

Appendix K

Landfill Management Plan



Redvale Landfill Landfill Management Plan

DRAFT FOR THE PANEL

This edition of the Landfill Management Plan is a DRAFT to be submitted with a substantive application by WM New Zealand for resource consents for the ongoing operations and expansion of Redvale Landfill, north of Auckland. This edition is not intended to be the complete Landfill Management Plan because content may be changed later according to detailed design and consent conditions which are not yet final.

Abbreviations

Abbreviation	Definition
AC	Auckland Council
AEE	Assessment of Effects on the Environment
AEP	Annual Exceedance Probability
AC-Compliance unit	Auckland Council
AMSL	Above mean sea level
ANZ DGV	Australian and New Zealand guidelines for fresh and marine water quality
ATF	Approved Transitional Facility Pad
AUP	Auckland Unitary Plan
BPO	Best Practicable Option (as defined in the RMA)
CAE	Centre for Advanced Engineering, University of Canterbury, New Zealand.
C&D	Construction and Demolition
CLC	Community Liaison Committee
CMS	Compliance Management System
DFCT	Dairy Flat Community Trust
DFH	Dairy Flat Highway
ED	Edition
ESCP	Erosion and Sediment Control Plan
FOS	Factor of Safety
FTAA	Fast-track Approvals Act
GD01	Auckland Council Guideline Document 2017/001
GD05	Auckland Council Guideline Document 2016/GD05
GEM	Gas emissions monitor (portable meter)
IQP	Independent Qualified Person (reference to Building Act)
ITA	Industrial and Trade Activity
LCS	Leachate collection sump
LFG	Landfill gas
LMP	Landfill Management Plan
MfE	Ministry for the Environment, New Zealand
MSW	Municipal Solid Waste
NHTCC	North Harbour Trotting and Country Club Incorporated
NIMS	National Integrated Management System
NRL	National Radiation Laboratory
NZS	New Zealand Standard
WorkSafe	Previously Occupational Safety and Health
PCB	Polychlorinated biphenyl
permeability	hydraulic conductivity

Redvale Landfill Management Plan

Abbreviation	Definition
PMF	Probable Maximum Flood
PRP	Peer Review Panel
rev	revision
RMA	Resource Management Act 1991
ROT	Record of Title
SH1	State Highway 1
T+T	Tonkin & Taylor Ltd
WAC	Waste Acceptance Criteria
WMNZ	Waste Management NZ (Company)
USEPA	United States Environmental Protection Authority

Glossary

Term	Definition
General terms	
Redvale Landfill	Name of the landfill, including ancillary activities.
Redvale Landfill Expansion	Project name for the proposed expansion 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.
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 Sedimentation 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.

Redvale Landfill Management Plan

Term	Definition
South-western property	Comprises of the existing Managed Fill site, Stockpile 4 and Sedimentation 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 BeneVap, LFG energy plant, staff facilities and offices, wheel wash.
Basegrade	The surface at the base of the landfill.
BeneVap	An on-site leachate evaporator system that uses heat from landfill gas combustion to evaporate water from leachate.
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

Redvale Landfill Management Plan

Term	Definition
	remediation, along with some contaminated but non-hazardous soils.
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.
Landfill Gas 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.
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).

Redvale Landfill Management Plan

Term	Definition
Sediment retention ponds /sedimentation pond	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.

Contents

Abbreviations	2
Glossary	3
1 Introduction and summary	12
1.1 Structure	12
1.2 Purpose	12
1.3 Operating procedures manual	12
1.4 Consent requirements	12
1.5 LMP reviews	13
1.6 Site development	13
1.7 Land ownership	13
1.8 Lists of consents	13
1.9 Staff	14
1.10 Training, health and safety	14
1.11 Staff status board	15
1.12 Record keeping	15
1.13 Buildings	15
1.13.1 Building consent requirements	15
1.13.2 Essential facilities	15
1.13.3 Other facilities	15
1.13.4 Reporting and record-keeping	16
1.14 Utilities	16
1.14.1 General	16
1.14.2 Sewage	16
1.14.3 Site water	16
1.14.4 Potable water	17
1.14.5 Reporting and record-keeping	17
1.15 Bond	17
2 Community and Iwi Liaison	21
2.1 Iwi Liaison	22
2.2 Community Liaison	22
2.2.1 Good Neighbour Policy	22
2.2.2 Community Liaison Committee	22
2.2.3 Community Webpage	25
2.2.4 Neighbour list	25
2.2.5 Visitors	25
2.2.6 Environmental education facility	25
2.2.7 Non-landfill Area (Site buffer)	25
2.3 Complaints	27
2.3.1 Complaints procedure	27
2.3.2 Online complaints form	27
2.3.3 Reporting and record-keeping	27
2.4 Community trust	30
2.4.1 Trust Deed	30
2.4.2 Map	30
2.4.3 Funding	30
2.5 Peer review panel	32
2.5.1 Peer Review Panel role	32
2.5.2 PRP membership	32
2.5.3 PRP agreement	32
2.5.4 Reporting	32

Redvale Landfill Management Plan

3	Site Operations Management Plans	33
3.1	Waste control	34
3.1.1	Class 1 area	34
3.1.2	Class 2 area	34
3.1.3	Prohibited waste	35
3.1.4	Special waste	35
3.1.5	Toxicity test (TCLP test)	35
3.1.6	Pre-acceptance procedure	37
3.1.7	Odorous wastes	38
3.1.8	Emerging contaminants	39
3.1.9	Monitoring	41
3.1.10	Contingency	44
3.1.11	Gatehouse Control	45
3.2	Disposal	47
3.2.1	Tip face	47
3.2.2	Class 1 waste	49
3.2.3	Class 2 waste	50
3.2.4	Special waste	51
3.2.5	Monitoring	54
3.2.6	Contingency	55
3.3	Cover	58
3.3.1	Scope of this section	58
3.3.2	Daily cover	58
3.3.3	Intermediate cover	59
3.3.4	Materials and thickness	59
3.3.5	Final cover	60
3.3.6	Final levels	65
3.3.7	Monitoring	66
3.3.8	Contingency	67
3.4	Erosion and Sediment Control Plan	69
3.4.1	Overview	69
3.4.2	Sediment Control Strategy	69
3.4.3	Sediment Control Methods	73
3.4.4	Inspection and maintenance	77
3.4.5	Contingency	81
3.5	Design, operation and maintenance of stormwater devices	86
3.5.1	Design and operation of stormwater devices	86
3.5.2	Inspection and maintenance	92
3.6	Odour Management Plan	97
3.6.1	Purpose	97
3.6.2	Sources of odour	97
3.6.3	Consent requirements	97
3.6.4	Odour management	97
3.6.5	Odour control systems	98
3.6.6	Monitoring	105
3.6.7	Response and contingency plan	109
3.7	Landfill gas management	116
3.7.1	Consent requirements	116
3.7.2	Purpose	116
3.7.3	Landfill Gas Overview	116
3.7.4	Landfill gas system – design and construction	119

Redvale Landfill Management Plan

3.7.5	Landfill Gas System - Operation	124
3.7.6	Landfill Gas - Monitoring Plan	127
3.7.7	Landfill Gas - Contingency Plan	131
3.7.8	Landfill Gas - Emergency Plan	135
3.7.9	Landfill Gas - Safety	135
3.8	Dust management Plan	143
3.8.1	General	143
3.8.2	Dust monitoring	145
3.9	BeneVap Management Plan	149
3.9.1	Background	149
3.9.2	Operational and Monitoring Procedures	149
3.9.3	Contingency Plan	152
3.10	Noise Management Plan	158
3.10.1	General	158
3.10.2	Construction	159
3.10.3	Operations	159
3.10.4	Energy Centre	160
3.10.5	Monitoring	162
3.10.6	Noise Contingency	163
3.11	Landscape Mitigation and Restoration Plan	166
3.11.1	General	166
3.11.2	Planting Methodology	166
3.11.3	Maintenance	167
3.12	Traffic Management Plan	171
3.12.1	General	171
3.12.2	Gatehouse	172
3.12.3	Vehicle restrictions	173
3.12.4	Vehicle count	173
3.12.5	Truck movements response limits	173
3.12.6	Pre-notification	174
3.12.7	Manifest forms	174
3.12.8	Communication	174
3.12.9	Roading	175
3.12.10	Traffic signs	175
3.12.11	Speed limits	175
3.12.12	Parking areas	175
3.12.13	Lighting and Visibility	175
3.13	Litter Management Plan	176
3.13.1	General	176
3.13.2	Reporting and record-keeping	177
3.14	Vermin	178
3.14.1	Bird control	178
3.14.2	Bird contingency	179
3.14.3	Firearms	182
3.14.4	Pest Bird Management Plan	182
3.14.5	Reporting and record-keeping	182
3.14.6	Vermin /Insects	182
3.15	Biosecurity	186
3.15.1	Biosecurity regulatory requirements	186
3.15.2	Transitional facility	186
3.15.3	Transitional facility biosecurity management	186

Redvale Landfill Management Plan

3.15.4	Records and reporting	189
3.15.5	Contingency	190
3.16	Health and Safety	191
3.16.1	Relevant legislations	191
3.16.2	Company Policy	191
3.16.3	Site Specific Programmes	191
3.16.4	Trainings	191
3.16.5	Notifiable work	192
3.16.6	Reporting and record-keeping	192
3.17	Emergency Management Plan	199
3.17.1	General	199
3.17.2	Site information	199
3.17.3	Emergency Events	201
3.17.4	Spill Response Plan	218
3.17.5	Reporting and record keeping	238
3.18	Environmental Management Plan - General	241
3.18.1	Introduction	241
3.18.2	Storage of Environmental Hazardous Substances and Secondary Containment	241
3.18.3	Potential Sources of Contaminants and Management	243
3.18.4	Monitoring and Review	244
3.18.5	Contingency	246
3.19	Stormwater monitoring and contingency plan	253
3.19.1	Stormwater Monitoring Programme	253
3.19.2	Contingency	257
3.20	Groundwater	273
3.20.1	Consent requirements	273
3.20.2	Groundwater system	273
3.20.3	Groundwater monitoring plan	274
3.20.4	Groundwater contingency plan	276
3.21	Leachate Monitoring and Contingency Plan	288
3.21.1	Leachate containment	288
3.21.2	Leachate collection	288
3.21.3	Leachate disposal	290
3.21.4	Other liquids	290
3.21.5	Leachate monitoring	290
4	Expansion construction	299
4.1	Design and construction	300
4.1.1	List of structures and construction activities	300
4.1.2	Design	300
4.1.3	Specifications	301
4.1.4	Construction	301
4.1.5	Types of materials	301
4.1.6	Construction monitoring	303
4.1.7	Construction Contingency Plan	303
4.2	Liner	306
4.2.1	Liner Design	306
4.2.2	Liner Construction	307
4.2.3	Liner monitoring	310
4.3	Ecology Management Plans	315
4.3.1	Avifauna Management Plan	315

Redvale Landfill Management Plan

4.3.2	Lizard Management Plan	316
4.3.3	Native Fish Capture and Relocation Plan	317
5	Closure	318
5.1	Post Closure Management Plan	318
5.1.1	General	318
5.1.2	Closure	319
5.1.3	Aftercare	322
5.1.4	Contingency	327

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1 Introduction and summary

1.1 Structure

The LMP is organised as follows:

Section 1 – This introduction

Section 2 – Community and Iwi liaison

Section 3 – Site operations

Section 4 – Expansion construction

Section 5 – Post-Closure

1.2 Purpose

The purpose of this Landfill Management Plan (LMP) is:

- a to satisfy resource consent conditions which require the site to have a management plan;
- b to identify all consents and external controls relevant to the facility;
- c to describe the management, construction, operation and monitoring framework which will be employed at the site to satisfy (b);
- d to provide pertinent reference information.

The LMP is intended to provide a definitive reference document for all site personnel, regulatory authorities and peer reviewers. This LMP may also include other matters deemed appropriate from time to time by the Peer Review Panel (PRP) or Auckland Council (AC).

In the event of any conflict between the resource consent conditions and the provisions in the LMP, then the resource consent conditions take precedence.

1.3 Operating procedures manual

A separate set of standard operating procedures will be maintained for activities which require more detailed information, and which are not otherwise already covered in this LMP.

The operating procedures will be available on request for inspection by Auckland Council (AC) and the Peer Review Panel (PRP).

The operating procedures may variously also be referred to as work instructions.

Some of the operating procedures will be standards provided by the parent company of the owner of Redvale Landfill. These would be identifiable in any listing of operating procedures.

1.4 Consent requirements

[To be updated with new consent condition references]

A number of additional items are contained in legislation and guides such as those published by Ministry for the Environment (MfE), and this LMP will attempt to identify and address those which are pertinent in each of the relevant sections of this LMP.

1.5 LMP reviews

The LMP or any section within it will be revised when a revision is required which may be prompted by changes in regulatory requirements, by changes to operating procedures, by advances in technology, by formal requests from peer reviewers, by review of authorities, or by need for clarifications.

The LMP is to be regularly updated to cater for development of specific designs, as-built construction, changes to regulatory requirements and better technology. The plan will be reviewed annually or more frequently in some circumstances.

The procedure will involve collating required changes, preparing a draft revision, obtaining the written approval of PRP and AC, finalising any changes and distributing revised documents to copy holders.

A separate historical copy will be maintained of each section or edition being replaced which will be available on request.

1.6 Site development

Site development plans are included in Chapter 1 Appendix A.

1.7 Land ownership

Parcels of land making up the landfill site are listed below, inclusive of the Record of Title number and area. The current landowners are solely Waste Management NZ Limited. The below includes titles and instruments / easements that are relevant to the current activities.

Legal description	Title	Area (ha)	Instruments/easements ¹
Lot 1 DP 125471	218905	31.2050	
Lot 1 DP 353568	218904	26.5589	D482711.1 – Conservation Covenant
Lot 2 353568	218905	0.7345	
Section 1 SO 68946	NA118B/596	2.2840	
Lot 1 DP 155355	562515	53.7726	
Lot 2 DP 446482	562515	3.1377	
Lot 1 DP 446482	562514	23.8963	
Lot 1 Deposited Plan 322777	90886	9.6328	
Lot 1 Deposited Plan 117463	578978	2.0002	
Lot 2 Deposited Plan 452672	578978	17.3695	

1.8 Lists of consents

[TBC]

Consent	Granted by	Granted to	Granted date	Expiry date	Purpose

¹ There are a number of instruments/easements that are included on the titles noted. Those included in this table are considered to be relevant to the development and use of the landfill

Redvale Landfill Management Plan

1.9 Staff

The staff organisational structure is indicated on Chapter 1 Appendix B. The numbers of staff and reporting lines of responsibility may be altered from time to time to efficiently address prevailing circumstances. Notification of changes would be by way of regular review of this Management Plan. The essential staff which will be employed full time during operations are:

Role	Responsibility
Landfill Manager	The Landfill Manager requires proven construction ability, a general understand of relevant scientific issues, project management experience, and a background in a civil engineering. The responsibilities include reporting to the Company's managing director, membership of senior management team of the Company, employment of staff, keeping of personnel records, liaison with PRP and AC on management issues, obtaining PRP approval of senior landfill staff, day-to-day running of the landfill, management of construction, customer vehicle control, community liaison, commercial management.
Landfill Engineer	The Engineer requires professional engineering status, a minimum of 3 years' experience in geotechnical, landfill or environmental engineering, a relevant tertiary education, and experience in environmental regulatory compliance, assessments, permitting and enforcement. The responsibilities include compliance with resource consents and technical aspects of legislation, environmental monitoring, environmental controls, final approval of design and construction plans, delegation of responsibilities only to senior staff or consultants approved by PRP, compliance with approved construction plans and specifications, liaison with PRP and AC on technical issues, implementation of Waste Acceptance Policy, staff status board.
Professional Engineer	[Condition X] requires operations to be under the responsibility of a Professional Engineer experienced in landfill operations, approved by Auckland Council. The current professional engineer is: <i>Jonathan David Payne, Environmental Engineer, CPEng (Eng NZ) No. 1011044.</i>
Gatehouse Attendant	The Gatehouse Attendant is responsible for weighing-in and weighing out of refuse vehicles, refusing access to members of the public, and conducting procedures for ensuring compliance with the Waste Acceptance Policy.
Operators (minimum 2)	Landfill Operators are responsible for opening up, placing and compacting the waste, covering at the end of each day, nuisance control, and rejection of unacceptable waste.
Other staff	Other staff will be employed as required. In particular, additional persons are required periodically for construction, maintenance, gas station operation and administration, as indicated in Chapter 1 Appendix B.

1.10 Training, health and safety

The training of staff and health and safety issues are described in Section 3.16 Health and Safety of this LMP.

1.11 Staff status board

The Landfill Engineer will be responsible for maintaining a 'Staff Status Board' to give managers a quick reference as to a staff member's currency of qualifications, training and experience.

The medical records and private components of employment contracts of staff will be kept separate and confidential.

1.12 Record keeping

For each individual staff person, two files will be held on site:

- confidential records (job application, employment contract, personal medical information) - these will be accessible only by the Landfill Manager and a designated assistant.
- compliance records (copy of driver licence, training history, copy of firearms licence, copy of NRL licence, emergency home contact details) - these will be accessible by selected office staff.

1.13 Buildings

1.13.1 Building consent requirements

Buildings and amenities e.g. potable water will be provided as appropriate for a proper workplace and to comply with the Health and Safety at Work Act 2015. Buildings will have building consents in accordance with the Building Act 2004 or amendment version of it.

Any separate resource consent requirements are detailed throughout this plan.

1.13.2 Essential facilities

Essential buildings and facilities will be maintained on the site during the operation of the landfill:

- Gatehouse. A manned gatehouse will inquire in regard to acceptability of waste and record weights of waste.
- Landfill gas station. Landfill gas will be treated by controlled burning and utilisation processes.
- Wheel wash. Mud will be cleaned from the wheels of vehicles leaving the site whenever mud and dust on the access road will become a nuisance.

1.13.3 Other facilities

Other buildings and facilities will be provided by the Company as required:

- Administration office.
- Workshop.
- Workers lunchroom.
- Fuel bay.
- Laboratory.
- Dangerous goods store.
- Truck & tray wash.

Reticulated services and utilities are described below.

1.13.4 Reporting and record-keeping

Event	Reporting
Building warrant of fitness renewal and IQP inspections	Annual submission to AC
Dangerous Goods Licence	Annual renewal fee to AC

Records of construction, building consents, building warrants of fitness, alarm agencies, and dangerous goods licence, etc, will be kept on the site. Building warrants of fitness, dangerous goods licence, and smoking policy will be openly displayed as required by relevant legislation.

1.14 Utilities

1.14.1 General

Utilities will be provided for and maintained on site for the effective operation of the landfill, inclusive of power and telecommunications. The site holds a number of radio frequency licences for internal radio communications, for "site radio", and for GPS.

1.14.2 Sewage

The gatehouse, workshop, flare site office and site office will each have their own holding tank for septic waste, which will be fitted with high level alarms. If an alarm comes on, a sewage disposal contractor will be called to remove the sewage from the site. Also, a contractor may be commissioned to remove sewage on a regular scheduled basis e.g. once a fortnight.

The health authorities gave their approval of these arrangements in 1993².

1.14.3 Site water

A source of bulk water supply will be maintained at all times during the operating life of the landfill. This water would be regarded as non-potable. Available sources are:

Sediment Retention Ponds 1 – 4: mobile pumps. Water pumped direct into water trucks. Sediment Retention Pond 1 also has a pumping system to deliver water to the hilltop tanks for use in the new wheel wash system installed in 2015. It is noted that Sediment Retention Pond 1 will be systematically enlarged.

Water abstraction place and method (2026)

(a) Ponds 1/2/3/4 - mobile pumps. Water pumped direct into water trucks. Pond 1 also has a pumping system to deliver water to the hill top tanks for use in the new wheel wash system installed in 2015. It is noted that Pond 1 will be systematically enlarged.

(c) Ponds 5 and 6 - fixed pumps supplying hill-top header tanks for the on-site reticulated water supply. The header tanks capacity is 120,000 litres. The water is piped direct into water trucks through hydrants. It is noted that Pond 6 will be systematically removed during construction of the proposed Class 2 Landfill Extension.

² Waitemata Health, 26 August 1993: Letter, Public Health Services North Shore & Rodney, ref 3/8/1/8 "sewage disposal: Redvale Landfill", signed by Dell Hood.

(d) Stockpile 4 ground water - a fixed pump in the subsoil drain spring at the toe of the stockpile, supplying a separate hill-top 20,000 litre header tank for the on-site potable water system. The water is reticulated only within the site.

1.14.4 Potable water

Potable water will be obtained from a combination of (as at 2026):

- building roof run-off and storage tanks (used at the gatehouse)
- stockpile No. 4 subsoil drains i.e. ground water (used for the workshop, flare site office and main site office) - this source was registered in 1999 with the Ministry of Health as an ungraded community drinking water supply (see Sectuib 3.20)
- town water supply tanker deliveries (periodically required to supplement current sources).

A programme of regular testing will be conducted in accordance with the Ministry of Health registration, the NZ Drinking water guidelines, or good practice.

A contingency procedure will be established for treatment of the reticulated potable water supply if the potable water fails essential water quality tests.

1.14.5 Reporting and record-keeping

Event	Reporting
Sewage removal	Records kept by the gatehouse No reporting to other parties or authorities
Site water use	Quarterly to Auckland Council via their online Water Usage Data Management System (WUDMS)
Potable water use	Quarterly to Auckland Council via their online Water Usage Data Management System (WUDMS)
Electric power	Internal company records and commercial electricity use/supply records No reporting to other parties or authorities
Telecommunications	Internal company records and commercial telecommunications services supplier records No reporting to other parties or authorities

1.15 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.

Redvale Landfill Management Plan

The Bond has been reviewed in 2026³ and is still considered appropriate for the remainder of the operations and expansion proposed as part of substantive application.

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³ Tonkin & Taylor Ltd (2026), Bond Assessment Report. *Redvale Landfill Expansion*

Appendix A Site Development Plans

DRAFT



WM
New Zealand

WM NEW ZEALAND

REDVALE LANDFILL EXPANSION

CONCEPT DESIGN
SUBSTANTIVE ISSUE

PROJECT NO : 1092369.3000
ISSUE DATE : 10.08.2026

 **Tonkin+Taylor**
www.tonkintaylor.co.nz

*Together we create and
sustain a better world*

DRAWING REGISTER				
		DRAWING NUMBER	REV	TITLE
1	• •	1092369.3000-C01	A	DRAWING LIST AND LOCALITY PLAN
2	• •	1092369.3000-C10	A	OVERALL SITE LAYOUT
3	• •	1092369.3000-C11	A	BASEGRADE AND PHASE LAYOUT
4	• •	1092369.3000-C12	A	LEACHATE COLLECTION LAYOUT
5	• •	1092369.3000-C13	A	EXISTING CONSENTED FINAL CONTOURS
6	• •	1092369.3000-C14	A	PROPOSED FINAL CONTOURS AND DRAINAGE LAYOUT
7	• •	1092369.3000-C15	A	PROPOSED PRE-SETTLEMENT ENVELOPE PLAN
8	• •	1092369.3000-C16	A	PROPOSED CONCEPTUAL PHASE LAYOUT PLAN
9	• •	1092369.3000-C20	A	CROSS SECTIONS
10	• •	1092369.3000-C30	A	CLASS 1 LINING SYSTEM DETAILS
11	• •	1092369.3000-C31	A	CLASS 1 PERIMETER BUND DETAILS
12	• •	1092369.3000-C32	A	CLASS 1 NORTHERN PERIMETER DETAILS
13	• •	1092369.3000-C33	A	CLASS 1 AND CLASS 2 CAP DETAILS
14	• •	1092369.3000-C35	A	CLASS 2 LINING SYSTEM DETAILS
15	• •	1092369.3000-C36	A	CLASS 1 AND CLASS 2 LEACHATE SUMP DETAILS
16	• •	1092369.3000-C40	A	GAS COLLECTION SYSTEM LAYOUT
17	• •	1092369.3000-C50	A	STOCKPILE 4 LAYOUT
18	• •	1092369.3000-C51	A	STOCKPILE 4 STAGING
19	• •	1092369.3000-C52	A	STOCKPILE 4 DETAILS
	• •	DENOTES DRAWINGS IN THIS ISSUE: 10.08.2026		



TOPOMAP SOURCED FROM LINZ DATA SERVICE, <https://data.linz.govt.nz/layer/50798-nz-topo250-maps/>, LICENSED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENSE. ACCESSED 19/03/25.

LOCALITY PLAN
SCALE (A1) NTS
SCALE (A3) NTS



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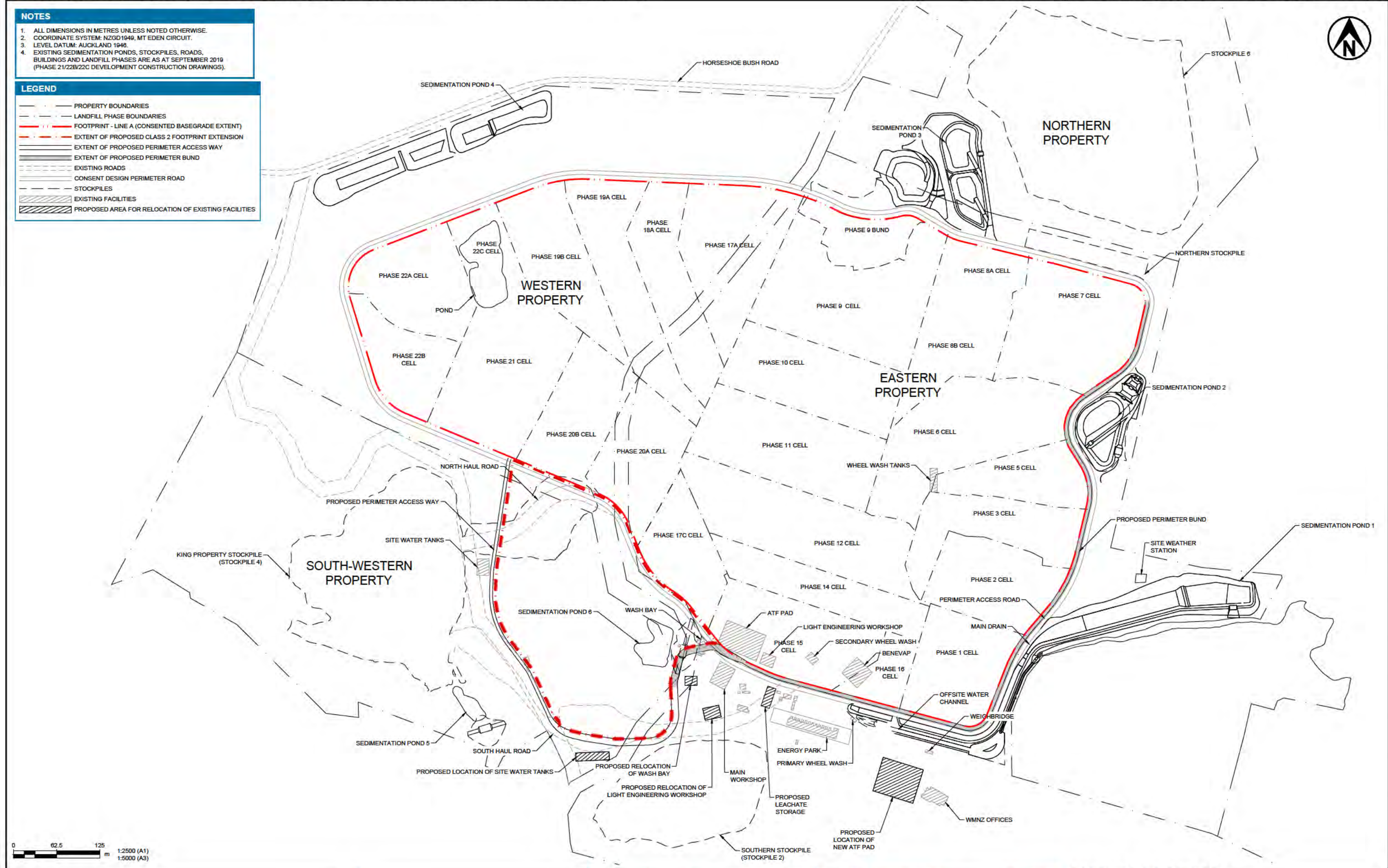
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					DRAWN	MELP	Aug 26	SUBSTANTIVE ISSUE		
					DESIGN CHECKED	SFE	Aug 26	PROJECT PHASE		
					DRAWING CHECKED	JC	Aug 26	CONCEPT DESIGN		
					NOT FOR CONSTRUCTION					THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED
PROJECT REDVALE LANDFILL EXPANSION									TITLE	DRAWING LIST AND LOCALITY PLAN
SCALE (A1) NTS										
DWG No. 1092369.3000-C01										
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE			REV	A

NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND 1948.
4. EXISTING SEDIMENTATION PONDS, STOCKPILES, ROADS, BUILDINGS AND LANDFILL PHASES ARE AS AT SEPTEMBER 2019 (PHASE 21/22B/22C DEVELOPMENT CONSTRUCTION DRAWINGS).

LEGEND

- PROPERTY BOUNDARIES
- LANDFILL PHASE BOUNDARIES
- FOOTPRINT - LINE A (CONSENTED BASEGRADE EXTENT)
- EXTENT OF PROPOSED CLASS 2 FOOTPRINT EXTENSION
- EXTENT OF PROPOSED PERIMETER ACCESS WAY
- EXTENT OF PROPOSED PERIMETER BUND
- EXISTING ROADS
- CONSENT DESIGN PERIMETER ROAD
- STOCKPILES
- EXISTING FACILITIES
- PROPOSED AREA FOR RELOCATION OF EXISTING FACILITIES



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DESIGNED AWS Aug.26		DRAWING STATUS		CLIENT WM NEW ZEALAND	
DRAWN MELP Aug.26		SUBSTANTIVE ISSUE		PROJECT REDVALE LANDFILL EXPANSION	
DESIGN CHECKED SFE Aug.26		PROJECT PHASE		TITLE OVERALL SITE LAYOUT	
DRAWING CHECKED JC Aug.26		CONCEPT DESIGN		SCALE (A1) 1:2500	
NOT FOR CONSTRUCTION		THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		DWG No. 1092369.3000-C10	
APPROVED		DATE		REV A	
A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	
REV	DESCRIPTION	CAD	CHK	DATE	

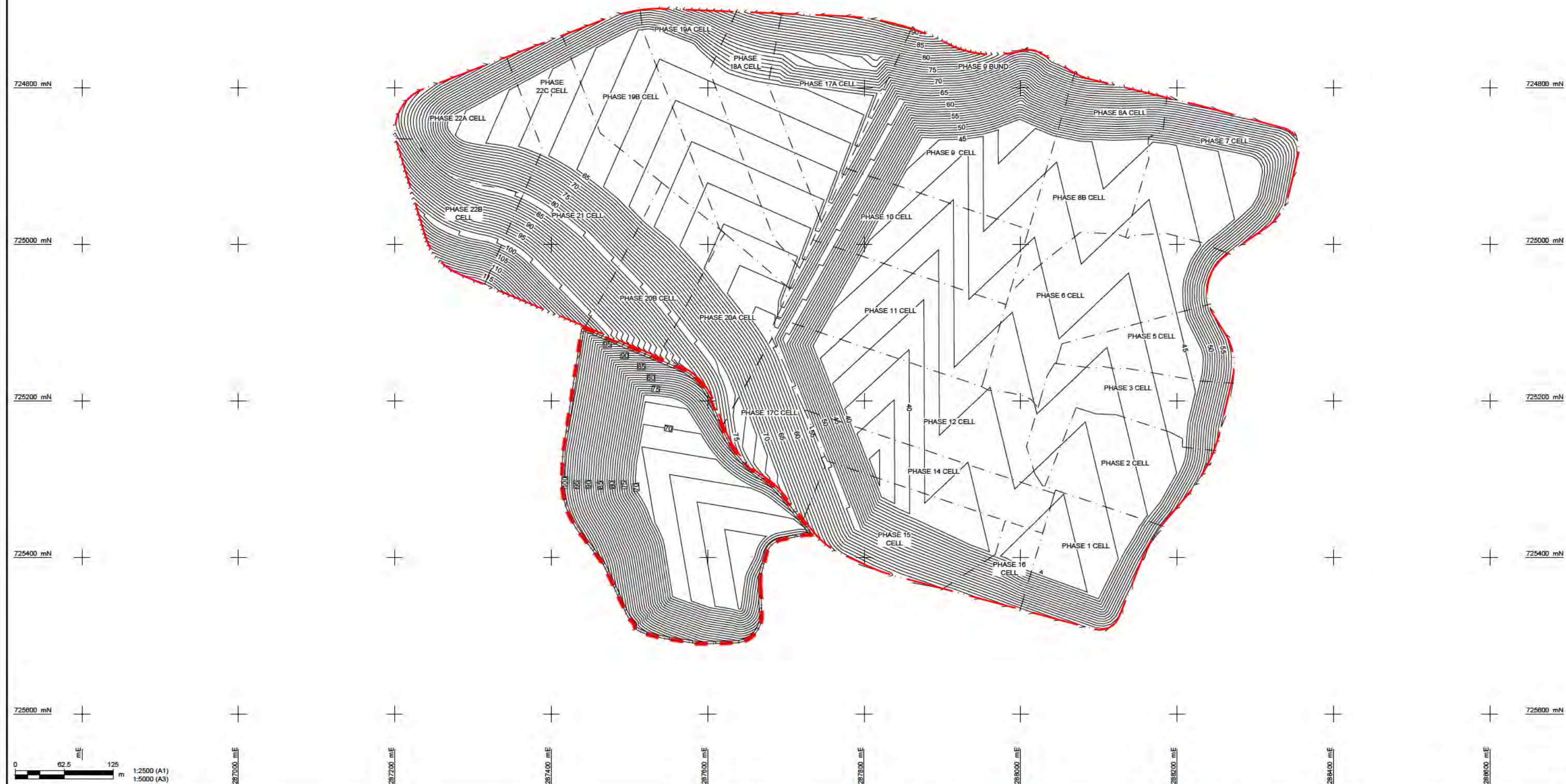


NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND 1946.

LEGEND

- 100 — BASEGRADE CONTOURS (5.0m INTERVAL)
 — — — BASEGRADE CONTOURS (1.0m INTERVAL)
 - - - LANDFILL PHASE BOUNDARIES
 ——— FOOTPRINT - LINE A (CONSENTED BASEGRADE EXTENT)
 - - - - - EXTENT OF PROPOSED CLASS 2 FOOTPRINT EXTENSION



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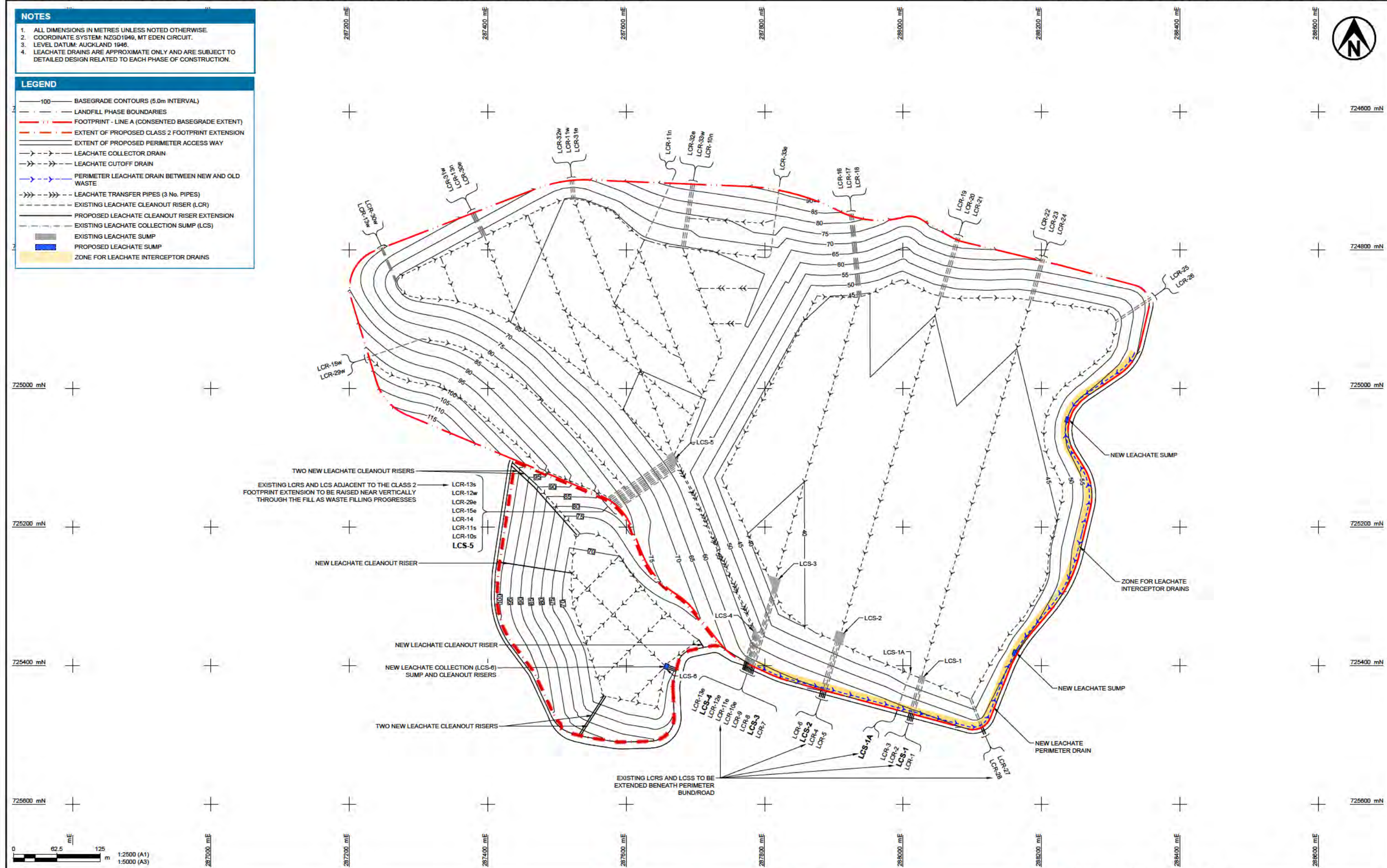
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A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED	AWS	Aug.26	DRAWING STATUS	CLIENT WM NEW ZEALAND PROJECT REDVALE LANDFILL EXPANSION TITLE BASEGRADE AND PHASE LAYOUT
					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE	
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE	
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN	
					NOT FOR CONSTRUCTION — — — — — THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED				
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE	SCALE (A1) 1:2500 DWG No. 1092369.3000-C11 REV A		



1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND 1946.
4. LEACHATE DRAINS ARE APPROXIMATE ONLY AND ARE SUBJECT TO DETAILED DESIGN RELATED TO EACH PHASE OF CONSTRUCTION.

— 100 —	BASEGRADE CONTOURS (5.0m INTERVAL)
- - - - -	LANDFILL PHASE BOUNDARIES
— () —	FOOTPRINT - LINE A (CONSENTED BASEGRADE EXTENT)
- - - - -	EXTENT OF PROPOSED CLASS 2 FOOTPRINT EXTENSION
— — — — —	EXTENT OF PROPOSED PERIMETER ACCESS WAY
— > — > — > —	LEACHATE COLLECTOR DRAIN
— >> — >> — >> —	LEACHATE CUTOFF DRAIN
— > > — > > — > > —	PERIMETER LEACHATE DRAIN BETWEEN NEW AND OLD WASTE
— >>> — >>> — >>> —	LEACHATE TRANSFER PIPES (3 No. PIPES)
— — — — —	EXISTING LEACHATE CLEANOUT RISER (LCR)
— — — — —	PROPOSED LEACHATE CLEANOUT RISER EXTENSION
— — — — —	EXISTING LEACHATE COLLECTION SUMP (LCS)
■	EXISTING LEACHATE SUMP
■	PROPOSED LEACHATE SUMP
■	ZONE FOR LEACHATE INTERCEPTOR DRAINS



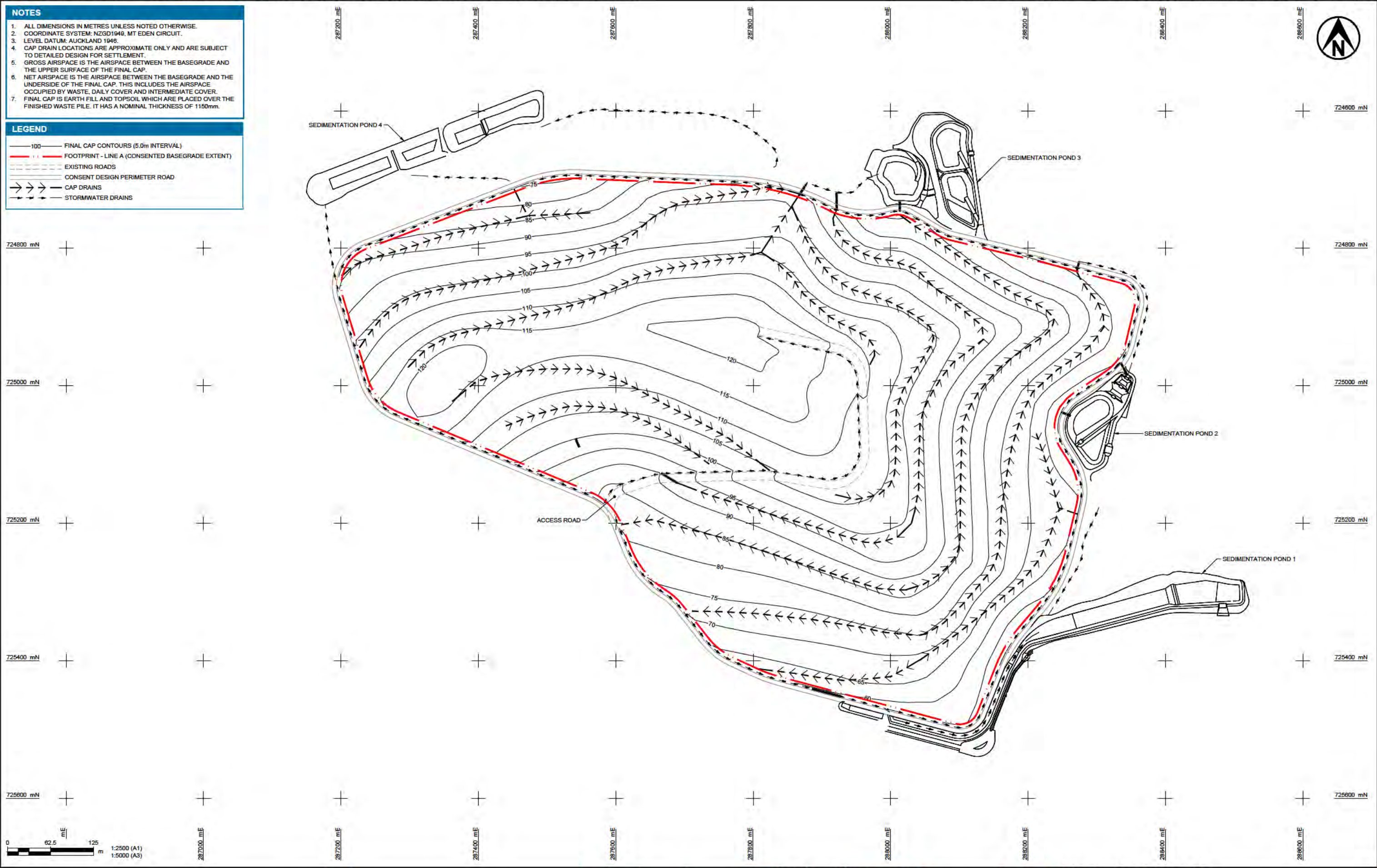
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A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED	AWS	Aug.26	DRAWING STATUS	CLIENT WM NEW ZEALAND PROJECT REDVALE LANDFILL EXPANSION TITLE LEACHATE COLLECTION LAYOUT SCALE (A1) 1:2500 DWG No. 1092369.3000-C12 REV A
					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE	
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE	
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN	
					NOT FOR CONSTRUCTION THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED				
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE			

- NOTES**
1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
 2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
 3. LEVEL DATUM: AUCKLAND 1948.
 4. CAP DRAIN LOCATIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO DETAILED DESIGN FOR SETTLEMENT.
 5. GROSS AIRSPACE IS THE AIRSPACE BETWEEN THE BASEGRADE AND THE UPPER SURFACE OF THE FINAL CAP.
 6. NET AIRSPACE IS THE AIRSPACE BETWEEN THE BASEGRADE AND THE UNDERSIDE OF THE FINAL CAP. THIS INCLUDES THE AIRSPACE OCCUPIED BY WASTE, DAILY COVER AND INTERMEDIATE COVER.
 7. FINAL CAP IS EARTH FILL AND TOPSOIL WHICH ARE PLACED OVER THE FINISHED WASTE PILE. IT HAS A NOMINAL THICKNESS OF 1150mm.

- LEGEND**
- 100 — FINAL CAP CONTOURS (5.0m INTERVAL)
 - — — FOOTPRINT - LINE A (CONSENTED BASEGRADE EXTENT)
 - — — EXISTING ROADS
 - — — CONSENT DESIGN PERIMETER ROAD
 - → → CAP DRAINS
 - → → STORMWATER DRAINS

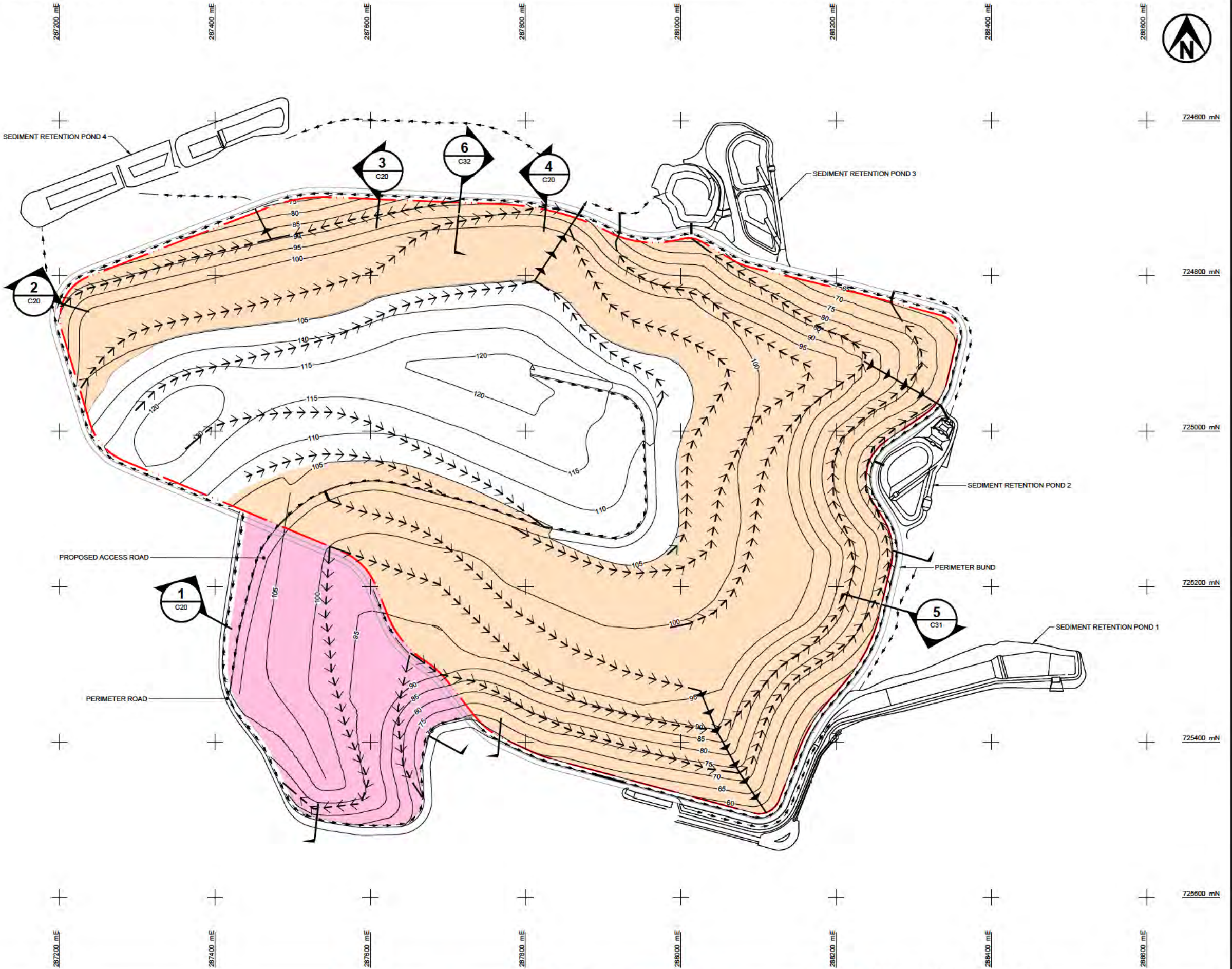


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A		SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED AWS Aug.26	DRAWN MELP Aug.26	DESIGN CHECKED SFE Aug.26	DRAWING CHECKED JC Aug.26	DRAWING STATUS SUBSTANTIVE ISSUE	PROJECT PHASE CONCEPT DESIGN	CLIENT WM NEW ZEALAND
REV		DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE	NOT FOR CONSTRUCTION				PROJECT REDVALE LANDFILL EXPANSION
								THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED				TITLE EXISTING CONSENTED FINAL CONTOURS
												SCALE (A1) 1:2500
												DWG No. 1092369.3000-C13
												REV A

- NOTES**
1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
 2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
 3. LEVEL DATUM: AUCKLAND 1946.
 4. CAP DRAIN LOCATIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO DETAILED DESIGN FOR SETTLEMENT.
 5. GROSS AIRSPACE IS THE AIRSPACE BETWEEN THE BASEGRADE AND THE UPPER SURFACE OF THE FINAL CAP.
 6. NET AIRSPACE IS THE AIRSPACE BETWEEN THE BASEGRADE AND THE UNDERSIDE OF THE FINAL CAP. THIS INCLUDES THE AIRSPACE OCCUPIED BY WASTE, DAILY COVER AND INTERMEDIATE COVER.
 7. FINAL CAP IS EARTH FILL AND TOPSOIL WHICH ARE PLACED OVER THE FINISHED WASTE PILE. IT HAS A NOMINAL THICKNESS OF 1150mm.

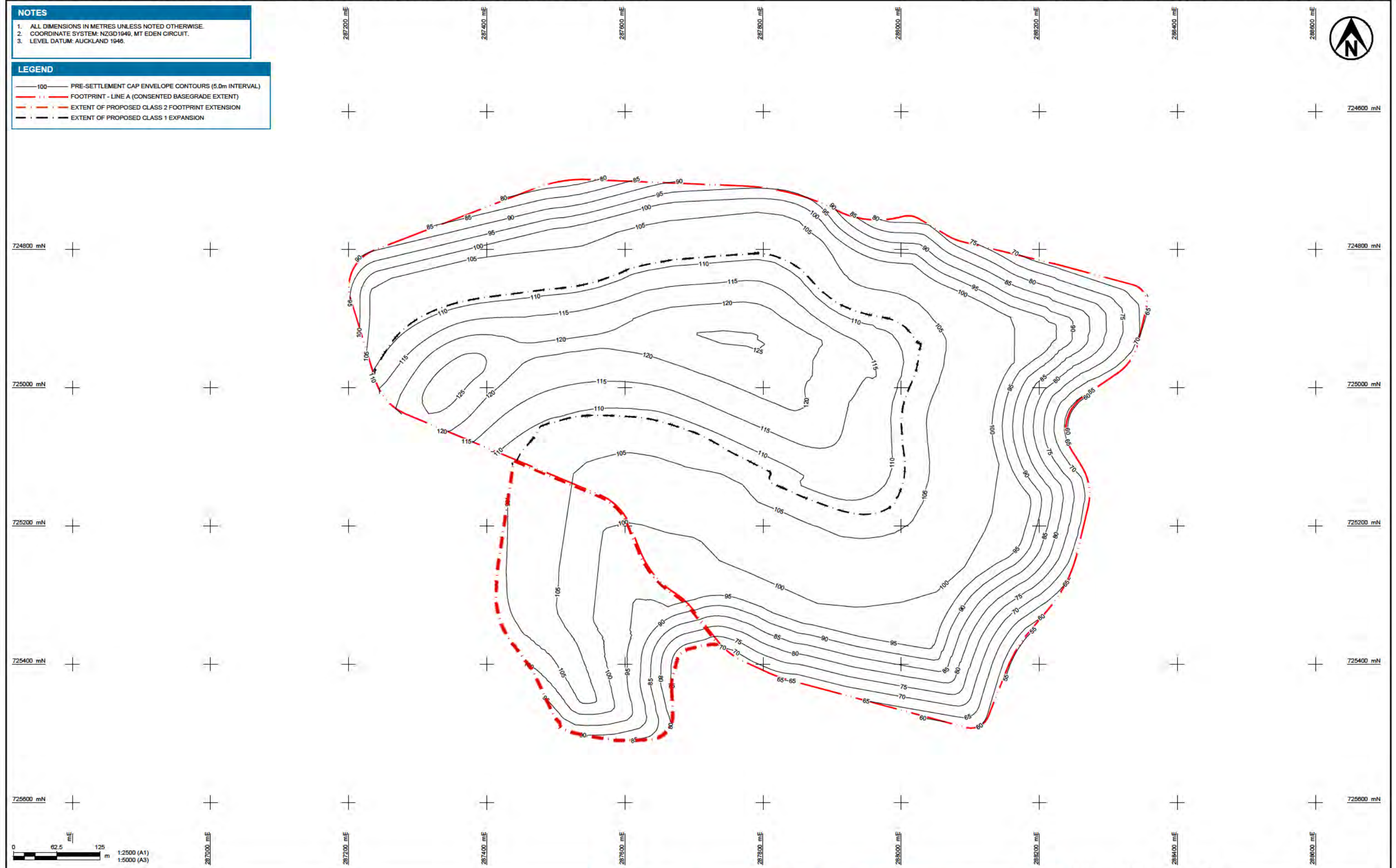
- LEGEND**
- 100 POST-SETTLEMENT CAP CONTOURS (5.0m INTERVAL)
 - EXTENT OF REVISED FINAL SURFACE PROFILE WITHIN EXISTING LANDFILL
 - EXTENT OF CLASS 2 FOOTPRINT EXTENSION CAP
 - FOOTPRINT - LINE A (CONSENTED BASEGRADE EXTENT)
 - CONSENT DESIGN PERIMETER ROAD
 - PROPOSED ROAD
 - CAP DRAINS
 - LETDOWN DRAINS
 - STORMWATER DRAINS
 - CULVERTS



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DESIGNED AWS Aug.26		DRAWING STATUS		CLIENT WM NEW ZEALAND	
DRAWN MELP Aug.26		SUBSTANTIVE ISSUE		PROJECT REDVALE LANDFILL EXPANSION	
DESIGN CHECKED SFE Aug.26		PROJECT PHASE		TITLE PROPOSED FINAL CONTOURS AND DRAINAGE LAYOUT	
DRAWING CHECKED JC Aug.26		CONCEPT DESIGN		SCALE (A1) 1:2500	
NOT FOR CONSTRUCTION		THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		DWG No. 1092369.3000-C14	
APPROVED		DATE		REV A	
A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	
REV	DESCRIPTION	CAD	CHK	DATE	

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND 1948.



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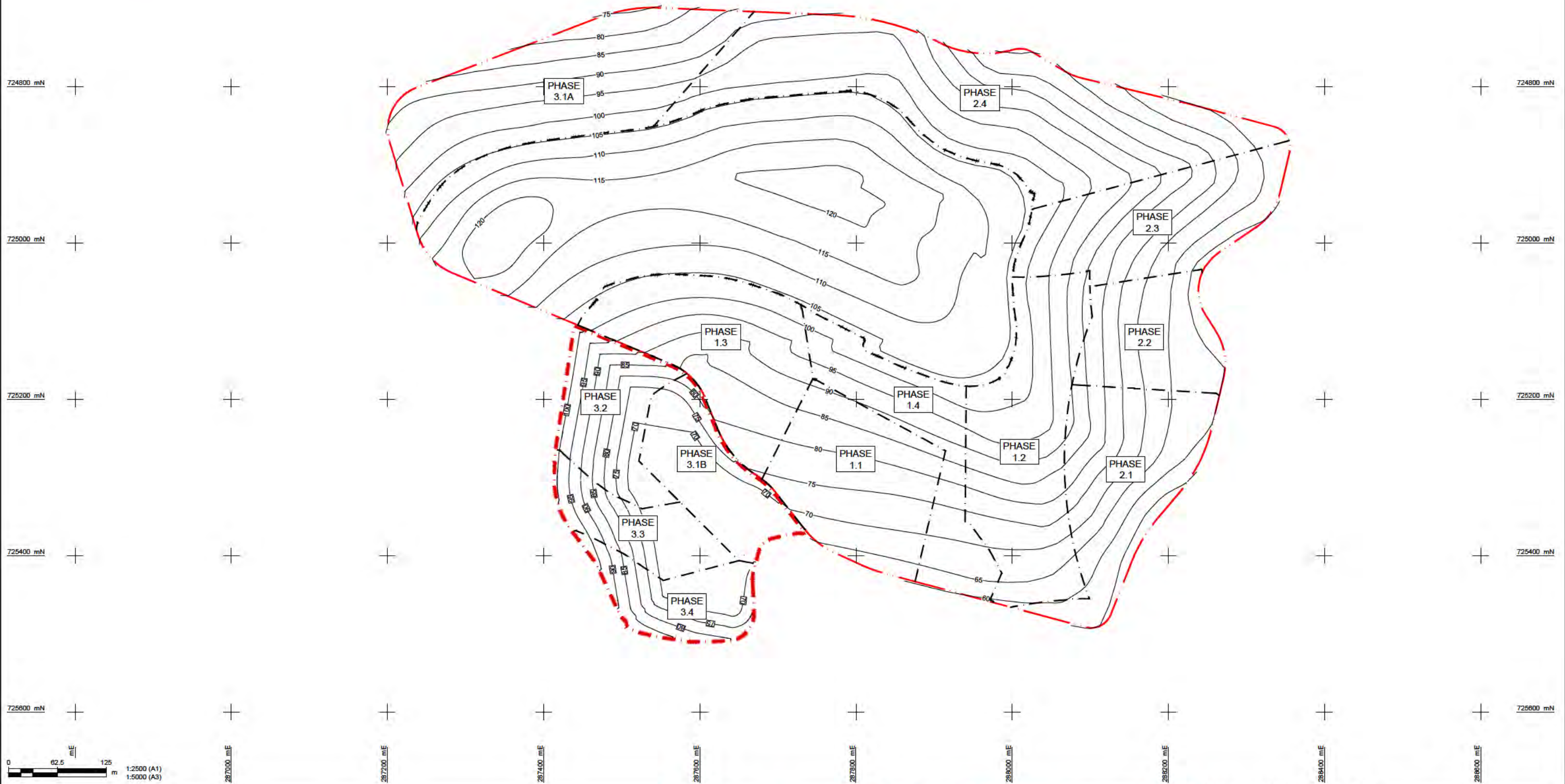
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					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE	
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE	
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN	
NOT FOR CONSTRUCTION					THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED				

NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND 1946.

LEGEND

- 100 EXISTING FINAL CAP CONTOURS (5.0m INTERVAL)
- 100 CLASS 2 BASEGRADE CONTOURS (5.0m INTERVAL)
- FOOTPRINT - LINE A (CONSENTED BASEGRADE EXTENT)
- EXTENT OF PROPOSED CLASS 2 FOOTPRINT EXTENSION
- PROPOSED PHASE BOUNDARIES



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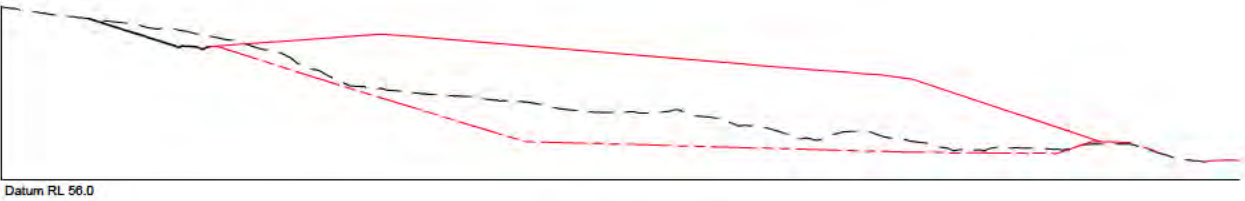
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REV	DESCRIPTION		CAD	CHK	DATE	APPROVED	DATE		NOT FOR CONSTRUCTION		THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED						

NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE SYSTEM: NZSD 1949, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND 1946.

LEGEND

- EXISTING GROUND
--- CONSENTED BASEGRADE
--- PROPOSED BASEGRADE
--- CONSENTED POST SETTLEMENT CAP
--- PROPOSED POST SETTLEMENT CAP
--- PROPOSED PERIMETER ROAD



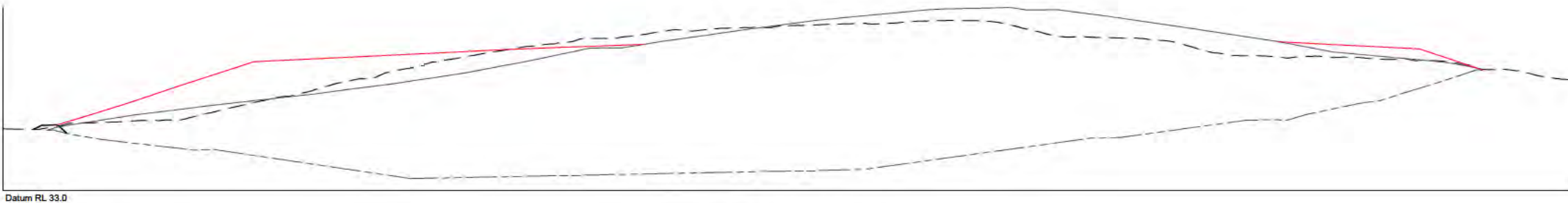
1 SECTION
C14 SCALE (A1) 1:1250
SCALE (A3) 1:2500



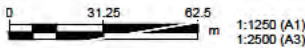
2 SECTION
C14 SCALE (A1) 1:1500
SCALE (A3) 1:3000



3 SECTION
C14 SCALE (A1) 1:1250
SCALE (A3) 1:2500



4 SECTION
C14 SCALE (A1) 1:1250
SCALE (A3) 1:2500



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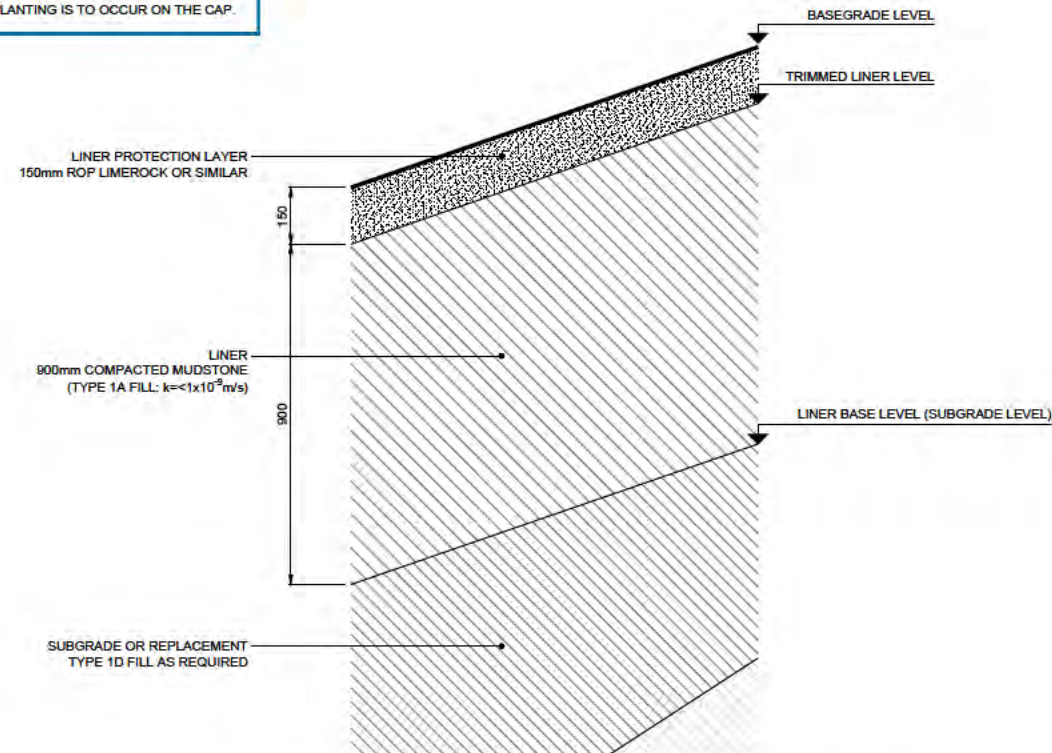
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					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN
					NOT FOR CONSTRUCTION			
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE		

CLIENT **WM NEW ZEALAND**
PROJECT **REDVALE LANDFILL EXPANSION**
TITLE **CROSS SECTIONS**

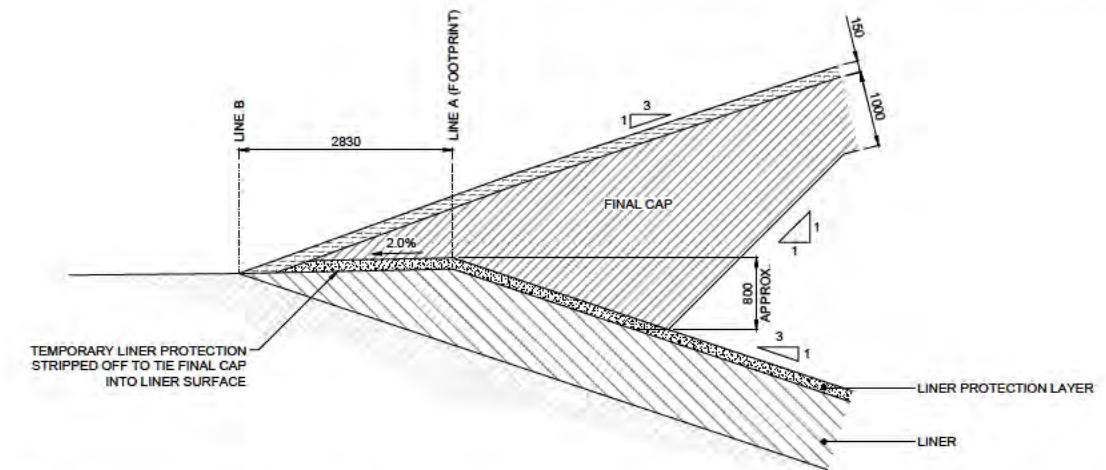
SCALE (A1) AS SHOWN DWG No. 1092369.3000-C20 REV A

NOTES

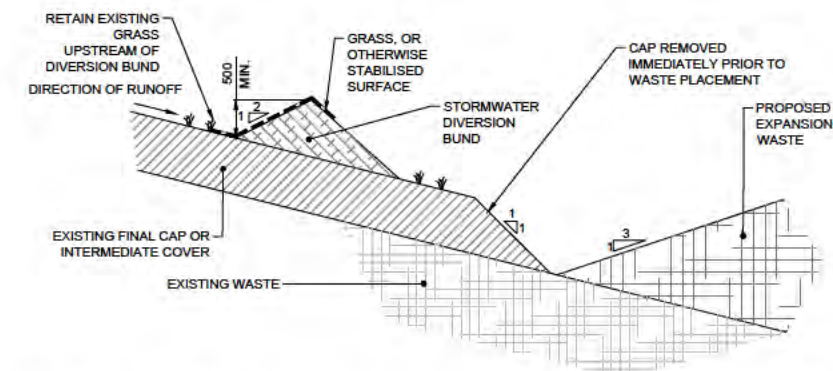
1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. STORMWATER DIVERSION BUND TO BE REMOVED AND REPLACED WITH 150mm THICK LINER PROTECTION LAYER PRIOR TO PLACING REFUSE.
3. CAP THICKNESS VARIES WHERE PLANTING IS TO OCCUR ON THE CAP.



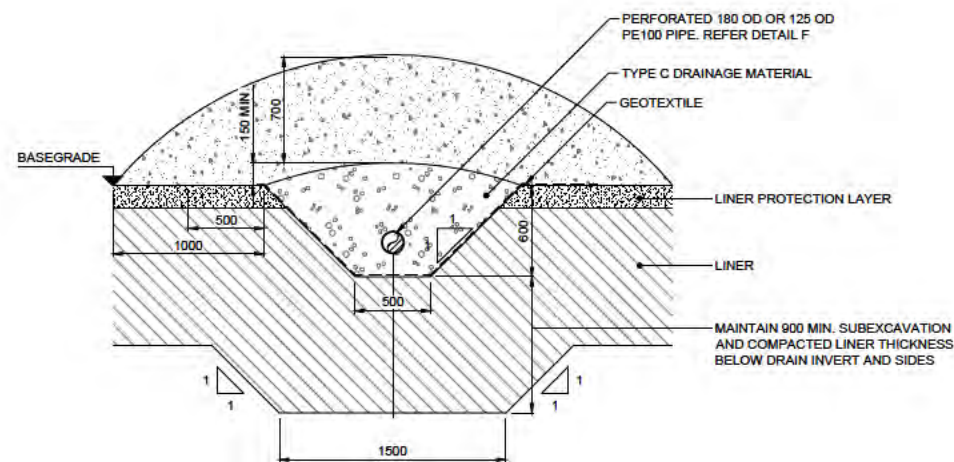
A STANDARD CLASS 1 LANDFILL LINING SYSTEM
SCALE (A1) 1:10
SCALE (A3) 1:20



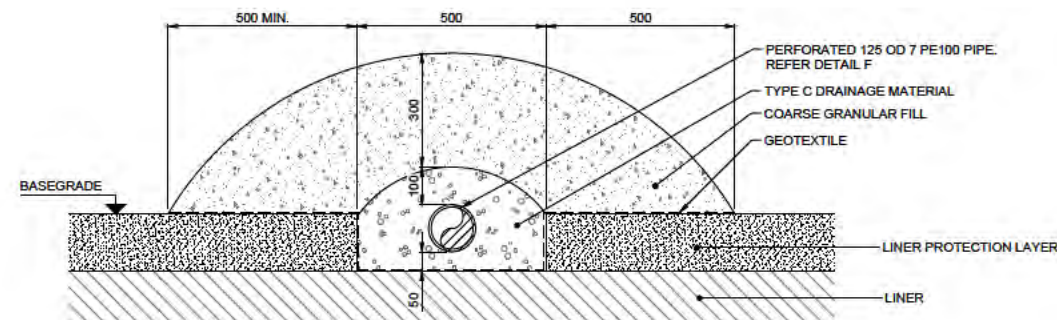
B TYPICAL DETAIL OF CLASS 1 LANDFILL FINAL CAP PERIMETER TIE-IN
SCALE (A1) 1:50
SCALE (A3) 1:100



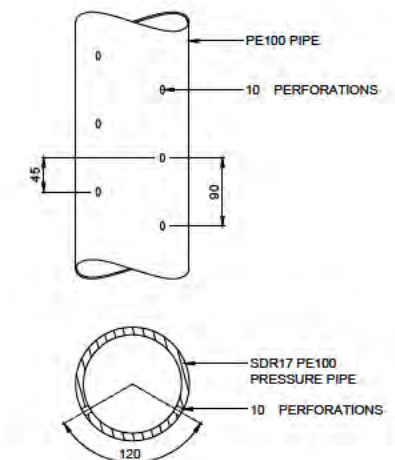
C TYPICAL TEMPORARY CLASS 1 LANDFILL STORMWATER DIVERSION BUND
SCALE (A1) 1:50
SCALE (A3) 1:100



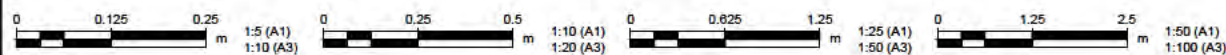
D TYPICAL CLASS 1 LANDFILL LEACHATE COLLECTOR DRAIN
SCALE (A1) 1:25
SCALE (A3) 1:50



E TYPICAL CLASS 1 LANDFILL LEACHATE CUTOFF DRAIN
SCALE (A1) 1:10
SCALE (A3) 1:20



F LEACHATE COLLECTOR PIPE PERFORATIONS
SCALE (A1) 1:5
SCALE (A3) 1:10

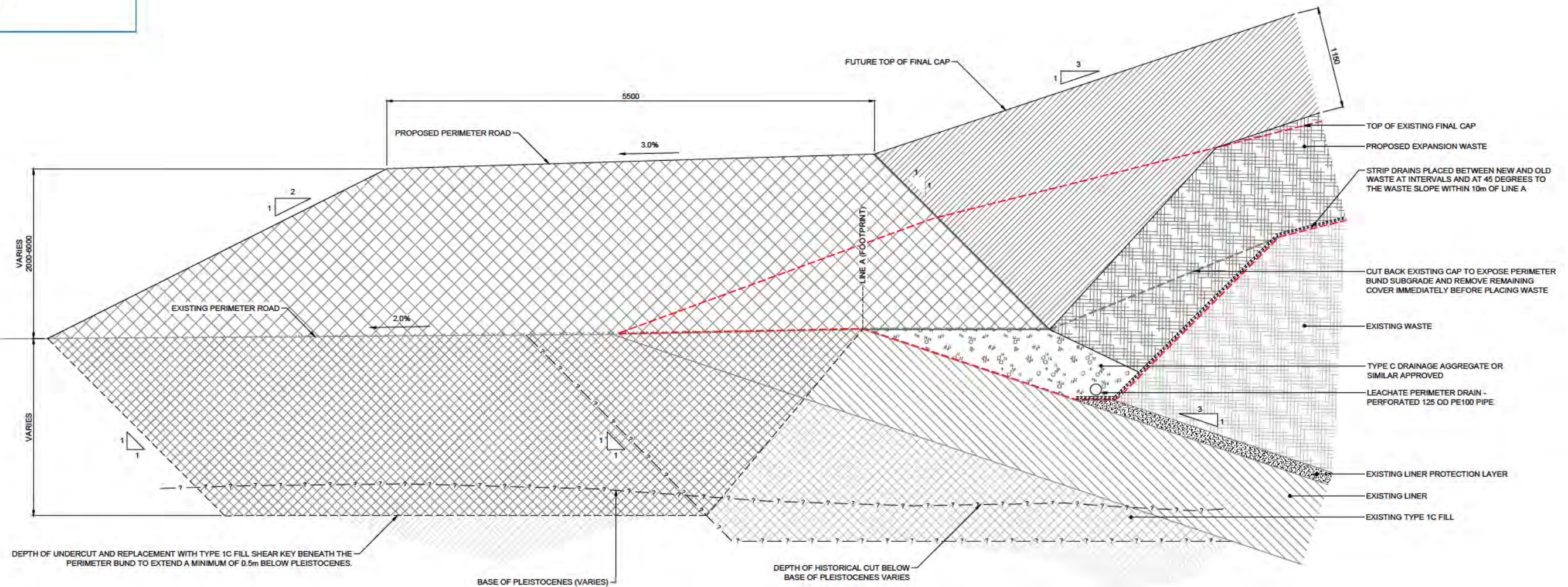


NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

LEGEND

---	EXTENT OF EXISTING CAP AND WASTE TO BE REMOVED
	EXISTING LINER
	EXISTING LINER PROTECTION LAYER
	PROPOSED FINAL CAP
	PROPOSED TYPE C DRAINAGE
	EXISTING WASTE
	FUTURE WASTE
	EXISTING TYPE 1C FILL
	FUTURE TYPE 1C FILL



5 TYPICAL DETAIL OF PERIMETER BUND AND REVISED FINAL SURFACE TIE-IN
C14 SCALE (A1) 1:25
SCALE (A3) 1:50

0 0.625 1.25 m
1:25 (A1)
1:50 (A3)



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A SUBSTANTIVE ISSUE

REV DESCRIPTION

MELP AWS 10.08.26

CAD CHK DATE

NOT FOR CONSTRUCTION

APPROVED

DATE

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

DESIGNED	AWS	Aug.26
DRAWN	MELP	Aug.26
DESIGN CHECKED	SFE	Aug.26
DRAWING CHECKED	JC	Aug.26

DRAWING STATUS	SUBSTANTIVE ISSUE
PROJECT PHASE	CONCEPT DESIGN

CLIENT WM NEW ZEALAND

PROJECT REDVALE LANDFILL EXPANSION

TITLE CLASS 1 PERIMETER BUND DETAILS

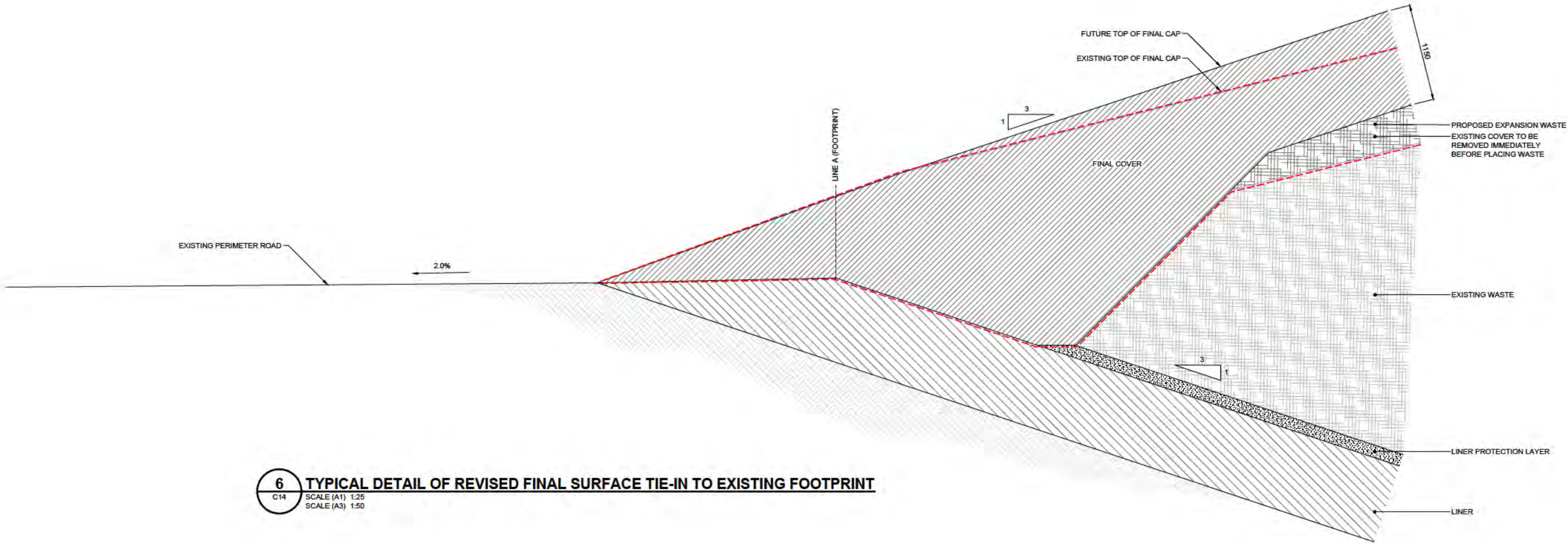
SCALE (A1) 1:25

DWG No. 1092369.3000-C31

REV A

NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.



6

TYPICAL DETAIL OF REVISED FINAL SURFACE TIE-IN TO EXISTING FOOTPRINT

C14

SCALE (A1) 1:25
SCALE (A3) 1:50

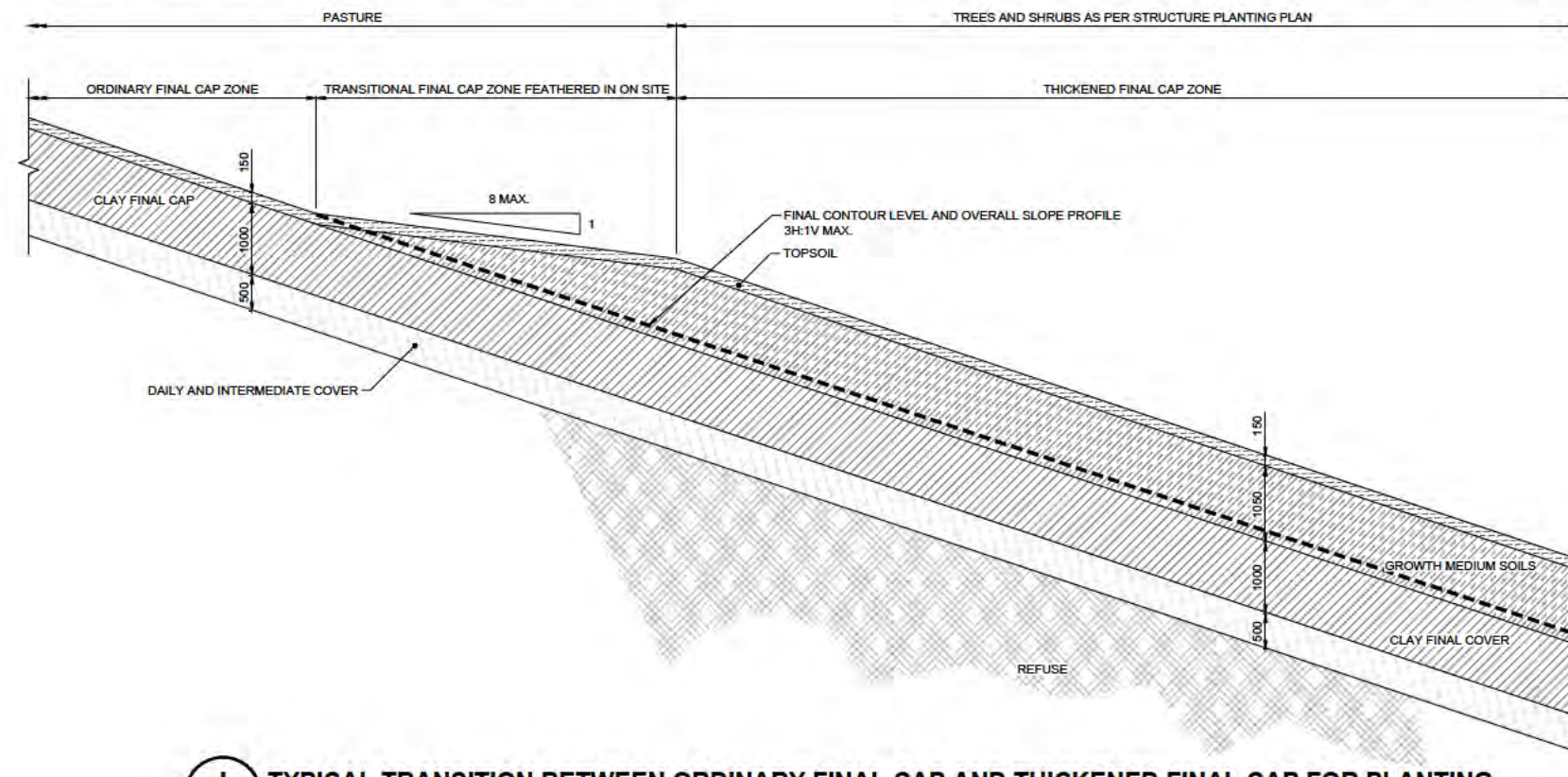


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					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN
					NOT FOR CONSTRUCTION			THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE		

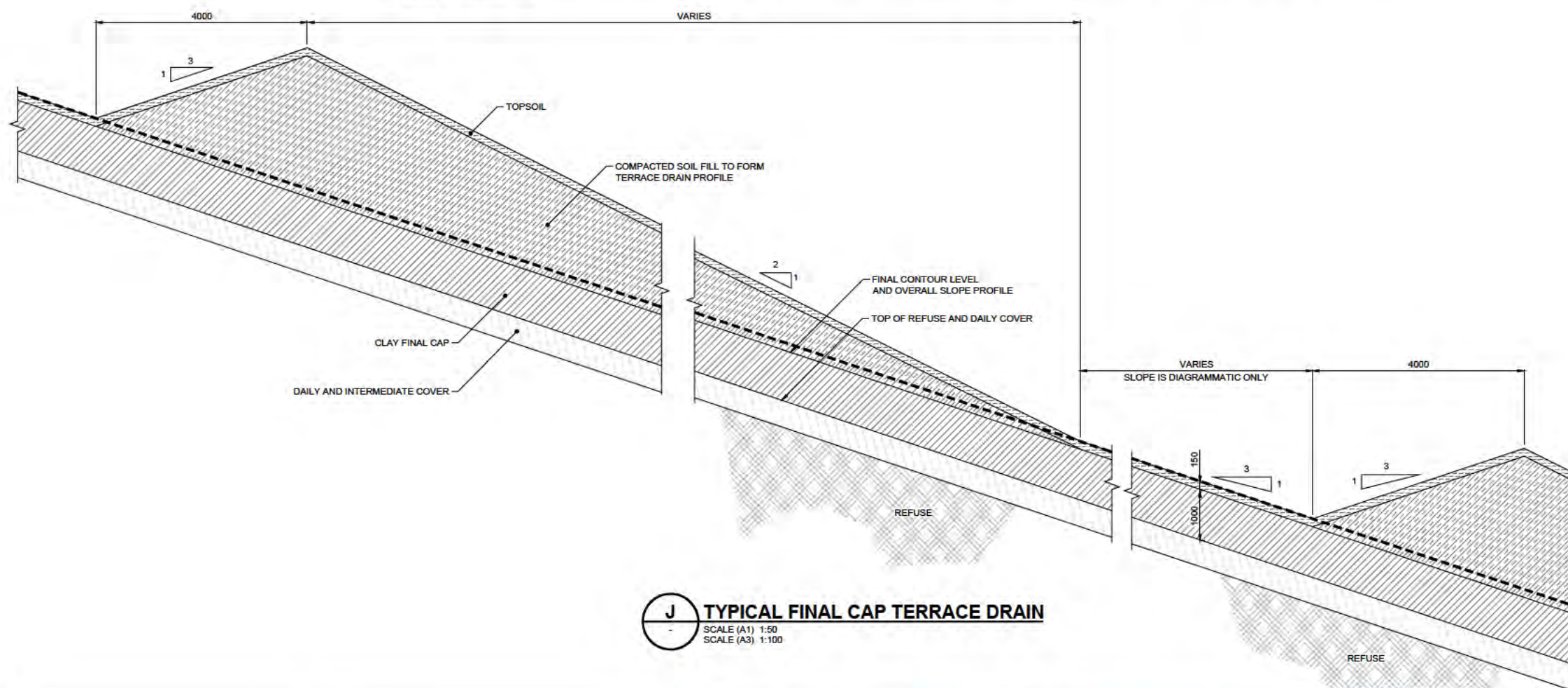
CLIENT	WM NEW ZEALAND
PROJECT	REDVALE LANDFILL EXPANSION
TITLE	CLASS 1 NORTHERN PERIMETER DETAILS
SCALE (A1)	1:25
DWG No.	1092369.3000-C32
REV	A

NOTES

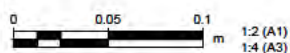
1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.



I TYPICAL TRANSITION BETWEEN ORDINARY FINAL CAP AND THICKENED FINAL CAP FOR PLANTING
SCALE (A1) 1:50
SCALE (A3) 1:100



J TYPICAL FINAL CAP TERRACE DRAIN
SCALE (A1) 1:50
SCALE (A3) 1:100

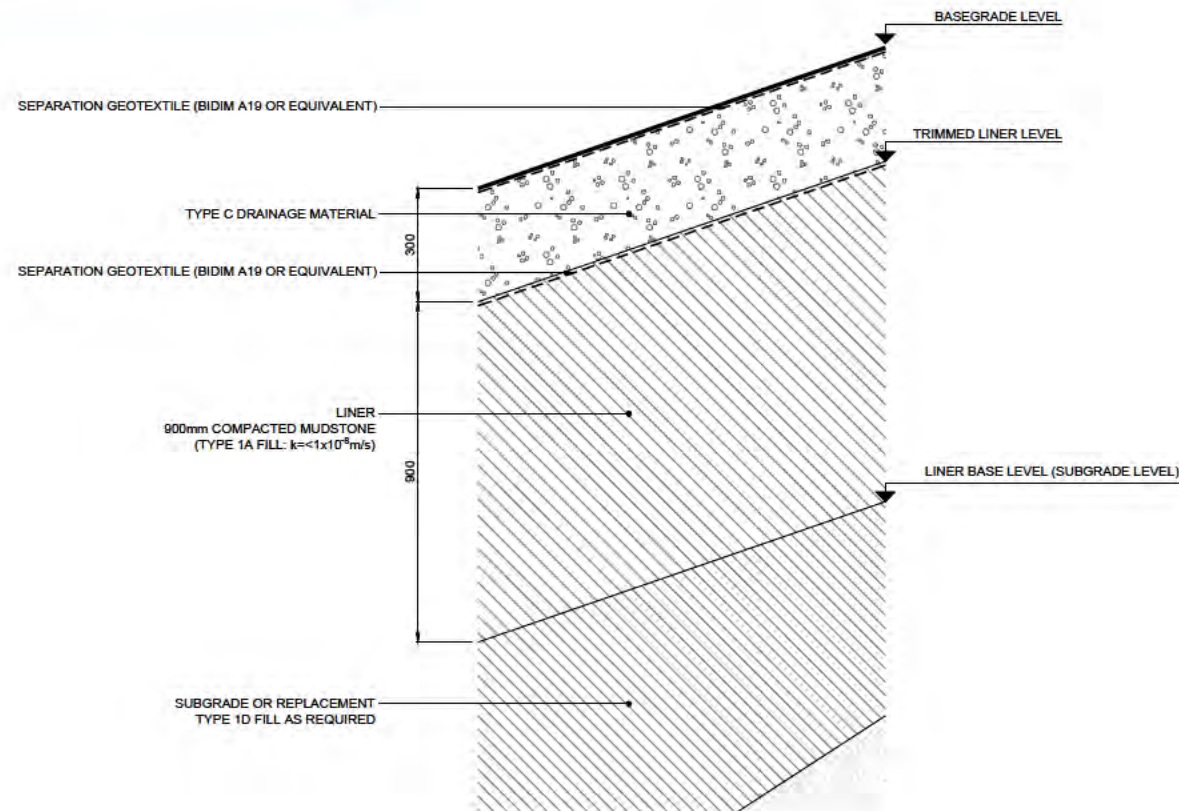


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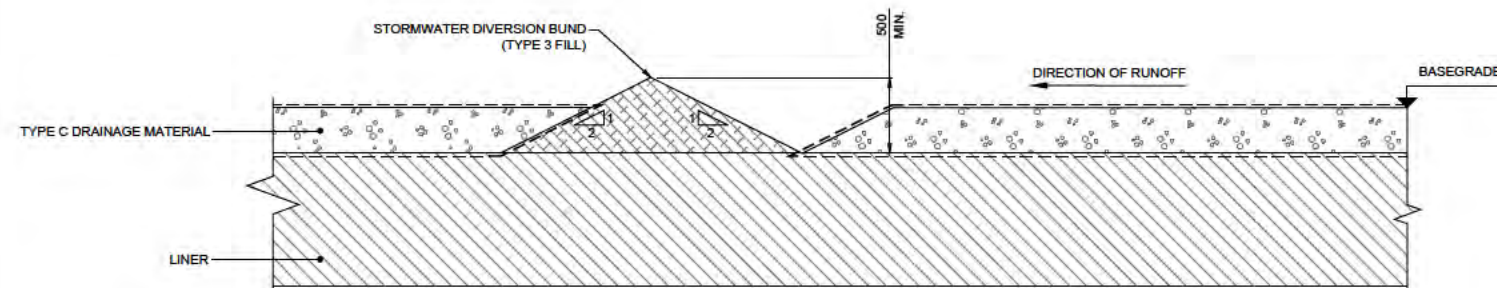
A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED	AWS	Aug.26	DRAWING STATUS	CLIENT WM NEW ZEALAND		
					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE			
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE			
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN			
					NOT FOR CONSTRUCTION				THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED	TITLE CLASS 1 AND CLASS 2 CAP DETAILS	
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED		DATE		SCALE (A1) 1:50	DWG No. 1092369.3000-C33	REV A

NOTES

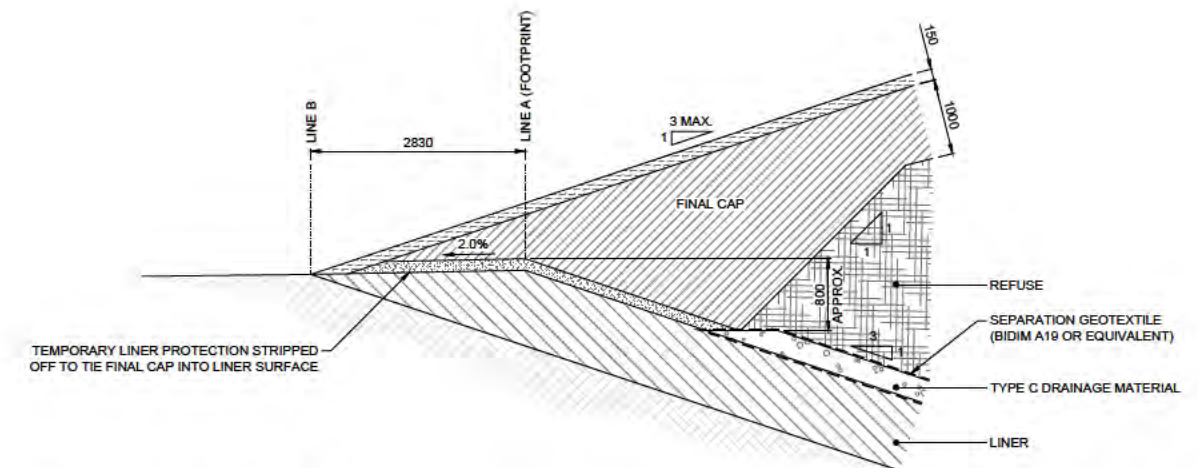
1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. LEACHATE DRAINAGE LAYER THICKNESS SHALL BE A MINIMUM OF 300mm FOR TYPE C AGGREGATE.
3. STORMWATER DIVERSION BUND TO BE REMOVED AND REPLACED WITH 300mm THICK TYPE C AGGREGATE PRIOR TO PLACING REFUSE.



