (Technical Report G).
Indigenous biodiversity	B7.2.1(1); B7.2.1 (2); B7.2.2 (5); E3.2(15); E15.3(2); E15.3(4); E15.3(7)	The WMNZ landholdings includes an area identified as an SEA under the AUP, which has been avoided in the design of the proposed extension works at Redvale.; The Ecological Values Assessment (Technical Report J) describes the prevalence and types of indigenous biodiversity on the site. As the site is an operational landfill, the site contains limited indigenous biodiversity.
Freshwater systems	B7.3.1 (1); B7.3.1 (2); B7.3.1 (3); B7.3.2 (1); B7.3.2 (4); B7.3.2 (5); B7.3.2 (6); E3.2(1); E3.2(2); E3.2(3); E3.3(1); E3.3(2); E3.3(3); E3.3 (5); E3.3 (10); E3.3(11); E3.3(12); E3.3(15); E3.3(16)	The AUP has a clear directive to enhance degraded freshwater systems, minimise loss of freshwater systems and avoid, remedy or mitigate adverse effects on freshwater systems. These directives flow from the RPS down through the regional plan provisions. While there is a strong theme on the protection of freshwater – the provisions also run in partnership with those relating to infrastructure, which enable the development and operation of infrastructure The Ecological Impact Assessment (Technical Report K) and Stormwater, ITA and Sediment Assessment (Technical Report G) have assessed the impacts of the project on freshwater systems. A number of mitigation measures will continue to be implemented to ensure the water quality and habitats for freshwater macroinvertebrate and native fish species are protected.
Air Quality	E14.2 (1); E14.2 (2); E14.2 (4); E14.3 (1); E14.3 (3); E14.3 (6); E14.3 (8); E14.3 (9); E14.3 (10)	Redvale Landfill is located within a rural area, which is characterised under the AUP as being a medium air quality environment. The Air Quality Assessment Report identifies the local ambient air environment as including rural production activities, non-residential activities and dwellings. The air quality provisions of the AUP set out to manage both amenity effects and human health effects of activities. For the Redvale Landfill, these effects include odour and dust, which are amenity effects and discharges from combustion and LFG.; As described in Section 7 above and in the Air Quality and Odour Technical Assessment, odour and dust effects will be appropriately managed in accordance with measures set out in the LMP and proposed conditions of consent. In particular for odour the following measures are proposed:; the application of a 500-metre buffer between the placement of putrescible waste and occupied dwellings will be used to minimise adverse odour effects;; increasing the thickness of daily cover to suppress fugitive emissions and; reducing operating hours in the early hours of the winter months when meteorological

Theme	Relevant objectives and policies	Comment
		conditions are most conducive to assisting the spread of potential odour.
Vegetation	E15.2(1); E15.3(1); E15.3(3)	Vegetation clearance across the site will be limited as the majority of the extension works will be located within the existing landfill footprint and managed fill areas on the site which are already highly modified. Native replanting will be undertaken within areas where vegetation is proposed to be removed once final cap contours are in place.
Rural environment		
Rural character and amenity	E14.2(4); E14.3(2); E14.3(3); E14.3(6); E25.3(9); H19.2.1(1); H19.2.1(5); H19.2.3(1); H19.2.4(1)	The rural character of the area is a mixture of farmland, rural industry and rural residential living. Components of the surrounding rural character are highly modified and also subject to change.; The Landscape and Visual Assessment report (Technical Report Q) provides an assessment of effects on rural character and concludes that effects on viewing audiences will be no more than minor during operation until 2036 and less than minor in the long-term following completion of filling.; Visually, the proposed Class 1 expansion and Class 2 extension will be well-contained by existing topography and vegetation, and any visual amenity effects on specific properties would be largely limited to the construction period.; Noise, dust and odour effects are mitigated through existing measures set out in the proposed conditions and the Landfill Management Plan.
Land disturbance	E11.2(1); E11.2(2); E11.2(3); E11.3(1); E11.3(2); E11.3(4); E11.3(5); E11.3(7); E11.3(8); E12.2(1); E12.3(1); E12.3(2); E12.3(3); E12.3(4); E12.3(5); E12.3(6)	The landfill will be developed in phases, minimising the area of soil exposed at any one time. Overland flows on the site will be directed into Sediment Retention Ponds prior to discharge.; The site has an extensive sediment treatment pond system, which manages sediment runoff at the site. Erosion and sediment control measures will be implemented in accordance with an ESCP and LMP to minimise sediment generated on site.
Environmental risk		
Industrial and Trade Activities	E33.2(1); E33.3(1); E33.3(2); E33.3(3)	Areas of Industrial and Trade Activities will be carefully managed throughout the operation of the landfill, to ensure appropriate management practices. Site-specific Environmental Management Plans will be prepared and implemented, which identify the environmentally hazardous substances associated with a particular Industrial or Trade Activity, and sets out methods to avoid or minimise potential effects (Stormwater, ITA and Sediment Assessment, Technical Report G).
Natural hazards and flooding	E36.2(1); E36.2(4); E36.2(5); E36.3(3); E36.3(4); E36.3(16); E36.3(21); E36.3(22); E36.3(23); E36.3(25); E36.3(26);	The existing landfill and proposed development has been designed to mitigate the risk of natural hazards and flooding.; The existing stormwater system has been assessed in the Stormwater, ITA and Sediment Assessment report (Technical Report G) as being sufficient for managing stormwater runoff within the landfill catchment. Technical Report G concludes that the landfill does not have any impact on peak flows in the Rangitōpuni stream, and downstream flooding.; The