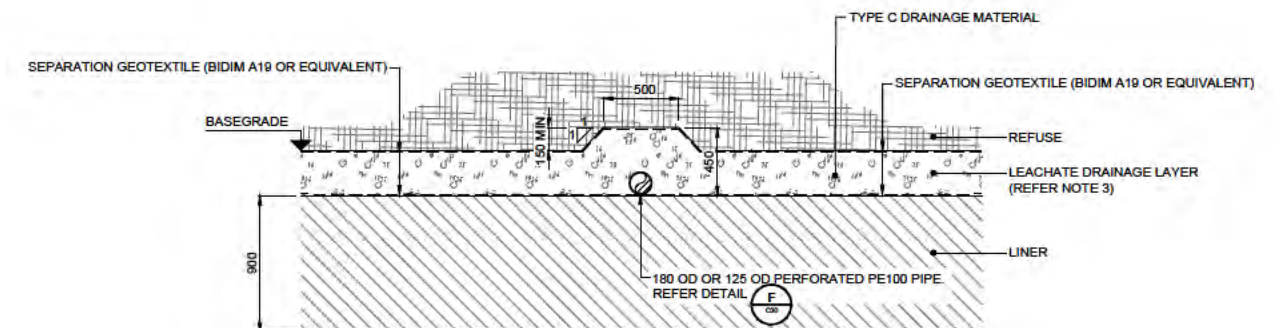
K STANDARD CLASS 2 FOOTPRINT EXTENSION LINING SYSTEM
SCALE (A1) 1:10
SCALE (A3) 1:20



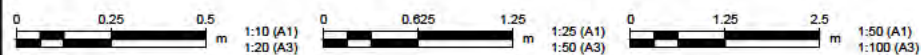
M TYPICAL TEMPORARY CLASS 2 FOOTPRINT EXTENSION STORMWATER DIVERSION BUND
SCALE (A1) 1:25
SCALE (A3) 1:50



L TYPICAL DETAIL OF CLASS 2 FOOTPRINT EXTENSION FINAL CAP PERIMETER TIE-IN
SCALE (A1) 1:50
SCALE (A3) 1:100



N TYPICAL CLASS 2 FOOTPRINT EXTENSION LEACHATE COLLECTOR DRAIN
SCALE (A1) 1:25
SCALE (A3) 1:50

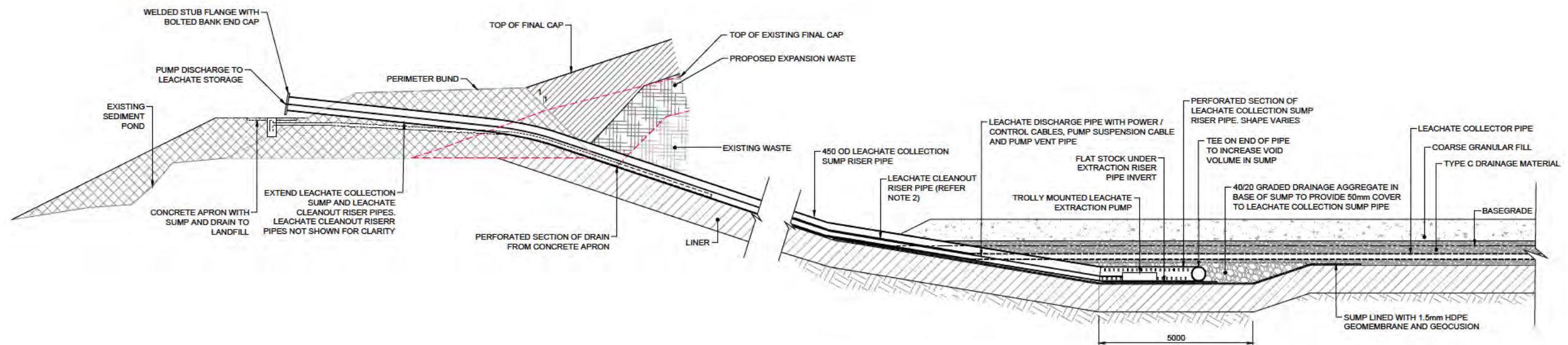


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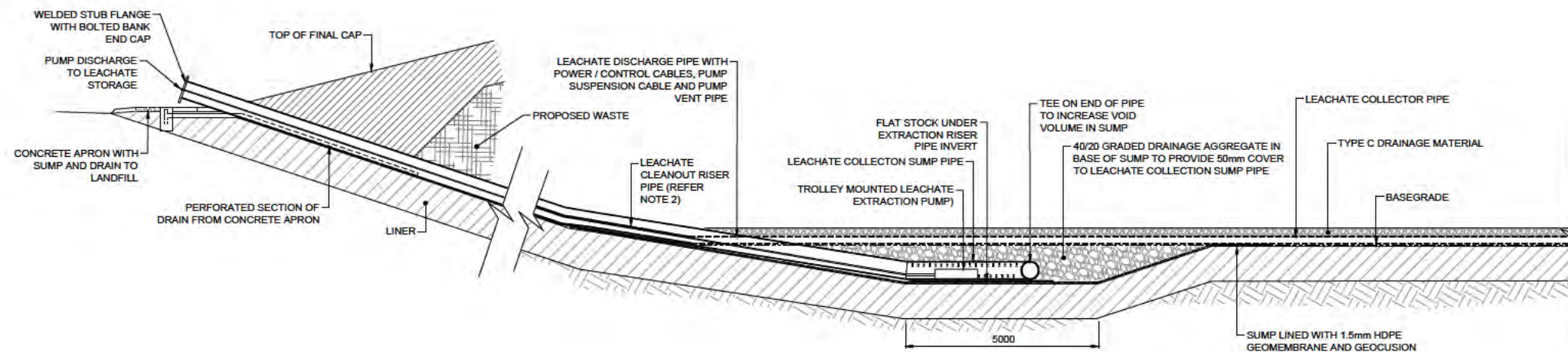
A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED	AWS	Aug.26	DRAWING STATUS	CLIENT WM NEW ZEALAND		
					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE			
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE			
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN			
					NOT FOR CONSTRUCTION				THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE			SCALE (A1) AS SHOWN	DWG No. 1092369.3000-C35	REV A

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. LEACHATE CLEANOUT RISER PIPE NOT SHOWN IN TOP HALF OF SECTION FOR CLARITY.

**CLASS 1 LEACHATE SUMP TYPICAL DETAIL**

SCALE (A1) 1:75
SCALE (A3) 1:150

**CLASS 2 LEACHATE SUMP TYPICAL DETAIL**

SCALE (A1) 1:75
SCALE (A3) 1:150

0 1.875 3.75 m
1:75 (A1)
1:150 (A3)



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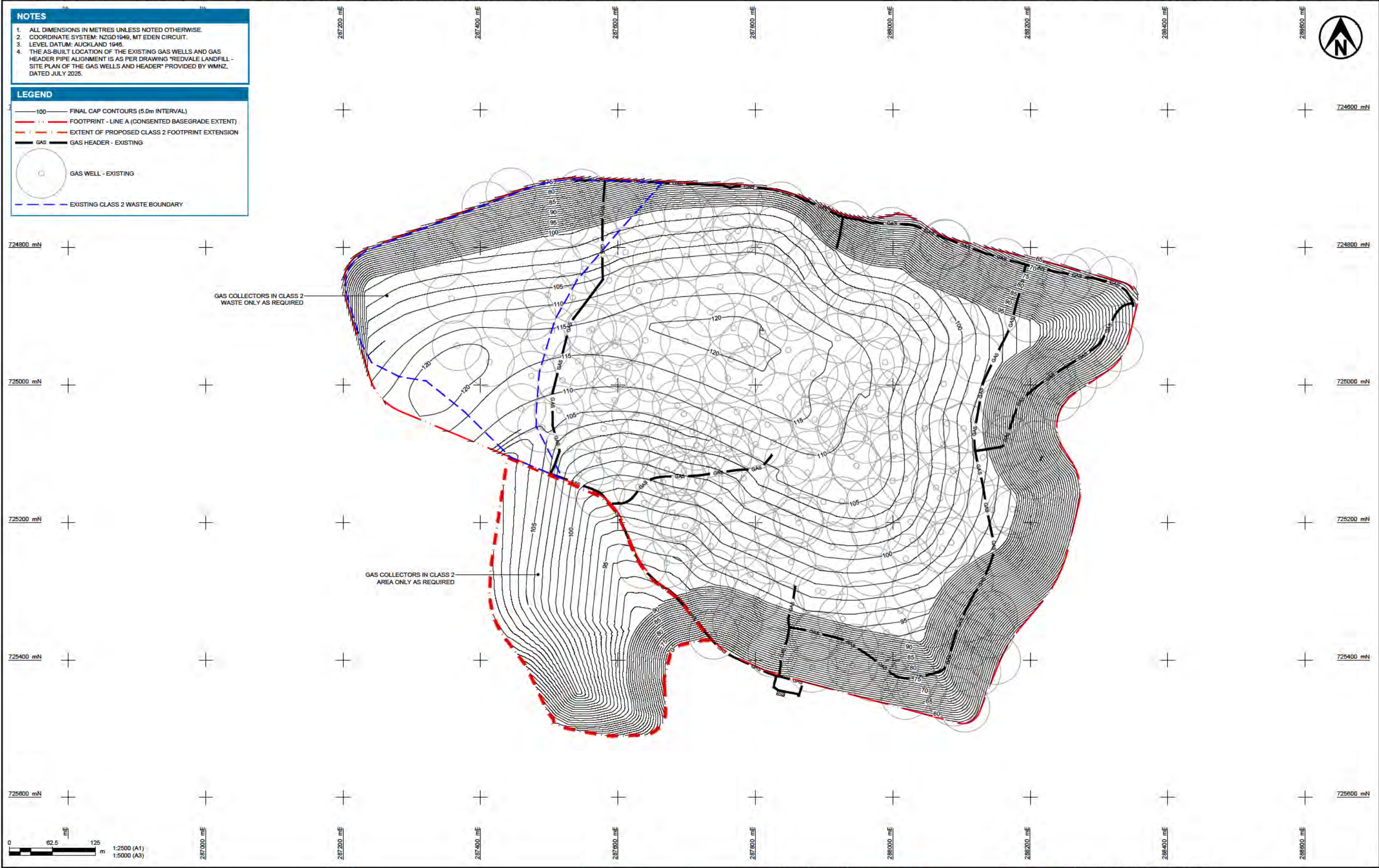
A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED	AWS	Aug.26	DRAWING STATUS	CLIENT WM NEW ZEALAND PROJECT REDVALE LANDFILL EXPANSION TITLE LEACHATE SUMP DETAILS
					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE	
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE	
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN	
					NOT FOR CONSTRUCTION				THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED		DATE	SCALE (A1) 1:75	
								DWG No. 1092369.3000-C36	
								REV A	

NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE SYSTEM: NZGD1949, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND 1948.
4. THE AS-BUILT LOCATION OF THE EXISTING GAS WELLS AND GAS HEADER PIPE ALIGNMENT IS AS PER DRAWING "REDVALE LANDFILL - SITE PLAN OF THE GAS WELLS AND HEADER" PROVIDED BY WMNZ, DATED JULY 2025.

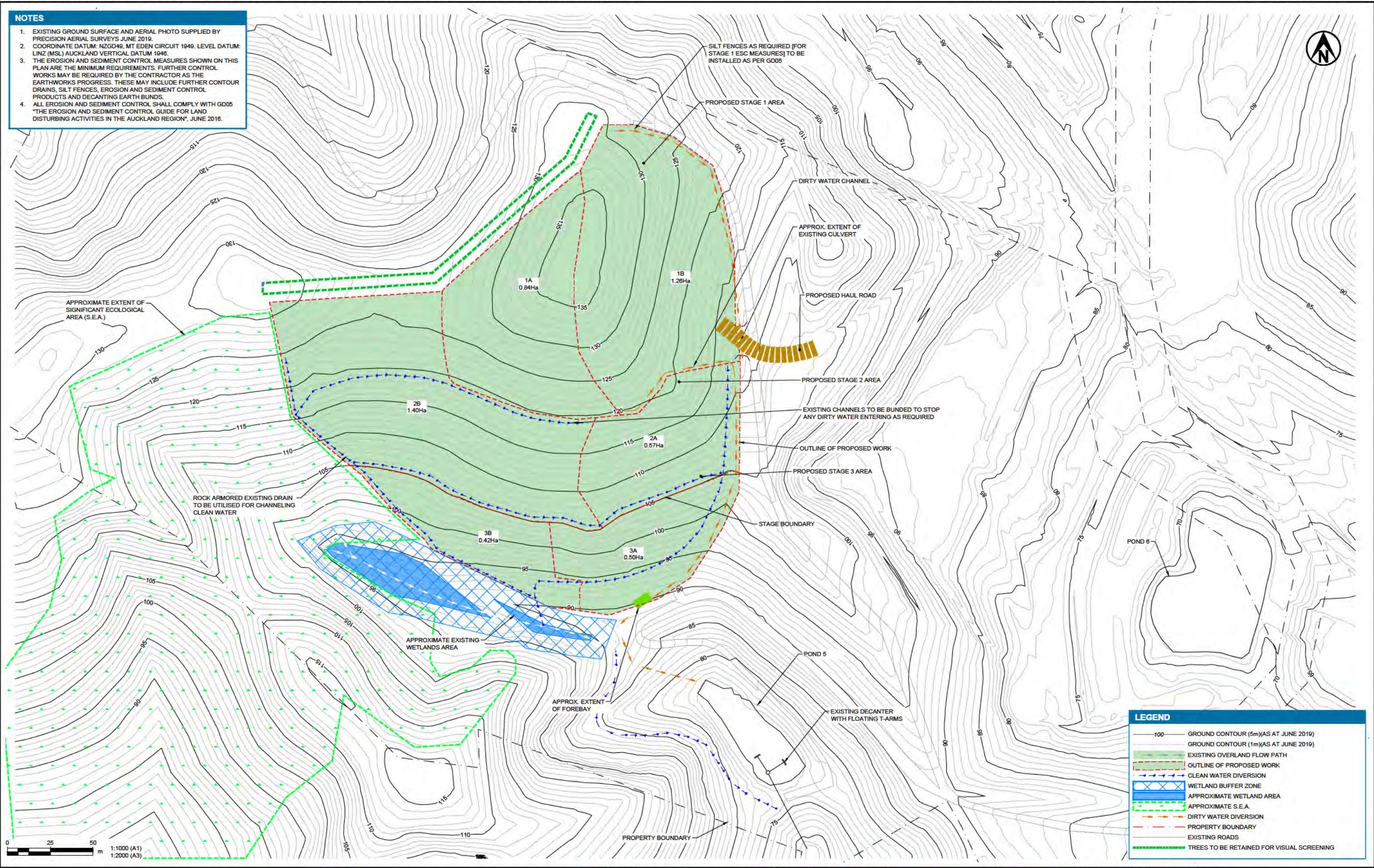
LEGEND

- 100 FINAL CAP CONTOURS (5.0m INTERVAL)
- FOOTPRINT - LINE A (CONSENTED BASEGRADE EXTENT)
- EXTENT OF PROPOSED CLASS 2 FOOTPRINT EXTENSION
- GAS GAS HEADER - EXISTING
- GAS WELL - EXISTING
- EXISTING CLASS 2 WASTE BOUNDARY



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DESIGNED AWS Aug.26		DRAWING STATUS		CLIENT WM NEW ZEALAND	
DRAWN MELP Aug.26		SUBSTANTIVE ISSUE		PROJECT REDVALE LANDFILL EXPANSION	
DESIGN CHECKED SFE Aug.26		PROJECT PHASE		TITLE GAS COLLECTION SYSTEM LAYOUT	
DRAWING CHECKED JC Aug.26		CONCEPT DESIGN		SCALE (A1) 1:2500	
NOT FOR CONSTRUCTION		THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		DWG No. 1092369.3000-C40	
APPROVED		DATE		REV A	
A SUBSTANTIVE ISSUE		MELP AWS 10.08.26			
REV	DESCRIPTION	CAD	CHK	DATE	



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A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED	AWS	Aug.26	DRAWING STATUS	CLIENT WM NEW ZEALAND		
					DRAWN	MELP	Aug.26	SUBSTANTIVE ISSUE			
					DESIGN CHECKED	SFE	Aug.26	PROJECT PHASE			
					DRAWING CHECKED	JC	Aug.26	CONCEPT DESIGN			
					NOT FOR CONSTRUCTION				THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED		DATE	SCALE (A1) 1:1000		DWG No. 1092369.3000-C50	REV A

NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

2. CLEAN / DIRTY WATER DIVERSION CHANNELS TO BE ARMoured WHERE NECESSARY TO PREVENT EROSION.

LEGEND

GROUND CONTOUR (5m) (AS AT JUNE 2019)

GROUND CONTOUR (1m) (AS AT JUNE 2019)

EXISTING OVERLAND FLOW PATH

STABILISED AREA

WORKING PLATFORM

OUTLINE OF PROPOSED WORK - STAGE 3

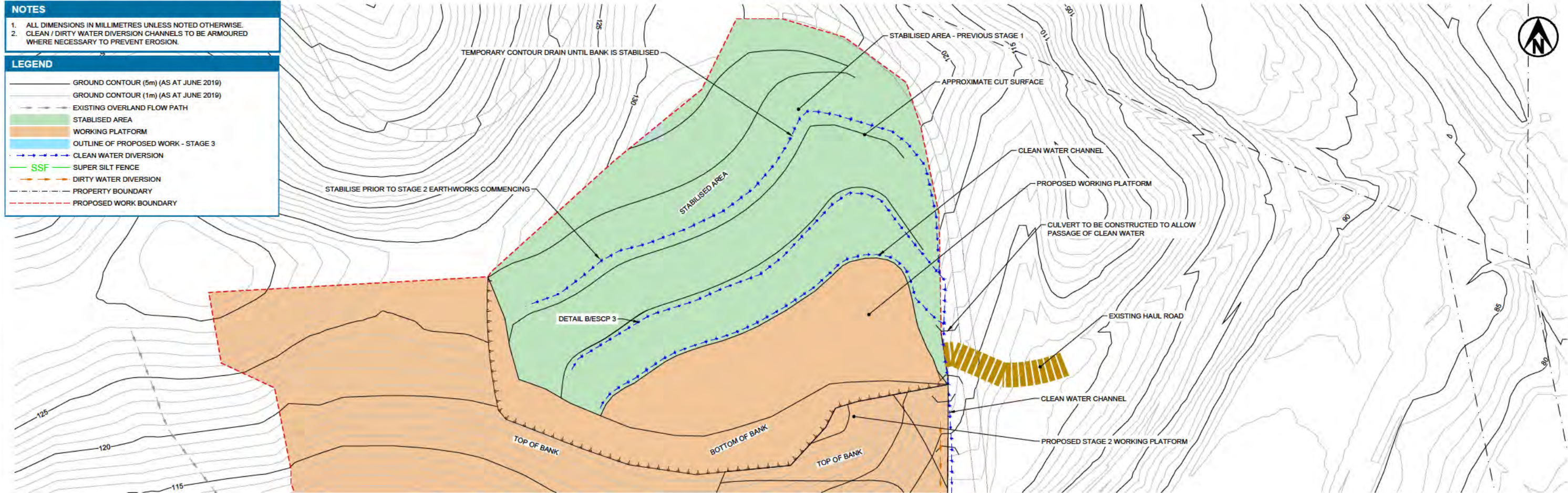
CLEAN WATER DIVERSION

SSF SUPER SILT FENCE

DIRTY WATER DIVERSION

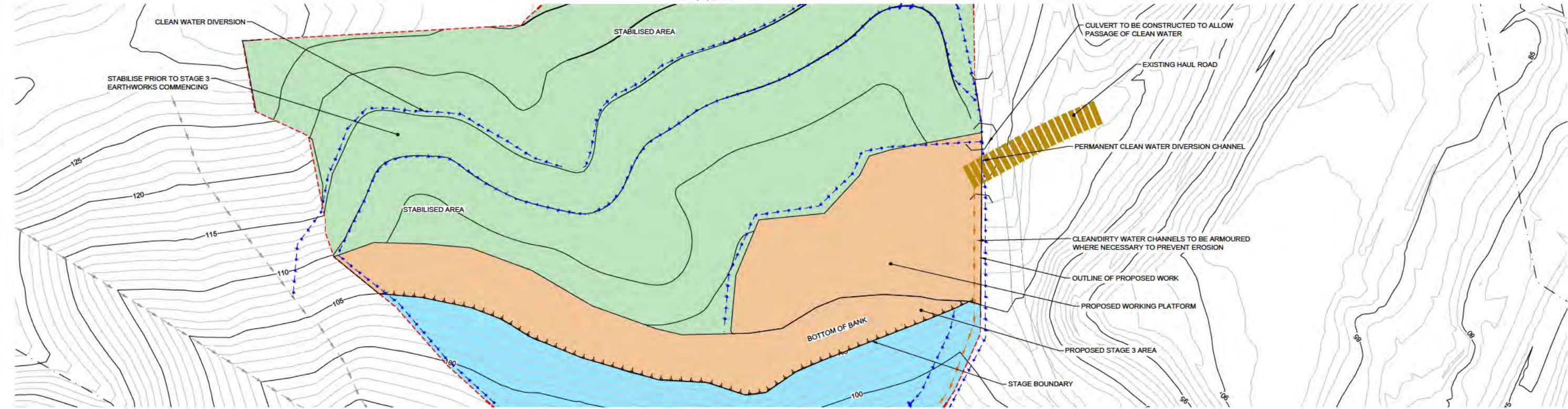
PROPERTY BOUNDARY

PROPOSED WORK BOUNDARY



END OF STAGE 1 / START OF STAGE 2

SCALE (A1) 1:750
SCALE (A3) 1:1500



END OF STAGE 2 / START OF STAGE 3

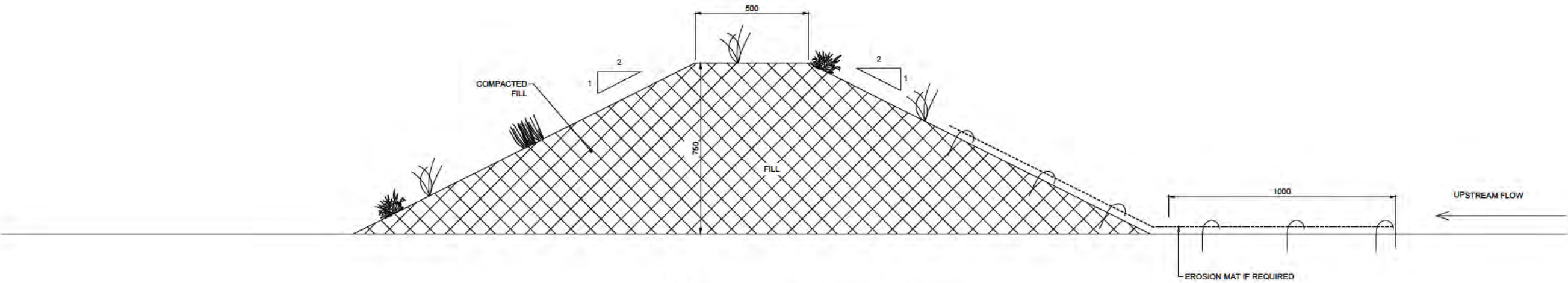
SCALE (A1) 1:750
SCALE (A3) 1:1500



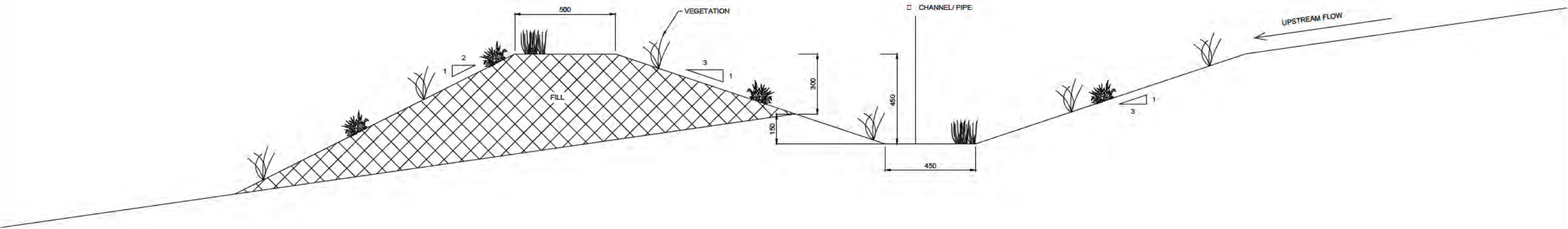
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NOTES

1. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES TO COMPLY WITH AND BE CONSTRUCTED IN ACCORDANCE WITH GD05.
3. TYPICAL DETAILS SOURCED FROM AUCKLAND REGIONAL COUNCIL GD05.



A EARTH BUND - TYPICAL SECTION
SCALE (A1) 1:10
SCALE (A3) 1:20



B CLEAN WATER DIVERSION CHANNEL - TYPICAL SECTION
SCALE (A1) 1:10
SCALE (A3) 1:20



1:10 (A1)
1:20 (A3)



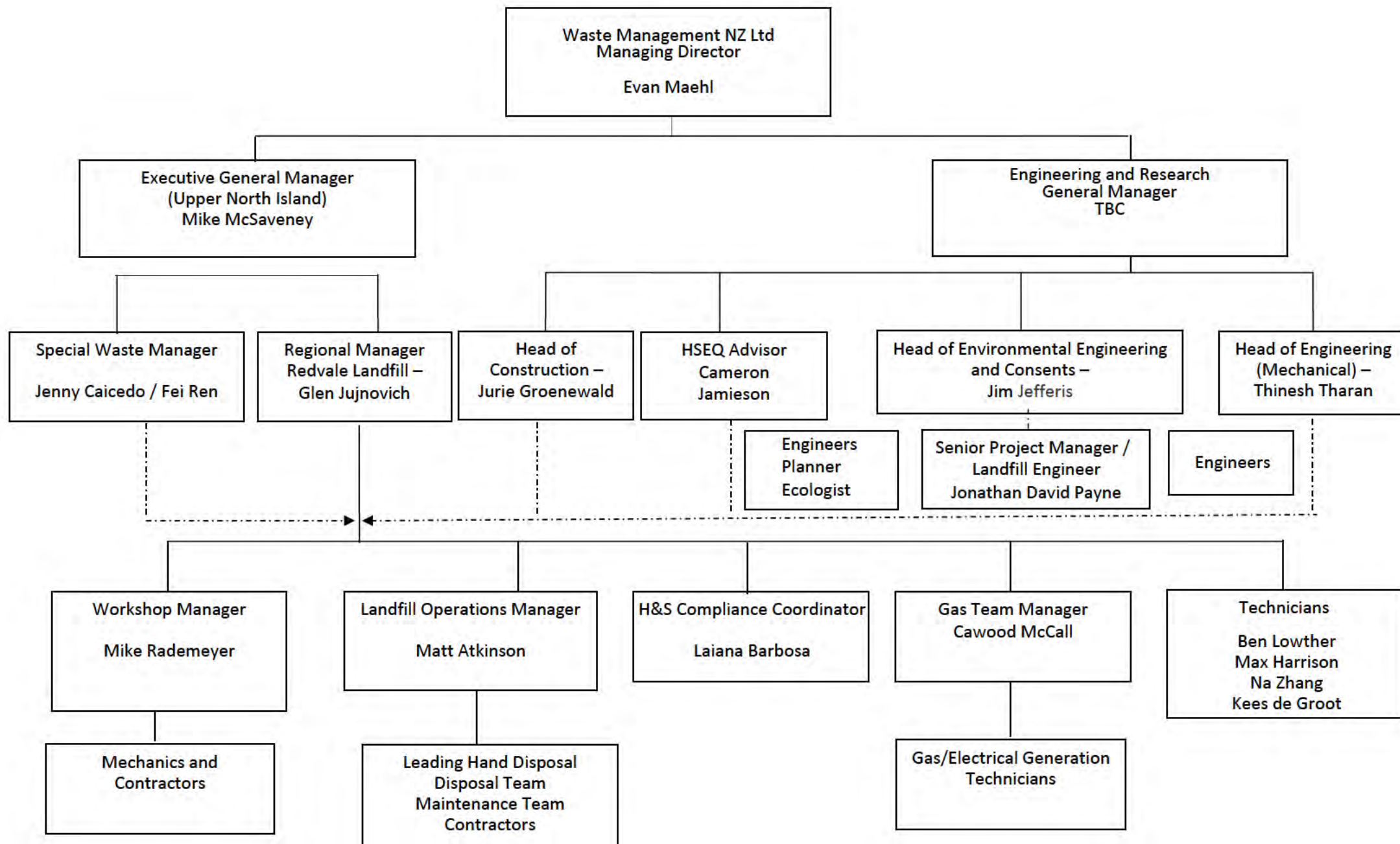
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A	SUBSTANTIVE ISSUE	MELP	AWS	10.08.26	DESIGNED	AWS	Aug.26	DRAWING STATUS SUBSTANTIVE ISSUE PROJECT PHASE CONCEPT DESIGN	CLIENT	WM NEW ZEALAND			
					DRAWN	MELP	Aug.26		PROJECT	REDVALE LANDFILL EXPANSION			
					DESIGN CHECKED	SFE	Aug.26		TITLE STOCKPILE 4 DETAILS				
					DRAWING CHECKED	JC	Aug.26						
					NOT FOR CONSTRUCTION					THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED			
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE		SCALE (A1)	1:10	DWG No.	1092369.3000-C52	REV	A

Appendix B Staff Organisation Chart

DRAFT



Redvale Landfill Staff Organisation Chart

2 Community and Iwi Liaison

This contains the following sections:

- Section 2.1 – Iwi Liaison
- Section 2.2 – Community Liaison
- Section 2.3 – Complaints Management
- Section 2.4 – Community Trust
- Section 2.5 – Peer Review Panel

DRAFT

2.1 Iwi Liaison

[To be confirmed with mana whenua partners]

2.2 Community Liaison

2.2.1 Good Neighbour Policy

WMNZ will seek to operate the Redvale Landfill in a manner of a good neighbour.

WMNZ will maintain and respect the right of the public to approach the Company in the event of unexpected problems or any nuisance from the landfill operation. The Company will facilitate this by encouraging a Community Liaison Committee (CLC) to meet regularly and by establishing a formal procedure for responding to complaints.

2.2.2 Community Liaison Committee

The main aim of CLC will be to bridge the gap between the Redvale Landfill and the Surrounding Community. The role of the CLC will be as below:

- Establish and maintain a forum for communication between the consent holder and the community surrounding Redvale Landfill
- Disseminate information about Redvale Landfill, to the local community
- Hear the concerns of residents and people working in proximity to the landfill, and to review complaints
- hear and recommend proposals to alleviate those concerns relating to the landfill from complainants, the consent holder and other parties;
- receive, discuss and consider as it sees fit any material provided to it by WMNZ, including material provided in accordance with *[Condition XX]*, and to provide such feedback to the WMNZ as it deems appropriate and to consult with the WMNZ on relevant matters in the LMP in accordance with *[Condition XX]*.

2.2.2.1 Membership of CLC

The CLC will comprise the following representatives in accordance with *[Condition XX]*. The Committee will comprise 'appointees' as opposed to formal 'members' because there will be no binding rules other than to satisfy the consent condition.

The composition of the Committee will be as follows:

- Local residents including
 - up to 6 resident members being one from each of Richards Road, Dairy Flat Highway, Horseshoe Bush Road and Tender Road Locations
 - up to 2 from the Dairy Flat Community Trust Area.
- At least two representatives of WMNZ;
- A representative from Dairy Flat School, if available;
- A representative from the Auckland Council Local Board, if available; and
- A representative from Tangata Whenua, if available

The CLC will appoint an independent chairperson. The Committee either will designate from its regular attendees a Resident's Liaison Officer or will allow the role of Resident's Liaison Officer

defined in the consent conditions to be filled by more direct communications between the Company and residents.

Council staff and members of the PRP may also be invited by the CLC and WMNZ to attend CLC meetings.

If a representative resigns or retires, then the landfill operator will aim for a replacement from the same residential quarter and will ask the group they represent to help find a replacement representative. The landfill operator will accept any replacements appointed by resigners in accordance with the Guidelines.

The composition of committee includes the following:

- Chairman
- AC representative
- PRP representative
- PRP representative
- WMNZ company representative
- Minute secretary
- Dairy Flat Local Board Member
- Dairy Flat School
- Representatives from neighbourhood residents (all meetings remain open to all residents)
- Tangata Whenua representative

The current composition of the CLC can be found at the Redvale Energy Park Community Liaison web page.

2.2.2.2 Meetings of CLC

Meetings of the CLC will be held four times per year in normal circumstances or less frequently if decided by the CLC itself at intervals determined by the committee.

The meetings will be held at a local venue to be determined by the Committee Chairman.

A document will be maintained to provide suggested guidelines for conducting CLC meetings (Section 2.2 Appendix A). Minutes will be prepared by WMNZ.

WMNZ will ensure that:

- CLC has adequate secretarial support
- Fulfil the responsibilities of organising the meetings
- Minute preparation and notice of meeting is sent prior to each meeting
- At least 5 working days prior to meeting, a draft agenda will be sent out to eligible members of the CLC, PRP and AC, Dairy Flat School and any member of the public who wishes to attend
- A draft agenda will also include a list of complaints received at the site and those complaints made to AC, since the agenda for previous meeting was issued.
- Minutes are taken with clear action points outlined with appropriate timeframe
- Minutes will be made available to CLC and a copy to AC within 10 working days of the meeting
- A copy of the minutes will be made available in WMNZ community webpage.

A representative of WMNZ, or any other CLC member where appropriate and able to attend will report the progress of the agreed action points of the meeting in the next CLC meeting.

2.2.2.3 Material to be supplied by the WMNZ (the consent holder)

It will be WMNZ's priority to inform the CLC of the on-going or planned activities at Redvale Landfill. WMNZ will be responsible to bear any cost related to the operation of CLC. To support the role of CLC, WMNZ will supply the following information without delay:

- The six monthly PRP reports provided to the Auckland Council;
- Details of any more than minor modifications to the design or methodology chosen for operation and construction of the landfill, where such modifications are the subject of a request for PRP or Auckland Council approval under [Condition XX];
- Proposed changes to the LMP, where such are to be submitted to the Auckland Council for approval or to be reviewed in accordance with [Condition XX];
- Access to a hard copy of the LMP will be available at the Landfill during office hours;
- Notification in circumstances where the Auckland Council has advised that it intends to waive the requirement for annual review of the LMP under [Condition XX];
- Details of any equivalent alternative daily cover for which Auckland Council approval is sought under [Condition XX];
- Copies of all reports provided to the Auckland Council relating to odour field inspections under [Condition XX];
- A copy of the recommendations of the independent odour consultant following their review, as provided to the Auckland Council under [Condition XX];
- Copies of the olfactometry and dispersion modelling reports provided to the Auckland Council under [Condition XX];
- An annual update on the airspace remaining at the landfill;
- The records of degrees of settlement of refuse; water monitoring records; and weather station data;
- Copies of any resource consents being sought or submissions made by WMNZ in relation to the Redvale Landfill, prior to the application or submission being lodged with the Council. A copy of the application or submission will be provided to the CLC no later than 5 working days following lodgement of the application or submission with the Council. This also include submission/application made to the council under s127 and s128 of the RMA.
- A line item will be added in the CLC meeting agenda to capture the information about the new resource consent application or variation to the current resource consents sought in relation to the Redvale Landfill.

2.2.2.4 Community consultation

Any update in the management plan requires approval from the PRP and AC. Updates to the following sections of the LMP which have direct relation to the surrounding community will also require consultation with the CLC:

- Nuisance control measures
- Community liaison
- Complaints response procedure for odour effects beyond the notional odour boundary
- Odour management and;
- Landscape mitigation and restoration work

2.2.3 Community Webpage

WMNZ will establish, maintain and periodically update, at its own cost, a community webpage dedicated to communicating information relating to the landfill operation and other information (without limitation) including:

- Information about the CLC, including the role of the CLC and current membership (unless privacy is required by any member);
- Date, time and venue for the next CLC meeting;
- Minutes of CLC meetings (from the date of grant of this consent). Minutes will be posted no later than 10 working days following the relevant meeting;
- Information about the complaints procedure operated by the consent holder and the Council, including business hours and out of hours contact details;

The link for the community webpage: [TBC]

WMNZ will also consider including any other information that the CLC requests be available on the webpage and will endeavour to include such information where appropriate to do so.

Access will be given to the CLC members to the site's weather station data and the link for this will be made available in the community webpage.

2.2.4 Neighbour list

Site management will maintain a confidential list of neighbours and local residents only for the purpose of direct communication if and when required, such as in particular types of emergencies.

2.2.5 Visitors

The landfill operator will host site visits for people and groups interested in the landfill. All visits to the site will be required to be arranged in advance, and a host person employed at the landfill will be nominated. All visitors will be required to sign in and will be issued with security passes. The site's relevant safety procedures will be applied which may involve company induction, site induction, PPE and being accompanied on site. Visitors (other than regular visitors, contractors and tradesmen with appropriate briefing) will be accompanied by a representative of the Company at all times. Visitors will only be allowed to get out of their vehicles in areas designated by the host person, in order to comply with site safety requirements and to minimise disruption to site operations.

2.2.6 Environmental education facility

An Environmental Education Facility will be established and be available to educate all interested parties in the management of the landfill and waste management issues in general. The facility will also be available for use by other parties, such as local schools and community groups, as a venue for meetings.

The Company will allocate resources to a public education programme on the community's role in waste disposal in general and recycling. The Company will aim to coordinate any programme with similar activities carried out by the regulating authorities and other parties.

2.2.7 Non-landfill Area (Site buffer)

From time to time the Company may offer its non-landfill buffer land to community users for activities which are not adverse to landfill operations (eg. Stock grazing)

Appendix A CLC Guidelines

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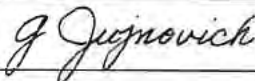


MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

Safety First in everything we do

Date:	01/05/2024	RA No:	WM UNI RED RA 103		
Division:	UNI	Branch/Site:	Redvale Landfill and Energy Park		
Task Location:	Redvale Disposal and Gas Operations	Work Activity:	Managing an External Complaint		
Permits / Authorisations required:	WORK PERMIT: ☐ BREAKTHROUGH: ☐ CONFINED SPACE: ☐ HOT WORK: ☐ FALL PREVENTION: ☐				
Permits / Authorisations approved and reviewed by:				Date:	
Work Instruction prepared in consultation with: <i>List all persons involved</i>	Amirul Kahlid, Glen Jujnovich, Matthew Atkinson & Laiana Barbosa			Date:	01/05/2024
Comments	The steps to take when managing and responding to a complaint that has been made by a member of the public.				
Process:	Name:	Position Title:	Signature:	Date:	
Task Manager Approval:	Amirul Khalid	Odour Technician		4/6/24	
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator	Laiana Barbosa	04/06/2024	
Final Approval:	Glen Jujnovich	Regional Manager		04/06/2024	



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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REQUIRED EQUIPMENT	
PPE Required:    	Additional equipment/Tools: Cell Phone Radio Telephone (RT) Redvale Landfill Complaint form Complaint register Vehicle
REQUIRED LICENCES & COMPETENCIES	
Licences: Class 1	Competencies: A Nose Calibration Certificate from Watercare
LEGISLATIVE REFERENCES (Optional)	
• Redvale Landfill consents • Redvale Landfill Air discharge consent 2013, Consent 37802. • Redvale Landfill, Resource Consents 2016, General Consent condition 27 including requirements to manage Odour and respond to community concerns within 24 hours.	



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

Safety First, in everything we do

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Receipt of Complaint from Community directly or via Auckland Council	- When a complaint is received, the Air Quality Technician (AQT) is to ascertain sufficient information to complete the top portion of the complaint record form. - Immediately notify the disposal Operations Manager or Team Leader of landfill refuse odour, and/or the Generation Manager or Gas Team Leader of landfill gas odour. - Provide them with initial details so they can investigate the source to start corrective action as soon as possible. - If the complaint is received after office hours, when AQT is not on the site, or by email or phone message, confirmation of receipt should be provided to the Complainant, and the complaint details should be forwarded to the next available person being either the Operation Manager/ Generation /Team Leader or Regional Manager or another suitably trained person to action.	All complaints are received through telephone call, text or by an online form for logging complaints which is to be available at all times on the WM Redvale website. DO NOT ENTER THE PROPERTY Ensure conversations with the Complainant always remain calm. Understandably, some community members can become emotional or angry around this issue. Listen, and acknowledge their concerns, and take notes of times, dates, and perception of the type of odour. Thank the Complainant for contacting us in the first instance. Important: Do not give any information on assumed site activities, as the result investigation may differ and confuse the issue. If they require information, you are unable to provide, recommend the	Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		complainant to email the CLC with their questions. If the Complainant becomes aggressive or abusive, confirm the investigation is underway, and they will be notified in due course, and politely terminate the conversation. We are not obliged to visit the properties or meet with complainants who are aggressive or abusive to our staff.	
Initial Response to Complainant	3. The AQT is to explain to the Complainant that: a. The complaint will be investigated promptly. b. Odour type, Rating, Consistency c. A response will be provided within 24 hours either a telephone call, email or text. d. Request an odour rating from the complainant.	Do not give any information on assumed site activities, as the resulting investigation may differ and confuse the issue. The Complainant may at any time register their complaint with Auckland Council. Odour types: 1. Landfill Gas (LFG) 2. Rubbish 3. Chemical	Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System
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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		Intermittent or constant odour 0 Not detectable 1 Very weak 2 Weak 3 Distinct 4 Strong 5 Very strong 6 Extremely strong If the Complainant becomes aggressive or abusive, politely terminate the conversation. We are not obliged to visit the properties of or meet with Complainants who are aggressive or abusive to our staff.	Compliance Coordinator Regional Manager Suitably trained person
Complaint Investigation	4. In most cases, appropriate action(s) will be taken between half an hour and an hour where the complaint is made during the landfill opening hours and as soon as reasonably possible where the complaints are made outside such hours; a. Where practical, visit the complainant's address to validate the odour if they approve. b. The complainant may decline to be visited for the purpose of odour verification. In this instance visit the nearest roadside to validate the	<i>We are not obliged to visit the properties of the complainants. We need to demonstrate a thorough, prompt and sincere response to community concerns, investigation of the issue, and demonstrate a review of our operation on site to</i>	Air Quality Technician OR: Operations Manager Operations Supervisor

5



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	odour where possible and contact the complainant within 2 hours to inform them about the corrective action if the odour is found to be from our site. 5. If there is Odour present, immediately notify Operations advising the type of odour, intensity and direction, request a review of odour suppression measures, and information on any particularly odorous loads tipped. 6. Conduct an internal patrol after the investigation to identify the area that the odour may come from in order to start step 7. 7. Advice/plan with odour labourer to form an action with odour device management: - Device relocation/adjustment - Increase odour chemical dosing rate	ensure the odour source is contained, and suppression measures are adjusted to minimize the chance of a recurrence. DO NOT ENTER THE PROPERTY The investigation must coincide with a review of activities on or deliveries to the site that may contribute to odour, and the effectiveness of suppression measures including suppressant dosing and operation of suppression equipment, and gas network integrity/vacuum. When odour is detected notify the complainant. Verify their complaint and inform them that we will lodge it with Auckland Council and inform the team to further investigate on-site and adjust the suppressant.	Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		Do not aggravate the complainant any further when no odour was detected during the investigation. Keep the conversations short and professional.	
Reporting back to Complainant	8. If there is Odour, respond to the complainant vocally or by sending a written response by TXT or email within 5 working days: a. confirm the details of the complaint. b. accept or reject its validity with reasons. indicate what operationally has been done to mitigate further odour issues.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person

7



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System
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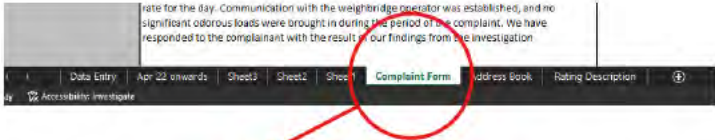
WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Documenting a complaint and reporting it to the council.	Notification must be sent to Auckland Council within 24 hours of the complaint being made. 10. Access the complaint register File path: (I:\Redvale\Environmental\26community\Complaints\Complaint Register) 11. Fill in all information collected from the investigation. All weather data (temperature, humidity, wind speed, wind direction and barometric pressure) are collected on Outpost Central. All information gathered is logged in through the "data entry" category of the complaint register. Before submitting, log the complaint in on Vault, this is to acquire the INCR number. https://app.outpostcentral.com/english/login2.aspx (outpost central) Login: Redvaleguest Password: community  (Data entry at the bottom bar)		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System
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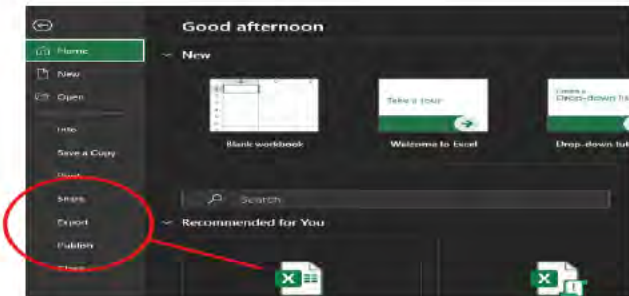
WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	12. Log the complaint on Vault, acquire the INCR number and include the number in the complaints register data entry. Once all details are obtained, press submit.  (Far right of the data entry page) 13. Once submitted, go to the "complaint form" category at the bottom bar.  (In bottom bar) 14. Go to "file" (top left) and go to "export" to export the file into PDF form.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System
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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	 15. Save the created PDF into the "complaints submitted to council" file, choose the year within the file, and save it with the number above the previous complaint form's number.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person

10

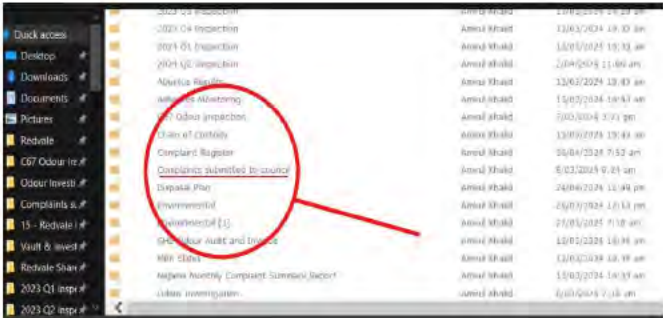


MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	File path: I:\Redvale\Environmental\26community\Complaints\Complaints submitted to the Auckland Council  16. Once it is saved, email the file to the regional manager. His reviewing of the created form is required before sending it away to the council.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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I have read and understood the attached Work Instruction (<i>Enter name and sign</i>)				
Name:	Signature:	Company:	Date:	Inducted By:

2.3 Complaints

2.3.1 Complaints procedure

Provision will be made for any member of the public to make a complaint in regard to any operational matter of the landfill including for example relating to noise, odour, dust, litter, water quality or pests.

The optional ways to make a complaint will include:

- Telephone
- Visit in person
- Text SMS
- Email
- Online form on the community webpage.

The detailed procedure for handling the complaints is outlined in Section 2.3 Appendix A. The main elements of the process will be:

- receipt of complaint
- referral to Landfill Manager or deputy
- investigation
- remedial action
- verbal reply within 2 days, or personal visit within 5 days, or written reply within 5 days.
- individual written record of each complaint
- sign off by Landfill Manager
- complaints register (summary of complaints)
- AC notification within 24 hours
- complaint register available to AC, PRP and CLC.

All employees will be trained to immediately report any complaints from clients, site visitors, neighbouring property owners or the surrounding community to the Landfill Manager's office.

2.3.2 Online complaints form

An online form for logging complaints will be made available at all times on the website. The online form includes the following fields for complainants to complete:

- The address, time and date of complaint lodged, nature of complaint (eg. odour, noise, etc); and will provide a field for the recording of any additional information about a particular complaint. In the case of odour complaints, the online form will allow the complainant to record the frequency, intensity (using the 0-6 scale set out in [Condition XX]), duration and a description of the offensiveness of the odour complained of.
- Once logged, a copy of the complaint will be automatically forwarded to the consent holder, Auckland Council and the complainant, and within 24 hours of receiving the logged complaint, the consent holder will advise Auckland Council of the outcome of any investigation(s) that it has undertaken.

2.3.3 Reporting and record-keeping

Redvale Landfill Management Plan

Event	Reporting and record-keeping
Complaint (Odour, Dust, Noise, Litter, etc,)	Record all details on a complaint report form. Record the identifying details in the complaints register. Send details of the complaint to AC within 24 hours of the receipt of the complaint. Make the complaint register available during CLC meeting
Odour field inspection report	Keep in a site file. Make this available to independent odour review consultants.
Olfactometry and dispersion modelling report	Keep a copy on site. Submit the report to AC. Make this report available to CLC.
Independent odour review report	Keep a copy of the report on site. Submit the report to AC. Make this report available to CLC.
Design related approvals from AC/PRP	Keep a copy on site. Include in the agenda of CLC meeting.

Appendix A Complaint Procedure: Managing an Odour Complaint

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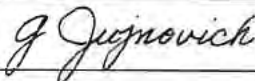


MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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Date:	01/05/2024	RA No:	WM UNI RED RA 103	
Division:	UNI	Branch/Site:	Redvale Landfill and Energy Park	
Task Location:	Redvale Disposal and Gas Operations	Work Activity:	Managing an External Complaint	
Permits / Authorisations required:	WORK PERMIT: ☐ BREAKTHROUGH: ☐ CONFINED SPACE: ☐ HOT WORK: ☐ FALL PREVENTION: ☐			
Permits / Authorisations approved and reviewed by:				Date:
Work Instruction prepared in consultation with: <i>List all persons involved</i>	Amirul Kahlid, Glen Jujnovich, Matthew Atkinson & Laiana Barbosa			Date: 01/05/2024
Comments	The steps to take when managing and responding to a complaint that has been made by a member of the public.			
Process:	Name:	Position Title:	Signature:	Date:
Task Manager Approval:	Amirul Khalid	Odour Technician		4/6/24
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator	Laiana Barbosa	04/06/2024
Final Approval:	Glen Jujnovich	Regional Manager		04/06/2024



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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REQUIRED EQUIPMENT	
PPE Required:    	Additional equipment/Tools: Cell Phone Radio Telephone (RT) Redvale Landfill Complaint form Complaint register Vehicle
REQUIRED LICENCES & COMPETENCIES	
Licences: Class 1	Competencies: A Nose Calibration Certificate from Watercare
LEGISLATIVE REFERENCES (Optional)	
• Redvale Landfill consents • Redvale Landfill Air discharge consent 2013, Consent 37802. • Redvale Landfill, Resource Consents 2016, General Consent condition 27 including requirements to manage Odour and respond to community concerns within 24 hours.	



MANAGING AN ODOUR COMPLAINT

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HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Receipt of Complaint from Community directly or via Auckland Council	- When a complaint is received, the Air Quality Technician (AQT) is to ascertain sufficient information to complete the top portion of the complaint record form. - Immediately notify the disposal Operations Manager or Team Leader of landfill refuse odour, and/or the Generation Manager or Gas Team Leader of landfill gas odour. - Provide them with initial details so they can investigate the source to start corrective action as soon as possible. - If the complaint is received after office hours, when AQT is not on the site, or by email or phone message, confirmation of receipt should be provided to the Complainant, and the complaint details should be forwarded to the next available person being either the Operation Manager/ Generation /Team Leader or Regional Manager or another suitably trained person to action.	All complaints are received through telephone call, text or by an online form for logging complaints which is to be available at all times on the WM Redvale website. DO NOT ENTER THE PROPERTY Ensure conversations with the Complainant always remain calm. Understandably, some community members can become emotional or angry around this issue. Listen, and acknowledge their concerns, and take notes of times, dates, and perception of the type of odour. Thank the Complainant for contacting us in the first instance. Important: Do not give any information on assumed site activities, as the result investigation may differ and confuse the issue. If they require information, you are unable to provide, recommend the	Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		complainant to email the CLC with their questions. If the Complainant becomes aggressive or abusive, confirm the investigation is underway, and they will be notified in due course, and politely terminate the conversation. We are not obliged to visit the properties or meet with complainants who are aggressive or abusive to our staff.	
Initial Response to Complainant	3. The AQT is to explain to the Complainant that: a. The complaint will be investigated promptly. b. Odour type, Rating, Consistency c. A response will be provided within 24 hours either a telephone call, email or text. d. Request an odour rating from the complainant.	Do not give any information on assumed site activities, as the resulting investigation may differ and confuse the issue. The Complainant may at any time register their complaint with Auckland Council. Odour types: 1. Landfill Gas (LFG) 2. Rubbish 3. Chemical	Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager



MANAGING AN ODOUR COMPLAINT

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		Intermittent or constant odour 0 Not detectable 1 Very weak 2 Weak 3 Distinct 4 Strong 5 Very strong 6 Extremely strong If the Complainant becomes aggressive or abusive, politely terminate the conversation. We are not obliged to visit the properties of or meet with Complainants who are aggressive or abusive to our staff.	Compliance Coordinator Regional Manager Suitably trained person
Complaint Investigation	4. In most cases, appropriate action(s) will be taken between half an hour and an hour where the complaint is made during the landfill opening hours and as soon as reasonably possible where the complaints are made outside such hours; a. Where practical, visit the complainant's address to validate the odour if they approve. b. The complainant may decline to be visited for the purpose of odour verification. In this instance visit the nearest roadside to validate the	<i>We are not obliged to visit the properties of the complainants. We need to demonstrate a thorough, prompt and sincere response to community concerns, investigation of the issue, and demonstrate a review of our operation on site to</i>	Air Quality Technician OR: Operations Manager Operations Supervisor

5



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	odour where possible and contact the complainant within 2 hours to inform them about the corrective action if the odour is found to be from our site. 5. If there is Odour present, immediately notify Operations advising the type of odour, intensity and direction, request a review of odour suppression measures, and information on any particularly odorous loads tipped. 6. Conduct an internal patrol after the investigation to identify the area that the odour may come from in order to start step 7. 7. Advice/plan with odour labourer to form an action with odour device management: - Device relocation/adjustment - Increase odour chemical dosing rate	ensure the odour source is contained, and suppression measures are adjusted to minimize the chance of a recurrence. DO NOT ENTER THE PROPERTY The investigation must coincide with a review of activities on or deliveries to the site that may contribute to odour, and the effectiveness of suppression measures including suppressant dosing and operation of suppression equipment, and gas network integrity/vacuum. When odour is detected notify the complainant. Verify their complaint and inform them that we will lodge it with Auckland Council and inform the team to further investigate on-site and adjust the suppressant.	Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		Do not aggravate the complainant any further when no odour was detected during the investigation. Keep the conversations short and professional.	
Reporting back to Complainant	8. If there is Odour, respond to the complainant vocally or by sending a written response by TXT or email within 5 working days: a. confirm the details of the complaint. b. accept or reject its validity with reasons. indicate what operationally has been done to mitigate further odour issues.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person

7



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System
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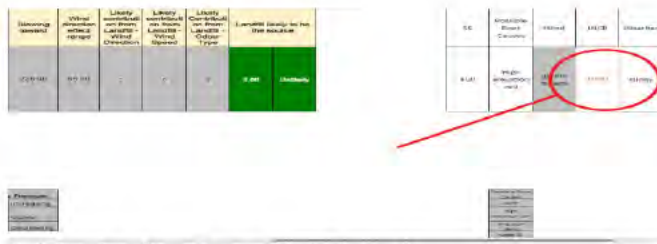
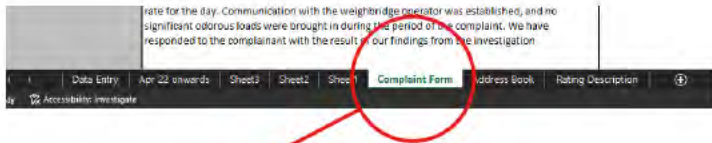
WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Documenting a complaint and reporting it to the council.	Notification must be sent to Auckland Council within 24 hours of the complaint being made. 10. Access the complaint register File path: (I:\Redvale\Environmental\26community\Complaints\Complaint Register) 11. Fill in all information collected from the investigation. All weather data (temperature, humidity, wind speed, wind direction and barometric pressure) are collected on Outpost Central. All information gathered is logged in through the "data entry" category of the complaint register. Before submitting, log the complaint in on Vault, this is to acquire the INCR number. https://app.outpostcentral.com/english/login2.aspx (outpost central) Login: Redvaleguest Password: community  (Data entry at the bottom bar)		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System
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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	12. Log the complaint on Vault, acquire the INCR number and include the number in the complaints register data entry. Once all details are obtained, press submit.  (Far right of the data entry page) 13. Once submitted, go to the "complaint form" category at the bottom bar.  (In bottom bar) 14. Go to "file" (top left) and go to "export" to export the file into PDF form.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person

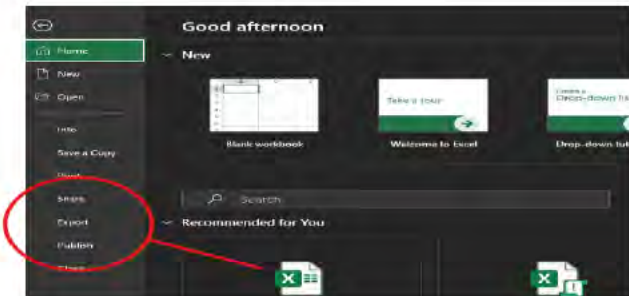


MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	 15. Save the created PDF into the "complaints submitted to council" file, choose the year within the file, and save it with the number above the previous complaint form's number.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person

10

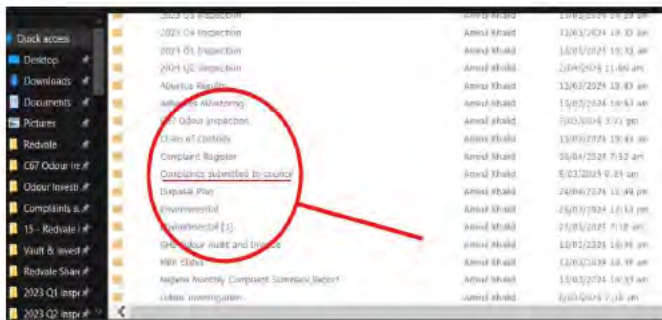


MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	File path: I:\Redvale\Environmental\26community\Complaints\Complaints submitted to the Auckland Council  16. Once it is saved, email the file to the regional manager. His reviewing of the created form is required before sending it away to the council.		Air Quality Technician OR: Operations Manager Operations Supervisor Generation Manager Compliance Coordinator Regional Manager Suitably trained person



MANAGING AN ODOUR COMPLAINT

Work Instruction Form

HSEQ Management System

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I have read and understood the attached Work Instruction (<i>Enter name and sign</i>)				
Name:	Signature:	Company:	Date:	Inducted By:

2.4 Community trust

2.4.1 Trust Deed

A formal Deed of Charitable Trust was established 29/7/93 between Waste Management as settlor and the Community Trustees as trustees. The charitable purpose is “any purpose for the general benefit of the Dairy Flat Community including but without limitation the establishment or maintenance of domains and parks, the maintenance and care of local roads the beautification of Dairy Flat, gifts for local libraries or museum, gifts to local daycare centres, kindergartens and schools, and any other purposes (whether relating to relief of poverty, the advancement of education or religion or any other matter which in the opinion of the Trustees will in general terms benefit the Dairy Flat Community) which are charitable according to the laws of New Zealand”.

2.4.2 Map

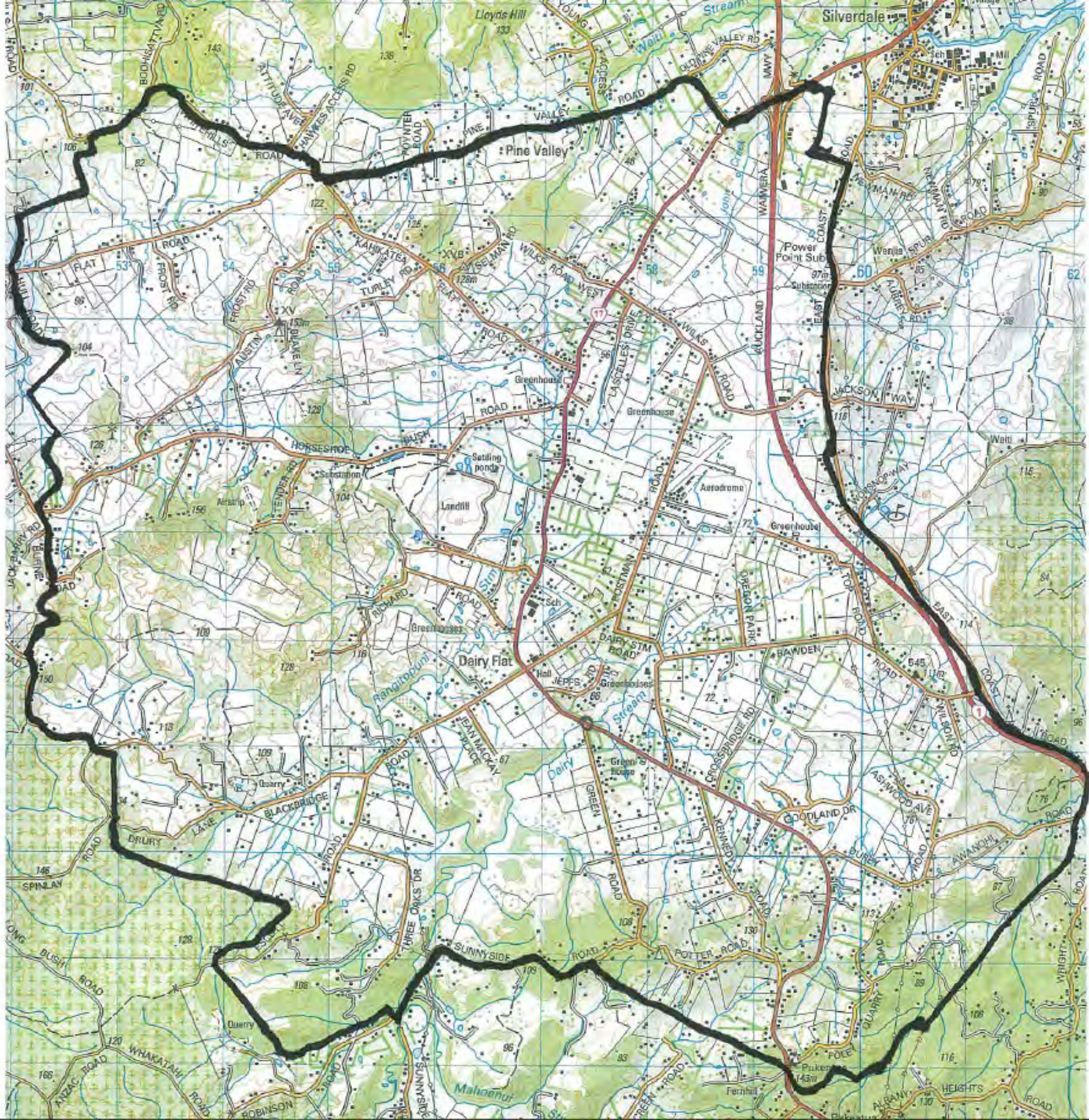
The map that defines the area can be found in Section 2.4 Appendix A.

2.4.3 Funding

The Trust invites and receives applications to obtain funds from the Trust, and the Trust distributes the funds as it sees fit within its rules.

Appendix A DFCT area

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2.5 Peer review panel

2.5.1 Peer Review Panel role

The Peer Review Panel (PRP) is an independent group of experts engaged at WMNZ's cost to oversee parts of the activities on the site that are unique to waste containment, waste management and landfilling.

The role of the PRP will be to review, inspect, report, mediate and approve design, construction, operations, site maintenance and monitoring. The scope of work of the PRP will be set out in an agreement between the Company and the Peer Review Panel members.

AC excludes the PRP from responsibility for:

- Surface water and ground water monitoring
- Special waste acceptance monitoring
- Landfill gas monitoring
- The role of the PRP may be clarified by further discussion at any time.

2.5.2 PRP membership

Members will be qualified, experienced practitioners in disciplines relevant to solid waste disposal.

Each individual appointment will require prior certification by Council.

The panel will comprise a maximum of five members for the operating life of the landfill.

The membership as at 21/03/26 comprised:

Alan Pattle (chairman)	Pattle Delamore Partners Ltd
Mark Drury (community nominee)	AECOM New Zealand Ltd
Chris Gulliver	Engineering Geology Ltd
Paul Kennedy	Kennedy Environmental Ltd

2.5.3 PRP agreement

The PRP agreement⁴ will set out:

The terms and conditions under which the Panel members perform their review services, and;
The Panel's role and responsibilities in order to comply with the consent conditions

2.5.4 Reporting

Event	Report
Investigations & daily construction activity.	Monthly report by Redvale Landfill sent to PRP.
6 Monthly Report by PRP	PRP emails report direct to both: Auckland Council Copy to Redvale Landfill

⁴ Waste Management NZ Ltd, 25 August 1993: Waste Management NZ Ltd Redvale Landfill Peer Review Panel Agreement.
Note: Some Schedules subsequently amended.

3 Site Operations Management Plans

This section contains the following sections:

- Section 3.1 – Waste Control
- Section 3.2 – Disposal
- Section 3.3 – Cover
- Section 3.4 – Erosion and Sediment Control Plan
- Section 3.5 – Design, Operation and Maintenance of Stormwater Devices
- Section 3.6 – Odour Management Plan
- Section 3.7 – Landfill Gas Management Plan
- Section 3.8 – Dust Management Plan
- Section 3.9 – Benevap Management Plan
- Section 3.10 – Noise Management Plan
- Section 3.11 – Landscape Mitigation and Restoration Plan
- Section 3.12 – Traffic Management Plan
- Section 3.13 – Litter Management Plan
- Section 3.14 – Vermin
- Section 3.15 – Biosecurity
- Section 3.16 – Health and Safety
- Section 3.17 – Emergency Management Plan
- Section 3.18 – Environmental Management Plan – General
- Section 3.19 – Stormwater Monitoring and Contingency Plan
- Section 3.20 – Groundwater
- Section 3.21 – Leachate Monitoring and Contingency Plan

3.1 Waste control

3.1.1 Class 1 area

The landfill will continue to accept non-hazardous solid waste that meets Class 1 landfill waste acceptance criteria including:

- residential, commercial and industrial solid waste;
- general waste from collections taken from sources which do not handle special waste or hazardous waste and therefore do not ordinarily generate waste that requires pre-acceptance testing;
- general waste from transfer stations which remove hazardous waste if any before dispatch to the landfill;
- demolition debris, subject to assessment of incidental contaminants if any that may have an adverse environmental or health effect;
- special waste, subject to testing and/or specific assessment to confirm that it is non-hazardous;
- sludges with solids contents greater than 20 percent;
- Wastewater treatment plant sludges with a solids content less than 20% if chemical or physical stabilisation processes ensure that the sludges contain no free liquids as determined by the paint filter liquids test at the point of haulier dispatch;
- Liquids and sludges with solids content less than 20 % derived solely from on-site processes (including leachate, leachate treatment sludge, wash water, on-site cess pit cleanings, and gas condensate) provided that they are also non-hazardous.

The landfill will accept particular wastes at the landfill operator's discretion:

- Packages goods originally intended only for domestic use but would be regarded as hazardous in bulk will be accepted provided that the quantity is less than 0.1% of the daily waste tonnage. Examples could include wrongly labelled household cleaning agents, expired containerised food, aerosol cans for domestic use, off-specification rejected retail-packaged products.
- Soil from sites listed in the Hazardous Activities and Industries List (HAIL) pursuant to the NES, either without testing if the HAIL designation is on account of horticulture only and the excavation is no larger than would be expected for a building platform for a single suburban residential unit or house, or otherwise with prior testing that shows it's non-hazardous, and in all cases provided that the waste generator and haulier are aware of their obligations under the NES to protect human health during the soil disturbance.

3.1.2 Class 2 area

The Class 2 area will accept waste that meets the Class 2 Landfill waste acceptance criteria including:

- Construction and demolition waste (C&D)
- Managed fill material including contaminated soil from earthworks and site remediation that meets the total concentration limits set out in the WasteMINZ Guidelines for Class 3 waste.
- Clean fill material
- Non-putrescible industrial waste
- The maximum incidental or attached biodegradable material (e.g., vegetation) must be no more than 5% by volume per load.

The landfill will not accept:

- Hazardous waste

- Excessively odorous waste
- Untreated sewage
- Bulk liquids

Waste acceptance policy will be advised to customers as a matter of course for proposed wastes. In the case of special waste, additional waste acceptance guidelines may be enforced at the site's discretion in the interests of managing the possible risk of wider adverse environmental and health effects.

3.1.3 Prohibited waste

Waste is prohibited i.e. hazardous and therefore not acceptable for disposal if it is within one of the following categories

(Reference: Appendix H, Technical Guidelines for Disposal to Land, WasteMINZ, 2023)

Class	Characteristic
H1	Explosives
H2	Gases
H3	Flammable liquids
H4.1	Flammable solids
H4.2	Substances or wastes liable to spontaneous combustion
H5.1	Oxidising substances
H6.2	Infectious substances
H7	Radioactive materials
H8	Corrosives
H10	Liberation of toxic gases in contact with air or water
H13	Capable, by any means after disposal, of yielding another material (i.e., leachate which possessed any of the above characteristics

3.1.4 Special waste

The term 'special waste' refers to any waste that either:

- Cannot initially be satisfactorily described in terms of contaminant content by visual observation which has therefore undergone a toxicity test and which has passed the toxicity test, or;
- Requires particular handling precautions for worker safety

3.1.5 Toxicity test (TCLP test)

Waste that is hazardous by the characteristic of toxicity is not acceptable. This characteristic is determined by the Toxicity Characteristic Leaching Procedure (TCLP) test.

If the waste 'passes' the test, then it can be accepted into the landfill. If the waste 'fails' the test, then it must be rejected as hazardous waste.

Prior to acceptance of non-listed special waste, samples will be taken and analysed for a number of parameters. The list of parameters for analysis will be decided on a case-by-case basis depending on knowledge of the history of the waste. The result for each parameter will be compared to pre-specified parameter acceptance limits. If any parameter exceeds the guideline limit, the waste will be rejected, unless it can be shown that the additional impact of the exceedance will be insignificant, based on a case-specific assessment of relevant information from other international jurisdictions,

Redvale Landfill Management Plan

leachate treatability, environmental risk, nuisance and odour potential, health and safety, and other operational factors.

TCLP Limits for the landfill are included in Table 3-1 below.

Table 3-1 TCLP limits for Class 1 and Class 2 areas (mg/L)

	Class 1	Class 2
Limits from WasteMINZ and US toxicity characteristic		
Arsenic	5	1
Barium	100	20
Cadmium	1	0.2
Chromium	5	1
Mercury	0.2	0.04
Selenium	1	0.2
Silver	5	1
1,1-dichloroethene	0.7	0.07
1,2-dichloroethane	0.5	0.05
2,4,5-trichlorophenol	400	40
2,4,5-trichlorophenoxypropionic acid (Silvex)	1	0.1
2,4,6-trichlorophenol	2	0.2
2,4-dichlorophenoxyacetic acid	10	1
2,4-dinitrotoluene	0.13	0.013
Carbon tetrachloride	0.5	0.05
Chlordane	0.03	0.003
Chlorobenzene	100	10
Chloroform	6.0	0.6
Endrin	0.02	0.002
Heptachlor	0.008	0.008
Hexachlorobenzene	0.13	0.013
Hexachlorobutadiene	0.5	0.05
Hexachloroethane	3	0.3
Lindane	0.4	0.08
m-Cresol	200	20
Methoxychlor	10	1
Methylethyl ketone	200	20
Nitrobenzene	2	0.2
o-Cresol	200	20
p-Cresol	200	20
Pentachlorophenol	100	10
Pyridine	5	0.5
Tetrachloroethene	0.7	0.07
Total cresol	200	20

Redvale Landfill Management Plan

	Class 1	Class 2
Toxaphene	0.5	0.05
Trichloroethylene	0.5	0.05
Vinyl chloride	0.2	0.02
TLCP Limits from WasteMINZ only		
Antimony	0.6	0.06
Boron	20	2
Copper	5	0.5
Cyanide	50	10
Lead	5	1
Molybdenum	10	1
Nickel (incl. slag)	10	1
Vanadium	2	0.2
1,4-dichlorobenzene	7.5	0.75
Benzene	0.5	0.05
BTEX total	10	-
DDT	0.02	-
Ethylbenzene	5	5
Polychlorinated biphenyls	0.0001	5
Toluene	5	10
Tributyltin oxide	0.02	0.3
Xylene (m-, o-, p-)	5	10
Specific waste stream limits		
Sulphide – nickel slag	5	10
Zinc – ASR [not a WasteMINZ limit]	500	-
PFAS limits		
PFOS + PFHxS	0.0007	0.00007
PFOA	0.0056	0.56

The derivation of the limits and any variations from WasteMINZ guidelines are described in:

- Redvale Landfill, 'Waste Acceptance Criteria', Prepared for Waste Management NZ Ltd, Prepared by Tonkin & Taylor Ltd, dated August 2026,
- ...[subsequent submissions, correspondence, decisions]

3.1.6 Pre-acceptance procedure

The procedure for site staff to enter into a contract to take special waste will be typically as follows:

- Receive inquiries from prospective customers and existing customers proposing a new waste for disposal.
- Obtain details of the waste and the process which generated the waste.
- In the case of non-listed special waste, ask for and obtain adequate test results to show that the waste is non-hazardous. This means obtaining test results for contaminants relevant to the

source identified in the previous step. If the anticipated contaminants are not listed with limits, then assess the waste case-by-case.

- If assessing case-by-case, then consider the harmfulness of the chemical will need to be considered, the amount of waste to be disposed and the potential effect of the waste on leachate quality.
- In the case of non-listed special waste, obtain the separate agreement of the Landfill Engineer i.e. a “compliance sign-off”.
- Assess odour potential.
- Send a quotation and agree on a waste acceptance contract. The agreement may include: a covering letter; the basis of acceptance (e.g. lab test results); conditions of acceptance (e.g. right to inspect loading of the waste onto trucks, daily truck limits); Commercial terms; Haulier rules, Site rules for customers; Forms like Notification of Special Waste Delivery (Section 3.1 Appendix A).
- All waste with the potential for re-use as final cap soil will be assessed against the criteria set out in the Section 3.3 of the LMP

The requirements for testing are:

- The testing must be done by an accredited laboratory
- The sample size must be sufficient to effectively characterise the material
- The sampling will typically include worst-case and average concentrations, but this is disposer specific.

3.1.7 Odorous wastes

There are two different types of ‘odorous wastes, as defined within the abbreviations within this LMP. This includes:

- Malodorous wastes and
- Putrescible wastes.

Odorous wastes will be managed through the existing classifications on waste that is undertaken at either the collection point of the waste or transfer stations. Before accepting any waste at Redvale Landfill the landfill sales staff will assess the waste quality against landfill waste acceptance criteria (WAC – as detailed in LMP Section 3.1, Waste Control) in order to evaluate the odour potential of the waste. Waste odour potential will be evaluated on a case-by-case basis. WAC allows WMNZ to determine whether the waste can be accepted on-site based on the ability to manage its impacts. Redvale Landfill will not accept known malodorous waste unless specific pre-acceptance criteria and procedures have been put in place to manage potential odours from these wastes. In most cases the landfill sales team will ask for potentially malodorous waste, such as biosolids, animal waste or wool scourings, to be pre-treated by the waste generator to reduce odours prior to delivery. In these examples, pre-treatment might include mixing the waste with lime, aeration, or mixing with an absorbent. A precautionary approach will be taken when accepting any new potentially malodorous waste streams, including trial disposal of small quantities before entering longer term contracts. Where waste is assessed under the WAC as being excessively odorous, or has been identified as excessively odorous on-site, future loads will not be accepted unless the waste can be pre-treated to reduce odour to acceptable levels.

Through these classifications, it is understood the origin of the waste and therefore the potential for this to cause odour discharges from the landfill (eg. Municipal wastes). These wastes will be diverted accordingly to the correct tip face at the site.

3.1.8 Emerging contaminants

It is possible that a contaminant or group of contaminants may become a concern typically due to improvements over time in scientific knowledge about its effects and distribution.

WM will carry out periodic review to identify emerging contaminants.

The review steps will be:

- Review New Zealand and international regulations and good practice guidelines, to identify whether there are pre-existing TCLP limits for other sites and jurisdictions. For example, the WasteMINZ Guidelines do contain TCLP limits for several other contaminants which could be applied to assess the suitability of incoming waste if needed (i.e., if those contaminants are in the waste-stream).
- If there are pre-existing TCLP limits, compare the conditions under which they were developed with Redvale Landfill conditions. If the assumptions are conservative, they can be adopted.
- If there are no pre-existing criteria, or if the assumptions are not appropriate for Redvale Landfill, develop Redvale-specific criteria.
- Document the criteria and assumptions and update the Landfill Management Plan.

The landfill operator may at their sole discretion restrict or refuse to accept compliant waste at any time for any reason relating to prudent management of uncertain or unknown environmental risks from that waste. Emerging contaminants including PFAS and TOF's are emerging pollutants and as such a precautionary approach for disposal at landfill is used. WM will carry out a review every five years to identify emerging contaminants.

3.1.8.1 Site-generated waste

A number of activities on the site will lead to the production of hazardous liquid waste and hazardous solid waste which are not acceptable in the landfill and must be disposed off-site. Other activities on the site will result in non-hazardous liquid and non-hazardous solid waste, which can be dumped into the landfill.

On-site waste	Disposal
Leachate	The disposal of leachate is described in Section 3.21.3 of this LMP.
Truck wash sludge and washwater	Sediment catch pits and grease traps will be installed at fuel bays and truck wash facilities. The sludges are not expected to be hazardous. When cleaning out is either necessary or regularly scheduled, the sludges will be dumped in the landfill. This waste amount will be tiny compared to the overall landfill but may still be periodically analysed. Also, liquid effluent from the grease traps will be treated as if contaminated by leachate unless proven otherwise.
Wheel wash water and sludge	Sludge taken out of the wheel wash ponds will not be permitted to leave the site either on its own or mixed with other materials, unless destined for a proper treatment facility. If the wheel wash water has been contaminated by leachate, then the sludge will be tipped directly into the tip face. If the wheel wash water has not been contaminated by leachate, then the sludge may alternatively be dumped in an elevated place which is remote from a watercourse, where it can dry and either be engulfed during excavation for bulk on-site earthworks or become part of the daily and intermediate cover.

Redvale Landfill Management Plan

Sedimentation pond silt	Silt removed from ponds will be either tipped into the landfill (particularly if it contains excessive wetland plants and dead vegetation) or dumped in an elevated place which is remote from a watercourse, where it can dry and be engulfed in bulk earthworks or become part of the landfill cover.
Incidental hazardous waste	If any waste does not comply with the Redvale Landfill Waste Acceptance Policy, reference will be made to the Redvale Landfill Emergency Management Plan for proper handling and removal of the incidental hazardous waste.
Contractor's waste	If any waste produced by a contractor is identified, then the contractor will be instructed to remove it. If the contractor does not respond promptly, then the site management will arrange for proper disposal and charge costs to the contractor. If the contractor cannot be identified (i.e. orphan waste found on the site), site management will arrange for proper disposal, i.e. acceptable waste will be put into the landfill and hazardous waste will be disposed at an appropriate off-site facility.
Spilt customer's waste	If any waste is spilt away from the tip face, then the customer will be asked to clean it up. If the customer does not have the resources, then site staff will clean up the waste and dispose of it into the tip face. Repeated spills by the same generator or haulier will be discussed directly with them. If the spilt waste is judged in the first instance to be hazardous waste, then the Emergency Management Plan Section 3.17 Hazardous Waste Discovery would immediately come into effect.
Lead-acid batteries	Dead batteries from on-site plant will be collected, temporarily stored safely e.g. in labelled green mobile garbage bins with lids, and removed by a recycler.
Used motor oil	Used motor oil will be drained into a used oil tub and pumped to an oil dump tank. Separate tanks may be required for separate oil brands for example for the electric power generators. A removal contractor will either call on a scheduled basis or be called when the dump tank is three quarters full. The site will aim to partake in any national oil recycling industry programme. Any used oil dump tank will be surrounded by a bund to contain any oil spill. Rainwater inside the bunded area will be released regularly by opening the valve and then closing it again as soon as the water has drained out.
Solvents	Used solvents, e.g. for cleaning machine parts, paint thinning, etc., which are not acceptable in the used oil, will be collected in sealable drums, temporarily stored in a secure place on the site (e.g. dangerous goods store), and disposed of the site at a proper treatment facility.
Workshop wastes	A number of other expected site-generated wastes will be expected to be acceptable for disposal into the landfill, e.g. drained oil filters, used air filters, worn machine parts, and empty containers which held detergents, lubricants, odour neutraliser, herbicide, seed, laboratory chemicals, rags, etc.
Antifreeze coolant	Water coolant drained from radiators of on-site plant is not considered to be hazardous and may be disposed as for leachate and may include pouring into

Redvale Landfill Management Plan

	the active cell of the landfill. If pure antifreeze is to be disposed, it will be taken away as hazardous waste.
Contaminated soil after a spillage	Soil used to soak up spilled potentially hazardous site waste e.g. diesel will be subject to the pre-acceptance procedures, although quantities of less than a truckload may be disposed with care in the landfill if the risk is assessed as better than sending it by road out to another site for treatment or disposal.
Spill clean-ups	Used clean-up kit fabrics, clothing and equipment will be disposed in the landfill.
Sewage	The gatehouse, office and workshop each have their own holding tank for septic waste, which will be fitted with high level alarms. If an alarm comes on, a sewage disposal contractor will be called. Also, a contractor may be commissioned to remove sewage on a regular scheduled basis e.g. once a fortnight. The sewage system comprising toilets, showers and hand basins will not be used for any chemical disposal.

3.1.8.2 Recycling

The Redvale Landfill is not authorised to operate a recycling facility. Extraction of recyclables will be expected to have taken place prior to delivery, through initiatives by local authorities, by transfer stations, and by waste companies elsewhere in conjunction with industry.

Re-useable materials may be extracted from the waste solely for use in the waste pile construction. Examples of re-useable materials are fabrics as a substitute for geotextiles, and glass or shredded tyres or rubble as a substitute for gas drainage aggregate.

3.1.9 Monitoring

3.1.9.1 Screening for acceptable waste

Opportunities exist for identifying and removing unacceptable waste at a number of points:

- at the generator's site
- at the transfer station
- at the gatehouse
- at an on-site screen-testing station
- at the tip face

With regard to WMNZ's own waste trucks, the company will keep sufficient records to be able to establish the route and industries visited to collect each waste load, which will assist with identification of generators if any unacceptable waste is identified. With regard to other customers, responsibility to deliver only acceptable waste will be placed on them by way of contracts entered into before acceptance.

Responsibility for delivering only acceptable waste, and for identifying and removing unacceptable waste, will also be placed on transfer station operators who are customers of the landfill, regardless of whatever additional checking will be done at the landfill.

The landfill will operate an attended gatehouse, to coordinate the site activities relating to disposal of only acceptable waste.

Redvale Landfill Management Plan

All disposal operations staff at Redvale will receive training to identify any waste which may be unacceptable on the basis of non-contact inspection at the tip face. The characteristics which may alert staff may include but not be limited to odour, visible fumes and smoke, compressed gas vessels, non-empty drums of liquids, undeclared sludge, electric batteries. The staff will also be trained to be alert to special waste which may require particular environmental, health and safety precautions, particularly undeclared special waste about which they have not yet been informed.

An incident report system will be made available to all staff to identify waste acceptance issues for the attention of site management, and to record details of any rejected waste.

3.1.9.2 Screening testing

Capability will be maintained to take samples of special waste at short notice on arrival of the waste at the site, for laboratory analytical testing to confirm that the waste complies with consent conditions and to confirm that the waste matches the description in the acceptance contract.

The assigned technician who takes the sample will either dispatch them for independent testing or conduct tests in-house at the on-site laboratory.

The list of parameters and frequency for screen testing will be set at the discretion of site management.

Random load inspections will be carried out at a frequency of approximately 1 in 50 loads. The frequency may be revised (up or down) depending on previous inspection results.

3.1.9.3 Video surveillance

The landfill will operate a closed-circuit television system (CCTV) at the gatehouse, to assist with inspection of the waste and haulage vehicles, and to provide a visual record if needed for any investigation into activities contrary to proper landfill operations. The system will record 24 hours per day, 7 days per week.

All tapes from the gatehouse CCTV camera will be retained for a minimum of 2 weeks before reuse.

3.1.9.4 Waste surveys

Surveys of the incoming waste will be performed periodically in accordance with the consent conditions, which refer to the MfE procedure⁵.

The survey procedure will deviate from the MfE procedure only as required for safety and practical operations at the tip face, in a manner which has no impact on the principle of representative sampling.

3.1.9.5 Reporting

Event / item	Reporting
Waste tonnes	Monthly report to AC (format in the table below)
Special waste test results for an especially contentious proposal	To AC for their acknowledgment of WM's decision to accept it.

⁵ Ministry for the Environment, March 2002: The New Zealand Waste Analysis Protocol.

Redvale Landfill Management Plan

Event / item	Reporting
Site generated liquids and leachate disposed into waste pile	To PRP via monthly reports. To AC annually upon request from AC.
Site generated waste removed from site	In-house records.
Screen testing results (performed at site's discretion on waste upon arrival at the site).	In-house records. To AC upon request insofar as needed to demonstrate compliance.
Waste analysis survey	To AC within 3 months after completion.
Register of daily vehicle numbers	To PRP and AC on request.
Waste turned away at the gatehouse upon being deemed hazardous	To PRP via monthly reports. AC to be notified within 48 hours.
Cessation for further waste deliveries on account of excessive odour.	In-house incident recording and tracking system.
Waste rejection for any reason before it arrives.	In-house records.
Exceedance of the daily truck movements limit (650)	AC reporting as TL2 exceedance

Format of monthly tonnage report to AC after Resource consents [date xx] have commenced:

Note: [Condition XX] are interpreted to mean TOTAL amounts "received" INCLUDING recoverable materials that are subsequently extracted on Redvale Landfill site.

Monthly Input (tonnes) (received at landfill from all sources inside and outside Auckland including transfer stations)	Historic Class #	Month e.g. March 2026 (tonnes)
Domestic/ Commercial/ Industrial waste [Condition XX]	A1+A2+B+C1	
Special Waste [Condition XX]	C2+D+E1+E2+E4	
Total into Redvale Landfill (Before recoveries)		

Redvale Landfill Management Plan

Note: A breakdown of waste and recoverable components may be reported for other purposes e.g. Waste Levy and Airspace Consumption calculations.

Breakdown #1 (not required by consents)		
Total across weighbridge	A1+A2+B+C1+C2+D+E 1+E2+E4	
Additions from Managed Fill	RM	
Total into Redvale Landfill		

Breakdown #2 (not required by consents)		
Subtotal Waste	A1+A2+B+C1+C2+D	
Cover material e.g. "R" material	E1 or R	
Other recovered materials e.g. Tyres	E2	
Cover materials from Managed Fill	RM	
Cover soils e.g. Topsoil	E4	
Cover soils from within the landfill site	Truck docketts	
Subtotal Recovered Materials (re-used within the landfill)		
Total into Redvale Landfill		

3.1.10 Contingency

3.1.10.1 Rejection of hazardous waste

If any waste load is rejected at the gate or removed because it is hazardous, the AC will be notified as required by the consent conditions.

Any suspect wastes will be inspected at the gatehouse, screen testing station, and/or tip face. If a waste is found to be hazardous, it will be removed from the site at the expense of the customer. Anyone depositing refuse that repeatedly does not conform to the site acceptance policy will be refused entry for future tipping unless compliance can be proved in advance.

Rejections will be recorded in an incident register system.

3.1.10.2 Rejection of odorous waste

The site operator will cease accepting waste that is the source of persistent odour (excluding putrescible waste) beyond the boundary of the site unless and until the waste has been treated off-site to eliminate that odour. The site operator will keep an in-house log of all incidences in which further deliveries of any waste are ceased on account of odour.

3.1.10.3 Removal

Removal of unacceptable waste from the tip face is described in Section 3.2 of this Management Plan titled "Disposal".

3.1.11 Gatehouse Control

3.1.11.1 Hours of operation

The allowable hours of operation will be from 6.00 a.m. to 6.00 p.m. Monday to Saturday. For operational practicality, the actual hours may be reduced, upon notice to customers. Operating hours are:

	Monday to Friday	Saturday
General Waste & Public waste	6:15am - 4:30pm 7:30am – 4:30 pm (on 1 May to 31 August for only putrescible waste)	7:00am - 2:00pm 7:30am – 4:30 pm (on 1 May to 31 August for only putrescible waste)
Putrescible Waste & Special Waste including odorous waste	7:30am - 3:30pm	7:30am - 1:00pm

During the colder months (from 1 May to 31 August), acceptance of putrescible waste will commence after 7:30 am, reducing the overlap between daily cover removal and putrescible waste placement with unfavourable dispersion conditions.

Site management may at their discretion reduce the hours of acceptance for any or all wastes.

Appendix A Notification of Special Waste Deliveries

DRAFT

To: **Accounts / Lab / Operations / Op Mgr.**

From:

Date: **17/11/2017**

Notification of Special Waste Deliveries - Redvale

Arrival & Haulier Information

PLEASE ENSURE EACH TRUCK CARRIES THIS AND SHOWS IT TO REDVALE WEIGHBRIDGE

Haulier TBC

Acceptance Times 6AM-430PM Mon-Fri 7AM-2PM Sat/Public Holidays (Not 1/1, Easter Fri, 25/12)

Condition for Acceptance **As per quotation / Also Wrapped / Dampened Down / Covered / Spaced Loads/ Rate / No dust at tip-face / Other**

Generator Information

Generator name TBC

Site Address

Responsible Contact on Site TBC

Cell Phone

Company to Charge TBC

Waste Information

Waste description

Quantity t

Physical State **Soil / Soil-like / Sludge / Powder/ Other Sludge**

Expected Odour

Method of Shipment

Truck and Trailer / Flat Deck / Hook/Gantry Bin / Other

Sampling & Screen Testing Requirements

Sampling Frequency

Visual Check

Odour Check

Paint Filter

pH

Water Reactivity

Flammability

Solids Content Compact Density

Other #

Operator PPE Requirements & Handling at Landfill

Cell Operators **Gloves / Overalls / Safety Glasses / Goggles / Dust Mask / Respiratory mask / P4 if dusty**
P1 GREEN P2 BLUE P3 YELLOW P4 RED P5 ORANGE

Special precautions

Disposal instructions

Survey Disposal Coordinates / Place in prepared area / Apply direct odour
spray / Cover Immediately / Water Spray before during tipping / Spread over tip face / Apply direct
odour spray if smelly / Other / Nothing Special

Approval for Disposal

Sales Specialist Landfill

Compliance Manager

Auckland Regional Operations Manager

Commercially acceptable

Complies with company
environmental policy

Commercially Acceptable

Approval subject to / Notes

3.2 Disposal

3.2.1 Tip face

3.2.1.1 Tip face definition

Generally, tip face of the landfill is divided into three categories:

1. **Working face** - Designated location where waste is actively deposited and compacted throughout the day. This area is also known as the 'tip face', is where waste is spread/compacted/buried and being the primary zone exposed to air.
2. **Push area** – When the working face is required to be located away from the waste drop-off area, the intervening area is often referred to as the 'push area' or 'push ramp'. The push area is not generally considered to be part of the working face and is usually located at a higher elevation. However, it is important to minimise the length of the push to minimise the exposed area of refuse and to ensure there is no exposed refuse overnight.
3. **Waste drop-off area** - Waste drop-off ('tip pad') is an area where waste is deposited by incoming vehicles. Ideally, waste should be tipped off the back of the delivery truck as close as possible to the working face, to minimise the "push" of the refuse. However, this is not always possible due to the physical constraints of filling the landfill cell.

3.2.1.2 Working face size

There will be three working faces, one for each waste area (Class 1 Putrescible, Class 1 Non-Putrescible and Class 2).

The maximum size of each working face is as follows:

- Class 1 Putrescible: maximum 900 m²
- Class 1 non-putrescible: maximum 2,500 m²
- Class 2: maximum 2,500 m²

The working surface of each daily refuse cell shall be kept to a minimum and shall not exceed the areas detailed above. The tip face for putrescible waste will be located at least 500 m from any existing sensitive receptor, in accordance with [Condition XX]. The distance from the site where trucks tip their waste to the site where the waste is buried will be kept to a practical minimum.

Continuous assessments will be conducted throughout the day to determine, based on incoming volumes, the optimal time to initiate the reduction of the working face size. This reduction should be timed to ensure adherence to the daily covering requirement and completion before the day's operations come to an end.

The Operation Supervisor is responsible for marking an estimated area of the working face before moving into a new location. The size of the working area is monitored by daily walkover. The size of the working face is influenced by a number of factors including rate of waste, wind speed and direction and availability of equipment. Stripping and placement of daily or intermediate cover is carried out progressively depending upon the amount of waste and weather conditions.

3.2.1.3 Tipping pad

An adequate turning area will be maintained on the working face for trucks to manoeuvre and tip. The working face surface will be maintained for safe traffic movements and to reduce the transport of mud out onto access roads. In fine weather, it is anticipated that the working pad will comprise roading aggregate material and/or a thick layer of compacted mudstone, part of which is a sacrificial edge while bulldozers push waste off the pad and into the burial site. In wet weather, it is to be

expected that a greater amount of surface preparation of the working pad road surface will be required.

3.2.1.4 Drainage

Stormwater cut-off drains and diversions will be formed to minimise stormwater run-on to daily cover areas.

Open drains around the tipping pad will be formed to encourage stormwater run-off from the tipping pad to soak into the waste and to minimise the generation of run-off from the tipping pad.

3.2.1.5 Minimum plant and personnel

A water cart and a compaction machine will be maintained on site at all times. In addition to these two, various combinations of mobile plant will be used at the discretion of site management depending on factors at the time, such as materials to be handled, nature of seasonal works, waste acceptance rate, type of waste, cover requirements, earth haul distances and grades, safety, and machine economics.

While waste is being placed at the projected waste acceptance rate of approximately 2,000 tonnes per operating day, the following absolute minimum list of mobile machines will be maintained readily available at all times on the site:

- 1 x Compactor
- 1 x Bulldozer
- 1 x Hydraulic excavator
- 1 x Dump truck
- 1 x Water truck
- 1 x 4WD utility vehicle

The landfill will periodically employ more equipment to improve efficiency of the operation, by hiring or buying. The typical ancillary mobile plant list which may change from time to time is:

- Additional Compactor(s)
- Additional Bulldozer(s)
- Additional Hydraulic excavator(s)
- Additional Dump truck(s)
- Additional Water truck(s)
- Additional 4WD utility vehicle(s)
- Tractor(s)
- Re-fuelling truck
- Motor-grader
- Wheel loader
- Towable roller(s)

The working face(s) will be manned at all times during open hours. A minimum of 2 persons will be allocated at all times to the working face.

3.2.1.6 Working face facilities

Additional facilities will be provided, operated and maintained when and as required at the working face, for example sentry box, ablutions, lighting tower, portable power supply, mains power supply, tarp removal pad, sampling gantry, sample jars, trailer park, bollards, stop logs, signs, litter fences, visual screens, noise screens, odour mitigation systems, road surfacing materials, drainage materials stockpiles, gas collection system materials, bird scaring systems, fire extinguishers, first aid kits,

spare PPE, towing chains, alternative daily covers, tray wash water supply, hazardous waste isolation materials, re-fuelling tanks, surveying instruments, level pegs, waste analysis survey equipment, etc.

3.2.1.7 Personal Protective Equipment

Operators and pointsmen/spotters will be provided with appropriate personal protective equipment in accordance with the site's health and safety policy which is described in Section 3.17 Health and Safety of this LMP.

3.2.1.8 Nuisances, dust, litter, birds, vermin, noise, odour

Nuisances and their management are described individually in other sections of this LMP.

3.2.2 Class 1 waste

3.2.2.1 Tipping

General waste will be allowed to tip where directed by a spotter/pointsmen, on a tipping pad as close as practical to its final disposal site, or direct into a special prepared burial site.

Landfill operators will be responsible for reporting any abnormal loads. These will be recorded, by way of inspection registers or incident reports or a similar system which is readily accessible to all staff.

3.2.2.2 Compaction

The waste will be compacted with specialised heavy mobile compaction equipment. The equipment will be selected with due regard to efficiency and environmental factors such as noise and emissions.

In regard to noise, larger, noisier compactors may not operate closer than 500 m to neighbours' houses unless either the operation takes place behind a screening bund or the operation is considered to be short term construction and takes place only after 7:30 a.m. in the morning. Machines operating at the working face will use broadband reversing alarms. The contractors and customers will also be encouraged to use the same alarm system to reduce the noise level.

For efficient compaction, the layers will be generally flat to slightly sloping upwards in the direction of pushing. Waste will be spread as thin as practical e.g. less than 0.6 m before compaction. The waste being compacted will be ramped up at the outside slope edge or sloped away and down towards the existing waste pile to reduce potential future leachate breakouts.

The minimum density of refuse will be 0.7 tonne of refuse per cubic metre occupied only by refuse. In practice, the Company will aim for higher densities of more than 0.8 t/m³ and typically in the order of 1.0 t/m³ which are expected for optimisation of the balance between cost to achieve high density and cost to provide airspace.

Topographic surveys will be conducted at least annually to review airspace consumption efficiency. In practice, the Company will aim for more frequent surveys in order to monitor progress in regard to compaction and density.

3.2.2.3 First lift

This section describes location restrictions on certain types of waste. Exemptions may be allowed only in special circumstances with the agreement of the PRP.

Selected refuse will be placed in the first lift of nominal 3 m thickness on any liner, to avoid any low permeability waste which might unnecessarily hamper the free movement of leachate by gravity towards collection drains. This means that any low permeability wastes such as contaminated soils

and sludges will not be allowed within 3 m above any floor liner or within 3 m from any sidewall liner. Also, this first lift or 'fluff layer' will not be compacted in thinner layers.

Any general or special waste containing bulky and hard refuse items (e.g. C&D timber, car bodies) will not be placed in the first lift, to avoid puncturing the liner.

3.2.2.4 Last lift

General waste containing bulky refuse items will not be placed in the final lift, to avoid puncturing the final cap after settlement, unless a specific blinding and separation layer is formed.

Special waste which has significantly different compressibility properties from the surrounding general waste (e.g. compressible or stiff) will not be placed within 3 m underneath final cover, to avoid sharp differential settlement which could affect the integrity of the cap.

To reduce potential odour from the final cap, and to reduce risk of encountering specific harmful waste in any post closure activity like underground services work, the following wastes will not be allowed within 3 m underneath the final cap:

- Odorous special waste
- Special waste which has implications for health and safety (e.g. asbestos)

3.2.2.5 Daily Cover

Daily cover is described in a separate section (Section 3.3.2) of this LMP.

3.2.3 Class 2 waste

The Class 2 extension area will accept only material meeting the Class 2 waste acceptance criteria [Condition XX]. Incidental or attached biodegradable material (such as vegetation) must not exceed 5% by volume per load ([Condition XX]).

3.2.3.1 Tipping

The Class 2 landfill will operate with its own tip pad to achieve separation from Class 1 disposal. Class 1 landfill traffic strictly prohibited beyond the entrance point to Class 2 tip pad, governed by a full time spotter and token system where drivers must present appropriate token at each facility in order to be able to unload there.

Once the load and accompanying documentation have been accepted at the weighbridge, the driver will be instructed by the weighbridge operator to follow the road signs and proceed directly to the Class 2 area to offload the C&D material in the demarcated tipping area.

Once the vehicle arrives at the tipping platform for the Class 2 area, the driver will need to provide the token to the spotter received from the weighbridge before tipping the load in piles within the designated tipping area.

Daily inspections of the site and tipped materials will be undertaken by the delegated team members, operators manager, monitoring technician and/or operators. Inspections will be carried out to determine if the material is considered to be compliant with the Class 2 waste acceptance criteria. If loads are found to be unacceptable, then they will be removed as soon as practical.

If either the site manager, operations manager, monitoring technician or operators sees a load (or part of a load) which he/she believes may not conform to the requirements of the class 2 landfill, it will not be spread out and compacted with the rest of the fill material. The landfill/operations

manager and/or the Sales Specialist will be notified immediately, and the material will be either picked up and taken to the Class 1 landfill for disposal or removed from the site. If there is a need to relocate non-compliance Class 2 material to Class 1, the truck transporting the rejected load will be required to pass over the weighbridge to record the tonnage for the correct levy calculation before disposal to Class 1.

The waste generator will be notified and charged the full disposal costs.

3.2.3.2 First lift

Selective C&D waste will be placed within the first lift of nominal 3 m thickness on top of the liner to avoid any hard or sharp refuse items from puncturing the liner.

3.2.4 Special waste

3.2.4.1 Handling instructions and manifests

Special wastes will be handled in accordance with instructions prepared by site management and agreed with the customer at the time of entering into the specific contract to take the waste. The instructions will deal with transport, handling (e.g. dust and odour control), burial and PPE. The instructions will be given in advance to the operators either verbally when the first load arrives or in documents which are readily accessible (e.g. manifest documentation for non-listed special waste).

Every load of non-listed special waste for disposal at Redvale Landfill will be required to follow the procedures set out in Section 3.1 above, including the completion of a Notification of Special Waste. Tip face operators will be responsible for confirming that the waste that has been tipped is the same as the waste that has been declared on the manifest.

3.2.4.2 Sampling

Samples for screen testing purposes will be taken at the discretion of site management to verify that the waste is:

- non-hazardous;
- in accordance with the description of the waste agreed in the customer contract;
- consistent with any advice given to or by the interested authorities (e.g. AC) about the waste.

3.2.4.3 Odorous special wastes

Odorous special waste (excluding putrescible waste) will be managed in a manner that complies with consent requirements. The management of odorous waste, odour monitoring and odour control methods are outlined in Section 3.6 Odour Management Plan. Odorous wastes will be categorised as three main types:

Known odorous waste	Example: sewage plant screenings. This category includes wastes which are known in advance to be odorous. Landfill working face staff will have waste-specific instructions for disposal, which will be specified in advance by landfill management and recorded on portable manifest and notification forms pertaining to each waste.
Potentially odorous waste	Examples: solvent sludge, hydrocarbon contaminated soil. This category includes suspected odorous waste (e.g. odorous bin identified by the gatehouse attendant), frequently odorous waste (sealed transfer bins from out of town), and slightly but variable odorous waste (inorganic solvent sludge). Landfill staff will have standing instructions for disposal.

Redvale Landfill Management Plan

Unexpected odorous waste	Examples: transfer vehicle load containing fish heads. This category includes any waste which is unexpected found to be odorous when tipped. Landfill staff will have standing instructions for mitigative response actions.
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3.2.4.3.1 Preparation

Before opening up, preparations will be made to make sure that enough persons, equipment and odour control systems are ready, available and in working order.

Hauliers of known odorous waste will be required by contract to give advance notification (1 hour) of arrival at the landfill for disposal.

Immediately before tipping any known or potentially odorous load, preparations will be made including a combination of the following items where applicable:

- to have enough persons, equipment and odour suppressant systems ready;
- to have suitable odour control systems started and operating for example portable T-bar sprayers and fixed perimeter fence line and Cannons
- to set aside general waste for immediate mixing and burial;
- to set aside cover soil for immediate burial;
- to form a concave shape on part of the active tip face in readiness to receive and quickly bury the notified waste;
- to survey any proposed burial site in advance to avoid striking any previous special waste burials, gas wells and underground services;
- to dig a hole for burial;
- to hold each truck before tipping until the tip face is ready;
- to hold back successive trucks carrying the same waste for the length of time required to achieve the most efficient burial and odour minimisation.

3.2.4.3.2 Digging a hole

Digging a hole for burial of odorous loads will be considered only in particular cases such as bulky or fragile odorous loads, because of the risk of strong odour coming from hole dug in the underlying old waste. Holes will not be dug until the waste has arrived on the site, and applicable tipping preparations are in effect.

3.2.4.3.3 Tipping

Trucks will be directed where to tip by personnel at the working face.

Odorous waste disposal areas may be defined from time to time together with specific odour controls such as extra spray systems, thicker cover, and wind direction pre-requisites.

If a screen test is scheduled, and the sampling technician is ready, the technician will be allowed to take a sample after tipping provided that it does not affect the speedy burial of the odorous waste.

The standing instructions in regard to potentially odorous wastes will be that they are to be treated as for known odorous waste, except preparations and control systems may be stood down after tipping if odour is found to be minor.

The standing instructions in regard to unexpected odorous waste will be that if a load is found unexpectedly to be odorous after tipping, all preparations and procedures for known odorous waste are to be instigated immediately, and manual sprays used direct on the waste if appropriate.

3.2.4.3.4 Burial

The odorous waste will be buried as quickly as practical, by general waste or cover, whichever has been set aside in preparation. The odorous waste will be mixed immediately with set-aside general waste if this has been pre-specified as part of the burial procedure. Machine operations will be organised to minimise the spreading of the odorous waste over a large surface area or over the tracks and wheels of the machines.

Burial will not be considered to have been completed until the odorous waste has been covered by either

- (a) 300 mm thickness of general waste, or
 - (b) 300 mm thickness of daily cover soil, or
 - (c) equivalent alternative daily/intermediate/final cap materials. For daily cover alternatives, these can include effective sealing materials like foam, mulch and tarps.
- and there is no objectionable odour.

3.2.4.3.5 Rejection

If an odorous load either is significantly more odorous than expected, or arrives outside the hours allowed in the Management Plan and agreed with the customer, then landfill staff will be under instructions to report the incident to the Landfill Manager. Landfill management will maintain an internal incident reporting and response action tracking system. Landfill management will investigate and either:

- (a) continue accepting the waste with care; or
- (b) advise the generator that approval is withdrawn until further pre-acceptance testing provides satisfactory results; or
- (c) cease accepting waste from the contractor who more than twice jeopardises the site's compliance with odour control aspects of its consents.

Overall, WMNZ does not control behaviour of hauliers on the highway, but WMNZ is willing to take action with respect to any load on its property which includes the entrance road that has the potential to either affect the site's compliance or to generate a neighbour complaint.

3.2.4.3.6 Health and safety

PPE will be specified on manifests forms for adoption by the hauliers, and PPE will be provided to staff in accordance with the site's health and safety system. Tip face operators will be advised to move away if fumes are overpowering.

3.2.4.4 Putrescible waste

The management and sorting of putrescible waste is set out in Section 3.1 above. In regards to putrescible waste placement this will be placed at least 500m from any existing dwelling, whereas non-putrescible waste will be placed on the landfill within that distance. This will provide an additional buffer between active tipping of putrescibles and surrounding residential dwellings.

3.2.4.5 Sludge waste

Sludges, which tend to have low strength, will be treated as odorous waste as above. It's especially noted that:

- Sludge waste will have already been categorised as known odorous, potentially odorous, or non-odorous in advance.
- Mixing sludge waste quickly with general waste may be performed not only for the reason of odour, but for reasons of health and safety for workers, and the stability of compaction machines on the working face over possible 'soft spots'.

3.2.4.6 Dusty waste

A water cart will be maintained in operating condition and be available at all times to suppress dust during tipping. The water cart will be in attendance at the tip face during tipping of known dusty loads and suspected dusty loads, and will be available at all times to be called to the tipping pad for unexpected dusty loads.

3.2.4.7 Held waste

Periodically, waste will be taken onto the site but not accepted for immediate burial. For example, soil removed during a contaminated site clean-up may need to be "parked" safely until test results have been obtained. In these instances, the waste will be covered by tarps and at a location which avoids stormwater run-on, until the waste is either removed or landfilled.

3.2.4.8 C&D waste

C&D debris wastes which contain no unidentifiable contaminants will be treated as general waste, except:

- C&D waste such as rubble may preferentially be placed over leachate drains to improve drainage conditions;
- C&D waste containing large hard items will not be placed on liner or immediately beneath final cover, to avoid puncturing of liner or final cap.

3.2.4.9 Asbestos

Due to the different nature of asbestos waste, management of this is considered separately with an Asbestos Management Plan (Chapter 2.2 Appendix B).

3.2.4.10 Certified burials

The landfill will offer a service in which a responsible person certifies that the load has been "crushed and buried" in the landfill, and a supplementary service in which the exact location of the waste is determined by land survey methods. Observation, surveying and certification would make no change to the disposal procedure which would otherwise occur.

3.2.4.11 Hazardous waste

Landfill operators will be trained to identify waste which is hazardous or unacceptable and will be made responsible for reporting incidences to site management for a decision on action. A hazardous waste removal guide is presented in Section 3.2 Appendix A.

3.2.5 Monitoring

3.2.5.1 Consent requirements

[Condition XX]

3.2.5.2 Airspace consumption

Periodic surveys, undertaken at a minimum rate of once annually, of the waste pile will be used to calculate airspace consumption. Together with tallies of the amounts of waste received, the density of the waste will be calculated. Then together with the company's waste projections, the remaining life of the landfill will be estimated. A basic summary will be provided annually to the PRP.

3.2.5.3 Tip face coordinates survey

The exact location coordinates and dimensions of the general waste tip face will be determined by land survey methods on at least a weekly basis.

Site management will survey special waste burial locations and all as-built services to be buried in the waste pile, as required for compliance with the consent conditions. Such surveys will also be conducted for safety, for example so that future excavations can be set out to avoid previous burials.

Additional surveys might be performed for environmental risk assessments, or if considered to be relevant to possible future re-evaluation of gas and leachate installations, or for the company's customers' purposes, or if called for by the authorities for specific wastes.

Settlement monitoring is described in Section 4.2 Liner.

3.2.5.4 Reporting and record-keeping

No formal reporting is required for routine working face operations.

Event	Reporting and record-keeping
As-built drawings	Drawings will be maintained and updated at least annually to show the locations of all installations in the waste pile and surveyed special burials. These records will be kept electronically using CAD software.
Earth fill tests and construction materials tests results	Tests reports will be filed on the site and a register of all tests kept for the operating life of the landfill. Test result summaries (and full final test reports on request) will be submitted to the PRP for review at the end of each phase of work (typically annually).
Basegrade levels	As-built drawings will be prepared within 1 year after completion of the construction work described in the drawings. Basegrade as-built levels generally are the same as design levels.
Cover and roading materials	Truck tallies will be kept electronically using database software.
Water monitoring	Monitoring records will be reported to the AC via quarterly reports and copied to the PRP.
Weather station data	Site will maintain a weather station and keep the record of the data electronically.

3.2.6 Contingency

Contingency plans relating to working face disposal are addressed in the Emergency Management Plan and Closure Management Plan of this LMP.

Appendix A Hazardous waste removal guide

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REDVALE LANDFILL HAZARDOUS WASTE REMOVAL GUIDE	
<u>Hazardous waste item</u>	<u>Action</u>
All hazardous waste	If there is immediate danger to health, refer to the emergency management plan. If the customer can be identified, send the waste back on the truck which delivered it. If customer can't be identified, move the waste to a secure place. If the waste is a minor amount incidental to the load, bury it carefully and immediately, and notify site management
Pressurised gas cylinder	Inform Redvale Workshop who do have approval handlers If needed external parties will be sourced.
Fire extinguisher	Inform Redvale Workshop who do have approval handlers If needed external parties will be sourced.
Bomb	Police, who will contact Internal Affairs bomb disposal team
Drum of unidentified liquid	As above for "all hazardous waste", otherwise; Waste Management Technical Services East Tamaki Ph 09-274-7963
Refrigerator, not degassed	Waste Management Technical Services East Tamaki Ph 09-274-7963
Laboratory Chemicals	Waste Management Technical Services East Tamaki Ph 09-274-7963
Tyres; bulk and uncut	Waste Management NZ Ltd Tyre Recycling 75 Mclaughlins Road, Wiri, Auckland 2104
Lead acid batteries	Waste Management Technical Services East Tamaki Ph 09-274-7963
Agricultural chemicals	Waste Management Technical Services East Tamaki Ph 09-274-7963
PCB (capacitors)	Waste Management Technical Services East Tamaki, Ph 09-274-7963
Asbestos	Wet and bury.
Rechargeable batteries in commercial amounts (Nickel-Cadmium, nickel metal hydride, Lithium ion, lead, alkali)	Waste Management Technical Services East Tamaki, Ph 09-274-7963
Used radiator coolant	Waste Management Technical Services East Tamaki, Ph 09-274-7963
Other hazardous waste	Waste Management Technical Services East Tamaki, Ph 09-274-7963
Vermin (foreign insects, fruit fly and larvae, wood boring insects, unusual spiders, giant african snails, snakes and other reptiles, toads)	Ph 0800 809 966 for MPI advice
Other waste information: Noxious weeds Household hazardous waste	Call AC pollution hotline 09 377 3107 www.hazmobile.govt.nz (Auckland region except Waitakere City)
Used oil	Waste Management Technical Services East Tamaki, Ph 09-274-7963

Fig 3.2.7.1 Hazardous waste removal guide

Appendix B Asbestos Management Plan

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WASTE MANAGEMENT NZ LIMITED

Redvale Landfill

ASBESTOS MANAGEMENT PLAN WASTE DISPOSAL FACILITY

ADDRESS: Landfill Access Road, RD4, Albany 0794

TELEPHONE: [REDACTED]

FAX: [REDACTED]

BRANCH MANAGER: Glen Jujnovich

TELEPHONE: [REDACTED]

Reviewed by: Na Zhang

Date: 11 March 2025

Review Date: 11 March 2026

Figure 3.2.8.3

1



CONTENTS

1. Introduction	3
1.1 What is asbestos?	4
1.2 Definitions	4
2. Responsibilities	5
2.1 Regional / Branch Managers	5
2.2 Site Supervisor	6
2.3 Workers, contractors, and visitors	7
2.4 Weighbridge	7
3. Asbestos-related diseases	8
4. Control Limits	8
5. Health monitoring of the workers	9
5.1 Safety process for controlling asbestos risks:	9
6. Aim of Asbestos Monitoring Plan (AMP)	9
7. Identified Asbestos and ACM	10
8. Signage	12
9. Asbestos Disposal and Monitoring in Redvale Landfill	12
9.1 Identification of Asbestos	12
9.2 Receipt and handling of asbestos waste at approved Landfill	13
9.2.1 Asbestos Designated Area	13
9.2.2 Receipt and handling of asbestos waste at refuse transfer stations	14
9.2.3 Work Instruction and Risk Assessment	14
9.2.4 Risk Assessment	15
9.3 PPE	15
9.3.1 Masks:	15
9.3.2 Disposable Coveralls should be:	15
9.3.3 Gloves should be:	15
9.3.4 Footwear for asbestos work should be:	15
9.3.5 Decontamination Compatibility	15
9.4 Product Classification and Coding	16
10. Training	16
11. Examining Asbestos under Microscope	17
12. Emergency Procedures	17
12.1 Emergency Contact List:	17
12.2 Landfill	18
References:	19
APPENDIX 1 – Procedures (WI/RA)	20
APPENDIX 2: Example of Asbestos Acceptance Criteria and Instructions	78
APPENDIX 3 - Redvale Landfill Authorised Contractor Agreement for Asbestos	79



1. Introduction

Asbestos and asbestos related building products and materials up until the 1990s were commonly used in New Zealand construction due to its strength, durability and resistance to fire and water. Worksafe New Zealand is the agency responsible for the legislation that manages the removal and disposal of these hazardous materials under the [Health and Safety at Work \(Asbestos\) Regulations 2016](#).

Disposal Facilities accepting asbestos and Asbestos Contained-Material (**ACM**) must have an asbestos management plan in place. [*The Health and Safety at Work (Asbestos) Regulations 2016 & Work Safe: Approved Code of Practice, Management and Removal of Asbestos, 2016; and Good practice guidelines to manage the collection, receipt, transport and disposal of asbestos waste, 2018*].

Accordingly, Redvale Landfill as a recipient / potential recipient of ACM has to institute an asbestos management plan specifying how the workplace's identified asbestos or ACM will be managed. This plan must be accessible at the workplace and reviewed (*Part B Section 9.6 and 9.7 of the ACOP*).

This plan aims to outline the areas of the property:

- Where asbestos is known to exist, or
- Where it is strongly presumed that it exists; or
- Where it is presumed could exist due to improper/unauthorized disposal.

The plan will outline a safe system for working in and around these areas, with a view to mitigating the potential health risks that asbestos is known to cause.

This plan considers the risks associated with working in and around areas where materials that contain asbestos are known to exist, and they include, but are not limited to:

- The interaction of any worker, contractor/sub-contractor, customer or visitor in areas where ACM/ACD (Asbestos Containing Dust or Debris) is known to be present.

Site Managers, supervisors and workers must review and (if necessary) revise the asbestos management plan every five years, or when:

- Identification of ACM/ACD
- Decisions, and reasons for decisions, about the management of the risk arising from asbestos at the workplace;
- Procedures for detailing incidents or emergencies involving asbestos or ACM/ACD at the workplace;
- The workers of the PCBU, contractors and sub-contractors who carry out the work involving asbestos, including –
 - o Information and training that has been and will be provided to the workers;
 - o Roles and responsibilities of the workers;
 - o Any health monitoring of the workers that has been or will be undertaken

PLEASE REMEMBER.

- **ONLY THOSE WHO HAVE BEEN TRAINED IN THE SAFE HANDLING OF ASBESTOS CONTAINING MATERIALS ARE TO DO SO**
- **NO ONE IS TO DISTURB ASBESTOS CONTAINING MATERIAL AT ANY TIME**
- **REPORT ALL DAMAGE TO ASBESTOS CONTAINING MATERIAL IMMEDIATELY**



1.1 What is asbestos?

'Asbestos' is a term describing naturally occurring fibrous silicate minerals (rock-forming minerals). There are two groups, and six common types:

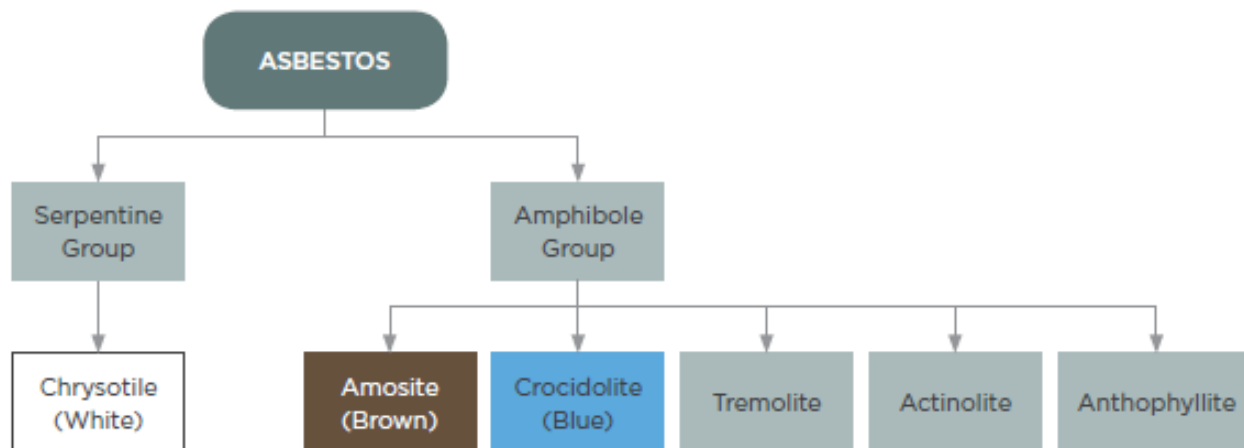


Figure 1: Types of asbestos. Source: Work Safe New Zealand, ACOP: management and removal of asbestos <http://construction.worksafe.govt.nz/guides/acop-management-and-removal-of-asbestos/>

White asbestos was the most common form of asbestos used in New Zealand, followed by brown asbestos; and blue to a lesser extent.

White asbestos has long, curly fibres, which are flexible enough to spin and weave into fabric. Its versatility made it the most common type of asbestos in building and household products.

Brown asbestos it was mostly mined in Africa and was often used in asbestos cement sheet and pipe insulation. It was also used in insulating boards, ceiling tiles and thermal insulation.

Blue asbestos is known for its excellent heat resistance and ability to repel water. It was mostly mined in South Africa, Bolivia and Australia. In South Africa, it was called 'woolly stone.' It has straight, thin, blue fibres.

Blue asbestos was used to insulate steam engines and is also found in some spray-on coatings, pipe insulation and cement products. It is brittle, and products containing blue asbestos often malfunction. This increases the potential of airborne asbestos exposure for people doing maintenance, repair and replacement work.

Blue asbestos is claimed to be the 'most dangerous asbestos' because its fibres are so thin. This makes them easy to inhale and lodge in the linings of a person's lungs. However, all types of asbestos should be treated with equal caution, because all of their fibres can be inhaled into the lungs.

Asbestos is most commonly found in sprayed coating (fire protection on structural supports, e.g. columns and beams), pipe insulation, ceiling and door panels, window panels, floor tiles, cement roof sheeting and textured decorative coating such as Artex.

1.2 Definitions

Asbestos cement (AC): A product consisting of sand aggregate and cement reinforced with asbestos fibres usually found in the form of sheeting which is either flat or corrugated and used in wall, ceiling, roof and pipes.

Asbestos containing dust or debris (ACD): Dust or debris that has settled within a workplace and it, or assumed to be contaminated with asbestos.



Asbestos containing material (ACM): Any material, object, product, soil or debris that contains asbestos. Small to medium proportions of various forms can be found in a wide range of sprayed finishes for older commercial and residential properties, and also in soils where asbestos cement was previously disposed or used as a roading material.

Air Monitoring: This means airborne asbestos fibre sampling that assesses exposure and the effectiveness of control measures. Air monitoring includes exposure monitoring, control monitoring and clearance monitoring.

Airborne Asbestos Fibres: Means any fibres of asbestos small enough to be made airborne. For the purposes of monitoring airborne asbestos fibres, only respirable asbestos fibres (those fibres less than 3 µm wide, more than 5 µm long and with a length to width ratio of more than 3 to 1) are counted.

Note: Airborne asbestos fibres are generated by the mechanical disintegration of Asbestos Containing Materials (ACM) and subsequent dispersion of the fibres into the air from activities such as demolition and the use, removal and disposal of asbestos and ACM. Airborne dust has the potential to contain respirable asbestos fibres.

Competent person: A person who has the knowledge, experience, skills, and qualifications to carry out a particular task under these regulations, including any knowledge, experience, skills, and qualifications prescribed in a safe work instrument (Health and Safety at Work (Asbestos) Regulations 2016).

Friable (Unbound) asbestos products: Products when asbestos fibres are not firmly bound and are more likely to release fibres into the atmosphere when disturbed, such as crushing. Friable asbestos products include but are not limited to:

- Sprayed asbestos fire retardants
- Soundproofing; and Textiles
- Thermal lagging, e.g. pipe insulation

Non-friable asbestos: In relation to asbestos or ACM, means not friable (and, for the purposes of this definition, asbestos and ACM include material containing asbestos fibres reinforced with a bonding compound) (Approved Code of Practice: *Management and Removal of Asbestos 2016*)

Person conducting a business or undertaking (PCBU): A PCBU may be an individual person or an organisation, in most cases the PCBU will be an organisation (for example, a business entity such as a company).

Personal Protective Equipment (PPE): (a) means anything used or worn by a person (including clothing) to minimise risks to the person's health and safety; and (b) includes air-supplied respiratory equipment (Approved Code of Practice: *Management and Removal of Asbestos 2016*)

2. Responsibilities

2.1 Regional / Branch Managers

It is the responsibility of the Regional/Branch Manager to:

- Ensure there are procedures/processes established for the acceptance and disposal of "Asbestos Special Waste" prior to any ACM being accepted at the waste facility for approved disposal;
- Ensure there are emergency procedures established where inappropriate/unauthorised disposal of "Asbestos / ACM" is identified and reported by workers at the waste facility for appropriate handling and disposal;
- Ensure all workers involved with the acceptance, processing and disposal of Asbestos / ACM are trained in facility procedures;



- Ensure all workers involved with the collection, transportation and disposal of asbestos waste undertake annual health monitoring as specified in compliance with Work Safe regulations (Work Safe: ACOP: Management and Removal of Asbestos, Part C: 16)
- Ensure air monitoring as per HSEQ QRG 4.2.10.01 *airborne asbestos monitoring in the workplace guideline* is undertaken in areas where Asbestos, ACM or ACD could potentially be.
- Where ACM is identified or presumed, commission an external report to investigate and determine whether asbestos is present at the site;
- Develop an asbestos register for the site based on the findings of the external report;
- Develop a Site Asbestos Management Plan;
- Communicate the findings of the external investigation report to all workers (including visitors, contractors, staff etc.) if there is the possibility of them working near or disturbing ACM;
- Install appropriate signage indicating ACM;
- Update the Emergency Contacts list, located on the exterior of the building; with a note for any emergency services stating that the building is known to contain; or is strongly presumed to contain asbestos;
- Ensure that the appropriate control measures and disposal of ACM are followed by a licensed asbestos removalist and an Asbestos Removal Control Plan is provided and reviewed by a licensed asbestos assessor before any work on ACM commences; and
- Ensure that an appropriate clearance is provided by a licenced asbestos assessor (Class A) or suitably competent assessor (Class B) prior to reoccupation of the area.

2.2 Site Supervisor

It is the responsibility of the designated Site Supervisor to:

- Ensure that the appropriate "Asbestos Special Waste" disposal forms are completed prior to any ACM being accepted at the waste facility for approved disposal;
- Ensure emergency procedures are implemented on the identification of unauthorised Asbestos / ACM at the waste disposal facility;
- Ensure workers at the site are trained and comply with procedures for the acceptance, processing and disposal of asbestos / ACM at the waste facility;
- Ensure that the appropriate disposal for materials that contain asbestos is followed as per the Asbestos Management Plan and associated waste facility procedures;
- Assist in the preparation of the Asbestos Management Plan for the site;
- Ensure that area(s) associated with the disposal, handling, processing or disposal of asbestos / ACM have the necessary demarcation zones identified, and / or cordoned off;
- Where site staff are not trained, ensure only approved licensed contractors perform the remedial removal of the unauthorised disposal of asbestos / ACM products;
- Ensure that the area(s) where contractors are performing any remedial or repair work on materials that are known to; or are presumed to contain asbestos are suitably assessed and relevant demarcation zones are identified, and / or cordoned off;
- Ensure that only approved licensed contractors or workers perform the remedial work and are observed to be wearing the appropriate PPE for handling asbestos and complying with the asbestos control plan;



- Ensure that a clearance certificate is provided for reoccupation of the area.

2.3 Workers, contractors, and visitors

It is the responsibility of all workers, contractors and visitors to:

- Not disturb any asbestos containing material and must report any damage to their supervisor/manager straight away
- Confine their movements to designated walkways, where practicable;
- Not enter any designated area associated with the disposal, processing or burial of asbestos / ACM products unless trained and approved by facility management;
- Not enter an area that has been cordoned off for remedial work, unless they are to be performing the remedial work in areas where asbestos is known to; or is presumed to exist;
- Must not undertake and work associated with asbestos or ACM products unless trained or supervised by a licenced asbestos removalist or appropriately qualified supervisor;
- Wear the appropriate PPE performing disposal/repair work in areas where asbestos is known to; or is presumed to exist;
- Contain and dispose of any asbestos fragments in the appropriate manner as per a licensed removalists Asbestos Removal Control Plan; and
- Report any incident or unsafe practice.
- Only those who have been trained in safe handling of asbestos containing materials are to do so.

2.4 Weighbridge

The Weighbridge Attendant received prior notice by phone no less than 1 hour before the expected arrival of the load ACMWRAP and called the Spotter on the Radio Telephone to prepare. ACMCONSTW/ACMCONSTU the driver will present the paperwork to the weighbridge attendant only.

- Reception of Asbestos Containing Material at the gatehouse.
- Confirm that they are an “Authorised Asbestos Contractor” delivering to Redvale. If not, refuse entry. No Sundry Customers.
- Notify landfill personnel of impending ACMWRAP / ACMCONSTW /ACMCONSTU / ACMSOIL / ACMSLUDGE waste arrival via Radio Telephone.
- If the load is unacceptable, the following courses of action shall be taken:
- If not wrapped or covered send the truck away.
- If the load is not on a tipping truck or bin send the truck away.
- If the truck arrives outside acceptance time, contact the Landfill Supervisor and only let on-site if an agreement is reached.
- An Event Record Pad is to be completed and passed on to the Landfill Manager.
- Weigh in. Follow the usual procedure using gatehouse software.
- Notify landfill personnel of the arrival of ACM.
- Confirm that the driver has PPE or supply the driver with suitable respiratory protection (P2 masks).
- Tell the driver to wear the P2 mask at all times whilst on the landfill.



- Provide the Driver with the appropriate reference placard to display in the truck window (piece of paper containing the material type carried – Class 1 or Class 2).
- Convey instructions from landfill personnel to the driver i.e. send the truck straight to the working face.
- Weigh out. Follow the usual procedure using weighbridge software.
- Retrieve the reference placard from the Driver.
- The Weighbridge attendant will liaise with the disposal supervisor to determine if the load can be disposed of.
- The waste may be accepted so long as the minimum cover can be obtained.

3. Asbestos-related diseases

Prolonged inhalation of asbestos fibres can cause serious and fatal illnesses, including varying forms of cancer and asbestos related diseases. Smokers that work with asbestos, have a far greater risk of developing lung cancer than non-smokers.

Accordingly, exposure should be prevented. The National Exposure Standard (NES) of 0.1 fibres/mL should never be exceeded, and control measures are to be reassessed whenever air monitoring indicates the 'control level' of 0.01 fibres/mL has been reached.

4. Control Limits

Where asbestos and ACM are identified in the workplace, the PCBU must undertake air monitoring to determine the levels of exposure. It is important to note that there are no safe exposure limits to asbestos fibres and all practicable steps must be taken to ensure that exposure to asbestos is kept and maintained as low as possible and under no circumstances exceed the Control Limits.

New Zealand legislation requires companies to monitor employees' exposure to hazards and ensure work areas where reasonably practicable are controlled to eliminate risk. Certain products like asbestos dust that cannot be eliminated from the workplace or isolated from employees therefore require sampling and monitoring of potential exposure.

In New Zealand there are currently two workplace exposure standard models endorsed by WorkSafe New Zealand for Asbestos (Table):

- Workplace Exposure Standards (WES)
- Control Standards

At Redvale we have adopted the Control Standards model, which are occupational hygiene best practice and are not health-based standards – i.e. they are below the concentrations set by WES for asbestos, ensuring greater safety margins for our workers (HSEQ QRG 4.2.10.01 Airborne Asbestos Monitoring in the Workplace).

Table 1: Workplace Exposure Standard Models for Asbestos

The Workplace Exposure Standard		The Control Standard	
Workplace Exposure levels for monitored airborne asbestos fibres		Control levels for monitored airborne asbestos fibres	
Types of Asbestos	Control /Action	Control Level (airborne asbestos fibres/ml)	Control/Action



White Asbestos	An average concentration over any 4-hour period of 1 fibre per millilitre of air; and An average concentration over any 10-minute period of 6 fibres per millilitre of air.	> or = 0.01 > 0.01	Continue with control measures Review control measures
Brown and Blue Asbestos	An average concentration over any 4-hour period of 0.1 fibres per millilitre of air; and An average concentration over any 10-minute period of 0.6 fibres per millilitre of air.	≥0.02	Stop working and find the cause

5. Health monitoring of the workers

Workers who carry out work involving asbestos should be provided with the appropriate health monitoring programme. In compliance with Work Safe regulations (*Work Safe: ACOP: Management and Removal of Asbestos, Part C: 16*) health monitoring at **Redvale** includes:

- Physical examination: this emphasises the respiratory system and includes a spirometry and auscultation of the chest. If there are any abnormalities, further tests may be required, possibly including an X-ray.
- The worker's demographic, medical, and occupational history
- Records of the worker's personal exposure to asbestos such as:
 - Relevant risk assessment reports
 - Air monitoring results

Together, this is known in the code as "full asbestos medical". According to Work Safe regulation, this sort of health monitoring should be done after the first year of employment and then every five years. However, Waste Management's current Policy is to perform Annual medicals on an annual basis for all workers at Redvale.

5.1 Safety process for controlling asbestos risks:

When managing asbestos-related risks, the workplace PCBU must:

- Identify or assume the presence of asbestos and ACM at the workplace.
- Assess the likelihood of exposure to airborne asbestos from the identified or assumed asbestos.
- Eliminate or minimise the risks by putting control measures in place.
- Review the control measures to make sure they are effective.

6. Aim of Asbestos Monitoring Plan (AMP)

The aim of this plan is to help duty holders comply with their requirement to provide healthy and safe work for everyone who works with asbestos (Refer to HSEQ QRG B4.4.2.10.01 Airborne Asbestos Monitoring in the Workplace).

This AMP details an approach towards managing the asbestos hazards identified at the Site, by documenting procedures designed to minimise the risk of exposure to asbestos at the Site, for workers that include: employees, the maintenance team, the gas team, surveyors, contractors, construction workers and visitors.

Specifically, this plan considers the risks associated with working in and around areas where materials that contain asbestos are known to exist. Site Managers, Supervisors and workers should review this Asbestos



Management Plan on a regular basis (on an annual basis as a minimum) as the needs and issues of the site change and develop.

The plan must include:

Decisions and reasons for decisions, about the management of the risk arising from asbestos at the workplace;

Procedures for detailing incidents or emergencies involving asbestos or ACM at the workplace;

The workers who carry out work involving asbestos, including:

- Information and training that has been and will be provided to the workers;
- Roles and responsibilities of the workers;
- Any health monitoring of the workers that has been or will be undertaken.

7. Identified Asbestos and ACM

This Plan considers the risks associated with working in and around areas where materials that contain asbestos are known to exist, and they include, but are not limited to:

- Dealing with existing know asbestos already present on site.
- Disposal of Asbestos Containing Materials (ACM).
- Airborne Asbestos in the Workplace.
- Asbestos discovered by workers in solid materials (soil, demolition debris and any other commercial waste).
- Emergency provisions for undeclared asbestos or asbestos release.

The Plan takes a risk-based approach; for the assessment of risk, the following factors are relevant.

- Asbestos is accepted for disposal at Redvale Landfill
- The site has had a long history of accepting asbestos
- Asbestos arrives wrapped and is disposed of without any direct physical contact with workers.
- Asbestos is covered by inert material once offloaded.
- Air monitoring for asbestos fibres since 2017 has never reached the control level.



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Map showing asbestos containing material (ACM) location on-site at Redvale:





8. Signage

If the enclosure, encapsulation or sealing options are used in commercial buildings, the location of the asbestos must be clearly labelled and recorded on the building plans.

Examples of Asbestos Awareness signage on site:



9. Asbestos Disposal and Monitoring in Redvale Landfill

9.1 Identification of Asbestos

Asbestos is contained within many materials and cannot be identified by visual inspection alone. Material that looks like ACM, may not be ACM and vice versa. ACM is only a hazard if it becomes airborne small fibres. The risk of airborne fibres is maximised from material that has a fibrous appearance and is brittle; any such material should be treated as asbestos.

There is no facility on site to confirm or positively identify asbestos.

Any fibrous material will be considered Asbestos by Redvale Landfill (unless the customer provides analytical evidence that the material does not contain asbestos).

The friable (unbound) asbestos group of products is rarely received at Redvale Landfill. Most of this material has already been disposed, of during earlier periods of removal work in the Auckland region.



Redvale Landfill receives ACM in various forms. ACM may be classified and treated as follows:

- ACM WRAP – Large pieces of ACM that require wetting and wrapping.
 - o Wrapping requirement is two layers of durable High-Density Poly Ethylene. Suitable PVC adhesive tape is to be used to maintain the wrapping while in transit.
- ACM SOIL – Small pieces of ACM dispersed in another medium (usually soil) that require wetting and covering.
 - o Covering may be by way of at least one layer of durable High-Density Poly Ethylene with suitable PVC adhesive tape to secure cover. Covers need to extend down the side of the load but are not required on the floor of the load.

This plan considers the risks associated with working in and around areas where materials that contain asbestos are known to exist, and they include, but are not limited to:

- Disposal of Asbestos Containing Materials (ACM).
- Airborne Asbestos Monitoring in the Workplace.
- Asbestos discovered by workers in solid materials (soil, MF, demolition debris and any other commercial waste).

9.2 Receipt and handling of asbestos waste at approved Landfill

Asbestos waste should be disposed of in a dedicated special waste location at the landfill (Section 7 of the Health and Safety at Work (Asbestos) Regulations 2016). The disposal location should be considered an area of asbestos related work and the appropriate controls should be established to protect workers from asbestos exposure. Asbestos waste disposal areas must have appropriate signage to alert site workers and customers to the presence and location of asbestos (Sections 10, 12, 50, Health and Safety at Work (Asbestos) Regulations 2016).

All asbestos waste disposal areas should be located a sufficient distance away from the edge of the landfill and a sufficient from other landfill activities to minimise the risk of exposure.

Asbestos waste should be appropriately packaged or wrapped and covered as described in Part C, Section 8 of the ACOP. If not, it should be rejected at the weighbridge.

9.2.1 Asbestos Designated Area

At Redvale Landfill all incoming ACM will be disposed of in a dedicated area. This area will have restricted access and specific safety controls in place such as:

- ACM specific machinery: Machines which are only used in the ACM area and have specific filters.
- Decontamination Area: An area for workers to safely put on and remove PPE.
- Odour Cannons and T-bars: The area will have continuous use of these during operational hours to dampen the area and prevent asbestos fibres from becoming airborne.
- Specific PPE requirements: Paper disposable overalls (rated type 5, category 3 - EN ISO 13982-1), P2 masks, gloves (latex gloves or ninja gloves EN388/443) and disposal boot covers.
- No unnecessary or unauthorized access.
- Warning Signs around the site (See photo's below)
- Regular monitoring.



9.2.2 Receipt and handling of asbestos containing material waste at refuse transfer stations

9.2.2.1 Although asbestos is not accepted at refuse transfer stations, its arrival can occur in two ways: unexpectedly (uncontrolled)). Each situation requires a distinct procedure. Uncontrolled receipt of asbestos waste

Uncontrolled receipt refers to those situations where asbestos waste is deposited at a refuse transfer station that would not otherwise accept asbestos, or in a form not accepted at the site (e.g. not packaged correctly).

As standard good practice, site workers should visually check the material prior to disposal and ask the customer what the material is, how much there is, where it came from and, if it is building material, the age of the material. If ACM is identified or suspected the customer should be instructed to take the material away and to contact a licensed removalist or approved disposal facility for further advice.

If in doubt, transfer station workers should treat the material as asbestos or ACM.

Refer to Emergency procedures – Transfer Stations.

9.2.3 Work Instruction and Risk Assessment

Purpose and Scope

This procedure defines requirements to minimise the risk associated with the handling and disposal of ACM waste at a landfill or transfer station. Site specific Work Instructions and Risk Assessments are to be attached to this Asbestos Management Plan as Appendix 2.

Asbestos is contained within another material, ACM (Asbestos Containing Material) with the potential for Asbestos fibres to be released as the containing material degrades. Also, not all asbestos waste is contained within large sheets or other objects.

Some are dispersed within smaller pieces in another media usually soil or large concrete structures. It is not possible to physically remove the Asbestos contaminated material from such media so procedures are required to be developed to ensure they are disposed of safely at Landfill. Procedures include any pre-acceptance process through identification at Weighbridge to final internment in the landfill.

Key Requirements



For asbestos to be safe it cannot be airborne, so correct identification, wetting, wrapping or covering (where appropriate) and monitoring is required.

9.2.4 Risk Assessment

The risk assessment form identifying the main risks related to this procedure is provided in (Appendix 2), control measures that are required to follow to minimise the effect of asbestos exposure are also provided in the Risk Assessment.

9.3 PPE

The PPE required for asbestos work are as follows (Coleman, 2017):

- Masks (P2 Dust masks for contractors, P2 half-face respirator for operating staff)
- Disposable Coveralls (rated type 5, category 3 - EN ISO 13982-1)
- Gloves (latex gloves or ninja gloves EN388/443)
- Steel-toe safety boots and disposable boot covers

9.3.1 Masks:

P2-rated dust mask (to be worn only for short durations, one use only).

P2-rated half-face respirator (to be used for longer durations of ACM exposure, must be fit checked)

9.3.2 Disposable Coveralls should be:

Disposable coveralls rated type 5, category 3 (prEN ISO 13982-1)

One size too big

Sealed cuffs

Fitted hood worn over respirator straps

Legs worn over footwear – do not tuck into boots

9.3.3 Gloves should be:

Latex; low protein, (powder free)

alternative; disposable Nitrile gloves (latex gloves or ninja gloves EN388/443).

9.3.4 Footwear for asbestos work should be:

Steel capped, rubber soled, laceless

To be left on site until work is complete

To be decontaminated upon completion

Alternatively, use disposable boot covers

9.3.5 Decontamination Compatibility

When selecting PPE, PCBU's and workers should consider if reusable PPE can be decontaminated.

PPE that is not clothing must be disposed of as asbestos waste or decontaminated and kept in a sealed container until it is re-used for asbestos work.

Clothing should be made from material that provides protection against fibre penetration; not wool or other materials that attract fibrous dust (Refer section 14.9 of Approved Code of Practice – Management and removal of asbestos).



9.4 Product Classification and Coding

Any fibrous material will be considered Asbestos by Redvale Landfill (and therefore requires wetting and either wrapping or covering prior to disposal, unless the generator (customer/removalist) provides analytical evidence that the material does not contain asbestos.

The friable (unbound) asbestos group of products is rarely received at Redvale. Most of this material has already been disposed, during earlier periods of removals work in the Auckland region.

Redvale receives ACM in various forms. ACM is currently subdivided into 4 groups as follows:

- **ACMWRAP** – Large pieces ACM that require wetting and wrapping.
- **ACM SOIL** – Small pieces of ACM dispersed in another medium (usually soil) that require wetting and covering.
- **ACMCONSTU** – Unwrapped construction / ACM: large items of construction material such as a part of a bridge deck/beam containing ACM.
- **ACMCONSTW** – Wrapped construction / ACM: large item like a concrete beam/pile containing ACM, and due to its size, it can be practically wrapped.

Table 21: Proper Shipping Name Information for Asbestos

Proper Shipping Name	White Asbestos	Brown Asbestos	Blue Asbestos
UN Number	2590	2212	2212
Packing Group Number	III	II	III
Haz Chem Code	2X	2X	2X
Class Label	9	9	9

10. Training

According to the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016 (Section 9), a PCBU has obligations to ensure that workers are adequately trained and experienced or are supervised by an adequately trained and experienced individual for any work, operation of plant or exposure to substances that is capable of causing a risk in a workplace.

In addition to section 9 above, a PCBU must ensure that workers who are engaged by the PCBU and who the PCBU reasonably believes may be involved in asbestos removal work or in the carrying out of asbestos-related work are trained in the identification and safe handling of, and suitable control measures for, asbestos and ACM. Anyone given the responsibility to manage the asbestos hazards and implement the Asbestos Management Plan should consider undertaking a Level 2: Advanced awareness training or the **“Asbestos Removal – Class B” training course**.

The workers must receive task-specific training on [Part C Section 12 of the [ACOP](#)]:

- How to recognise material that may contain asbestos or is an ACM worker likely to encounter
- How to handle and work with asbestos and ACM safely
- Every step of the safe work procedures for receipt, transport and disposal of asbestos waste
- Decontamination, waste and transportation requirements
- What to do if something goes wrong i.e. trained in emergency procedures
- The PCBU's PPE and respiratory protection programme (section 14.12.2 of ACOP)
- Health monitoring requirements



- Air monitoring processes
- Any other matters the PCBU (and workers or representatives) considers relevant.

11. Examining Asbestos under Microscope

Under a microscope, white asbestos looks different from brown and blue asbestos.

White asbestos has long, curly fibres, which are flexible enough to spin and weave into fabric. Its versatility made it the most common type of asbestos in building and household products.

Brown asbestos has harsh, spiky fibres. It was mostly mined in Africa and was often used in asbestos cement sheet and pipe insulation. It was also used in insulating board, ceiling tiles and thermal insulation.

Blue asbestos is known for its excellent heat resistance and ability to repel water. In South Africa it was called 'woolly stone.' It has straight, thin, blue fibres.

Blue asbestos was used to insulate steam engines and is also found in some spray-on coatings, pipe insulation and cement products. It is brittle, and products containing blue asbestos often malfunction. This increases the potential of airborne asbestos exposure for people doing maintenance, repair and replacement work.

Blue asbestos is claimed to be the 'most dangerous asbestos' because its fibres are so thin. This makes them easy to inhale and lodge in the linings of a person's lungs. However, all types of asbestos should be treated with equal caution, because all of their fibres can be inhaled into the lungs.



Figure: Asbestos Awareness Minerals . Source: <http://construction.worksafe.govt.nz/guides/acop-management-and-removal-of-asbestos>

12. Emergency Procedures

In the event that asbestos is identified, or inappropriately disposed of or damaged workers must report to their site supervisor immediately.

All personnel must be cleared from the area.

The area is to be cordoned off.

The supervisor must arrange for emergencies relating to the type and location for exposure i.e. Building containing asbestos, Landfill or Transfer station outlined below.

12.1 Emergency Contact List:

POSITION / COMPANY	NAME	CONTACT NUMBER(S)
Regional Manager	Glen Jujnovich	[REDACTED]
Operations Manager	Matt Atkinson	[REDACTED]
Regional H&S Partner	Louise Barratt	[REDACTED]
LICENSED ASBESTOS REMOVALISTS & ASSESSORS		
WM Employee	Aaron Menzies	[REDACTED]



WM Employee	John Saunders	
WM Employee	Ross Harford	
WM Employee	Sacheda Naicker	

Asbestos must only be handled by a certified contractor (Class A or B) listed on the WorkSafe NZ website for your area.

12.2 Landfill

Unauthorised or improper disposal of asbestos or asbestos containing material (ACM).

When identifying ACM in waste dropped off at landfills in general waste:

- Isolate the area immediately.
- Ground staff to move and remain upwind of ACM.
- Advise Supervisor
- Communicate with machine operators advising of ACM.
- Machine operators push the product away from the tip face.
- Additional waste or cover material be dropped and pushed over ACM preventing spread.
- Follow site procedures – Record and register the location of ACM.
- Investigate the potential source of load.

When identifying ACM spill either before or after the truck has passed the weighbridge:

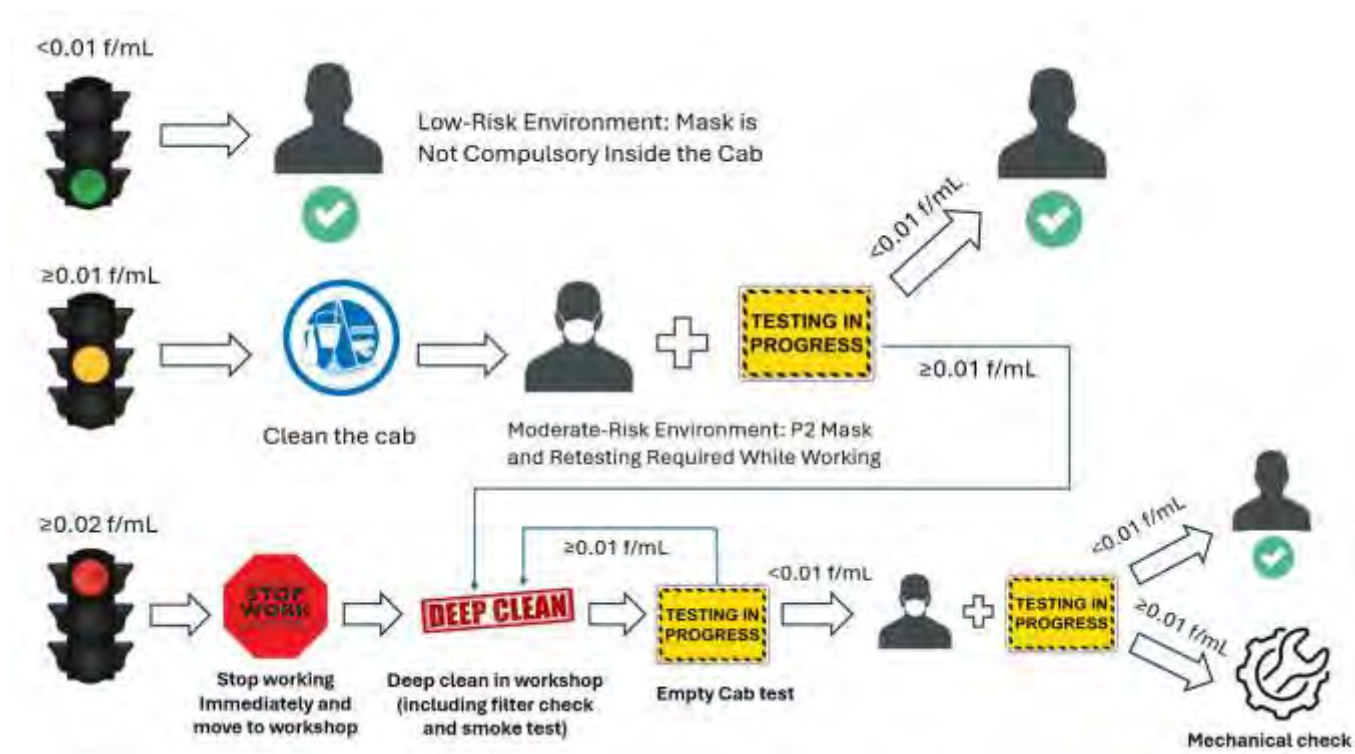
- Isolate the area immediately.
- Ground staff to move and remain upwind of ACM.
- Advise Operations Manager
- Communicate with water truck operator to advise of ACM spill.
- Water truck operator to dampen load immediately with water.
- Additional cover material should be dropped and pushed over ACM preventing spread.
- Operations Manager to ensure appropriate machine collects ACM covered spill and drops it on ACM pad (NOT inside ACM area)
- Follow site procedures – record and register the location of ACM.
- Investigate the potential source of load.



12.3 Asbestos detection inside the cab

It is considered an emergency if the asbestos detected inside the cab reaches or exceeds 0.01 f/mL. The following procedures should be followed based on the asbestos concentration:

- <0.01 f/mL: This is a low-risk environment, and wearing a mask inside the cab is not mandatory. The cab must be cleaned daily by the operator, using wipes and keeping the floor free of debris.
- ≥0.01 f/mL: The cab must be cleaned using a HEPA filter fitted vacuum cleaner as per UNI RED WI 036 Decontamination of ACM Machinery. The operator can then continue working while wearing a mask. The asbestos test should be repeated. If the result remains the same, a deep cleaning is required in the workshop, as per UNI RED WI 036 Decontamination of ACM Machinery, including filter checks and a smoke test.
- ≥0.02 f/mL: Work must stop immediately. A deep cleaning of the cab should be performed by the workshop as per WM UNI RED WI 036 Decontamination of ACM Machinery, including filter and smoke tests. Afterward, the test will be repeated. If the result is still ≥0.01 f/mL, a mechanical check is required.



References:

- WasteMINZ 2018: Good practice guidelines to manage the collection, receipt, transport and disposal of asbestos waste <http://www.wasteminz.org.nz/wp-content/uploads/2018/05/Good-practice-guidance-managing-asbestos-waste-consultation-document.pdf>
- HSEQ QRG 4.2.10.01 Airborne Asbestos Monitoring in the Workplace



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APPENDIX 1 – Procedures (WI/RA)



Class 2 C&D Operation

Risk Assessment Form

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Division: Waste Management UNI	Branch/Site: Redvale Landfill & Energy Park	WI No. WM UNI RED WI 1061
This form is to be completed by the person/s undertaking the risk assessment in accordance with the applicable 'Identification and Risk Assessment Checklist'.		
Task/Equipment/Activity to be risk assessed:	Waste Disposal at the Class 2 C&D Landfill	
Person/s at Risk:	Employee ☒ Contractor ☐ Member of Public ☐ On-Site Visitor ☐ Environment ☐ Business ☐	
Date of Assessment:	18/04/2023	Date of Last Assessment: 04/05/2023
List all persons involved in completing the Risk assessment - HSR Representative, workers, involved etc..	Louise Barnett, Glen Iujnovich, Jonathan Gray, Saso Fatamaka, Laiana Barbosa	Date: 01/12/2023
Overview of Activity:	Disposal of Class 2 Material at the Class 2 C&D Landfill site at Redvale.	
Process:	Name:	Position Title
Task Owner Approval:	Matt Atkinson	Operations Manager
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator
Final Approval:	Glen Iujnovich	Regional Manager

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
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Class 2 C&D Operation

Risk Assessment Form

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Section 1. Summary of key hazards that were identified during the assessment – list in order of significance.					
1.	Collisions / Interactions	CR1	7.	Human intervention or handling of ACM	CR2
2.	Fitness for Work	CR 10	8.	Unauthorised delivery, non-approved operators, incorrectly or inadequately wrapped ACM	CR2
3.	Exposure to ACM	CR2	9.	Lone worker	No Critical Risk
4.	Loss of control – sinking, slipping, rollover	CR4	10.	ACM exposure to the environment	No Critical Risk
5.	Hydrogen Sulphide (H2S) and landfill gas exposure	CR8	11.	Spill	No Critical Risk
6.	Damaged packaging when tipping/moving	CR2	12.		

Important Note: An Activity can create a Hazards that involves multiple Critical Risks.

Critical Risk	Possible SIF Event Descriptions
CR1 Collisions	With moving or stationary objects or people, reversing incidents, breaches of the 5mtr rule, hitting overhead objects, actual or potential collisions.
CR2 Exposure to hazardous substances	Asbestos, medical waste, incompatible loads / chemicals, incorrect disposal, unknown products, failure to use correct PPE
CR3 Insecure loads	On trucks, forklifts, racking failure, product storage too high, unrestrained product stacks, e.g., baled cardboard
CR4 Loss of Control	Actual and potential rollovers, unintended, uncontrolled or unexpected movement of plant or equipment and vehicle rollaways, failure to engage park brake
CR5 Exposure to uncontrolled energy	Failure to lock out or tag out fixed or mobile plant, unauthorised use of plant, entrapment in plant/ crushing, no permit to work issued or approved
CR6 Electricity / Arc Flash	Contact, or near contact with overhead power cables, no lock out or tag out when working on landfill electricity generation, potential electrical shock (damaged power leads, extension cables) etc, potential and actual shock / arc
CR7 Falls from heights	No permit to work issued or approved, no fall arrest or prevention of fall equipment used, no edge protection, incorrect use of tools as work platforms (ladders, steps, chairs), out of date fall arrest PPE
CR8 Overcome by fumes or gases	No emergency response plan developed, no gas detection equipment used, no lock out or tag out in place, failed valves, failure to use correct PPE, exposure to fumes from fire or gas leaks, no permit to work issued or approved,
CR9 Threatening Behaviour	Assault, violent attacks, threatening behaviour
CR10 Drug or alcohol impairment	Could include prescription medications which restricts the use of plant operation or ability to drive
CR11 Fire/Explosion	Incompatible loads/chemicals, gas leaks, no hot work permit approved in explosive or fire sensitive areas (landfills, confined spaces), incorrect tools used which can cause sparks, no gas detection equipment used
CR12 Accidental Firearm discharge	Actual and potential, failure to follow safe practices

2

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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CR13 Drowning No emergency response plan when working close to water (whether on foot or with plant and equipment), no permit to work issued, incorrect PPE, working alone close to water, incorrect plant selection with only one point of egress.

Section 2. Risk Assessment (List identified hazards and detail measures taken to address the hazards)							
Identified Hazard	Uncontrolled Risk		Risk Rating	Current controls	Controlled Risk		Residual Risk Rating
	Likelihood	Consequences			Likelihood	Consequences	
Collisions/interaction with heavy machinery, light vehicles, and any other vehicles at the tip pad	Unlikely	Significant	High	- A VCR / pre-start check must be completed before operating any machinery or vehicle. - All operators, contractors and third parties must complete site induction and be aware of the risks. - The 5-metre rule must be applied and followed. - All parties must follow the site traffic management plan. - All mobile plant must be fitted with a HEPAFILTER, reverse squawker, beacon, horn, and working mirrors. - RT verbal communication between operators must be completed when working in close proximity. - PPE – HI-Viz clothing, long sleeves and trousers must be worn by all workers and a P2 mask must be worn by all parties when exiting their vehicles while in the Class 2 tip pad. - PPE required for walking over clay covered areas in Class 2 area on foot are – P2 Mask, High viz, long sleeves, Hard hat, and Safety Boots. - PPE for direct potential contact with the uncovered area in the Class 2 area on foot (i.e. When walking over uncovered ACM material), Latex /disposable gloves, Boot covers, hard hat,	Rare	Significant	Low
Collision/interaction with humans							

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

3



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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				Half-face respiratory mask (P2 rating); Disposable overalls (CAT.111 protection level) - An ACM go pack needs to be available in all machinery used in the Class 2 area (The go pack must contain: a P2 mask, safety glasses, Cat III protective overalls, certified shoe covers, nitrile gloves, disposal bag available in cab) - All drivers must swing the tailgate in a safe zone before tipping their load off to ensure that they do not get their loads stuck.			
Fitness for Work	Almost Certain	Major	11H	- Operators must adhere to Waste Management's Drug & Alcohol Policy and Procedures. - Operators are made aware of the employee assistance program and the contact details. - Internal Fatigue management training must be completed by all operators. - Operators must take regular breaks outside of the Class 2 area and break facilities are made available to all operators. - Operator to ensure they remain hydrated	Rare	Major	16H
Exposure to Asbestos Containing Material	Likely	Major	10H	- Internal Asbestos Awareness Training must be completed by all workers. - PPE as listed in WM UNI RED WI 1061 must be worn. (Dust masks P2, safety glasses, overalls) - Water trucks must be available and used to dampen down dusty loads. - Annual medical checks are to be completed to monitor staff health. - A HEPA filter must be fitted on all machinery that is intended to be used in the Class 2 working area or a JESA with suitable control must be completed.	Unlikely	Major	17H

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

4



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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				- Routine air sampling by an Environmental Technician must be completed. A total of 9-12 samples would be obtained and repeated each month. - Redvale Class 2 acceptance procedures must be followed. - All vehicles and machinery must have windows and doors always closed.			
Loss of control – sinking, slipping, rollover	Possible	Major	18H	- Only approved contractors or those who have completed site induction are allowed to enter the Class 2 area for work other than waste load deliveries. - The 5-metre rule must be applied and followed by all operators. - Driver must follow spotter/ operator's instructions while in the class 2 tip pad. - Spill procedures and training must be completed for all team members. - Site-specific speed limits must be adhered to. - Seatbelts must be worn while driving/operating plant or vehicles. - Operators must ensure the trucks tip on level stable ground. - Immediately report any soft spots and uneven surfaces, demarcate or remedy them if possible. - Pad inspections to determine condition and maintenance tasks must be completed weekly using the appropriate inspection forms.	Rare	Major	16H
Exposure to Hydrogen Sulphide (H ₂ S) and Landfill Gas (Methane)	Possible	Major	18H	- Wear PPE according to WM UNI RED W1 1061 including a P2 mask. - Portable gas detectors are available for workers to carry during tasks, especially in areas prone to gas accumulation.	Rare	Major	16H

5

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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				- Only trained persons are allowed to enter the Class 2 area for work other than waste load deliveries. - SDS for H2S and methane available to workers. - Respirator with ABEK1 cartridge must be used for H2S limits over 15ppm - Operators must be inducted to the site and understand the site emergency management plan before any work can be undertaken in the Class 2 area.			
Damaged packaging when tipping, or when using an excavator or bulldozer. (Possible release of loose fibres)	Almost Certain	Moderate	15H	- Work Instruction WM UNI RED WI 1061 training must be completed for all workers - Task-specific PPE must be worn (dust masks P2, gloves) depending on the working area in the Class 2 area. - Operators to check windsock and must stand upwind - Drivers while in vehicles must have windows & doors closed. - The water truck must be available to dampen downloads that are dusty and material where required. - ACM must be covered/buried as soon as possible. - Redvale Class 2 acceptance procedures must be followed.	Possible	Moderate	15H
Human intervention or handling of ACM Release of loose fibres	Likely	Moderate	14H	- Incorrectly or inadequately wrapped loads are to be rejected on entry at the weighbridge if identified. - Event pad reporting is to be completed by the operator if inadequately wrapped loads are identified and reported immediately to TL or Ops Manager.	Unlikely	Moderate	12M

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

6



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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				- Work Instruction WM UNI RED WI 1061 must be followed. - All operators must complete Asbestos Awareness training. - Asbestos-related PPE must always be worn by the operator as outlined in WM UNI RED WI 1061.			
Unauthorised delivery, non-approved operators	Likely	Moderate	14M	- Class 2 waste acceptance procedures must be followed at all times. - Only approved third parties are allowed to enter the Class 2 area. - Weighbridge must reject the loads if they are unauthorised or non-approved. - Operators are responsible for the correct burial of ACM.	Rare	Moderate	11M
Lone worker	Unlikely	Minor	9M	- Whilst working alone in this location, radio communication must be available at all times. - Team leader to be aware of staffing levels in this location and only those directed by a TL are authorised to carry out work duties in the Class 2 area.	Rare	Minor	3M
ACM exposure to the environment (dust cloud)	Possible	Minor	8M	- WM UNI RED WI 1061 must be followed. - During dry conditions water truck to the wet area before staff entering. - Regular watering of the Class 2 area to be undertaken, prompted by TL or Machine operator. - The Water truck must be available to dampen down dusty loads, prompted by TL or Machine operator. - All operators to ensure that they have enclosed cab (windows and doors closed) while in the cab.	Rare	Minor	3M

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)

7



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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				All machines working in the Class 2 area to have HEPAFILTER installed			
Spill procedure for the Class 2 area	Possible	Minor	8M	- Work Instruction WM UNI RED WI 1061 training must be completed for all workers. - PPE as listed in WM UNI RED WI 1061 must be worn at all times depending on the working area. (Dust masks P2, safety glasses, overalls) - Only trained individuals should handle ACM, including training on how to deal with spills. - Regular inspections to identify any cover issues or improvements are to be completed daily by operators, TL or supervisors. - Avoid unnecessary disturbance of ACM buried material.	Rare	Minor	8L
If the activity is new, are there any permanent controls not yet implemented or awaiting funds – CAPEX approval? If so, what temporary controls have been taken to ensure the task can be completed safely while waiting for those permanent controls to be completed?							
Control option	Hierarchy (see below)	Resources required	Person/s responsible	Approved by?	Implementation date		
N/A							

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

8



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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SIGN-OFF BY WORKERS				
Name:	Signature:	Company/Division:	Date:	Inducted By:
Tiki Fataouka		WM / Redvale	31-05-24	
don Dilley		WM	31/5/24	
Dayarand Swarup		-	04/05/24	
Sepha Marsters		"	04/05	
Julius Birt		WM	09/06/24	
Kareem Askin		WM	4/6/24	
Ron Webb		WM	6/6/24	
Varuna		"	7/6/24	
Cesey		WM	10/6/24	
Camron Bentley		WM	10/6/24	
Harry Tuxana		WM	10/6/24	
Sepha Marsters				
Alvin Queja		WM	13/6/24	
Magnus Lumley		WM	17/6/24	
Innes Edwards		WM	13-6-24	
Phillipe Murray		WM	13-6-24	

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

9



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 C&D Operation

Risk Assessment Form

HSEQ Management System

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1. CONSEQUENCE / IMPACT CRITERIA			Consequence / Impact Ratings (Where an event has more than one 'Loss Type', choose the 'Consequence / Impact' with the highest rating. If 'Near Miss' select potential rating.)				
Description			Insignificant	Minor	Moderate	Major	Significant
Health and Safety			Near miss	First aid treatment required	Medical treatment required	Lost time injury to worker, injury to member of the public or permanent injury or disability (public or workers)	One or more fatalities (public or workers)
Environmental			Near miss and insignificant spill /leak reporting is not required for spills of <20L in a contained site, or <1L in to a stormwater catchment area. All spills must be cleaned.	Minor environmental damage	Environmental impact requiring treatment inside or outside site	Serious environmental harm requiring restoration and/or remediation inside or outside of site with possible regulatory intervention	Permanent/material damage to environment requiring ongoing remediation and monitoring with regulatory involvement and possible further enforcement action
Business Interruption			A temporary delay in servicing a small number of customers	Delay affecting customers but no damage to relationships	Irreversible to customers that cause some harm to relationships	Widespread damage to customer relationships (some permanent)	Irreversible damage to a large number of customers (impacts viability of the business)
Reputational			Slight impact - public awareness may exist but no public concern	Limited impact - local public concern	Considerable impact - regional public concern - client unwell	National public concern - loss of client	International public attention - loss of core client
Financial (\$ set locally)			>0.2% EBIT	0.1% to 0.5% EBIT	1% to 2.5% EBIT	2.5% to 5% EBIT	5% + EBIT

2. LIKELIHOOD / PROBABILITY & RISK RATING			Risk Rating				
Likelihood / Probability	Examples (Near-misses as well as actual events)	% chance of occurring					
Almost Certain	The unwanted event has occurred frequently, occurs in order of one or more times per year & is likely to reoccur within 1 year	>75% - 99%	5 L	10 M	15 H	21 E	25 E
Likely	The unwanted event has occurred infrequently, occurs in order of less than once per year & is likely to reoccur within 5 years	>50% - 74%	4 L	9 M	14 H	20 E	24 E
Possible	The unwanted event has happened in the business/industry at some time, or could happen within 10 years	>25% - 49%	3 L	8 M	13 H	18 H	23 E
Unlikely	The unwanted event has happened in the business/industry at some time, or could happen within 20 years	>11% - 24%	2 L	7 L	12 M	17 H	22 E
Rare	The unwanted event has never been known to occur in the business/industry, or is highly unlikely that it will occur within 20 years	0 - <10%	1 L	6 L	11 M	16 H	19 H

Risk Level: **Extreme Task Based** No work to be undertaken **Extreme Enterprise** requires GM Sign off **High** Requires Manager/Regional Manager Sign off **Medium** Requires Supervisor Sign off **Low** Monitor

DOC REF: WM UNI RED RA 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 Operation

Work Instruction Form

HSEQ Management System

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Date:	19/04/2024		Risk Assessment No:	WM UNI RED RA 1061	
Division:	Upper North Island		Branch/Site:	Redvale Landfill & Energy Park	
Task Location:	Waste Disposal at the Class 2 C&D Landfill		Work Activity:	Class 2 Material disposal operations	
Permits / Authorisations required:	WORK PERMIT: ☐ BREAKTHROUGH: ☐ CONFINED SPACE: ☐ HOT WORK: ☐ FALL PREVENTION: ☐				
Permits / Authorisations approved and reviewed					Date:
Work Instruction prepared in consultation with:	Matt Atkinson, Safo Fatamaka, Glen Jujnovich, Laiana Barbosa				Date: 19/04/2024
List all persons involved					
Comments	This Work Instruction covers the Class 2 C&D landfill site layout, signage, PPE requirements, use instructions, and the precautions that employees must take when working in the Class 2 area.				
Process:	Name:	Position Title:	Signature:	Date:	
Task Manager Approval:	Matt Atkinson	Operations Manager	<i>M. Atkinson</i>	30/04/2024	
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator	<i>Laiana Barbosa</i>	30/04/2024	
Final Approval:	Glen Jujnovich	Regional Manager	<i>G. Jujnovich</i>	30/04/2024	

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 Operation

Work Instruction Form

HSEQ Management System

Safety First. in everything we do

REQUIRED EQUIPMENT	
PPE required: Safety gloves (latex gloves or ninja gloves EN388/443) P2 mask (for durations of less than 60 minutes) Half-face respiratory mask (P2 rated) (for durations of 60 minutes or more) Disposable coveralls rated type 5, category 3 (EN ISO 13982-1) Disposable boot covers Hardhat Steel-toe safety boots High viz Safety glasses ACM PPE to-go kit in machines 	Additional equipment/Tools: Radio (RT) Hepa filters must be fitted to plant/machinery used in the Class 2 C&D working area. Portable personal gas monitor Safety goggles
REQUIRED LICENCES & COMPETENCIES	
Licences: Full Driver's License – WTR Endorsements	Competencies: Risk assessment associated with this WI - WM UNI RED RA 110 HSEQ RA – Mobile General plant Asbestos awareness training
LEGISLATIVE REFERENCES (Optional)	

2

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Site Layout and Control Signage	Tier 1 Contamination Zone: Full personal protective equipment is required as per the Risk Assessment and Work Instructions. Tier 2 Contamination Zone: P2 mask PPE requirement as per the Risk Assessment and Work Instructions. Contamination Free Zone - Clean Area: Soil technician to sample ground in all four zones monthly for confirmation of contamination and contamination free status. Class 1 Disposal Location: Designated area for disposing of Class 1 Nickel Slag material. Class 2 Disposal Location: Designated area for disposing of Class 2 material, which includes Class 2 Asbestos-Containing Material. - Cannon - Decontamination Shed: Controls related to the decontamination shed - Machinery Parking Location (Daytime): Designated parking area for machinery during the day - Overnight Machinery Parking & Refuelling: Area designated for overnight parking and refuelling of machinery. - Spotters Shed: Shed specifically designated for spotters and decontamination shower - Location Development: Area to be developed further, options include creating a clean bund or converting it into a roadway - Secondary Tipping Point(Maybe?): Designated point for secondary tipping, specifically for Class 1 materials, for internal use such as sludge and stumps for maintenance or construction - Separation Bund Between Class 1 and Class 2: Implementation of a separation bund, which could be constructed using either concrete blocks or a clay/soil bund for effective segregation between Class 1 and Class 2 materials.	Site Map V:1	WMNZ Workers

3

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 Operation

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
PPE Requirements	Two distinct circumstances are described, each requiring two specific PPE levels: - Team members working outside in the Class 2 tip pad area walking over clay-covered asbestos-contaminated material, or truck drivers walking in tier 2 zones to uncover loads and to disconnect and reconnect trailers. - Team members working in the Tier 1 contamination area of the Class 2 area may be exposed to or walk over asbestos-contaminated materials. Full PPE controls must be used. Note: disposable overalls must be one size larger than your normal clothing Tape the cuffs to seal your body. Have a fitted hood worn over respirator straps and wear overalls over boots. Do not tuck disposable overalls into the boots. Do not wear laced boots as they are difficult to clean properly.	- PPE for walking over clay or other covered areas in the Class 2 tip pad area Tier 2 zone as shown on the site plan above. - P2 mask - High viz - Hard hat - Safety shoes - PPE for direct contact with the ACM area i.e., when walking over uncovered ACM, tier 1 contamination area - Latex gloves/disposable nitrile gloves - Disposable boot covers - Half-face respiratory mask (P2) - Disposable overalls (CAT.111 protection level) - Disposable boot covers	WMNZ Workers & Truck drivers delivering waste to the Class 2 location

4

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 Operation

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
ACM PPE to-go kit contents	1. All heavy machines operating in the tier 1 contamination zone of the Class 2 area must have a PPE to-go pack in case of an emergency breakdown or need for retrieval.	Kit includes: XXL overalls Shoe covers P2 mask Gloves Glasses	WMNZ operators
Operation of the Decontamination Area	1. The decontamination zone (at the boundary between the contamination areas) is used for putting on and removing the specialised full PPE. 2. In addition, it contains First Aid Kits, an Eye Wash Station, contaminated PPE receptacles, and a 1.5m x 1.5m disposable plastic flooring sheet. 3. All personnel entering or exiting the tier 1 contamination zone must have passed through the decontamination zone to put on or remove PPE.	At the perimeter of the tier 1 contamination zone, the decontamination zone identifies the location where PPE controls are effective. The decontamination zone controls apply when workers have direct contact with ACM and do not apply when walking over clay or other clean material covered areas, but all workers must still wear P2 masks when walking over the covered ground within the detailed Monofil area (refer to site layout map V:1)	Signed off workers

5

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 Operation

Work Instruction Form

HSEQ Management System

Safety First. in everything we do

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	If contact is made whilst walking over the ACM, upon exiting the site and returning to the light vehicle, the operator is to follow the procedures and utilise the decontamination hut following the correct PPE removal procedure.	The decontamination hut is between tier 1 and tier 2 contamination zones (refer to image V:1 for clarity). 	
Decontamination procedure if additional disposable PPE is required	- Before beginning work, place a bin liner in the trash can and have an asbestos-specific plastic sheet available. - Before removing contaminated disposable PPE, place the asbestos-specific plastic sheet on the ground in the shed and stand in the centre of the sheet. - While removing footwear coverings, roll them inside out to capture any asbestos fibres. - Roll the disposable coverall inside out whilst removing it. - Roll the mittens inside out whilst removing them. - Dispose of used P2 masks.		WMNZ Workers

8

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Class 2 Operation

Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	7. All items of disposable PPE must be placed into the bin after each item has been removed.		
Disposal of items in the bin	A bin for disposal of the removed PPE is in the decontamination shed. Put all items inside and close the lid securely.		WMNZ Workers
WMNZ workers supervision of Trucks delivering loads to the Class 2 Area	- At the Class 2 tip pad there is a dedicated spotter. - They will confirm whether the load is class 2 material by identifying the product token displayed on the windscreen of the delivery truck. - The spotter will then direct the driver to the correct tipping location.	Key points: - All drivers must swing their tailgates open before tipping their load. No driver is to proceed without instruction from the spotter. - Operators and drivers while operating in the Class 2 area must keep their machine and truck windows closed while inside the machine or truck. - The spotter must ensure that all truck drivers in the Class 2 area go past the decontamination zone to tip loads and must remain in their cabs with the windows closed while the load is managed. - A driver may only depart the cab of the truck when in the designated secure zone before passing the decontamination zone (detailed on the map).	WMNZ Workers & Truck drivers delivering waste to the Class 2 location

7

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	Tier 1 Contamination Zone: Full personal protective equipment is required as per the Risk Assessment and Work Instructions. Tier 2 Contamination Zone: P2 mask PPE requirement as per the Risk Assessment and Work Instructions. Contamination Free Zone – Clean Area: Soil technician to sample ground in all four zones monthly for confirmation of contamination and contamination free status. Class 1 Disposal Location: Designated area for disposing of Class 1 Nickel Slag material. Class 2 Disposal Location: Designated area for disposing of Class 2 material, which includes Class 2 Asbestos-Containing Material.	e. All drivers must wear at least a P2 respirator once in the tier 1 contamination zone if they want to exit the cab and operate the tailgate. 	
Material visual inspection	The spotter is required to visually examine Class 2 material to confirm accurate classification. - Before guiding the truck to the tipping location, - The spotter must identify the product token displayed on the dashboard of the delivery truck to confirm the product type.		WMNZ Workers

8

DOC REF: WM UNI RED WI 1061
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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	3. After the load has been tipped, the spotter must conduct a visual inspection of the material to verify its compliance with the Class 2 waste acceptance criteria. This confirmation is determined by the following steps: Steps to be taken upon identification of nonconforming material: 1. Isolate the tipped load. 2. Inform the dozer operator that the identified load does not meet the waste acceptance criteria. 3. Record the registration of the delivery truck; if the truck is still present on the pad, inform the driver of the non-conforming load. 4. Immediately contact a supervisor to report the non-conforming delivery. Upon notification, the supervisor is responsible for: 1. Arranging for an ADT and excavator to uplift the non-conforming load and dispose of it in the correct location in the landfill. 2. The Operations Manager will then follow up with the sales manager to advise the customer	Class 1 example:  Waste includes: General household waste such as food scraps, packaging materials, non-recyclable plastics, and paper Class 2 example:  Class 2 waste includes: • Bulky items that cannot be recycled or donated. ○ Furniture	

9

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	and the weighbridge of the change in waste classification, as additional charges will apply.	○ Mattresses ○ Appliances ▪ Plasterboard. ▪ Fiberglass. ▪ Contaminated timber: ○ Painted ○ Treated ○ Varnished ○ oiled. ▪ Engineered wooden strand board: ▪ Soft board ▪ Hardboard ▪ Particle board, ▪ Plywood ▪ MDF ▪ Custom wood ▪ Wallpaper, lining paper and building paper. ▪ Flooring products: ○ Carpet and underlay. ○ Vinyl/lino/leum ○ Cork tiles ○ Lay tiles. ▪ Wire, wire rope, wire netting. ▪ Non-recyclable glass. ○ Pyrex or borosilicate glass ○ Tempered or safety glass.	

10

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 15/04/2024
NEXT REVIEW DATE: 15/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		○ Mirrors ○ Ceramics or glassware ○ Mixed-color glass ▪ Demolition waste: ○ Concrete and masonry ○ Wood from structural elements, such as beams, joists, studs, and flooring ○ Plastics and insulation from pipes, fixtures, insulation, and other building components ▪ Rubber ▪ Clay products: ○ Pipes ○ Tiles ○ Pottery ○ Sculptures and art	

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)

11



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Dust Releases	1. If visible quantities of dust are discharged into the atmosphere, all personnel in the Class 2 area must remain inside their vehicles. 2. The spotter must use the RT to call and inform all personnel in the impacted area about the visual discharge identification. 3. The operator must ensure that the air conditioning unit recirculates internal air only rather than air from the exterior. 4. Any machine that operates on ACM must be equipped with a HEPA filter. 5. If there is an airborne discharge of dust and contamination Incident Report must be completed and submitted to the Operations Manager.	Note: the spray stream water/odour cannon must be in operation during dry weather to dampen down potential airborne ACM and if needed the spotter can instruct the use of the water cart to dampen the tip pad area. 	WMNZ workers
Tipping off ACM and moving to the burial location	This protocol is implemented for the disposal of ACM to minimize potential spread. It does not pertain to non-ACM Class 2 Materials. 1. The ACM is to be pushed to the burial location by a dozer or excavator. 2. Once at the burial location, if the ACM wrap is to be compacted, it must have soil covering it first.	The truck driver is to ensure they are in the correct lane to drop their load as directed by the spotter. The machine operator or spotter needs to ensure the truck is back as far into the lane as required. This will limit the amount of material that may contaminate the cover material. If the material is dry, a water cart is to be used to limit airborne contaminants. The operator calls the water truck on the RT and directs them to the location.	WMNZ workers

12

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		Note: Care is needed to ensure the plastic bagged wrapped ACM stays intact, this limits the ACM from becoming airborne or dispersing into other areas.	
Operator Breaks	- Operators must position the machine in the designated safe parking area, as shown on the site map when entering or exiting the cab. - The operator must sustain three points of contact when entering and exiting the machine. - Ensure proper suit-up procedures are followed upon returning from a break, but at least a P2 Mask must be worn.	Note, If the machine is located beyond the decontamination area, the operator must wear a P2 respirator if walking over clay covered ACM material No breaks are to be taken in the Class 2 area – all staff are to leave the area for breaks.	WMNZ workers
Breakdown Process	- If there is a machine breakdown, the operator is to call via RT or mobile phone to a supervisor and advise. - The operator is to remain in the machine. - The operator must put on the PPE from the ACM PPE to-go kit if exiting the machine and subsequently follow the disposal method referred to above. - A JSEA (Job Safety and Environmental Analysis) must be completed by the Operations Manager if there is a towing procedure for a stuck vehicle or breakdown.	The Operations Manager to complete the JSEA to allow for safe towing and/or machine maintenance practices. To allow for the safe exiting of the machine whilst on ACM, all machines must have an ACM PPE to-go pack in it. Do not tow the vehicle if the JSEA is not complete.	WMNZ workers

13

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



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Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Machine refueling procedure	- Machines are to be parked overnight in the area designated contamination-free (as indicated by the red cone) to allow safe access for the Mini Tanker operator to access and fuel. - The operator must ensure at the end of the day that access to the fuel tank is not obstructed by excessive ACM material and if necessary operator to arrange with the water truck driver to wash down around the fuel tank at shutdown. - PPE requirement for the refuelling operator, fuel-resistant safety boots, anti-static overalls (minimum of 7 CAL rating), heavy-duty fuel-resistant PVC gloves, safety glasses, and P2 mask optional for use in the contamination-free zone.	 Site's contamination status: (a) Special protection measures to be required to set the site environment for Class 2 work. Site's contamination status: (b) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (c) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (d) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (e) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (f) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (g) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (h) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (i) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (j) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (k) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (l) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (m) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (n) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (o) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (p) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (q) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (r) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (s) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (t) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (u) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (v) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (w) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (x) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (y) Special PPE requirement to get the site environment and work area ready. Site's contamination status: (z) Special PPE requirement to get the site environment and work area ready.	WMNZ workers & Minitankers operator
End-of-day Procedure	- The area for ACM disposal must be covered with at least 300 mm of ACM-free cover/soil. - Park the machine in the sign-posted area as indicated in the site map V:1.	The machine parking location is shown in map V:1 included in this document	WMNZ workers

14

DOC REF: WM UNI RED WI 1061
 ISSUE DATE: 19/04/2024
 NEXT REVIEW DATE: 19/04/2025

VERSION (4)
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Class 2 Operation

Work Instruction Form

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	3. Follow the workplace procedure for waiting for the machine to go through the turbo timer shutdown process. 4. Dispose of PPE in the rubbish bin provided and detailed in this document.		

DOC REF: WM UNI RED WI 1061
ISSUE DATE: 19/04/2024
NEXT REVIEW DATE: 19/04/2025

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
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15



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

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DOCUMENT UNCONTROLLED WHEN PRINTED
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Class 2 Monofil Operation

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I have read and understood the attached Work Instruction (Enter name and sign)				
Name:	Signature:	Company:	Date:	Inducted By:
Trent K-L		WM	01-03-24	Matt
Phil Murray		WM	"	"
Ash Weber		Advanced Personnel	1-3-24	Matt
Vish Fataunda		WM	01.03.2024	" "
Jonathan Green		WM	1/3/24	"
Varuna Atapattu		"	"	"
Jon Dilley		"	1/3/24	"
JIMMUEL VALIENTE		WM	1/3/24	"
Matt Atkinson		WM	1/3/24	"
Alexander		"	11.3.24	"
Raymond Swamy		WM NZ	13/03/24	"

16

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Asbestos Exposure Monitoring (Air)

Work Instruction

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Date:	15/11/2023	Risk Assessment No:	WM UNI RED RA 023	
Division:	WM UNI	Branch/Site:	Redvale Landfill	
Task Location:	Redvale Landfill	Work Activity:	Asbestos Exposure Monitoring	
Permits / Authorisations required:	WORK PERMIT: ☐ BREAKTHROUGH: ☐ CONFINED SPACE: ☐ HOT WORK: ☐ FALL PREVENTION: ☐			
Permits / Authorisations approved and reviewed by:			Date:	
Work instruction prepared in consultation with:	Nabil Soliman, Hernanta Yadav, Laiana Barbosa & Glen Jujnovich		Date:	15/11/2022
List all persons involved				
Comments	This activity includes the sampling of air with the help of an air sampling pump and cassette filter inside the waste management boundary according to the asbestos management plan. The air filters are sent to an external laboratory to be tested for fiber concentration.			
Process:	Name:	Position Title:	Signature:	Date:
Task Manager Approval:				
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator	Laiana Barbosa	28/11/2023
Final Approval:	Glen Jujnovich	Regional Manager	G Jujnovich	28/11/2023

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
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VERSION (4)
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VERSION (5)
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REQUIRED EQUIPMENT	
PPE Required: High Viz Clothing, Hard Hat, Steel Cap Footwear, RT <i>For example</i> 	Additional equipment/Tools: <u>Sampling</u> Asbestos Sampling Pump – SKC XR5000 Tygon Tubing – 0.9m Charger Spring Clip Adjustable Belt 25mm Air Monitoring Cassettes PCM 0.58 MCE Filter <u>Calibration</u> SKC - Laboratory Film Flowmeter 300- 3000ml/min Tripod Stand Soap Film Solution Stopwatch Rubber Tubing with Stopper
REQUIRED LICENCES & COMPETENCIES	
Licences:	Competencies:
LEGISLATIVE REFERENCES (Optional)	
Health and Safety in Employment (Asbestos) Regulation 1998 Standard - NOHSC:3003 (2005)	

2

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
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DOC REF: WM UNI RED PL 002
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VERSION (5)
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Asbestos Exposure Monitoring (Air)

Work Instruction

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
Introduction	Redvale landfill accepts a variety of waste, including asbestos-contaminated material. Asbestos consists of tiny fibres which are known to cause serious health problems, such as lung cancer. It is good practice for occupational health monitoring to be undertaken during the disposal of asbestos or asbestos contaminated materials. An asbestos sampling pump can be used to monitor potential asbestos exposure during the disposal process. The sampling pump draws air through a filter to capture airborne particles. These filters are later analysed within a laboratory using Phase Contrast Microscopy (PCM). This technique involves counting all fibers that meet defined criteria for asbestos and are considered a measure of the airborne asbestos concentration. The results will provide information on the baseline and ongoing surveillance monitoring in relation to potential asbestos exposure. The monitoring will also provide a check on the operational control measures in place for the satisfactory disposal of asbestos-containing materials. KEY POINTS • Asbestos consists of tiny fibres that when inhaled, can get into the lungs and cause health problems. • Asbestos monitoring will help ensure the safety of everyone at Redvale. • After sampling, the filters used are sent to an independent laboratory and analyzed whether fibre concentration in air is within the accepted level (<0.01 fibre/ml). If fibre concentration is >0.01 fibre/ml, then those particular filters need to be tested further to explore the nature of particulate matter using Transfer Electron Microscopy (TEM method) in consultation with an accredited laboratory.		
Calibration	Assembly Screw the tripod legs into the base ring. Insert the bulb end of the flowmeter into the centre hole of the base ring and slide the glass down into the ring until the zero line is approximately 1 ½ inches above the base ring. Tighten the screws until the O-ring is compressed snugly against the glass. Preparation		

3

DOC REF: WM UNI RED W1 023
ISSUE DATE: 15/11/2023
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VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
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ISSUE DATE: 11/03/2025
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Work Instruction

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	Tip the flowmeter at an angle and pour a small amount of film solution into the top of the glass tube so that the liquid runs down the sides. Squeeze the rubber bulb occasionally to release trapped air and continue adding film solution until the liquid fills the bulb and rises to a level just above the side arm inlet. To calibrate the pump, connect the pump, with the sampling cassette, to the rubber tubing attached to the rubber stopper. Note: If sampling site calibration is not possible, environmental influences may affect the flow rate, such as temperature and pressure changes. Refer to Figure 1, Beneath. Picture of Asbestos Pump in Calibration using Laboratory Film Flowmeter.		

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ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

4



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
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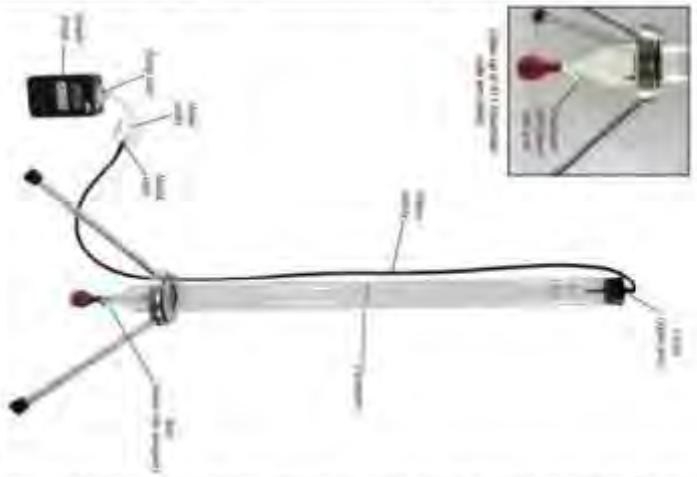


Asbestos Exposure Monitoring (Air)

Work Instruction

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
			
Operation	Turn on the pump. Gently squeeze the rubber bulb to bring the liquid momentarily above the sidearm inlet. Bubbles (soap film) will form, which travel up the glass tube with the airflow. Repeat until the bubbles travel the length of the tube without breaking. <i>Caution do not vigorously squeeze the bulb otherwise; a froth may form and cause a film to be drawn into the pump.</i>		

5

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
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ASBESTOS MANAGEMENT PLAN

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Work Instruction

HSEQ Management System

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Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	Use a stopwatch to time a single film as it travels between the volume lines marked on the glass. Start the stopwatch when the film reaches the zero line and stop the stopwatch when the film reaches the volume line. Record the time. Repeat the procedure at least three times ending at the same volume line and average the results. Determine the Flow Calculate the flow using the following equation: $\text{Flow (ml/min)} = \frac{60}{\text{Time (sec)}} \times (\text{Volume line used (ml)})$ Air Sampling Principles Select an appropriate flow rate for the situation being monitored. The sampling flow rate must be between 0.5 and 5.0 L/min for personal sampling and is commonly set between 1 and 2 L/min. The most significant problem when sampling for asbestos is overloading the filter with non-asbestos dust. UK, HSC-approved methods recommend sample volumes of at least 480L to gather a quantifiable fibre loading. However, dusty environments may require smaller volumes (<400L) to obtain countable samples. If more than about 25 to 30% of the field area is obscured with dust, the result may be biased low. Connect the pump to the base of each sampling cassette with the flexible Tygon tubing. Remove the end cap of each cassette and take each air sample open face. Assure that each sample cassette is held open side down. When personal sampling, the distance from the nose/mouth of the employee to the cassette should be within 20cm. Secure the cassette on the collar or lapel of the employee using the spring clip. Fixed, static sampling requires the cassette to be a minimum of 1 meter from the ground. Record the sampling pump start time and other required information.		