Theme	Relevant objectives and policies	Comment
	E36.3(29); E36.3(30); E36.3(31); E36.3(32); E36.3(33); E36.3(35)	Geotechnical Assessment report (Technical Report B) has assessed the site as being geotechnically suitable for the proposed landfill expansion, taking into account potential land instability and seismic risk.
PC120 Natural hazards and flooding[^14]	E36.2 (3A); E36.2 (3B); E36.2 (3C); E36.2 (4); E36.2 (5); E36.2 (7); E36.2 (8); E36.3 (1A); E36.3 (1B); E36.3 (1C); E36.3 (3); E36.3 (4A); E36.3 (4B); E36.3 (4C); E36.3 (21); E36.3 (22); E36.3 (25); E36.3 (29); E36.3 (30A); E36.3 (30H); E36.3 (33A); E36.3 (33B); E36.3 (33E); E36.3 (35); E36.3 (36)	The proposed landfill expansion is not expected to create or exacerbate natural hazard risks on other properties, infrastructure and the environment.; The Stormwater, ITA and Sediment Assessment has evaluated flood hazard risk at the existing site and associated with the proposed expansion. The Sediment Retention Ponds are assessed as being appropriately sized to manage stormwater on site and detain peak flows. Technical Report G concludes that the landfill does not have any impact on downstream flooding from the site and therefore is not anticipated to result in the creation or exacerbation of flood hazard risks on other sites.; The Geotechnical Assessment report (Technical Report B) includes a slope stability assessment, which assesses the site as being geotechnically suitable for the proposed landfill expansion, taking into account potential land instability and seismic risk.; Overall, the project is not considered to be inconsistent with the policies and objectives under PC120.
Leachate management/waste management	E13.2(1); E13.2(2); E13.3(1); E13.3(2); E13.3(3); E13.3(4)	Redvale Landfill expansion has been designed to meet the design requirements of the Landfill Guidelines. The landfill will continue to be managed in accordance with good practice and in line with the proposed conditions and the LMP, which minimises the potential for adverse effects from landfill operation.

9.3 Section 104(1)(c) - any other relevant matters

9.3.1 The Auckland Plan 2050

The Auckland Plan is a long-term spatial plan that sets the direction for how Auckland will grow and develop. The plan includes a number of outcomes and within these outcomes are directions and focus areas. Some of these have particular relevance to the proposed development of Redvale Landfill and therefore are discussed below to provide some wider context.

Direction 4 under the Environment and Cultural Heritage outcome is to 'Ensure Auckland's infrastructure is future-proofed'. Landfills are critical infrastructure which will support Auckland's growth – as such, the continued provision of a landfill facility at Redvale prior to ARL becoming operational is well aligned with the infrastructure objectives of the Auckland Plan. It is important that Auckland maintains continuity of landfill capacity in the region.

Further, while there are no directly relevant outcomes for waste, the Auckland Plan identifies several other matters of relevance, including directions which support development of homes and places, and opportunities and prosperity for Auckland's residents. To achieve the directions set out in the Auckland Plan, supporting infrastructure is critical. Redvale landfill provides a contained disposal location for waste and therefore plays an important part in protecting receiving environments and enabling development of the Auckland region.

As such, the provision of waste infrastructure for the region is critical to support the overarching themes of the Auckland Plan.

9.3.2 Waste Management and Minimisation Bylaw 2019

Auckland Council's Waste Management and Minimisation Bylaw provides for a licensing system for waste collectors and operators of waste facilities. The bylaw also provides the framework for operational controls about the collection, transportation and disposal of waste, and collection of waste.