6

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
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VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
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VERSION (5)
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Classification (i.e., Internal, Confidential)





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Work Instruction

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Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	Immediately after sampling, close and seal each cassette with the base and plastic plugs. Do not touch or puncture the filter membrane, as this will invalidate the analysis. Recheck the flow rate of the sampling pump using the film flowmeter. The end flow rate must be within 10% of the start flow rate for sampling to be valid. Send the samples back to the laboratory with the Asbestos Air Sampling Form completed.		
Sampling Strategy	To gather information on potential exposure to asbestos of personnel at Redvale, monitoring will take place from both a fixed static position and from personal positions, whereby the air sampling filter will remain within the immediate breathing zone of selected individuals. It is intended that the positions used for sampling will represent the maximum asbestos exposure potential for Redvale personnel undertaking normal duties. <u>Static Monitoring</u> 1. Fixed Position, Downwind of the Active Pad. The asbestos monitoring unit will be installed at a fixed position immediately downwind of the active pad. To achieve this, the unit will likely be mounted on infrastructure in the vicinity of the Pad. Possible infrastructure includes the spotter's hut, catchment fence, landfill gas header, or other appropriate support. In mounting the unit, the filter must be attached in a downward position and at least one meter above the ground. The placement of the unit will be communicated with Landfill Operators to ensure monitoring is uninterrupted throughout the sampling period. In addition, the placement of the unit should avoid excessive spray drifting from water trucks and T-Bars. Monitoring from a downwind position is expected to represent potential exposure to personnel operating within the immediate area of the active pad. This may include Gas Team Members, Special Waste Samplers, Landfill Operators, Truck Drivers, and Spotter. The monitoring period will take place over 7 hours (0900-1600).		

7

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Asbestos Exposure Monitoring (Air)

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	<u>Personal Monitoring</u> 2. Tip Pad Spotter The asbestos monitoring pump and the filter will be mounted on the Tip Pad Spotter, with the filter fixed within 20 cm of the breathing zone. The spotter will continue normal duties with the unit in operation. During lunch/smoko breaks, the unit will be shifted to the replacement spotter, with the assistance of the Air Monitoring Technician. It is intended that pump operation will continue uninterrupted throughout transition periods. For representative samples to be collected, it is imperative that the spotter carries out their duties in a normal manner. The equipment should be checked periodically by the spotter to ensure that the unit is operating normally. A quick check will entail ensuring that the filter and tubing are correctly attached to the pump, that there are no kinks in the tubing restricting flow, and that the pump is turned on and sucking air (easily determined by listening for the low buzz of the pump when in operation). Although the sampling pump is relatively robust, the spotter must take care when handling the equipment to ensure that there is no unnecessary damage. It is expected that personal monitoring using the spotter will take place over a 5-hour section of their shift, likely from 10:30-15:30. This duration was selected because it should capture a representative sample of the asbestos exposure to the spotter, without the duration of sampling becoming unnecessarily inconvenient. 3. Compactor / Dozer The unit will be mounted inside the cab of a selected compactor/dozer operating on the Pad. It is intended that the pump, filter and all accessories are mounted free and independent of the driver, with the filter, kept in a fixed position within 20 cm of the operator's breathing zone. In this manner, the operator can exit and enter the cab		

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Work Instruction

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	detached from the unit. Sampling duration will take place from 0830-1600, which will give a representative indication of asbestos exposure over a full shift. <u>Monitoring Frequency</u> Sampling will be repeated so that a total of 9-12 samples are obtained each month, though monitoring from all the four positions detailed above. Once samples have been collected, the cassettes will be packaged and sent to the accredited laboratory for analysis. Sampling will be performed during all-weather periods so that sampling remains representative of normal operating conditions. The exception to this is during rainfall or if rainfall is forecast. In this case, sampling will be postponed or will be abandoned if sampling has commenced. In this circumstance, the filter will be sent for analysis if the duration of sampling exceeds three hours. (Sampling taking place within compactor/dozer cabins will not be affected by rainfall). For more details, refer to EN 216 Redvale Lab folder or 'Computer>everyone (\\nzredvale01)(l)>11air>Asbestos Monitoring'		

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)

9



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Asbestos Exposure Monitoring (Air)

Work Instruction

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
			

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)

10



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Work Instruction

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I have read and understood the attached Work Instruction (Enter name and sign)				
Name:	Signature:	Company:	Date:	Inducted By:
Nabil Saliman		Redvale Lab	6/12/23	
Max Harrison		Redvale Lab	6/12/23	
Amirul Abdul Khair		Redvale Admin	6/12/23	
Na Zhang		Redvale Lab	12/6/24	

11

DOC REF: WM UNI RED WI 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Risk Assessment Form

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Division: WM UNI		Branch/Site: Redvale Landfill		
This form is to be completed by the person/s undertaking the risk assessment in accordance with the applicable 'Identification and Risk Assessment Checklist'.				
Task/Equipment/Activity to be risk assessed:	Asbestos Exposure Monitoring (Air)			
Person/s at Risk:	Employee ☒ Contractor ☒ Member of Public ☐ On-Site Visitor ☐ Environment ☐ Business ☐			
Date of Assessment:	15/11/2023	Date of Last Assessment:	16/11/2022	
List all persons involved in completing the Risk assessment - HSR Representative, workers, involved etc.:	Nabil Soliman, Laiana Barbosa & Glen Jujnovich		Date:	
Overview of Activity	This activity includes the sampling of air with the help of an air sampling pump and cassette filter inside the waste management boundary according to the asbestos management plan. The air filters are sent to an external laboratory to be tested for fibre concentration.			
Process:	Name:	Position Title:	Signature:	Date:
Task Owner Approval:	Glen Jujnovich	Regional Manager	<i>G Jujnovich</i>	28/11/2023
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator	<i>Laiana Barbosa</i>	28/11/2023
Final Approval:	Glen Jujnovich	Regional Manager	<i>G Jujnovich</i>	28/11/2023

DOC REF: WM UNI RED RA 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

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HSEQ Management System

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Section 1. Summary of key hazards that were identified during the assessment – list in order of significance.							
1.	Interaction with heavy machinery at the tip face	Critical Risk?	Yes CR1	6.		Critical Risk?	Yes/No
2.	Vehicle collision on route to sampling location	Critical Risk?	Yes CR1	7.		Critical Risk?	Yes/No
3.	Exposure to hazardous substances	Critical Risk?	Yes CR2	8.		Critical Risk?	Yes/No
4.	Slips, trips, and falls	Critical Risk?	No	9.		Critical Risk?	Yes/No
5.	Manual Handling	Critical Risk?	No	10.		Critical Risk?	Yes/No

Important Note: An Activity can create a Hazards that Involves multiple Critical Risks.

Critical Risk	Possible Scenario Descriptions
CR1 Collisions	With moving or stationary objects or people, reversing incidents, breaches of the 5mtr rule, hitting overhead objects, actual or potential collisions.
CR2 Exposure to hazardous substances	Asbestos, medical waste, incompatible loads / chemicals, incorrect disposal, unknown products, failure to use correct PPE
CR3 Insecure loads	On trucks, forklifts, racking failure, product storage too high, unrestrained product stacks, e.g., baled cardboard
CR4 Loss of Control	Actual and potential rollovers, unintended, uncontrolled or unexpected movement of plant or equipment and vehicle rollaways, failure to engage park brake
CR5 Exposure to uncontrolled energy	Failure to lock out or tag out fixed or mobile plant, unauthorised use of plant, entrapment in plant/ crushing, no permit to work issued or approved
CR6 Electricity / Arc Flash	Contact, or near contact with overhead power cables, no lock out or tag out when working on landfill electricity generation, potential electrical shock (damaged power leads, extension cables) etc, potential and actual shock / arc
CR7 Falls from heights	No permit to work issued or approved, no fall arrest or prevention of fall equipment used, no edge protection, incorrect use of tools as work platforms (ladders, steps, chairs), out of date fall arrest PPE
CR8 Overcome by fumes or gases	No emergency response plan developed, no gas detection equipment used, no lock out or tag out in place, failed valves, failure to use correct PPE, exposure to fumes from fire or gas leaks, no permit to work issued or approved,
CR9 Threatening Behaviour	Assault, violent attacks, threatening behaviour
CR10 Drug or alcohol impairment	Could include prescription medications which restricts the use of plant operation or ability to drive
CR11 Fire/Explosion	Incompatible loads/chemicals, gas leaks, no hot work permit approved in explosive or fire sensitive areas (landfills, confined spaces), incorrect tools used which can cause sparks, no gas detection equipment used
CR12 Accidental Firearm discharge	Actual and potential, failure to follow safe practices

DOC REF: WM UNI RED RA 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Risk Assessment Form

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CR13 Drowning

No emergency response plan when working close to water (whether on foot or with plant and equipment), no permit to work issued, incorrect PPE, working alone close to water, incorrect plant selection with only one point of egress.

Section 2. Risk Assessment (List identified hazards and detail measures taken to address the hazards)							
Identified Hazard	Uncontrolled Risk		Risk Rating	Current controls	Controlled Risk		Residual Risk Rating
	Likelihood	Consequences			Likelihood	Consequences	
Interaction with heavy machinery at the tip face	Possible	Significant	25	- Always apply the 5-metre rule. - Use the RT to notify operators of your presence when entering the tip pad. - Wear PPE - hard hat, safety boot, high viz, long pants. - Follow Spotter instructions.	Rare	Significant	19
Vehicle collision on route to sampling location	Likely	Moderate	14	- Always apply the 5-meter rule. - A Safety Belt must be worn when driving a vehicle. - Workers must complete a light vehicle assessment. - All operators must have a current NZ full driver's license. - All parties must be inducted to the landfill. - All drivers must obey the site traffic management plan. - All vehicles must use a beacon light on the vehicle. - All WM employees must use the RT to notify spotter of their presence when working near heavy vehicles in operation. Never overtake any vehicle while driving to the sampling site.	Possible	Moderate	13
CR2 Exposure to hazardous substances	Likely	Moderate	14	- All workers must undergo Asbestos Awareness training. - All operators wear appropriate PPE, P2dust mask, safety glasses or goggles, safety boots, and gloves. - All operators must complete an Annual Health check.	Unlikely	Moderate	12

DOC REF: WM UNI RED RA 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Risk Assessment Form

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				Vehicles must be cleaned with a HEPA filter vacuum cleaner.			
Slips, trips and falls	Possible	Minor	8	- Wear appropriate PPE and ensure safety footwear is in good condition. - Operators must maintain three points of contact. - Take caution when walking and keep an eye out for potential slip/trip hazards, as often the surface is uneven and slippery. - Where possible, if the ground is covered with grass, these locations need to be weeded periodically.	Unlikely	Minor	3
Manual Handling	Possible	Minor	8	- All workers must complete manual handling and risk awareness training. - Workers must wear appropriate PPE as listed in WM UNI RED RA 023. - Use lift assist for heavier loads.	Possible	Minor	8
If the activity is new, are there any permanent controls not yet implemented or awaiting funds – CAPEX approval? If so, what temporary controls have been taken to ensure the task can be completed safely while waiting for those permanent controls to be completed?							
Control option	Hierarchy (see below)	Resources required	Person/s responsible	Approved by?	Implementation date		

DOC REF: WM UNI RED RA 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Risk Assessment Form

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SIGN-OFF BY WORKERS				
Name:	Signature:	Company/Division:	Date:	Inducted By:
Nabil Saliman		Redvale Lab	6/12/23	
Max Harrison		Redvale Lab	6/12/23	
Amirul Abdul Khalil		Redvale Admin	6/12/23	
Na Zhang		Redvale Lab	11/6/24	

DOC REF: WM UNI RED RA 023
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)

5



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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HSEQ Management System

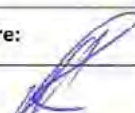
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Decontamination of ACM from Landfill Machinery

Work Instruction Form

HSEQ Management System

Date:	15/11/2023			Risk Assessment No:	WM UNI RED RA 036
Division:	UNI	Branch/Site:	Redvale		
Task Location:	Redvale Workshop	Work Activity:	Decontamination of ACM Machine		
Permits / Authorisations required:	WORK PERMIT: ☐ BREAKTHROUGH: ☐ CONFINED SPACE: ☐ HOT WORK: ☐ FALL PREVENTION: ☐				
Permits / Authorisations approved and reviewed by:				Date:	
Work Instruction prepared in consultation with: <i>List all persons involved</i>	Nabil Soliman, Sacheda Naicker, Laiana Barbosa & Glen Jujnovich			Date:	15/11/2023
Comments	The correct way to safely decontaminate ACM machinery and Landfill machinery				
Process:	Name:	Position Title:	Signature:	Date:	
Task Manager Approval:	Mike Rademeyer	Workshop Supervisor		04/12/23	
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator	<i>Laiana Barbosa</i>	04/12/2023	
Final Approval:	Glen Jujnovich	Regional Manager	<i>G Jujnovich</i>	04/12/2023	

1

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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Work Instruction Form

HSEQ Management System

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REQUIRED EQUIPMENT	
PPE Required: Hi-Vis, Disposable Overalls, Hard Toe Gumboots, Helmet with Face Shield, Half Face Respiratory Mask (P2), Disposable Gloves. <i>For example</i> 	Additional equipment/Tools: Portable Water blaster, Water Truck, Asbestos Decontamination area Reference to and the related RA's: LOTO WM UNI RED WI 003 ACM Handling WM UNI RED WI 110 Asbestos Exposure Monitoring WM UNI RED 023
REQUIRED LICENCES & COMPETENCIES	
Licences:	Competencies: Risk Assessment associated with this WI: WM UNI RED RA 036 Trained personnel only to complete this task(s) OR to be completed under the supervision of trained personnel. Note: Any staff member or contractor working on the machinery needs to have a personal Lockout Lock on each isolation.
LEGISLATIVE REFERENCES (Optional)	

2

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

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Decontamination of ACM from Landfill Machinery

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Decontamination Location	1. ACM machinery to be decontaminated on the ACM pad. 2. Park the machinery/vehicle away from downwind of other operations/people. 3. Set up a decontamination area for PPE removal upwind of this site and cone off the area. 4. Turn off the vehicle/machinery and secure the park brake, LOTO the machine to prevent unauthorized use. Landfill machinery gets decontaminated in the workshop wash bay.	Always be mindful of what is downwind. Always make sure the vehicle is secure LOTO is in place, WM UNI RED WI 003 Lock Out Tag Out Refer to ACM handling WM UNI RED WI 110 for PPE removal set up	Workshop Staff Operator

3

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

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Work Instruction Form

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Soaking of Machinery	Bring the water truck to the decontamination area use gentle spray and dampen the entire vehicle/machinery with water to not aggravate the ACM dust prior to using the water blaster to suppress the ACM dust from becoming airborne. 	It is important to gently soak the vehicles/machinery to restrict the asbestos fibers and prevent ACM splash back during water blasting. 	Workshop Water Truck Operator Operator

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Decontamination of ACM from Landfill Machinery

Work Instruction Form

HSEQ Management System

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Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
PPE	1. Put on all PPE as per the ACM handling WM UNI RED WI 110	1. Overalls are not to be tucked inside gumboots.  2. Respiratory mask to go under hood of overalls.	Workshop Staff Operator

5

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Decontamination of ACM from Landfill Machinery

Work Instruction Form

HSEQ Management System

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Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
		3. Respiratory mask must be inspected and fit checked before use.	
Water Blasting	1. Position the portable water blaster upwind of the machinery/vehicle. 2. Dampen the machine prior to water blasting Turn on and spray off all ACM at an angle (to prevent splashback)		Workshop Staff Operator
Disposal of ACM	1. Once finished water blasting the vehicle/machinery, clean up any residual		Workshop Staff Operator

6

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Decontamination of ACM from Landfill Machinery

Work Instruction Form

HSEQ Management System

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Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	material by Water blasting it towards the disposal area. 2. If a secondary ACM Machine is available, use that to clean up residual materials if appropriate.		
Exchange of HEPA Filters	1. These filters are to be changed at 250 to 500hr intervals depending on the volume of ACM deliveries. 2. The filters are to be bagged for disposal at the ACM disposal area.		Workshop Staff
Removal of PPE	1. Removal of PPE must be done in the decontamination area. 2. Remove the visor and use wipes and spray provided to decontaminate. 3. To remove overalls, roll them inside out while removing them to trap any asbestos fibre. 4. Remove gloves and boot covers as you go using the same method (roll them inside overalls). 5. Dispose of these items into the specified bin in the decontamination shed, 6. Wipe down the outside of the respirator before removing it. Then store it in its assigned location, 7. Wash hands.	It is important to remove your PPE in the correct order and in the correct way to reduce the risk of airborne fibers. Ensure that the respiratory mask is on while removing other PPE ALWAYS.	Workshop Staff Operator



7

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Decontamination of ACM from Landfill Machinery

Work Instruction Form

HSEQ Management System

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Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	8. as per the ACM handling WM UNI RED WI 110		
Removal of Vehicle/Machinery	1. Remove the LOTO. 2. Move machinery to the new location.	Follow any PPE requirements of the area e.g. Respirator, boot covers and gloves if walking to a machine in the ACM area.	Workshop Staff Operator

DOC REF: WM UNI RED WI 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (4)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (ie Internal, Confidential)

8



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
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Decontamination of ACM from Landfill Machinery

Work Instruction Form

HSEQ Management System

I have read and understood the attached Work Instruction (Enter name and sign)				
Name:	Signature:	Company:	Date:	Inducted By:
Jonathan		W/M	7/12/23	
Shirley		W/M	7/12/23	
Ross HARPER		W/M	7/12/23	
Johann Rummel		W/M	7/12/23	
S. NARAYAN		W/M	12/12/23	

9

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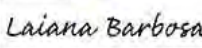
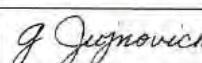
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DECONTAMINATION OF ACM MACHINERY & LANDFILL MACHINERY

Risk Assessment

HSEQ Management System

Division: UNI		Branch/Site: Redvale		
This form is to be completed by the person/s undertaking the risk assessment in accordance with the applicable ' <i>Identification and Risk Assessment Checklist</i> '.				
Task/Equipment/Activity to be risk assessed:	Decontamination of ACM machinery & landfill machinery			
Person/s at Risk:	Employee ☒ Contractor ☒ Member of Public ☐ On-Site Visitor ☐ Environment ☐ Business ☐			
Date of Assessment:	15/11/2023	Date of Last Assessment	17/05/2023	
List all persons involved in completing the Risk assessment - HSR Representative, workers, involved etc.:	Sacheda Naicker, Laiana Barbosa, Mike Rademeyer and Glen Jujnovich		Date: 15/11/2023	
Overview of Activity	The Correct way to safely decontaminate ACM Machinery and Landfill Machinery.			
Process:	Name:	Position Title:	Signature:	Date:
Task Owner Approval:	Mike Rademeyer	Workshop Supervisor		4/12/23
HSEQ Approval:	Laiana Barbosa	Compliance Coordinator		04/12/2023
Final Approval:	Glen Jujnovich	Regional Manager		04/12/2023

WM UNI RED RA 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
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DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
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Section 1. Summary of key hazards that were identified during the assessment – list in order of significance.							
1.	Interaction with heavy machinery at the tip face	Critical Risk1	Yes	6.	Noise	Critical Risk	No
2.	Potential energy	Critical Risk5	Yes	7.	Fatigue	Critical Risk	No
3.	Electrocution	Critical Risk	No	8.	Control of water blaster	Critical Risk	No
4.	Hazardous substance exposure	Critical Risk2	Yes	9.	Slip trip fall	Critical Risk	No
5.	Vehicle Collision	Critical Risk1	Yes	10.	Manual handling	Critical Risk	No

Important Note: An Activity can create a Hazards that involves multiple Critical Risks.

Critical Risk	Possible SP Event Descriptions
CR1 Collisions	With moving or stationary objects or people, reversing incidents, breaches of the 5mtr rule, hitting overhead objects, actual or potential collisions.
CR2 Exposure to hazardous substances	Asbestos, medical waste, incompatible loads / chemicals, incorrect disposal, unknown products, failure to use correct PPE
CR3 Insecure loads	On trucks, forklifts, racking failure, product storage too high, unrestrained product stacks, e.g., baled cardboard
CR4 Loss of Control	Actual and potential rollovers, unintended, uncontrolled or unexpected movement of plant or equipment and vehicle rollaways, failure to engage park brake
CR5 Exposure to uncontrolled energy	Failure to lock out or tag out fixed or mobile plant, unauthorised use of plant, entrapment in plant/ crushing, no permit to work issued or approved
CR6 Electricity / Arc Flash	Contact, or near contact with overhead power cables, no lock out or tag out when working on landfill electricity generation, potential electrical shock (damaged power leads, extension cables) etc, potential and actual shock / arc
CR7 Falls from heights	No permit to work issued or approved, no fall arrest or prevention of fall equipment used, no edge protection, incorrect use of tools as work platforms (ladders, steps, chairs), out of date fall arrest PPE
CR8 Overcome by fumes or gases	No emergency response plan developed, no gas detection equipment used, no lock out or tag out in place, failed valves, failure to use correct PPE, exposure to fumes from fire or gas leaks, no permit to work issued or approved.
CR9 Threatening Behaviour	Assault, violent attacks, threatening behaviour
CR10 Drug or alcohol impairment	Could include prescription medications which restricts the use of plant operation or ability to drive
CR11 Fire/Explosion	Incompatible loads/chemicals, gas leaks, no hot work permit approved in explosive or fire sensitive areas (landfills, confined spaces), incorrect tools used which can cause sparks, no gas detection equipment used

WM UNI RED RA 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

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ISSUE DATE: 11/03/2025
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Risk Assessment

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CR12 Accidental Firearm discharge	Actual and potential, failure to follow safe practices
CR13 Drowning	No emergency response plan when working close to water (whether on foot or with plant and equipment), no permit to work issued, incorrect PPE, working alone close to water, incorrect plant selection with only one point of egress.

Identified Hazard	Uncontrolled Risk		Risk Rating	Current controls	Controlled Risk		Residual Risk Rating
	Likelihood	Consequences			Likelihood	Consequences	
Interaction with heavy machinery at the tip face	Possible	Significant	21	Ensure the Smtr rule is applied at all times Use the RT to notify operators of your presence when working near heavy vehicles in operation Wear the required PPE - hard hat, safety boot, high viz, long longs. If entering the Monofil area – use the decontamination station and wear full PPE – P2 mask, boot covers, and disposable overalls.	Rare	Significant	19
Potential energy – pressure hoses, springs, clutches	Possible	Major	18	Ensure that workers have read and signed the Lock Out Tag Out WI (WM UNI RED WI 003) and WA (WM UNI RED RA 003) Isolate the energy source and Lock out and tag out all sources of energy.	Unlikely	Major	17
Electrocution	Possible	Major	18	Ensure that any power source has been locked out and de-energized. Workers must complete a SLAM assessment – is the work area clear of water/liquids. Ensure all tools and equipment have current test and tag, are maintained and are fit for use.	Rare	Major	16
CR2 Exposure to hazardous substances Hazardous substance exposure – skin contact, Inhalation, ingestion.	Unlikely	Moderate	14	Appropriate handling of the hazardous substance as per the SDS sheet SDS (safety data sheets, MSDS) available Workers trained in Asbestos Training. Spill kit available	Unlikely	Moderate	12

3

WM UNI RED RA 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
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ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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Risk Assessment

HSEQ Management System

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Identified Hazard	Uncontrolled Risk		Risk Rating	Current controls	Controlled Risk		Residual Risk Rating
	Likelihood	Consequences			Likelihood	Consequences	
				Eye and face wash on site Task specific PPE as per SDS All workers must undergo Asbestos Awareness training. All personnel must wear the required PPE, P2dust mask, and safety glasses or goggles, safety boots, disposable overalls and nitrile gloves. All Personnel must complete an Annual Health check. Vehicles must be cleaned with a HEPA filter vacuum cleaner. Stand downwind when cleaning the machine			
Vehicle collision	Likely	Moderate	14	Safety Belt must be worn when driving a vehicle. All workers must have a current NZ full driver's license. All workers must obey site road rules and the speed limits onsite. All workers must use a beacon light on vehicles while driving on site. All workers must use the RT to notify operators of their presence when working near heavy vehicles in operation	Possible	Moderate	13
Noise – leading to hearing damage.	Possible	Moderate	13	Grade 5 hearing protection must be worn.	Rare	Minor	6
Fatigue	Possible	Moderate	13	Workers should complete an annual health check. Workers must have fatigue awareness training. Workers have a minimum of one day off a week. Workers are to ensure they are always fit for work	Rare	Moderate	11
Control of water blaster	Possible	Moderate	13	Ensure a face shield is worn and the correct asbestos PPE is worn – P2dust mask, and safety glasses or goggles, safety boots, disposable overalls and nitrile gloves. The water Blaster operating manual must be followed at all times.	Rare	Moderate	11

4

WM UNI RED RA 036
 ISSUE DATE: 15/11/2023
 NEXT REVIEW DATE: 15/11/2024

VERSION (5)
 DOCUMENT UNCONTROLLED WHEN PRINTED
 Classification (i.e. Internal, Confidential)



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ASBESTOS MANAGEMENT PLAN

HSEQ Management System

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DECONTAMINATION OF ACM MACHINERY & LANDFILL MACHINERY

Risk Assessment

HSEQ Management System

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Identified Hazard	Uncontrolled Risk		Risk Rating	Current controls	Controlled Risk		Residual Risk Rating
	Likelihood	Consequences			Likelihood	Consequences	
Slips, trips and falls	Possible	Minor	5	Operators must maintain three points of contact when entering and exiting vehicles. Ensure good housekeeping of all paths and walkways. Ensure flooring surfaces are appropriate for the work being undertaken. Ensure adequate lighting at all times.	Unlikely	Minor	7
Manual Handling	Possible	Minor	8	All workers must complete Manual handling training. Workers must wear appropriate safety shoes for the task. Use 2 persons lift or a mechanical aid to lift heavy items. Ensure job rotation of workers to reduce repetitive movement. Workers must have regular breaks.	Possible	Minor	8

If the activity is new, are there any permanent controls not yet implemented or awaiting funds – CAPEX approval? If so, what temporary controls have been taken to ensure the task can be completed safely while waiting for those permanent controls to be completed?

Control option	Hierarchy (see below)	Resources required	Person/s responsible	Approved by?	Implementation date

WM UNI RED RA 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e. Internal, Confidential)

5



DOC REF: WM UNI RED PL 002
ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

VERSION (5)
DOCUMENT UNCONTROLLED WHEN PRINTED
Classification (i.e., Internal, Confidential)





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HSEQ Management System

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DECONTAMINATION OF ACM MACHINERY & LANDFILL MACHINERY

Risk Assessment

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SIGN-OFF BY WORKERS				
Name:	Signature:	Company/Division:	Date:	Inducted By:
<i>[Signature]</i>	<i>[Signature]</i>	W/m	7/12/23	
<i>[Signature]</i>	<i>[Signature]</i>	W/m	2/12/23	
ROSS HARGREAVE	<i>[Signature]</i>	W/m	2/12/23	
Felicia Korman	<i>[Signature]</i>	W/m	7/12/23	
S. VAIKON	<i>[Signature]</i>	W/m	12/12/23	

WM UNI RED RA 036
ISSUE DATE: 15/11/2023
NEXT REVIEW DATE: 15/11/2024

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ISSUE DATE: 11/03/2025
NEXT REVIEW DATE: 11/03/2026

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APPENDIX 2: Example of Asbestos Acceptance Criteria and Instructions

Asbestos must be wrapped correctly to ensure there is no risk to our staff and customers.

ACCEPTABLE WRAPPING METHODS

Polythene sheeting

Asbestos sheeting, asbestos lagged pipes and similar long or large items should be wrapped in new heavy duty 200µm (minimum thickness) polythene sheeting. Once wrapped, label the bundles to indicate the presence of asbestos. Double wrap the waste in polythene sheeting and apply adhesive tape to the entire length of every overlay to minimise the risk of the sheeting splitting or tearing. Bundles have a maximum allowance weight of 1000kg. We require any pallets brought into the facility to be left behind and have exchange pallets available.

Bags

Asbestos waste must be contained in new and heavy 200µm (minimum thickness) polythene bags. The waste must be double bagged and closed with a goose necktie. The bags should be no more than half full to reduce the risk of bags tearing or splitting.

Mark bags clearly 'Caution asbestos – do not open or damage bag. Do not inhale dust'.

Drums

We do not accept asbestos waste in drums.

There must be NO exposed asbestos product protruding from plastic bags or sheeting and acceptable wrapping methods used as above

ON-SITE PROCESS

Acceptance Times 6:30 AM-3.30 PM Mon-Fri 7 AM-1 PM Sat/Public Holidays (except Christmas Day, New years Day and Easter Friday)

1. Manifest/permit information is recorded at the weighbridge on arrival.
2. A staff member will inspect incoming loads. Non-compliant loads will not be accepted.



APPENDIX 3 - Redvale Landfill Authorised Contractor Agreement for Asbestos

Asbestos will only be accepted at Redvale from contractors authorised for asbestos. Note that WMNZ does not endorse or guarantee any third party.

To be an authorised contractor you should be compliant with the current Health and Safety in Employment (Asbestos) Regulations and agree to the following requirements:-

This applies to both Asbestos Contractors and those carrying Asbestos for others.

1. We the company below have current procedures and processes in place to ensure that the following is complied with:-
2. All asbestos and asbestos containing materials must be presented at Redvale as per the current requirements of the New Zealand Regulations for the correctly identified class. Please refer to your certified Asbestos Handler for any further information.
3. Any asbestos job above 10m² should be managed via a person holding an Asbestos removal licence. Please refer to Worksafe website.
4. If the wrapping is done by a Third Party then there must be a process in place to ensure it has been done in the approved manner, especially to ensure that it is fully wet.
5. A Hard Hat, Hi-Visibility vest, suitable safety footwear, and a suitable mask (minimum P2) is required when opening/closing tailgates for unloading.
6. Asbestos must be correctly identified for disposal. Any fibrous material will be considered Asbestos by Redvale (and therefore treated as such prior to disposal) unless the generator provides analytical evidence that the material does not contain asbestos.
7. No manual unloading is permitted – ACM is accepted in commercial tipping bins or on tipping-body trucks only and packed in a way that allows free and unhindered tipping.

Transportation is managed to meet the standard NZ5433:2012. Please carry a copy of ACM Notification of Special Waste – Redvale with each delivery to show at the weighbridge. Not required for wrapped Asbestos.

For transport, Special Provision 168 states “Asbestos which is immersed or fixed in a natural or artificial binder (such as cement, plastics, Asphalt, resins, or mineral ore) in such a way that no escape of hazardous quantities of respirable asbestos fibres can occur during transport is not subject to the provisions of this standard (NZS5433



Part 2:2012)". It is up to the generator to ensure this applies, hazardous documentation is required if this is not the case.

Any delivery that does not meet our requirements could result in the company being removed from the Authorised Contractor list immediately. Please also refer to our WMNZ Landfill Haulier Rules, Commercial Terms and Conditions and Site Safety, Health and Environmental Rules for the Redvale Landfill.

The Authorised Contractor guarantees to WMNZ to perform the above processes to ensure that Asbestos is delivered to Redvale in a safe and consistent manner.

ABOUT ASBESTOS

<http://en.wikipedia.org/wiki/Asbestos>

SAFETY REQUIREMENTS FOR THE REMOVAL OF ASBESTOS

<http://construction.worksafe.govt.nz/guides/acop-management-and-removal-of-asbestos/www.asbestosaware.co.nz>

FURTHER INFORMATION

For any further information please contact our main office on: 09 427 0600

3.3 Cover

3.3.1 Scope of this section

This section of the LMP describes:

- Daily cover
- Intermediate cover
- Final cap

3.3.2 Daily cover

3.3.2.1 Consent requirements

[Condition XX]

3.3.2.2 Purpose of daily cover

The purpose of daily cover is:

- To reduce nuisances (birds, vermin, litter, odour, dust);
- To reduce fugitive gas emissions.
- To reduce infiltration of stormwater into the landfill (subsequently generates leachate).

3.3.2.3 Materials and thickness

Daily cover will generally comprise natural earth material. A minor organic content from vegetation will be acceptable. A minor amount of contamination or flagging with waste will be acceptable if the soil has been used previously as cover.

Daily cover will be placed over all refuse every day to a minimum thickness of 300mm.

Natural earth materials which have been deemed to be waste (e.g. soil contaminated by petroleum) may be left overnight without daily cover provided that:

- it is machine-rolled to seal it against stormwater infiltration and erosion, or it is covered with an alternative daily cover e.g. tarp;
- there is no stormwater run-on;
- it is not odorous and will not become odorous;
- it will be covered properly with clean daily cover as soon as deliveries of that waste cease;
- it will be covered regardless with clean daily cover if the forecast next delivery of the waste intended to overlie it is more than a fortnight away.

By the end of each day, the tip face will be shaped with slopes of no steeper than 1 vertical: 3 horizontal (1V:3H) before placing daily cover.

Soils are typically used as daily cover however the use of alternative daily cover will not be excluded if it can be demonstrated that an alternative will perform as effectively as soil cover for compliance with respect to nuisances, stability, and environmental effects. However, approval will be required from PRP and AC before using an alternative daily cover.

3.3.2.4 Methods

In dry weather, when the available soils are friable in nature, bulldozers will be used to spread the soils as daily cover. The soils will be either tipped by dump truck alongside the tip face each day or obtained from adjacent stockpiles of previously removed but re-useable daily cover.

In wet weather, when the available soils are saturated and plastic, hydraulic excavators (diggers) with wide buckets will be used, to spread and smooth the cover. A large float may be used to subsequently smooth and seal the surface.

Daily cover will be stripped, commencing half an hour before the posted operating hours for each day. Both bulldozers and diggers will be used as required. The removed soil will be stockpiled alongside the tip face for re-use. From 1 May to 31 August (inclusive), stripping of daily cover in the Class 1 putrescible area will not commence until after 7:15 am, in accordance with Condition 41, and the first placement of putrescible waste will not occur until after 7:30 am.

If satisfactory removal of cover is impractical, 'windows' will be cut through the cover to permit future gas and leachate migration.

If the underlying waste or the cover soil itself is known to be or found to be unusually odorous, either the cover will not be stripped at all (provided this would not seriously affect future leachate and gas migration), or additional odour control measures would be taken during the cover stripping e.g. direct application of odour suppressant or foam.

3.3.2.5 Stockpiling

It is the responsibility of landfill operations management to ensure that an adequate supply of soil cover is available and accessible at all times. This issue will be important in winter when the non-landfill parts of the site become inaccessible due to severe softening of the wet ground which is experienced at this site.

3.3.3 Intermediate cover

3.3.3.1 Consent requirements

[Condition XX]

3.3.3.2 Purpose of intermediate cover

Intermediate cover is a sealing layer of earth material. The intermediate cover may be either:

- Temporary cover over incomplete parts of the waste pile (where more refuse will be placed at a later date)
- Permanent cover over completed parts of the waste pile (being either a sub-layer to or a preliminary part of the final cover).

The purpose of intermediate cover is:

- To minimise water infiltration and hence reduce leachate generation;
- To minimise fugitive gas emissions and reduce odour;
- To minimise air intrusion when the waste is under vacuum for better gas extraction

3.3.4 Materials and thickness

Intermediate cover will comprise suitable earth fill materials capable of being compacted to achieve low permeability (typically $< 1 \times 10^{-8}$ m/s). Intermediate cover will be at least 450mm thick.

Intermediate cover will be placed over any area that will remain unused for a period of more than 12 weeks [Condition XX].

3.3.4.1 Methods

The spreading of topsoil and grass seeding will be undertaken preferably during spring and summer season to allow successful establishment of the vegetation. If grassing is not practicable in regard to

the weather, timing, urgency or for any other reason, an alternative stabilisation option will be implemented which may include the use of an alternative cover like synthetic material.

3.3.4.2 Timing

Where any cover of any kind is unlikely to be worked for a period in excess of 6 months, it will be grassed before a period of 6 months. This period will be reduced as far as practical to 3 months. AC may also require that exposed area to be grassed, having regard to the size, location, composition and intended use of the area, climatic and topographical conditions, and the potential impact on the amenity of surrounding properties and residents of leaving the area ungrassed, and the area's visibility from beyond the boundaries of the consent holder's land. Any issues between the consent holder and the AC in regard to the timing of putting cover and grassing, will be forwarded to the PRP whose decision will be final.

3.3.4.3 Planting

Intermediate cover will be established wherever the intermediate cover is unlikely to be worked for a period in excess of 6 months. Stabilisation will comprise a combination of any one or more of top-soiling, sowing, hydroseeding and mulching as considered suitable at the time.

3.3.4.4 Removal

Temporary intermediate cover will be removed, before refuse is due to be placed over the area. The intermediate cover soil will generally be used as daily cover, but the intermediate cover soil may also be selectively removed without contamination for re-use in clean fill situations such as other areas of intermediate cover.

Removal of intermediate cover potentially will release a burst of odour, both from the uncovered waste and from the disturbed soil itself. Odour control will be exercised by minimising the extent and rate of intermediate cover removal at all times, and otherwise, by odour suppression methods considered appropriate at the time and as set out in Section 3.6.

3.3.5 Final cover

3.3.5.1 Consent requirements

[Condition XX]

3.3.5.2 Purpose

The objectives of final cover are:

- To minimise infiltration of stormwater into the landfill and hence leachate generation;
- To minimise gas and odour emissions, and optimise gas extraction to the treatment plant;
- To provide a medium for restoration of vegetation, for aesthetic effects and erosion resistance

3.3.5.3 Materials

While it is recognised that certain man-made materials such as synthetic polyethylene sheet can make a good seal against gas egress and water egress, it is also possible to construct a satisfactory cap using compacted earth materials. The site has a surplus of soils which are rich in clay (good for sealing against water flow) and the cap design will incorporate a thick compacted layer of these soils.

These materials must meet the following requirements:

Redvale Landfill Management Plan

- 1 The soil shall be MOIST i.e. neither dry nor wet. This means that the soil shall not be so dry as to be either powdery or crumbly or dusty when tipped and the soil shall not be so wet as to contain either slush, slop or free water.
- 2 The soil shall contain no cohesive clump or inclusion larger than 0.45 m size.
- 3 The soil or original site of any soil proposed to be imported to the landfill shall be available to be inspected by the landfill operator at any time before and during deliveries.
- 4 The soil shall not have discernible discolouration, odour or texture associated with chemical contamination.
- 5 The soil shall not exceed maximum allowable contamination limits specified in the table below.

Parameter	Maximum average concentration in uppermost 0.9 m of final cap including topsoil, growth medium and compacted clay (mg/kg)
Arsenic	20
Cadmium	3
Chromium (total)	400
Copper	325
DDT	12
Dieldrin	2.6
Lead	210
Mercury	0.75
Nickel	105
Zinc	400
PAH (BaP equivalents)	10
Asbestos	ND

- 6 The soil shall be fit for purpose which means that topsoil must be friable organic soil that would fit the normal description of topsoil, growth medium soil must be suitable for growing grass and shrub-sized plants, and low-permeability soil must be able to achieve a uniform compact layer.
- 7 The soil shall be acceptable to the landfill operator who may reject soil for any reason.

For a low-permeability clay layer the criteria for this material must meet the above requirements as well as the following:

- 8 The soil shall be either PLASTIC CLAY or PLASTIC SILTY CLAY or PLASTIC CLAYEY SILT.
- 9 The soil shall be at a water content and consistency that allows a bulldozer of D6 size with standard tracks to spread the soil to a continuous and uniform layer of 250 mm loose thickness over compacted refuse or daily cover and to achieve a tight surface after four bulldozer or compactor passes without leaving deep ruts and without leaving exposed underlying material.

Redvale Landfill Management Plan

- 10 The soil shall meet the following criteria on delivery if required by the landfill engineer:
Hydraulic conductivity $< 1 \times 10^{-7}$ m/s at standard compaction; Plasticity Index > 10 ; Liquid Limit > 35 (i.e. plastic); Liquidity Index > 0.5 and < 1.5 (i.e. neither too dry nor too wet).
- 11 The soil shall contain no visible sand or gravel.
- 12 The soil shall contain no organic matter ($< 1\%$) and no roots larger in diameter than fencing wire.

3.3.5.4 Thickness

The final cap will comprise at a minimum (from the top):

- 0.15m thickness of topsoil and,
- 1m thickness of compacted clay soil

The above is shown in cross-section in Chapter 3.3 Appendix A. There are three cap profiles, for pasture, shrubs and trees.

The Landscape and Planting Plan is included and described in Section 3.11. Trees will not be planted on the final cover directly above the refuse because their roots could penetrate to the waste and later die off due to landfill gas and cause preferential paths for gas egress and water ingress. The area allocated for tree planting is at the edge of the landfill refuse boundary and therefore will have no effect on the landfill gas escape or water ingress. The area allocated for tree planting is at the edge of the landfill refuse boundary and therefore will have no effect on the landfill gas escape or water ingress following die off of the roots.

Shrub-like plants will be planted in pre-determined areas of the final cap known as the shrub-zone, and these will have a higher thickness than the minimum final cap thickness. The shrub zone design requires:

- A layer of clay of virtually uniform thickness of 1 m is initially placed as final cover.
- An additional thickness of material is added later in the shrub zone – this provides an opportunity to also smooth any uneven contours resulting from differential settlement.
- The additional material added to the shrub zone is feathered out around its edges – this difference in final levels is unlikely to be significant after landfill settlement and planting and is not considered to be a departure from the intent of the landscaping contour plans.

In summary, final cap thicknesses will be adopted at Redvale Landfill as follows (in addition to daily cover):

Table: Final cover layer thickness		
	Pasture zone	Shrub zone
<u>Layer</u>	<u>Layer thickness (mm)</u>	<u>Layer thickness (mm)</u>
Topsoil	150	150
Growth medium (partly organic)	0	1050
Clay	1000	1000
TOTAL	1150	2200

3.3.5.5 Locations and timing

The landfill surface will be progressively restored i.e. properly covered and grassed as areas reach final level. The aim will be to ensure that the objectives of final cover listed above will be met promptly and in a timely manner. In this way restoration will become an integral part of the landfill

operation and experience gained during the early phases would be applied to the forward planning of cover construction in subsequent areas.

The advantages of placing final cover promptly outweigh the disadvantages, so it is not proposed to wait for settlement to occur first. This means however that more frequent repairs may be required to fix areas of final cover distressed due to differential settlement.

3.3.5.6 Removal of final cover for side slope steepening

Areas where historic final cover have been installed will have it removed sequentially (from lower levels to higher levels) to enable the steepening of the final landfill profile side slopes to a maximum gradient of 1 vertical: 3 horizontal (1V: 3H).

3.3.5.7 Cap drainage

Cap drainage will be established by contouring the final cover to form drainage swales as shown on drawing of the Site Development Plans in Section 1, Appendix B.

All cap drainage will be inspected periodically, and drainage swales will be maintained to mitigate the observed effects of:

Uneven settlement (requiring adjustment of swale gradient/surface) – see below;

Localised erosion (due to uneven grass strike for example)

Cracking (due to settlement or desiccation)

In areas where experience shows drainage swales may be prone to erosion or de-vegetation, appropriate additional protection measures will be implemented (e.g. riprap, matting, concrete lining or close turfing).

3.3.5.8 Differential settlement

The total amount of long-term settlement is expected to be 5% of refuse thickness. Differential settlements may be up to half of the total settlement. Factors affecting settlement include the nature of the waste, moisture, compaction surcharging and the phasing or speed of completion up to final level.

Issues associated with differential settlement include:

- cover cracking, leading to gas escape and air intrusion;
- ponding, leading to leachate generation and local higher gas generation and pressure;
- reverse falls or steep falls on bench drains, leading to wash-outs or erosion;
- uneven slope profiles, leading to poor aesthetics;
- low points in gas pipes, leading to condensate blockage;
- mismatch profiles between old settled areas and newly filled areas.

Often it will be necessary to marry a newer part of the landfill (built up to design level) to an older part of the landfill (which has settled to below design level). Problems could arise with continuity of fall in bench drains (leading to either a step down or a step up) and continuity of slopes (a step in the upslope / downslope direction).

To allow for differential settlement effects, all open drains on the final cap are designed with a 2% minimum slope and freeboard of 300 mm, which is more than conventional earth drain slopes of around 1.0% and less than steep earth drain slopes that could be prone to erosion of around 3%.

Also, surface drainage features will be designed with a large measure of over-capacity to cater for settlement. For example, the surface drainage swales shown on the Site Development Plans are

designed to flow less than 50% full, with significant over-capacity due to the increasing drain cross section area with depth.

Remedies to differential settlement problems are suggested in Section 3.3.8, 'Cover - Contingency'.

3.3.5.9 Methods

All final cover material will be placed by spreading in layers and compacting using earthmoving machines.

The minimum standard will be to achieve hydraulic conductivity of approximately 1×10^{-8} m/s. Higher values have been shown to be relatively ineffective at achieving the objectives of final cover.

Achieving a lower permeability of final cover by heavy compaction might be difficult due to spongy waste underneath and might be counterproductive if the compaction method results in a layer which is either brittle or prone to seasonal desiccation. Nevertheless, site management will generally aim for a better permeability standards.

The actual permeability achieved will depend on facts at the time including nature of the soil material, water content, weather conditions, types of compaction machines that are available, slope angle, and installations such as gas well heads to be worked around.

The effectiveness of final cover will be subject to regular monitoring and assessment.

3.3.5.10 Edge detail

Final cover will be married to the extreme edge of the liner to provide a gas-tight seal Section 3.3 Appendix A.

3.3.5.11 Planting

Planting of final cover is described in the Landscape Planting Mitigation Plan included as Section 3.3 Appendix A.

3.3.5.12 Underground services

A number of services will be installed by trenching into the final cover, including gas headers, condensate pipes, leachate re-circulation lines, control / communications cables, and irrigation pipes. The installation trenches will be excavated to not closer than 0.6 m above the base of the final cover clay layer. After installing the services, the trenches will be backfilled with compacted low-permeability soils. Any granular bedding will be interspersed with cut-offs to reduce potential gas and liquid flow.

3.3.5.13 Stockpiles

Towards the end of the landfill's operating life, there will be a greater demand for final cover materials (and to a lesser extent for liner materials).

It is proposed to continue to use Stockpile 4, including for closure activities. This will include:

- Use as a source of borrow material for landfill construction and for capping.
- Stockpiling of surplus soils removed during development of the Class 2 extension.

Once the Class 2 extension area has been developed, Stockpile 4 will be the main area on site for sourcing and storing suitable soil materials. The area will remain active after the cessation of waste placement. This is to allow it to be used as a source of final capping materials – since the final cap cannot be constructed until after the last waste has been placed in the landfill.

The development of the Class 2 landfill extension will generate a significant volume of cut as this area is developed in stages. Some of this will be used to construct the perimeter bund around the southern and eastern sides of the existing footprint, and some will be used for daily cover or final capping. Surplus cut material will be stockpiled within the Stockpile 4 area during each stage of development.

Upon completion of borrowing/stockpiling activities, the borrow area, will be shaped to a suitable low maintenance, long-term profile, retopsoiled and revegetated prior to removal of erosion and sediment control measures.

3.3.6 Final levels

3.3.6.1 Consent requirements

[Condition XX]

3.3.6.2 Setting out

WMNZ will place refuse up to the design final levels, less a height to allow for the construction of final cover. Proper survey techniques will be used to ensure that the cover will have the required thickness beneath final surface drains and structures.

3.3.6.3 Overfilling

The landfill will be filled to pre-settlement levels. The waste pile will settle down to the design final levels [Condition XX] in the post-closure period. The pre-settlement levels may be higher than the design final level by as much as 5% (reduced settlement percentage based on age of waste already placed beneath the highest parts of the landfill) of the refuse depth). Areas of landfill that have been progressively completed and capped before the closure date will have already undergone some settlement, therefore only a portion of the landfill will be at the maximum pre-settlement levels on the closure date.

The onus is on the landfill operator to ensure that the design final levels will be achieved. Settlement monitoring and projections to re-affirm or change the pre-settlement levels will be periodically reported to the PRP.

3.3.6.4 Stability

The slope of the landfill cap is designed to be a maximum of 1 (vertical): 3(horizontal), (1V:3H) based on aesthetic, maintenance and stability requirements. The minimum slope would be 1 (vertical): 20 (horizontal) (1:20 (5%)). There may be two exceptions:

- on the outside flank of a bench drain, the slope may locally be steeper than 1V:3H to achieve an overall average of 1V:3H from bench to bench;
- as the refuse is overfilled to allow for future settlement back to design levels, the slope may be slightly steeper than 1V:3H until settlement has occurred.

With regard to stability, two types of possible landslip on the sloping cap of the landfill pile have to be considered. The first type is "sheet-sliding" of the cover. This will be minimised by providing a firm, compacted clay fill as the cover material which will not become weakened by saturation because surface water will flow away down the slope and any infiltrating water will flow down into the more permeable refuse underneath. The second type is deep-seated slumping which could encompass some of the refuse. The compacted refuse is generally considered to be sufficiently strong to resist this type of landslip, provided that weak substances (e.g. sludge) are not placed immediately under the cap. The margin of stability is described by a factor of safety which is to be

greater than 1.5 for static long-term conditions, greater than 1.3 for temporary conditions and less than 1.0 for earthquake conditions. The factor of safety is defined as the ratio of resisting forces (associated with soil strength) divided by driving forces (associated with gravity and other mobilising effects).

3.3.7 Monitoring

3.3.7.1 Weekly walkovers

All areas of intermediate and final cover will be inspected by a walk-over survey conducted weekly. The purpose will be to observe the condition of the cover (cracking, vegetation distress, waterlogging, ponding, differential settlement, landslip, erosion), gas installations and stormwater drainage system.

3.3.7.2 Settlement

Settlement markers will be installed at the rate of approximately one per two hectares. The area of monitoring will include final cover areas and intermediate cover areas which may be left for 12 months or more. Levels will be surveyed quarterly. Results will be summarised in monthly reports to the PRP.

3.3.7.3 Quantities of cover

A recording system e.g. daily plant docket will be operated to track the amounts cover, roading and other materials used on site. Such records will be made available to AC upon request.

3.3.7.4 Reporting and record-keeping

Event	Reporting
Settlement survey (quarterly)	Monthly reports to PRP
Extent and amount of cover (annual analysis)	Monthly reports to PRP
Walkover findings (weekly)	Quarterly air quality reports to AC
Repairs to cover (gas-related)	Quarterly air quality reports to AC
Repairs to cover (related to water, leachate, restoration)	Monthly reports to PRP
Quantity of cover, road and other materials used on site	Upon request to AC
Final cover thickness measurements	Monthly report to PRP.
Final cover volume measurements	Monthly report to PRP.
Final cover material visual inspections	Monthly report to PRP.
Final cover material geotechnical tests	Monthly report to PRP.
Final cover placement observations (daily record)	Monthly report to PRP.
Final cover placement geotechnical tests	Monthly report to PRP.
Final cover construction quality control test results	Monthly report to PRP.
Aerial extent of final cover	Annual LMP revision.

3.3.8 Contingency

3.3.8.1 Consent requirements

[Condition XX]

3.3.8.2 Response guidelines

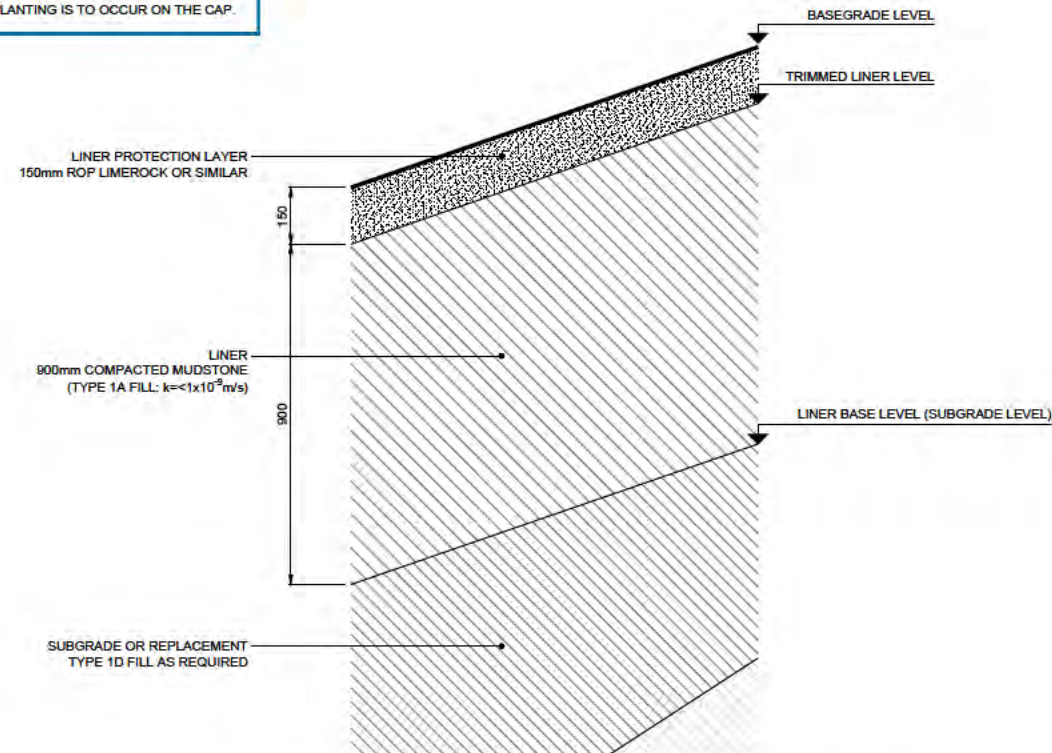
Contingency triggering event	Response guidelines
Leachate breakout	Leachate breakouts will be repaired by excavating the cover either partly or entirely from the breakout source and replacing the cover with proper compaction and layer thicknesses. If the cover is entirely removed, it would be worthwhile to excavate a hole into the waste and to backfill the hole with loose materials to encourage downward infiltration into the waste of the leachate flow which was causing the breakout. Odour and gas controls would be required during the work.
Cover cracking	Cracking could be apparent by observation, or by evidence of air intrusion in gas well readings, or by odour emissions, or by gas bubbles on wet ground, or by audible hissing of gas flow under pressure. Cracks could be repaired by stripping topsoil, stripping part of the cover clay thickness, and reinstating them with proper compaction and spreading.
Erosion	Areas which are observed to suffer from erosion will be repaired by installing erosion protection measures such as riprap, concrete lining or reinforced turf.
Differential settlement	The remedies to differential settlement problems will be assessed at the time of discovery or planned work and might include: the final cover clay layer could be thickened locally and feathered into the adjacent area; intermediate cover could be placed, to be supplemented to achieve full final cover specification at a later date after some settlement has taken place. Marrying of final cover by cutting it to make it thinner than specified in any area will not be considered to be an option for restoration in areas of differential settlement.

Appendix A Final Cap Details and cross sections

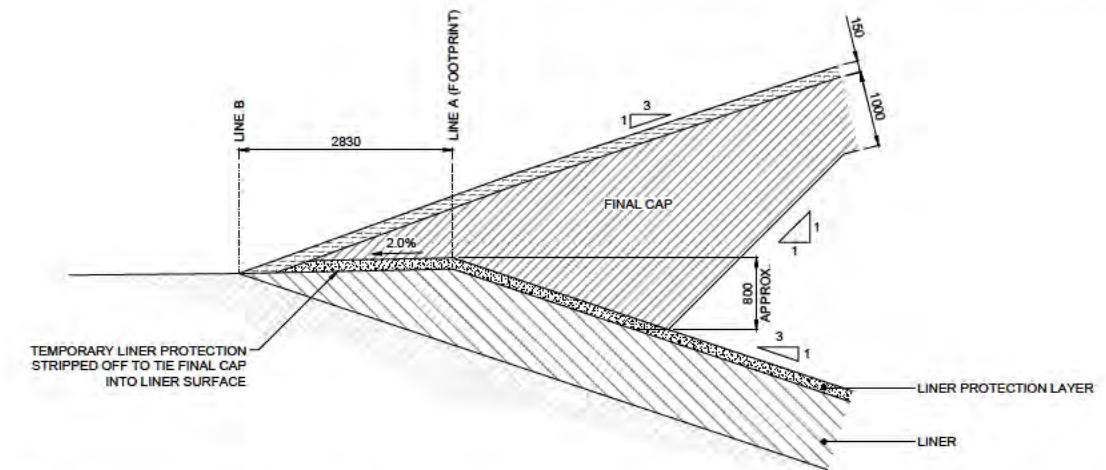
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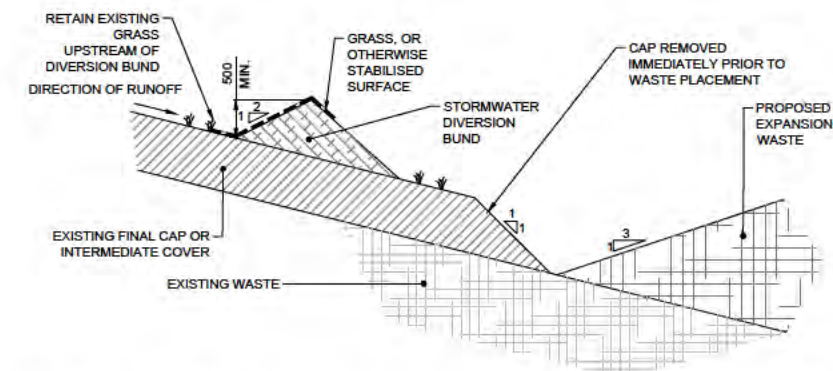
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2. STORMWATER DIVERSION BUND TO BE REMOVED AND REPLACED WITH 150mm THICK LINER PROTECTION LAYER PRIOR TO PLACING REFUSE.
3. CAP THICKNESS VARIES WHERE PLANTING IS TO OCCUR ON THE CAP.



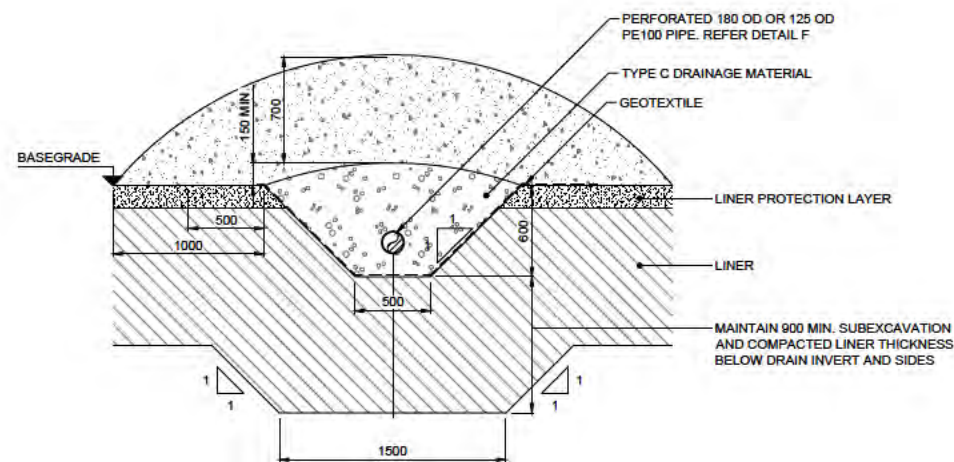
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SCALE (A3) 1:20



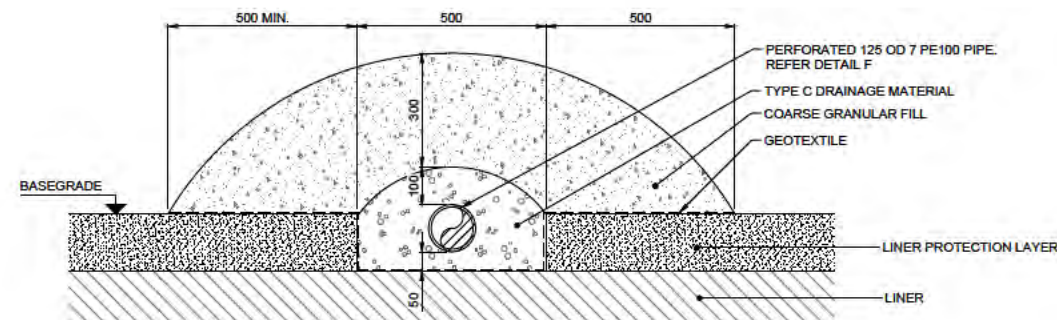
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SCALE (A3) 1:100



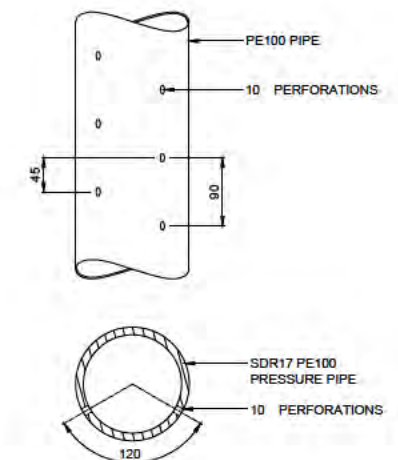
C TYPICAL TEMPORARY CLASS 1 LANDFILL STORMWATER DIVERSION BUND
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SCALE (A3) 1:100



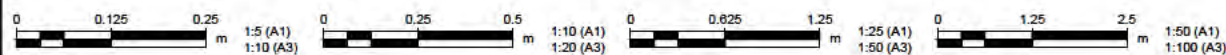
D TYPICAL CLASS 1 LANDFILL LEACHATE COLLECTOR DRAIN
SCALE (A1) 1:25
SCALE (A3) 1:50



E TYPICAL CLASS 1 LANDFILL LEACHATE CUTOFF DRAIN
SCALE (A1) 1:10
SCALE (A3) 1:20



F LEACHATE COLLECTOR PIPE PERFORATIONS
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SCALE (A3) 1:10

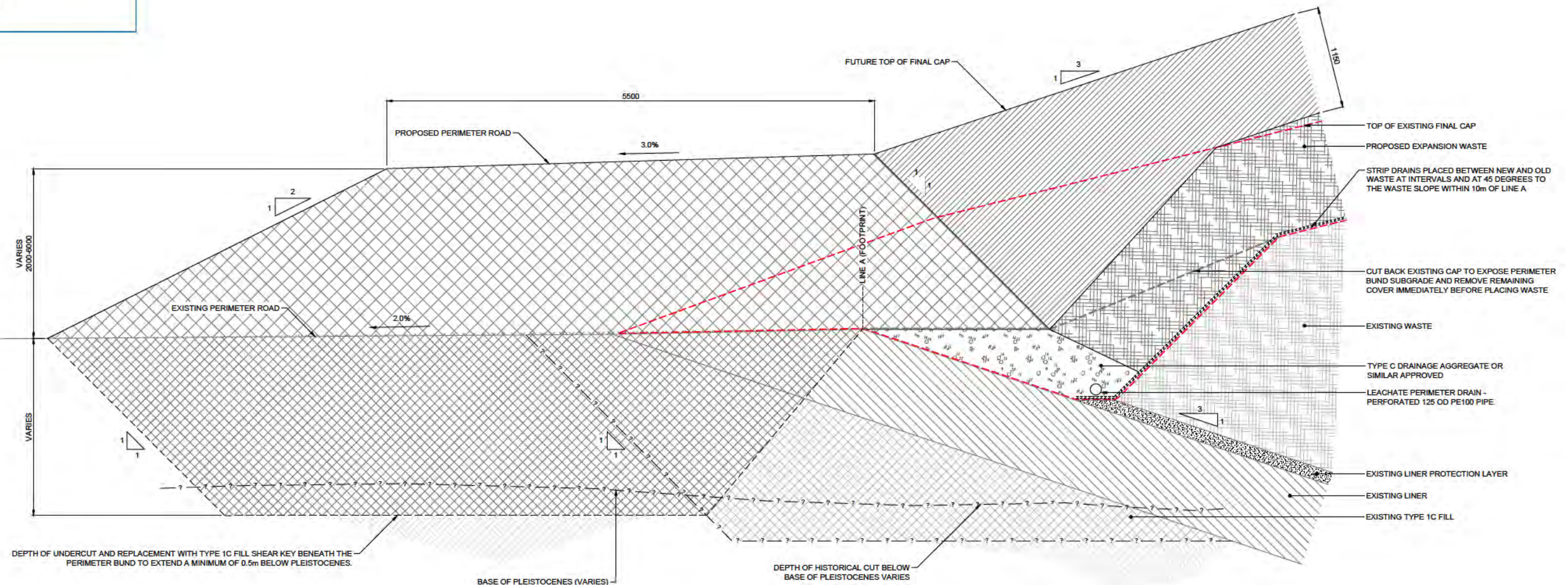


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LEGEND

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	EXISTING LINER
	EXISTING LINER PROTECTION LAYER
	PROPOSED FINAL CAP
	PROPOSED TYPE C DRAINAGE
	EXISTING WASTE
	FUTURE WASTE
	EXISTING TYPE 1C FILL
	FUTURE TYPE 1C FILL



5 TYPICAL DETAIL OF PERIMETER BUND AND REVISED FINAL SURFACE TIE-IN
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 SCALE (A3) 1:50

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 1:25 (A1)
 1:50 (A3)



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A SUBSTANTIVE ISSUE

REV DESCRIPTION

MELP AWS 10.08.26

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DESIGNED AWS Aug.26
 DRAWN MELP Aug.26
 DESIGN CHECKED SFE Aug.26
 DRAWING CHECKED JC Aug.26

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DRAWING STATUS
 SUBSTANTIVE ISSUE
 PROJECT PHASE
 CONCEPT DESIGN

CLIENT WM NEW ZEALAND

PROJECT REDVALE LANDFILL EXPANSION

TITLE CLASS 1 PERIMETER BUND DETAILS

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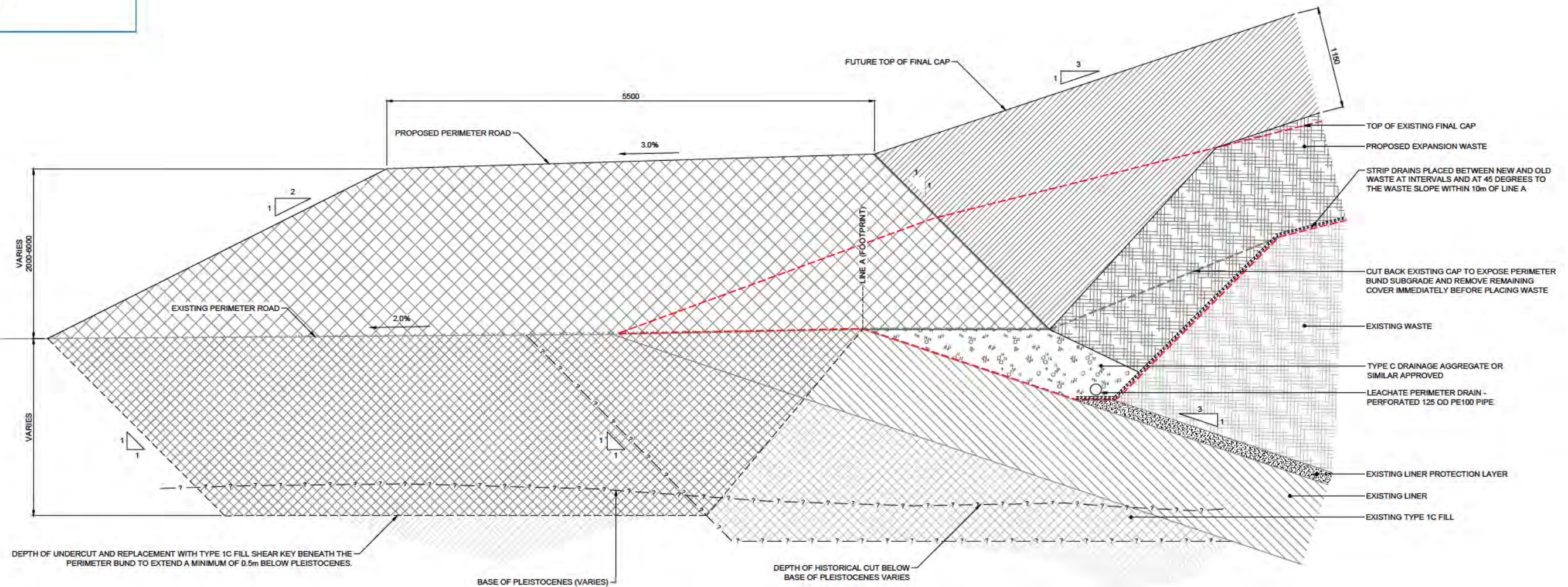
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LEGEND

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	EXISTING LINER PROTECTION LAYER
	PROPOSED FINAL CAP
	PROPOSED TYPE C DRAINAGE
	EXISTING WASTE
	FUTURE WASTE
	EXISTING TYPE 1C FILL
	FUTURE TYPE 1C FILL



5 TYPICAL DETAIL OF PERIMETER BUND AND REVISED FINAL SURFACE TIE-IN
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 SCALE (A3) 1:50

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CLIENT WM NEW ZEALAND

PROJECT REDVALE LANDFILL EXPANSION

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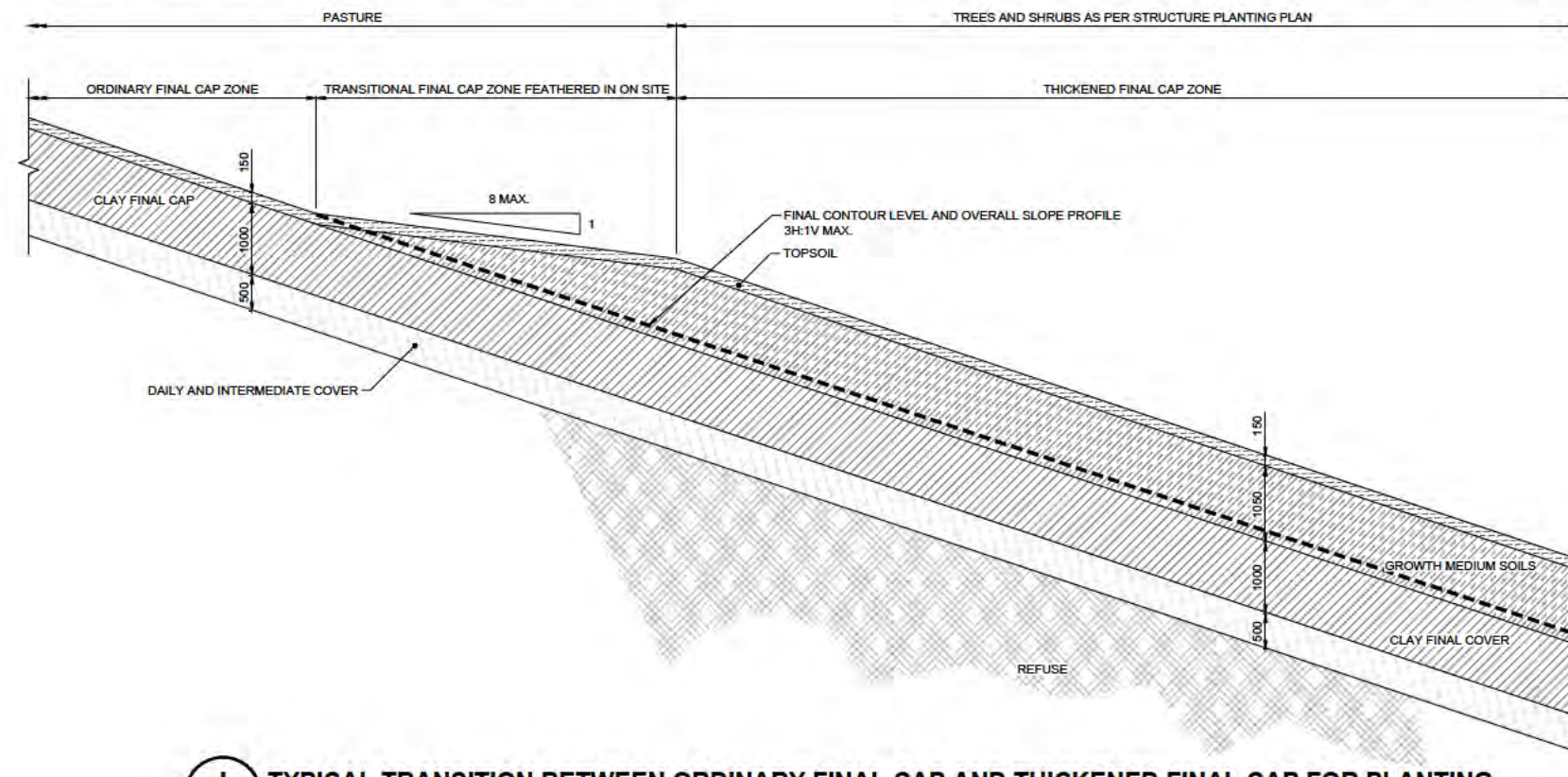
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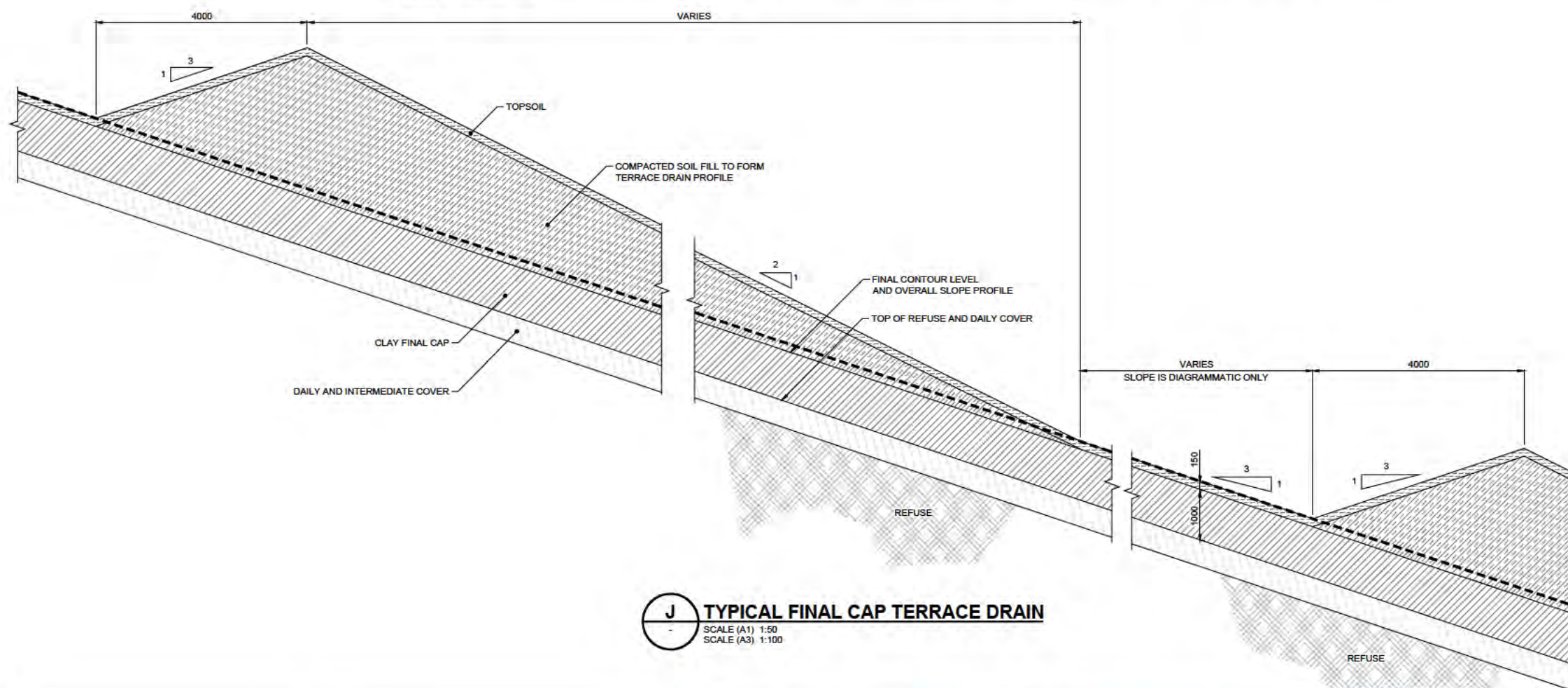
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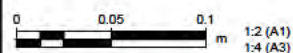
1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.



I TYPICAL TRANSITION BETWEEN ORDINARY FINAL CAP AND THICKENED FINAL CAP FOR PLANTING
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J TYPICAL FINAL CAP TERRACE DRAIN
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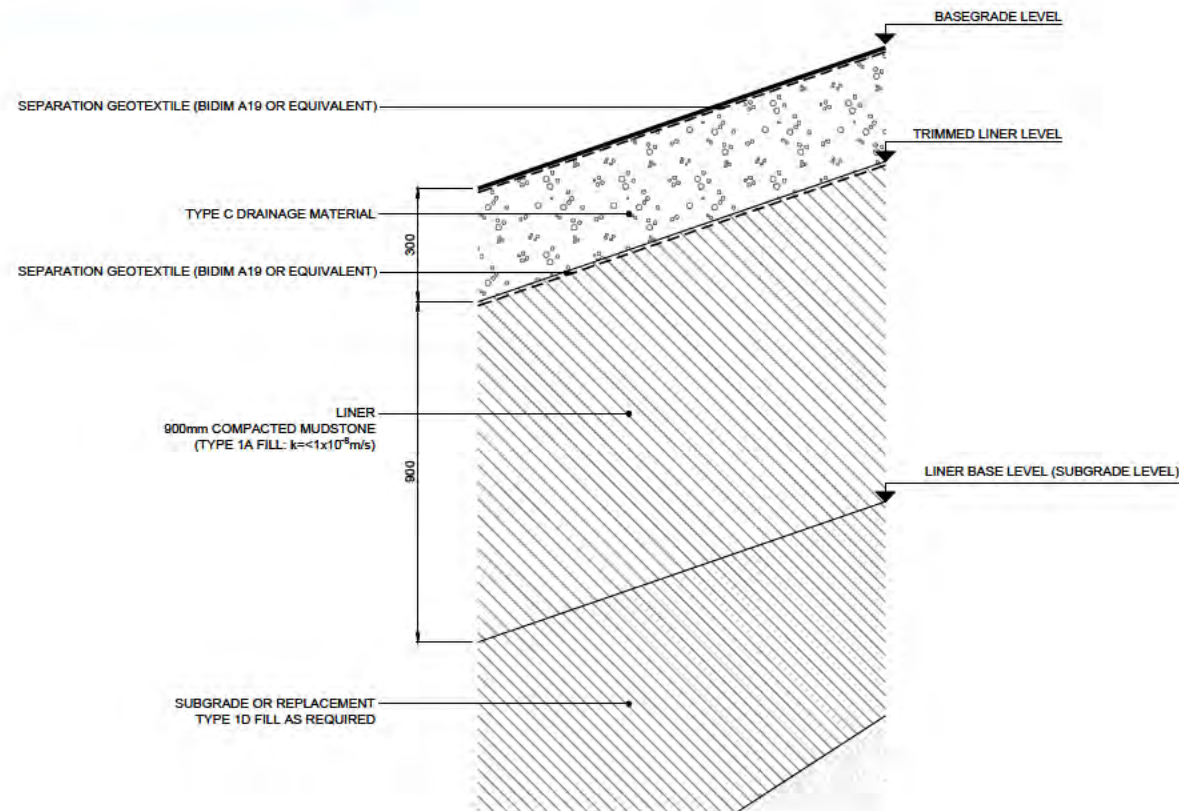


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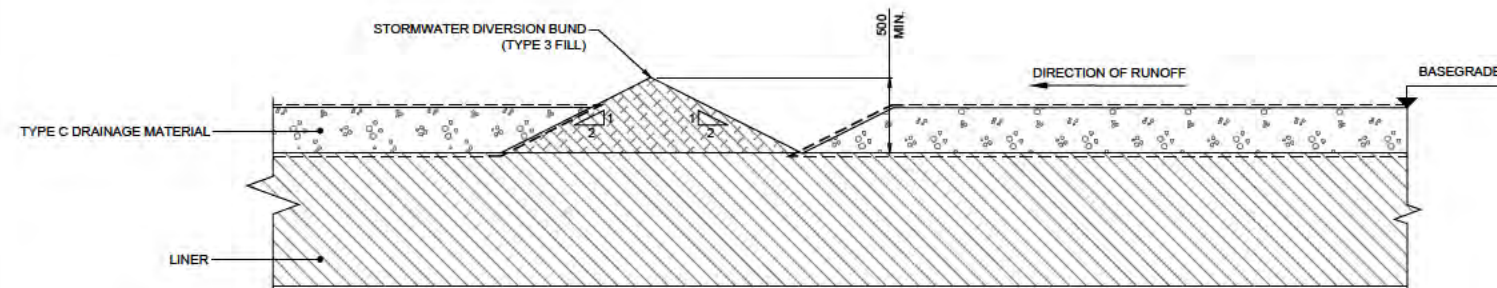
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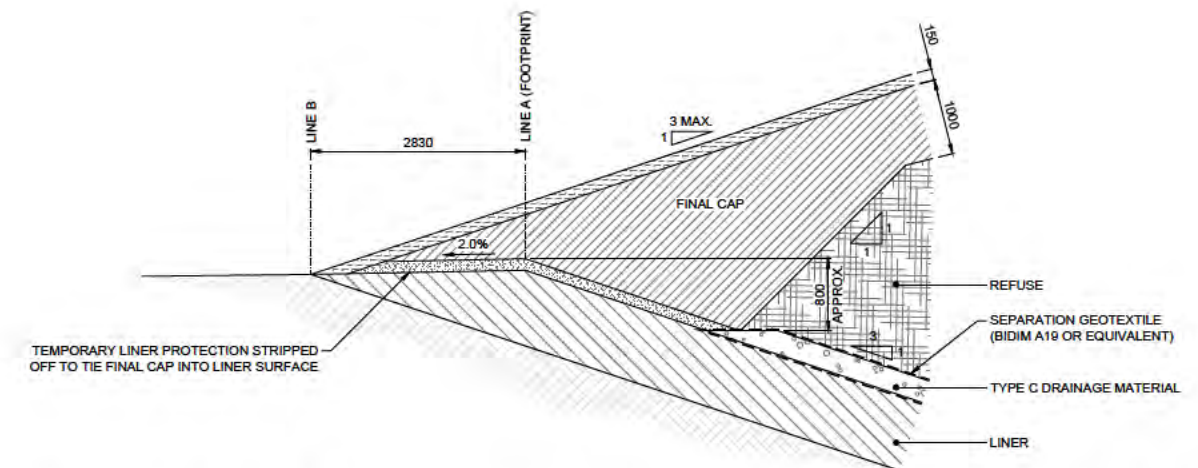
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2. LEACHATE DRAINAGE LAYER THICKNESS SHALL BE A MINIMUM OF 300mm FOR TYPE C AGGREGATE.
3. STORMWATER DIVERSION BUND TO BE REMOVED AND REPLACED WITH 300mm THICK TYPE C AGGREGATE PRIOR TO PLACING REFUSE.



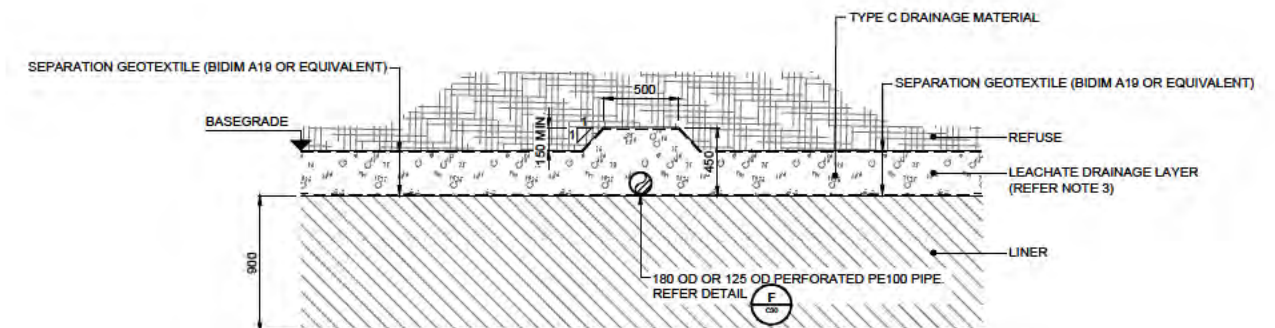
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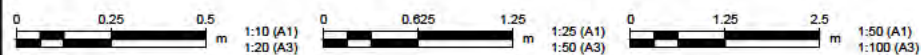
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L TYPICAL DETAIL OF CLASS 2 FOOTPRINT EXTENSION FINAL CAP PERIMETER TIE-IN
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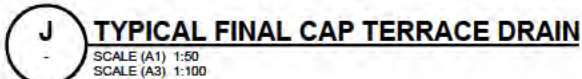
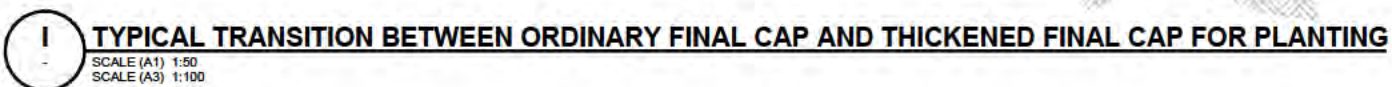


N TYPICAL CLASS 2 FOOTPRINT EXTENSION LEACHATE COLLECTOR DRAIN
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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE					

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3.4 Erosion and Sediment Control Plan

3.4.1 Overview

3.4.1.1 Purpose

The aim purpose of this Erosion and Sediment Control Plan (ESCP) is to set out how the Landfill at Redvale will minimise the amount of water-borne sediment in surface water leaving the site, to preserve the biological health of the receiving water.

3.4.1.2 Background

The ESCP shall meet the requirement of the Auckland Council Technical Publication GD05⁶.

To carry any activities within the catchment of the four sedimentation ponds, there is no requirement of having an ESCP. However, it is considered that erosion and sediment control remain an issue in terms of complying with the discharge consents for the four permanent ponds during site development and therefore an ESCP will be maintained for the site in the form of this section in the Redvale Landfill Management Plan.

Six main stormwater ponds have been designed to meet the water quality and water quantity attenuation objectives of the relevant Auckland Council Technical Guides, GD05. The pond system (sedimentation pond 1, 2, 3, 4, 5 and 6) meet the GD05 sizing requirements (i.e. minimum volume of pond between 2% and 3%). The Ponds sizing also meets the flow attenuation requirements of GD01 i.e. that the pond outflows maintain below pre-development levels. This is further discussed Section 3.5 of the LMP.

The proposed Class 2 footprint Extension will necessitate the phased removal of Pond 6 when the new Class 2 landfill liner is constructed, requiring the simultaneous expansion of Pond 1 to compensate for the loss of Pond 6 stormwater pond capacity. The existing final cap contours/stormwater drainage and proposed final cap contours/stormwater drainage are indicated on Site Development Plans in Section 1.

3.4.1.3 Regulatory requirements

Guidance Document 001 (GD01) Stormwater Management Devices in the Auckland Region provides guidelines for the selection and design of stormwater management devices which achieve water quality treatment, retention of stormwater on-site and the detention of frequent storm events for stream protection and detention of larger storm events for flood mitigation.

Guidance Document 005 (GD05) Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region. gives guidance on the selection, design and use of erosion and sediment control practices and measures for land disturbing activities.

3.4.2 Sediment Control Strategy

3.4.2.1 Management approach

The management approach to erosion and sediment control is to adopt the best practices to reduce the possible environmental effects of activities undertaken on site. The potential adverse environmental effects are:

⁶ Leersnyder, H., Bunting, K., Parsonson, M., and Stewart, C. (2018). Erosion and sediment control guide for land disturbing activities in the Auckland region. Auckland Council Guideline Document GD2016/005. Incorporating amendment 1. Prepared by Beca Ltd and SouthernSkies Environmental for Auckland Council

- Adverse impacts on flora and fauna from high suspended solids in water.
- Adverse impacts on flora and fauna from excessive siltation.
- Loss of land value (aesthetic, cultural, economic) due to erosion, land slips and destabilisation.
- Sediment deposition causing channel blockages and flooding.

The site's landfill engineer will take responsibility for ensuring that the principles of the management approach to erosion and sediment control are followed and that sediment controls are installed and working. This will involve a prior risk assessment for significant earthwork.

3.4.2.2 Principles

This ESCP sets out temporary, semi-permanent and permanent sediment control measures for the site under the specific control areas of construction, operations and completed areas.

This ESCP provides for a risk minimisation approach aimed at the following three first principles:

Minimising surface erosion.

Promoting sedimentation of suspended solids before water leaves the site.

Controlling flows to minimise adverse effects of discharge water on downstream biota.

The strategies to comply with these principles are taken from GD05:

- 1 – Minimise land disturbance.
 - 2 – Stage construction.
 - 3 – Protect steep slopes.
 - 4 – Protect water courses.
 - 5 – Stabilise exposed areas rapidly.
 - 6 – Install perimeter controls.
 - 7 – Employ detention devices.
 - 8 – Get trained contractors.
 - 9 – Make sure the plan evolves.
 - 10 – Assess and adjust (inspect, monitor, maintain).
- and (included in this plan):
- 11 - Take response actions described in the monitoring and contingency sections

3.4.2.3 Risk Assessment

The basis for a risk assessment is to determine the likelihood of an adverse effect on the basis of the work and natural factors along with sensitivity of the environment. Prior to construction adoption of recommendations from the consultant design specifications are to be adhered to. Where consideration for sediment and erosion control does not form part of the consultant's design then the adoption of the principles outlined in the various plans documented in Section 1.4 Regulatory Requirements shall be applied.

3.4.2.4 Earthworks Planning

Earthworks may be carried out to stockpile the excessive soil, to borrow the soil to be used as cover in the landfill and develop an area for solid waste disposal; cell. If the activity is carried out outside the catchment of the one of the sediment retention ponds, a separate resource consent will be sought as per the relevant rules and regulations. Following additional measures are required for any activities carried the catchment of the sediment retention ponds.

Pre-commencement

AC will be notified at least five days prior to the commencement of any earthworks activities. An ESCP will be prepared in accordance with the GD05 and submitted to AC for approval. The content of the ESCP will include but not be limited to:

- Site description including soil type, slope and total area;
- Specific erosion and sediment controls;
- Supporting calculations and design drawings;
- Catchment boundaries and contour information;
- Details of construction methods;
- Dewatering methods and treatment devices;
- Timing and duration of works;
- Details of stabilisation measures;
- Monitoring and maintenance requirements;
- Details of the receiving environment;
- Methodology of implementing control measures; and
- Emergency procedures if there is an accidental untreated discharge.

Pre-construction meeting

Prior to the start date of Specified Earthworks activities, a pre-start meeting will be held. The meeting will

- Be located on the site;
- Be scheduled at least five days before the anticipated commencement of earthworks;
- Include an officer from AC- Resource Consents and Compliance Unit;
- Include representation from the contractors who will undertake the works;
- Allocate project roles and responsibilities for ESC; Have a copy of the final approved ESCP shall be made available.

Certification of erosion and sediment control measures

Within 10 days after completing the installation of erosion and sediment control devices specified in ESCP and prior to the commencement of the Specified Earthworks, a certification from a suitably qualified surveyor/engineer will be submitted to the AC. The certification will indicate the erosion and sediment control measures have been constructed and completed in accordance with the AC's GD05. The written certification may be in the form of report of any other form acceptable to the council. All the erosion and sediment control measures will be operational before any earthworks commence.

3.4.2.5 Permanent stormwater treatment devices

At Redvale, the permanent stormwater treatment devices mainly include the sediment retention ponds, culverts, channels etc. aimed at reducing surface erosion and enhancing the sedimentation. There are 6 major pond system on site; Ponds 1-6 and a number of drains and culverts around the perimeter of the landfill.

Additions of any new structures will have to follow specific procedures as outlined below:

Pre-Construction Meeting

At least 5 working days prior to initiation of any construction of new permanent stormwater treatment devices on the site, a pre-construction site meeting shall be organised between the AC and all relevant parties including the site stormwater engineer.

The following information shall be made available at the pre-construction meeting:

- Timeframes for key stages of the works authorised;
- Contact details of the site contractor and site stormwater engineer; and,
- Approved (signed/stamped) construction plans.

Post-Construction Meeting

Within 30 days of practical completion, a post-construction site meeting shall be arranged and conducted between the AC and all relevant parties including the site stormwater engineer. It is expected that the construction of the stormwater devices are carried out as per the plans and designs discussed in the pre-construction meeting. Any more than minor modifications to the approved plan/design are required to have pre-approval from AC.

Certification of Construction Work

Within 30 days of the practical completion of the permanent stormwater treatment devices, as built certification and plans of any new stormwater treatment devices shall be provided to the AC. The as-built certification shall be certified by a suitably qualified registered surveyor or engineer and shall include but not limited to:

- The surveyed location (to the nearest 0.1m) and level (to the nearest 0.01m) of the discharge point from the site, with co-ordinates expressed in terms of NZTM and LINZ datum.
- Location, dimensions and levels of any major overland flow paths including cross sections and long sections;
- Plans and cross sections of all structural controls, including confirmation of the water Quality Volume, storage volumes and levels of any outflow control structures,

As-built plan of all existing permanent stormwater treatment devices

Certified As-Built plans for all existing permanent stormwater treatment devices will be provided to the satisfaction of AC. Ponds 1, 2, 3, 4, 5 and 6 systems are the permanent stormwater treatment devices present on site. The plans will include, but not limited to:

- Location, dimensions and levels of any major overland flow paths including cross sections and long sections;
- Plans and cross sections of all structural controls, including confirmation of storage volumes and levels of any outflow control structure.

Upon any works to expand the sediment retention ponds, specifically pond 1, updated asbuilts will be sent to Auckland Council in accordance with this plan.

3.4.2.6 Sustainability

A strong focus on sustainability will be considered where practicable when implementing controls and executing construction work. Sustainable considerations shall include but not limited to:

- Local and sustainable procurement;
- Reusability of materials;
- Pursue net zero waste;
- Minimise vegetation removal where practical;
- Avoid air, land and water discharges where practical;
- Minimisation of water use on site;
- Minimal earthworks approach through staged construction;
- Foster community buy-in through supporting local industry, providing a forum for open discussion and adopting the best practice health and safety processes.

3.4.2.7 AC Consultation/Notification

For construction activities carried out outside the catchment of the sediment retention ponds referred to as specified earthworks, and construction of any new permanent stormwater devices, consultation with AC will be done as below.

Event	Details/Time frame
AC notification- of earthworks	At least 5 days prior to any earthworks starts
Pre-construction meeting	Scheduled at least 5 days prior to the start of the earthworks or construction of new permanent stormwater treatment devices on the site. Will include AC officer, contractor responsible for the construction and site stormwater engineer.
Certification of erosion and sediment control measures	By a suitably qualified engineer, Within 10 days of installation of the ESC devices, In accordance with GD05.
Post-construction meeting	Within 30 days of practical completion of the construction of a new permanent stormwater treatment device on site.
Certification of completion of construction work by suitably qualified surveyor/engineer	Within 30 days of completion of earthworks.
As built plans for all existing permanent stormwater treatment devices by suitably qualified surveyor/engineer	Within one year of the commencement of the consent.
AC notification	At least 2 days prior to the removal of erosion and sediment control devices.

Updated information which is to be considered part of the ESCP will be sent to the AC whenever a significant change is made.

3.4.3 Sediment Control Methods

3.4.3.1 Sources of sediment

The types of activities that can generate sediment are tabulated below:

Redvale Landfill Management Plan

Area	Types of sediment generating activities
Waste pile - current operations	soil cover roading tipping
Waste pile - area under construction	excavation subliner earth fill liner earth fill
Peripheral	temporary soil stockpiles permanent soil stockpiles earth borrow areas construction material stockpiles leachate irrigation buildings vehicle manoeuvring / parking / roads wheel wash system

3.4.3.2 List of methods

All sediment control features will be operated so that they comply with the requirements of the various applicable regulatory requirements and aim to achieve the established first principles.

Methods will focus on both prevention of erosion and reduction of sediment transport.

As the active landfill area changes with the progressive stages of development, the location of cut off drains, sediment control structures, etc, will be modified to suit.

To achieve the desired outcomes, the landfill site will utilise a combination of the following:

Control Method		Comments
Non-structural erosion minimisation, Including:	Rapid stabilisation of exposed areas – track rolling surfaces, compaction, mulching, grass seeding, planting etc.	Comments: the area of unvegetated daily cover is to be minimised.
	Staged construction – progressively planned earthworks staging where works are undertaken in smaller units over time.	Objective: minimise the duration of exposure and risk to erosion/sediment discharge.
	Slope Protection – Avoid disturbing steep slopes via clean water diversion.	Objective: minimise erosion potential
	Programming - restricting earthworks only in between 1 October to 30 April (unless a winter works permit is applied for from Auckland Council and issued for the works) Limit the maximum bare area to 25 ha during (1 Oct-30 April) and to 10ha during 1 May to 31 Sep)	Objective: To reduce the probability of bare land exposure to rainfall. Suitable for the construction areas. Comments: earthworks outside the 1 Oct- 30 April period will require prior AC approval.

Redvale Landfill Management Plan

Control Method		Comments
	Rapid stabilisation of exposed areas – track rolling surfaces, compaction, mulching, grass seeding, planting etc.	Undertaken on temporarily unprotected soil surfaces before rain completed slopes when work moves elsewhere construction areas by end of April any area that will be left more than 2 months final cover areas pond batters. Comments: the area of unvegetated daily cover is to be minimised.
Water management controls, including:	Diversion channels and bunds – Conveys stormwater on site and directs it to one of the sediment retention ponds for treatment.	Objective: to carry flows down steeper slopes. This applies to smaller flows from temporary landfill contour drains and to larger flows from wider permanent catchments.
	Contour drains – Temporary excavated channels on the construction site designed to break overland flow and reduce erosion power.	Objective: to carry flows from the construction area to the sediment retention devices (diversion channels to ponds).
	Check dams/flumes – Channel reinforcement with rip-rap/geotextiles	Objective: reduce erosion potential. Suitable for steeper slopes for moderate flow velocities or volumes.
	Stabilised entranceways: Road surfacing Road washing Wheel washing	Objective: to reduce amount of silt picked up on truck tyres. Objective: to keep silt on site where silt controls are in place. Objective: to remove silt and mud from vehicle tyres prior to exiting site. Comments: Designed to prevent transfer of material to the local roads. It is vital that all trucks and vehicles that access the site while conditions are muddy travel through the wheel wash prior to exiting the site

Redvale Landfill Management Plan

Control Method		Comments
Stabilisation practices including:	Topsoiling and grass seeding Hydroseeding Turfing Mulching Geotextiles and erosion control blankets	Objective: To stabilise the surface by covering exposed areas and minimising erosion potential. Can be implemented as short term or long-term solutions.
Structural sediment controls including:	Sediment retention ponds: holding ponds that allow silt to settle prior to discharge. Baffles are incorporated where inflows are directed away from the outlet to maximise siltation time. T- bar decants are also installed to provide an overflow path for the clean surface water in SRP's if required.	Objective: to maximize siltation within settling ponds. Designed for majority of storm events. Comments: Sediment is cleaned out from the ponds periodically as required to reduce potential for resuspension and to maintain pond capacity.
	Silt fences/super silt fences	Objective: maximise capture of mobilised silt. Suitable at or near source.
	Silt socks: tubular filtration device containing a filter material such as sawdust.	Objective: to capture and filter runoff. Suitable on flat or low gradient sites with small catchments.
	Stormwater inlet protection: barrier around a catchpit, water sensitive device or a stormwater inlet (can be a silt fence, silt sock etc.)	Objective: to intercept and filter sediment-laden run off before it enters a reticulated stormwater system.
Chemical dosing, including:	Flocculation/Coagulation: chemical dosing of sediment retention ponds via batch dosing and a rainfall activated system	Objective: chemical dosing used to improve the efficiency of SRP's by increasing settling rate. Designed for storm events, high flows and volumes. Redvale Landfill currently has a rainfall activated flocculation dosing system placed at pond 4 system, and a temporary installation at pond 5 that captures run-off from stockpile 4. The chemical PolyDADMAC is used as a flocculation agent. PolyDADMAC is an organic polymer. The work instruction for the flocc dosing system is given in Section 3.4 Appendix B, and the temporary ESCP for stockpile 4 is included as Section 3.4 Error! Reference source not found..

3.4.4 Inspection and maintenance

3.4.4.1 Inspection programme

All erosion and sediment control structures will be inspected periodically. The person responsible and the frequency on inspections will be detailed on a suitable form. Inspections will aim to identify any items which require maintenance or amendment in order to perform to design standards and to meet the first principles, and to verify compliance with consent conditions where applicable.

The items to be inspected will include:

Sediment Retention Pond

Inlet, banks

- wetland, sediment level
- decant, spillways, outlet

Channel

- grass, linings
- scour

Stockpile

- cut-off drains, chutes
- vegetation

Liner construction zone

- run-on diversion, refuse separation
- primary silt pond

Borrow area

- stripping, cut-off drains
- bench drains, berms
- primary silt pond

Landfill - tip face

- berms, falls
- sediment traps

Landfill - intermediate cover slope

- cut-offs, chutes
- soil type, rills, grass, rough, smooth

Landfill - final cover slope

grass

- swales
- flumes

Daily, intermediate and final cover area

3.4.4.2 Inspection frequency

It will be the responsibility of landfill engineer or its nominee to carry out regular inspections of the erosion and sediment control. A summary is outlined in the table below.

Frequency	Inspection items	Responsible Person
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Redvale Landfill Management Plan

Weekly	Bare earthwork areas and earth lined channels until the grass growth is established	Landfill engineer or a nominated person
Pre-storm	All ESC structures	Landfill engineer or a nominated person
Post-storm	All ESC structures	Landfill engineer or a nominated person
Monthly	All ESC structures	Landfill engineer or a nominated person
Six monthly	All ESC structures	Landfill engineer or a nominated person

The site will be made accessible to AC representative for carrying out an inspection. Any recommendation made by the AC officer will be incorporated by the site as soon as practicable. The recommendation may include the provision of any additional treatment devices, use of chemical flocculants to treat the sediment laden runoff or any other method that is deemed appropriate at that time.

Based on the outcomes of the inspections, maintenance will be scheduled as required.

3.4.4.3 Maintenance programme

Any required maintenance will be undertaken in a timely manner.

Any damage relevant to a sediment source that renders a control structure ineffective will be attended with priority and as soon as practical.

Following list of items can be taken as a guide for maintenance.

Maintenance Items	Maintenance Frequency	Action required
Sedimentation ponds (1, 2, 3, 4 and 5)	When the silt volume is more than 20% of the total pond capacity. If the sample from the discharge has 50 g/m ³ or more suspended solids in 95% of samples in any consecutive twelve-month period	Desilting Seek options for source reduction of sediments.
Floating decant	Monthly	Removal of dirt
Access to pond inlet/outlet monitoring point	Six monthly	Lawn mowing, repair the walking access if required.
Sedimentation header ponds (pond 1, 2)	Annually, or When the silt volume is more than 20% of the total pond capacity	Desilting
Surface water drainage	Six monthly or Post storm	Repair/cleaning as required
Offsite channel pond	When the silt volume is more than 20% of the total pond capacity.	Desilting

Redvale Landfill Management Plan

Maintenance Items	Maintenance Frequency	Action required
Road wash water holding pond (near main gate)	When the silt volume is more than 20% of the total pond capacity.	Desilting
Wheel wash pond-1 (to be decommissioned)	Quarterly or When the silt volume is more than 20% of the total pond capacity	Desilting
Wheel wash pond-2 Noting that this will wheel wash will be removed as part of the proposed landfill expansion.	Six monthly When the silt volume is more than 20% of the total pond capacity	Desilting
Sediment retention Pond 1, 2, 3, 4 & 6	Annually (April-May) Post storm	Desilting (if needed) grass harvesting, clearing of any blockages in perforated PVC pipe etc.
Stormwater catchpits along the access road	Weekly	Cleaning
Oil and grit interceptors (1, 2, 3 & 4) near the access bridge	Weekly	Cleaning/emptying
Oil and grit interceptors	Fortnightly	Cleaning/emptying
T bars from interceptors (1, 2, 3 & 4)	Weekly	Cleaning and removal of soil accumulated surrounding the T bar.
Landfill	When cracks are seen on the landfill cover or leachate breakout occurred.	Sealing of the cracks seen in the landfill cover to avoid stormwater ingress leading to leachate buildup and leachate breakout and prevent landfill gas escaping.
Earth bunds / earth lined channels	Pre-storm Post storm	Repair for any damage
Flumes: Culverts, flume drains, lined channels and downspouts	Pre-storm Post storm	Repair for any damage
Rip rap	Post storm	Repair for any damage Improve the structure if found ineffective.
Unstable ground	If any sign of cracks/slide or instability is noticed	Repair/rehabilitate
Cattle Stop	When the silt volume is more than 20% of the total capacity	Desilting

3.4.4.4 De-commissioning

The decommissioning of the erosion and sediment control measures in specified earthworks areas will require AC approval.

Redvale Landfill Management Plan

Each of the main sediment retention ponds is designed as a "permanent" structure, with a design life of 50+ years. However, in the long term when the landfill is fully rehabilitated and sediment levels in the runoff reduce, the ponds will be de-commissioned and the runoff from the site will be allowed to return to a more natural regime. This de-commissioning procedure will need to be determined at some future time and will depend on a number of factors such as the desirability of retaining the ponds as wetland areas.

3.4.4.5 Reporting and record keeping

Event	Location	Remarks
Inspection prior to or following a storm event (within 24 hrs of storm)	Record in company file	
Regular inspections	Record in company file	
Maintenance	Record in company file	
All Inspections and maintenance record	To AC if requested.	

3.4.5 Contingency

3.4.5.1 Consent requirements

[Condition XX]

3.4.5.2 General

The erosion and sediment control measures are a form of contingency provision for storm water issues.

The regime of setting Trigger Levels and responding to any exceedance will be followed like that for other sections of this LMP especially the section on surface water.

3.4.5.3 Response limits (Trigger Levels)

Trigger levels

Response limits (or trigger levels) are values for the monitoring parameters which, if exceeded, require a course of action to be taken. Upon completion of a monitoring event, the results will be checked against the pre-specified response limits. If no response limit is exceeded, the monitoring event will be routinely reported in due course. If any response limit is exceeded, action will be taken immediately as described in this contingency plan. The limits are set at two levels:

Trigger Level 1 (Lower response limit)

Exceedance of TL1 warns of potential adverse effects, warns of potential future non-compliance with the resource consent conditions, requires investigation and reporting, and might require remedial action.

Trigger Level 2 (Upper response limit)

Exceedance of TL2 will be regarded as evidence that significant environmental harm and breaches of consent conditions either have occurred, are currently occurring, or are about to occur. The upper limit will be set either at the limit specified in the resource consent if there is one, or at a limit which if exceeded indicates non-compliance, or at a limit which would require specialist advice to be called upon on average once every 3 years. It usually requires urgent mitigative actions, immediate notification of authorities, prompt investigations and prompt remedies.

Extreme exceedance of TL2 might require reference to the emergency action plan.

The response limits for erosion and sediment control are tabulated below.

Monitoring parameter/event	TL1	TL2
Turbidity in discharge from Pond 1, 2, 3 and 4 by automatic meter	60 NTU	200 NTU
Suspended sediment in stormwater: Percent of samples >50 g/m ³ in the last 12 months	4%	95%
Inspection of erosion controls	Damaged or ineffective	Leading to excessive

Redvale Landfill Management Plan

Monitoring parameter/event	TL1	TL2
		sediment generation.
Silt level in pond	20% full	50% full

3.4.5.4 Response action guidelines

Guidelines for action in the event of a response limit exceedance or event requiring system adjustment are tabulated below.

Event	Response guideline
General TL1 exceedance	Re-measure to verify; check calibrations. Evaluate reason for exceedance. Act to reduce level to below TL1. Investigate installing further sediment control structures where appropriate.
General TL2 exceedance	Re-measure to verify; check calibrations. Notify site management. Notify AC. Evaluate reason for exceedance Act immediately to reduce level to below TL2 by using available contingency measures. Investigate installing further sediment control structures where appropriate.
Storm is forecast	If significant rainfall is forecast, ponds can be emptied if the pond water quality meets the discharge criteria. Pond 1 can be drawn down quickly using the fast valve thereby increasing the storage capacity of the pond.
Intense storm in progress	If the landfills pond system is full and suspended sediment levels exceed response limits, downstream environmental effects may be mitigated by allowing the flow to continue for a few hours after the level at Ponds (the last point of control) has dropped a nominal small distance below service spillway control level. At this point, the flow can be shut off completely for a time while headspace remains, to provide earlier relief for downstream biota.

3.4.5.5 Reporting

Potential contamination event	Reporting
No TL exceeded.	Routine quarterly report to AC.
TL1 exceeded.	Routine quarterly report to AC.
TL2 exceeded.	Notify AC immediately. Liaison regarding corrective actions.

Appendix A Erosion and sediment control inspection report

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REDVALE LANDFILL MANAGEMENT PLAN
Erosion and sediment control



EROSION AND SEDIMENT CONTROL INSPECTION REPORT

Redvale Landfill
 Landfill Access Road
 Dairy Flat
 Auckland
 New Zealand
 P O Box 228
 Silverdale 0944
 Telephone 64 9 427 0600

Inspection by:		Date of this inspection:	
Item	Location	Action required	Action completed (/ /)
	<i>Pond</i>		
	<i>-inlet, banks</i>		
	<i>-wetland, sediment level</i>		
	<i>-decant, spillways, outlet</i>		
	<i>Channel</i>		
	<i>-grass, linings</i>		
	<i>-scour</i>		
	<i>Stockpile</i>		
	<i>-cut-off drains, chutes</i>		
	<i>-vegetation</i>		
	<i>Liner construction zone</i>		
	<i>-run-on diversion, refuse separation</i>		
	<i>-primary silt pond</i>		
	<i>Borrow area</i>		
	<i>-stripping, cut-off drains</i>		
	<i>-bench drains, berms</i>		
	<i>-primary silt pond</i>		
	<i>Landfill - tip face</i>		
	<i>-berms, falls</i>		
	<i>-sediment traps</i>		
	<i>Landfill - intermediate cover slope</i>		
	<i>-cut-offs, chutes</i>		
	<i>-soil type, rills, grass, rough.smooth</i>		
	<i>Landfill - final cover slope</i>		
	<i>-grass</i>		
	<i>-swales, flumes</i>		
	<i>-flumes</i>		
	<i>Quarry</i>		
	<i>-cut-offs, chutes</i>		
	<i>-pump, sediment levels, outlet</i>		

Figure: 3.4.7.2

Appendix B Work Instruction for Flocculant dosing system

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WORK INSTRUCTION FORM

SEDIMENTATION POND 4D)

REFILLING FLOCCULANT (PDADMAC SOLUTION) IN FLOC BOX AT

Figure: 3.4.7.4

HSEQ Management System

Date:	13/01/2021			Risk Assessment No:	WM UNI RED RA 021	
Division:	WM UNI		Branch/Site:	Redvale Landfill		
Task Location:	Redvale Landfill		Work Activity:	Refilling flocculant (PDADMAC solution) in floc box at Sedimentation pond 4D		
Permits / Authorisations required:	WORK PERMIT ☐ BREAKTHROUGH ☐ CONFINED SPACE ☐ HOT WORK ☐ FALL PREVENTION ☐					
Permits / Authorisations approved and reviewed by:						Date:
Work Instruction prepared in consultation with:	Hemanta Yadav					Date: 13/01/2021
List all persons involved						
Comments	Note: The use of flocculant on the pond system will only be undertaken during the rainy season and if the daily monitoring of stormwater test results, current water levels in the ponds and weather forecast show the likelihood of exceedance of the stormwater discharge limits for suspended solids from Redvale pond. The Environmental Monitoring Technician, who has knowledge of the pond water treatment capacity and is aware of the potential risks will be allowed to operate the floc system.					
Process:	Name:	Position Title:	Signature:	Date:		
HSE Approval:	Chris Robertson	HSE Advisor				
Final Approval:	Blair Macfarlane	Regional Manager				

WORK INSTRUCTION FORM

SEDIMENTATION POND 4D)

REFILLING FLOCCULANT (PDADMAC SOLUTION) IN FLOC BOX AT

Figure: 3.4.7.4

HSEQ Management System

REQUIRED EQUIPMENT	
PPE Required: Gum Boots, Gloves, Long Sleeve Shirt, Safety Vest, Hard Hat	Additional equipment/Tools: Floc box, Crystal Floc Container supplied by Erosion Control, Flocculant solution (Polydamac) which is diluted to the required concentration by the supplier.
REQUIRED LICENCES & COMPETENCIES	
Licences: None.	Competencies:
LEGISLATIVE REFERENCES (Optional)	

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Introduction	- A rainfall activated floc box supplied by Erosion Control Co. Ltd. (ECCL) has been installed near sedimentation pond 4D to chemically dose sediment retention in pond 4 system. Pond 4 receives storm water from north east catchment of landfill. - For continuous dosing during the rainfall, the flocculant level in the floc box need to be routinely checked and replenished with 10% Poly Diallyl Dimethyl Ammonium Chloride (PDADMAC) solution. Ensure that enough PDADMAC solution is present at the site for uninterrupted operation of floc unit. The solution can be procured from the ECCL (supplier number 58893, phone no: 08007872966) supplied in the 200L and 20L drum. 200 litres drum		Environmental Monitoring Technician

WORK INSTRUCTION FORM

SEDIMENTATION POND 4D)

REFILLING FLOCCULANT (PDADMAC SOLUTION) IN FLOC BOX AT

HSEQ Management System

Figure: 3.4.7.4

Safety Precautions	Ensure that the correct PPE is worn for the task. Follow all traffic management when driving to the site, park in a safe area, and as close as possible to the floc box to minimise the carrying distances of the flocculant containers. As far as possible the flocculant drum should be kept near the floc box and filling is done with the help of a 18mm hose fitting supplied by the supplier. 		Environmental Monitoring Technician
Refilling of flocculant in the floc box	- The floc box contains two tanks: header tanks at the top and floc tank at the bottom. The header tank opens into the floc tank through a removable bung (located the bottom of header tank) and small holes (located on the side walls of header tank). - The removable bung is used for the removal of rain water from the floc tank and refilling of flocculant with the help of a hose fitting. - The header tank receives the rain water through the catchment tray which enters into the floc tank through side holes. The rain water in the floc tank displaces the floc and is released through dosing pipe into the water channel for sediment retention. - Once the floc tank is filled with the rain water, it is emptied and refilled with floc with the help of hose.		Environmental Monitoring Technician

HSEQ Management System

Figure: 3.4.7.4

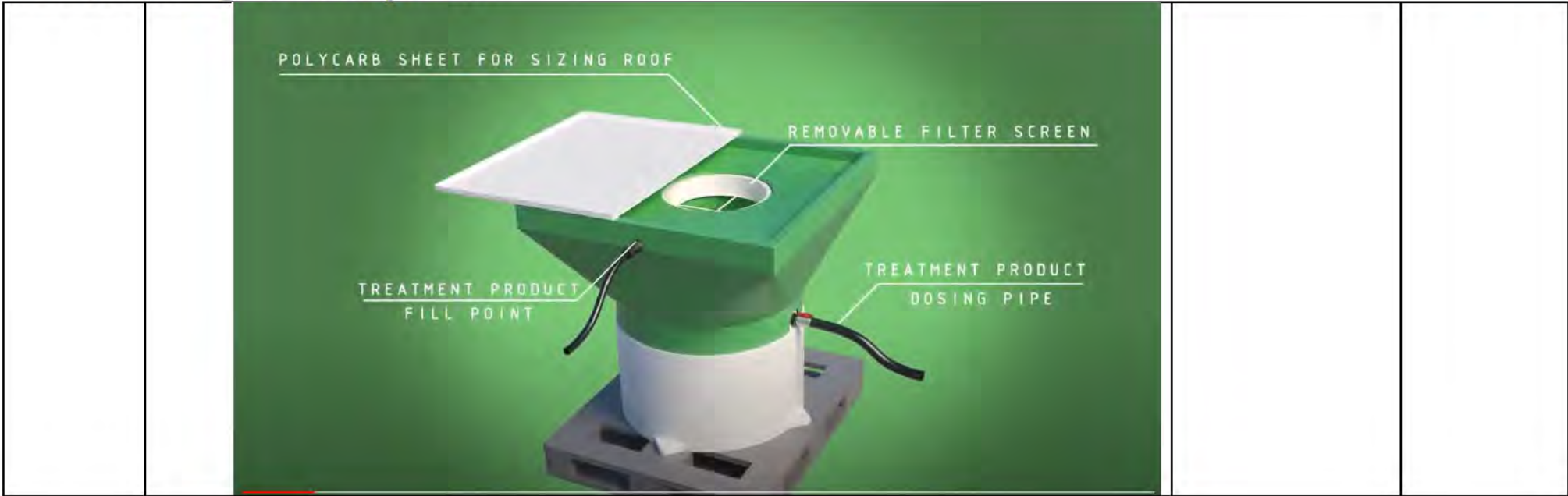


Figure: 3.4.7.4

HSEQ Management System



WORK INSTRUCTION FORM
SEDIMENTATION POND 4D)

REFILLING FLOCCULANT (PDADMAC SOLUTION) IN FLOC BOX AT

Figure: 3.4.7.4

HSEQ Management System

I have read and understood the attached Work Instruction <i>(Enter name and sign)</i>				
Operators Name:	Signature:	Company:	Date:	Inducted By:

Appendix C Temporary ESCP

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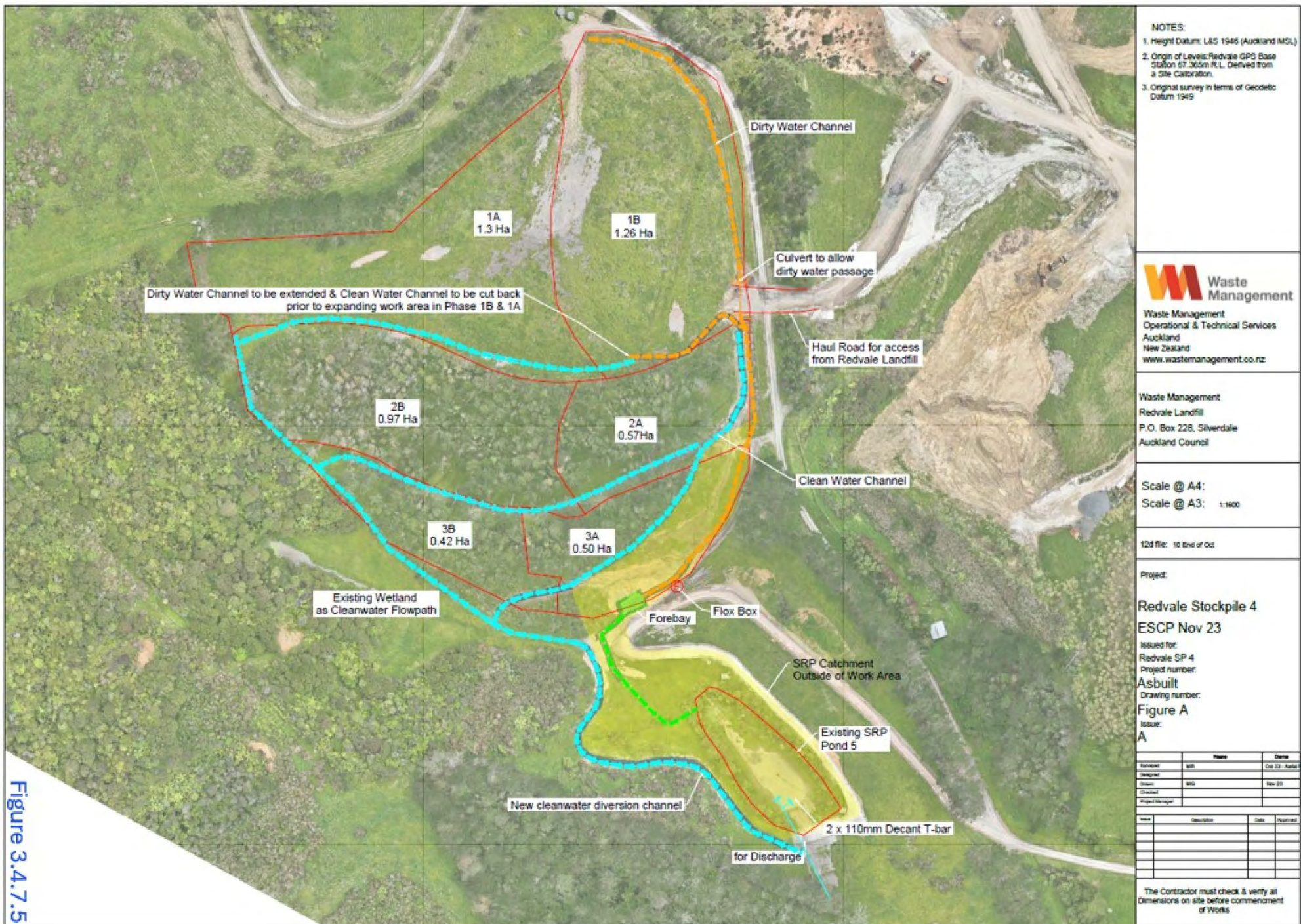


Figure 3.4.7.5

Figure: 3.4.7.5

3.5 Design, operation and maintenance of stormwater devices

3.5.1 Design and operation of stormwater devices

3.5.1.1 Consent requirements

[Condition XX]

3.5.1.2 Design Philosophy

The site stormwater system is designed to achieve four principal objectives:

- a) Stormwater run-off which has contacted refuse will be kept separate from stormwater from all other places and will be treated as leachate.
- b) Stormwater run-off from development areas will be controlled to avoid erosion and will be passed through sedimentation ponds to reduce sediment in the discharges.
- c) Stormwater run-off from neighbours' land and land within the site which is outside the development areas will be diverted in separate drainage systems directly to the off-site receiving waters.
- d) Stormwater from completed areas will be controlled by permanent drainage systems and by practices such as grassing to minimise erosion.

3.5.1.3 Life of Ponds

The ponds will be required for stormwater sediment control until all landfilling and rehabilitation within their catchments are completed. They may be required for flow control indefinitely to ensure pre-development outflows are not exceeded. None of the ponds will have its catchment fully completed until near the end of the life of the landfill.

In the long term, the ponds will be de-commissioned and the run-off from the site will be allowed to return to a more natural regime. This de-commissioning procedure will need to be determined at some future time and will depend on a number of factors such as the need for ongoing outlet flow control and the desirability of retaining the ponds as wetland areas.

Notwithstanding the hydrological requirements, each pond has been designed as a "permanent" structure, with a design life of at least 50 years.

3.5.1.4 Off-site Water Channel

The off-site water channel across the south side of the landfill site intercepts water running onto the landfill site from the south and diverts it direct to a Rangitopuni Stream tributary beside the Trotting Club. The channel also collects water from a catchment to the south-east of the site which originally flowed through a valley in the centre of the Trotting Track, until the valley was filled in 1993.

Within the south-eastern corner of the landfill site, a flow balancing pond is incorporated in the off-site water channel. The purpose of this pond is to provide a transition from a grassed channel to a lined channel and to attenuate the flow.

The design standards for the southern off-site water channel will be:

- return period for channel capacity = 50 years
- catchment area = 22 hectares
- design discharge = 2,400 l/s
- minimum freeboard at design discharge = 500 mm
- maximum flow velocity in grassed channel = 1.5 m/s

- grassed channel side slope = 1:2.5.

3.5.1.5 On-site Water Channel

The purpose of the on-site surface water drainage channels is to direct on-site stormwater from the development areas to the sedimentation ponds. The channels will be sized to cater for the ultimate flows, which increase lower down the drainage catchment. The channels will be designed such that water velocities are kept sufficiently low so as to minimise erosion of the inverts. In areas where velocities would be too high for conventional channels, the design will incorporate culverts and downspouts with riprap protected outlets. All surface drainage channels will be designed as permanent structures.

The design standards for on-site water channels to the main sedimentation ponds will be:

- compliance with consent [*Condition XX*] (return period and freeboard)
- return period for channel capacity = 50 years
- catchment areas consistent with pond designs (as detailed below)
- minimum freeboard at design flow rate = 300 mm (no suitable alternative overland flow paths will generally be available).
- maximum flow velocity in grassed channels = 1.5 m/s
- steepest grassed channel side slope = 1:2.5.

3.5.1.6 Working/tipping area

To divert surface run-off away from an active tipping area, temporary ditches and berms will be constructed. Water which has come into contact with waste will be considered contaminated and will be treated or disposed separately as leachate, for example by soakaways in the waste. Water which has only contacted soil materials will be considered uncontaminated and will be diverted or pumped into the on-site surface drainage system, and thence to the sedimentation ponds.

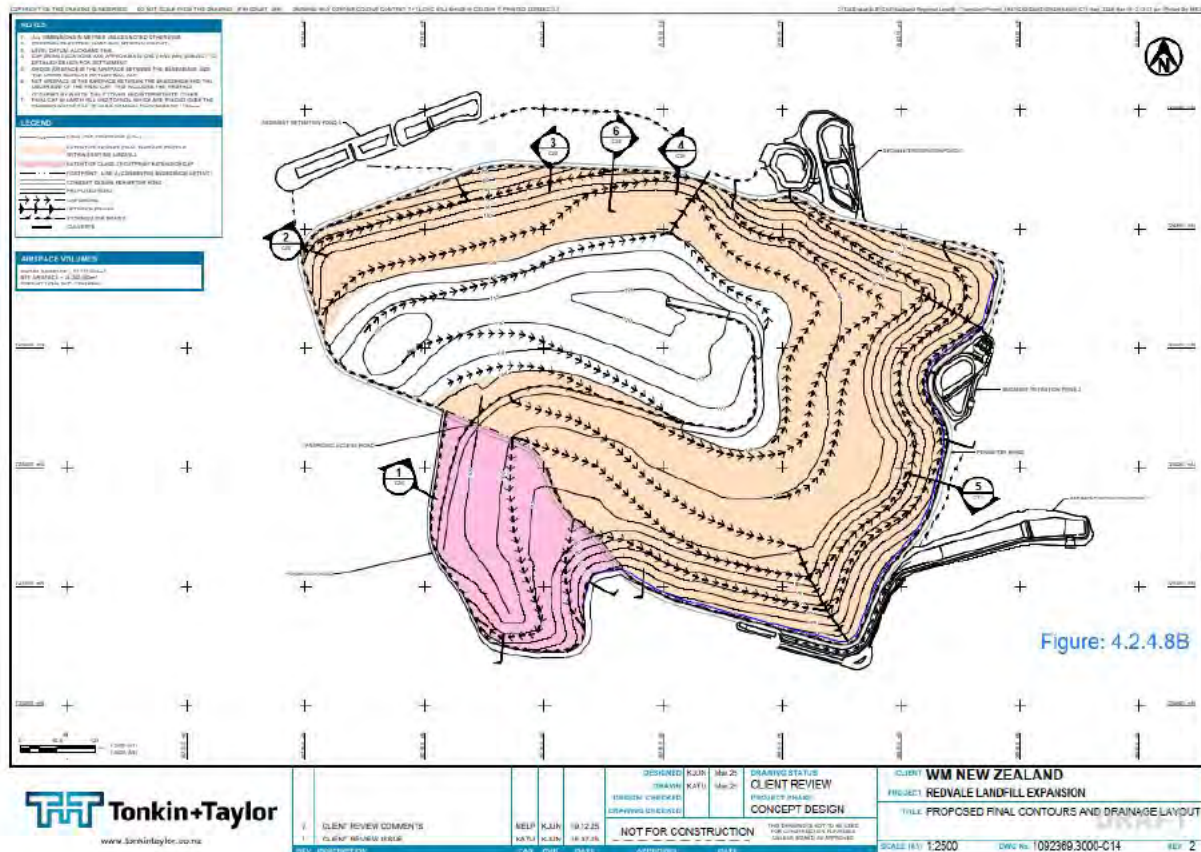
3.5.1.7 Stormwater Sump

Until completion of the landfill, stormwater will flow to the lowest point within the void excavated for the landfill. Temporary pumping systems will be maintained to evacuate stormwater from the sumps to the on-site channels and ponds, and to avoid flooding in the sumps which could otherwise enter the waste pile and become contaminated. The main sump pumping system will comprise a primary barge-mounted pump, automatic float switching, delivery line to the on-site water channel, equivalent ready-to-switch-on back-up pump, mains power supply, and the site's own back-up power supply.

3.5.1.8 Stormwater from workshop area and energy compound

The stormwater from the built up area; roof and paved areas within the energy compounds and central fuel areas, will be controlled and discharged into the existing stormwater detention ponds. The stormwater at fuel bay and workshop area will be collected in oil interceptors and these will be cleaned regularly. For example, workshop contains, 2 (no.) triple chambered oil and grit interceptors, vehicle wash bay and a number of manholes and catchpits. Similarly, an oil and grit interceptor is present at the south-eastern site office. The overflow water from the oil interceptor will into the pond 1 system. The details of stormwater flow from these areas are shown below.

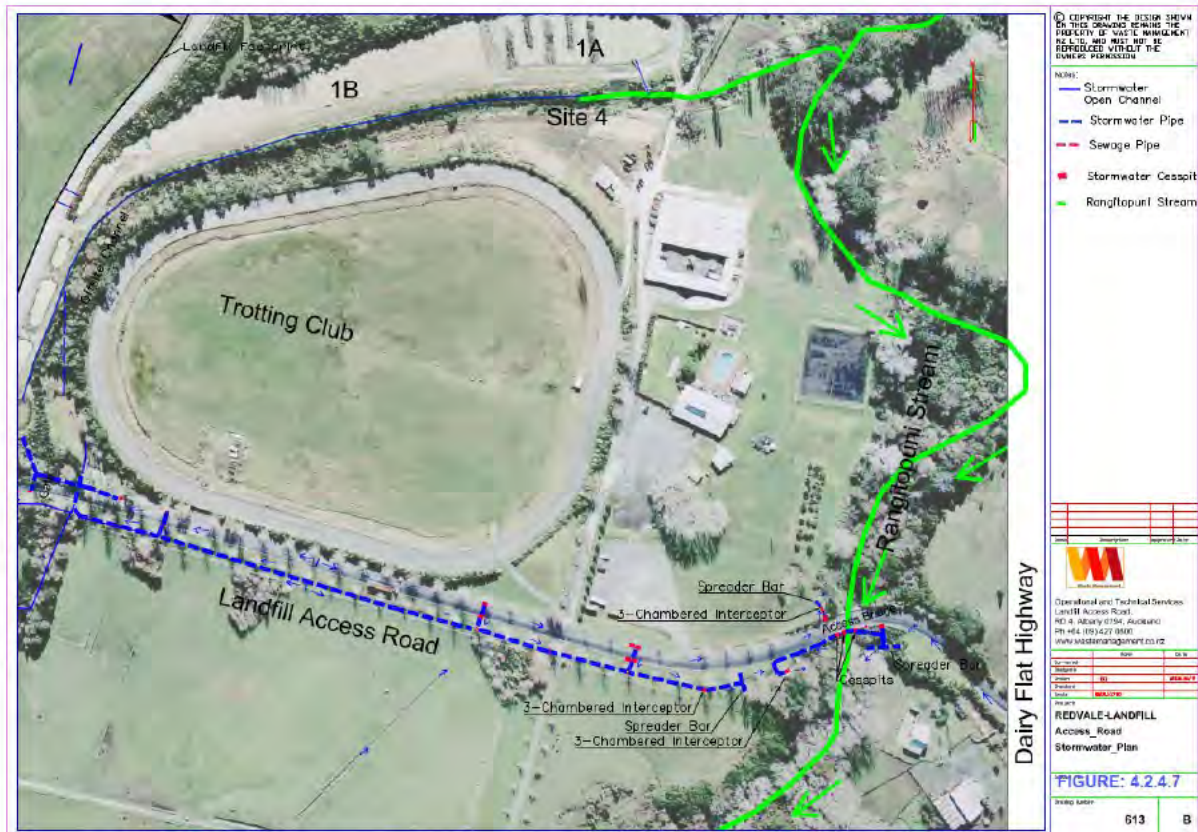
Redvale Landfill Management Plan



3.5.1.9 Stormwater from the Landfill access road

The stormwater and roadwash water from the Landfill Access Road will go through the existing catchpits and then to grit interceptors before discharging to Rangitopuni Stream. The design standard of the interceptors will be as per the GD05 guidelines. The access road near the bridge contains two (2m³ each), triple chambered oil and grit interceptors; one at the southern and other at the north eastern side of the bridge. The stormwater flow from the Landfill Access Road is shown below.

Redvale Landfill Management Plan



Vehicles leaving the sites are required to go through rumble strips to facilitate dropping the mud/dirt sticking to the wheels, wheel arches, mud flaps and chassis of the vehicles. The rumble strips are incorporated within both wheel washes (#1 new and #2 old), and a cattle grid is installed immediately west of the access gate when exiting the site onto Landfill Access Road.

3.5.1.10 Sedimentation Ponds

The design standards for the main sedimentation ponds will be:

- compliance with consents [Condition XX]
- maximum discharge flow rate as per table below
- storm duration for maximum flow rate = 24 hours
- outfalls to minimise erosion
- stable side slopes
- emergency spillway event = 1% AEP
- minimum freeboard at 1% AEP flow rate = 300 mm
- wetland
- minimum pond volume = 200 m³ per hectare of catchment
- pond volume sufficient to attenuate peak outflows to below pre-development levels
- minimum structural design life = 50 years

In order to provide for access and de-silting, the dam or bund crest widths will be 3 m.

Each pond has a purpose designed outlet structure, with five principal components:

- a floating decant outlet to provide slow discharge from the upper settled zone of the pond water under most conditions
- an overflow (service) spillway designed to handle the maximum discharge flow rate

Redvale Landfill Management Plan

- a shut-off slide gate valve in the service spillway to isolate the pond in most conditions if evidence of contamination occurs
- an emergency spillway 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

The pond batters will be vegetated. This, together with planting in the buffer zone surrounding the ponds will ensure that they blend with the landscape.

Modification to the existing pond catchments will be required as a result of the proposed landfill expansion. The proposed changes include:

- Diversion of the Pond 6 catchment to Pond 1 to allow for the expansion of the landfill footprint over existing Pond 6. All ancillary areas diverted to Pond 1.
- Filling in of the pond adjacent to the main office and diversion of the catchment to Pond 1.
- Diversion of the existing Pond 1 catchment to Pond 2.
- Expansion of Pond 1 to approximately 13,500 m³ from the existing 9,920 m³ due to existing flows to the off-site channel and balance pond being diverted to Pond 1, the area comprising the existing channel and balance pond will be used to expand Pond 1.
- In addition, the contributing catchments for Ponds 2, 3 and 4 will be managed to ensure that they meet a minimum of 200 m² pond volume per hectare.

Key pond design values as per GD05 are summarised below.

Pond	Catchment Area	Pond Size	Required WQV	Required GD05 size (2%)	Required GD05 size (3%)	Are the ponds adequately sized
1	34 hectares	13,500 m ³	2731 m ³	6800 m ³	10,200 m ³	Yes
2	11.5 hectares	9100 m ³	930 m ³	2300 m ³	3450 m ³	Yes
3	23.4 hectares	17,740 m ³	1920 m ³	4680 m ³	7020 m ³	Yes
4	17.9 hectares	9760 m ³	1260 m ³	3580 m ³	5370 m ³	Yes
Total	86.8 hectares	50,100 m ³	6841 m ³	17,360 m ³	26,040 m ³	-

Sediment control

An important requirement of the consent conditions relates to suspended sediment levels in the discharge flow from the ponds. Testing during the design phase indicated that stormwater is likely to remain turbid and high in suspended solids for an extended period of time, due to the nature of the clay minerals present in the mudstone and limestone at the site.

Following attempts are made to optimise sediment removal:

- Maximising (as far as practicable) pond size and volume
- Maximising detention time by utilising a small decant outlet

- Constructing the ponds to full size well in advance of attracting full design catchments and flows

Site adopts a pond operating procedure for the ponds as outlined in Section 3.5 Appendix A (Sedimentation Ponds Decisions Table). The procedure guides the use of flow controlling valves; sluice gate valve and decant valve on the basis of rain forecast, pond water quality and pond water level. Use of this procedure has found to improve the sedimentation removal efficiency of the ponds while maintaining the uniform flow rate at the outlets.

3.5.1.11 Drainage Terraces

Permanent surface water channels (variously called drainage terraces, berm drains, contour drains) will be formed on the final cap of the landfill.

The design standards for drainage terraces will be:

- compliance with consent conditions
- return period for channel capacity design = 50 years, critical duration, [Condition XX]
- catchment areas unique to each drain as per Site Development Plan
- minimum freeboard at design flow rate = 300 mm, [Condition XX]
- design and construction to minimise erosion

Drainage terraces on the final landfill surface will be subject to the effects of settlement, depending on the thickness of the underlying refuse and the timing of drain construction relative to refuse placements. To allow for on-going differential settlement, the drains will be designed with a 2% minimum slope (earth drain slopes are typically 0.5% - 1.0%), and freeboard of 300 mm. These features should be sufficient to cope with settlement-induced drainage difficulties, while at the same time avoiding excessive erosion which can occur in steeper earth-lined drains.

Where localised differential settlement results in low points in the cover drains, repairs and maintenance will be performed to restore fall to drain inverts. Any such areas will be noted by exception reporting and corrective task allocation during weekly walkover inspections of the landfill surface.

Overfilling

Drainage terrace slopes are central to the issue of over-filling the landfill. The landfill will be filled higher than the levels defined in the Site Development Plans by 5% of the refuse thickness, to allow settlement to take the levels back down to design final cap levels (within a target time of 5 years after final capping at each location). The overfill levels will be calculated firstly for all locations on terrace drains, and then the batter slopes between terrace drains will be interpolated appropriately.

The existing and proposed drainage terraces are indicated in Site Development Plans in Section 1.6.

3.5.1.12 Culverts and Downspouts

Downspouts, consisting of corrugated galvanised steel pipe or equivalent durable construction, will be provided to convey run-off from high level drainage terraces to the sedimentation ponds without causing erosion. Proper installation of these structures will ensure stability of the final cover and avoidance of erosion in adjacent channels.

3.5.2 Inspection and maintenance

3.5.2.1 Consent requirements

Condition 96 requires details of all inspections and maintenance of the stormwater system to be retained for the preceding three years. Condition 121 sets out the required contents of the Operation and Maintenance Plan, including the regular maintenance and inspection programme, debris and sediment collection and disposal, post-storm maintenance and inspection checklists.

3.5.2.2 Regular Inspection and Maintenance

All the structures including the earth fill dams, stormwater detention ponds, spillways, pipes and permanent erosion protection will be a subject of regular inspection and maintenance to ensure they are working as per the requirements. Section 3.5 Appendix B provides a checklist of inspection and maintenance items as a guide. The record of maintenance work carried out on site will be kept in a maintenance register Section 3.5 Appendix C. The record will contain at least the preceding 3 years maintenance history.

3.5.2.3 Drainages, Culverts, Downspouts, Channels

Inspections of the surface water drainage system will be performed periodically (at least six-monthly) and after heavy storm events (more than 50 mm in 6 hours, or more than 80 mm in 24 hours). Any repair work required will be identified on an exception basis and entered into a written work programme. The order of priority for items to be inspected will be bare earth areas and drains (daily cover, earthworks excavations), grassed areas and drains (intermediate and final cover, buffer zones, Phase 10 bund), rubble areas and roads, then permanently surfaced flow paths and roads (Ponds 1 to 6, on-site access routes). The inspection and maintenance checklist will be taken as a guideline; Section 3.5 Appendix B.

3.5.2.4 Sedimentation Ponds

De-silting of the ponds will be undertaken whenever the volume occupied by sediment reaches 20% of the effective storage volume required by the consents (the consents require 200 m³ per hectare of catchment). The status in this regard will be determined by measuring the clear depth from the service spillway level down to the sediment level. The necessary clear depth varies slightly from pond to pond, but as a guide (based on the smallest pond), maintaining a clear depth of 1.0 m in all ponds will ensure that the criteria will be met. Assessment will be made by visual inspection at the beginning of each summer and again towards the end of each summer. De-silting will generally be achieved during the summer period by emptying the ponds completely and mucking out the settling areas by digger or dragline, either from the pond edge or from a temporary ramp into the pond itself.

3.5.2.5 Wetlands

Wetlands in the sedimentation ponds will be subject to annual inspection and maintenance as required. An inspection checklist is provided as Section 3.5 Appendix B for guidance.

3.5.2.6 Cesspits, Catchpits and Downspouts

There are a number of cesspits and interceptors present on site. These silt trap devices will be cleaned regularly as mentioned in maintenance checklist Section 3.5 Appendix A.

3.5.2.7 Disposal of debris

The recovered silt from the stormwater devices will be either incorporated in the landfill or mixed with other materials as a moisture conditioning agent to make a composite soil suitable for earth fills

3.5.2.8 Modification

The modification of stormwater devices may be done if the existing system is not performing efficiently or the modification does not reduce the performance of the stormwater management system. A detailed plan and drawings will be prepared for the modification sought and submitted to AC for approval prior to its modification.

Any modification to the operation and maintenance procedure will also require the AC approval.

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Appendix A Sedimentation Ponds Decisions Table

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Redvale Landfill

Sedimentation Ponds Flow Settings Decision Table

S.S. = Service Spillway E.S. = Emergency Spillway A = Approval Required

Conductivity or Turbidity	>TL2 (Cond >150 / Turb >200)									
	higher		ES		300mm below ES		SS		300mm below SS	
WL to	higher		ES		300mm below ES		SS		300mm below SS	
WL from	ES		300mm below ES		SS		300mm below SS		500 mm below SS	
Forecast	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain
Decant Valve	C	C	C	C	C	C	C	C	C	C
Sluice Valve	O	O	O	C	C	C	C	C	C	C
Weir pump	-	-	-	In	In	In	In	-	In	-
Fast Valve	C	C	C	C	C	C	C	C	C	C

Conductivity or Turbidity	TL1½ – TL2 (Cond 110 - 150 / Turb 120 - 200)									
	higher		ES		300mm below ES		SS		300mm below SS	
WL to	higher		ES		300mm below ES		SS		300mm below SS	
WL from	ES		300mm below ES		SS		300mm below SS		500 mm below SS	
Forecast	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain
Decant Valve	C	C	C	C	C	C	C	C	C	C
Sluice Valve	O	O	O	C	O	C	C	C	C	C
Weir pump	-	-	-	In	-	In	In	-	In	-
Fast Valve	A	C	A	C	A	C	C	C	C	C

Conductivity or Turbidity	TL1 – TL1½ (Cond 75 - 110 / Turb 60 - 120)									
	higher		ES		300mm below ES		SS		300mm below SS	
WL to	higher		ES		300mm below ES		SS		300mm below SS	
WL from	ES		300mm below ES		SS		300mm below SS		500 mm below SS	
Forecast	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain
Decant Valve	O	O*	O	O*	O	O*	O	C	C	C
Sluice Valve	O	O	O	O	O	O	O	C	C	C
Weir pump	-	-	-	-	-	-	-	-	In	-
Fast Valve	A	C	A	C	A	C	A	C	A	C

Conductivity or Turbidity	<TL1 (Cond <75 / Turb <60)									
	higher		ES		300mm below ES		SS		300mm below SS	
WL to	higher		ES		300mm below ES		SS		300mm below SS	
WL from	ES		300mm below ES		SS		300mm below SS		500 mm below SS	
Forecast	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain	Rain	No Rain
Decant Valve	O	O*	O	O*	O	O*	O	O*	O	O*
Sluice Valve	O	O	O	O	O	O	O	O	O	O
Weir pump	-	-	-	-	-	-	-	-	-	-
Fast Valve	A	A	A	A	A	A	A	C	A	C

* Note- In case of pond 1, to address the high water demand for second wheelwash, decant valve to be kept closed if there is no rain forecast.

FIGURE: 4.2.4.1

Appendix B Maintenance Checklist

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Redvale Landfill
Stormwater Devices Inspection/Maintenance-Checklist

Maintenance Items	Maintenance Frequency	Action required	Date last done
Stormwater Management			
Sedimentation ponds (1, 2, 3, 4, 6 and Phase 16 pond)	- Annually, or, - When the silt volume is more than 20% of the total pond capacity.	Desilting	
Floating decant	Monthly	Removal of dirt	
Access to pond inlet/outlet monitoring point	Six monthly	Cut bushes present, repair the steps if required.	
Sedimentation header ponds (pond 1, 2, 4, 6)	- Annually, or - When the silt volume is more than 20% of the total pond capacity	Desilting	
Surface water drainage	- Six monthly or - Post storm	Repair/cleaning as required	
Offsite channel pond	- Annually, or - When the silt volume is more than 20% of the total pond capacity.	Desilting	
Road wash water holding pond (near main gate)	- Annually, or - When the silt volume is more than 20% of the total pond capacity.	Desilting	
Wheel wash pond-1	- Annually or - When the silt volume is more than 20% of the total pond capacity	Desilting	
Wheel wash pond-2	- Annually or - When the silt volume is more than 20% of the total pond capacity	Desilting	
Drainage below the Managed Fill	- Monthly or - Post storm	Repair the channel, Concrete line the channel	
Wetlands Pond 1, 2, 3, 4 & 6	- Annually (April-May) - Post storm	Desilting (if needed) grass harvesting, clearing of any blockages in perforated PVC pipe etc.	
Stormwater catchpits along the access road	Weekly	Cleaning	
Oil and grit interceptors (1, 2, 3 & 4) near the access bridge	Weekly	Cleaning/emptying	
Oil and grit interceptors	Fortnightly	Cleaning/emptying	
T bars from interceptors (1, 2, 3 & 4)	Weekly	Cleaning and removal of soil accumulated surrounding the T bar.	
Landfill	When cracks are	Sealing of the cracks seen in	

	seen on the landfill cover leachate breakout occurred.	the landfill cover to avoid stormwater ingress leading to leachate buildup and leachate breakout and prevent landfill gas escaping.	
Potable Water Supply System			
Water holding tanks	• Every 2 years	Cleaning	
Pumphouse	• Monthly	Housekeeping; wash floor, check lids/pumps	
Pond 5	• Annually	Cleaning vegetation around the service spillway, floating decant and pump supply pipe etc.	
Landscape Planting			
Richard Road- Screen planting	• Six monthly (Nov/April)	Removal of dead trees/parts and Weed spray as needed.	
Managed Fill-Pond 6 area	• Six monthly (Nov/April)	As above	
Managed Fill- Upper section	• Six monthly (Nov/April)	As above	
Southern Highwall- Visual Bund	• Six monthly (Nov/April)	As above	
Southern highwall- Gorse clearing	• Annually (Nov)	Clearing/weed spray.	
Clearing of unwanted vegetation around all the ponds	• Six monthly (Nov/April)	Removal of dead trees/parts and Weed spray as needed.	
Other areas surrounding the landfill	• Six monthly (Nov/April)	As above	
Riparian planting along the northern earth fill (Stockpile 6)	• Six monthly (Nov/April)	As above	
Perimeter fencing	• Six monthly	Fixing of damaged part of the fence, removal of hanging vegetation etc.	
Bare earth area	• As needed.	Mulching/grass seeding if intended to remain unworked for 6 months or more, or after the site receives the final cover.	
Other items			
Pest management	• Gulls, cats, etc.		
Litter	• Daily/Weekly- As required.	Cleaning	
Dirt on the highway	• As required	Cleaning	
Gas wells	• When knocked over.		
Settlement monitoring markers	• Six monthly	reinstating	

FIGURE: 4.2.4.2

**Waste
Management**

Figure: 4.2.4.3 Maintenance Register

REDVALE LANDFILL MANAGEMENT PLAN

Surface water

WETLAND ANNUAL INSPECTION CHECKLIST

Item	Action	Done ? Comments ?
Flow Spreader	Check that the spreader is level. Check for blockages. Remove weeds and grass.	
Outlets	Check outflow point from the wetland to ensure no blockages.	
Wetland Plants	Crop Raupo and dispose of the cuttings to landfill. Check there are adequate plants and replace any that are dead or damaged ideally in winter.	
Weeds	Spray and remove weeds.	
Siltation	De-silt the pond if required.	
Assessment	Assess wetland performance.	
Maintenance summary	Summarise maintenance inspections and any work done.	
Annual report	Prepare an annual report for site operations management. Include if available: • Site diary • Filled-in inspection checklists • Internal audits and incident reports. • Assessment of performance. • Summary of maintenance.	
Record-keeping	Hard copies filed on site. Electronic (pdf) copies filed on site. Action items entered into the site's tracking system.	

FIGURE: 4.2.4.4

Appendix C Maintenance Register

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Figure: 4.2.4.3 Maintenance Register

3.6 Odour Management Plan

3.6.1 Purpose

This odour management is a comprehensive document within the overall LMP, designed as per requirement of the consent to identify, assess and control odour emissions from the landfill operation. The purpose of this management plan is to ensure that the generation and release of odorous substances are minimised, and any potential impacts on the surrounding environment and community are effectively managed. This plan serves as a proactive approach to address odour-related issues and maintain compliance with consent requirements.

3.6.2 Sources of odour

The sources of odours from the landfill can include but are not limited to:

- The decay of organic material (plant and animal)
- The decomposition of inorganic compounds
- Chemical reactions within the landfill
- Emanation (evaporation and sublimation) from some special wastes
- Landfill gas
- Leachate
- BeneVap

3.6.3 Consent requirements

[Condition XX]

3.6.4 Odour management

The main potential sources of odour at the Redvale Landfill are from the inbound waste itself, Benevap or LFG from buried waste which contains traces of odorous gases. These odours are offensive in character and in combination with other factors, could potentially cause adverse amenity effects for surrounding receivers. Potential odour may arise whenever waste is exposed to open air, presenting instances such as when daily, intermediate and final cover is removed, during the tipping of fresh waste, or when excavating into older waste for gas extraction.

3.6.4.1 Waste acceptance control and working face management

Waste acceptance control is detailed in Section 3.1. This includes the management of wastes for the purpose of odour control.

3.6.4.2 Working face management

In addition to minimising the size of the tipping face, odour neutralising sprayers are started before removing the cover to introduce neutraliser into the air before odour is released and odour suppressant is used on all areas where intermediate and daily cover is being removed and odour release potential is high.

3.6.4.3 Cover

Cover is managed in Section 3.3 of the LMP.

3.6.4.4 Landfill Gas

Landfill gas is naturally produced in landfills as organic waste materials decompose under anaerobic conditions. It comprises mostly Methane and Carbon Dioxide (both odourless), but it also contains trace gases which give it a characteristic odour e.g., Hydrogen Sulphide. WMNZ is responsible for implementation of an efficient and well-maintained gas collection system to capture landfill gases, especially methane. This is covered in LMP Section 3.7, Landfill Gas Management Plan.

3.6.4.5 BeneVap

Details of the operation and monitoring of the BeneVap is included in the BV300 Management Plan, Section 3.9 of the LMP.

3.6.5 Odour control systems

Opportunities to reduce the escape of odour can arise when landfill infrastructure and activities are found to need attention, for example:

- Fixing any leaking gas pipes and faulty pipe joints
- Stopping leaks from any leachate lines and faulty pipe joints
- Replacement and reinstatement wherever soil slumping and cracking of landfill cap or temporary cover has occurred allowing gas to escape
- Regularly reviewing operations and seeking opportunities for improvement in tip face management
- Regularly reviewing operations and seeking opportunities for improvement in for special waste disposal
- Improving management and operation of leachate and gas collection systems

3.6.5.1 Types of odorous waste

Putrescible waste

Putrescible waste (distinct from other types of odorous waste) is 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).

Excessively odorous waste

The waste loads are considered to be excessively odorous if the load:

- has potential to generate an odour complaint; or,
- has a history of odour complaints received from its neighbours; or,
- has an odour intensity 5 (very strong) or above in the opinion of odour monitoring technician, measured at the scale of 0-6 (0 being no odour detected and 6 being extremely strong odour) (refer to Section 3.6 Error! Reference source not found.).

The known potential excessively odorous loads that Redvale Landfill receives are:

- Grits - waste water treatment plant
- Screenings - waste water treatment plant
- Bio-solids
- Sludge - hydrocarbon/pond sediment/waste water treatment plant
- Soil-sewage

Special waste is disposed only via pre-approval. Any highly odorous waste is rejected before it is brought to the site. Any odorous waste entering site is assessed at the weighbridge where the

weighbridge operator informs the odour technician for potential odorous waste delivery. Odour assessment is carried out at the tip face before tipping.

The management of the disposal of putrescible wastes is included in Section 3.1.

3.6.5.2 Preparations and Burial of Excessively Odorous Waste

Immediately before tipping any known or potentially Excessively Odorous load, preparations will be made including a combination of the following items where applicable:

- to have enough persons, equipment and odour suppressant systems ready.
- to have suitable odour control systems started and operating for example portable T-bar sprayers and cannons.
- to set aside general waste for immediate mixing and burial.
- to set aside cover soil for immediate burial.
- to form a concave shape on part of the active working face in readiness to receive and quickly bury the notified waste.
- to dig a hole for burial.
- to avoid striking any previous special waste burials, gas wells and underground services.
- to hold each truck before tipping until the working face is ready.
- to hold back successive trucks carrying the same waste for the length of time required to achieve the most efficient burial and odour minimisation.

Burial of odorous waste will not be considered to have been completed until this waste has been covered by either:

- 300 mm thickness of general waste, or
- 300 mm thickness of daily cover soil, or
- effective sealing materials like foam,
- and there is no objectionable odour.

More details about waste disposal can be found in LMP Section 3.2, Disposal.

3.6.5.3 Odour Intensity and frequency

Odour intensity is assessed on a seven-point intensity scale from no odour (0) to extremely strong odour (6). While this is subjective (different people can perceive odour as different intensity), it still provides a useful quantitative tool for estimating odour intensity. Odour characteristic is what the substance smells like. However, because individuals perceive odour individually, the same chemical may be described quite different by different people. More details regarding odour intensity scale and odour characteristics are included below in the table below.

Sector	Intensity	Character / hedonic tone	Duration	Wind speed	Odour systems	Notable activity
1 On site	6 Extremely Strong	Rubbish	Short	Calm	T bar tip face	Gen waste tipping
2 Perim road	5 Very Strong	Gas (LFG)	Intermittent	Light breeze	Litter fence	Special waste
... Site bndry	4 Strong	Solvent	Continuous	Mod. breeze	Perimeter fence	Gas work
16 ADC / NOB	3 Distinct	Grassy		*Telemetry	Bypass road	Cover work

Redvale Landfill Management Plan

Sector	Intensity	Character / hedonic tone	Duration	Wind speed	Odour systems	Notable activity
Outside NOB	2 Weak	Earthy			Mobile unit	
	1 Very Weak	Burning				
	0 Non-perceptive	Odour spray				
		Other / uncertain				

3.6.5.4 Minimisation of odours

Odours will be minimised using the best practice methods described in relevant sections of the Landfill Management Plan. All landfill staff are required to use best-practice odour management techniques at all times. Redvale has also developed an odour control flow chart to deal with the known odorous loads including unexpected odorous loads that may arrive at the gate in the below.

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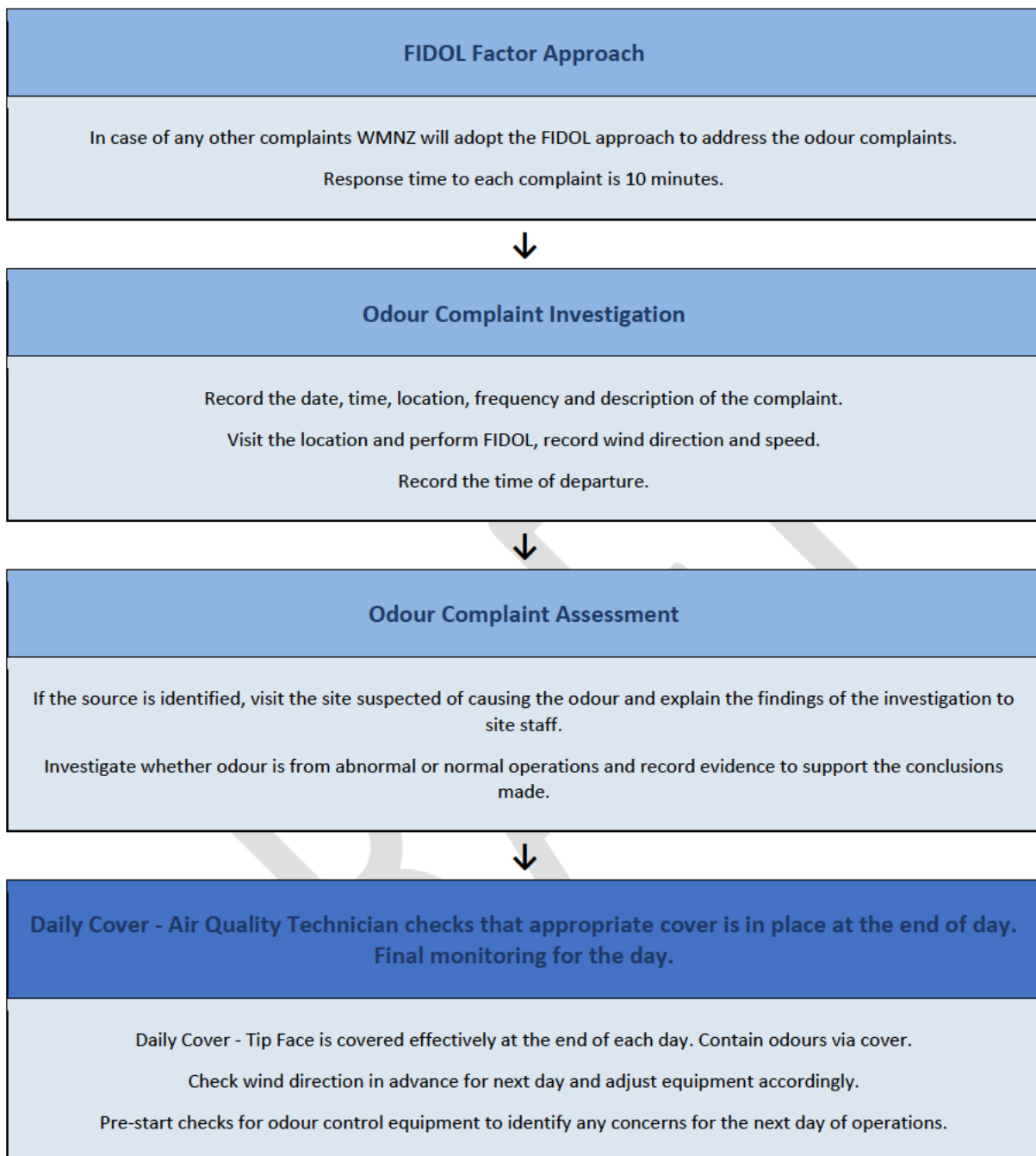
Redvale Landfill Management Plan

Redvale Odour Control Flow Chart



Redvale Landfill Management Plan

Redvale Odour Control Flow Chart



3.6.5.5 Complaint Investigation and recording procedure

Steps	Actions
Step 1: Receive the complaint	Record the date, time and location of the complaint and the complaint's description of the alleged odour event, including frequency (continuous or intermittent), perceived intensity, duration, description of the character of the odour, record the complaint's name and location along with wind direction and wind speed
Step 2: Visit the location of the complaint for at least 10 minutes	After visiting the location of the complaint, the odour technician must perform the following actions: - Record the name, address, time, and date of the arrival on the odour investigation form. - Assess and record the FIDOL factors, including intensity, characteristics, frequency, and duration of the odour. - Record the wind direction and strength and weather conditions throughout the investigation. - Determine the characteristics of the odour using odour characteristics chart. - Assess the width of the odour plume by moving at right angles to the wind direction, where possible. - Record the time of departure from the complaints' location is recorded.
Step 3: If the source is identified	- Assess the odour upwind of the suspected source. when practicable, conduct a 360 ° sweep around the source to eliminate other possible source of odour. - Record any observations of recognisable odour at other locations surrounding the alleged source, including times of observations at each location. - Visit the site suspected of causing the odour and explain the findings of the investigation to site staff. - Confirm the site operations taking place at the time of the complaint and any other operations that may have occurred recently that may be related to the odour discharge. - Record the name(s) of persons spoken to at the site and their comments. - Investigate whether odours are from abnormal or normal operations and record evidence to support the conclusions made.
Step 4: Make overall assessment	Make an overall assessment of adverse effects beyond the boundary.

3.6.5.6 Landfill Odour Mechanism

The mechanism of landfill odour involves the complex process of microbial decomposition of organic waste in a landfill, leading to the release of gases and volatile compounds. Mechanism of landfill odour is explained in the below table:

Redvale Landfill Management Plan

Waste Type	Mechanism of Odour Release	Odour Control
Refuse (old/new)	Exposure to open air	Cover, spray, odour patrols
LFG	Flux through final/intermediate cover	Extraction system, hotspot repairs
Leachate	BeneVap	Located to internalise odour effects.

3.6.6 Monitoring

Monitoring will include an assessment of whether odour is considered to be offensive and objectionable. Whether an odour has an offensive or objectionable effect requires an overall judgement that considers the frequency, intensity, duration, offensiveness/character and location of the odour event. WMNZ uses the FIDOL odour assessment framework to address any odour complaints on site, and also during pro-active odour patrols. The FIDOL method is summarised as follows:

Frequency	How often an individual is exposed to the odour
Intensity	The strength of the odour using VDI odour scale
Duration	The length of exposure
Offensiveness/Character	The character relates to the odour, which may be pleasant, neutral or unpleasant.
Location	The area from where the odour complaint is reported.

3.6.6.1 Responsibilities

The persons and parties involved in monitoring of odour are listed and their tasks are summarised in the table below:

Responsible person	General Tasks
Landfill Manager or nominee - a suitable employee to liaise with odour inspectors and manage the process	- Engage a full-time equivalent odour technician (odour inspector) on site. - Engage a suitably qualified external person for odour inspections. - Engage an independent consultant for annual odour review. - Assemble and give information to the odour inspectors and consultant. - Receive reports from the odour inspectors and immediately pass on significant odour detection notes to the Landfill Operations Supervisor.

Redvale Landfill Management Plan

Responsible person	General Tasks
	• Enter findings and actions taken into the site's incident recording and tracking system. • Chase up findings and recommendations until satisfactory resolution. • Ensuring management and operational practices described in the LMP are followed to ensure odour management is consistent with best practice Maintain site records of odour inspections and reviews. • Report to AC at the required frequencies. Provide information requested by an Enforcement Officer. • Train the Odour Inspector (site representative).
Landfill Operations Manager	• Employ best practice odour management techniques • Receive advice of findings from the odour inspections and reviews passed on by the LM/nominee. • Investigate any significant odour. • Remedy the cause of any significant odour. • Advise the LM/nominee of the further investigations and actions taken. • Be vigilant at all times regardless of inspections and improve processes whenever practical opportunities arise.
Odour Inspector (site representative) - Landfill Technician or Odour Technician trained in the odour inspection procedure	• Conduct the daily and weekly Odour Field Inspections. • Employ best practice odour management techniques. • Manage odour sources from the site in accordance with the condition of this consent and the LMP. • Monitoring odour management devices on site and ensuring that they are appropriately maintained and operated. • Ensuring that all odour complaints are responded to within half an hour where complaints are made during landfill opening hours and as soon as reasonably possible where such complaints are made outside such hours. • Carry out an investigation of the waste received at the landfill prior to any odour complaint. In case of any odorous waste received at landfill report to the landfill manager and sales manager immediately • Assisting the LM/nominee to ensure that the odour complaint response procedures outlined in the LMP are adhered to. • Conduct a critical analysis of the all the odour complaints received in the month and recommend changes in the operations practice to reflect best odour control practice • Undertake a daily odour patrol with the patrol locations based on meteorological conditions, location of the tip face or working area, and the complaints record and any consultation with the CLC.

Redvale Landfill Management Plan

Responsible person	General Tasks
	- As a part of proactive monitoring, air technician is required to utilise the wind speed, and direction data to predict the chances of odour compliant in the week. This information is provided to operational team to carry out best odour control practice. - Ensuring odour field inspections are carried out; - Making recommendations to the LM/nominee, when necessary to proactively address any actual or potential odour effects or complaints about odour effects. - Submit results to the LM/nominee before the end of the shift. - Accompany the external person on their odour inspections if they agree.
Weighbridge Attendant	Inform the odour technician of potentially odorous waste deliveries.
Odour Inspector (external) – Suitably qualified external person	- Conduct the monthly Odour Field Inspections - Promptly report any adverse finding to the LM/ nominee so that the site can take immediate and appropriate response action. - Report findings in writing, including any additional items and recommendations relevant to odour management practices.
Independent consultant	Review odour management annually with reference to [Condition XX]
Auckland Council	- Review and/or approve the field inspection methodology. - Review and/or approve any reduction in inspection frequency. - Review and/or approve any request to deem an independent consultant's recommendation unnecessary. - Receive odour inspections reports quarterly for the first 12 months (annually thereafter). - Request to see independent consultants reports if wanted by AC.

3.6.6.2 Records

Records of procedures, initiatives and events relevant to odour will be kept as described in relevant sections of this LMP. To summarise, the records will include:

- Complaints register and individual complaints record forms
- Gas event log
- Odour inspection record sheets
- Consultant study reports
- Site's HSE (health/ safety/ environment) incident recording and tracking system

3.6.6.3 Staff training

WMNZ has a list of staff who are trained to act as odour investigation persons. All the below staff members have successfully completed their nose calibration training as described in AS/NZS 4323.3:2001.

Name	Title
Matt Atkinson	Operations Manager
Laiana Barbosa	Health and Safety Coordinator
Ben Lowther	Air Quality Technician
Kees de Groot	Odour Technician
Vili Fatamaka	Operations Supervisor
Glen Jujnovich	Regional Manager

3.6.6.4 Reporting

Procedures and events relevant to odour management will be reported to external parties as described in the relevant section of this LMP. To summarise, reporting will include:

Event	Reporting
Odour complaint	To AC within 24 hours
Daily Odour inspection (by site rep)	To the site's internal record and AC Quarterly Reporting
Weekly odour inspection (by site rep)	To AC quarterly for the first 12 months and annually thereafter
Monthly odour inspection (by external person)	To AC quarterly for the first 12 months and annually thereafter
Annual odour review by independent consultant	To AC upon request
Complaints register	To AC upon request To CLC upon request at formal meetings
Annual review of landfill gas monitoring	To AC annually To PRP annually (copy)
A significant finding that requires response action on site	To the site's internal company incident reporting system according to internally set timeframes
Waste delivery cessation on account of odour	To the site's incident recording and tracking system To AC in summary on request

3.6.7 Response and contingency plan

3.6.7.1 Trigger levels

In the event of an odour complaint or during the daily or monthly odour surveys that objectionable odour is identified or if odour is identified on-site, the following response will be followed for the trigger levels identified below.

Level 1 Events:

- Objectionable odour is identified inside the landfill boundary, reported by anyone
- Investigation of an odour complaint verifies objectionable odour outside the boundary confirmed as originating from the landfill
- Daily or monthly odour surveys find objectionable odour outside the boundary and is confirmed as originating from the landfill

Level 2 Event:

- Odour outside the boundary is detected and formally validated by a Council Enforcement Officer (through either a complaint investigation or routine inspection) as objectionable and originating from the landfill.

3.6.7.2 Response

Contingency triggering event	Response guidelines
Odour (TL1)	Odour identified inside the landfill boundary • Notify the Regional and Operations managers • Inspect working face or gas system for obvious deficiencies • Rectify deficiencies or issues as soon as practicable • Undertake an additional daily odour survey to confirm the odour is within the boundary of the landfill. Landfill-related odour is identified outside the landfill boundary: • Immediately notify Regional Landfill Manager and Operations Manager that objectionable odour has been identified outside the landfill boundary, and advise the following: ○ Location, odour intensity, nature / character (i.e. refuse or landfill gas odour), current wind speed and direction In the case of objectionable landfill-related odour that is identified outside the landfill boundary, Operations Team is to: • immediately inspect the working face, current odour cannon and t-bar placements. • If odourous loads have or are currently being received, these are to be covered or buried further with additional waste or cover. • Any further identified changes to odour management at the working face must be undertaken within at least 1 hour, these may include: ○ Spray and / or cover odourous waste ○ Stop further deliveries from any identified odourous source ○ Redistribute odour cannons ○ Alter the odour cannon chemical rate • Undertake an additional follow up odour survey at the location the objectionable landfill-related odour was originally detected and immediately advise the Regional and Operations Manager of the results.

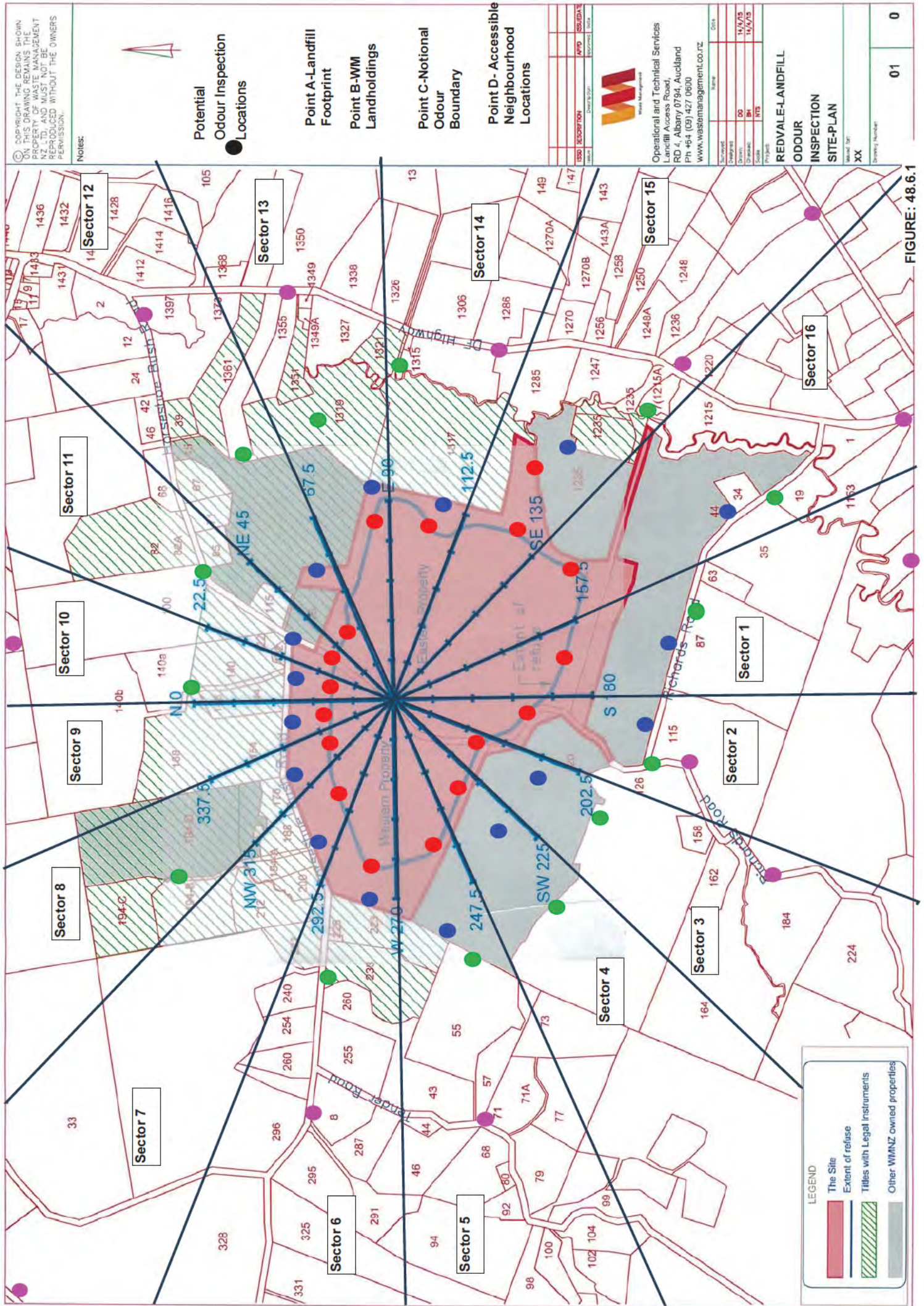
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	- If objectionable landfill-related odour is still detectable outside the landfill boundary, steps above must be repeated with additional measures such as reducing the working face size through the early application of daily cover along the boundaries of the working face. In the case of objectional landfill gas odour is identified outside the landfill boundary, the Operations team is to: - Immediately undertake a site walkover to attempt to confirm the source of the gas - Inspect wellheads, piping and connections - Repair obvious leaks in the gas system - Immediately repair deficiencies in the landfill cover - Undertake an additional follow up odour survey at the location the objectionable landfill-related odour was originally detected and immediately advise the Regional and Operations Manager of the results. - If objectionable landfill-related odour is still detectable outside the landfill boundary, steps above must be repeated but with additional remedial actions such as inspecting gas, flare and generation systems for proper operation and/or undertaking surface emissions testing.
Odour (TL2)	Objectionable odour outside the boundary formally validated by a Council Enforcement officer as objectionable and originating from the landfill: Depending on the character / nature of the odour detected (refuse or landfill gas odour), follow the above processes, with additional measures to be undertaken as directed by Council.

Appendix A Odour Inspection Site Plan

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Figure 3.6.8.1



Appendix B Weekly Odour Inspection Record Sheet

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Figure 3.6.8.2

REDDALE LANDFILL - ODOUR INSPECTION RECORD SHEET

Name _____ Date _____

Weather conditions (Fine / Cloudy / Overcast / Drizzle / Showers / Rain / Storm / Windy / Frost / Fog / Overnight rain) _____

Time	Sector	Distance	Odour Yes/No	Intensity	Character / hedonic tone	Duration	Wind direction	Wind speed m/s*	Odour systems operating	Notable activity	Investigation findings / Comments.

1	On site	6 Extremely Strong	Rubbish	Short	Calm	T bar tip face	Gen waste tipping
2	Perim road	5 Very Strong	Gas (LFG)	Intermittent	Light breeze	Litter fence	Special waste
...	Site bndry	4 Strong	Solvent	Continuous	Mod. breeze	Perimeter fence	Gas work
16	ADC NOB	3 Distinct	Grassy		*Telemetry	Bypass road	Cover work
	Outside NOB	2 Weak	Earthy			Mobile unit	
		1 Very Weak	Burning				
		0 Non-perceptive	Odour spray				
			Other / uncertain				

Appendix C Redvale Odour Control Flow Chart – Inwards Materials and Tip Face Management

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Redvale Odour Control Flow Chart

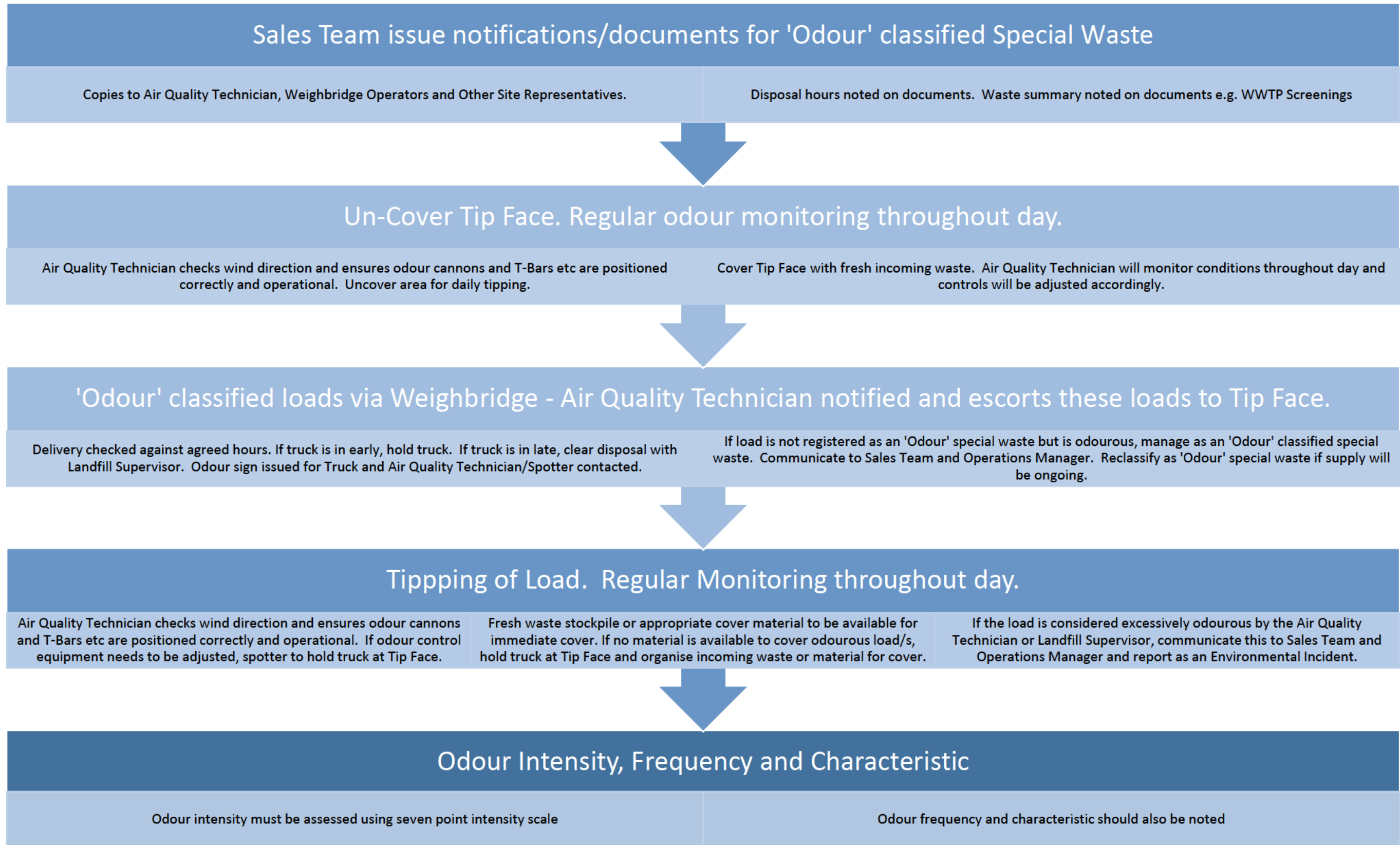


FIGURE: 3.6.8.3

Redvale Odour Control Flow Chart

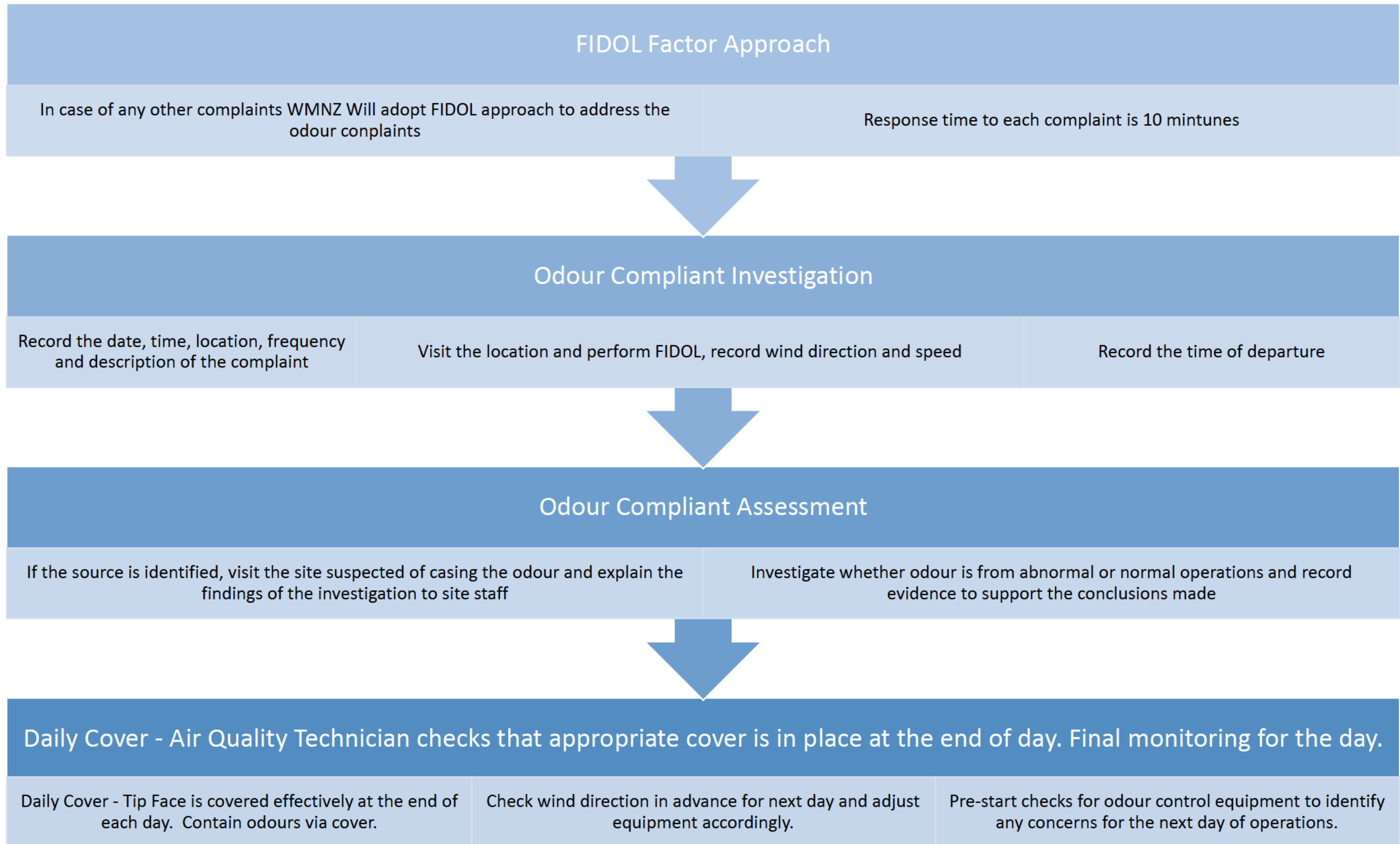


FIGURE: 3.6.8.3

Appendix D Procedures for Odour Inspection

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Procedures for odour inspections

Procedures for site staff from the commencement of the consent will be as follows to satisfy Conditions 66A, 67 and 68.

Daily odour field inspection

- a) Take a copy of the Odour Inspection Site Plan and Odour Inspection Record Sheet.
- b) Check the site's recent complaints history.
- c) Check the site's telemetry system for wind direction and wind speed.
- d) Check which odour systems are operating.
- e) Check special waste (potentially odorous) deliveries at the weighbridge.
- f) Drive a route to a downwind direction depending upon the wind direction.
- g) Record odour presence, intensity, character, duration, wind direction.
- h) Upon return, recheck telemetry, odour systems, and special waste.
- i) Submit results immediately to the landfill operations manager (same shift if odour is detected).

Weekly odour field inspection (quarterly after 12 months subject to AC approval)

- a) Take a copy of the Odour Inspection Site Plan and Odour Inspection Record Sheet.
- b) Check the site's recent complaints history.
- c) Check the site's telemetry system for wind direction and wind speed.
- d) Check which odour systems are operating.
- e) Check special waste deliveries in the past 2 hours.
- f) Drive a route that enters the sectors in downwind direction.
- g) Stop at least once at the downwind sectors marked on the Odour Inspection Site Plan that are "as close as practical to the notional odour boundary". Inspector may choose to visit the inner sites first and then move outwards or visit the outer sites first and then move inwards of the sector at his/her discretion.
- h) If an odour is detected, then stop for 10 minutes in the sector. Also, stop at the adjacent sectors; on either side of the sector where odour is detected, for five minutes to check if there is any odour.
- i) Stop at additional internal and external points to investigate any odour.
- j) Record odour presence, intensity, character, duration, wind direction.
- k) Upon return, recheck telemetry, odour systems and special waste.
- l) Submit results immediately to the landfill operations manager (same shift if odour is detected).

Monthly independent odour field inspection (six-monthly after 12 months subject to AC approval)

- a) Renew approvals and engagements that have been set up according to this procedure if applicable when the prior approval and engagements expire.
- b) Identify and contact a suitably qualified external person, and give them copies of the consent decision, consent conditions and Odour section of the Landfill Management Plan.
- c) Obtain Council approval of the external person.
- d) Engage the external person.
- e) Conduct a HSE induction before the external person goes out on site.
- f) Ask the external person to follow a procedure that they independently consider is appropriate, but to state in their report where their procedure differs from the site's Weekly Odour Field Inspection procedure and to give reasons for any differences including additions. Note: steps d, e and k from Weekly Odour Field Inspection procedure won't apply for monthly independent odour field inspection.
- g) Obtain a verbal report from the external person immediately after their inspection (same shift).
- h) Advise the site operations supervisor immediately of any significant odour finding so that they can start a timely response.
- i) Obtain a written report from the external person as soon as practical.
- j) Enter any recommended corrective and preventative actions into the site's incident recording and tracking system, and advise the relevant staff.

- k) Forward copies of written reports to AC on a quarterly basis (annually after 12 months).
- l) File copies of reports where they will be available to the CLC, PRP or AC on request.

Annual independent consultant review (continuing annually)

- a) Engage or re-engage an independent consultant with reference to Condition 68.
- b) Clarify for all parties that the procedure for this review is to be independently determined by the consultant.
- c) Provide them with all relevant information including copies of: Resource consent conditions; Air discharge consent conditions; LMP section 48; Complaints record; Site plans showing extent of cover; Site plans showing gas extraction infrastructure; Odour inspection reports; olfactometry measurement report; dispersion modelling study report; Anything else they request.
- d) Conduct a HSE induction before the consultant goes out on site.
- e) Accompany the consultant on site.
- f) Obtain a written report from the consultant as soon as practical.
- g) Enter any recommended corrective and preventative actions into the site's incident recording and tracking system, and advise the relevant staff.
- h) File copies of report and submit a copy to AC.

Olfactometry testing (within 12 months of commencement of the consent)

- Engage a consultant with reference to Condition 68A.
- Provide them with all relevant information including copies of: Resource consent conditions; Air discharge consent conditions; LMP section 3.6; Complaints record; Site plans showing extent of cover; Site plans showing gas extraction infrastructure; Odour inspection reports; etc.
- Conduct a HSE induction before the consultant goes out on site.
- Accompany the consultant on site.
- Obtain a written report from the consultant as soon as practical.
- Ensure the report contains the following:
 - a) The odour samples are collected from representative areas of active working face, daily cover, intermediate cover and final cover.
 - b) The sampling is conducted in light or calm conditions to characterise odour emissions over the course of a typical day, and comprises at least three samples from each representative source type.
 - c) The odour samples are analysed using dynamic dilution olfactometry by an accredited laboratory in accordance with AS/NZ 4323.3:2001, or other equivalent method to the satisfaction of the AC.
- Enter any recommended corrective and preventative actions into the site's incident recording and tracking system, and advise the relevant staff.
- File copies of reports and submit a copy to the AC.