As an existing facility, WMNZ has been operating Redvale Landfill under this bylaw and will continue to operate in accordance with this.

9.4 Part 2 of the RMA

The following sections provide an assessment against the relevant Part 2 matters of the RMA as required under Schedule 5, Clause 5(g) of the FTAA. Part 2 of the RMA sets out the purpose and principles of the Act.

9.4.1 Section 5 – Purpose

Section 5(1) states that the purpose of the RMA is to promote the sustainable management of natural and physical resources, with sustainable management defined in Section 5(2).

The proposal is consistent with the overall purpose of the Act and the reasons for this assessment are summarised below:

- The extended operation of Redvale Landfill will enable people and communities of the Auckland Region to provide for their social, economic and cultural wellbeing and for their health and safety by providing an interim sanitary and contained facility for disposal of waste that cannot be reduced, reused or recycled prior to ARL being operational.
- The life supporting capacities of air, water, soil and ecosystems will be protected by well-engineered design, robust operating practices and monitoring regimes, consistent with best practice for landfill management.
- Potential adverse effects from the ongoing operation of the landfill will be avoided, remedied or mitigated through landfill design, construction management measures, and operational procedures (particularly as controlled through the LMP and proposed conditions of consent).

9.4.2 Section 6 – Matters of National Importance

Matters of national importance, which are to be recognised and provided for, are set out in Section 6 of the RMA. The following matters are of particular relevance to the Redvale Landfill expansion project:

f the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development.

g The protection of outstanding natural features and landscapes from inappropriate subdivision,

use and development.

h The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.

i The relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.

j the management of significant risks from natural hazards.

Preservation of the natural character of wetlands, rivers and their margins and protection from inappropriate use and development

The preservation of the natural character of the Rangitōpuni Stream and identified wetlands is a key matter of relevance to the project. Potential effects of the project on the natural character of wetlands, rivers and their margins have been considered throughout the project's development and the design process. The location and design of the proposed development has taken into account existing scheduled natural features, such as wetlands, and existing streams and has been designed to avoid directly impacting these features. A range of stormwater management and erosion and sediment control measures will be implemented at the site to manage discharges from the site and avoid adverse effects on the stream as described in Section 7 above. This stormwater management include the diversion of clean water from the site as well as several Sediment Retention Ponds that are placed to assist in the treatment of water at the site that come into contact with ancillary areas of the landfill (not inclusive of areas of waste). Where stormwater comes into contact with waste this is treated as leachate. Leachate at the landfill has a specific treatment process which involves the capture of this separately to be treated via the LEU or trucked to an appropriately licensed facility. This process is specifically designed to capture and safely dispose of leachate to avoid the potential contamination of surrounding freshwater systems.

Protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna

There is one SEA located on the site to the south of Stockpile 4. The proposed works, particularly at Stockpile 4 are designed to avoid any impact on this SEA, including the vegetation and the identified natural inland wetland. Relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga.

On the basis of the assessment undertaken and the information received as at the date of lodging this application, the proposal recognises the relationship of Māori with their ancestral lands and water and is consistent with section 6(e). Further consultation will be ongoing to better understand how this relationship can be recognised and provided for.

9.4.3 Section 7 – Other Matters

Section 7 of the Act sets out other matters to which particular regard must be had when exercising functions and powers under the RMA. Of particular relevance to this proposal are:

a kaitiakitanga;

aa the ethic of stewardship;

b The efficient use and development of natural and physical resources.

c the maintenance and enhancement of amenity values;

d Intrinsic values of ecosystems

f Maintenance and enhancement of the quality of the environment

i The effects of climate change; and

j The benefits to be derived from the use and development of renewable energy

Having regard to these matters, the following points are noted:

- WMNZ is investigating how the project can provide for mana whenua kaitiaki to exercise kaitiakitanga, and as the consultation and engagement continues these opportunities can become fully developed and encapsulated in conditions and through other means.

- Amenity values and the quality of the environment will be managed through conditions of consent and the LMP. The Air Quality and Technical Odour Assessment (Technical Report D) sets out odour controls that will be implemented through consent conditions so the potential for odour and amenity effects will be brief, transient, and at most very weak in intensity in locations off-site. This includes limiting the placement of putrescible waste to maintain a separation distance of 500 m. Landfill operations are controlled through the LMP and ensure that the quality of the environment is maintained and enhanced.
- The site is already operating as an existing landfill and there is significant investment of landfill infrastructure at the site. Therefore, the extension of operations at Redvale Landfill is an efficient use of an existing physical resource.
- The landfill will continue to operate a gas generation plant, which converts LFG to energy and supplies this energy back to the national grid. This alternative use of LFG is a positive step in reducing effects of climate change and is a renewable energy resource.