Dispersion Modelling (within 12 months of commencement of the consent)

- Engage a consultant with reference to Condition 68B.
- Provide them with all relevant information including copies of: Resource consent conditions; Air discharge consent conditions; LMP section 3.06; Complaints record; Site plans showing extent of cover; Site plans showing gas extraction infrastructure; Odour inspection reports; Anything else they request.
- Conduct a HSE induction before the consultant goes out on site.
- Accompany the consultant on site.
- Obtain a written report from the consultant as soon as practical.
- Ensure the report meets the following criteria:
 - a) Is undertaken using the CALPUFF suite of models.
 - b) Considers the meteorological data collected from the on-site weather station.
 - c) Considers two scenarios; the landfill landform and location of working areas existing at the time of the modelling and the future "worst case" scenario taking

into account the height and proximity of the working area relative to sensitive receptors.

- Enter any recommended corrective and preventative actions into the site's incident recording and tracking system, and advise the relevant staff.

File copies of reports and submit a copy to the AC

Appendix E Daily Odour Patrol Sheet

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[illegible]

3.7 Landfill gas management

3.7.1 Consent requirements

[Condition XX]

3.7.2 Purpose

The purpose of this Landfill Gas Management Plan is to state the parameters relating to control of LFG and to describe the methods which will be employed at the site. The objective of the Landfill Gas Management Plan is to demonstrate how Redvale Landfill will comply with the conditions of the consent in regard to landfill gas.

3.7.3 Landfill Gas Overview

3.7.3.1 Abbreviations (unique to LFG)

BTU	British Thermal Units
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon dioxide
ETS	Emissions Trading Scheme
GJ	Giga Joules
H ₂ S	Hydrogen sulphide
LEL	Lower Explosive Limit
LFG	Landfill Gas
LEU	Leachate Evaporator Unit
LES	Leachate Evaporation System
LMP	Landfill Management Plan
MW	Megawatt
NMOC	Non-Methane Organic Compound
N ₂	Nitrogen
O ₂	Oxygen
ppm	parts per million
UEL	Upper Explosive Limit
VOC	Volatile Organic Compound

3.7.3.2 Composition

LFG is produced in landfills as organic waste materials decompose under anaerobic conditions. The gas is comprised of approximately equal parts of methane and carbon dioxide, with trace amounts of non-methane organic compounds and other substances.

Methane (CH₄) is a colourless, odourless and tasteless gas. It is also known as marsh gas and/or methyl hydride. It is explosive in concentrations ranging from 5 percent (the lower explosive limit, LEL) to 15 percent (the upper explosive limit, UEL) in air. It is flammable in concentrations above 15 percent methane.

Carbon dioxide is a colourless and odourless gas. It is non-combustible.

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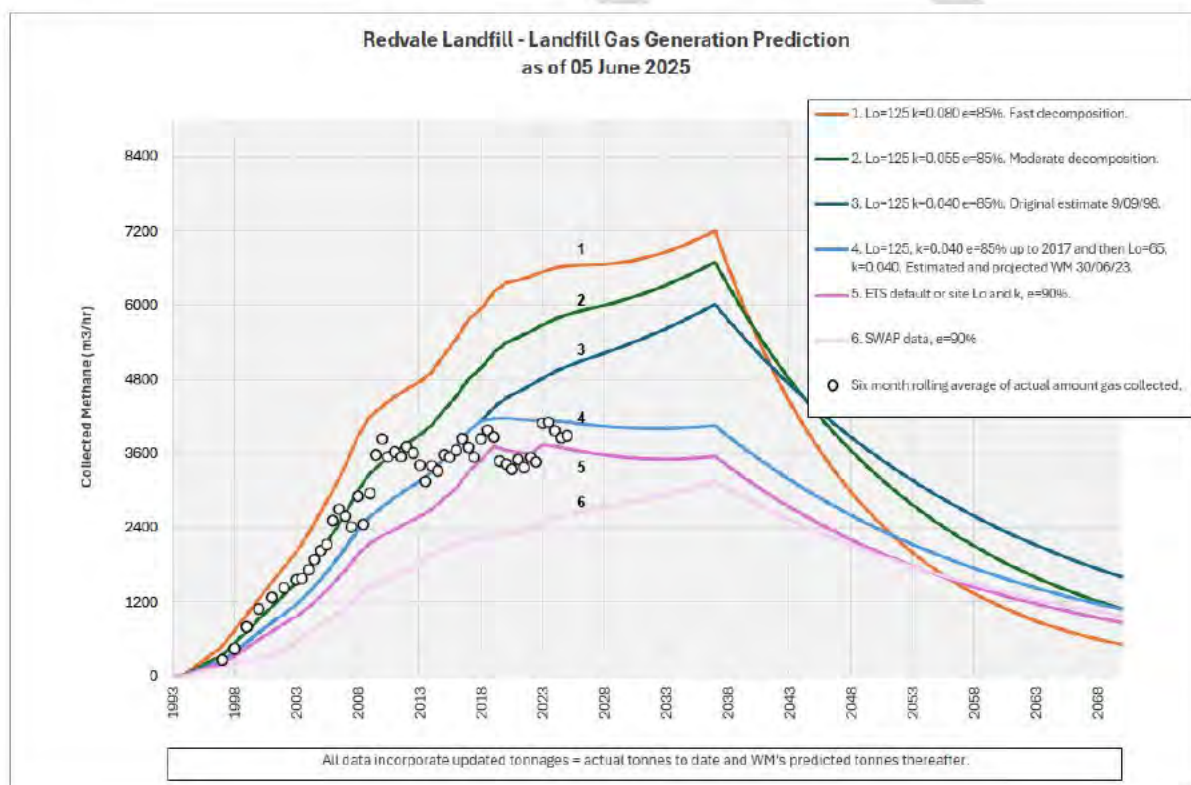
Trace compounds give the LFG its own characteristic odour. Some of the more significant odour causing classes of trace constituents include esters, phenols, organic acids, solvents, and sulphur compounds. An additional other trace compound is carbon monoxide, which may indicate combustion or landfill fire. Another trace compound is hydrogen sulphide, which is a colourless gas. Hydrogen sulphide is poisonous at any concentration and has an offensive odour similar to that of rotten eggs. It may occur at high concentrations, it is be odourless and flammable.

3.7.3.3 Condensate

LFG condensate is usually a clear liquid which accumulates inside LFG reticulation pipes. The amount depends on moisture content of the gas as it is generated in the waste, and subsequent changes in temperature, pressure, and velocity inside the collection system. Condensate is considered harmful and possibly carcinogenic to humans. Harm may be received by contact via skin, inhalation or ingestion.

3.7.3.4 Generation

The amount of LFG that will be generated by the landfill is estimated as per the summary in the LFG production graph in the figure below. These values will be reviewed annually as required by consents.



Redvale Landfill gas prediction model parameters			
	Methane rate factor, k (/year), which is a measure of how fast biodegradation will occur	Methane potential, L_0 (m³/tonne), which is a measure of how much methane any one cubic metre of waste could possibly produce given enough time	Assumed minimum collection efficiency
	k	L_0	e

Redvale Landfill Management Plan

	(yr ⁻¹)	(m ³ /t)	(%)
ETS 2025 default (line 5)	2021: 0.033 2023 onwards: 60.815 to 0.039	2021: 71.74 2023 onwards: 60.815	90
Estimated re-projection by WM on 30/06/23 (line 4)	0.040	1993 to 2016: 125 2017 onwards: 65	85
Original estimate (line 3)	0.04	125	85
Moderate decay estimate for comparison (line 2)	0.055	125	85
Fast decay estimate for comparison (line 1)	0.08	125	85

3.7.3.5 Emission

There are typically three paths by which LFG can leave a landfill:

- By migration into the adjacent soils and underground structures;
- By emissions into the atmosphere from the landfill operating areas and final cover areas;
- By extraction through the LFG collection system.

3.7.3.6 Potential impacts and liabilities

LFG can present an explosion and fire hazard when the following conditions are met:

- The concentration of methane is between 5 and 15 percent in air.
- A source of ignition is present.

LFG can present a nuisance in terms of odour and present an unsafe atmosphere by displacing ambient air with gas which may be toxic and deficient in oxygen.

3.7.3.7 Site specific design

The Site incorporates the following design features for minimising the potential environmental impacts associated with LFG.

- Buffer zone;
- Base and sidewall liner system;
- Phased development;
- Final cover system;
- Landfill gas extraction system;
- Landfill gas treatment by combustion.

3.7.3.8 Site-specific operation

The Site incorporates the following operating methods for minimising the potential environmental impacts associated with LFG.

- Landfill Management (refer to separate sections of the Redvale Landfill Management Plan)
- Environmental Management (this plan)
- Waste pre-acceptance procedures (Section 3.1- Waste Control)
- Waste acceptance procedures (Section 3.1- Waste Control)
- Waste placement (Section 3.2 - Disposal)

- Placement of putrescible waste (Section 3.6 - Odour Management Plan)
- Daily cover procedures (Section 3.3 - Cover)
- Landfill gas system operating procedures (refer to sections in this Landfill Gas Management Plan)
- Landfill gas system maintenance procedures (refer to sections in this Landfill Gas Management Plan)
- Landfill gas monitoring (refer to sections in this Landfill Gas Management Plan)

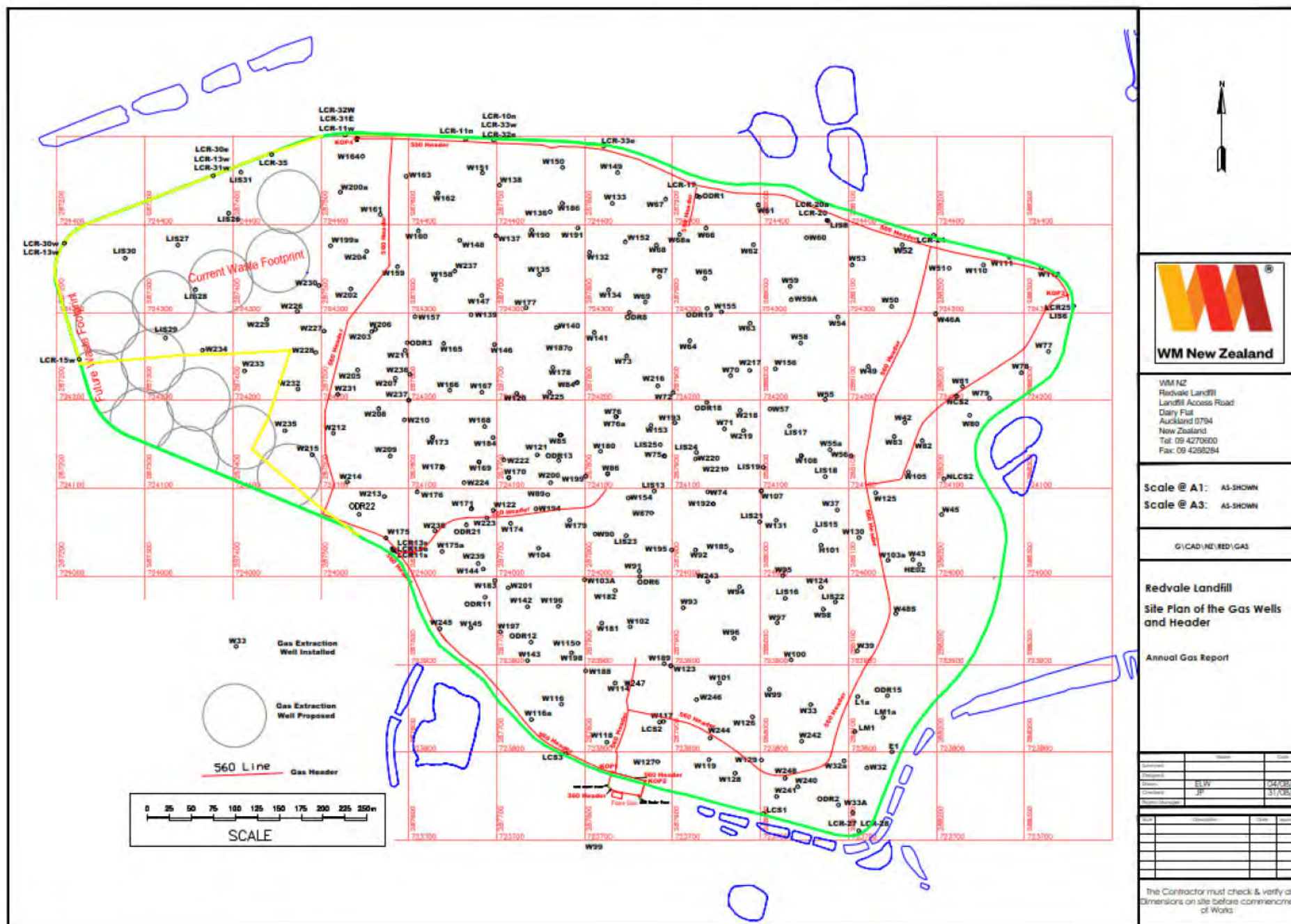
3.7.4 Landfill gas system – design and construction

3.7.4.1 Collection

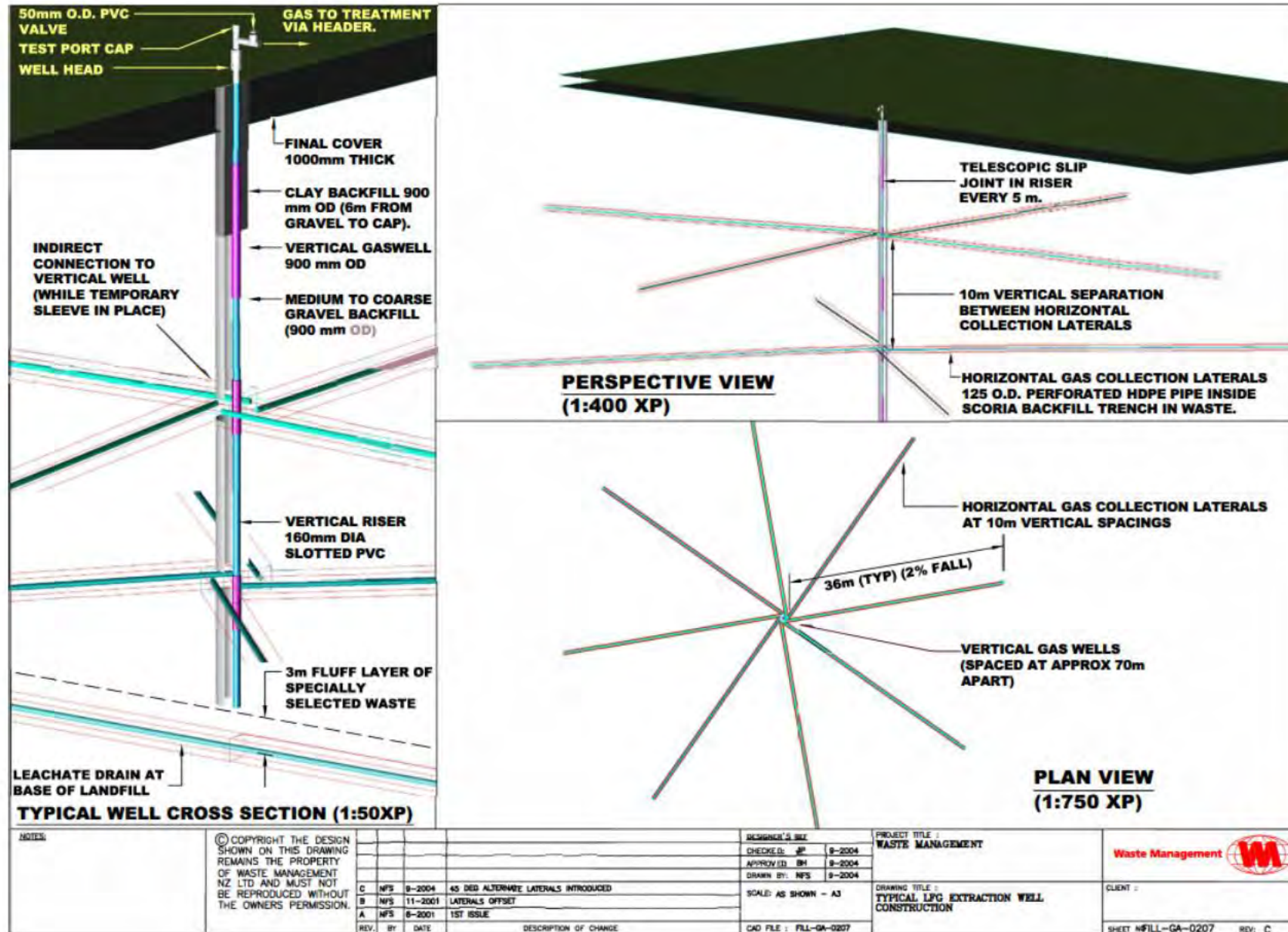
A LFG system has been developed to collect LFG. The aim is to reduce potential environmental impacts to the practicable minimum by optimising LFG collection from the waste pile.

Vertical wells are placed no further apart than 100 m (typically 70 m for gas wells installed prior to 2015 and 50m for gas wells installed since 2016) to apply vacuum throughout the waste. Horizontal wells radiate out from each vertical well for a horizontal distance of at least 30 m in the waste. At least four horizontal wells will be placed for each 18 m vertical height of each vertical well. The well layout is shown in the figure below. The individual well design is illustrated in the figure below. The condensate knockout pot as-built is illustrated in the figure below.

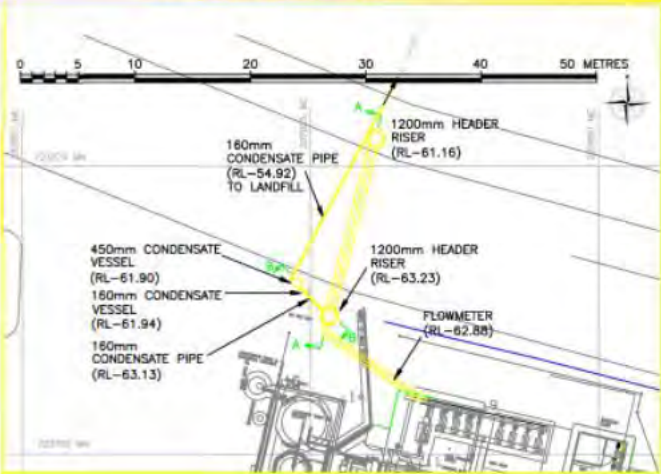
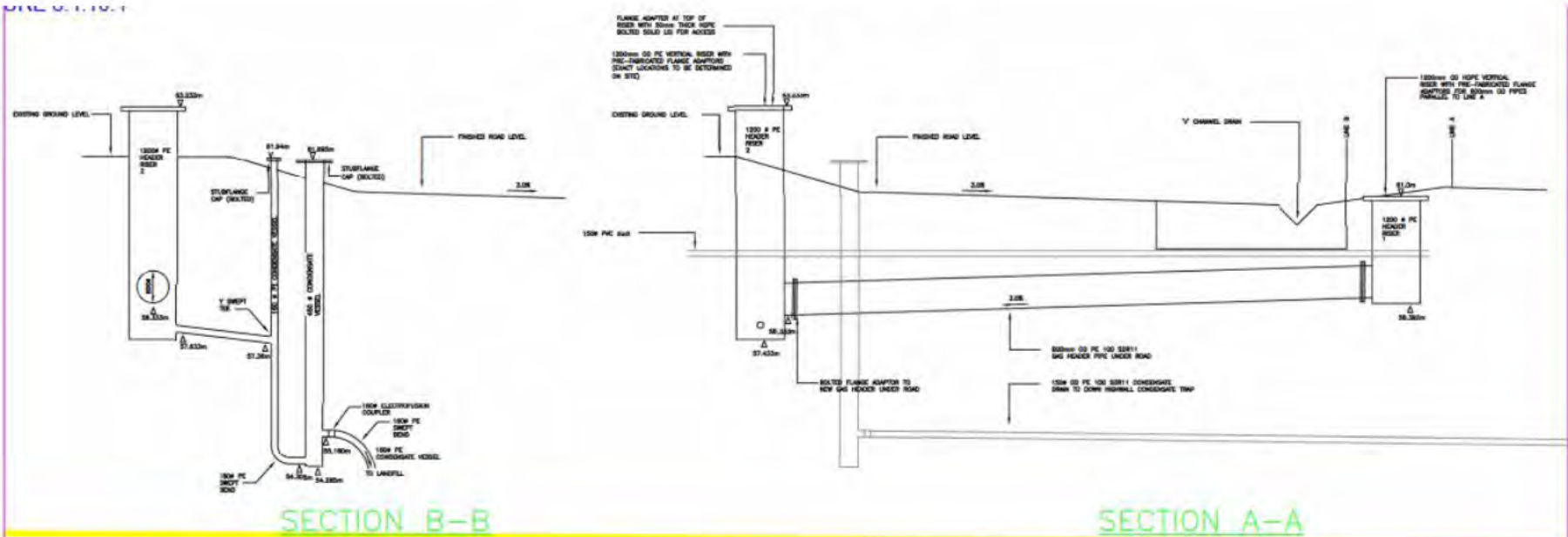
Redvale Landfill Management Plan



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Redvale Landfill Management Plan



NOTES:

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REV.	BY	DATE	DESCRIPTION OF CHANGE
1	J.L.	11-08	AS SHOWN

DESIGNER'S REF		
CHECKED:	C.J.	11-08
APPROVED:	J.M.	11-08
DRAWN BY:	J.M.	11-08
SCALE:	AS SHOWN	
CAD FILE:	DWG001	

PROJECT TITLE:	REDVALE LANDFILL PROJECT
DRAWING TITLE:	1200mm PE Riser Section - Detail

Waste Management	W
CLIENT:	
SHEET NO	02/02/08
REV:	0

Wells heads will be connected via sub-headers or “laterals” to continuous main header pipes encircling the landfill, to transport LFG to a flare station.

Permanent gas well header pipes on final cover areas will be laid in trenches within the final cover. A minimum undisturbed cap thickness of 0.5 m will be maintained beneath the invert of header pipes. All gas pipeline trenches will be carefully backfilled with compacted clay to the same standard as final cover. Temporary gas header and collection pipes may be laid across the surface, in which case the locations of pipes not already clearly visible will be marked to protect the pipes from damage and unplanned disruption by operations.

A landfill gas collection system is not proposed within the Class 2 footprint extension due the low organic content of Class 2 waste and therefore limited landfill gas generation potential of Class 2 waste. In the event landfill gas extraction is necessary in the future, horizontal collector pipes will be installed near the surface of the waste.

3.7.4.2 Treatment

LFG is conveyed under vacuum by header pipe to a flare station for a combination of treatments including destruction (for example by flaring) and beneficial use (for example by electricity generation and leachate evaporation). The aim is to optimise use of the LFG as an energy resource.

Additionally, the treatment of LFG will incorporate the following:

- The flare will be designed to comply with the consent requirements that prescribe flare temperature and flare retention time.
- Generator exhausts will comply with the consents that prescribe their height above ground.
- Backup systems for selected essential elements will be provided including back-up flares when generators shutdown and a back-up generator to run the main flare.
- The exhaust from the leachate evaporator unit (LEU / BeneVap 300) is discharged to the atmosphere and is required to meet the discharge criteria as per the conditions of the consent.

3.7.4.3 Condensate

Condensate is removed from the gas collection pipes at condensate knock-out pots, or condensate traps or condensate sumps. Condensate will be returned to the landfill by means of either injection into the waste mass or by pumping to the leachate collection system. If mixed with leachate, the mixture will then be either treated in the on-site leachate evaporator or recirculated into the waste at leachate injection points. Currently, two permanent pumps are installed in the main condensate management system. These pumps help to solve the interrupted gas flow to the energy park which led to some additional gas venting to atmosphere.

3.7.4.4 Records - LFG construction

The LFG system design will generally follow the design concepts described in the “Basis of Design Report” by Gas Control Engineering⁷. As-built drawings of gas well locations will be prepared and maintained on the site. Examples of gas well location plans are provided above in the figure above.

⁷ Gas Control Engineering, Inc., February 1998: Basis of Design Report - Revision No. 1 for the Landfill Gas Extraction System, Redvale Landfill Auckland New Zealand. Prepared for Chapman, Tripp, Sheffield and Young c/o Waste Management NZ Ltd. Project #1125-1.

3.7.5 Landfill Gas System - Operation

3.7.5.1 Operational criteria

Operational criteria for LFG control systems at landfills have been established based on engineering judgment, operational experience, and regulatory requirements. LFG management system is operated to optimise environmental controls related to best odour control practices. Operational targets for a well operated LFG collection system include the following:

- Maximise LFG flow; (this reduces the risks associated with landfill gas escaping from the landfill which can cause odour).
- Maintain methane less than LEL in perimeter probes (as shown below in Figure XX); (perimeter probes provide an indication of any gas escaping from the liner and can contribute towards odour).
- Maintain methane less than 5,000 ppm in surface emissions from final and intermediate covers; (any emission greater than 5,000 ppm can contribute adverse odour effects)
- Minimise odours from fugitive emissions; (this can be controlled by weekly walk overs, well head balancing and cap repairs).

The LFG system at Redvale Landfill aims for these operational targets and will run on a continuous basis. The standard operational procedure for wellhead adjustment and other specific work instructions will be kept in the site's manual of standard operating procedures.

3.7.5.2 Early Extraction of LFG from Working Face

While placement of intermediate cover around a well near the working face prior to putting it on a vacuum is generally considered best practice for minimising air ingress and reducing landfill fire risk, this should be balanced against the need to maintain gas extraction for odour control. In such cases, a temporary cover may be installed around the well to reduce any odour escaping from the area until the appropriate intermediate cover can be placed. If refuse is not being placed around the well for a period longer than five days, WMNZ will put the well on vacuum. If operations are moving away from a particular area within the landfill, the decision to put the well back on vacuum must be made as soon as practicable. All of these actions related to early extraction of LFG from the working face reflect best practice for odour management.

3.7.5.3 Maintenance

Maintenance schedules will be developed for each element of the gas system as it is completed. The detailed maintenance procedures will be kept in the manuals of standard operating procedures and manufacturers' manuals.

3.7.5.4 Records

Records of operations will be maintained on the site. Operational records will be kept for a minimum of two years, or longer if required for a specific purpose such as warranties or permanent as-built records, ETS reporting etc. Records will include (and are not limited to):

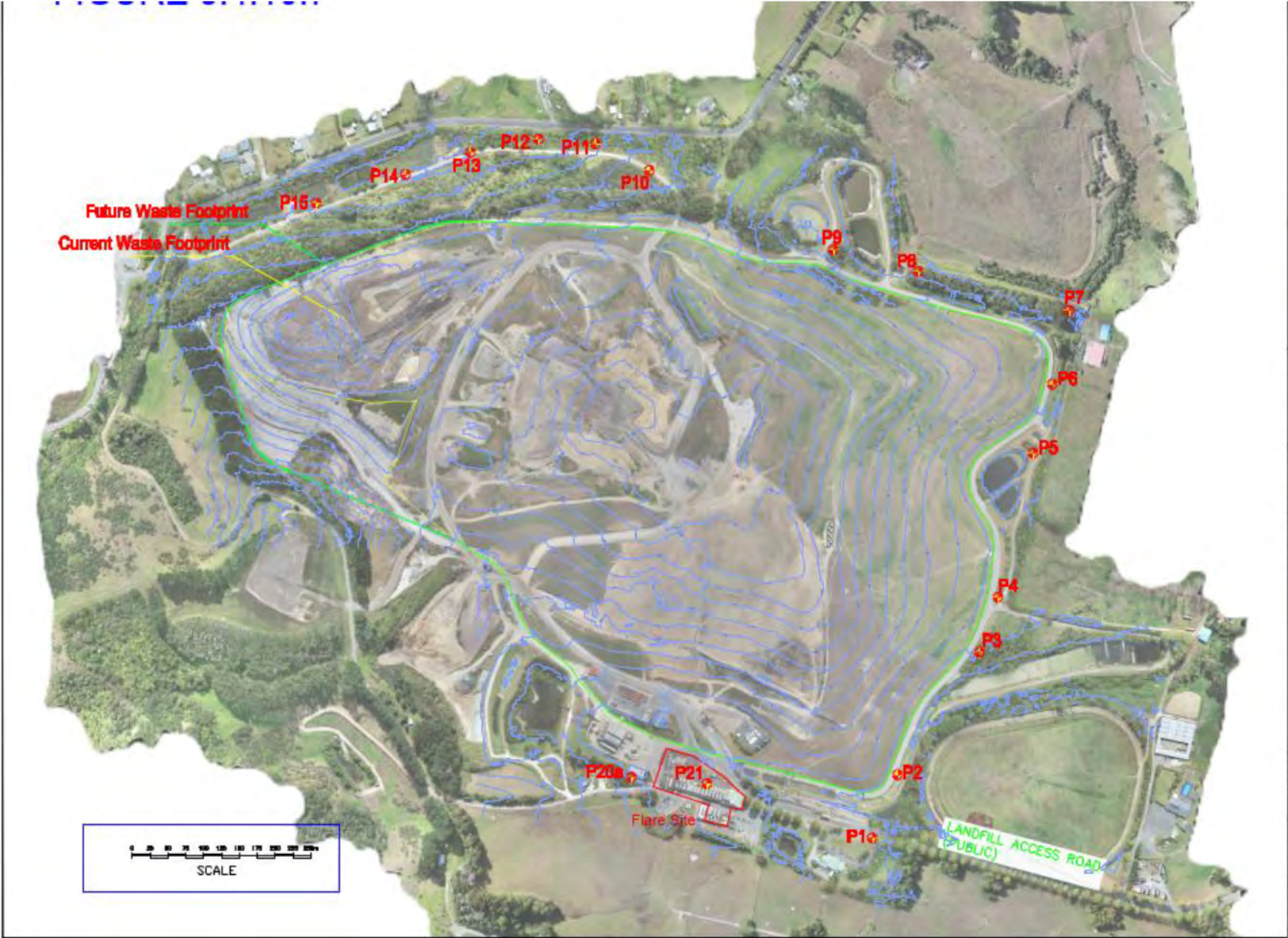
- Gas event log (diary of LFG related events, maintenance, wellfield adjustment, construction, inspections, and monitoring);
- As-built site plan (layout of the LFG wells, headers, condensate traps, flare station);
- Completed formal checklists (for operation and maintenance of each of the flare station facilities);
- Completed formal checklists (for operation and maintenance of collection system installations);

Redvale Landfill Management Plan

- Completed task lists (Compliance Management System);
- Daily LFG monitoring results at flare site;
- Monthly LFG monitoring results for well field;
- Quarterly LFG surface emissions monitoring for landfill covers.

DRAFT

Redvale Landfill Management Plan







WM New Zealand

WM NZ
Redvale Landfill
Landfill Access Road
Dairy Flat
Auckland 0794
New Zealand
Tel: 09 4270600
Fax: 09 4266284

Scale @ A1: NTS
Scale @ A3: NTS

G:\CAD\NZ\RED\1\DD\GAS\PP

**Redvale Landfill
Plan of Perimeter Probes
2025**

Category	Name	Date
Design		
Drawn	Ben New World	07/05/25
Checked	Jim Webb	07/05/25
Project Manager		

Ref	Description	Date	Approved

The Contractor must check & verify all Dimensions on site before commencement of Works

3.7.6 Landfill Gas - Monitoring Plan

3.7.6.1 Purpose

The purpose of monitoring is to provide information to:

- fulfil and document regulatory compliance requirements;
- avoid odour associated with fugitive emissions of LFG;
- identify surface emissions of LFG from the landfill;
- verify safe working conditions in structures and confined spaces;
- indicate if sub-surface LFG migration exists;
- identify any repair work needed;
- determine the quantity of recovered LFG;
- determine the quality of recovered LFG;
- monitor temperature of leachate in leachate evaporator
- monitor discharges from exhaust of flare and LFG generators
- indicate if a fire could be occurring in the waste;
- relate meteorological conditions to LFG generation and air discharge complaints.

All monitoring tasks required for compliance with the consent conditions will be listed in the in-house compliance management system task database.

3.7.6.2 Landfill gas parameters

All the below landfill gas parameters are monitored for each extraction wellhead on monthly basics. The landfill gas before entering the gas engines or flare is also testing six-monthly for the same parameters, with an additional hydrogen sulphide and total non-methane organic compounds.

Methane	Methane is a primary component of LFG. The methane concentration is an indicator of decomposition processes, sub-surface migration, flammability hazard, greenhouse gas contribution and available energy.
Carbon Dioxide	Carbon dioxide is the other primary component of LFG. The carbon dioxide concentration is an indicator of aerobic decomposition processes, greenhouse gas contribution, and sub-surface migration of LFG regardless of methane readings, although it can occur in the ground from non-landfill sources.
Oxygen	The oxygen concentration is a measure of displacement by other gases in the ground, and air intrusion into the landfill.
Residual Nitrogen	Residual nitrogen is a measure of aerobic decomposition in the landfill, and air infiltration into the landfill. Nitrogen makes up 80% of air, and is not altered by processes inside the landfill, and is therefore a measure of how much air is being drawn in. Residual nitrogen is self-calculated by gas analysers by calculating the balance of gas remaining in a sample of LFG after subtracting the concentrations of oxygen, methane, water vapour (adjusted for temperature) and carbon dioxide.
Temperature	Temperature is a measure of bacterial activity. Excessive LFG temperature is a sign of a landfill fire.
Carbon Monoxide	The presence of excessive carbon monoxide is a sign of a landfill fire.

Redvale Landfill Management Plan

Pressure	The LFG pressure is a measure of the driving force behind sub-surface migration, emission to atmosphere through cover, and flow to the extraction system.
Barometric Pressure	The barometric pressure trend (prior to LFG monitoring) may affect the flow rate of gas emissions. Higher atmospheric pressure causes less LFG emissions.
Hydrogen Sulphide	Hydrogen sulphide in LFG is a measure of its toxicity and odour potential.
Trace Gases	LFG might contain some gases which are harmful, toxic or carcinogenic. They include volatile organic compounds (VOCs) and non-methane organic compounds (NMOCs). Analyses are generally performed in specialist laboratories.
Odour	Odour is measured by olfactometry. The odour concentration is a measure of odour potential of the substance sampled such as LFG and special waste.
Flow Rate	Gas flow measurements are a measure of the energy source, and an indicator of collection efficiency or decomposition activity when compared with estimates of expected gas generation.

3.7.6.3 Odour

Response to odour events caused by landfill gas will be managed through the processes identified in the Section 3.6 Odour Management Plan.

3.7.6.4 Surface emission monitoring

Monitoring of surface emissions from the waste pile will be performed on a monthly basis for areas with intermediate cover and quarterly basis for areas with both intermediate and final covers to assess the concentration of LFG in the atmosphere. The procedure involves walking across the landfill surface following a 30 m grid pattern, and using a portable gas detector (with flame ionisation detector which can measure instantaneously to an accuracy of 50 ppm of methane) to continuously sample through a hollow wand held close to the landfill surface and recording the findings. The procedure will detect gas emissions which might not be detected by other methods such as walk-over inspections. Details will be contained in site work instructions.

3.7.6.5 Structures and confined spaces monitoring

Monitoring of structures overlying or adjacent to the waste disposal areas and the LFG collection system will be performed on a regular basis to verify safe working conditions in buildings, etc. from the hazard posed by methane.

Monitoring of confined spaces will be performed on a per occurrence basis to assess the threat to workers about to enter the confined space. Confined spaces will be defined as described in NZ OSH documents⁸. Based on Australian Standard AS 2865:2001, site specific standard operating procedures will be developed and followed.

3.7.6.6 Sub-surface monitoring

Monitoring sub-surface migration will be performed on a monthly basis to determine if a pattern of sub-surface LFG migration exists at the Site. It will involve monitoring gas probes located along the perimeter buffer zone of the site to detect the presence of combustible gases in the soil. The probe

⁸ Department of Labour, Occupational Safety & Health Service, undated: Essential facts on confined space safety, Information Sheet No. 2.

locations are as shown above in the figure above, and details will be contained in the site manual of standard operating procedures. Error! Reference source not found.

3.7.6.7 Walk-over survey

A walk-over survey for the Site will be performed on a weekly basis to monitor the condition of the final and intermediate soil cover, gas installations, tip face operation and drainage system. It will involve physically walking across the landfill surface and identifying any problem areas. Tasks for corrective action will be entered into and tracked using a job action record system, and details will be contained in the site manual of standard operating procedures. Error! Reference source not found.

3.7.6.8 Monitoring Probes

Methane contraction is measured and recorded on monthly basics in each of the gas monitoring probes outside the landfill footprint to check if there is any gas leakage from the landfill. The probe monitoring data is shared with the PRP in the annual report.

3.7.6.9 Flow rate

The gas flow rate will be measured at the flare and enables an annual comparison between actual and predicted gas generation rates. The gas flow rate will also be measured at individual wellheads in order to assess performance and to optimise gas extraction from the individual gas well. Details will be contained in the site manual of standard operating procedures. Error! Reference source not found.

The total gas flow rate entering the gas treatment plant (generators, flare and LES) are recorded.

3.7.6.10 Residual nitrogen, temperature, carbon monoxide

These parameters will be measured at individual well heads to provide an indication of air intrusion into the landfill due to active gas extraction, and to provide an indication of any fire in the landfill.

3.7.6.11 Generator exhaust stack emission monitoring

All gas generators are fitted with sampling ports on the exhaust near the point of discharge to enable stack testing to be conducted. Stack emission testing on at least three representative single generator exhaust stacks is conducted every three years. However, each generator is tuned every six months to comply with a maximum concentration of 550 mg/m³ of NO_x as stated in [Condition XX]

3.7.6.12 BenvVap 300 monitoring

Monitoring (visual inspections, odour) of the BeneVap 300 is conducted in accordance with the BV300 Management Plan in Section 3.9 of this LMP.

3.7.6.13 Climate Recording

A weather station will be maintained on the site to record parameters relevant to gas, odour and leachate generation, i.e. rainfall, wind speed, wind direction, barometric pressure, temperature. There is no landfill gas contingency plan associated with climate monitoring.

3.7.6.14 Documentation

Monitoring results and observations will be recorded either on gas analysers or paper forms. Electronic data will be downloaded and stored in a computer or cloud server which is regularly backed up. Monitoring results will be retained for the duration of the resource consent.

Redvale Landfill Management Plan

Calibration of portable and stationary instruments will be documented in a calibration call-up system and the individual equipment file maintained by an on-site laboratory. Maintenance of monitoring instruments will be documented in the individual equipment file. Calibration and maintenance records will be retained for a minimum of two years.

Documentation of responses to monitoring results is explained in the Contingency Plan below.

3.7.6.15 Data analysis and initial response

The data that is collected during monitoring will be evaluated by a combination of techniques including analytical and mathematical analysis, inductive and deductive logic, and subjective judgment. After each monitoring event, WMNZ will compare the results to the numerical and descriptive response limits specified in the Contingency Plan, and actions will be taken according to the Contingency Plan.

3.7.6.16 Reporting

Summaries of the results of LFG monitoring will be prepared and submitted to the AC and Peer Review Panel (PRP) at regular intervals as indicated below. The reports will include the following:

Event	Reporting
Odour or dust incident reported by staff member.	Internal reporting.
Odour complaint.	Report to AC within 24 hours of receipt of the complaint Monthly report to PRP
Surface emissions survey.	Monthly report to AC if any exceedance not repaired within 14 days. Annual report to AC. Copy to PRP.
Confined spaces monitoring.	Internal reporting.
Perimeter probe monitoring.	Annual report to AC. Copy to PRP.
Walkover inspection.	Annual report to AC. Copy to PRP.
Residual nitrogen.	Monthly report to AC Annual report to AC. Copy to PRP.
Comparison of actual LFG with predicted LFG, and estimate of average waste composition.	Annual report to AC. Copy to PRP.

Also, it is noted that the consent allows for the AC to enter the site at their discretion for inspections.

3.7.7 Landfill Gas - Contingency Plan

3.7.7.1 Purpose

The contingency plan provides pre-specified "response limits" or "trigger levels" for monitoring results which, if exceeded, prompt a course of remedial action. The contingency plan also provides guidelines for the appropriate remedial action and timeframes for completion.

3.7.7.2 Response limits

Upon completion of a monitoring event, the results will be checked against the pre-specified response limits. If no response limit is exceeded, the monitoring event is to be routinely reported in due course. If any response limit is exceeded, action is to be taken immediately as described in the Contingency Plan Flowchart. The response limits are set at two levels:

Trigger Level 1 (Lower response limit)

Exceedance of TL1 warns of potential adverse effects, warns of potential future non-compliance with the resource consent conditions, requires investigation and reporting, and might require remedial action.

Trigger Level 2 (Upper response limit)

Exceedance of TL2 is a strong indication that significant adverse effects and breaches of consent conditions either are already occurring, or could have occurred, or are about to occur. The upper limit is typically set at the limit specified in the resource consent, so exceedance of the upper limit typically indicates non-compliance. It usually requires urgent mitigative actions, notification of authorities, calling of the specialist adviser, and prompt instigation of investigations and remedies.

Extreme exceedance of TL2 might require reference to the emergency plan.

The response limits are shown in the monitoring "event" tables on the following pages.

3.7.7.3 Contingency plan flow chart

All results received will be compared to response limits, TL1 and TL2, defined in this contingency plan. The response procedure is summarised in the contingency plan flow chart, Section 3.7 Appendix B.

3.7.7.4 Table of trigger levels

Event	TL1	TL2
Odour	Objectionable odour inside landfill boundary.	Objectionable odour outside the boundary evidenced by either (a) multiple complaints for same reason and verified by site management as exceptional and originating from the landfill, or (b) complaint received via AC and formally verified by AC as objectionable and originating from the landfill.
Surface emission of methane	500 ppm (0.05%) methane by volume	5000 ppm (0.5%) methane by volume

Redvale Landfill Management Plan

Methane in structures and confined spaces	Either (a) 1.25% methane by volume (25% of LEL) or (b) 3.0% carbon dioxide by volume	5.0% methane by volume (100% of LEL)
Methane in perimeter probes	Either (a) 1.25% methane by volume (25% of LEL), and 5.0% carbon dioxide by volume or (b) Apparent gas flow or pressure in probe	5.0% methane by volume (100% of LEL)
Findings from walk-over inspection	Any one of: - point source of gas escape - point of air intrusion such as a deep crack - gas reticulation system malfunction (damage, leak or failure) - leachate recirculation system malfunction - condensate system malfunction - vegetation stress due to gas - leachate breakout - erosion, inadequate surface drainage - refuse exposed by insufficient cover or by cover instability	Any observation judged to be in non-compliance with consent conditions.
Residual nitrogen, temperature, carbon monoxide in a gas well	Residual Nitrogen = 15 %v/v Gas Temperature = 55 °C Carbon Monoxide = 100 ppm	Residual Nitrogen = 20 %v/v Gas Temperature = 65 °C Carbon Monoxide = 1000 ppm
Gas readings at main flare	Carbon Monoxide = 1000 ppm Gas Temperature = 60 °C	N/A
Dust	Refer to separate Dust Management Plan	Refer to separate Dust Management Plan

3.7.7.5 Response guidelines

Monitoring event	Response guidelines
Odour	Refer to LMP Section 3.6 Odour Management Plan response guidelines.
Surface emission of methane over intermediate or final cover	Possible urgent remedial and precautionary actions include: - Repair cracks; - Repair seal around well heads; - Increase vacuum at individual wells. Possible investigative actions include:

Redvale Landfill Management Plan

	• Re-check instrument calibration and repeat measurements; • Perform a local walkover inspection; Check nearby gas systems for CH₄, CO₂, O₂ and pressure. Possible corrective actions include:8 • Repair any cracks in the landfill cover; • Adjust vacuum at individual wells; • Repair the LFG collection system; • Install additional gas extraction well or lateral.
Methane in structures and confined spaces.	Possible urgent remedial and precautionary actions include: • Evacuate people from structure; • Lockout electrical equipment and place signs to warn of the danger. • Ventilate areas, leave doors and hatches and openings (windows) open. Possible investigative actions include: • Check wind speed, wind direction, barometric pressure patterns; • Check nearby gas systems for CH₄, CO₂, O₂ and pressure. • Determine gas ingress point(s). Possible corrective and preventative actions include: • Improve LFG collection system; • Excavate trenches and place cut-offs or vents; • Increase gas collection in the landfill; • Review the confined spaces list. • Block off gas ingress point(s). • Increase monitoring of structure or install permanent gas monitoring sensor if necessary.
Methane in perimeter probes	Possible investigative actions include: • Check barometric pressure patterns; • Check flares for CH₄, CO₂, O₂ and pressure; • Review liner reports, geology and hydrogeology. • Drill additional investigative probes; • Analyse the gas to differentiate between landfill gas and other sub-surface gas e.g. from swamps, buried animals, and adjacent ancient landfills. • check that readings are repeatable, and check variation in water table levels in probes from historical levels. • Determine if any near-by off-site structures are at risk by monitoring with FID instrument. Possible corrective and preventative actions include: • Improve LFG collection system; • Excavate trenches, place cut-offs or vents or provide secondary gas extraction system. • Increase gas collection in the landfill. • Increase monitoring of structure or install permanent gas monitoring sensor if necessary.

Redvale Landfill Management Plan

Findings from weekly walk-over inspection.	Possible investigative actions include: • Use portable gas meter to define extent of concern; • Review design drawings of affected features. • Check exposed pipeline for damage, leaking joints and note areas where gurgling can be heard (namely condensate is accumulating and interfering with gas flows).
Residual nitrogen, temperature, carbon monoxide in a gas well.	Possible investigative actions include: • Perform a local walkover inspection, particularly noting any cracks in the landfill cover, damaged pipelines, all joints for leakage, damage at wellheads-both wellhead pipe works and breaks in the ground around the wellhead. • Look for trends in gas quality that may indicate air intrusion; • Check well pressures; • Measure gas parameters at other wellheads in the vicinity. • Check instruments for correct operation and that readings are repeatable. Possible corrective and preventative actions include: • Repair any cracks in the landfill cover; • Reduce vacuum at individual wells; • Repair LFG collection system.
Oxygen and methane concentration in gas entering gas treatment plant	Possible corrective actions include • Adjust wells in well field • Adjust burner settings to correct gas concentrations • Adjust flows entering generators

3.7.7.6 Specialist adviser

WMNZ will consult a specialist adviser as required. The specialist adviser person may be either a specialist staff member of the company or an external consultant having relevant experience.

3.7.7.7 Record Keeping and Reporting

Event	Reporting
TL2 exceedance	Notification to Auckland Council
TL2 exceedance involving significant increase in discharge of contaminants to air.	Notification to Dairy Flat School

3.7.8 Landfill Gas - Emergency Plan

3.7.8.1 Emergency preparedness

The emergency scenarios which are relevant to air discharge and will be dealt with in the site Emergency Management Plan will include:

- fire - landfill
- landfill gas system rupture (gas burning, gas not burning)

A telephone system will be operated to facilitate the placement of complaints to responsible landfill staff. This number (Ph 09 427 0600) will be manned during normal work hours. After hours, a voicemail message will be provided on this number directing the caller to the responsible landfill staff.

Auto-dial systems will be installed and maintained to contact responsible staff in the event of failure to reignite the flare if extinguished and failure of any other system which is likely to cause a significant hazard or unacceptable odour event.

Significant hazards are:

- unacceptable odour event
- fire
- smoke
- earthquake
- unscheduled landings onto landfill i.e. hot air balloon or any other aircraft
- persistent presence of raw gas

3.7.9 Landfill Gas - Safety

3.7.9.1 Methane

Methane (CH₄) is the main component in landfill gas (LFG). CH₄ is the main potential source of harm in LFG.

When CH₄ is introduced into an area, fresh air is gradually displaced until the area may be completely filled with the gas. During this process, the air/methane mixture passes through three specific ranges; lean, explosive and rich.

Mixtures in the lean range, from fresh air to the lower explosive limit (LEL), contain too little gas in relation to the amount of air to burn - propagation of flame does not occur on contact with a source of ignition. The LEL is 5% CH₄ by volume. Mixtures in the explosive or flammable range, which extends from the LEL to the upper explosive limit (UEL), will propagate flame. The UEL is 15% CH₄ by volume. If ignited, the gas can cause damage and personal injury. Mixtures in the rich range, which extends from the UEL to 100% CH₄, contain too much gas in relation to air to be combustible. However, since the addition of air to these high concentrations of CH₄ creates mixtures in the flammable region, rich mixtures must be considered equally dangerous.

3.7.9.2 Scope

The HSE legislation requires that the site must address a number of processes including but not limited to

- Identification of gas hazards
- Hazard control, by elimination, isolation, and minimisation
- Information for employees and contractors

Redvale Landfill Management Plan

- Training and supervision
- Monitoring of employee health
- Emergency procedures
- Recording, reporting and investigation of accidents

These topics are each discussed below.

3.7.9.3 Identification of gas hazards

The following table provides the basic list of hazards for the site in regard to landfill gas.

a) Physical hazards	Comments
Landfill gas fire	Fires may start in exposed and/or decomposing solid waste.
Landfill gas explosion	Explosions may occur wherever landfill gas is present.
Asphyxiation	Landfill gas may cause an oxygen deficiency in accessible enclosures like trenches, vaults, conduits and structures.
Uneven terrain in operational areas	Landfill gas can accumulate in low-lying areas, as it is slightly heavier than air.
Utility services	Underground utilities such as gas, site water, compressed air, leachate, landfill gas, condensate, electric power cables, voice & data communication cables, sewerage, potable water, stormwater, groundwater, lubricants and used oil all exist at the site. Utility trenches often contain backfill which is more permeable to gas than the surrounding ground. The backfill material e.g. gravel may contain landfill gas and carry the gas in harmful concentrations for a considerable distance from the waste pile.
Solar exposure	Landfill gas well monitoring and walk-over inspections involve the technician continuously out in the sun, which could lead to dehydration and sunburn.
Electrical - source of ignition	Areas close to gas sources are classified as hazardous with reference to NZS 2430.3.7:1997, for example: • Any point within 0.25 m around a point of potential gas leakage such as a wellhead, valve, blower, and flanged pipe joint. • Any area within 3 m of a venting duct such as vents on leachate tanks. • Any enclosed or inadequately vented area within the gas system such as a condensate pump shed. • Inside any tank.

Redvale Landfill Management Plan

	Site management will identify hazardous areas on a hazardous area classification plan. Special electrical fittings are required, and a higher level of care is required for any work in a hazardous area.
(b) Activity Hazards:	Comments
Operation of the LFG plant	-
Monitoring of the LFG combustion plant and remote LFG flares.	-
Inspection, monitoring and adjustment of active LFG extraction wells	Routine activities in the outdoor environment and over difficult terrain may entail ergonomic considerations.
Inspection and maintenance of installations like leachate pipes and soakaways.	-
(c) Chemical Hazards:	Comments
Hazardous air pollutants in landfill gas	Hydrogen sulphide (H ₂ S) and other toxic gases may be present. H ₂ S is poisonous at any concentration.

3.7.9.4 Hazard control by elimination, minimisation and isolation

A sample of potentially suitable procedures for the elimination, minimisation and isolation of hazards includes but is not limited to:

- Adhere to site health and safety rules.
- Ensure that at least two people are present at all times when attending any flare or combustion source on the landfill (buddy system). For monitoring of any gas well head and other inspections of gas system elements on the landfill, at least one other person must be advised of the activity who will remain on the site until advised of completion of the activity.
- Follow formal "lock out" procedures to isolate gas/power sources during maintenance.
- Wear hard hats at all times.
- Always wear high visibility clothing in accordance with site rules.
- Wear gloves when working around a flare, combustion source, leachate or condensate source on the landfill.
- Wear recommended protective equipment relevant to the particular task.
- Absolutely forbid any smoking at any time on the landfill within the waste pile footprint and within the gas plant and flare compound.
- Have a fire extinguisher readily available, especially when monitoring gas concentrations within structures and/or confined spaces.
- Whenever conducting bore hole probing near buildings ensure that sub-grade utility lines are located and clearly marked prior to the probing event.
- Avoid all sources of ignition and any equipment that could emit a spark.
- In any hazardous area, ensure that there will be no naked flame.
- Follow proper confined space entry procedures.

Redvale Landfill Management Plan

- During any maintenance work, wear clothing covering all of the body including gloves and splash guard over the face.
- Remove, wash or destroy any contaminated clothing after contact with condensate.
- Rinse any splashes to the skin with water immediately, and thoroughly wash after.
- Seek medical advice in any event of inhalation or ingestion.
- Before gas activities, make eye contact with nearby heavy machine operators to ensure your presence is noted.
- Always check as-built drawings of any area before excavating or drilling.
- If appropriate, use a cable detector to locate cables before excavating.
- Avoid ignition sources around any excavation.
- Test excavations before entry, and enter only if there is no alternative.

Personal Protective Equipment (PPE) may include a selection of:

Safety footwear

- Distinctive high visibility clothing (including a hi-viz vest during construction)
- Head protection (safety helmet or hard hat)
- Hearing protection (appropriate muffs or plugs)
- Eye protection
- Skin protection (full limb coverage non-synthetic clothing)
- Hand protection (suitable gloves)
- Enhanced protection (e.g. rubber or Tyvek PPE items)

Confined spaces work may involve the use of additional equipment for example:

- Positive pressure breathing apparatus
- Forced ventilation equipment
- Personal four-gas meter
- Ladder
- Safety harness
- Lifting winch
- PPE with fastening straps

3.7.9.5 Information for employees and contractors

The site management will operate internal systems to address and communicate health and safety issues relating to landfill gas for the benefit of employees. This will include regular meetings which all relevant staff are expected to attend.

The site will maintain Operations and Maintenance manuals for specific items of plant and standard operating procedures for specific activities relating to landfill gas. These manuals will contain specific instructions and safety notes for any installation, operation, maintenance and monitoring.

Systems will also be operated for the safety of visitors and contractors.

3.7.9.6 Training and supervision

Initial training of employees i.e. induction on topics relating to landfill gas will be performed to familiarise them with:

- The safest methods of completing the tasks and using plant and machinery required of them
- The correct use of personal protective equipment available to them
- The known hazards of the workplace including landfill gas
- The control mechanisms put in place to eliminate, isolate or minimise the hazards

- How to identify hazards in the workplace
- How to identify and notify notifiable work

Each employee who works with gas will be assigned a suitably trained or experienced person as their supervisor.

Work Instructions

In order to facilitate appropriate training for Gas Team operators and to comply with Health & Safety Regulations, a suite of work instructions have been developed to cover off various operational activities undertaken by the Gas Team members at the Redvale Landfill. A full copy of the Work Instructions are kept at the Gas Flare site, and the master copies held in the Main Office.

3.7.9.7 Monitoring

Review of hazards: The site's overall hazard list will be updated periodically and any new hazards that have been identified will be analysed to determine the measures needed to control them. Existing hazards and control measures will be checked, because location, magnitude or timing of the existing hazard may change with time. Employees will be asked to be involved in hazard identification.

Review of training: Employee training will be reviewed frequently to keep up appropriate levels of refresher training relevant to their role.

Review of health: Employees engaged in activities where they are or could be regularly exposed to hazardous materials will be offered the opportunity of health monitoring with appropriate medical examination and testing.

Review of reporting: The content and suitability of reports that are prepared for both internal and external distribution relating to landfill gas will be reassessed at suitable intervals.

3.7.9.8 Emergency procedures

Events relating to safety around landfill gas will be reported and resolutions will be tracked as for general contingencies and emergencies at the site.

The site's Emergency Action Plan will contain procedures for addressing emergency events in regard to landfill gas safety.

3.7.9.9 Record keeping

For the purposes of health and safety, records that are pertinent to landfill gas will be maintained on the site, and may include:

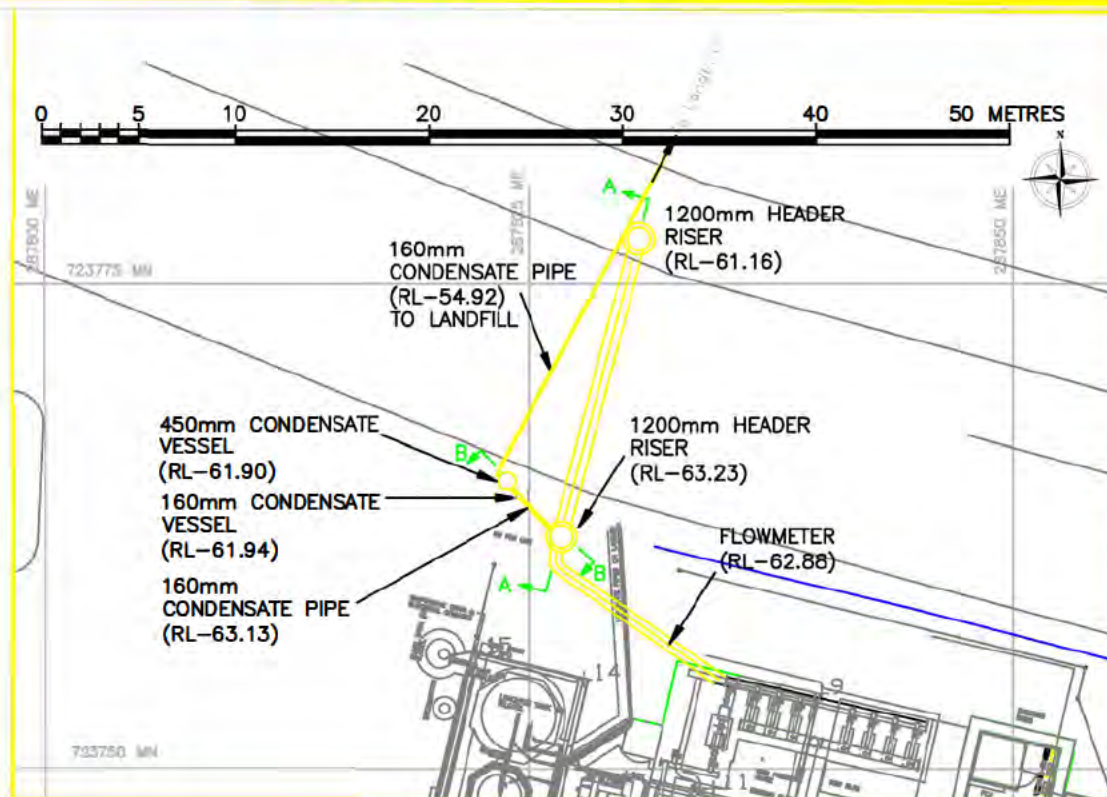
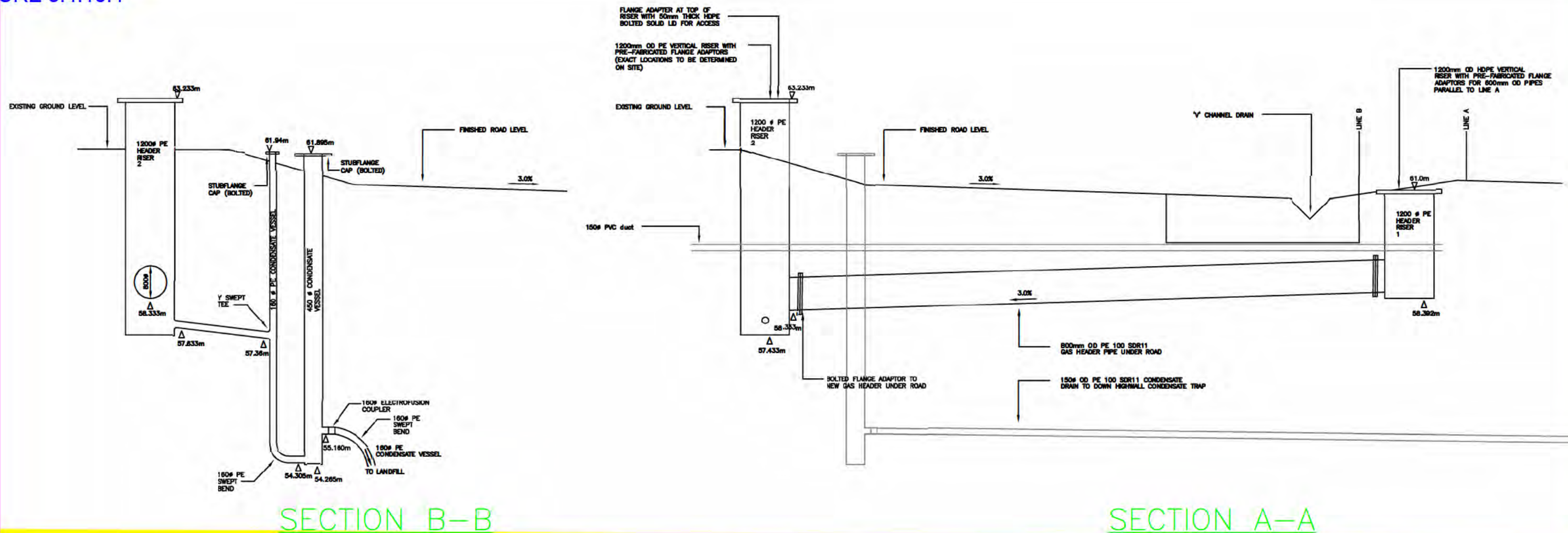
- A hazard list relating to LFG
- A copy of this LFG Management and Contingency Plan
- A copy of the site's emergency management plan
- Details of emergency contacts
- Copies of H&S forms
- Copies of Health and Safety meeting notes and directives
- Authorisation documentation
- PPE issue records
- Copies of reports submitted to authorities relating to LFG

Accidents will be investigated as provided for in the HSE legislation.

Appendix A Gas knockout pot as-built

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FIGURE 3.4.10.4



NOTES:

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REV.	BY	DATE	DESCRIPTION OF CHANGE
A	C.J.	11-08	AS-BUILT

DESIGNER'S REF

CHECKED: C.J. 11-08

APPROVED: D.S. 11-08

DRAWN BY: NFS 11-08

SCALE: SCALE AS SHOWN

CAD FILE : CADFILE

PROJECT TITLE :
REDVALE LANDFILL PROJECT

DRAWING TITLE :
GAS HEADER PIPE
SECTION & DETAIL

Waste Management

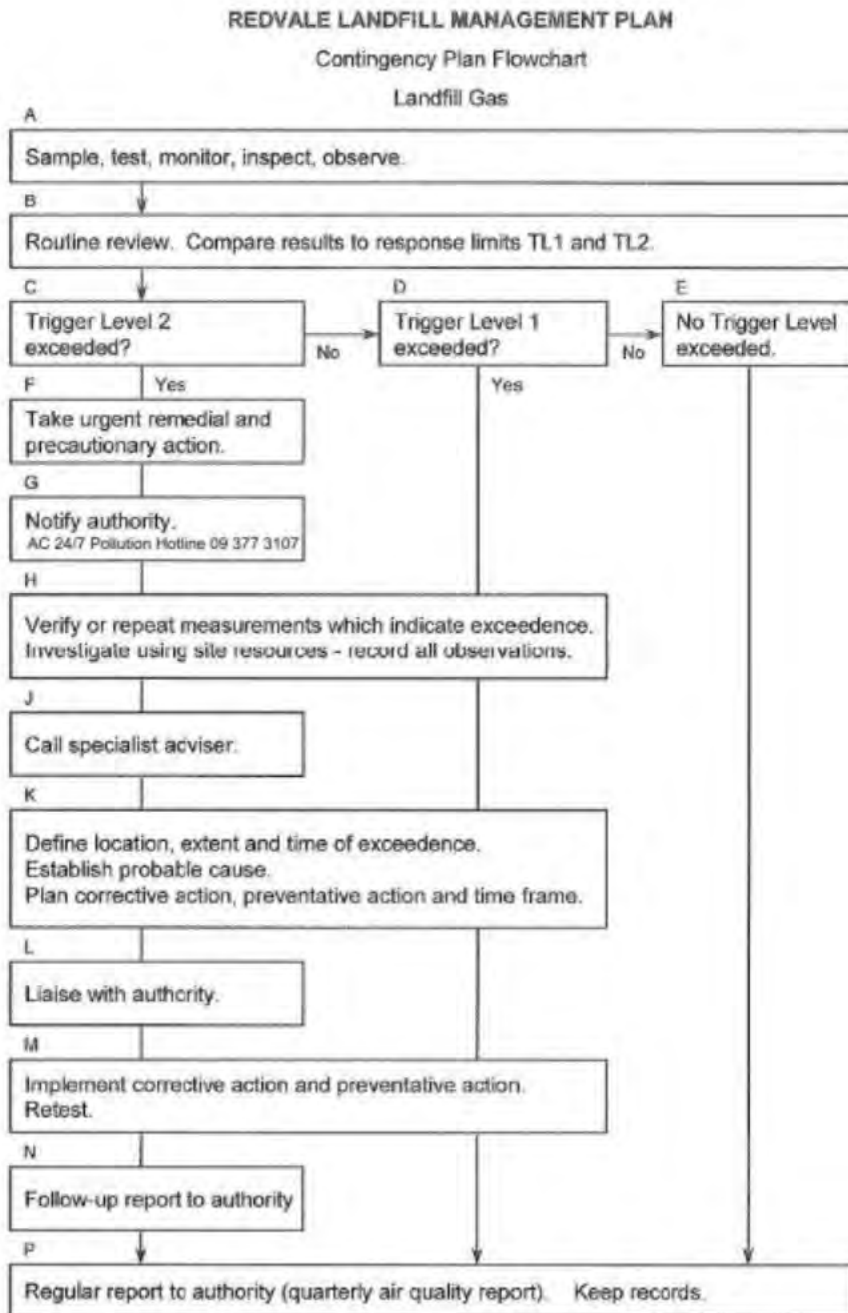


CLIENT :

SHEET NO SITEGA0545

REV: A

Appendix B Contingency plan flowchart



Appendix C List of work instructions

REDALE LANDFILL MANAGEMENT PLAN - LIST OF WORK INSTRUCTIONS FOR GAS

Number	Title
3600.081.001	Construct Horizontal Gas Wells (Laterals)
3600.081.002	Construct vertical gas wells by auger drilling
3600.081.003	
3600.081.004	Construct Vertical gas Wells
3600.081.005	Maintain Switchboards in The Control Room
3600.081.006	Maintain Gas Scrubber #1
3600.081.007	Maintain Gas Hardware at Flare Station
3600.081.008	Maintain Gas Hardware On Landfill
3600.081.009	Design And Installation Of Gas Systems
3600.081.010	Surface Emission Monitoring
3600.081.011	Calibrate gas analyser for high gas concentration
3600.081.012	Monitor Gas At Well Heads
3600.081.013	Monitor Gas From In ground probes
3600.081.014	Download data from Gas Analyser
3600.081.015	Operate Diesel genset at Flare Site
3600.081.016	Operate Flare #1
3600.081.017	Shut down Flare #1
3600.081.018	Maintain Flame Arresters on Flare #1 and LEU
3600.081.019	Refill Flare Slamshut Nitrogen Bottle
3600.081.020	Walk Over Inspection
3600.081.021	Refill Flare/LEU Pilot Light LPG Bottle
3600.081.022	Operate Diesel Generator During Power Failure
3600.081.023	Monitor Gas At Passive Flare
3600.081.024	Empty Water From Oil Bund At Gas Plant
3600.081.025	Gas Planning
3600.081.026	Monitoring At Flare Station Six Monthly
3600.081.027	Measuring H2S In Landfill Gas Using Pump
3600.081.028	Surface Emission Monitoring Follow Up
3600.081.029	Annual Gas Report
3600.081.030	Write And Update Gas Management Plan
3600.081.031	Operate Mobile Landfill Gas Flare
3600.081.032	Monitor Gas At The Flare Station (Daily Reading)
3600.081.033	
3600.081.034	Install Condensate Pump
3600.081.035	Working Alone At Gas Flare Station
3600.081.036	Review Gas Readings Downloaded From The Portable Gas Meter

3.8 Dust management Plan

3.8.1 General

3.8.1.1 Consent requirements

[Condition XX]

3.8.1.2 Reviews

Any proposed revisions will be submitted to AC and the PRP for review and approval prior to implementation.

3.8.1.3 Dust sources

Unsealed Roads	Some of the access roads, haul roads, tip faces and turning areas at the site will be surfaced with either mudstone, limerock or imported metal (blue rock). If these surfaces are allowed to become dry enough the action of vehicle movement will cause dust to be released. Dust release can be increased due to downward facing exhaust pipes, engine cooling fans, and excessive speed.
Sealed Roads	The main access road from Dairy Flat Highway continuing progressively (as the landfill is developed) around the perimeter of the landfill will be tar sealed. During wet weather mud attaches to the tyres, mud flaps, wheel arches and chassis of vehicles travelling on unsealed roads and bare earth areas, e.g. haul roads for carting daily cover. If these vehicles subsequently travel on sealed roads deposition of some of this material will be likely. Should the mud be allowed to become dry enough the action of vehicle movement will cause dust to be released from these sealed roads.
Bare Earth	Bare earth surfaces, left to dry out, have the potential to release dust when exposed to wind action. Bare earth includes daily cover.
Refuse	Certain types of refuse accepted at the landfill will contain fine particles that have the potential to become airborne. This is most likely to happen on windy days, especially while the refuse is being tipped from the truck or bladed into position.
Western Property Quarry	Quarry operations have been completed (i.e. dust issues negligible).
Trotting Track	The Trotting Track is currently used as an empty skip bin storage area by WMNZ.

3.8.1.4 Dust control

Redvale Landfill Management Plan

Speed Control	A maximum speed limit of 30km/hr will be designated at all places on the site. Road signs will be placed on the sites as required. A speed limit of 15km/hr will be designated on unsealed roads.
Road Washing	During and after wet weather, muddy sealed roads at the site will be washed down. This may be done using a water truck spraying the road, followed periodically by a tractor with a rotary broom sweeping the road.
Road Watering	When required, water trucks will be used at the site to spray water onto the surface of dry dusty roads For this and other control purposes a water truck will be maintained on site and in operable condition at all times. There are a number of catch pits and 2 stormwater interceptors installed along the landfill access road to catch the road wash.
Grass Cover	Dust release from bare surfaces at Redvale Landfill will be kept to a minimum by carrying out planned stripping of new earthworks areas and grass planting of completed areas. Intermediate and final refuse cover will be grassed in the next planting season after completion, i.e. in spring or autumn.
Pre-wash	Vehicles leaving the site during wet weather will be required to exit through the pre-wash, before entering the wheel wash.
Wheel Wash	Vehicles leaving the site will be required to exit through a wheel wash
Rumble strips	These are incorporated within the wheel wash
Cattle grids	As at March 2026, WMNZ had installed 1 cattle grid in the outbound carriageway at the site entrance. The outgoing vehicles will be required to go through this and any mud/silt trapped in the cattle grid will be cleaned regularly.

3.8.1.5 Wheel wash

In order to minimise the amount of mud being deposited onto the main access road and being tracked out on to Dairy Flat Highway, vehicles leaving the site will be required to exit through the wheel wash.

Experience has shown that mud which drops from vehicles onto access roads is a main source of dust from the site when it dries. The wheel wash has been periodically improved to recognise site experience and may be improved again depending on new technology or further site experience.

Currently, Redvale has two wheel wash systems established on site known as wheel wash #1 (new unit) and wheel wash #2 (old unit). Wheel wash system #1 is proposed to be decommissioned and removed from the site. Wheel wash #2 is operated in normal conditions to wash dirt from vehicles.

The main features of wheel wash #2:

- A high pressure system.
- Entry controlled by a traffic light signal.
- Vehicles pass over railway iron grates. A combination of water sprays from beneath and beside the vehicles delivers streams of water to wash mud off.

- Signs advise drivers to pass through the wheel wash at a slow speed while water jets are directed at the vehicle's wheels, mud flaps, wheel arches and chassis.
- The wash water is recycled through two sedimentation ponds ("recycle ponds") from which the water is pumped back to a holding tank ready for use again in the wheel wash sprays.
- Periodically, part of the recirculating water is drained to a holding pond where it is tested and, if found to be uncontaminated, it is released to the on-site surface water pond system. The recycle ponds are then topped up with clean water.
- The recycle ponds may also receive potentially contaminated wash water from the separate truck wash bay.
- Water is abstracted from the second recycling pond and is treated with a flocculent to improve its quality before being pumped onto vehicles.

3.8.1.6 Water

Water will be obtained for dust suppression activities from:

- Ponds 1 to 4.
- Pond 5, and prior to construction of the proposed Class 2 footprint extension, Pond 6.

The water from these sources is derived from non-landfill run-off and is expected to be suitable for topping up the wheel wash system and for road washing and dust suppression.

The water from Ponds 5 and 6 is pumped to water tanks on elevated ground, from which it is reticulated to hydrants accessible by water trucks. The water from the other ponds is periodically managed in other ways (gravity feeds, portable pumps) whenever required.

3.8.2 Dust monitoring

3.8.2.1 Consent requirements

[Condition XX]

3.8.2.2 Dust Deposit Gauges

A simple method of measuring dust is to install dust deposit gauges. These are like a bucket on a pole, and the amount of dust accumulating in them is measured each month. The procedure is defined in ISO/DIS 4222.2⁹.

WMNZ at its discretion has periodically put deposit gauges in place at the locations shown in the figure below. For assessment the results are compared to a guideline level of 4 g/m²/30 days above the natural background level¹⁰.

a. Dynamic methods

Other methods may be considered for dust monitoring, including high volume samplers, low volume samplers, real time samplers and light scattering devices.

b. Total Suspended Particulate (TSP)

The exact method to be used if instructions are received from the AC will be determined and agreed at the time of testing.

c. Particle Analysis

⁹ International Standards Organisation, undated: Draft ISO/DIS 4222.2 Air quality - Measurement of atmospheric dustfall - Horizontal deposit gauge method.

¹⁰ Ministry for the Environment. 2016. Good Practice Guide for Assessing and Managing Dust.

Redvale Landfill Management Plan

Testing done on samples taken from the site in the past indicated no danger due to asbestosis or silicosis.

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Redvale Landfill Management Plan



Aerial photo supplied by Transpacific Industries Group (NZ) Ltd and flown by Precision Aerial Surveys (Date of Photography: 28 May 2014)
Property boundaries sourced from Land Information New Zealand data as at 8-Jul-2013 (Crown Copyright Reserved).

SITE PLAN

3.8.2.3 Reporting and record-keeping:

Event	Reporting/Record Keeping
Dust monitoring results at the discretion of the site	Routine monthly report to PRP Record kept for at least 12 months. Provide report to AC upon request.
Contingency response dust monitoring	Report to AC in 3 working days if complaint verified by AC. Routine monthly report to PRP. Routine annual report to AC. Record kept for the life of the landfill.
Total Suspended Particles (TSP) monitoring results	Routine monthly report to PRP. Routine annual report to AC. Record kept for the life of the landfill.

3.9 BeneVap Management Plan

3.9.1 Background

3.9.1.1 Introduction

The site has used the LEU to treat up to 80m³ of leachate per day for about the last 20 years. A BeneVap™ BV300 LEU has been operated at the Site since early 2021. The raw leachate is pumped into the evaporation vessel, where combustion of landfill gas (LFG) via a submerged downward chamber provides heat energy for leachate evaporation to occur. The off-gas vapour is then passed through a demister filter to remove any liquid droplets. Finally, the remaining vapour is heated to 750°C via LFG combustion and dispersed to atmosphere.

The BeneVap will be decommissioned once waste filling commences in that area of the landfill for the Class 1 Landfill expansion. At this stage, all leachate will be trucked off-site for treatment and disposal.

3.9.1.2 Objective

The objective of this document is to outline the processes and procedures needed to comply with the conditions of consent. The document will also cover the identification of corrective measures to be implemented to minimise adverse effects.

3.9.1.3 BV300 LEU Description

The BV300 supplied by BeneTerra is a thermal evaporation unit with a submerged combustion burner that utilises the LFG captured in the landfill. It is capable of treating up to 50 m³ of leachate per day (2.08 m³/hour). Although the rated evaporation rate of the BeneVap BV300 is lower than the old LEU, the actual performance of the old unit was actually very close to the throughput of the BeneVap. There are several improvements made for the new generation LEU technology used in the BeneVap including:

- Higher burner efficiency resulting in a cleaner stack gas compared to the old LEU, this negates
- the need for thermal oxidation in the flare;
- Less gas consumed due to no flaring requirements;
- Ability to vary leachate throughputs;
- Recovered opportunity cost by directing LFG to generators;
- Tried and tested technology in American landfills (BeneVap);
- Improved reliability to treat up to 50 m³ of leachate per day in one BV300.

The greater burner efficiency of the BV300 LEU allows the off-gas to be directly discharged to the atmosphere without being flared, thus resulting in redirecting LFG to generate more electricity. The absence of flaring means that a visible steam plume will be discharged from the BV300 LEU.

3.9.2 Operational and Monitoring Procedures

3.9.2.1 Odour Management

Odour management is included in Section 3.6 above.

3.9.2.2 Visual Effect

Discharging the off-gas at 80-90°C creates a visible plume of steam at the exhaust pipe. The BeneVap

should have a discharge plume that is only made up of steam. When undertaking the daily odour inspection, the air technician will also note the condition of the steam plume. If any unusual characteristics are observed, such as 'smoke' or colour in the discharge, then the Generation Manager will be contacted, and an assessment of the unit will be undertaken.

If the discharge is found to have an unusual characteristic, then the Generation Manager will consider a range of options to address the issue. These options will include:

- Reducing the throughput of leachate in the BeneVap. This has been found to bring the discharge back normal quickly.
- Stopping the BeneVap and undertaking an assessment of the inside of the unit. The build-up of any unusual scaling inside the vessel will be assessed and if appropriate, cleaning will be scheduled before the unit is reactivated.
- Assessment of the leachate quality. The most recent leachate quality parameters will be assessed to determine any significant changes that are associated with the change to the discharge.

3.9.2.3 Noise Effect

The BV300 vessel emits a noise that should remain below the site threshold for overall noise levels.

There is potential for the noise to exceed the limit at the boundary if the unit is not operated correctly. The blower is the unit with the most potential to emit a noise that could cause a complaint. The blower will be inspected for any unusual operation as part of the monthly checks so that anything that could cause an increase in noise emissions is detected early.

3.9.2.4 Leachate Testing

An annual test of the leachate will be undertaken. The test will include both the feed leachate and the concentrate, to potentially enable mass balance testing for anything that could be discharged to air. The results will be analysed for the concentrations of contaminants including Mercury (Hg), Volatile Organic Compounds (VOC), and Per- and Poly-fluoroalkyl substances (PFAS). PFAS is a relatively new area of concern for regulatory bodies due to the accumulation behaviour of the contaminant. Mercury is a highly toxic metal that can enter the landfill in many ways. All the above contaminants will be analysed once per year by an experienced and trained Environmental technician. The method of sampling can be found in the work instructions which are attached in Section 3.9 Appendix C. All analysis will be undertaken by an accredited laboratory.

Conductivity and Turbidity of leachate is continually monitored in the feed line to the BeneVap. The trigger level will be derived from the historical leachate data collected by the site Environmental technician. The conductivity will be derived using the mean of the historical leachate testing at the landfill, +2 standard deviations. The suspended solids will be assessed using measurements from a turbidity probe. A monthly suspended solids test will be carried out for a period of the 1st 12 months of operation. These will be checked against the turbidity readings to derive the relationship between the turbidity and suspended solids. A trigger level will be derived using the same process. Thereafter, the turbidity will be monitored to ensure the suspended solids remains within the required normal range.

3.9.2.5 BV300 Maintenance

BV300 maintenance is carried out by a trained technician on monthly basis using a check list provided by the supplier. The inspection, monitoring and maintenance procedures includes:

- BV300 operational lines.
- Isolation check.

- Fuel supply.
- Gas blower maintenance.
- Pilot supply.
- Burner head and roof.
- Stack and chevrons.
- Electric supply and panels.
- CV level pressure transmitter.
- Influent pump.
- Discharge valve and tank.
- Concentration vessel.
- Air compressor.
- Drive belt.
- Anti-foam pump and nozzle.
- General structure check.
- Check before start-up.

More details regarding maintenance and monitoring can be found in the supplier check list in Section 3.9 Appendix C.

3.9.2.6 Combustion Efficiency

The BV300 unit can be run on several automatic modes in relation to the concentration of leachate as well as the air and fuel supplies. The following modes are listed below:

- Continuous or batch mode.
- Minor discharge mode.
- Auto Fuel enable mode.
- Auto Air Fuel Ratio (AFR) mode.

BV300 is normally run on the preferred auto AFR mode, which is adjusted automatically using AFR set point or the combustion chamber temperature by toggling the oxygen or combustion chamber sensors. The auto AFR mode can be confirmed by looking at the “main” and “setup 2” screens and ensuring the “Auto AFR” button and the “fuel control enabled” button indicator lights are green and the air fuel equivalency ratio set point is set. This mode provides a stable process by adjusting air flow for a set gas flow rate to maintain the combustion chamber temperature set point. The frequency of inspection and clean out of the combustion chamber is set at a maximum of 4-week intervals.

3.9.2.7 Instrumentation

The BV300 vessel concentration temperature is measured using type J thermocouple. The thermocouple is wired into the interface card/relay model in the main panel and record temperature continuously. The thermocouple shuts the BV300 down in case of rise in temperature above 90 degrees. Exhaust stack and combustion chamber are equipped with type B thermocouple. Type B thermocouples are usually used to measure/record very high temperatures. All the offset temperature for vessel, stack and combustion chamber can be found on the setup 1 screen. The offsets are used to calibrate the sensors. The suspended solids and metals content of leachate entering the BV300 LEU will be continuously recorded monitored and recorded using nephelometer and electrical conductivity meter. The trigger levels for conductivity will be derived using historical landfill leachate testing while suspended solids will be assessed using turbidity probe.

3.9.2.8 Staff Responsibilities

Redvale Landfill Management Plan

Name	Designation	Duties
Glen Jujnovich	Regional Landfill Manager	- Overall management of BV300. - Reporting to AC for any non-compliance issues.
Cawood McCall	Generation Manager	To ensure that all the processes relating to BV300 must be operated, maintained, supervised, monitored and controlled in accordance with the BV300 management Plan.
Ben Lowther (or a designated alternative person)	Air Technician	- Carry out daily odour inspection. - Check the site's telemetry system for wind direction and wind speed. - Record and investigate any odour or visual complaints.
Max Harrison	Environmental Technician	Carry out leachate sampling as per the BV300 management plan.
Cawood McCall	Generation Manager	Inspection, operation and maintenance of BV300.
Jim Jefferis	Head of Environmental Engineering and Consents	Provide support for compliance and reporting.
Thinesh Tharan	Head of Engineering	Provide technical support for any mechanical issue with BV300.

3.9.3 Contingency Plan

3.9.3.1 Emergency Shut Down

In the event of the identification of any abnormal air discharge from the BV300 LEU that the Generation Manager considers could be causing an adverse effect beyond the boundary if the site, the emergency stop button must be activated to avoid any discharge going into the air. The emergency stop button is located on the side of the unit. Any unusual discharge shall be reported to the Landfill Manager immediately.

3.9.3.2 Response guidelines

Monitoring Event	Response Guidelines
Any excessive Build-Up of Scaling	Investigation actions include: Turn off the BV300 immediately.

Redvale Landfill Management Plan

	BV300 will be decommissioned and water blaster can be used to remove the build-up scaling.
Odour at a frequency and intensity that might be considered offensive by a reasonable person detected at the notional boundary that is directly attributed to the BeneVap	Investigative actions include: - Review leachate data to identify any unusual changes in the conductivity or turbidity. - Follow the complaints procedure if a complaint has been received. - Check wind speed, wind direction and barometric pressure. A portable odour system can be used as a remedial or precautionary action based on the outcome of the investigation, or at the discretion of the odour technician (i.e. if it is a particularly windy day).
Unusual visible discharge	Potential corrective actions: - Immediately turn off the BV300. - Report to Landfill Manager. - Carry out a detailed inspection of the whole unit. - If required complete additional sampling of raw and treated leachate for laboratory analysis.
Daily odour and visual inspection procedure	Check whether the BeneVap unit is working or not. - Check the site's telemetry system for wind direction and wind speed. - Drive to downwind direction areas. - Record if BeneVap odour is detected, intensity, and duration. Recheck the site's telemetry system for wind direction and wind speed. - Record the finding and if BeneVap odour is detected, submit results immediately to the Landfill Manager.
Noise, potentially from the BeneVap, audible outside of the boundary	- Check the operation of the BeneVap, including the blower, for anything unusual that could result in increased noise. - Check the noise attenuation barriers are in place at the Energy Centre. - Contact designated noise consultant = Marshall Day Acoustics, to come out to site and undertake a noise assessment.
Conductivity or Turbidity exceeding the trigger	- Complete additional sampling of raw and treated leachate for laboratory analysis. - Check for any changes to the discharge plume. - Report findings to Auckland Council in the standard quarterly monitoring report.

3.9.3.3 Complaint response

The following information must be supplied to Auckland Council when receiving a complaint:

- Details of the nature of the discharge;
- An explanation of the cause of the incident; and

Redvale Landfill Management Plan

- Details of remediation action taken.

If an odour, noise or visual complaint is received by the community, the investigation and notification to council will be within one working day.

All complaints regarding the operation of the BV300 LEU that are received must be recorded. The complaint details must include:

- The date, time, location and nature of the complaint;
- The name, phone number and address of the complainant, unless the complainant elects not to supply these details;
- Weather conditions, including approximate wind speed and direction, at time of the complaint; and
- Any remedial actions undertaken.

Details of any complaints received must be provided to the Council within one working day of the complaint.

3.9.3.4 Record keeping and Reporting

Daily data will be kept during the operation of the BV300 and will include key quantity parameters which are details as follows:

- Leachate volume processed;
- Landfill gas utilised;
- Temperature of leachate

The flow rate in and out of the BV300 is controlled by the programmable logic controller (PLC) and is a function of vapourisation. All the leachate processing volume readings are continuously monitored and a daily report is generated. This daily data is consolidated monthly and provided to the Redvale Landfill Peer Review Panel, who then include the data within their 6-monthly reports to Auckland Council.

Potential event	Reporting
Change in the operations	Annual review of LEU-MP
Odour/Visual complaint received	Notify AC within one working day
Air Quality Exceedance as per Section 3.6.5	Notify AC as soon as possible

Appendix A Odour Patrol Log Sheet

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[illegible]

Appendix B Work Instructions for Leachate Sampling

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Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System

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Date:	22/08/2024		Risk Assessment No:	
Division:	UNI	Branch/Site:	Redvale Landfill	
Task Location:	Energy Park – Redvale Landfill		Work Activity:	Leachate Sampling
Permits / Authorisations required:	WORK PERMIT: ☐ BREAKTHROUGH: ☐ CONFINED SPACE: ☐ HOT WORK: ☐ FALL PREVENTION: ☐			
Permits / Authorisations approved and reviewed by:				Date:
Work Instruction prepared in consultation with: <i>List all persons involved</i>	Max Harrison, Glen Jujnovich and Laiana Barbosa			Date: 22/08/2024
Comments	This work instruction is for sampling raw leachate and concentrate from both the Leachate Evaporation Unit (LEU) and BeneVap.			
Process:	Name:	Position Title:	Signature:	Date:
Task Manager Approval:	Max Harrison	Environmental Technician	<i>Max Harrison</i>	30/08/2024
HSEQ Approval:	Louise Barratt	HSEQ Partner	<i>L. Barratt</i>	30/08/2024
Final Approval:	Glen Jujnovich	Regional Manager	<i>G Jujnovich</i>	30/08/2024



REQUIRED EQUIPMENT	
PPE Required: • Chemical resistant gauntlet gloves • Safety glasses • Face mask • Coveralls • Steel cap footwear <i>For example</i> 	Additional equipment/Tools: • Sample bottles • Chilly bin • 10 L Bucket to capture any spillage • Indelible waterproof marker pen
REQUIRED LICENCES & COMPETENCIES	
Licenses:	Competencies:
LEGISLATIVE REFERENCES (Optional)	



Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
Preparation for sampling	1. Sample bottles should arrive from the analytical laboratory at least one week before needed for sampling, this occurs automatically from the Sampling Schedule which is sent to the analytical lab at the beginning of each calendar year. 2. Ensure ice bricks are in the freezer on the night before sampling. 3. Place sample bottles in a chilly bin with ice bricks after writing on the sample numbers and date (See next section), immediately prior to sampling.	Note, the technician must make appropriate preparations for sampling <u>before</u> the sampling day.	Laboratory Technician
Procedure - Documentation	4. Obtain sample bottle sets. Usually 2 bottle sets for leachate and one container for LEU/BeneVap sludge. 5. Obtain the Environmental Monitoring Sample Register and enter the details of each bottle in each sample set. 6. Complete the following fields for each sample bottle, in the Environmental Monitoring Sample Register: • Date - date of sampling, not document preparation.	Note, documentation must be done accurately to avoid any confusion about sample results and sample locations.	Laboratory Technician



Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	• Sampler - person's initials. • Location - actual sample location. • Bottle - e.g. 100/P/P/F/C = 100ml/Plastic/Preserved/Filtered/Chilled. • Analyte - e.g. List 3. • Lab - e.g. Hill's. Copy the WM sample numbers onto the correct bottles using an indelible waterproof pen, along with any other information (e.g. date) required by the independent lab.		



Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System
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Procedure – Taking Samples	7. First communicate with relevant staff working with LEU/BeneVap and let them know about the sampling plan 8. Transport the equipment to the BeneVap compound. 9. Put on disposable gloves, disposable coveralls, safety goggles and a face mask. 10. To alternate between the different Leachate Sumps, go to the touch display (Photo 1) and tap the screen. Select the box containing 'OVERVIEW'. New options will appear and select the box called 'LCS Pumps'. Tap the box beneath 'Select feed source' (Photo 2) to cycle through the different Leachate Sumps to the one you intend to sample. Wait a few minutes for	Note, leachate sampling always needs to be done in the presence of staff working in the leachate department.	Laboratory Technician
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Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	the leachate in the pipes to cycle through before sampling after changing the feed source. 11. Hang the 10-litre bucket from the tap in the pipeline to catch any overflow from filling the bottles. 12. Fill all the bottles in the sample sets from the taps on the relevant Input Lines. This will require that some bottles must be partially filled, and the resulting foam allowed to subside before continuing the fill. 13. Place the sample bottles back in the chilly bin. 14. Empty the contents of the plastic bucket in the corner of the bunded area and rinse with the nearby hose line. 15. If a LEU sludge sample is required, enlist the help of a member of the gas team to remove the pipe end cap. Gently open the valve a little to allow some sludge to be collected in the plastic bucket. Fill the sludge container from the bucket. Use the hose to clean the bottle, bucket and work area.	 Photo 1: Display system for BeneVap	



Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System

Safety First, in everything we do

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
	16. If sludge/concentrate from BeneVap unit is required, please ask the help of relevant staff to show the outlet tap from where the sample is taken out. As sludge is very hot, be very careful and first collect the concentrate in a bucket, from there fill the sampling bottles with the help of a small jug. Drain the remaining sludge from the bucket into a nearby drain (photo 3). 17. Place the sludge sample bottle in the chilly bin and inform relevant staff that you have finished the sampling and you are now leaving the site.	 Photo 2: Leachate Sump selection screen	
PROCEDURE – Dispatching Samples	18. Back at the lab, put on disposable gloves and wash the outside of the bottles and inside of the chilly bin. Dry them or allow them to dry before packing for dispatch. 19. Pack samples in the independent lab chilly bin. Add one to three ice bricks and packing material as appropriate. 20. Include C.O.C. and purchase order with samples to be delivered to the analytical laboratory. 21. Seal and address the chilly bin, stick it on the courier label and place it in the front office to be collected by the courier.		Laboratory Technician



Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System

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WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person (optional column)
		 Photo 3: Location of the inflowing leachate concentrate sampling valve	



Leachate Sampling

Work Instruction Form^(v4)

HSEQ Management System
Safety First, in everything we do

I have read and understood the attached Work Instruction (<i>Enter name and sign</i>)				
Name:	Signature:	Company:	Date:	Inducted By:

Appendix C BV300 Monitoring and Recording Logbook

DRAFT

Project Name:

Project No:

This checklist is to be followed when completing a scheduled maintenance service. Only certified EneTerra technicians or persons(s) under supervision or instruction of BT technicians are to access the unit during maintenance. The following forms/checklists must be completed prior to maintenance: Prestart, Take5 (or similar), SOP-10 BV300 operations.

Checks while BV300 operational				Y	N	N/A	Record	Electrical Supply and Panels				Y	N	N/A	Record
Spray test main gas train - any leaks or signs of corrosion?								Visual inspection on electrical panels, circuit breakers and fuses							
Spray test pilot gas train - any leaks or signs of corrosion?								Visual inspection for damage on electrical leads - #SC							
Visual inspection of influent train - any leaks or signs of corrosion?								Visual inspection for damage on VFD's and ignitor box							
Visual inspection of combustion air train - any leaks or signs of corrosion?								All panels closed and locked post checks							
Visual inspection of discharge line - any leaks or signs of corrosion?								CV Level Pressure Transmitter				Y	N	N/A	Record
Visual inspection of CV inspection hatches - any leaks or signs of corrosion?								Remove level PTs and clean PT housing from any grit							
Conduct full discharge cycle and stop when CV starts to refill								Check PT intact							
Isolation Checks				Y	N	N/A	Record	Check PT electrical wiring secure							
Full discharge cycle stopped and unit is shutdown								Check PT floating solenoids are not blocked							
Power supply isolated								Combustion Air Fan				Y	N	N/A	Record
Main gas and pilot gas supply isolated								Grease CA Fan TEFC motor (motor running)							
Influent supply isolated								Ensure fan impeller and shaft moves freely							
Fuel Supply				Y	N	N/A	Record	Check CA valve working and grease shaft							
Check MG filter for moisture and debris								Drain CA fan with manual ball valve							
Replace filter and clean intervals if required								Influent Pump				Y	N	N/A	Record
Remove and clean MG flow meter using dry cloth								Check for leaks and integrity of pipe work - #SC							
Check flow meter integrity and for loose wires								Check pneumatic valve and fittings for signs of corrosion							
Check relief valve is intact and not blocked								Check influent flow meter intact and loose wires, operational							
Check low and high pressure switch intact								Check actuator is intact							
Check safety block valves and LDU intact - #SC								Discharge Valve and Tank				Y	N	N/A	Record
Check all Pele's plugs operational								Check butterfly valve for leaks - #SC							
Check for signs of corrosion on contact points								Check operation of manual butterfly valve							
Gas Blower Maintenance				Y	N	N/A		Check integrity of pipework and discharge tank for leaks or corrosion							
Oil - FUCHS Reolin Unisyn CLP320 or Mobil SHC 632															
Service Gas Blower at required intervals as per supplier specs - See Appendix I of Gas Blower O&M Manual								Check integrity of discharge tank float switch							
Pilot Supply				Y	N	N/A	Record	Concentration Vessel				Y	N	N/A	Record
Check LPG bottles stamped - current								Remove inspection door and check gaskets and bolts for corrosion or wear and tear							
Check primary pressure regulator valve intact - #SC								Visual inspection of CV internal walls - any signs of damage or corrosion?							
Check filter for moisture and debris								Visual inspection of CC and baffle plates - any signs of damage or corrosion?							
Check rego relief valve for blockages								Visual inspection of CC exhaust triangles - any signs of damage or blockages?							
Check over pressure slam shut valve intact - #SC								Clean CV, CC and exhaust triangles using high pressure cleaner							
Check secondary pressure regulator valve intact - #SC								Air Compressor				Y	N	N/A	Record
Check pressure indicator - operational and no leaks								Check integrity of tube and fittings, drain accumulator							
Check copper relief lines are intact								Check filter for blockages							
Check pressure switches are intact								Service compressor every 6 months as per Supplier specs							
Check safety block valves intact								Anti-Foam Pump and Nozzle				Y	N	N/A	Record
Check all Pele's plugs operational								Check anti-foam pump, hoses and fittings for leaks							
Check for signs of corrosion on contact points								Remove and clean nozzle and fittings							
Burner Head and Roof				Y	N	N/A	Record	Check anti-foam has sufficient supply							
Check integrity of roof structure								General Structural Checks				Y	N	N/A	Record
Check all plumbing, nuts and bolts around burner								Paint touch-up as required							
Check functionality of fuel modulating valve and cam system								Steel framework in good condition							
Check fuel modulating valve motor for loose wires								Ladder and handrails in good condition							
Check ignitor plug, cable integrity and clean - #SC								Doors and vents in good condition. Rear doors locked open							
Check for signs of corrosion on contact points								Checks before start-up				Y	N	N/A	Record
Check UV sensor integrity, bulb, sight glass any loose wires - #SC								Inspection hatch bolted in place with gaskets							
Check O2 sensor for corrosion and exhaust port is not blocked, isolation valve working								Chevrons replaced with chevron drawer							
Check HSPT is intact								Isolation valves all opened and supply returned, influent pump primed							
Stacks and Chevrons				Y	N	N/A	Record	Remote and database connection available							
Check integrity of stacks, chevrons and draws								All alarms cleared and setpoints checked							
Remove and clean chevrons with high pressure cleaner								Note refill capacity							
Check integrity of stack bolts and gaskets for wear and tear															
Check stack temp probe mountings intact															

Comments / Information / Maintenance or Repair Details, when last serviced etc.:

#SC denotes a safety critical component which requires a check on functionality besides the checks listed in this checklist.

*Planned shutdowns should occur daily/weekly/fortnightly on projects and preventative maintenance frequency will be confirmed during commissioning.

**Checking an item includes full functionality, including operational, structural, mechanical, cracks, leaks, electrical and visual aspects.

Inspected by - Name:

Signature: _____

Date: _____

Auckland Council | Compliance Certification | DIS60373665 | 30/08/2024 | Page 27 of 27

3.10 Noise Management Plan

3.10.1 General

3.10.1.1 Relevant New Zealand and Internal Standards

The relevant noise standards are as follows:

- NZS 6801:2008 "Acoustics – Measurement of environmental sound"
- NZS 6802:2008 "Acoustics – Environmental Noise"
- NZS 6803: 1999 "Acoustics – Construction Noise"
- IEC 61672-1:2013 "Electroacoustics – Sound level meters - Part 1: Specifications"

3.10.1.2 Overview

Requirements in regard to noise are contained in consent Conditions 42 to 44. Condition 42 sets limits on the operational noise levels which are specific to site. All the periodic tasks related to landfill operations are considered as operational tasks.

The environment in which the landfill operates already experiences considerable residual sound from birds, general traffic on Dairy Flat Highway, farm machinery, aircraft and quarrying and typifies the working nature of a mixed rural zone. In order to capture specific sound from landfill operations in some cases requires measurements to be performed closer to the site followed by calculations to extrapolate sound levels to neighbouring properties.

3.10.1.3 Noise Management Plan and Revisions

The objective of the NMP is to outline the methods and measures by which the site will demonstrate the adoption of best practicable option (BPO) and ensure compliance with the consent noise limits in [Condition XX] .

Any material changes to this NMP shall be certified by Auckland Council (AC). As the NMP forms a part of the LMP, the approval of the Peer Review Panel will also be obtained.

3.10.1.4 Noise Limits

The noise emitted from on-site landfill operational activities shall comply with the following noise limits at the site boundary of any dwelling existing as at the date of granting this consent [date consent granted]. This will not be applicable to any houses on the land owned by WMNZ.

Noise limits

Time period	Noise limit
0600 to 0700 hours Monday to Saturday	45 dB L_{Aeq}
0700 – 2000 hours Monday to Saturday	55 dB L_{Aeq}
At all other times	45 dB L_{Aeq}

At all other times	75 dB L _{Amax}
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3.10.2 Construction

3.10.2.1 Construction works

Construction works are defined in accordance with NZS 6803:1999 and include initial establishment work, building construction, internal road construction, fencing, drainage and cell liner work. Seasonal earthworks associated with the Class 2 expansion falls under this definition. The other remaining site works to be considered as construction works are:

- the formation of noise control bunds on the outside edge of the waste pile, which may take in the order of one month in advance of waste placement behind the bund
- new building construction
- capping of the perimeter earth fill bunds which form a shoulder for the waste pile
- establishment of new dam if required
- stockpiling soil on neighbouring properties if the separate applicable consents do not specify noise controls

3.10.2.2 Noise sources

Heavy earthmoving machines are the likely source of greatest construction noise. An indicative plant list includes the following items. This list may be varied depending on the seasonal scope of work.

- Excavators
- Loaders
- Graders
- Bulldozers
- Earth compactors
- Articulated dump trucks
- Six-wheeled dump trucks
- Watercarts

3.10.2.3 Time restrictions

The majority of construction work will occur during the summer months. Work will typically start at 7:00 a.m. and finish at up to 8:00 p.m. on weekdays or start at 7.30 a.m. and finish no later than 6:00 p.m. on Saturdays. On public holidays, only quiet controlled work may be undertaken. On Sundays, no construction work will be undertaken.

3.10.3 Operations

3.10.3.1 Operational works

Operational works are considered to be all other activities not defined as construction and include the on-going placement of refuse, winning of cover (daily, intermediate and final), placement and compaction of cover, equipment maintenance and all ancillary works associated with landfill tip face operation.

3.10.3.2 Noise sources

As for construction, the heavy earthmoving machines associated with cover placement are the likely source of greatest noise. Also, noise from the landfill compactors and bulldozers may be significant during refuse placement on outer elevated parts of the refuse pile. An indicative plant list includes the following items.

- Landfill compactors
- Excavators
- Bulldozers
- Grader
- Tractor
- Watercarts
- Off-road dump trucks

3.10.3.3 Time restrictions

The maximum hours of business for the receipt and disposal of waste are specified in [Condition XX] as 6:00 a.m. to 6:00 p.m. Monday to Saturday. These hours may be extended to no later than 9:00 pm for equipment maintenance works only. Site management may from time to time at their discretion set customary opening and closing times within these hours. As of 2026, the landfill gate opens for the refuse trucks at 6:15 am, Monday-Saturday. The landfill will remain open for business on some public holidays but will have to comply with the appropriate noise limits on those days. No operational work can be undertaken on any Sunday.

Wherever necessary, work has to be curtailed by restricting the plant items and work practices in locations which are elevated and near boundaries. Methods to control noise generally are listed in the contingency plan Section 3.10.6.

3.10.4 Energy Centre

3.10.4.1 Overview

The energy compound contains the following operating plant and ancillary facilities:-

- Leachate Evaporation Unit (LEU) (x1)
- Blowers (x3)
- Generators (x15 including standby units⁴)
- Flares (x3) – (1 x flare for the LEU and 2 x sStandby fFlares)
- Workshop (x1)
- CAT 550 kKVA Standby generator (x1)
- BeneVap BV300 Leachate Evaporation Unit (LEU) (x1) [located separately from and north of the Energy Centre]

3.10.4.2 Noise sources

The existing generators and, blowers, flares and leachate evaporation unit are the prominent primary noise sources within the energy compound. There would be additional Secondary noise sources (e.g.include the LEU and flares. Additional leachate evaporation units and additional gas powered generators etc.)generators which the site has planned to install progressively as the landfill progresses. Other tertiary sources of noise will sources include the noise generated during establishment / repair and servicing of machinery.

3.10.4.3 Noise Control

WMNZ will consider all practicable measures to control noise emissions from the site in accordance with the main objective of the NMP. The measures will include but not be limited to:

- regular servicing of the equipment present on site;
 - noise emission is to be considered as one of the key decisive factors when procuring new plant / machinery;
 - noise emission testing for the new equipment will be undertaken to ensure that it firstly aligns with the manufacturer-supplied specification. Secondly, if the emitted noise from the new equipment in conjunction with noise emitted from the existing sources exceeds the limit, then the new machine will not be used until the noise control measures are in place such that the emitted noise complies the site noise limit;
 - fitting exhaust silencers where practicable;
 - switching off the plant / machinery when it is not required to be running;
 - limiting the use of horns to only during an emergency;
 - maintaining haul roads in good condition and at gentle grades;
 - making operators aware of potential noise nuisance;
 - construction of bunds of about 5.5 m height on the outside edge of the waste pile adjacent to the active landfill area - this would avoid line-of-sight between neighbours and machinery engaged in operations;
 - scheduling some activities when wind direction is away from the closest residences;
 - minimising the number of heavy plant items using haul roads;
 - using smaller or quieter plant for some operations;
 - siting of noisy plant and machinery to reduce the effects on neighbours where practicable;
 - guidance on minimising noise effects on neighbours when using starter pistols and guns as bird and vermin control;
 - making provision of broadband reversing alarms instead of traditional pure tone beepers in all the plant and equipment owned or operated by WMNZ. As at 2026, all mobile operational plant on site are fitted with broadband reversing alarms. WMNZ will also encourage customers and contractors to adopt the same alarms where possible;
 - low-frequency noise emitted from the starting process of gas flares is considered as an important source of noise. Site will remain proactive in reducing the emission of such noise. Appropriate methodology will be adopted to practicably reduce low-frequency noise emission.
 - prior to the installation and operation of any new ore replacement plant on site (e.g. generators, leachate evaporators, blowers and flares), the potential noise levels at the notional boundary of the nearest affected dwellings will be calculated based on the simultaneous operation of the new and existing plant that would reasonably be expected to operate together. Any noise mitigation measures that may be required to maintain compliance at all times will be identified and applied prior to the operation of the new plant. Once the new plant is operational, the noise emissions will be measured to confirm compliance or otherwise with the relevant noise limits. If non-compliance with those noise limits is identified, the operation of the new plant will be suspended until further noise mitigation measures are implemented. Once compliant noise emissions are confirmed the process will be documented and submitted to the satisfaction of AC. .
- **Vibration Noise from Standby Flares :**

A low-frequency noise can be produced during the initial start-up of the standby flares. The noise has been investigated and found to be caused by the factory setting of the automatic start-up procedure which allows an excessive supply of air to the flame during the initial start-up process. This causes the flame to 'detach & reattach' from the burner and the resultant noise is commonly known as 'flare rumble'. The following mitigation measures will be implemented to prevent flare rumble during start-up:-

- a) Flare start-ups to be carried out manually by a trained member of the team so as to avoid using the auto start-up settings
- b) The technicians who carry out the manual start-ups will receive ongoing training about preventing flare rumble during start-up.
- c) The auto start-up will not be used until the factory setting has been changed to prevent flare rumble.

The following noise mitigation items have been completed as part of noise emission reduction:-

- (a) Installation of low noise blades on the cooling fans
- (b) Acoustic screening for the blowers
- (c) A 4.5m acoustic barrier wall to mitigate the noise breaking out from the existing generator enclosures

3.10.5 Monitoring

3.10.5.1 Monitoring locations

The locations for noise level measurements will be at the discretion of the noise monitoring consultant..

The number of sites to be monitored may be decreased or increased from time to time according to the relevance to current activities on the site.

3.10.5.2 Monitoring frequency

Noise is to be measured:

- In conjunction with a prior modelling assessment after any new generator/flare/evaporator plant etc. is installed, and;
- In response to any reasonable noise complaint or request by AC, if no obvious source is identified and removed or remediated.

3.10.5.3 Measurement methods

Routine noise level monitoring will be on an annual basis. The timing of the measurement of the noise will be at consultant's discretion. However, it is expected that it will include both the noisiest time of the day as well as the early morning noise levels (between 6am and 7am). The noise levels will be measured and assessed in accordance with New Zealand Standards NZS 6801: 2008, "Acoustics – measurement of Environmental Sound", and NZ 6802: 2008 "Acoustics – Environmental Noise". All construction noise will be measured and assessed in accordance with NZS 6803: 1999 "Acoustics – Construction Noise".

3.10.5.4 Reporting

As a guide, reports on noise measurements will:

- (a) state whether each measurement applies to operations or construction;
- (b) state the limit applicable to each measurement, and source document for the limit;

- (c) explain the measurement site selection;
- (d) describe or provide plans of the measurement sites, and relationship to notional boundaries;
- (e) state whether the sound level meter complies with IEC 61672-1;
- (f) state whether noise was measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008;
- (g) identify the title and amendment/version number of the New Zealand Standards and International Standards referred to;
- (h) present the results in tabular form which could be independently checked in terms of L_{Aeq} and L_{Amax} against the limits in [Condition XX] ;
- (i) state date, time and weather conditions during the measurements;
- (j) state that the report preparer was familiar with the NMP which is part of the Redvale Landfill Management Plan;
- (k) identify any specific sources contributing significantly to the noise measured;
- (l) recommend any appropriate remedial measures.

Noise monitoring results will be forwarded to the AC and the PRP on request. If results are sent to the AC, a copy of the letter of transmittal will be sent to the PRP as well.

3.10.5.5 Noise Complaint Procedure

Noise complaints can be made via a number of ways; telephone, text message, online form found at community webpage, email or in writing. A dedicated webpage will be maintained for the Redvale community which will contain the relevant information; complaint form, time, day, complainant name, address etc. to inform the complaint response procedure. The details of the complaint procedure are outlined in Section 2, of the LMP.

Site will maintain a register with the details of all the complaints received on site, response to any reasonable complaints, any noise issues identified by the investigation and details of any noise reduction measures taken. The register will be made available to AC upon request.

3.10.6 Noise Contingency

3.10.6.1 Response limits

Trigger levels

Response limits (or trigger levels) are values for the monitoring parameters which, if exceeded, require a course of action to be taken. Upon completion of a monitoring event, the results will be checked against the pre-specified response limits. If no response limit is exceeded, the monitoring event will be routinely reported in due course. If any response limit is exceeded, action will be taken immediately as described in this contingency plan. The limits are set at two levels:

Trigger Level 1 (Lower response limit)

Exceedance of TL1 warns of potential adverse effects, warns of potential future non-compliance with the resource consent conditions, requires investigation, and might require remedial action.

For noise, TL1 is reached if any L_{Amax} or L_{Aeq} noise level exceeds the level quoted in Section Error! Reference source not found. less 3 dB(A). If any noise complaint is received from the neighbours, it will also be considered as TL1 exceedance.

Trigger Level 2 (Upper response limit)

Exceedance of TL2 will be regarded as strong indication that significant harm to community amenity values and breaches of consent conditions either have occurred, are currently occurring, or are about to occur. The upper limits will be set either at limits specified in the consent conditions or at

limits which if exceeded indicate non-compliance. Exceedance of TL2 requires urgent mitigative actions, notification of authorities including AC and PRP, calling the specialist adviser, prompt investigations and remedies.

For noise, TL2 is reached if any L_{Amax} or L_{Aeq} noise level exceeds the level quoted above.

3.10.6.2 Response guidelines

If any TL1 is exceeded, possible investigative actions include:

- identify the possible source of noise
- inspect the servicing history of the equipment
- inspect the exhaust system condition of the subjectively noisiest vehicles
- review the programme of work at locations visible to neighbours

If any TL2 is exceeded, possible response actions include:

- immediately locate the activity causing the noise and modify or terminate it. The list of possible noise control measures are described in section 30.10.4.3.
- Additional monitoring to confirm compliance after a TL2 exceedance event will be scheduled if requested by the PRP or AC.

3.10.6.3 Specialist adviser

WMNZ will consult a specialist adviser as required. The specialist adviser person may be either a specialist staff member of the company or an external consultant having relevant experience.

The following specialist adviser has previously provided written advice on noise on the following occasions:

Mathew Cottle

Marshall Day Acoustics

Level 5/2 Commerce Street

Auckland 1010

Tel 09 379 7882

3.10.6.4 Reporting

Reporting will be as follows:

Event	Reporting
(a) No TL exceeded.	Routine monthly report to PRP i.e. state that noise measurements were taken and that the results were satisfactory.
(b) TL1 exceeded.	Routine monthly report to PRP. Upon request to AC.
(c) TL2 exceeded.	Notify AC and PRP immediately. Obtain specialist adviser advice (if not already given in test report).

Redvale Landfill Management Plan

	Copy report to AC and PRP.
d) Noise Complaints Register	Routine monthly report to PRP Included in the agenda of CLC meeting Upon request to AC.
e) All monitoring results	Upon request to AC.

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3.11 Landscape Mitigation and Restoration Plan

3.11.1 General

3.11.1.1 Purpose

The purpose of the Landscape Mitigation and Restoration Plan is to mitigate the potential visual, environmental and other adverse effects resulting from the proposed landfill operation at the site. The LMRP outlines the

- Consent requirements;
- Mitigation plantings-proposed planting, plant species, spacing, grades and layout, and;
- Planting and maintenance methodology.

3.11.1.2 Consent requirements

[Condition XX]

3.11.1.3 Structure Planting Plan

An updated Structure Planting Plan has been prepared by Boffa Miskell.

- The key features of the plan include:
- grass over most of the final landfill cap.
- strips of shallow rooting native colonising species on the final landfill cap.
- buffer zone planting all round.
- native species on the northern buffer zone.
- native riparian planting around ponds.

3.11.1.4 Planting Zone Description

The landscaping and planting plan for the site is shown in Section 3.11 Appendix A. This landscaping and land surface restoration programme will be progressively implemented throughout the life of the landfill. Any changes to the plan will require a consultation with the CLC.

3.11.2 Planting Methodology

3.11.2.1 Control of Weeds and Removal of Old Trees

All weed species including Kikuyu grass, Woolly nightshade and Privet will be eradicated using appropriate cutting and herbicides prior to landscape planting.

Any chemical pest control carried out shall be in accordance with NZS8409:2021 'Management of Agrichemicals' and per the manufacturer's recommendation for each particular weed species and product.

Similarly, old trees and dead trees/branches present, if any, will be cleared.

3.11.2.2 Soil De-compaction in New Planting Sites

To enable plantings to be successful and to limit plant losses, the top 300mm of all new planting sites will be suitably aerated prior to planting. This can be achieved by either careful filling of the topsoil layer or by ripping the top layers to a depth of about 250mm. Dry summer season will be selected to achieve the maximum aeration. Following de-compaction, vehicles and machinery should be kept off the soil surfaces in order to minimise compaction.

3.11.2.3 Timing

Planting will be carried out between mid April, or later if soil moisture levels are not sufficient at this time, through to the end of September. The planting will be carried out when the weather conditions are suitable.

3.11.2.4 Plant Implementation

The planting will be carried out by a suitably qualified and experienced person in accordance with good horticultural practice to ensure the continued survival, health and amenity value of the plantings.

The nursery plants supplied will be free of pests and disease such that there will be negligible impact on their successful establishment.

Planting holes will generally be twice the width and one and half times the height of the container/root ball unless specified otherwise, with the plants planted in such a way that the root ball is slightly covered (10-20 mm) with the soil medium. Following planting surround soil shall be compacted in such a way as to ensure no air pockets are remaining whilst avoiding damage to the roots. The plantings will be carried out at the approved spacing and locations as per the plans provided.

3.11.2.5 Planting in Intermediate and Final Cover Areas of the Landfill

The details of the planting; grass type, season and timing etc. for these areas are outlined in the table; Section 3.11 Appendix B. Any exposed areas of the landfill which are intended to remain unworked for period of more than 2 months will be grassed progressively. Different options; hydro-seeding, mulching, seeding etc. will be considered. Attention will be given not to have any bare earthwork areas exposed and make vulnerable to erosion especially during the rainy season; April-September.

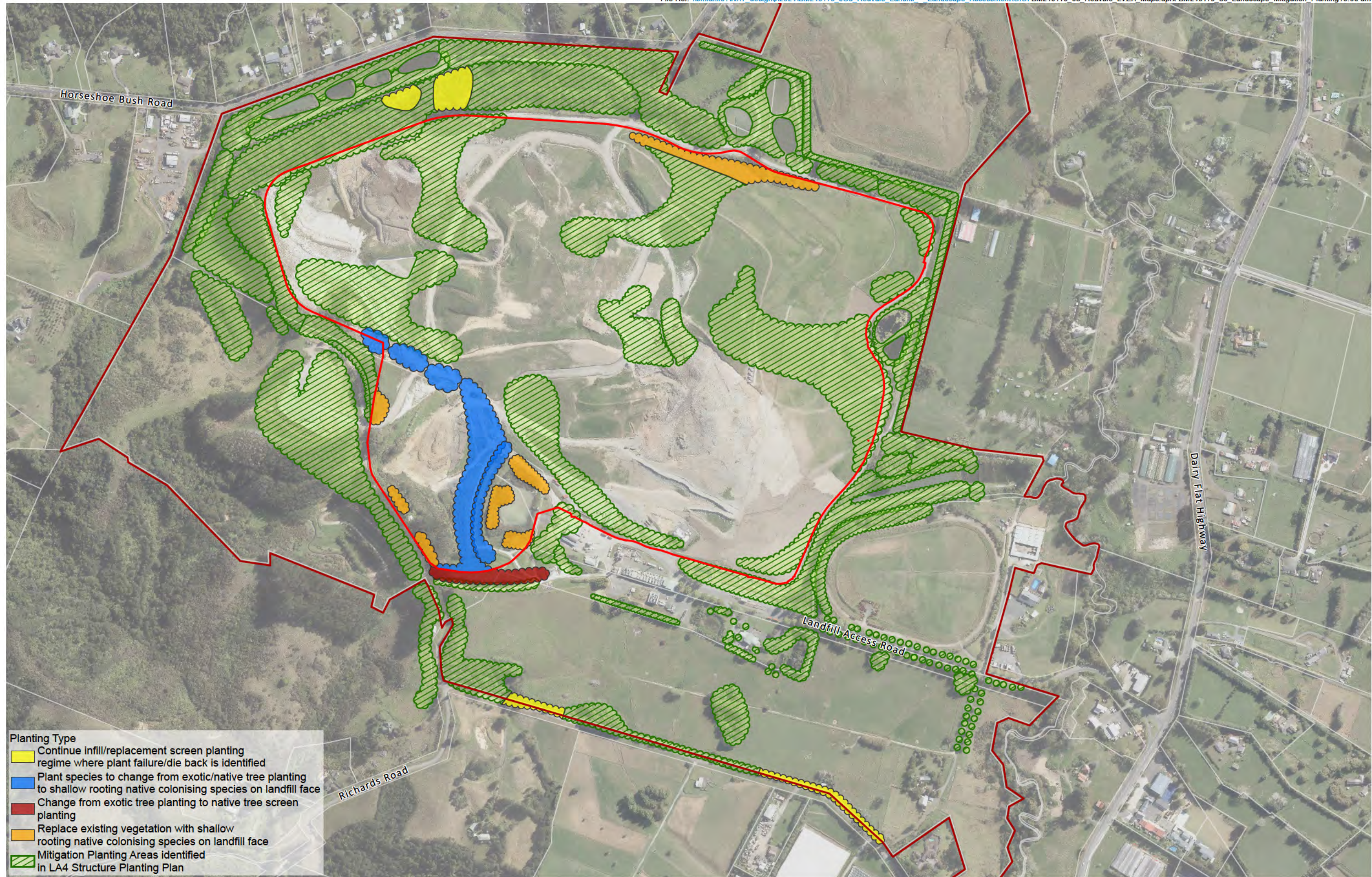
AC may suggest the timing and type of species to be planted in the intermediate and final cover areas. If the agreement cannot be reached on such matter, the decision of PRP will be the final.

3.11.3 Maintenance

The maintenance of the plantings will be carried out as per the findings of the inspection carried out on six monthly intervals. The checklist will be taken as a guideline for inspection (Section 3.11 Appendix C).

Appendix A Landscape Planting Mitigation Plan

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Appendix B Vegetation type and plant species

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Figure: 5.1.8.6 Vegetation type and plant species

Planting Type	Species		Spacing (m)	Minimum Grade
	Common name	Scientific name		
Screen Planting	Shining Gum	<i>Eucalyptus nitens</i>	4	2L
	Japanese Cedar	<i>Cryptomeria japonica</i>	4	2L
	Papauma/Broadleaf	<i>Griselinia littoralis</i>	4	2L
Native colonising species	Kanuka	<i>Kunzea ericoides</i>	1	1.5L
	Kahikatea	<i>Dacrydium dacrydioides</i>	1	1.5L
	Totara	<i>Podocarpus totara</i>	1	1.5L
	Manuka	<i>Leptospermum scoparium</i>	1	1.5L
	Cabbage Tree	<i>Cordyline australis</i>	1	1.5L
	Mapere	<i>Grahnia setifolia</i>	0.5	1.5L
	Flax	<i>Phormium tenax</i>	1	1.5L
	Hebe	<i>Hebe glaucous</i>	0.5	1.5L
	Mirror brush	<i>Caprosma repens</i>	1	1.5L
	Leyland cypress	<i>Cupressus leylandii</i>	1	1.5L
Native colonising species and interplanted native climax species	Kanuka	<i>Kunzea ericoides</i>	1	1.5L
	Kahikatea	<i>Dacrydium dacrydioides</i>	1	1.5L
	Totara	<i>Podocarpus totara</i>	1	1.5L
	Manuka	<i>Leptospermum scoparium</i>	1	1.5L
	Cabbage Tree	<i>Cordyline australis</i>	1	1.5L
	Mapere	<i>Grahnia setifolia</i>	0.5	1.5L
	Flax	<i>Phormium tenax</i>	1	1.5L
	Hebe	<i>Hebe glaucous</i>	0.5	1.5L
	Mirror brush	<i>Caprosma repens</i>	1	1.5L
	Flax	<i>Phormium tenax</i>	0.5	1.5L
	Karamu	<i>Coprosma lucida</i>	1	1.5L
Shallow rooting native colonising species	Mingimingi	<i>Caprosma proprinqua</i>	1	1.5L
	Manuka	<i>Leptospermum scoparium</i>	1	1.5L
	Cabbage Tree	<i>Cordyline australis</i>	1	1.5L
	Mapere	<i>Grahnia setifolia</i>	0.5	1.5L

REDDALE LANDFILL: LANDSCAPE MITIGATION AND RESTORATION PLAN

	Mirror brush	<i>Caprosma repens</i>	1	1.5L
	Flax	<i>Phormium tenax</i>	0.5	1.5L
	Karamu	<i>Coprosma lucida</i>	1	1.5L
	Mingimingi	<i>Caprosma proprinqua</i>	1	1.5L
Eucalyptus	Shining Gum	<i>Eucalyptus nitens</i>	4	2L
Pines	Redwood	<i>Sequoia sempervirens</i>	4	2L
	Radiata	<i>Pinus radiata</i>	4	2L
Coniferous screen	Leyland cypress	<i>Cupressus leylandii</i>	4	2L
	Griselinia	<i>Griselinia littoralis</i>	1	1.5L
Wetland		<i>Carex secta</i>	0.5	0.5L
	Oi-Oi	<i>Lectocarpus similis</i>	0.5	0.5L
Native riparian species	Cabbage Tree	<i>Cordyline australis</i>	1	0.5L
		<i>Carex secta</i>	0.5	0.5L
	Oi-Oi	<i>Lectocarpus similis</i>	0.5	0.5L
	Manuka	<i>Leptospermum scoparium</i>	1	0.5L
	Karamu	<i>Coprosma robusta</i>	0.5	0.5L
	Pate 8m	<i>Schefflera digitata</i>	1	0.5L
Grasses	Ryegrass	<i>Lolium perenne</i>	20 kg/ha	N/A
	Manuwa Ryegrass		8 kg/ha	N/A
	Wana Cocksfoot		5 kg/ha	N/A
	Huia White Clover		4 kg/ha	N/A
	Maku Lotus		3 kg/ha	N/A

Appendix C Landscape Planting Maintenance Checklist

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Figure 5.1.8.7. Landscape Planting Maintenance Inspection Checklist (6-monthly)

Inspection By:

Date:

Items	Site#	Site#	Site#
INSPECTION			
Plant health			
Soil moisture			
Disease			
Insects			
Stock or rodents			
Weeds			
Ground cover			
Serving purpose			
Other comments			
RECOMMENDATIONS			
Pruning			
Deadwood removal			
Weeding			
Mulching			
Irrigation			
Pest control			
Fencing			
Planting			
Other			

Figure: 5.1.8.7

3.12 Traffic Management Plan

3.12.1 General

3.12.1.1 Purpose

The traffic management plan will be kept on site. The objectives of having a traffic management plan are:

- To minimise the potential incidents related to vehicle collision etc.
- To avoid the unnecessary blockage of the road
- For smooth and efficient running of the construction and operational activities

This plan considers the risks associated with the identified hazards including, but not limited to:

- Requirement to segregate pedestrians from vehicles;
- Workplace layout;
- Traffic volumes, including routes, priority and exclusion zones;
- Signage;
- Lighting and visibility;
- Speed limits; and,
- Parking.

3.12.1.2 Review

The Regional Manager, Operations Manager, and employees review this traffic management plan on a regular basis as the needs and issues of the site change and develop. Any changes are subjected to further risk assessments. The traffic management plan is reviewed as a minimum on an annual basis.

3.12.1.3 Site Access

Traffic entrance/exit to the site is via: Landfill Access Road off Dairy Flat Highway.

3.12.1.4 Vehicle Rules

The following rules shall apply regarding the 'right of way' at this site.

All light vehicles entering operational areas should be fitted with and operate:

- Flashing amber lights, or hazard lights as a minimum.
- Seatbelts should be fitted and worn at all times.
- Light vehicles should be equipped with Radio Telephone (RT) comms switched to the site channel
- Any light vehicles entering the tipping pad area where there are waste trucks tipping should stop and communicate with the Spotter by RT prior to entering the area.

Designated Area	Right of Way
All roadways including haul roads	Vehicles/machinery
Uncontrolled road intersections	Vehicle on the right
Loaded and unloaded vehicle	Loaded forklift

Pedestrian walkways	Pedestrians
---------------------	-------------

3.12.1.5 One Way Perimeter Road

The unsealed Haul Road up to the tip face and the sealed perimeter road are generally set out as a one way circuit for waste delivery vehicles. This information is provided at driver induction, and at the weighbridge.

3.12.1.6 Demarcation Zones

Specific zones delineating vehicle operational areas and pedestrian areas have been clearly defined and designated.

3.12.1.7 Pedestrian Interaction

Pedestrian interaction within the site has been minimized through the use of a number of traffic control measures, including, but not limited to:

- Designated walkways clearly marked, colour coded with appropriate signage
- Barriers
- High visibility clothing
- Vehicle speed limits

At times, pedestrians and vehicles will be required to work in the same general area. Where this is necessary, the interaction shall be managed by means of a safe process, including, but not limited to:

- Physical barriers around exclusive pedestrian walkways
- Mobile plant and pedestrian demarcation zones
- Traffic management with spotter in control eg tip areas

All personnel working entering in and around operational areas of the site are required to wear high visibility PPE, including hard hat and safety glasses.

Visitors shall be provided with PPE prior to entering operational areas by their Company representative. Such PPE shall be returned when leaving the site.

3.12.2 Gatehouse

The landfill will operate an attended gatehouse during operating hours. The purpose will be to:

- to restrict entry only to authorised persons and vehicles;
- to issue information and site rules to new drivers;
- to verify that drivers have appropriate PPE;
- to verify that the waste (either declared by the driver or visible to the attendant) is authorised under a specific waste acceptance contract;
- to record details of the waste delivery (the minimum details are: vehicle registration number, an identifying name of the driver/hauler/generator, type of waste, weight of waste, date and time);
- to advise tip face operators of the arrival of waste which may have special handling instructions (e.g. for reasons relating to health and safety, potential odour, customer-requested supervision);

- to reject waste which is obviously unacceptable and to record details (e.g. odour, compressed gas cylinders);
- to record details of non-compliance with site rules by hauliers and to issue warnings (e.g. load not covered, load excessively dusty without prior declaration);
- to call for screen tests

Disposal procedures on the tip face and the role of tip face operators in regard to waste acceptance are described in Section 3.2 on Disposal.

3.12.3 Vehicle restrictions

The landfill will be open to waste hauliers using bulk waste haul vehicles which:

- (a) Comply with regional by-laws, if any, relating to waste haulage vehicles;
- (b) Have their loads enclosed, covered or secured so that refuse, litter and excessive odour do not escape.

Site management will place responsibility firmly on its hauliers to comply with all laws relating to transportation. Site management will not check every customer vehicle on the site, however, if a non-roadworthy vehicle comes to the attention of site management, then they will ask the driver to fix it within an appropriate time. An internal incident non-compliance report form will be filled out and recorded in the site's system for corrective action tracking.

The landfill will not be open to the general public.

Vehicles other than those complying with the bulk waste haul vehicle criteria may enter the site if they do not deposit refuse, are visiting the facility, make deliveries to the facility, have business at the facility or have other purposes related to the efficient running of the landfill.

Access for all refuse vehicles will be restricted to only the main access road from Dairy Flat Highway except in emergencies.

3.12.4 Vehicle count

The number of vehicles entering the site will be recorded at the gatehouse including: trucks carrying the landfill/managed fill materials, trucks carrying topsoil or clay to the landfill, fuel and engine oil delivery, sucker truck for emptying the cesspits and oil & grit interceptors, contractors delivering the machineries, tanker carting the leachate for off-site disposal, and vehicles entering for specific purposes; slope stabilisation (e.g. mulching), road sealing, ponds desilting and other site maintenance activities.

In accordance with [Condition XX], the number of truck movements generated per day by the landfill operation shall be limited to a maximum of 650 (325 in and 325 out). For this purpose, the trucks to be counted will include trucks carrying waste to the landfill, tankers carting leachate for off-site disposal and trucks for construction purposes. A register of daily trucks movement number will be available to the Auckland Council and PRP upon request. Any exceedance of the consent limit of 650 per day, will be reported to AC.

3.12.5 Truck movements response limits

Trigger levels

Response limits (or trigger levels) are values for refuse carrying truck numbers which, if exceeded, require a course of action to be taken. The limits are set at three levels:

- **Trigger Level 1 (Lower response limit):** Exceedance of TL1 warns of potential future non-compliance with the resource consent conditions, requires investigation and reporting and might require remedial action. TL1 is reached if the refuse truck movements on any one day is reached 600.
- **Trigger Level 2 (Upper response limit):** Exceedance of TL2 will be regarded as strong indication that breaches of consent conditions either have occurred, are currently occurring, or are about to occur. The upper limits will be set either at the limits (if any) specified in the resource consent, or at limits which if exceeded indicate non-compliance. Exceedance of TL2 usually requires urgent mitigative actions, notification of authorities and prompt investigations and remedies. TL2 is reached if the refuse truck movements on any one day exceeds the consented limit of 650.
- **Extreme event:** In case of any extreme event which can result in generation of extra ordinary waste, WMNZ can request AC to temporarily grant an increase in the truck movement for the [Condition XX]. The number of vehicles movement in and out from the site should be recorded and reported to council during this temporary relaxation period.

3.12.6 Pre-notification

The landfill will require pre-notification (typically 1 hour) before the arrival of Asbestos or Asbestos-Containing Material.

The landfill will require all special wastes to be accompanied by manifest forms. The manifest forms will include handling instructions that have been pre-specified at the time of entering into a contract to take the waste.

The gatehouse attendant will pass on relevant information to the tip face operators (special burial, odour potential, PPE) by site radio. The haulier drivers' copies of manifests can also be checked directly by tip face operators on request.

3.12.7 Manifest forms

Details of all wastes (general and special) will be captured by computer-based data management methods at the gatehouse, at least to the extent required to provide the summaries required by the consent conditions for reporting to the AC.

Details of special wastes will also be recorded by a special waste manifest system whereby each load of non-listed special waste will be accompanied by a form which provides relevant information including health and safety instructions. An example of a 'Notification of Special Waste Delivery' form is appended as Appendix A to Section 3.1.

3.12.8 Communication

The traffic management plan will be updated as per the location of the active tip face and construction activities on site. The updated will be communicated through to the site staff, contractors, consultants, suppliers and the waste delivery drivers. Onsite communication may include discussion in the daily tailgate meeting, weekly toolbox meetings etc. Whereas the external contractors will be communicated using a topic in the induction or discussing as a separate topic if they have been already inducted but there are some changes made following their last visit on site.

Redvale also maintains the system of communicating using radio transmission (RT). There is an obligation for each machine working on site to have a RT and communicate through what when needed.

3.12.9 Roading

On-site access roads for refuse hauliers will be constructed with all-weather surfaces from the site entrance to the working face. Culverts will be provided as required for drainage of surface water beneath and away from the access roads.

3.12.10 Traffic signs

Appropriate traffic signages; give away, stop, parking areas, one way etc. will be placed at different locations as per the requirement and those signs will be clearly visible to the people.

These signs serve as a constant reminder to all vehicle operators and pedestrians of conditions and requirements when accessing various areas on the site.

All signage requirements are reviewed and audited annually and checked during workplace inspections.

3.12.11 Speed limits

Appropriate speed limits signs will be displayed at different locations within the site. The speed restrictions applying to the site are:

- 30 kph for vehicle traffic areas (e.g. roadways and haul roads) and 15kph on unsealed roads
- walking pace or 15kph in pedestrian designated areas
- walking pace in loading/unloading areas

3.12.12 Parking areas

Parking is provided for employees, visitors and contractors and is situated at:

- Front, right and rear of main admin building.
- Front of workshop building.
- Flare site parking for staff and visitors on south side left of energy park building and across the road from the building.
- Designated areas inside the flare site complex.
- Site staff vehicle parking South East carpark from of landfill operations lunchroom.
- Operations and Contractor Parking at Workshop and landfill operations lunchroom.

Site will have a provision for heavy machinery parking areas during smoko or overnight.

3.12.13 Lighting and Visibility

Lighting has been specifically designed to ensure that vehicle and pedestrian operations are visible at all times.

Vehicles on site use their lights at all times whilst operating and where fitted, flashing orbital lights and reversing alarms are operated.

Appendix A Truck Movements Contingency Plan

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REDVALE LANDFILL MANAGEMENT PLAN

Contingency Plan Flowchart

Truck Movements

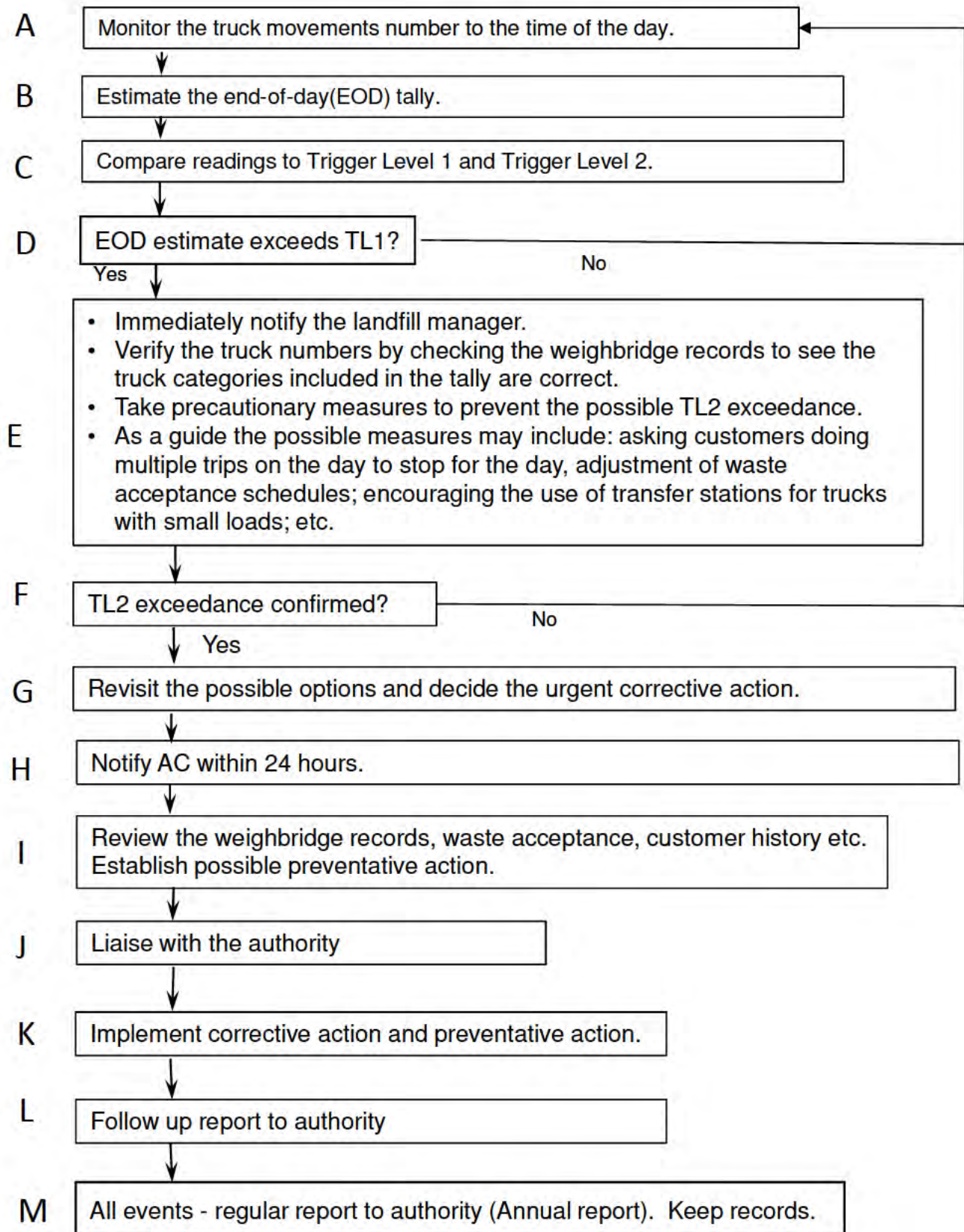


FIGURE: 3.1.6.6

3.13 Litter Management Plan

3.13.1 General

3.13.1.1 Consent requirements

3.13.1.2 [Condition XX] Litter sources

Litter sources include:

- tip face.
- re-mobilised litter caught on litter fences.
- trucks entering and leaving the landfill.
- poorly covered rubbish trucks could be the sources of litter on the highway.

3.13.1.3 Litter control

The best practicable option to minimise the litter generation from the landfill tipping face. The landfill operations deploys permanent litter fences around the principal downwind (north eastern) quarter of the tip face to catch litter before it enters neighbours' properties. The site also deploys several mobile little fences and the location of the litter fences may change depending upon the location of the active tipping location. Litter fences will be maintained as required and accumulated litter removed as soon as practicable.

A site representative will carry out a litter patrol along all public roads within a 1 km radius of the landfill footprint, including the Dairy Flat Highway, on a weekly basis, as shown in Figure XX below.



The findings will be reported to the landfill manager. Landfill staff will be scheduled to pick up litter from around the tip face on a daily basis, and from the public roads as required.

Litter originating from a landfill source will be collected from neighbours' properties upon request and as required. Any dispute as to the likely source of any litter on privately owned land shall be resolved by the AC, whose decision will be final.

If litter complaints are received for the rubbish trucks blowing litter on the highway, the landfill will follow up with the relevant party regarding the issue if the registration number of the truck is known.

3.13.2 Reporting and record-keeping

Notable events in relation to litter will be reported in monthly reports to the PRP.

Site will maintain a record of the litter patrols carried out along the Dairy Flat Highway and such records will be kept for at least 6 months.

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3.14 Vermin

3.14.1 Bird control

3.14.1.1 Bird control policy

The bird control policy at Redvale Landfill is to:

- Establish technologically advanced management practices which aim to prevent any bird problem arising.
- Use technologically advanced bird control methods which are effective from an economic, technical and public perspective.
- Use only methods which pose minimal risk to health and safety of site personnel and neighbours.
- Keep records of the use of bird control methods (type, frequency and effectiveness).
- Cooperate to resolve problems of public concern in regard to nuisance birds in the neighbourhood.

3.14.1.2 Bird control problems

Birds can pose a problem in regard to:

- Re-mobilised litter caught on litter fences.
- trucks entering and leaving the landfill.
- poorly covered rubbish trucks could be the sources of litter on the highway.
- Hazard to aircraft
- Defacing of property
- Damage to crops
- Interference with equipment
- Contamination of water supplies
- Spread of disease

The principal 'nuisance' birds are Myna and Southern, Black-backed gull.

The other less important potential nuisance birds are

- Red-billed gull (Note: protected under the Wildlife Act 1953)
- Sparrow
- Starling
- Magpie
- Pukeko

3.14.1.3 Primary control methods

Primary control methods involve 'habitat manipulation', including:

- restricting access to allow only bulk haul vehicles
- managing the waste by making use of waste transfer stations
- closing the tip face to the public
- operating machinery on the tip face continuously
- special handling of organic refuse including immediate burial
- compacting the refuse to minimise the yield to any scavenger

- minimising the uncovered tipping face area
- covering refuse regularly and promptly
- avoiding shallow standing water which attract birds
- providing vegetation cover such as long grass on inactive areas

3.14.1.4 Civil Aviation Authority

Contact will be made on request with the Civil Aviation Authority (CAA) to seek their advice whether any birds associated with the landfill have affected aviation. Copies of all written advice from the CAA will be forwarded to the Auckland Council - Rodney and brought to the attention of the PRP in monthly reports.

3.14.1.5 Reporting and record-keeping

Events	Report/Record Keeping
Any correspondence from CAA	Record will be kept on site for the duration of the landfill operation.

3.14.2 Bird contingency

3.14.2.1 Response limits

No numerical limit applies to bird count or other measurable.

However, there are events for which responses will be expected. These will be called trigger events

When a trigger event occurs, the PRP will be notified, and the response guidelines below will be considered.

3.14.2.2 Trigger events

Trigger events include:

- Complaint from neighbour or public about excessive landfill-related bird problems, validated by site management
- Documented advice of concern from authorities (Auckland Council or Health New Zealand)
- More than 100 gulls or 500 other nuisance birds observed landed at the landfill

3.14.2.3 Response guidelines

Primary control methods in response to trigger events include culling by daytime shooting (using appropriately qualified site staff) and live capture trapping (the latter specifically targeting myna and pigeon), which will be implemented within 5 working days of verification of the trigger event.

Secondary control methods involve auditory, visual, and other methods to disperse birds, which are effective, safe and humane. The methods that are available if required include:

Secondary control method	Guidelines
Distress Tapes	• speakers aimed to avoid obstructions • involve the use flock distress calls

Redvale Landfill Management Plan

Secondary control method	Guidelines
	• better if re-programmed with distress calls from local birds • option to include the call of a poisoned bird • played not more than 100 m away from the flock • maximum 15 seconds at a time • maximum 3 times per hour • noise intrusion on neighbours to be considered • discontinued as soon as the birds are back in flight, to avoid familiarity
Propane Cannons	• effective against starlings, gulls, magpies, mynas • operate for maximum 1 hour periods • blast interval 1 to 5 minutes, varied from day to day • optional megaphone for variable sounds • relocated every 2 to 3 days • located to avoid combustible material • fire extinguisher and PPE (safety glasses, ear muffs) for operator • local authority pre-approval required • good ventilation and care of gas cylinders • noise intrusion on neighbours to be considered • discontinued as soon as the birds are back in flight, to avoid familiarity
Racket Bombs	• user training essential • safety as for firearms • pistol loaded just before firing • maximum once per hour • maximum 3 in a row • avoid when fire restrictions apply • fire extinguisher and PPE (safety glasses, ear muffs) for operator • noise intrusion on neighbours to be considered • discontinued as soon as the birds are back in flight, to avoid familiarity
Blank .22 Calibre Shells	• user training essential • safety as for firearms • pistol loaded just before firing • maximum once per hour • maximum 3 in a row • avoid when fire restrictions apply • fire extinguisher and PPE (safety glasses, ear muffs) for operator • noise intrusion on neighbours to be considered • discontinued as soon as the birds are back in flight, to avoid familiarity
Athletics starter pistols	• noise intrusion on neighbours to be considered • discontinued as soon as the birds are back in flight, to avoid familiarity
Wire Grid System	• use nylon strings between high poles

Redvale Landfill Management Plan

Secondary control method	Guidelines
	- stable / anchored poles - use with other methods as some birds may walk in under the wires - suitable for large birds, not effective on small birds
Mobile Cover Net	- use for example light 85 mm mesh 36 m square on mobile 10 m high poles - pole trolleys designed to be stable
Shooting	- used on arrival of gulls - used in compliance with the firearms rules set out below - can never be used to harm protected birds such as red-billed gulls
Falcon Decoys	- Decoys imitate the predators and that increase the pressure on birds to evacuate a given area - Can be positioned at various locations - Have a choice of passive- to place in a position or active- can be flying with controllable movements.
Falconry	- The pest birds are hard-wired to scare the seagulls - Good public relations - Humane - A natural technique - Chemical free - Can make a use of noisemakers such as screamers and whistlers.

Any proposed new methods will be examined for compliance with the bird control policy, for compatibility and unison with other methods, dependence on other factors such as weather, and potential for ineffectiveness by target bird familiarity.

3.14.2.4 Inappropriate methods

<u>Control Method</u>	<u>Reasons for Rejection</u>
Shell Crackers	Safety concerns Public relations concerns
Ultra Sound	Not effective
Avitrol Poisoning	Safety concerns Public relations concerns Not humane (from 20 minutes to 4 hours to die)
Radio Control Aeroplanes	Safety concerns Nuisance to neighbours
Trained Dogs	No long-term effectiveness Public relations concerns
Microwave Radiation	Not effective

Steel overhead wire grid	Not human (maims the birds)
--------------------------	-----------------------------

3.14.2.5 Reporting and record-keeping

Events	Report/Record Keeping
Bird control methods used (if any)	Record will be kept on site and will be reported to the PRP on monthly report

3.14.3 Firearms

3.14.3.1 Scope

Firearms include shotguns (as the preferred firearm if any is to be used) and .22 calibre rifles. Live ammunition would be used.

Firearms may be used as either a supplementary primary control method to reinforce the existing primary control methods, or a secondary / contingency control method, for both birds and vermin. The firearms would be used by employees in the course of work or by contractors observing strict requirements contained in the WMNZ policy which aims to provide methods that are both humane and safe.

Allowable targets include mynas (Maina, "*Acridotheres tristis*"), Southern black-backed gulls (Kararo, "*Larus dominicanus*"), Swamp Hen (Pukeko, "*Porphyrio melanotus*"), cats, dogs, rabbits and possums, and other species specifically approved by the Landfill Manager. A notable forbidden target is red-billed gulls, which are a "protected species".

3.14.3.2 Firearms Use Policy and Procedure

WMNZ's firearms use policy and standard operating procedures are detailed in Appendix A.

3.14.4 Pest Bird Management Plan

A Pest Bird Management Plan (PBMP) has been prepared for Redvale Landfill by an appropriately qualified ecologist (Appendix B).

3.14.5 Reporting and record-keeping

The PRP will be advised (for example by way of monthly reports) if trigger events occur, and if secondary / contingency methods are used.

The monthly bird monitoring statistical analysis will be incorporated into the PRP monthly reports.

The existing culling register will be expanded to include trapping, and a register prepared of aviation liaison including with the North Shore Aero Club (NSAC) and Civil Aviation Authority (CAA).

3.14.6 Vermin /Insects

3.14.6.1 Consent requirements

[Condition XX]

3.14.6.2 Vermin/Insects list

Vermin and insects include but are not limited to:

- Rabbits
- Possums
- Rats
- Mustelids (ferrets, stoats and weasels)
- Insects such as flies, midges and wasps etc.

3.14.6.3 Primary control methods

The normal operation of the sanitary landfill, which includes the primary bird control methods described earlier in this section of the Management Plan, is expected to prevent vermin from developing a presence at the tip site. In particular, the placement of 300 mm of compacted daily cover at the end of each day will be a major deterrent by eliminating the food source.

3.14.6.4 Secondary control methods

A local exterminating firm will be contracted to inspect the site if evidence of an infestation is found despite proper landfill management procedures.

Appendix A Firearms Use Procedure

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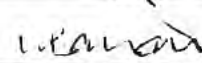
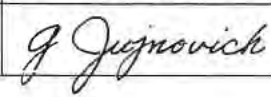


Bird Culling

Work Instruction Form (V4)

HSEQ Management System

Safety First, in everything we do

Date:	30/10/2025		Risk Assessment No:	WM UNI RED RA 102	
Division:	North Island		Branch/Site:	Redvale Landfill	
Task Location:	Landfill		Work Activity:	Bird Culling	
Permits / Authorisations required:	WORK PERMIT: ☐ BREAKTHROUGH: ☐ CONFINED SPACE: ☐ HOT WORK: ☐ FALL PREVENTION: ☐				
Permits / Authorisations approved and reviewed by:	Gm, Redvale Regional Manager and HSEQP			Date:	30/10/2025
Work Instruction prepared in consultation with: List all persons involved	Glen Jujnovich, Cawood McCall, Aaron Menzies, Laiana Barbosa, Mike Rademeyer, Matt Atkinson			Date:	30/10/2025
Comments	Only New Zealand Firearms License holders will be permitted to access or operate firearms. As per the Health and Safety at Work act 2015 (reprinted 1 October 2018), Redvale does not encourage the use of firearms by those who do not feel comfortable using them. The firearm storage safe is operated by two keys. Authorised operational staff who are current firearms license holders, and the Operations Manager may hold one key. If the Regional Manager is a licensed and authorised user, they may hold both keys to the safe. The primary target species are the Black Backed Seagull, Indian Myna, and any other species identified in the Landfill Management Plan.				
Process:	Name:	Position Title:	Signature:	Date:	
Task Manager Approval	Mike Rademeyer	Workshop Supervisor		6/11/25	
H&S Approval:	Louise Barratt	H&S Partner		31/10/2025	
Final Approval:	Glen Jujnovich	Regional Manager		31/10/2025	



Bird Culling

Work Instruction Form^(v4)

HSEQ Management System

Safety First, in everything we do

REQUIRED EQUIPMENT	
PPE Required: Hearing Protection – class 5 ear plugs or ear muffs Safety glasses Long sleeve shirt & long pants Hi visibility vest Safety shoes Wet weather gear / sun protection if required 	Additional equipment/Tools: Firearm of Category A classification. RT to communicate with Operational Team/Spotters
REQUIRED LICENCES & COMPETENCIES	
Licences: Firearms License (The license needs to be carried by the person(s) when using the firearm)	Competencies: Needs to have been approved to use firearms and follow the restrictions as per their license entitlements and legislative requirements. All employees conducting bird culling at the Redvale site must be signed off on the Risk Assessment (RA) and Work Instructions (WI) and must be authorized.
LEGISLATIVE REFERENCES (Optional)	
New Zealand Legislation (2018) <i>Health and Safety at Work act 2015</i>. Retrieved from https://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html New Zealand Legislation (2018). <i>Arms Act 1983</i>. Retrieved from https://www.legislation.govt.nz/act/public/1983/0044/latest/DLM72622.html Firearms Safety Code version 3.0 June 2023 https://www.firearmssafetyauthority.govt.nz/sites/default/files/2022-11/Firearms%20Safety%20Code%202022.pdf Secure storage and transportation guide for firearms and ammunition v4.0 - 30 November 2022 https://www.firearmssafetyauthority.govt.nz/sites/default/files/2022-11/firearms-secure-storage-guidance.pdf	



Bird Culling

Work Instruction Form^(v4)

HSEQ Management System
Safety First, in everything we do

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
Arms code	As per the Arms Code it is crucial for the safety of staff to understand and competently display an understanding of the 7 rules of gun safety, and use that as a reference point when operating a firearm on site: • Rule 1: Treat every firearm as loaded • Rule 2: Always point firearms in a safe direction • Rule 3: Load a firearm only when ready to fire • Rule 4: Identify your target beyond all doubt • Rule 5: Check your firing zone • Rule 6: Store firearms and ammunition safely • Rule 7: Avoid alcohol and drugs when handling firearms		Licensed Firearm User
Firearm storage	Ensure storage is compliant as described in the Firearm Secure Storage Guidance Document: 1. Ensure that children do not have access to firearms or ammunition. 2. Preventing theft of or unauthorised access to firearms or ammunition. 3. Ensure ammunition is not stored with the firearm; it must be stored separately.		Licensed Firearm User
Bird Culling, by use of a firearm	4. Inform the Operations Manager that the task is to be undertaken at a specific time and specific location.		Licensed Firearm User



Bird Culling

Work Instruction Form^(v4)

HSEQ Management System
Safety First, in everything we do

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	5. Inform operations staff in the field via RT. Inform office staff, guests, and contractors as appropriate for the situation.		
	6. Review any planned work activities with the Operations Manager / Supervisor occurring in the area and determine if safe and practical to proceed with culling.	Ensure no one is around, otherwise the cull needs to be stopped.	Licensed Firearm User
	7. Collect and check the firearm.		Licensed Firearm User
	8. Ensure the firearm is safe for use, check for damage, and if maintenance is required – stop and report any issues to the Operations Manager immediately. Ensure the firearm is not loaded until reaching the culling area.		
	9. Drive to shooting site and park vehicle in designated light vehicle area, away from operational areas. Apply 5-meter rule.		
	10. Advise Spotter of your approach to operational areas.		Licensed Firearm User
	11. Confirm where you are, the activity, and the direction of shooting (away from operational staff/plant/facilities). Confirm the OK to proceed from the Spotter.		
	12. Check the area for personal safety and the safety of others.	Be aware of anybody entering your area.	Licensed Firearm User
	13. Ensure that no other person, unless they have accompanied you, is in the vicinity of the culling area.		



Bird Culling

Work Instruction Form^(v4)

HSEQ Management System

Safety First, in everything we do

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	14. Use RT to warn other personnel on foot of your proximity.		
	15. Conduct the culling activity in a manner that ensures humane destruction, and ensures people, buildings, vehicles and plants are not at risk of damage or alarm from shot.		Licensed Firearm User
	16. Fire at birds overhead with shotgun only.		
	17. Consider the effective distance of travel of a shotgun shot to be 200m.		
	18. Do not fire toward hard surfaces, rocks, steel or into water.		
	19. Do not fire toward gas or leachate infrastructure.		
	20. Unload the firearm when moving between locations and at the completion of the activity.		
	21. Advise Spotter, Operations Manager and staff via RT of completion of culling activity. Confirm where you are, the activity is complete, and the direction of return to the office.		Licensed Firearm User
	22. Return to the vehicle and drive back to the office.		
	23. Complete the culling session, clean and store the firearm, and check that no ammunition is in the chamber.		Licensed Firearm User
	24. Return unused ammunition to separate locked storage.		



Bird Culling

Work Instruction Form^(v4)

HSEQ Management System

Safety First, in everything we do

WORK INSTRUCTION			
Task	Steps (This includes what to do and related control measures)	Key Points	Responsible person
	25. Record the date, time, location and number of birds culled, and the ammunition taken/returned to the store, in the Authorisation and Risk Assessment register.		
	26. Inform the Operations Manager that the task has been completed.	Report details of the activity, any abnormalities, or anything else of note.	Licensed Firearm User

Appendix B Redvale Landfill Pest Bird Management Plan

DRAFT

Redvale Landfill

Pest Bird Management Plan

for: Waste Management New Zealand

Figure 3.9.9.2



DOCUMENT CONTROL AND REVISION RECORD

Document title	Redvale Landfill Pest Bird Management Plan
Prepared for	Waste Management New Zealand

Author(s)	Michael Anderson, Senior Ecologist	
Reviewer(s)	Reviewer Reviewer title	

Version	Date	Author(s)	Reviewer
Status – V2	29 September 2025	MA	Reviewer's initials

Job number	68714
Filename	68714 Redvale Pest Bird Management Plan

Reference: Bioresearches (2025). Pest Bird Management Plan. Report for Waste Management New Zealand pp 34.

Cover Illustration: Common myna | Maina. Adults in flight. Photo: Ormond Torr; <https://www.nzbirdsonline.org.nz/species/common-myna>

EXECUTIVE SUMMARY

This Pest Bird Management Plan sets out a practical and lawful programme to keep pest bird numbers low at Redvale Landfill so that operational, public health, ecological, and aviation risks are minimised. The plan tailors procedures, roles, and records to Auckland conditions and Redvale's consents, so actions are auditable and escalation is predictable when risk thresholds are exceeded.

Management prioritises prevention at source. The working face is kept small, loads are sequenced, and compaction with timely daily cover removes food rewards. Organics access is denied where practicable by clean handling, exclusion lines, and housekeeping. Deterrents are used in short, rotating pulses and coordinated with cover so flushing has no reward. Lethal methods are reserved for lawful species and are conducted as short, targeted daytime operations under site standard operating procedures with humane standards. This hierarchy reflects regional guidance and evidence that mixed tools with rotation reduce habituation and improve control outcomes at landfills (Auckland Council 2020; Cook et al. 2008; WSP 2023).

Species priorities reflect risk and law. Common myna and southern black backed gull are the primary operational focus because of their attraction to food waste and capacity to create nuisance and aviation risk. Red-billed gull remains fully protected, so management relies on prevention and carefully planned non-lethal dispersal with strict stand downs when protected birds are present.

Monitoring ties action to evidence and supports adaptive management. Fortnightly whole-site counts provide the breadth needed to detect true changes in site use and to separate management effects from seasonal movements. Trigger thresholds link observations to response, and a simple monthly analysis tool combines counts, culling effort, and birds culled to recommend the minimum effort required in the following month to remain below agreed thresholds. The same data support transparent monthly and annual reporting to Auckland Council (Boffa Miskell 2021; Auckland Council 2020; Waste Management NZ 2025).

Implementation commences on 13 October 2025. Initial focus is on baseline monitoring, disciplined cover and organics control, lawful culling of target species where required, and pilot trapping for myna and pigeon. Registers capture all actions and outcomes so that performance can be analysed and methods adapted with evidence. The plan provides a clear pathway to maintain low bird numbers at the landfill, protect neighbour amenity and aviation safety, and demonstrate humane, effective practice to regulators and stakeholders (Boffa Miskell 2021; Auckland Council 2020; Waste Management NZ 2025).

TABLE OF CONTENTS

Document Control and Revision Record.....	i
Executive Summary	ii
1 Introduction.....	5
2 Operational Procedures	11
2.1 Reducing putrescible/organic waste.....	13
2.2 Good daily cover.....	13
2.3 Minimising the tip face extent.....	13
2.4 Minimising open earthworks and pools of water.....	13
2.5 Reducing barren areas	13
3 Bird Deterrence and Control Methods	15
3.1 Hierarchy and decision rules.....	15
3.2 Bird Number Threshold Levels.....	15
3.3 Bird Deterrence	18
3.4 Lethal control methods.....	18
3.5 Species-specific considerations	19
3.6 Non-target risk management and humane standards.....	20
3.7 Documentation, rotation, and review.....	20
4 Bird management and control registers	21
5 Bird Monitoring	22
5.1 Monthly whole-of-site counts and rationale	22
5.2 Initial Wildlife Hazard Assessment count (July)	22
5.3 Monitoring methods and data standards	23
6 Summary.....	25
References	26
Applicability and Limitations	28

List of Tables

Table 1. Primary and secondary target species included in this pest bird management plan.	7
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Table 2. Management thresholds for key bird species recorded at Redvale Landfill. Thresholds define the maximum numbers of birds tolerated before escalation is triggered. Actions range from reinforcing daily operational controls and applying deterrence, through to targeted lethal control for unprotected species, with full structural interventions considered if repeated breaches occur. Red-billed gulls are fully protected and may only be managed using non-lethal methods. 16

Table 3. Mean daily count of each species observed at Redvale Landfill at the three times of day surveys were conducted. Note that values are means of the two observation days. Also, Redvale Landfill values are for the whole landfill, i.e. three observation points combined..... 23

List of Figures

Figure 1. Demonstration of the Redvale monitoring model for Common myna using example monthly data (first 36 months). Blue line shows mean bird counts (N) recorded at the landfill, green line shows the number of birds culled (H), and the red line (right-hand axis) shows monthly culling effort (E, hours). The black dashed line represents the management threshold ($N_{\text{target}} = 400$), which triggers escalation if exceeded. This combined view illustrates how survey data, culling effort, and removals interact to inform adaptive bird management and compliance reporting. 30

List of Appendices

Appendix A Pest bird minimum effort statistical model

1 INTRODUCTION

This Pest Bird Management Plan sets out a practical and lawful programme to reduce and maintain pest bird numbers at Redvale Landfill at low levels so that operational, public health, ecological, and aviation risks are minimised. It consolidates and supersedes information from other New Zealand landfill practices (Boffa Miskell 2021)), and is adapted for Auckland conditions and the specific operating context at Redvale. The plan is prepared for use by Waste Management NZ operational staff and contractors, Auckland Council officers, and other stakeholders who require a clear description of procedures, responsibilities, and evidence supporting control methods.

Redvale Landfill is a large operating Class 1 facility that accepts putrescible and non-putrescible wastes and includes an open organics reception environment. The landfill is situated in a predominantly rural setting with lifestyle blocks and hedgerows and is within commuting range of coastal birds. This landscape context creates strong attractants for several pest bird species, particularly the common myna and southern black-backed gull, and intermittent use by the protected red-billed gull. The combination of exposed food sources, loafing structures, and local water bodies can increase nuisance, elevate disease transmission pathways, and interfere with day-to-day site operations. Existing site governance recognises these risks and already provides policy, triggers, and tools for bird control, including landfill practice controls, defined response events, and firearms use standards that this plan aligns with and updates (Waste Management NZ 2025).

The purpose of this plan is to prioritise prevention at source through disciplined landfill practice, then apply targeted deterrence, and only where necessary to use lethal methods that are lawful, humane, and effective. This hierarchy reflects evidence that deterrents can be effective in the short term but are prone to habituation unless combined with variation in method, timing, and location and supported by reinforcement. Operational bird management plans in New Zealand and peer-reviewed evaluations of landfill bird control both indicate that rotating tools and coupling non-lethal and lethal pressure, where lawful, sustain effectiveness and limit habituation over time (WSP 2023; Dunedin City Council 2023). This approach is embedded in the Redvale drafts and is retained and refined here so that the plan is operationally useful from the first day of implementation (Redvale PBMP Drafts 2025).

The scope of the plan covers all landfill-associated pest birds with a particular focus on Common myna (*Acridotheres tristis*) (Table 1). Secondary target species include southern black-backed gull, feral pigeon, Canada goose, European starling, and Mallard. The red-billed gull is included, but is fully protected under the Wildlife Act and is not subject to lethal control. Site practice and control actions are designed to avoid harm to protected species through correct identification, non-lethal dispersal where required, and strict stand down if protected birds are present in lines of fire or in proximity to other control methods, consistent with existing Redvale policy and registers (Waste Management NZ 2025).

The methods and standard operating procedures in this plan reflect landfill operational realities. Core prevention measures include keeping working faces small, rapid compaction and timely daily cover, stringent organics handling with exclusion lines or netting where practicable, and rigorous housekeeping. Deterrence methods include acoustic and visual tools and drone-assisted hazing, each applied in short, irregular patterns and rotated on a planned cycle to limit habituation, consistent with regional best practice guidance and recent site drafts (Auckland Council 2020; Redvale PBMP Drafts 2025). Lethal methods include daytime shooting in defined safe corridors for lawful species and live capture trapping for myna and pigeon, with mandatory daily checks and humane dispatch in line with Animal Welfare requirements.

The legal and regulatory framework is clear. The plan gives effect to consent requirements for an implemented pest control plan, integrates complaint handling and CAA liaison duties, and provides for record keeping and monthly reporting, including triggers for response and verification that aviation risk is being managed to the satisfaction of regulators (Waste Management NZ 2025). It is consistent with the Wildlife Act (1953) in protecting red-billed gull and recognising unprotected status for southern black backed gull and several other target species, and acknowledges game bird rules where mallard are present. It aligns with the Auckland Unitary Plan noise framework that constrains the use of acoustic devices and firearms to practicable day periods and with Animal Welfare Act requirements for daily live trap inspections, humane dispatch, and the safe handling of trapped animals, as operationalised in the Auckland Council guidance for pest control programmes (Auckland Council 2020).

The implementation date is 8 October 2025. Initial emphasis is on establishing baseline monitoring, tightening cover and organics controls, commencing lawful culling of target species, and piloting trapping where it adds value. The plan will be reviewed regularly, with monthly operational reporting and an annual performance review to confirm effectiveness, legal compliance, and any required changes to methods or thresholds. It consolidates recent Redvale drafts by integrating their operational details, key performance indicators, templates, and escalation pathways into a single coherent framework draws on council guidance so that it is both familiar to regulators and directly usable by site staff (Boffa Miskell 2021; Auckland Council 2020).

Table 1. Primary and secondary target species included in this pest bird management plan.

Species		Description
Common myna <i>(Acridotheres tristis)</i> Primary target		An introduced, highly adaptable omnivore now widespread in northern and eastern New Zealand. Mynas forage on invertebrates, food scraps, and small vertebrates, form large communal roosts, and readily exploit human-modified habitats. Breeding generally begins from late winter and adults commute between nest sites and feeding areas; during provisioning, they may range further for food, so numbers at the landfill can dip temporarily even when the local population remains high. Conservation status in New Zealand is Introduced and Naturalised. Mynas feed directly on exposed waste and scavenge around buildings and parking areas. They are included in the Wildlife Hazard Assessment for Redvale and are relevant to bird-strike risk through flocking behaviour near approach paths. (Wilson 2013).
Southern black-backed gull (<i>Larus dominicanus</i>) Secondary target		A large native gull abundant across non-forested habitats nationwide and particularly common at landfills, ports, and fish-processing plants. It congregates rapidly where putrescibles are exposed and undertakes frequent movements between the coast, farmland, and landfill. Conservation status is Not Threatened, and it is unprotected under the Wildlife Act for control purposes. Its large body mass, flocking at waste sources, and commuting flights make it a key species in the Wildlife Hazard Assessment and a high-relevance bird-strike risk near aerodromes. (Miskelly 2013).

Red-billed Gull (<i>Chroicocephalus novaehollandiae</i>) Protected native species (non-lethal methods only)		The red-billed gull is a small native gull found mainly around New Zealand's coasts, estuaries, and harbours. It is highly gregarious, often nesting in colonies and foraging both at sea and on land where food is available. Although occasionally observed at landfills, it is less strongly associated with waste than the larger southern black-backed gull. The species is fully protected under the Wildlife Act 1953 and therefore cannot be targeted with lethal control. At landfills, red-billed gulls may scavenge opportunistically on food waste or loaf on open surfaces, but management responses must be restricted to preventative and non-lethal deterrence measures only. Conservation status is At Risk – Declining, with population reductions attributed to food availability changes, predation, and disturbance. The species was recorded during the Wildlife Hazard Assessment and is relevant to bird-strike risk due to flocking behaviour and commuting flights, although less so than black-backed gulls or Canada geese. (Mills 2013).
Rock pigeon / feral pigeon (<i>Columba livia</i>) Secondary target		An introduced pigeon has established itself widely in towns and on farmland, nesting on buildings, bridges and quarry faces. Diet is dominated by seeds and grain but pigeons readily take food waste and spillage at transfer and receipt areas; they also loaf on rooflines and structures. Conservation status is Introduced and Naturalised. Pigeons are included in the Wildlife Hazard Assessment and pose a moderate strike risk due to frequent low-altitude movements between roosts and feeding areas, with hazard elevated by occasional flocking around grain or organic waste. (Powlesland 2013).

Common starling (<i>Sturnus vulgaris</i>) Secondary target		An introduced passerine that forms large communal roosts and feeds in flocks across pasture, short-grass areas, parks, and urban margins. Starlings take invertebrates and food scraps and will attend landfills when conditions are suitable, particularly around edges and grassed areas. Conservation status is Introduced and Naturalised. Their tendency to form dense flocks makes them relevant for bird-strike risk despite their small individual mass, and they are listed in the Wildlife Hazard Assessment for operational awareness. (Flux 2013).
Canada goose (<i>Branta canadensis</i>) Secondary target		A large, introduced goose associated with lakes, ponds, pasture and open grass. Geese graze and loaf on short grass and readily use settlement ponds and adjacent pasture at landfills. Conservation status is Introduced; in New Zealand, the species is managed as unprotected. Their high body mass, flocking behaviour, and frequent commuting between water and pasture make them relevant in the Wildlife Hazard Assessment and a high-consequence bird-strike risk when movements intersect flight paths. (Williams 2013).

Mallard (<i>Anas platyrhynchos</i>) Secondary target		An introduced game bird that is now the most common waterfowl in New Zealand. Mallards use ponds, drainage features, and short-grass margins for loafing and feeding, and can breed in wetlands and modified habitats around landfill infrastructure. Conservation status is Introduced and Naturalised; harvest is regulated in season by Fish & Game. Mallards are included in the Wildlife Hazard Assessment as they can aggregate on settlement ponds and undertake regular commuting flights, creating a non-trivial bird-strike risk, particularly where flocks are flushed. (Williams 2013).
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2 ECOLOGICAL IMPACT OF PEST SPECIES

Bird species associated with landfills affect native biodiversity and ecosystem health via competition for nest sites and food, predation and breeding interference, disease carriage and water-quality degradation, habitat modification, and (for mallards) hybridisation. The species most relevant at Redvale are those listed in Table 1: common myna, southern black-backed gull, red-billed gull, feral/rock pigeon, common starling, Canada goose and mallard. Other pest/nuisance species (e.g. spur-winged plover) may be present, but are not inherently drawn to the site, or at higher than usual densities, due to any of the landfill features.

2.1 Competition for nesting sites and breeding interference

Common mynas and starlings are aggressive cavity users that displace native birds and disrupt breeding. In New Zealand, myna territories are large (mean c. 0.83 ha per pair in Auckland), and pairs defend nest cavities aggressively, behaviour consistent with competitive exclusion of native hole-nesters (Counsilman, 1974; Wilson, 2013). Removal of mynas on Motuora Island was followed by increases in several native species, consistent with competitive release (Tindall et al., 2007). Starlings have been documented in Aotearoa actively contesting nest sites with threatened orange-fronted parakeets, highlighting direct interference with native cavity-nesters (Kearvell, 2013). Around coastal and landfill margins, southern black-backed gulls and, occasionally, red-billed gulls can dominate foraging areas, displacing smaller native species; deterrence of red-billed gulls must be non-lethal given their protected and declining status (Frost & Taylor, 2018).

2.2 Predation and direct breeding losses

Southern black-backed gulls are prolific predators and scavengers whose numbers have been elevated historically by anthropogenic food sources, increasing predation pressure on vulnerable ground-nesting and colonial natives (e.g., black-fronted tern, wrybill, dotterels, and other seabirds). Limiting waste access and deterring loafing/roosting can therefore reduce localised predation pressure around landfill-adjacent habitats. Mynas also take eggs and nestlings opportunistically and harass other species near nests, reinforcing the benefit of suppressing roosts and food availability near sensitive habitats.

2.3 Disease transmission and water-quality effects

Bird aggregations at waste and water bodies elevate risks of pathogen carriage and faecal contamination that can affect native wildlife, livestock and people. Southern black-backed gulls have been implicated as vectors of *Salmonella* in agricultural settings (including S. Brandenburg during sheep abortion outbreaks), contaminating pasture and stock water via daily movements (Clark, 2001; Alley & Wortmann, 2001). Feral pigeons are established reservoirs of zoonoses such as *Cryptococcus* and *Chlamydia*, and they host *Trichomonas gallinae*, which can spill over to raptors and other birds via contact or predation (Haag-Wackernagel & Moch, 2004). Waterfowl contribute substantial faecal and nutrient loading to ponds and drains. A New Zealand study quantified high prevalences of *E. coli*, enterococci and *Campylobacter* in droppings of geese, ducks, gulls and swans, underscoring eutrophication and microbial-water-quality risks where birds loaf on settlement ponds (Moriarty et al., 2011). Mallards in New Zealand are also

frequent hosts of low-pathogenicity avian influenza viruses, indicating ongoing circulation in resident populations and a potential transmission interface with native waterfowl (Stanislawek et al., 2024).

2.4 Habitat modification, vegetation, and aquatic ecosystem impacts

High-density gull or pigeon roosts deposit guano that enriches soils, alters plant communities, and can foster nitrophilous weeds. Around water, nutrient inputs accelerate eutrophication and algal blooms that reduce oxygen and degrade invertebrate and fish habitats relied on by native fauna. Canada geese and mallards add to nutrient loading and physically degrade wetlands through grazing, trampling, and sediment resuspension. A New Zealand review of Canada geese documented grazing damage, fouling of pasture and waterways, and conflicts with restoration plantings (Spurr & Coleman, 2005).

2.5 Hybridisation (mallard × grey duck)

Mallards have extensively hybridised with native grey duck (*Anas superciliosa*), producing hybrid swarms and a marked loss of pure grey duck phenotypes across much of New Zealand. The sustained high mallard abundance near wetlands has reinforced this genetic displacement (Robertson et al., 2019; Williams, 2019).

2.6 Summary for management

At Redvale, the principal ecological risks are: 1) cavity competition and nest interference by mynas and starlings; 2) elevated predation and pathogen carriage by southern black-backed gulls; 3) disease reservoirs and fouling by feral pigeons; 4) eutrophication and microbial contamination from Canada geese and mallards; and 5) long-term loss of grey duck integrity via mallard hybridisation. Operational controls that reduce access to food and open water, prevent loafing/roosting, and suppress aggressive cavity competitors are central to reducing these impacts.

3 OPERATIONAL PROCEDURES

The most effective way to manage pest bird activity at landfills is through disciplined site operations that minimise food rewards, reduce standing water and barren surfaces, and prevent conditions that allow birds to loaf and forage. Good landfill practice is the foundation of bird management and reduces the need for deterrence or lethal control. The measures described here form part of normal landfill operations, consistent with both international guidance and national technical standards for the disposal of waste (EPA Ireland 2019; Ministry for the Environment 2023).

3.1 Reducing putrescible/organic waste

The attraction of landfills for birds is largely driven by access to putrescible material. Reducing the proportion of organics entering the landfill is a primary management objective. Where practicable, organics should be diverted from disposal to alternative processing, such as composting or anaerobic digestion, to reduce the food available to birds (Ministry for the Environment 2023). Where organics are accepted, unloading areas must be managed to limit exposure: waste is unloaded in small, controlled quantities, handled quickly, and placed under cover or compacted within the same working day. Any spillage must be collected immediately to avoid feeding opportunities for mynas, gulls, or pigeons.

3.2 Good daily cover

Daily cover is one of the most important operational controls for bird management. All putrescible material must be compacted and covered at the end of each working day using soil or approved alternative daily cover. This prevents birds from accessing fresh waste overnight and reduces odour, flies, and litter that may attract them. Cover should be at least 150 mm thick where soil is used, or equivalent if approved alternative materials are applied, in line with Ministry for the Environment technical guidelines (2023). Audits of cover application must be carried out daily to confirm adequacy, with corrective actions taken immediately where deficiencies are observed (EPA Ireland 2019).

3.3 Minimising the tip face extent

The working face is a critical control point for bird attraction. The area of exposed putrescible waste should be kept as small as practicable, consistent with safe tipping and compaction. Waste should be placed, compacted, and covered progressively, with the face limited to a size that can be fully managed within one operating day. A small working face reduces the time window and surface area available for birds to access food, directly lowering their incentive to visit the site.

3.4 Minimising open earthworks and pools of water

Large open earthworks and unlined depressions can create surface water pools that attract birds such as gulls, geese, and mallards. To prevent this, earthworks should be staged and completed as quickly as possible, and interim drainage provided to avoid ponding. Settlement ponds, which are necessary for stormwater management, must be designed and maintained with exclusion measures where practicable, such as floating lines, grids, or other physical barriers, to discourage waterfowl from landing. Prompt reinstatement of capped areas with topsoil and vegetation cover also reduces opportunities for ponding and bare ground use.

3.5 Reducing barren areas

Exposed, unvegetated surfaces provide loafing areas for gulls and other pest birds. Capped and inactive areas should be progressively rehabilitated with topsoil and grass seeding as soon as practicable, in line

with the site's closure and aftercare plan. This reduces barren ground and creates a stable vegetated surface less attractive to birds for roosting. Regular inspections should be carried out to detect and repair erosion or settlement that exposes bare soil. By maintaining vegetative cover across closed cells and inactive areas, overall bird presence on the site is reduced.

4 BIRD DETERRENCE AND CONTROL METHODS

4.1 Hierarchy and decision rules

Control at Redvale follows a prevention-first hierarchy that removes food and habitat rewards before any active dispersal or lethal action is considered. Deterrents are used in short, carefully planned pulses to avoid habituation, and lethal methods are reserved for lawful species when prevention and deterrence are insufficient to meet risk thresholds. This hierarchy mirrors established landfill bird management practice and provides a clear audit trail from problem definition to method selection and review

4.2 Bird Number Threshold Levels

Operational thresholds are set to ensure that bird activity at Redvale Landfill does not compromise site safety, amenity, or compliance with aviation risk requirements. There will be low tolerance thresholds for large-bodied birds (southern black-backed gull, Canada goose, mallard, or other species greater than 50 g) feeding directly at the landfill face or using settlement ponds and other waterbodies. Small passerines such as house sparrows may occasionally be present in low numbers around site margins, but their activity is tolerated provided they do not interfere with landfill operations.

For common myna, which is the primary operational focus, the management target is set at a maximum of 400 individuals per count. If monitoring records more than 400 mynas on site during any single count, an immediate escalation response is triggered.

More generally, if at any time more than 20 individuals of any single large-bodied species greater than 50 g are recorded feeding or loafing at the landfill, or if combined numbers of these species exceed 100 individuals, management responses will be elevated. Escalation in the first instance involves reinforcement of deterrence methods, supported where necessary by targeted lethal control as described in Sections 3.3 and 3.4.

Table 2. Management thresholds for key bird species recorded at Redvale Landfill. Thresholds define the maximum numbers of birds tolerated before escalation is triggered. Actions range from reinforcing daily operational controls and applying deterrence, through to targeted lethal control for unprotected species, with full structural interventions considered if repeated breaches occur. Red-billed gulls are fully protected and may only be managed using non-lethal methods.

Common name	Scientific name	Management target / threshold	Action
Common myna	<i>Acridotheres tristis</i>	Maximum 400 individuals per count. If >400 in a single count, immediate escalation.	Immediate escalation of deterrence and control (increase hazing, deploy traps, begin targeted removals). Record event in registers and report in monthly return.
Southern black-backed gull	<i>Larus dominicanus</i>	Low tolerance. If >20 individuals of this species are feeding/loafing at the landfill, or combined large-bodied species >100, escalate.	Reinforce deterrence, initiate targeted lethal control where lawful and safe, increase cover and waste handling. If breaches persist, consider structural measures (overhead wires, baling) and escalate per plan.
Red-billed gull	<i>Chroicocephalus novaehollandiae scopulinus</i>	Protected species. No lethal control permitted. Manage through prevention and non-lethal deterrence only.	Use prevention (cover, housekeeping) and non-lethal dispersal. Immediate stand down of lethal operations if red-billed gulls are present; liaise with regulators and document actions.
Rock pigeon (feral pigeon)	<i>Columba livia</i>	Low to moderate tolerance. If >20 individuals present and feeding at the face, escalate.	Deploy trapping (multi-capture cages), reinforce exclusion of roost sites, and consider targeted culling where lawful and safe. Record traps, checks and outcomes in registers.
Common starling	<i>Sturnus vulgaris</i>	Small passerines tolerated in low numbers; but starlings are often >50 g so if >20 present and causing issues, escalate.	Increase deterrence at edges and grassed areas, use targeted netting or exclusion where feasible, and consider trapping during high-use periods. Monitor for rapid changes during breeding season.
Canada goose	<i>Branta canadensis</i>	Low tolerance. If >20 geese present or combined large-bodied species >100, escalate immediately.	Deny access to ponds (exclusion lines, grids), increase deterrence, and apply targeted lethal control where lawful and necessary. Record and report actions.

Mallard	<i>Anas platyrhynchos</i>	Low tolerance. If mallards aggregate on ponds and numbers cause risk, treat within the large-bodied species thresholds.	Maintain pond exclusion measures, use deterrence, and, where required apply targeted lawful control. Prioritise non-lethal measures for protected or managed waterfowl where relevant.
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4.3 Bird Deterrence

4.3.1 Prevention-based methods

Prevention reduces the probability that birds settle by denying access to food, water, and preferred loafing structures. Working faces are kept as small as practicable, loads are sequenced to shorten the exposure of putrescibles, and compaction and daily cover are applied the same day so that no visible putrescibles remain by close of operations. Organics receipt points are operated to deny access through clean handling, immediate removal of spillage, and, where practicable, fitting of line grids or netting that interrupt flight paths into bays. Litter fencing and housekeeping reduce windblown attractants, and staff amenities are enclosed so that food is never available in open operational spaces. These measures sit at the base of the control pyramid and are continuous rather than episodic, which accords with the structure and intent of the Smooth Hill bird management framework adapted here (Boffa Miskell 2021).

4.3.2 Deterrents and hazing protocols

Deterrents are applied in short pulses and are coordinated with face closure and rapid cover so that flushed birds find no reward on return. Acoustic devices, such as distress calls, are used sparingly, oriented to avoid reflective structures, and activated for very brief bursts before being shut off once birds take flight. Any use of propane cannons is limited to short operating windows with variable intervals and frequent relocation to limit predictability, and with consideration of neighbour amenity, noise rules, and operator safety. Visual tools, including predator kites, reflective flags, and lasers at low light, are rotated by type, location, and timing to reduce habituation risk. Drone-assisted hazing is employed as a non-contact option with short, irregular flights timed to peak bird activity and integrated with cover so that dispersal results in immediate loss of access to food. Humane standards, fire risk, and public safety are embedded in method selection and deployment, with signage and access controls used as appropriate, consistent with Auckland Council pest control guidance on planning, humane practice, signage, and minimising non-target risks (Auckland Council 2020).

4.4 Lethal control methods

Lethal control is limited to species for which it is lawful and is conducted as short, targeted daytime operations designed to break reinforcement at the working face and other hot spots. Shotguns are the preferred firearm for safety near machinery and structures, and their use is confined to defined safe arcs under site standard operating procedures, with immediate stand down if protected species are present in any line of fire. Live capture trapping is employed for species such as Common myna and feral pigeon using multi-capture cages that are pre-fed where appropriate, placed to intercept regular movement paths, and serviced daily within twelve hours after sunrise. Traps set for live capture are provided with water when set, non-targets are released immediately, and target species are dispatched humanely, in line with humane standards and the Auckland Council guidance on euthanising live capture animals and daily trap inspection duty of care (Auckland Council 2020).

4.4.1 Shooting

Shooting is a targeted, lethal control method used to reduce the numbers of large, nuisance bird species at the working face when prevention and deterrence have failed to achieve required thresholds. Only pre-authorised, trained and licensed personnel may undertake shooting operations. Use is restricted to

daylight hours, calm weather, and clear lines of sight so that shots can be taken into defined safe arcs; operations are suspended immediately if any protected species, including red-billed gull, enter the line of fire. Firearms used on site should be those specified in the operator protocol, with shotguns generally preferred for effectiveness and to limit range, and all use must follow the operator's firearm safety and handling procedures (Waste Management NZ 2025). Bird culling via shooting is already in place and carried out regularly (see Appendix B, Table 4, for data on current culling activity).

Each shooting operation is planned and briefed in advance. A scheduled rotation with standardised shooting frequency should be established. Adjustment of the frequency of shooting events, or culling effort, can occur in an adaptive manner, as determined by ongoing monitoring. Should shooting events be determined to be too infrequent, they can be increased in response until target thresholds are achieved. See section 6 for details regarding monitoring.

A Bird Control Officer or other authorised manager must sign the operation permit, confirm safe arcs and exclusion zones with the operations manager, and ensure spotters and radio communications are in place to prevent accidental exposure of staff, contractors, or the public. Operators must adopt firing positions that avoid ricochet or stray shot towards plant, infrastructure, or neighbouring properties, and must not fire over water or across public access routes. Noise and neighbour amenity are managed by limiting the frequency and duration of shooting rounds and by recording events in the deterrent and culling registers for transparency and review (Waste Management NZ 2025).

Humane dispatch and carcass handling must be practised at all times. Shots should aim to render the animal instantly insensible, and death should be confirmed before carcass retrieval. All carcasses are recovered promptly and disposed of in accordance with biosecurity and waste procedures; incidents involving non-target or protected species are recorded and reported to management and regulators as required. Shooting effort and outcomes are recorded in the culling register with time on task, number of shots, species confirmed present before action, numbers removed, any interruptions for protected species, and carcass disposition so that catch per unit effort and compliance can be demonstrated (Waste Management NZ 2025; Auckland Council 2020).

Shooting is always used within an adaptive management framework. If repeated rounds do not reduce bird numbers to acceptable levels, additional measures such as intensified trapping, baiting campaigns where authorised, or structural changes to waste handling will be considered rather than increasing continuous shooting effort. This ensures methods remain proportionate, effective, and consistent with humane and safety obligations (Waste Management NZ 2025).

4.5 Species-specific considerations

Common mynas are highly responsive to food availability and human activity, which means control effort is most effective when prevention removes access to fresh organics and when trapping or narcotic baiting is deployed with careful pre-feeding and close supervision. For southern black backed gulls, rapid cover, clean handling of organics, and interruption of access to stranded water are the primary controls, with short, targeted culling rounds used as necessary where lawful and safe. Red-billed gull is fully protected and receives non-lethal management only, which places greater emphasis on prevention and carefully planned deterrents. Pigeons respond well to multi-entry cage traps set near structures and regular flight paths with whole grain baits, combined with exclusion of roosting and nesting sites by physical means. Canada geese are managed by denying access to ponds through exclusion grids or line arrays and by targeted, lawful culling where necessary. These species-focused notes remain grounded in the same

hierarchy of control and in humane practice and monitoring so that method selection is proportionate and auditable (Auckland Council 2020; Boffa Miskell 2021).

4.6 Non-target risk management and humane standards

All methods are planned to minimise non-target risk. Staff utilising any control method will be trained in correctly identifying species, to ensure no non-pest species are mistakenly targeted. Humane standards apply to every method, humane dispatch that renders animals instantly insensible with death following immediately.

4.7 Documentation, rotation, and review

Every deployment is recorded for method, location, time, effort, and outcome so that effectiveness can be assessed and methods can be rotated or retired deliberately. Deterrents are moved frequently and cycled by type and timing to disrupt habituation, and lethal methods are scheduled as brief interventions rather than standing pressure. The control toolbox is reviewed regularly in light of monitoring, neighbour feedback, and any consent or regulatory advice, while reflecting Auckland Council expectations for planned, humane, and monitored programmes (Boffa Miskell 2021; Auckland Council 2020).

5 BIRD MANAGEMENT AND CONTROL REGISTERS

The registers provide an auditable record of actions and outcomes so compliance can be demonstrated, performance analysed, and methods adapted. They follow the Smooth Hill framework for clear procedures and traceable records and reflect Auckland Council guidance for planned, humane, and monitored pest control programmes (Boffa Miskell 2021; Auckland Council 2020). The Waste Management NZ Redvale management plan also requires that method use, complaints, and aviation liaison are logged and available for monthly reporting and regulatory review (Waste Management NZ 2025).

All registers use consistent fields for date, time, zone, operator, weather, species, method, effort, and outcomes so datasets can be merged for analysis and linked to monitoring results (Boffa Miskell 2021; Auckland Council 2020). Data quality is maintained by daily sign-off, weekly cross-checks, and monthly reconciliation before reporting. Named complaint information is restricted to authorised staff and regulators. Operational registers are retained for the life of the landfill with digital backups and are available to the Auckland Council on request (Boffa Miskell 2021; Auckland Council 2020; Waste Management NZ 2025).

The following registers will be kept:

- Culling register recording authorisation, safe arcs, species confirmed before action, numbers removed, shots and hours, interruptions for protected species, carcass disposal, and incidents (Auckland Council 2020; Waste Management NZ 2025).
- Trapping register with unique trap IDs and coordinates, pre-feed dates, bait type, daily inspection times within twelve hours after sunrise, captures, non-target outcomes, water provision when set, maintenance, relocations, and retirement (Auckland Council 2020).
- Deterrent deployment log covering device or method, location and orientation, activation windows and minutes active, relocations, and observed bird response to manage rotation and neighbour effects (Auckland Council 2020).
- Daily cover and organics audit recording open face area, cover type and thickness, time to cover, exposed organics after cover, litter and pond status, and corrective actions to demonstrate removal of food rewards (Boffa Miskell 2021; Waste Management NZ 2025).
- Incident and complaints register detailing context, investigation findings, actions, feedback, and closure to support transparency and monthly summaries (Waste Management NZ 2025).
- Aviation liaison and trigger log recording validated large landings, authority advice, Civil Aviation Authority correspondence, the responses implemented, and outcomes, with copies of written advice retained for reporting (Waste Management NZ 2025; Boffa Miskell 2021).