In summary, it is considered that the proposal has had regard to the provisions of section 7 of the Act.

9.4.4 Section 8 – Treaty of Waitangi

While assessment of section 8 of the RMA is not strictly required under the FTAA, the project has taken the principles of the Treaty of Waitangi into account, particularly through extensive consultation with mana whenua over an extended period of time. Support by mana whenua on the expansion project is demonstrated in the letter of report received from the mana whenua partners, attached as Appendix H.

9.5 Section 105 and 107

Sections 105 and 107 are relevant to applications for discharges under section 15 of the Act and Schedule 6, Clause 1(C) of the FTAA.

Section 105 sets out additional matters which must be considered by a consent authority when considering an application for a discharge permit. Section 105(1) states:

1 If an application is for a discharge permit or coastal permit to do something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to—

a the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and

b the applicant's reasons for the proposed choice; and

c any possible alternative methods of discharge, including discharge into any other receiving environment.

The matters identified in sections 105(1) have been addressed throughout this report. In particular, Section 3 which describes the receiving environments and Section 7 which assesses the effects on the environment. The methods proposed are considered to be appropriate, will ensure adverse effects are avoided, remedied or mitigated, and are consistent with accepted best practice.

9.5.1 Section 107 of the RMA

Section 107(1) restricts the granting of discharge permits in certain circumstances, namely if, after reasonable mixing the contaminant or water discharged (either by itself or in combination with other contaminants or water) is likely to give rise to any of the following effects in the receiving waters:

- The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
- Any conspicuous change in the colour or visual clarity;
- Any emission of objectionable odour;
- The rendering of fresh water unsuitable for consumption by farm animals; and
- Any significant adverse effects on aquatic life.

As described in section 9 of the AEE, the discharge of water and contaminants to water or to land in circumstances where it may reach water will not give rise to any of the effects listed above after reasonable mixing. Section 107 does not create an impediment to the granting of the necessary consents under the Fast-track Approvals Act.

10 Proposed conditions of consent

In accordance with Schedule 5, Clause 5(1)(k), WMNZ propose a suite of draft conditions (Appendix J). These largely align with the existing conditions of consent for the Site. The existing consent conditions have been amended where required to reflect current operational practices on the site and new conditions have been added to address the proposed changes and development of the site.

Mitigation measures are recommended throughout the specialist reports and in the AEE above to ensure adverse effects are appropriately avoided, remedied or mitigated. In some instances, these involve the preparation of management plans at a stage when further details of the construction method have been determined. The conditions proposed by the applicant capture the key mitigation measures and management plans addressed in the specialist reports and assessment of effects. These conditions are intended to support the conclusions in the specialist assessments, and to provide certainty to the Panel and Auckland Council regarding key issues. The conditions have been structured broadly by specialist area recommendations and organised to ensure they are clear for operational staff to implement.

11 Conclusion

This AEE report has been prepared on behalf of WMNZ to accompany a substantive application to the EPA for the operation and development of the Redvale Landfill, north of Auckland under section 42(1) of the FTAA.

The proposal involves extending the existing operations and developing approximately 4.56Mm3 of additional airspace at the existing site. This includes 3.13 Mm^3 in additional Class 1 Landfill expansion on top of the existing Class 1 refuse placement area and 1.43 Mm^3 of Class 2 Landfill extension.

The proposed works require consent as a non-complying activity overall under the Auckland Unitary Plan, however as set out under the FTAA it is not subject to section 104D of the RMA.

This AEE report draws the following conclusions:

- The Redvale Landfill Expansion project is consistent with and supports the purpose of the FTAA, which is to facilitate the delivery of infrastructure and development projects with significant regional or national benefits.
- The works are consistent with Part 2, 3 and 6 of the Resource Management Act 1991;
- A number of NES and NPS are relevant to this proposal and have been assessed in Section 9. It is considered, taking into account mitigation, the project is consistent with these.
- The works are supported by objectives and policies of the Auckland Unitary Plan, particularly provisions around enabling infrastructure and the benefits of infrastructure for the social, economic and cultural wellbeing of people and communities.
- The proposal will have significant positive economic benefits by providing critical waste disposal infrastructure for the Auckland region in the transitional period while ARL is being established and will support population growth and development.
- A set of proposed consent conditions have been provided in Appendix J.

12 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. 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 WM New Zealand will submit this report as part of an application for resource consent and that a Panel as the consenting authority will use this report for the purpose of assessing that application.

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