6 BIRD MONITORING

The monitoring programme verifies that prevention and control actions are reducing bird numbers at the working face and across the site, provides early warning of elevated risk, and supplies an auditable evidence base for adaptive management and regulatory reporting. The structure follows the Smooth Hill framework for clear procedures and traceable records and aligns with Auckland Council expectations that pest control programmes are planned, humane, and monitored for effectiveness (Boffa Miskell 2021; Auckland Council 2020).

6.1 Fortnightly whole-of-site counts and rationale

Counts of all birds present on the landfill will be undertaken fortnightly. This whole-of-site census complements the twice-weekly tip-face scans and the weekly drone snapshots by capturing site-wide abundance and composition, including species that may not concentrate at the face. Counts undertaken every two weeks is necessary because landfill bird numbers respond quickly to changes in food exposure, weather, and breeding behaviour. Common myna form large communal roosts and can number in the hundreds; they also exploit diverse food sources across the wider landscape and readily shift between foraging areas, which drives short-term fluctuations at specific sites. Nest preparation typically begins from late August to early September, with up to two successful broods per season in New Zealand. During breeding, adults commute between nest sites and feeding areas and may range further when provisioning young, which can depress counts at the tip-face even when the local population remains high. Conversely, post-breeding aggregation at communal roosts can increase local counts. Fortnightly whole-of-site counts capture these seasonal pulses so that operational decisions are based on true site abundance rather than on short snapshots at a single location (Wilson 2013).

Communal roosting of many hundreds of myna at dusk confirms the local breeding calendar and clutch parameters, supporting the expectation of seasonal dispersal and fluctuating counts at landfills in northern New Zealand (Wilson 2013). This ecological context justifies a fortnightly census to detect real changes on site use by myna and other species, and to separate operational effects from seasonal movement patterns.

6.2 Initial Wildlife Hazard Assessment count (July)

A one-off baseline count was undertaken for the Wildlife Hazard Assessment in July. The method comprised fixed-point vantage counts focused on the active tip-face, organics reception areas, ponds, and perimeter sectors, using timed scan periods and species identification to confirm the presence of protected and unprotected gulls, myna, pigeons, Canada geese, starlings, sparrows, and spur-winged lapwings. The results indicated a typical landfill assemblage dominated by myna and southern black-backed gull, with smaller numbers of other species and intermittent presence of red-billed gull. These July results serve as an initial reference point for trend assessment, noting that a single winter count cannot represent seasonal peaks or breeding-season dispersion. Exact figures and locations are held in the Wildlife Hazard Assessment technical appendix and will be cross-referenced in the annual report.

Table 3. Mean daily count of each species observed at Redvale Landfill at the three times of day surveys were conducted. Note that values are means of the two observation days. Also, Redvale Landfill values are for the whole landfill, i.e. three observation points combined.

Species	Redvale Landfill			Mean count
	Morning	Midday	Afternoon	
Myna	1079	854.5	969	967.5
Red-billed Gull	275	122.5	162	186.5
House Sparrow	30	32.5	87.5	50
Pukeko	20.5	8.5	16	15
Southern Black-backed Gull	20	11	13	14.7
Feral Pigeon	0	11.5	28.5	13.3
Welcome Swallow	9.5	1.5	6	5.7
Paradise Shelduck	5	3	3	3.7
Mallard	2	2	2	2
Black Swan	2	2	2	2
Spur-winged Plover	5	0	0	1.7
Australasian Harrier	0.5	2	2.5	1.7
Skylark	2	1	0	1
Kingfisher	1.5	0	0	0.5

6.3 Monitoring methods and data standards

Tip-face vantage counts are undertaken twice, from a fixed point, once a month, using a ten-minute scan protocol and recording species maxima, time, weather, face area, and recent cover activity. Monthly drone flights produce orthophotos of the working face and organics areas, estimating exposed organics area and documenting flock distribution for quality assurance and retrospective review. Drone-derived measures of face area and exposed organics are referenced to site polygons so they can be related to daily cover audits. Data are stored in a single database with versioned templates and are summarised weekly and monthly for decisions and reporting (Auckland Council 2020).

Trigger thresholds link monitoring to action (see section 4.2). A validated complaint, documented advice of concern from an authority, more than one hundred gulls landed on site, or five hundred other nuisance birds landed constitute trigger events. When any trigger is met the manager is notified, a response is selected, and the event and outcome are recorded for monthly reporting. These triggers ensure predictable and auditable responses proportionate to risk.

6.3.1 Recommended analysis method for monthly data

Redvale will use a statistical tracking tool that links three monthly figures, namely the average survey count of landed birds, the total culling effort in hours, and the number of birds culled. The model adapts standard effort-removal approaches from wildlife and fisheries management to estimate how effective control has been and to calculate the minimum culling effort required next month to keep bird numbers below an agreed threshold. Landfill staff enter the three figures in a dedicated Excel workbook and the tool returns estimated parameters and the recommended effort required to remain below the operational threshold. This improves efficiency by avoiding over-effort when numbers are already low, increases responsiveness when counts rise, and provides transparent monthly outputs for Auckland Council review.

The method is described in Appendix 5A and can be deployed as a standardised Excel framework on request.

6.3.2 Technical details of the statistical model

The model uses a log-linear effort–removal relationship to estimate an intrinsic monthly increase parameter and an effectiveness parameter from the observed monthly data. From these estimates, it calculates the minimum monthly effort required to hold counts at or below a management threshold. Inputs are the monthly mean count of landed birds, total culling hours, and the number culled. Outputs are the parameter estimates, the minimum effort required for the following month, and predicted counts under planned effort levels. If the minimum recommended effort exceeds current capacity, escalation measures are triggered. Full equations, sources, and implementation notes are reproduced in Appendix A

7 SUMMARY

This plan provides a practical, lawful programme to keep pest bird numbers low at Redvale so that operational, public health, ecological, and aviation risks are minimised. It tailors procedures to Auckland conditions and Redvale's consents, ensuring clear responsibilities, auditable records, and predictable escalation when risk thresholds are exceeded (Boffa Miskell 2021).

The management approach prioritises prevention at source through disciplined landfill practice, including a small working face, rapid compaction, timely daily cover, and organics access denial, because removing food rewards is the most reliable way to suppress bird pressure. Deterrents are then used in short, carefully planned pulses and rotated to avoid habituation, and lethal methods are reserved for lawful species when required to meet risk thresholds. Humane standards and neighbour amenity are embedded throughout in line with Auckland Council guidance on planned and monitored pest control (Auckland Council 2020).

Common myna and southern black backed gull are the primary operational focus, reflecting their abundance at landfills and capacity to create nuisance and aviation risk. Red-billed gull remains fully protected, so management relies on prevention and carefully planned non-lethal dispersal with strict stand downs when protected species are present. Site firearms use, trapping, and any approved narcotic baiting are governed by Waste Management NZ procedures that emphasise safety, humane practice, and complete record keeping for monthly and annual review (Waste Management NZ 2025).

Monitoring ties action to evidence. Twice weekly tip face scans and weekly drone snapshots track immediate operational risk, and fortnightly whole of site counts provide the breadth needed to detect true changes in site use and to separate management effects from seasonal movements. Triggers link observations to action, and the plan's analysis method uses fortnightly counts, culling effort, and birds culled to recommend the minimum effort required in the following month to stay below agreed thresholds. This approach supports efficient deployment of methods, transparent reporting to Auckland Council, and continuous improvement through adaptive review (Boffa Miskell 2021; Auckland Council 2020; Waste Management NZ 2025).

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APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of Waste Management New Zealand as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions. Where opinions or judgements are to be relied on, they should be independently verified with appropriate legal advice.

Maps and Images

All maps, plans, and figures included in this report are indicative only and are not to be used or interpreted as engineering drafts. Do not scale any of the maps, plans or figures in this report. Any information shown here on maps, plans and figures should be independently verified on site before taking any action. Sources for map and plan compositions include LINZ Data and Map Services and local council GIS services. For further details regarding any maps, plans or figures in this report, please contact Bioresearches.

Appendix A *Pest bird minimum effort statistical model*

Overview

Effective bird management at landfills requires not only routine monitoring but also tools that can predict the level of control effort needed to prevent bird numbers from exceeding operational thresholds. At Redvale, this is achieved using a log-linear effort–removal model that has been adapted from harvest theory in wildlife and fisheries management (Hilborn & Walters 1992; Caughley & Sinclair 1994). Unlike conventional harvest models, which estimate how much removal can be sustained, the model here works in reverse: it estimates the minimum level of effort needed each month to hold pest bird counts below a defined threshold. This approach ensures that operational responses are efficient, evidence-based, and transparent for regulatory reporting.

The core equation relates changes in monthly bird counts to both removals and control effort:

$$y_t = \ln \left(\frac{N_{t+1}}{N_t} \right) + \frac{H_t}{N_t} \approx r - qE_t$$

where N_t is the mean monthly bird count from monitoring, E_t is culling effort in hours, H_t is the number of birds culled, r is the intrinsic monthly increase (through reproduction or immigration), and q is an effectiveness parameter describing the rate of removal per bird per hour of effort. Regression methods are used to estimate r and q from observed data.

From these parameters, the model calculates the minimum monthly effort ($E_{\min}$) required to keep counts below a set management threshold (N_{target}):

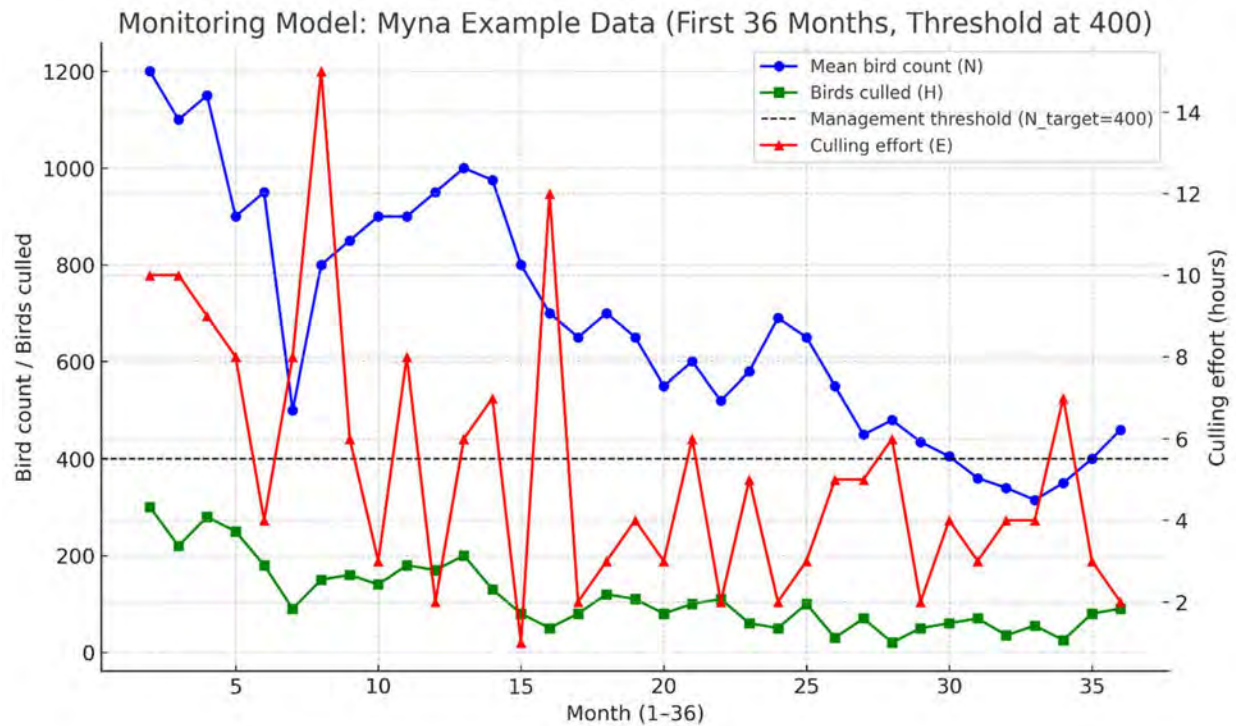
$$E_{\min} = \max \left(0, \frac{r - H_{\text{bar}}/N_{\text{target}}}{q} \right)$$

where H_{bar} is the assumed average monthly culls used for planning (commonly set to zero for conservative estimates). If the recommended minimum effort exceeds current operational capacity, the plan requires escalation, either through additional culling, deployment of traps, or reinforcement of preventative measures

In practice, the model only requires staff to enter three monthly values, mean count, effort, and removals, into a standardised Excel framework. The tool then produces estimated growth and effectiveness parameters, the required minimum effort, and predicted outcomes under different control scenarios. This enables managers to adjust operations proactively, maintaining compliance with thresholds while avoiding wasted effort during periods of low bird pressure.

Over time, as more months of data accumulate, the model becomes increasingly reliable. By linking monitoring counts, culling effort, and removals in a transparent framework, the approach provides a strong evidence base for both operational planning and regulatory reporting. In short, once data are tracked consistently, this model allows Redvale to estimate the amount of effort needed to keep pest bird numbers below the target threshold, ensuring management is both adaptive and cost-effective.

Figure 1. Demonstration of the Redvale monitoring model for Common myna using example monthly data (first 36 months). Note that this data is fictional and prepared as a demonstration only. Blue line shows mean bird counts (N) recorded at the landfill, green line shows the number of birds culled (H), and the red line (right-hand axis) shows monthly culling effort (E , hours). The black dashed line represents the management threshold ($N_{\text{target}} = 400$), which triggers escalation if exceeded. This combined view illustrates how survey data, culling effort, and removals interact to inform adaptive bird management and compliance reporting.



Appendix B Bird culling records

Table 4. Summary of pest bird culling records at Redvale Landfill, 2019–2025. Totals, mean monthly removals, and maximum monthly removals are shown for each species. The “reported total” row reflects the overall sum across all species, including months where species were not individually recorded.

Common name	Scientific name	Total culled (2019–2025)	Mean per month	Maximum in a month
Common myna	<i>Acridotheres tristis</i>	8,654	211	567
Southern black-backed gull	<i>Larus dominicanus</i>	1,212	28	52
Rock pigeon (feral pigeon)	<i>Columba livia</i>	432	14	46
Canada goose	<i>Branta canadensis</i>	187	37	89
Deer ¹	<i>Cervidae spp.</i>	8	8	8
Reported total (birds & vermin)	-	13,899	196	645

¹Deer are not a target bird species but are retained in the register for completeness.

Notes:

- Species records vary across the dataset. Where a species was not recorded in a given period, its culls were aggregated into the “reported total” row.
- The reported total therefore, represents all culling effort across the period 2019–2025, while species-specific totals only reflect the months when those species were recorded separately.

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3.15 Biosecurity

3.15.1 Biosecurity regulatory requirements

Any site in New Zealand that provides for de-vanning of shipping containers is required to register as a transitional facility which includes appointment of a facility operator and approved handlers. This is a requirement under the Biosecurity Act 1993.

The Biosecurity Act 1993 (Biosecurity Act) is administered by the Ministry for Primary Industries (MPI). It provides a legal basis for excluding, eradicating and effectively managing pests and unwanted organisms, and its power can be variously used by MPI Biosecurity New Zealand (MPIBNZ), other government agencies, regional council and pest management agencies.

3.15.2 Transitional facility

3.15.2.1 Definition and requirements

Transitional facilities are approved for holding, inspection, treatment or destruction / disposal of uncleared risk goods imported into New Zealand. Containment facilities are places approved for holding organisms (plants or animals) that should not, whether for the time being or ever, become established in New Zealand. They operate under facility standards which details the minimum requirements for approval. The movement of biosecurity risk goods between MPI approved facilities (including for export), requires a transfer application to be submitted to MPI.

Every approved facility must have an approved Operator. Facilities are required to have met the specific physical and operational requirements of the MPIBNZ Standard(s) they are approved under the Biosecurity Act 1993. To this end, Redvale has submitted to MPIBNZ an operational procedure (with site plan) to document how they meet the Standard requirements. These procedures are specific to the Redvale facility.

3.15.3 Transitional facility biosecurity management

3.15.3.1 Functions and purpose

The Biosecurity Act, provides a legal basis for excluding, eradicating and effectively managing pests and unwanted organisms.

Import Health Standards (IHSs) are documents issued under Section 22(1) of the Biosecurity Act. They state the requirements that must be met before risk goods can be imported into New Zealand. Import Health Standards are put in place for the import of risk items into New Zealand that pose a biosecurity threat. These standards include the requirements that must be met in the exporting country, during transit and during importation, before biosecurity clearance can be given.

3.15.3.2 Scope

The scope of this plan covers all operations with respect to storing and de-vanning containers at the Transitional Facility located at the Redvale Landfill.

3.15.3.3 Location

For the purpose of this Management Plan, the site location for the Transitional Facility permitted by MPI under the Biosecurity Act is:

Redvale Landfill

Redvale Landfill Management Plan

Landfill Access Rd

Dairy Flat, RD4 Albany 0794

AUCKLAND

3.15.3.4 Facility operator

The current registered facility operator(s) under the provisions 103 (7) of the Biosecurity Act 1993.

Approved Facility Operator	MPI no. & training expiry date	Contact details
Glen Jujnovich	Cert # 403897, Expires on 23/05/2027	Ph: [REDACTED] Mo: [REDACTED]
Christopher Rogers	Cert # NZBTFO-05278, Expires on 25/06/2028	Mo: [REDACTED]

The current Accredited Person(s) under the Provisions 103 (7) of the Biosecurity Act 1993 are:

Accredited Person	MPI no. & training expiry date	Contact details
Andrew Speed	Cert # 1003031, Expires on 31/03/2027	Mo: [REDACTED]
Magnus Lumley	Cert # 1003482, Expires on 02/06/2027	Mo: [REDACTED]
Christopher Rogers	Cert # NZBTFO-05278, Expires on 25/06/2028	Mo: [REDACTED]

3.15.3.5 Transitional Facility Number Protection

The Transitional Facility is issued with a certificate with an Approved Transitional Facility number displayed. In order to ensure that this number is not used illegally, the certificate is not displayed where members of the public can view the certificate.

3.15.3.6 Container Security

There are three levels of security prior to gaining entry to the contents of any container in the transitional facility.

- Main gate access.
- Flare site main gate access.
- Security padlocks on the container once clearance has been given.

3.15.3.7 Site Security

The container is placed on the road access from the main gate up to the office. The main gate is closed after 5.30 pm and not opened until 6 am the following morning. On Saturdays and statutory holidays, the site is open from 7.00am to 2.00 pm. There is no general public access to the site.

3.15.3.8 Segregation of uncleared goods

The segregation of uncleared goods is important to prevent contamination of other goods, the facility or the wider environment. In order to achieve this, the area where uncleared goods are kept is clearly marked. This area is managed to control pests and vegetation or any live animals.

There is no facility for uncleared goods to be stored, therefore at the end of the day these goods are returned to the confines of the container.

3.15.3.9 Hygiene

An effective hygiene system will help to prevent the accumulation and possible spread of contamination. To achieve this, Redvale ensures that:

- The facility is cleaned before use and kept clean at all times;
- Sweepings or contamination from the delivery container or wrapping is disposed of properly (e.g. placed in an appropriately sized, solid, secure, and preferably lined biosecurity bin);
- Any spilled uncleared goods that might constitute a biosecurity risk are reported to a MPI Inspector immediately. pH 0800 809966

3.15.3.10 Biosecurity Bin Waste Disposal

All contamination is recorded and reported to MPIBNZ ph 0800809966.

All waste is placed in the lined Biosecurity Bin. The bin is located outside the reception building along with the Biosecurity container which has a pan and brush, fly spray, and bin liners.

During collection it is ensured that the labelled Biosecurity waste bin is close to the container. Once the cleaning has been completed, the bag is sealed by taping or tying the bag. The waste is left inside the bin until MPI removes the material when the bag is full, or wait until next MPI inspection to remove the waste.

3.15.3.11 Biosecurity Bin

Equipment used for hygiene purposes (including a bin or broom, dustpan or other cleaning equipment) are used only for Biosecurity purposes within the facility and are clearly labelled so.

3.15.3.12 Treatment of identified biosecurity risks

The treatment of identified biosecurity risks will follow the protocols set by MPI.

- For example, Invertebrates
- i. Crawling insects - spray and contain.
 - ii. Flying insects - spray and contain.

3.15.3.13 Signage

Biosecurity related signages are placed on the site's main gate and landfill gas flare site.

3.15.3.14 Access

Access to the site is controlled through security-controlled gates with electronic locking and padlocks.

3.15.3.15 Maintenance Requirements

The site facility operator is responsible for maintaining the filing system and updating the copy of the Biosecurity manuals as listed in the table below.

Item	Frequency	Action By Who
Biosecurity Bin And Broom	Six Monthly And Annually	Facility Operator
Biosecurity Bin Contents	Six Monthly and Annually	Facility Operator
Biosecurity Documentation	Annually	Facility Operator
Biosecurity Manual	Annually	Facility Operator
Site Certification	Annually	Facility Operator
Staff Certification	Annually	Facility Operator
Container devanning location	Annually	Facility Operator

3.15.4 Records and reporting

3.15.4.1 Facility Records

The following records are kept on site:

- facility plans, specifications, or any structural drawings
- facility and Operator approvals
- any old versions and the current version of a facility operating manual
- staff records including training records, skills and experience of people working in the facility, including Accredited Persons details (if required)
- records of internal and external audits including date, auditor, non-compliances and any corrective actions taken
- copies of any lease agreements or contracts with any other users of the facility
- copies of any audit dispensations
- copies of the relevant Standards
- records of major or minor modifications to the facility
- records of pest and weed control programmes
- records of destruction of Biosecurity waste
- copies of MPI inspections and annual equipment audits

3.15.4.2 Consignment Records

The following records (where applicable) for each consignment of uncleared goods received at the facility are kept and maintained:

- phytosanitary certificates (photocopy acceptable)
- relevant written authorisations for biosecurity clearances and directions or any transfers of uncleared goods
- permits to import
- arrival date of the consignment in the transition facility
- consignment identifier (e.g. container number, air waybill number, courier number)
- full inventory of the consignment
- records of any MPIBNZ inspections or treatment of uncleared goods
- dates of unpacking
- records of any pests, unwanted organisms or other organisms found and any control actions taken (including contacting MPI) date of biosecurity clearance or destruction of the consignment, or part of a consignment.
- Logsheets

3.15.4.3 Record Keeping

Records of all matters relating to Biosecurity will be held both electronically and in ring-binders on the site. The files are held by the Compliance Coordinator at the Redvale site.

3.15.4.4 Reporting

There are no consent requirements for reporting except as for MPI's reporting requirements as follows:

- Container information can be electronically entered via the MPI website or faxed directly to MPI
- In the event of a Biosecurity breach, MPI must be notified on 0800809966
- When the Biosecurity Authority Clearance Certificate (BACC) requires MPI officers to be present at the time of container opening.

3.15.5 Contingency

Contingency plans are important so that in an emergency situation no biosecurity risks are inadvertently neglected. In the event of a Biosecurity emergency, procedures can be found in the Redvale "Site Emergency Management Plan".

3.16 Health and Safety

3.16.1 Relevant legislations

A selection of legislation where Health and Safety is recognised is listed below as a guide. It is not the aim of this management plan to provide a comprehensive list.

- Building Act 2004, and amendments
- Dangerous Goods Act 1974, and amendments and regulations (now superseded by HSNO Act)
- Hazardous Substances and New Organisms Act 1996 (HSNO Act)
- Smoke-Free Environments Act 1990, and amendments and regulations
- Health and Safety at Work Act (2015)
- Health and Safety in Employment Act 2016 and amendments and regulations
- HSE - The Asbestos Regulations 2016
- HSE - Health and Safety in Employment (Prescribed Matters) Regulations 1993
- HSE - Health and Safety in Employment Regulations 1995

3.16.2 Company Policy

The site will operate the health and safety management system of the owner's company, Waste Management (NZ) Ltd.

The company has recognised Health and Safety at work place as a priority issue and has developed a number of policies related to it. These policies are updated regularly on an annual basis to suit the company needs and the changing health and safety regulations.

3.16.3 Site Specific Programmes

The Redvale site will maintain its own site-specific elements of the company's health and safety programme, including:

- site-specific items for induction of new staff (Section 3.16 Appendix F)
- site health and safety Induction for visitors and contractors (Section 3.16 Appendix A)
- site rules for customers of Redvale Landfill
- site risk register
- site-specific pre-employment medical check programme
- site-specific programme of ongoing annual medical check programme
- site-specific PPE guidelines
- Redvale Landfill Emergency Management Plan (see Section 3.17 of this LMP)
- site Gas Flare Site safety provisions
- site programme of safety meetings
- site-specific tasks or standard operating procedures or work instructions
- site-specific provisions of fire extinguishers, first aid kits, spill kits and confined space entry equipment
- site incidents/accidents and near misses are recorded in vault (third party system).
- Standard Operating Procedure for Disposal of Asbestos Containing Materials

3.16.4 Trainings

In addition to other essential training required for the position a person is working, the following are the list of core trainings identified and applicable to all staff.

- Induction - corporate
- Induction - site
- Risk Management Awareness
- Event pad use
- Manual handling
- Injury management

3.16.5 Notifiable work

Some works will be notifiable to the WorkSafe New Zealand. Notification will be the responsibility of the person authorising the work.

The definition of notifiable work will be taken from the HSWA 2015 Regulations.

Confined space entries (for example entry within the leachate evaporator unit) will be considered as confined space entry and is notifiable to WorkSafe.

3.16.6 Reporting and record-keeping

A typical list of forms and records relating to health and safety will be, as a guide:

- "Record of accident or incident not causing serious harm".
- "Notice of accident / serious harm", or equivalent forms prepared by the Company.
- Internal incident reporting system; vault.
- Vehicle accident insurance claim form.
- Accident insurance claim form.
- Medical insurance provider details.
- Redvale Landfill staff status / training record
- Records of training sessions held at Redvale Landfill.
- Minutes of Redvale Landfill health & safety toolbox meetings, including attendance.
- Minutes of Redvale Landfill full site health & safety meetings, including attendance.
- Staff training record.
- Redvale Landfill first aid kit inventory check lists.
- Certified First-Aiders register.
- Redvale Landfill risk register.
- Redvale Landfill accident register; vault.
- Confined space entry risk assessments and permits.
- Job safety and environmental analysis records.
- Key risk observation, safety interaction, and workplace inspection records.

It will be recognised that when it comes to health and safety, proper and thorough record-keeping will be essential to exercising the Company's policy.

Redvale Landfill will maintain a number of forms for routine reporting (e.g. monthly) of health, safety, accident, illness and environmental statistics, firstly for site management and secondly for company-wide management.

The status of any significant health and safety issue being tracked using the site's incident non-compliance reporting and tracking system will be contained in separate monthly reports to senior Company management.

Appendix A Health and Safety Policy

DRAFT

Health and Safety Policy

1.0 Objectives

As a Person Conducting a Business or Undertaking, (PCBU), Waste Management NZ Limited and its subsidiaries ("WM"), are committed to the safety, health and wellbeing of our workers. We believe that all workplace related incidents, injuries and illnesses are preventable and aspire to achieve our aim of "Zero Harm" by making health and safety the first priority in all our business activities. We also believe that attaining the highest standards in health and safety is paramount to the success and sustainability of our business.

2.0 Waste Management achieves these objectives by:

- a) Expecting all workers and contractors to cease work if they feel unsafe, or are exposed to health risks;
- b) Consulting with workers and relevant stakeholders in the decision-making processes impacting on workplace health and safety;
- c) Complying with all legal requirements in accordance with [The Health and Safety at Work Act 2015](#), codes of practice and standards applicable to our activities;
- d) Ensuring our systems and processes effectively support the business and our workers to work in a healthy and safe environment;
- e) Demonstrating visible safety leadership through our supervisors, managers, and Directors;
- f) Identifying and understanding the hazards and risks relevant to the activities we undertake and provide effective controls to assess, and manage them accordingly;
- g) Providing appropriate training and support to our workers and contractors to enable them to understand our vision of "Zero Harm", and to allow them to perform their roles competently in line with the health and safety expectations;
- h) Setting objectives, targets and key performance indicators which continually drive us to improve our health and safety performance;
- i) Learning from our performance and continuously improving our processes and work practices; and sharing lessons learnt with others;
- j) Ensuring that all incidents are investigated fully - specifically identifying the causal and contributing factors so that appropriate corrective actions are taken;
- k) Identifying Critical Risks and ensuring these are actively managed;
- l) Regularly undertaking audits and inspections of our operations; and
- m) Communicating this Policy to workers and interested stakeholders; and reporting on our health and safety performance openly and transparently.

3.0 All Officers (Executive LeadershipTeam) are required to:

- a) know about workplace health and safety matters and keep up to date.
- b) gain an understanding of the operations of the organisation and the hazards and risks generally associated with those operations.
- c) ensure the PCBU has appropriate resources and processes to eliminate or minimise those risks;
- d) ensure the PCBU has appropriate processes for receiving information about incidents, hazards and risks, and for responding to that information;
- e) ensure there are processes for complying with any duty, and that these are implemented;
- f) verify that these resources and processes are in place and being used.

4.0 All Persons in control of a workplace (Regional Manager, Branch Manager, Supervisor) are required to:

- a) Take all practicable steps to ensure the health and safety of all workers while at work;
- b) Ensure that all workers are trained and competent to perform their tasks in line with the company's health and safety processes, procedures, and expectations;
- c) Ensure all HSEQ systems are implemented and followed at all times.
- d) Ensure all workers are able to perform their duties in a healthy and safe manner (e.g., access to appropriate resources, well maintained plant and equipment, and Personal Protective Equipment ("PPE") relevant to the task; and
- e) Support WM in achieving its objectives set out in [Section 2](#) of this Policy
- f) have a clear understanding of risk and change management and risk identification.
- g) support workers in their understanding and application of risk management.
- h) identify risks that could result in impacting mental health and wellness of workers and apply controls to eliminate them so far as reasonably practicable. If the risks can't be eliminated, they should be minimised.
- i) Sites are required to promote work-life balance to support positive mental health and wellbeing of all workers.
- j) Where managers need assistance from professional services in supporting mental health and wellness of workers upon risk identification then please engage with People and Culture for direction and support.

5.0 All Workers and Contractors are required to:

- a) Carry out their work in accordance with WM's safety policies, processes and procedures;
- b) Be accountable for their own health and safety, that of others, and ensure their actions or inactions do not create health and safety risks to others;
- c) "SLAM" – Stop, Look, Assess and Manage the hazards and risks inherent to the activities they undertake;
- d) Comply, so far as reasonably able, with any reasonable instruction that is given to them by the PCBU to allow the PCBU to comply with the law;
- e) Stop work if they feel unsafe or exposed to health risks; and
- f) Immediately report any hazards or identified risks and all incidents which cause actual or potential injury, health related issues or damage.
- g) For mental health and wellbeing, the worker suffering harm through the work environment should speak to their manager first, using existing employment relations approaches, or should access support such as RAISE Employee Assistance Programmes.

6.0 Worker Physical Health and Wellbeing

- a) Employed workers will be offered and encouraged to have an annual health assessment at WM's cost which may include health monitoring in relation to identified work risks and a general health assessment for the Employee's benefit.
- b) The employed worker will receive all health assessment results. WM will not receive any personal information relating to individual health assessment results, with the exception of health monitoring of work-related hazards.
- c) Non-permanent workers will be assessed, dependant on the task they are completing for WM. Where the task has a potential risk to a worker's health and wellbeing, this will be discussed and reviewed

Figure 3.14.3.1

accordingly.

7.0 Children in the Workplace

- a) Due to the nature of our work and risks involved, children under the age of 15 are not allowed to be brought into the workplace under any circumstances. Children over the age of 15 can attend a place of work if enrolled in a recognised work experience programme.
- b) Where workers are required to look after a child / children due to unforeseen circumstances during work hours, carers leave or annual leave are provided as an option, or workers may be allowed to work from home only with approval from a Level 3 manager.
- c) If a worker is on parental leave and would like to attend a workplace to introduce their child to fellow workers, this must be approved by their reporting manager first. The parent or child must not enter operational areas due to risk.
- d) Open days or pre-arranged site visits that may involve children attending, must be approved by the relevant divisional General Manager who will nominate a worker/s to be responsible for the safe management of the open day or site visit and ensure safety requirements are met.

8.0 Application

This Policy applies to all workers, contractors and joint venture partners engaged in activities under WM's operational control.

9.0 Breaches of policy

Any breach of this Policy, including breaches of local procedures, may result in disciplinary action, with potential of formal outcomes up to and including instant dismissal.

This Policy will be reviewed annually.

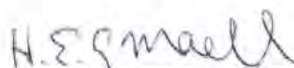

Approved by the Managing Director
Date: 02 November 2023

Figure 3.14.3.1

Risk Management Policy

Waste Management NZ Ltd (“WM”) faces a wide range of risks in the business environment. It shall actively manage these risks to ensure it operates a safe workplace and is able to sustain the achievement of its business objectives.

WM takes a proactive approach to risk management, ensuring a company-wide system is in place, which addresses all internal and external risk factors.

WM is committed to making the necessary resources available to assist those accountable and responsible for managing risk at all levels.

1.0 Definition and Scope

Risk is defined as the potential of an action, inaction or activity to adversely affect WM’s commercial objectives, as well as the company’s vision or values, and is evaluated in terms of likelihood and consequences of the event occurring.

There are many different forms of risk, which WM must manage, including but not limited to,

- a) Operational and Compliance risk
- b) Critical Risk
- c) Enterprise and Strategic risk
- d) Health and Safety risk
- e) Environmental and Climate Change risk
- f) Change risk (Management of Change)

WM differentiates between Corporate Enterprise Risk and Branch Enterprise Risk. This acknowledges that WM branch enterprise risk exposure may be different and must be managed at branch level.

WM’s [Risk Management Program](#) applies to all businesses, including wholly owned subsidiaries, within the WM group.

2.0 Rationale for Managing Risk

The purpose of the Risk Management Program is to maintain a business environment that effectively reduces risk exposure to acceptable levels and ensures compliance to relevant legal, regulatory and governance standards, as well as enabling informed decisions to be made.

3.0 Critical Risk

Critical Risks are potential incidents or events in the workplace, that can cause death or serious harm. At WM, we understand these risks require stricter controls and processes to ensure worker and public safety. WM has reviewed its activities and identified a number of Critical Risks that impact our business.

Not all Critical Risks identified apply to all branches, so they are required to list the top 5 as a minimum and conduct a full review of one Critical Risk every month from February to November, ensuring those Critical Risks identified are reviewed twice per year. Where sites have multiple Critical Risks, they can list up to 10 but must remember to review each identified Critical Risk twice per year.

4.0 Enterprise Risk

Enterprise Risk Management is embedded in all organisational practices and processes and is operated through the Enterprise Risk Management Framework (“**ERMF**”) which is located on the HSEQ page of the WM portal.

Figure 3.14.3.2

4.1 Branch Enterprise Risk

- a) Branch level risk management is the responsibility and accountability of each Branch Manager. Each Branch Manager must ensure that a detailed Enterprise [Risk Register](#) is developed for their branch. These will be supported by the relevant Regional Manager, General Manager and corporate support functions as appropriate.
- b) The Branch Enterprise Risk Registers will be regularly reviewed, reported on and audited both internally and externally, in accordance with the ERMF.

4.2 Corporate Enterprise Risk

- c) The Executive Leadership Team ("ELT") has in conjunction with the Senior Leadership Team (SLT), developed a Corporate Enterprise Risk Register.
- d) ELT will review information on the risks set out in this register at the monthly ELT meetings when an identified risk has been involved in an incident. A full register review is to be completed every six (6) months regardless of any monthly reviews being completed. It is the responsibility of both the ELT, and the relevant Risk Owner stated in the Corporate Enterprise Risk Register, to ensure that this information is discussed and reviewed with the SLT so that informed decisions and appropriate action relating to the risks set out in the Corporate Enterprise Risk Register can be made.
The Chief Risk Officer will report on any changes made to the Corporate Risk Register to the ELT at the earliest opportunity whenever a review has been completed. Any changes made by the ELT upon this review will be reported back to the SLT at the earliest opportunity.
- e) Financial risk is centrally managed by the CFO unless otherwise specifically delegated within the appropriate authority levels and transaction limits set out in the [Delegations of Authority](#) and the company policies (including the [Treasury Policy](#)).

5.0 Health and Safety Risk

Please refer to the Health and Safety Policy for further information on the management of this risk.

6.0 Operational and Compliance Risk

This risk is managed and supported by a number of systems and processes including HSEQ, People and Culture, legal and finance as well as the policies and the Business Rules and Delegated Authority Levels.

7.0 Change Risk (Management of Change)

Where a change is required to the way we operate this can expose our workers or the organisation to potential risk. Whenever there is a change in process, a change in the plant or equipment used in operations, the removal of or, change to a person's role within the organisation, there is a risk that this may impact on the health and safety of workers, the environment, and/or to the effectiveness in the way the company operates. In all such cases, the Management of Change process must be followed to ensure any risk/s are identified and assessed before the change is made, and the appropriate controls put into place to minimise exposure to the risks identified by the assessment.

8.0 Measure and Reporting Requirements

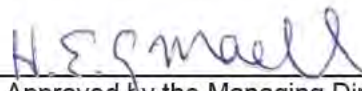
- a) Risk Management performance will be measured and reported on a regular basis, through the processes prescribed by the ERMF.
- b) The WM ERMF will be reviewed on an annual basis by the Chief Risk Officer to ensure it is fit for purpose and meets the needs of WM and any changes will be reviewed by the rest of the ELT to approve.

Figure 3.14.3.2

9.0 Communication and Consultation

- a) Communication and consultation with workers and contractors of the requirements in this Policy shall be carried out in accordance with the [HSEQ Management Standards](#), which are set out on the portal.
- b) This Policy applies to all workers and contractors engaged in activities under WM's operational control.
- c) The Managing Director is accountable to the Board of Directors for ensuring this Policy is implemented.

This Policy will be reviewed annually.


Approved by the Managing Director

Date: 20 April 2023

Figure 3.14.3.2

Workplace Training Policy

Waste Management NZ Ltd ("WM") is New Zealand's leading recycling and waste management company with a particular focus on the solid, liquid and hazardous waste management markets.

WM recognises that training is an integral component to business management. The competencies, skills, and knowledge possessed by our workers are key factors in the success and prosperity of WM operations. Employee development and training opportunities are made available taking into consideration the business requirements, benefits for individuals, and the needs of the operating business units.

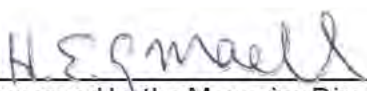
Workplace training and development programmes shall be organised in consultation with business unit Managers, Operational Supervisors and employees, and in alignment with Business Plans and statutory requirements. Where a workplace hazard and potential risk has been identified, all relevant persons shall be provided with specific information and training to eliminate or minimise exposure.

As part of our commitment, WM shall:

- a) Conduct training needs analysis to determine the training requirements for particular positions and tasks undertaken,
- b) Develop core training elements which identify the required level of competency for employees to effectively perform their work and meet their obligations,
- c) Provide the training, skills and knowledge to ensure employees are competent to satisfy the requirements of individual job descriptions and organisational goals, objectives and targets now and in the future,
- d) Allocate resources and time for workers to participate in training programmes both internally and externally where identified as applicable and practicable,
- e) Provide training which has regard for the trainee's language, literacy and numeracy skills, level of existing knowledge and level of details,
- f) Meet accountability requirements by recording and documenting all training and development activities.
- g) Monitor and review the effectiveness of workplace training and development activities to ensure organisational goals, objectives, and targets are met.

WM is committed to ensuring the development of WM employee competencies, knowledge and skills to a standard that meets internal and external customer expectations. This is to ensure the achievement of corporate responsibility, employee development and safety and statutory compliance.

This Policy will be reviewed as per the footer date.


Approved by the Managing Director

Date: 25 / 11 / 2021

Figure 3.14.3.3

Contractor Engagement Policy

1.0 Introduction

This policy governs the engagement of consultants and contractors (“Independent Contractors”).

Independent Contractors fall into two categories. The first category comprises professional consulting service providers (for example consulting engineers) and the second category comprises trade / labour service providers (for example, Owner Drivers). This Policy does not cover people or entities engaged through labour hire agencies.

The engagement of any Independent Contractor must be done in accordance with the Contractor Management Manual contained in [HSEQ STD 4.1.0](#).

2.0 Policy

- a) All contracts entered into must be reviewed by [WMNZ Legal department](#).
- b) If there is any doubt as to the validity of a proposed contractor arrangement, advice should be sought from Corporate Counsel prior to proceeding.
- c) To minimise the risk of not complying with the legal obligations surrounding the engagement of contractors, all persons engaged must comply with the [Health and Safety Policy](#), which must be adhered to, except as may be authorised by [Corporate Counsel](#).
- d) Failure to adhere to this Policy will be treated seriously and may result in disciplinary action.

3.0 Is a person being engaged an Employee or Contractor?

[Appendix A](#) - The table appended to this Policy identifies common key factors in determining the status of a person or an entity, i.e. whether they are an employee or an Independent Contractor.

4.0 Contractor Status Assessment

It is important that if an Independent Contractor arrangement is proposed and there are questions as to the person or entity's status that Corporate Counsel and the CFO are consulted and that only a form of contract as approved by Corporate Counsel is used.

5.0 Engagement of Contractors

No contractor may commence providing services until an Independent Contractor Agreement has been formally approved by the Corporate Counsel and then executed.

6.0 Contractor Management Manual and Insurance

This Policy should be read in conjunction with the [HSEQ STD 4.1.0](#) which amongst other things sets out the requirements for pre-qualification of contractors.

All Independent Contractors should have and maintain the following insurances unless approved otherwise by Corporate Counsel or CFO:

- (a) Public Liability Insurance of \$10M;
- (b) Professional Indemnity Insurance of \$2M (in the case of consultants providing professional services).

Owner Drivers should have and maintain the following insurances unless approved otherwise by Corporate Counsel or CFO:–

- (a) Vehicle cover to include Third Party Insurance - \$10 M (to include Vicarious Liability Clause Extension)
- (b) Equipment - \$10,000. (Refer Clauses 3.4.1, 9.1, 10.1.1 and 10.6 of General Contract Conditions)

- (c) Public Liability – \$1 M
- (d) Statutory Liability - \$500,000

7.0 Seeking Assistance

If you have any questions that are not specifically addressed in this Policy, please ask the Corporate Counsel.

This Policy will be reviewed as per date in footer


Approved by the Managing Director

Date: 2/10/20

Appendix A - Assessing the Status of whether a Person is an Employee or Contractor

- The law applies certain tests to determine whether a particular person is an employee or independent contractor. Those tests involve identifying various factors indicating employment or independent contract and balancing them up in the particular case. It needs to be remembered that just because someone or an entity is described as a contractor it does not necessarily mean that they are a contractor.
- The checklist below should be used as a guide in determining the status of a person or an entity, i.e. whether they are an employee or independent contractor.
- Rarely does a contractor have all of the criteria indicating independent contract, or an employee all of the criteria indicating employment. Usually, most contractor arrangements have some features indicating employment, and many employment arrangements have some features indicating independent contract.
- Where however the features indicating employment outweigh the features indicating independent contract, the relationship will be one of employment regardless of whether WM calls the person a contractor and uses a contractor agreement.

Indicators	Employee	Contractor
Advertises their services	No	Yes
Applied in response to job vacancy advertisement or notice	Yes	No
Engaged following a request for tender or expression of interest process	No	Yes
WM able to lawfully direct and control the work	Yes	No
Works standard or set hours	Yes	No
Sets own hours of work	No	Yes
Engaged to achieve a specified result	No	Yes
Engaged to provide services or Labour	Yes	No
Paid on receipt of GST invoice	No	Yes
Paid hourly, weekly, monthly, annual or award rate	Yes	No
Provided with rate increases at same time as WM employees	Yes	No
Provided with rate increases as negotiated from time to time or at agreed intervals provided for in contractor agreement	No	Yes
Overtime and penalty rates provided	Yes	No
Bears risk in relation to the work	No	Yes
Required to perform work personally	Yes	No
Able to delegate work	No	Yes
Provided with paid annual, sick and long service leave and allowances	Yes	No
Provided with superannuation	Yes	No
Provided with award benefits	Yes	No
PAYE tax withheld	Yes	No
Generally provide own tools, equipment and materials	No	Yes
Generally reimbursed for expenses	Yes	No
Operating own business with number of clients	No	Yes
Works exclusively for WM	Yes	No
Required to perform work at WM's premises	Yes	No
Required to have own insurance	No	Yes

Safe Driving Policy

1.0 Purpose and Scope

Waste Management NZ Limited ("WM") will act to ensure the health and safety of its employees, contractors, customers and the general public through promoting professional driving and operating practices by its employees, contractors, subcontractors ("WM driver") when operating WM owned and leased vehicles, plant and equipment, as well as any vehicle driven by a WM employee for work purposes including rental vehicles ("WM Vehicles"). This Policy outlines the responsibilities of WM and WM drivers in supporting this commitment.

2.0 Responsibilities of WM

WM shall:

- a) Provide Vehicles and procure rental vehicle plant and equipment, that are fit for purpose, are compliant with relevant safety and statutory requirements and are fitted with relevant safety and emergency equipment.
- b) Recognise that as a company, WM has a level of responsibility to ensure the safe use and operation of WM Vehicles.
- c) Ensure adequate resources are available to maintain a safe and compliant fleet.
- d) Provide driver assessments, training and information for all WM drivers as deemed necessary. This includes, but is not limited to:
 - i. Road safety training.
 - ii. Fuel efficiency training.
 - iii. Risk management.
 - iv. Specialised vehicle training.
 - v. Refresher courses or meetings.
 - vi. Advanced driver training (as required).
 - vii. Defensive Driving training.
 - viii. 4WD training (as required)
- e) Maintain records on WM driver training and competency in Vault at the Branch Level, as well as provide feedback to the driver.
- f) Investigate all reported incidents, infringements, near misses and hazards reported to WM and act in accordance with WM procedures.

3.0 Responsibilities of the WM Driver

3.1 Operating WM Vehicle

As applicable, each WM driver must:

- a) Complete all relevant training before being allowed to drive or operate plant and equipment unsupervised.
- b) Signed off on Risk Assessment for type of truck, or item of plant and equipment.
- c) Signed off on the Work Instruction or Coaching document for the type of truck, or plant and equipment
- d) Signed off and deemed competent to drive the truck or operate the item of plant or equipment

Figure 3.14.3.5

unsupervised.

- e) Never drive or operate plant and equipment you have not been trained on
- f) Ensure the security of any WM Vehicles, plant, or equipment under their control by locking it when leaving the WM Vehicle unattended.
- g) Operate all WM Vehicles in a professional and courteous manner as ambassadors of WM and the WM brand.
- h) Operate all WM Vehicles, plant, and equipment in a safe manner and in accordance with prescribed operating procedures and all relevant safety and statutory requirements and obligations. This includes, but is not limited to:
 - i. Ensure this Policy has been read in conjunction with any other WM Policies.
 - ii. Maintain full compliance with all New Zealand Road Traffic Rules.
 - iii. Be in full control of the WM Vehicle at all appropriate times.
 - iv. Minimise distractions whilst driving.
 - v. Comply with company Standard Operating Procedures and work instructions (such as the Traffic Management Plans or other).
 - vi. Comply with operation Procedures as per any relevant NZTA or Worksafe NZ Code of Practice.
 - vii. Wear seatbelts at all times when driving or operating any item of plant where a seatbelt is fitted. Exception to this rule is granted if a driver is in the standing position operating from the left-hand side in a LEV, or when operating on an item of plant close to water.
 - viii. Prevent fatigue by allowing time for meal breaks and rests, making sure correcting lenses are worn if required, sunglasses are worn in bright weather, windscreens are kept clean, the inside of the WM vehicle is maintained at a moderate temperature, drinking plenty of water and stopping every two to three hours for a break.
 - ix. Ensure that in cab technology or mobile phones, are not used whilst the WM Vehicle is moving, and they are stored correctly while the WM Vehicle is in operation
 - x. Ensure children (being young person's 15 years of age or younger) are not in any WM Vehicle while being used for WM business, for reasons of safety. Should the need to transport child / children while undertaking WM operations, prior approval from the branch or division manager must be obtained in writing, stating the period of time for which such approval is given.
- i) No unauthorised person/s are allowed to operate or be transported in any heavy WM Vehicles or items of plant, unless authorised by the reporting manager.

3.2 NZTA (Waka Kotahi) Worktime Logbook Requirements

- a) Any worker driving a vehicle classified as a Class 2, Class 3, Class 4, or Class 5 must follow and abide by the below points at all times. Failure to do so could result in personal prosecution, fines, loss of licence and/or potential disciplinary.
 - i. Complete a logbook and abide by the New Zealand Worktime Logbook Rules at all times while driving any class 2, 3, 4, or 5 vehicles.
 - ii. WM requires all Class 2 drivers to complete a logbook and abide by the worktime/logbook rules even if operating within 50-kilometre radius of the work site.
 - iii. Workshop personal are exempt from completing a logbook if taking a truck for a service, COF (in the vicinity of the testing station) or conducting a road test within 50 kms radius from base where a load is not carried for hire or reward.
 - iv. Employees identified as having continuous logbook compliance issues or having been identified as not complying with the worktime & logbook rules will be required to undergo remedial training provided by WM and or may be subject to an investigation and disciplinary action.

Figure 3.14.3.5

- v. Take a minimum 30 minute break before 5½ of driving time.
- b) Where a worktime rule breach occurs, the following disciplinary guidelines are to be followed
 - i. Up to 5 breaches in any given month. For first time offence, employees will undergo further training and coaching. Should breaches continue then disciplinary action may be taken
 - ii. More than 5 and below 10 breaches in any given month. For first time offence, employees will undergo further training and coaching, and a formal discussion. Should breaches continue, disciplinary action will be taken
 - iii. More than 10 breaches in any given month may result in disciplinary action.
 - iv. Any severe breach of worktime rules may result in instant dismissal.
- c) Where secondary employment is undertaken that requires a logbook to be used, or results in worked hours impacting worktime rules i.e. a person drives during the week and is required to maintain a logbook, and then works a local store serving customers at a weekend. WMNZ must be informed to ensure there is no conflict of interest, the hours being worked do not impact your employment with WMNZ, and that fatigue is being managed to ensure rest periods required under worktime rules are being adhered to.

3.3 Monitoring and Reporting

Each WM driver must, as applicable:

- a) Conduct pre and post operation inspections of all heavy WM Vehicles, or any required WM Vehicle and record it through the daily driver's inspection and the WM Vehicle Condition Report (VCR) book, to determine that no damage or malfunction is evident that would affect the safe operation of the WM Vehicle. Light WM Vehicles will be inspected quarterly as per the WM Vehicle Policy and WM drivers must record weekly VCRs for the WM owned components of their WM Vehicles.
- b) Immediately report any damage or malfunction to a WM Vehicle to their direct manager. Failing to identify or report any damage before use makes the driver personally responsible for damage upon taking control of the WM Vehicle and/or plant and equipment.
- c) Immediately report any accident or incident that they are involved into their direct manager, regardless of the perceived / actual damage cost (if any) or severity of the incident, which,
 - i. Resulted in any WM Vehicle and/or plant and equipment under their control being damaged,
 - ii. Resulted in any other property damage, altercation, or injury; or
 - iii. Resulted in a near miss.
- d) In the event of an accident involving a WM Vehicle, whether at fault or not, and whether the WM Vehicle was being used for a business purpose or not, an employee must immediately contact their manager and submit themselves for a post-incident drug and alcohol test as soon as possible. This could be in addition to any testing undertaken by Police.

3.4 Incident and Infringement Notices

- a) A WM driver must report any incident, infringement notice or fine incurred while using a WM Vehicle during or outside of work activities as soon as practicable to their direct manager.
- b) Where WM receives notice of an infringement or fine, the WM driver responsible must give compensation to WM, by making immediate arrangements with their direct manager for the direct settlement of costs involved or payment of any debt to WM.
- c) An employee must co-operate fully in any investigation following any incident or infringement. Where an employee breaches road traffic rules or WM policies, an investigation and disciplinary action may result.
- d) In the event of a speeding incident (whether resulting in an infringement notice or recorded on a WM Global Positioning System ("GPS") device), the following guidelines apply in relation to disciplinary action:
 - 0 - 20% above the legal speed limit – for first time offence, may result in a written warning. Repeat

offending may result in final warning.

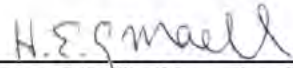
- 20 - 30% above the legal speed limit – may result in a final written warning.
- Greater than 30% above the legal speed limit – potential dismissal.

- e) For other driving offences involving employees, such as running a red light or reckless driving – disciplinary outcome including potential dismissal.
- f) WM driver retraining/defensive driving may be enforced as applicable. See Section 3.4

3.5 Licenses and Training

- a) When driving a WM Vehicle on a public road, the WM driver must at all times hold, and be able to produce the required valid full licenses for the task being undertaken, including any endorsements, certificates or accreditations required for the task.
- b) If undergoing license development, they must hold the correct learners or restricted license (e.g. Class 2L, 4L and 5L) while undergoing training. Restricted licence holders must have gained permission to operate from the '[Head of People and Culture](#)'. WM needs to ensure if permission is given, that the restricted licence moves to full licence within a short period of time six (6) months. WM will utilise the [NZTA TORO](#) system to verify the status.
- c) Consideration will be given to learner's license holders and valid overseas licenses holders. An overseas license is legally valid only if the license is written or translated correctly into English and the driver has been in New Zealand less than 12 months. Refer rules - [NZ Transport Agency for new residents](#)
- d) Where applicable licenses, certificates or accreditations either expire or are suspended, the WM driver must immediately notify their direct manager of such circumstances and not operate motor WM Vehicles until they have the regained applicable, current and valid license, certificate or accreditation. WM may apply mandatory revision training timetables to any certificate or accreditation that is not subject to expiry dates.
- e) All WM drivers must participate in Driver Assessment and Training, and any additional training as required by WM. WM drivers are required to follow any recommendations made by the training provider and confirm that they have understood any recommendations from the trainer.
- f) A WM driver may be required to participate in remedial driver training as per the [WM-HR-P-12 Vehicle Policy](#).
- g) Where activities are undertaken at a WM controlled site that restricts unauthorised public access, WM drivers are excluded from the above license or endorsement requirements while progressing their license development. The WM driver or mobile plant operator MUST have undergone training on the relevant risk assessment/s, work instruction/s, and have been assessed and deemed competent, and capable to perform the task before being allowed to undertake a task unsupervised.
- h) The Site Manager MUST sign off the training forms and give authorisation before any unlicensed worker is allowed to operate, or drive any WM Vehicle, and ensure a detailed licence development programme has been implemented. If the WM driver has any questions regarding these rules, they should contact their direct manager in the first instance. Any breach of these rules may result in disciplinary action being taken.

This Policy will be reviewed as per footer.


Approved by the Managing Director
Date: 08 August 2023

Firearms Use Policy

1.0 Objectives

Waste Management NZ Limited and its subsidiaries ("WM") recognises the risk created by the use of firearms and is committed to improving the safety of all workers, contractors and customers through reducing this risk and ensuring best practice when it comes to the handling and usage of firearms.

2.0 Purpose

The purpose of this document is to ensure all workers and contractors of WM fully comply with the [Health and Safety at Work Act 2015](#), the [Health and Safety at Work \(General Risk and Workplace\) Regulations 2016](#), the [NZ Arms Legislation Act 2020](#) and the [New Zealand Arms Code](#).

3.0 Waste Management achieves these objectives by

- a) Requiring all workers and contractors using firearms on WM controlled sites, follow the HSEQ Management System [HSEQ QRG 4.2.11.03 Firearms Use Procedure Guide](#) and ensure firearms and ammunition are stored, transported and used in accordance with the [Health and Safety at Work Act 2015](#), the [Health and Safety at Work \(General Risk and Workplace\) Regulations 2016](#), the [NZ Arms Legislation Act 2020](#) and the [New Zealand Arms Code](#).
- b) Requiring only Authorised Firearm Users, who are appropriate and licensed workers or contractors authorized by the General Manager, to be allowed to use firearms.
- c) Requiring Authorised Firearm Users to be adequately trained, hold the correct licenses to use firearms and follow the correct operational practices as per training and instruction.
- d) The Branch Manager or Landfill Manager may authorize the use of a firearm on a WM controlled landfill site for the explicit purpose of vermin and bird control where required.
- e) Where bird and vermin control on landfill sites is required, and the use of a firearm is appropriate, that the task is undertaken by a WM worker or Contractor who is an Authorised Firearms User. Where firearms are used by contractors, they too must be supplied with a copy of and comply with this Policy. On each occasion, a JSEA / risk assessment for the task must be carried out, detailing procedures to mitigate risk, and a copy must be held on file at the site.
- f) Requiring Authorised Firearm Users follow the correct procedure for removing a firearm from storage, inserting ammunition, storing a firearm and disposing of a firearm as per [HSEQ SOP 1505 2 Standard Operating Procedure Firearms Use](#).
- g) Requiring Authorised Firearm Users to follow the correct procedure for the purchase, discharge, storage and disposal of ammunition as per HSEQ SOP 1505 2 Standard Operating Procedure Firearms Use.
- h) Requiring Authorised Firearm Users to store, transport and secure firearms and ammunition in a manner that complies with the New Zealand Arms Act, and reduces the risk of alarming other workers, customers, or members of the public.
- i) Properly maintaining and auditing required firearm documents.
- j) Allocating Branch Managers, General Managers and the Managing Director clear, specific responsibilities regarding the use of firearms through the HSEQ Management System HSEQ SOP 1505 2 Standard Operating Procedure Firearms Use.
- k) Requiring that all authorised contractors follow all instructions issued by the relevant branch manager, abide by the [New Zealand Arms Code](#), [NZ Arms Legislation Act 2020](#) and relevant legislation at all times. Contractors are required to assess the risks of extermination operations, implement control measures and follow all relevant company policies and procedures while on site.

Figure 3.14.3.6

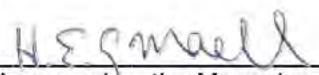
4.0 Compliance with Policy

Non-compliance with this Policy may result in management action which could include termination of employment or in the case of a contractor, termination of contract.

5.0 Application of Policy

Responsibility for the application of this Policy rests with all workers, contractors and joint venture partners engaged in activities under WM's operational control.

This Policy will be reviewed annually.


Approved by the Managing Director
Date: 03 October 2023

Appendix B Workplace Training Policy

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Workplace Training Policy

Waste Management NZ Ltd ("WM") is New Zealand's leading recycling and waste management company with a particular focus on the solid, liquid and hazardous waste management markets.

WM recognises that training is an integral component to business management. The competencies, skills, and knowledge possessed by our workers are key factors in the success and prosperity of WM operations. Employee development and training opportunities are made available taking into consideration the business requirements, benefits for individuals, and the needs of the operating business units.

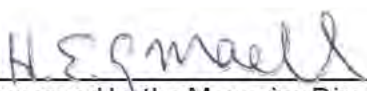
Workplace training and development programmes shall be organised in consultation with business unit Managers, Operational Supervisors and employees, and in alignment with Business Plans and statutory requirements. Where a workplace hazard and potential risk has been identified, all relevant persons shall be provided with specific information and training to eliminate or minimise exposure.

As part of our commitment, WM shall:

- a) Conduct training needs analysis to determine the training requirements for particular positions and tasks undertaken,
- b) Develop core training elements which identify the required level of competency for employees to effectively perform their work and meet their obligations,
- c) Provide the training, skills and knowledge to ensure employees are competent to satisfy the requirements of individual job descriptions and organisational goals, objectives and targets now and in the future,
- d) Allocate resources and time for workers to participate in training programmes both internally and externally where identified as applicable and practicable,
- e) Provide training which has regard for the trainee's language, literacy and numeracy skills, level of existing knowledge and level of details,
- f) Meet accountability requirements by recording and documenting all training and development activities.
- g) Monitor and review the effectiveness of workplace training and development activities to ensure organisational goals, objectives, and targets are met.

WM is committed to ensuring the development of WM employee competencies, knowledge and skills to a standard that meets internal and external customer expectations. This is to ensure the achievement of corporate responsibility, employee development and safety and statutory compliance.

This Policy will be reviewed as per the footer date.


Approved by the Managing Director

Date: 25 / 11 / 2021

Figure 3.14.3.3

Appendix C Contractor Engagement Policy

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Contractor Engagement Policy

1.0 Introduction

This policy governs the engagement of consultants and contractors (“Independent Contractors”).

Independent Contractors fall into two categories. The first category comprises professional consulting service providers (for example consulting engineers) and the second category comprises trade / labour service providers (for example, Owner Drivers). This Policy does not cover people or entities engaged through labour hire agencies.

The engagement of any Independent Contractor must be done in accordance with the Contractor Management Manual contained in [HSEQ STD 4.1.0](#).

2.0 Policy

- a) All contracts entered into must be reviewed by [WMNZ Legal department](#).
- b) If there is any doubt as to the validity of a proposed contractor arrangement, advice should be sought from Corporate Counsel prior to proceeding.
- c) To minimise the risk of not complying with the legal obligations surrounding the engagement of contractors, all persons engaged must comply with the [Health and Safety Policy](#), which must be adhered to, except as may be authorised by [Corporate Counsel](#).
- d) Failure to adhere to this Policy will be treated seriously and may result in disciplinary action.

3.0 Is a person being engaged an Employee or Contractor?

[Appendix A](#) - The table appended to this Policy identifies common key factors in determining the status of a person or an entity, i.e. whether they are an employee or an Independent Contractor.

4.0 Contractor Status Assessment

It is important that if an Independent Contractor arrangement is proposed and there are questions as to the person or entity's status that Corporate Counsel and the CFO are consulted and that only a form of contract as approved by Corporate Counsel is used.

5.0 Engagement of Contractors

No contractor may commence providing services until an Independent Contractor Agreement has been formally approved by the Corporate Counsel and then executed.

6.0 Contractor Management Manual and Insurance

This Policy should be read in conjunction with the [HSEQ STD 4.1.0](#) which amongst other things sets out the requirements for pre-qualification of contractors.

All Independent Contractors should have and maintain the following insurances unless approved otherwise by Corporate Counsel or CFO:

- (a) Public Liability Insurance of \$10M;
- (b) Professional Indemnity Insurance of \$2M (in the case of consultants providing professional services).

Owner Drivers should have and maintain the following insurances unless approved otherwise by Corporate Counsel or CFO:–

- (a) Vehicle cover to include Third Party Insurance - \$10 M (to include Vicarious Liability Clause Extension)
- (b) Equipment - \$10,000. (Refer Clauses 3.4.1, 9.1, 10.1.1 and 10.6 of General Contract Conditions)

- (c) Public Liability – \$1 M
- (d) Statutory Liability - \$500,000

7.0 Seeking Assistance

If you have any questions that are not specifically addressed in this Policy, please ask the Corporate Counsel.

This Policy will be reviewed as per date in footer


Approved by the Managing Director

Date: 2/10/20

Appendix A - Assessing the Status of whether a Person is an Employee or Contractor

- The law applies certain tests to determine whether a particular person is an employee or independent contractor. Those tests involve identifying various factors indicating employment or independent contract and balancing them up in the particular case. It needs to be remembered that just because someone or an entity is described as a contractor it does not necessarily mean that they are a contractor.
- The checklist below should be used as a guide in determining the status of a person or an entity, i.e. whether they are an employee or independent contractor.
- Rarely does a contractor have all of the criteria indicating independent contract, or an employee all of the criteria indicating employment. Usually, most contractor arrangements have some features indicating employment, and many employment arrangements have some features indicating independent contract.
- Where however the features indicating employment outweigh the features indicating independent contract, the relationship will be one of employment regardless of whether WM calls the person a contractor and uses a contractor agreement.

Indicators	Employee	Contractor
Advertises their services	No	Yes
Applied in response to job vacancy advertisement or notice	Yes	No
Engaged following a request for tender or expression of interest process	No	Yes
WM able to lawfully direct and control the work	Yes	No
Works standard or set hours	Yes	No
Sets own hours of work	No	Yes
Engaged to achieve a specified result	No	Yes
Engaged to provide services or Labour	Yes	No
Paid on receipt of GST invoice	No	Yes
Paid hourly, weekly, monthly, annual or award rate	Yes	No
Provided with rate increases at same time as WM employees	Yes	No
Provided with rate increases as negotiated from time to time or at agreed intervals provided for in contractor agreement	No	Yes
Overtime and penalty rates provided	Yes	No
Bears risk in relation to the work	No	Yes
Required to perform work personally	Yes	No
Able to delegate work	No	Yes
Provided with paid annual, sick and long service leave and allowances	Yes	No
Provided with superannuation	Yes	No
Provided with award benefits	Yes	No
PAYE tax withheld	Yes	No
Generally provide own tools, equipment and materials	No	Yes
Generally reimbursed for expenses	Yes	No
Operating own business with number of clients	No	Yes
Works exclusively for WM	Yes	No
Required to perform work at WM's premises	Yes	No
Required to have own insurance	No	Yes

Appendix D Safe Driving Policy

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Safe Driving Policy

1.0 Purpose and Scope

Waste Management NZ Limited ("WM") will act to ensure the health and safety of its employees, contractors, customers and the general public through promoting professional driving and operating practices by its employees, contractors, subcontractors ("WM driver") when operating WM owned and leased vehicles, plant and equipment, as well as any vehicle driven by a WM employee for work purposes including rental vehicles ("WM Vehicles"). This Policy outlines the responsibilities of WM and WM drivers in supporting this commitment.

2.0 Responsibilities of WM

WM shall:

- a) Provide Vehicles and procure rental vehicle plant and equipment, that are fit for purpose, are compliant with relevant safety and statutory requirements and are fitted with relevant safety and emergency equipment.
- b) Recognise that as a company, WM has a level of responsibility to ensure the safe use and operation of WM Vehicles.
- c) Ensure adequate resources are available to maintain a safe and compliant fleet.
- d) Provide driver assessments, training and information for all WM drivers as deemed necessary. This includes, but is not limited to:
 - i. Road safety training.
 - ii. Fuel efficiency training.
 - iii. Risk management.
 - iv. Specialised vehicle training.
 - v. Refresher courses or meetings.
 - vi. Advanced driver training (as required).
 - vii. Defensive Driving training.
 - viii. 4WD training (as required)
- e) Maintain records on WM driver training and competency in Vault at the Branch Level, as well as provide feedback to the driver.
- f) Investigate all reported incidents, infringements, near misses and hazards reported to WM and act in accordance with WM procedures.

3.0 Responsibilities of the WM Driver

3.1 Operating WM Vehicle

As applicable, each WM driver must:

- a) Complete all relevant training before being allowed to drive or operate plant and equipment unsupervised.
- b) Signed off on Risk Assessment for type of truck, or item of plant and equipment.
- c) Signed off on the Work Instruction or Coaching document for the type of truck, or plant and equipment
- d) Signed off and deemed competent to drive the truck or operate the item of plant or equipment

Figure 3.14.3.5

unsupervised.

- e) Never drive or operate plant and equipment you have not been trained on
- f) Ensure the security of any WM Vehicles, plant, or equipment under their control by locking it when leaving the WM Vehicle unattended.
- g) Operate all WM Vehicles in a professional and courteous manner as ambassadors of WM and the WM brand.
- h) Operate all WM Vehicles, plant, and equipment in a safe manner and in accordance with prescribed operating procedures and all relevant safety and statutory requirements and obligations. This includes, but is not limited to:
 - i. Ensure this Policy has been read in conjunction with any other WM Policies.
 - ii. Maintain full compliance with all New Zealand Road Traffic Rules.
 - iii. Be in full control of the WM Vehicle at all appropriate times.
 - iv. Minimise distractions whilst driving.
 - v. Comply with company Standard Operating Procedures and work instructions (such as the Traffic Management Plans or other).
 - vi. Comply with operation Procedures as per any relevant NZTA or Worksafe NZ Code of Practice.
 - vii. Wear seatbelts at all times when driving or operating any item of plant where a seatbelt is fitted. Exception to this rule is granted if a driver is in the standing position operating from the left-hand side in a LEV, or when operating on an item of plant close to water.
 - viii. Prevent fatigue by allowing time for meal breaks and rests, making sure correcting lenses are worn if required, sunglasses are worn in bright weather, windscreens are kept clean, the inside of the WM vehicle is maintained at a moderate temperature, drinking plenty of water and stopping every two to three hours for a break.
 - ix. Ensure that in cab technology or mobile phones, are not used whilst the WM Vehicle is moving, and they are stored correctly while the WM Vehicle is in operation
 - x. Ensure children (being young person's 15 years of age or younger) are not in any WM Vehicle while being used for WM business, for reasons of safety. Should the need to transport child / children while undertaking WM operations, prior approval from the branch or division manager must be obtained in writing, stating the period of time for which such approval is given.
- i) No unauthorised person/s are allowed to operate or be transported in any heavy WM Vehicles or items of plant, unless authorised by the reporting manager.

3.2 NZTA (Waka Kotahi) Worktime Logbook Requirements

- a) Any worker driving a vehicle classified as a Class 2, Class 3, Class 4, or Class 5 must follow and abide by the below points at all times. Failure to do so could result in personal prosecution, fines, loss of licence and/or potential disciplinary.
 - i. Complete a logbook and abide by the New Zealand Worktime Logbook Rules at all times while driving any class 2, 3, 4, or 5 vehicles.
 - ii. WM requires all Class 2 drivers to complete a logbook and abide by the worktime/logbook rules even if operating within 50-kilometre radius of the work site.
 - iii. Workshop personal are exempt from completing a logbook if taking a truck for a service, COF (in the vicinity of the testing station) or conducting a road test within 50 kms radius from base where a load is not carried for hire or reward.
 - iv. Employees identified as having continuous logbook compliance issues or having been identified as not complying with the worktime & logbook rules will be required to undergo remedial training provided by WM and or may be subject to an investigation and disciplinary action.

Figure 3.14.3.5

- v. Take a minimum 30 minute break before 5½ of driving time.
- b) Where a worktime rule breach occurs, the following disciplinary guidelines are to be followed
 - i. Up to 5 breaches in any given month. For first time offence, employees will undergo further training and coaching. Should breaches continue then disciplinary action may be taken
 - ii. More than 5 and below 10 breaches in any given month. For first time offence, employees will undergo further training and coaching, and a formal discussion. Should breaches continue, disciplinary action will be taken
 - iii. More than 10 breaches in any given month may result in disciplinary action.
 - iv. Any severe breach of worktime rules may result in instant dismissal.
- c) Where secondary employment is undertaken that requires a logbook to be used, or results in worked hours impacting worktime rules i.e. a person drives during the week and is required to maintain a logbook, and then works a local store serving customers at a weekend. WMNZ must be informed to ensure there is no conflict of interest, the hours being worked do not impact your employment with WMNZ, and that fatigue is being managed to ensure rest periods required under worktime rules are being adhered to.

3.3 Monitoring and Reporting

Each WM driver must, as applicable:

- a) Conduct pre and post operation inspections of all heavy WM Vehicles, or any required WM Vehicle and record it through the daily driver's inspection and the WM Vehicle Condition Report (VCR) book, to determine that no damage or malfunction is evident that would affect the safe operation of the WM Vehicle. Light WM Vehicles will be inspected quarterly as per the WM Vehicle Policy and WM drivers must record weekly VCRs for the WM owned components of their WM Vehicles.
- b) Immediately report any damage or malfunction to a WM Vehicle to their direct manager. Failing to identify or report any damage before use makes the driver personally responsible for damage upon taking control of the WM Vehicle and/or plant and equipment.
- c) Immediately report any accident or incident that they are involved into their direct manager, regardless of the perceived / actual damage cost (if any) or severity of the incident, which,
 - i. Resulted in any WM Vehicle and/or plant and equipment under their control being damaged,
 - ii. Resulted in any other property damage, altercation, or injury; or
 - iii. Resulted in a near miss.
- d) In the event of an accident involving a WM Vehicle, whether at fault or not, and whether the WM Vehicle was being used for a business purpose or not, an employee must immediately contact their manager and submit themselves for a post-incident drug and alcohol test as soon as possible. This could be in addition to any testing undertaken by Police.

3.4 Incident and Infringement Notices

- a) A WM driver must report any incident, infringement notice or fine incurred while using a WM Vehicle during or outside of work activities as soon as practicable to their direct manager.
- b) Where WM receives notice of an infringement or fine, the WM driver responsible must give compensation to WM, by making immediate arrangements with their direct manager for the direct settlement of costs involved or payment of any debt to WM.
- c) An employee must co-operate fully in any investigation following any incident or infringement. Where an employee breaches road traffic rules or WM policies, an investigation and disciplinary action may result.
- d) In the event of a speeding incident (whether resulting in an infringement notice or recorded on a WM Global Positioning System ("GPS") device), the following guidelines apply in relation to disciplinary action:
 - 0 - 20% above the legal speed limit – for first time offence, may result in a written warning. Repeat

offending may result in final warning.

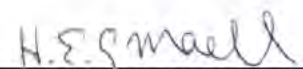
- 20 - 30% above the legal speed limit – may result in a final written warning.
- Greater than 30% above the legal speed limit – potential dismissal.

- e) For other driving offences involving employees, such as running a red light or reckless driving – disciplinary outcome including potential dismissal.
- f) WM driver retraining/defensive driving may be enforced as applicable. See Section 3.4

3.5 Licenses and Training

- a) When driving a WM Vehicle on a public road, the WM driver must at all times hold, and be able to produce the required valid full licenses for the task being undertaken, including any endorsements, certificates or accreditations required for the task.
- b) If undergoing license development, they must hold the correct learners or restricted license (e.g. Class 2L, 4L and 5L) while undergoing training. Restricted licence holders must have gained permission to operate from the '[Head of People and Culture](#)'. WM needs to ensure if permission is given, that the restricted licence moves to full licence within a short period of time six (6) months. WM will utilise the [NZTA TORO](#) system to verify the status.
- c) Consideration will be given to learner's license holders and valid overseas licenses holders. An overseas license is legally valid only if the license is written or translated correctly into English and the driver has been in New Zealand less than 12 months. Refer rules - [NZ Transport Agency for new residents](#)
- d) Where applicable licenses, certificates or accreditations either expire or are suspended, the WM driver must immediately notify their direct manager of such circumstances and not operate motor WM Vehicles until they have the regained applicable, current and valid license, certificate or accreditation. WM may apply mandatory revision training timetables to any certificate or accreditation that is not subject to expiry dates.
- e) All WM drivers must participate in Driver Assessment and Training, and any additional training as required by WM. WM drivers are required to follow any recommendations made by the training provider and confirm that they have understood any recommendations from the trainer.
- f) A WM driver may be required to participate in remedial driver training as per the [WM-HR-P-12 Vehicle Policy](#).
- g) Where activities are undertaken at a WM controlled site that restricts unauthorised public access, WM drivers are excluded from the above license or endorsement requirements while progressing their license development. The WM driver or mobile plant operator MUST have undergone training on the relevant risk assessment/s, work instruction/s, and have been assessed and deemed competent, and capable to perform the task before being allowed to undertake a task unsupervised.
- h) The Site Manager MUST sign off the training forms and give authorisation before any unlicensed worker is allowed to operate, or drive any WM Vehicle, and ensure a detailed licence development programme has been implemented. If the WM driver has any questions regarding these rules, they should contact their direct manager in the first instance. Any breach of these rules may result in disciplinary action being taken.

This Policy will be reviewed as per footer.


Approved by the Managing Director
Date: 08 August 2023

Appendix E Rehabilitation and Injury Management Policy

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Rehabilitation and Injury Management Policy

Waste Management NZ Ltd (“WM”) is one of the leading providers of waste management, resource recovery and transport solutions to customers across New Zealand with a particular focus on the solid, liquid and hazardous waste management markets.

WM is committed to the provision of support and assistance to ensure an integrated Rehabilitation and Injury Management System exists for all employees who sustain a work related injury or illness. WM is committed to aiding recovery and, where possible, the return to normal life activities, including work, and a quality of life that is meaningful and satisfactory.

WM and its employees recognise that employment performs an essential role in maintaining an individual's self-esteem and provides important social and economic factors for physical and psychological wellbeing. This means that collectively we have a social and economic interest in ensuring that employees return to work safely and as soon as possible following injury or illness.

This Policy portrays our combined commitment to all employees by ensuring:

- a) Compliance with all applicable legislation, laws, regulations, and standards, and where adequate legislation or laws do not exist, adopt and apply industry best practice standards that reflect WM's commitment to injury management;
- b) A safe and effective Rehabilitation Program which ensures the rights and confidentiality of injured employees, is commenced as soon as practicable after a work related injury or illness;
- c) An injury management approach that is consistent with medical opinion as the accepted standard of practice;
- d) A co-operative and consultative team approach between employees, employee representatives, treating practitioners, injury management providers, union representatives, return to work advisor's and management;
- e) All managers are aware of their responsibilities in relation to injury management of employees through involvement in developed injury management programs aimed at return to work and the provision of suitable duties to aid the program, wherever practicable;
- f) The provision of meaningful alternative duties for injured employees, where practicable, in the workplace;
- g) The provision of injury management opportunities, where practicable, for employees who sustain non-work related injuries;
- h) Provision of a readily accessible and applicable injury management procedure;
- i) Participation in a Rehabilitation Program will not prejudice an injured employee;
- j) Employees have the right to nominate an accredited injury management provider of their choice to conduct their Rehabilitation Program;
- k) Employees have the right to utilise a WM provided treating practitioner or choose their own treating practitioner;
- l) That the services provided by accredited rehabilitation providers are in line with both WM and employee requirements, delivered on time and established in consultation with WM, the employee and treating practitioner; and,
- m) That all employees have the right to injury management and that they are aware of their responsibilities as detailed in [HSEQ B3.2.2 Branch Rehabilitation and Injury Management](#).
- n) It is the normal expectation of all parties that participation in Rehabilitation Program will ultimately lead to a resumption of pre-injury duties. In the event of this expectation being unrealistic or unrealised, retraining, redeployment or termination of employment may need to be considered.

Figure 3.14.3.7

REDVALE ENERGY PARK INDUCTION FOR VISITORS, SUPPLIERS, CASUAL WORKERS & CONTRACTORS

Version 6 – May 2019

Welcome to Redvale Landfill Flare Site.

To ensure the safety of yourself & others on site we ask that you observe the following rules at all times:

1. **SIGN IN & OUT**

All visitors, suppliers & contractors are to park in the visitor car park & to sign in and out at reception upon arrival/departure from site, unless issued with a swipe card to use at the boomgate. Swipe cards must be returned to the white box at the exit swipe station when no longer required – unreturned swipe cards will be charged at \$50 + GST each.

Also requires sign in/out at the flare site Energy Park Building office

2 **Health & Safety Policy and Procedures**

Waste Management requires all external workers working on our facilities to undertake a Health & Safety Induction Training Course prior to entry.

No site work may be undertaken unless a current signed and dated Certificate of Completion has been received by us or you are supervised at all times by a Waste Management representative.

3. **FLARE STATION ACCESS**

Access to the flare station is prohibited unless approval has been granted by a member of the flare station.

4. **EXITS**

1. Main entrance gate
2. South side pedestrian gate.
3. Eastern gate
4. Staff will demonstrate how to open main gate in an emergency.

5. **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Long sleeved shirt, long pants, steel capped boots, hard hat and high viz vest are required **at all times**. Gloves must be carried and worn when required. Additional PPE may be required due to the nature of the work.

6. **PERMITS**

A job safety environmental analysis (JSEA on the "I drive") is to be completed with the aid of staff member before starting a job. Other relevant permits as required.

7. **SMOKING IS PROHIBITED IN ALL AREAS OF THE FLARE STATION.**

This includes e-cigarettes and vapes due to the ignition source.

Redvale is a smoke free site and no smoking is allowed anywhere on site.

8. **ROAD RULES**

Standard road rules apply on landfill area.

Inside flare station keep speed at walking pace/5kph.

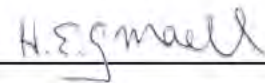
9. **WHEEL WASH**

Appendix F Redvale Landfill Site Induction

DRAFT

This Policy will be evaluated in line with any legislative amendments and/or in accordance with the review date established hereunder. This Policy will be displayed at all our workplaces which confirms the Board of Directors, managers and employees' commitment to making WM workplaces safe and healthy for all our employees and others, thus ensuring the achievement of corporate responsibility, statutory compliance and demonstrated due diligence .

This Policy will be reviewed as per footer date.



Approved by the Managing Director

Date 22 November 2022

Figure 3.14.3.7

Redvale Landfill Site Induction

Welcome to WMNZ Ltd – Redvale Landfill & Energy Park. At this site, we take all reasonable measures to minimise risks to People and the Environment. This induction includes a general site induction compulsory for everyone, and includes specific induction for the Energy Park and Workshop.

Address: WMNZ Ltd, Redvale Landfill, Landfill Access Road, Dairy Flat. (off SH17, opposite Dairy Flat School, 10km north of Albany Auckland)

Operating Times:

- Landfill: 6:15 am - 4:30 pm (Mon-Fri); 7:00 am - 2:00 pm (Sat/holidays)
- Summer construction: 6:00 am - 6:00 pm
- Maintenance work is allowed outside of these hours.



Contacts:

- Regional Manager: Glen Jujnovich
- Operations Manager: Matt Atkinson
- Energy Park Manager: Cawood McCall
- Workshop Supervisor: Mike Rademeyer
- Compliance Coordinator: Laiana Barbosa

Site Map:



Redvale Landfill Site Induction

General Induction

Site Control

Different areas of the site are under the control of different parties. Be aware of this and obey any reasonable and lawful request made by the WM personnel in these areas.

Visitors

Visitors are required to sign in and out at reception upon arrival/departure from the site unless you have completed an appropriate Health & Safety Induction and have been issued with a swipe card. Vehicle entry/exit to the landfill is restricted to the boom-gate lane beside the Weighbridge entry lane. The appropriate swipe card will be issued at reception. Swipe cards must be returned to the white box at the exit swipe station when no longer required – unreturned swipe cards will be charged at \$50 + GST each.

Working Outside Normal Hours

You need to obtain permission from your Redvale Supervisor that you will be working outside normal hours. If you need to leave the landfill and the gates are closed, drive to the yellow marker line on the outbound lane and the gate will open automatically

PPE

Minimum PPE always required:

- Long shirt and pants only
- High Viz
- Safety boots - zipper/lace boots or gumboots only, elastic safety boots not permitted.
- Hard Hat



Task Dependent:

- Gloves, safety glass and P2 masks must be used when and where required. Non penetrating sole boots are required for the tip pad.

Site Hazards

There are various hazards and risks on site, and we need everyone to be aware of them and take precautions. They include **vehicle-pedestrian interaction, fire and explosion, electricity, working at height, contractors, visitors, biological hazards that can cause immediate (acute) or long-term (chronic) health effects, emissions to water, emissions to air, litter, noise and odour.**



Smoking, alcohol and drugs

All WMNZ sites are **smoke/vape, drug and alcohol-free**. Redvale Landfill Management reserves the right to conduct drug and alcohol testing randomly, after any event/near miss or if there is just cause.



Removal of Company Property

Removal of company property from the site, including waste products is strictly prohibited.

JSEA / Work Permit

A permit to work is required for certain works as per the Work Permit. Authority is required for Hot Work (welding), Working at Heights, and Confined Spaces. Please **do not** commence work until this is completed. Contractors and Third Parties need to provide a safe job method statement and may also need to complete (with the assistance of a WMNZ employee) and sign a Job Safety and Environment Analysis (JSEA).

Lock Out Tag Out

Isolation of Energy Sources. All machinery under repair or maintenance **MUST BE LOCKED AND TAGGED OUT**. Failure to follow this directive could lead to dismissal from the site.



Driving on site

Road rules: Adhere to site-specific speed limits (30 km/h general, 5 km/h in Energy Park, 15 km/h near Workshop). No mobile phone use while driving; seat belts are required.

Reverse Parking: reverse parking only: Energy Park, Workshop, Disposal lunchroom parking area, ACM tip pad Active cell/tip pad, clean clay/topsoil areas, side AND rear of

Redvale Landfill Site Induction

admin building.

Wheel wash: All vehicles that access the landfill area must go through the wheel washes before leaving the facility. Please allow adequate time for the wheel washes to clean your vehicle. Note that light vehicles must use the second wheel wash only.

Flashing light: All light vehicles must show a flashing roof light and carry a radio for communicating with landfill staff.

5 Metre Rule: operators of mobile plant or trucks must observe the 5m rule. Never walk behind the vehicle, always make eye contact with the driver/operator and ensure they know you are there. Where there are other plant, structures, or people within 5m, **STOP**. Operating within 5m requires the guidance of a spotter or clear instruction and communication from all parties involved in intended actions.



Licences

Licences are to be current for all work undertaken on site and a copy yearly must be provided. If you do not have a current licence do not operate the equipment.

Emergencies

In an emergency, a Redvale staff member will guide you to an assembly point:

Primary Assembly Point - In front of the Redvale Landfill main administration building, if accessible.

Alternative assembly Point – In front of the ATF area.

Refer to the Site Emergency Management Plan for more specific information.

Incidents Management

All incidents and near misses are to be reported immediately to a Redvale Landfill site supervisor.

First aid kits and Fire extinguishers are located inside all main site buildings, all yellow gear and light vehicles, and the spotter's hut.



There is a **defibrillator** located inside the Energy Park – access via the back door.

Before undertaking any job, **SLAM**. Stop, Look, Assess (the risks) and Manage.

Spills: Redvale Landfill follows strict rules to protect water quality and keep the site clean. If any oil or fuel spills, report immediately.

Taking Photos: No one including WMNZ staff (contractors, suppliers, visitors) is allowed to use visual material without gaining authorisation from WMNZ before.



Children: Children are not permitted anywhere on site unless part of a company supervised tour.



Restricted Areas and Access

ATF Pad: Redvale landfill contains a Ministry of Primary Industries (MPI) Approved Transitional Facility. The facility has restricted access and operates heavy vehicles and plant to handle the shipping containers. Under no circumstances should unauthorised people enter the facility or open any shipping container on site.

Monofil – C&D Class 2 waste disposal: Monofil accepts class 2 waste - construction and demolition. It may contain Asbestos, and it is required the use of **P2 masks and boot covers** as additional **PPE** for protection against potential exposure. This is a restricted access area and only trained staff can enter the Monofil.

The Work Instructions for Monofil – Class 2 should be read and understood by staff before

entering this area. All Monofil protocols must be followed.



Redvale Landfill Site Induction

Specific Areas Induction

Energy Park

All visitors to the Energy Park must sign in at the Main Office of the Energy Park building

Access: Access to the Energy Park is prohibited unless approval has been granted by a member of the Energy Park.

Additional PPE: Working around the LFG Blowers (>85 dB) and Generator (>125 dB) requires a minimum of class 5 hearing protection. Additional PPE may be required depending on the nature of the work.



Noise: Due to the proximity of neighbours to the Energy Park, keeping the noise down is important where possible. No loud work is to be undertaken after hours without permission from the Generation Manager.

Redvale Leachate Compound: The Redvale Leachate Compound contains the Leachate evaporation unit and poses multiple hazards. It is also a storage for hydrogen peroxide, an SDS is available. Entry is through controlled access only and is managed by the Energy Park Manager.

Workshop

All visitors to the Site Workshop must sign in at the Main Office of the Workshop building.

Additional PPE: Inside the Workshop gloves, ear protection and safety glasses/goggles are to be carried and used where required. Additional PPE may be required depending on the nature of the work.

Tools and Equipment: If you intend to use WMNZ tools and equipment, you will need specific permission from a WMNZ employee. They all must be returned to the correct place. Any damage must be reported.



Warning Lights: When your work creates noise and or dust, activate the warning light. e.g., Welding and Grinding.

Dangerous Goods Store: A dangerous goods store is available on-site at the Workshop. Contact the Workshop Supervisor or site Chemist for more information.



Redvale Landfill Site Induction

Please print clearly.

Full name: _____

Company/Job Title: _____

Contact Phone No: _____

Email Address: _____

I have read and understood the rules for the following sites and agree to comply with them:

General Induction:
Specific Area – Energy Park:
Specific Area – Workshop

☐
☐
☐

Signed: _____ Date: ____/____/____

Quiz

In case of an emergency where are the assembly points?

- a) Primary Assembly Point: _____
- b) Alternative Assembly Point: _____

What are the speed limits in each of these areas:

- a) Landfill _____
- b) Energy Park _____
- c) Workshop _____

Where are WMNZ Ltd Fire extinguisher and first aid kits located?

- a) _____
- b) _____
- c) _____

What is the minimum PPE required on site?

- a) _____
- b) _____
- c) _____
- d) _____

All vehicle with mud on their wheels must pass through the wheel wash before leaving site, to prevent tracking mud out onto the main road. **Under wet muddy conditions use of the wheel wash is mandatory.**

General: A series of air horn blasts will require immediate evacuation of the flare site to flagpole muster station IN FRONT OF MAIN ADMIN BUILDING.

10. EMERGENCIES

In the event of an emergency, immediately notify a WMNZ staff member & proceed to one of the 2 assembly points as directed. These are located in front of the Redvale Landfill site office under the flag poles & outside Waste Management's workshop at the north eastern corner.

11. ACCIDENTS & INCIDENTS

First aid kits are located inside the Main office, Workshop, Flare site and Landfill smoko room buildings. Trauma kits are located in all WMNZ machines & vehicles.

Fire extinguishers are located inside all WMNZ machines, vehicles & buildings

All accidents & incidents are to be reported immediately to a WMNZ supervisor.

An accident is any event that results in an injury of any type. An incident is any event that results in physical damage to equipment, interruption to work, or any near miss situation

A report must be submitted for an injury of any type to the site manager.

12. HAZARDS ON SITE

Noise, dust, machinery, vehicles, heat, electricity, high voltage cables, gas, flames, explosion, Leachate, magnetic fields. Do not enter Generators if you have a pacemaker

All suspected hazards or dangerous work practices must be reported immediately to site staff or management. A hazard is any activity or situation that may result in an accident or incident.

13. FUEL OR OIL SPILLS

Strict permit rules apply to care for the environment at Redvale Landfill with regard to water quality & site cleanliness. If any fuel or oil is spilled, please contain the spill & contact a WMNZ manager or staff member immediately.

14. REMOVAL OF COMPANY PROPERTY

Removal of Company property from site, including waste products, is strictly prohibited.

15. SMALL VEHICLES ON THE LANDFILL

All small vehicles must show a flashing roof light and carry a radio for communicating with landfill staff. These are available from reception.

Redvale landfill has a seat belt policy which is compulsory for all road users on site.

16. AFTER HOURS EXIT

At the main exit gate, drive front wheels to yellow marker line on the exit lane. Gate will open and then close automatically after driving thru.

17. Inside the EP complex safety glass wear is mandatory.

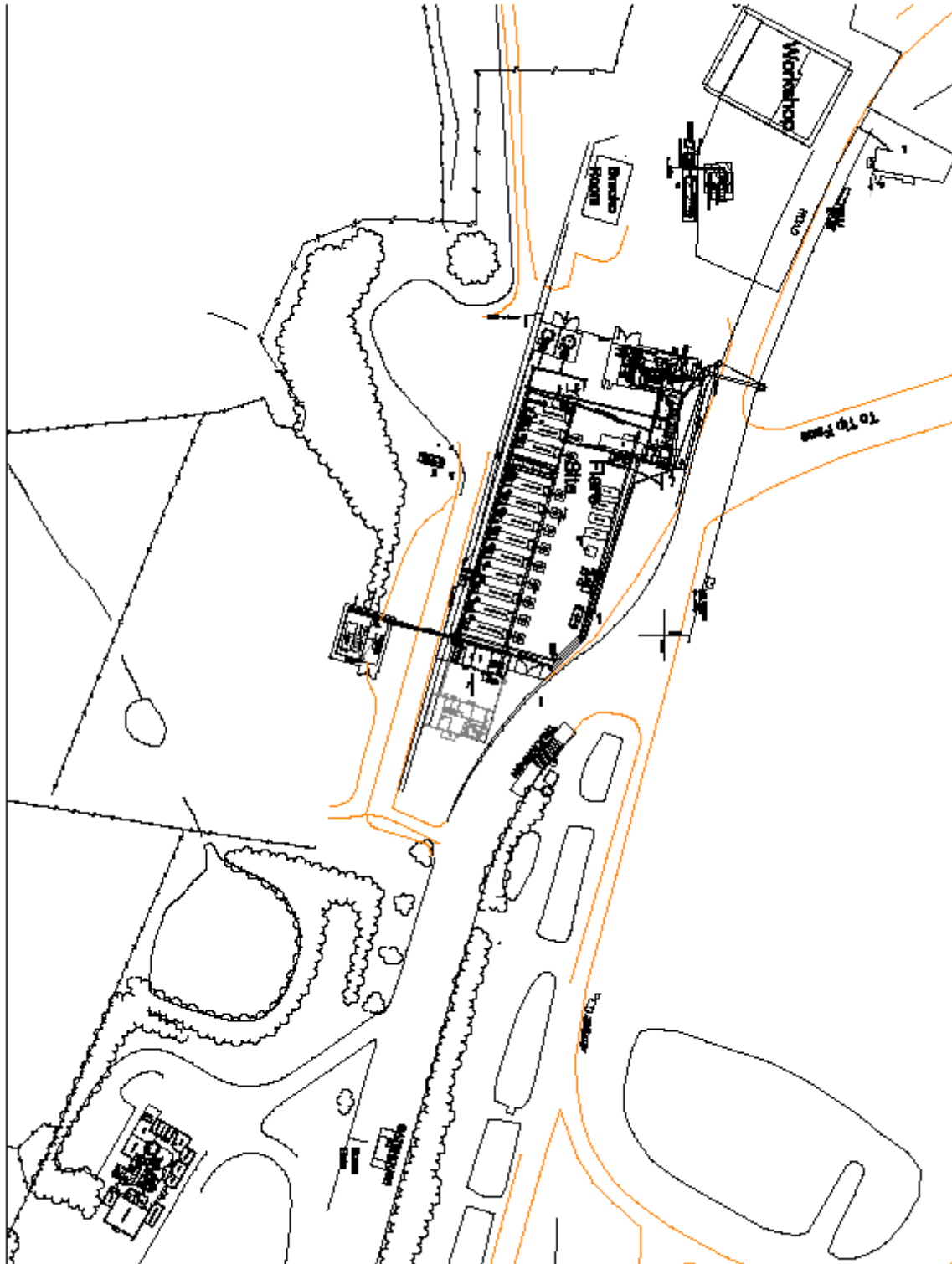
Contacts:

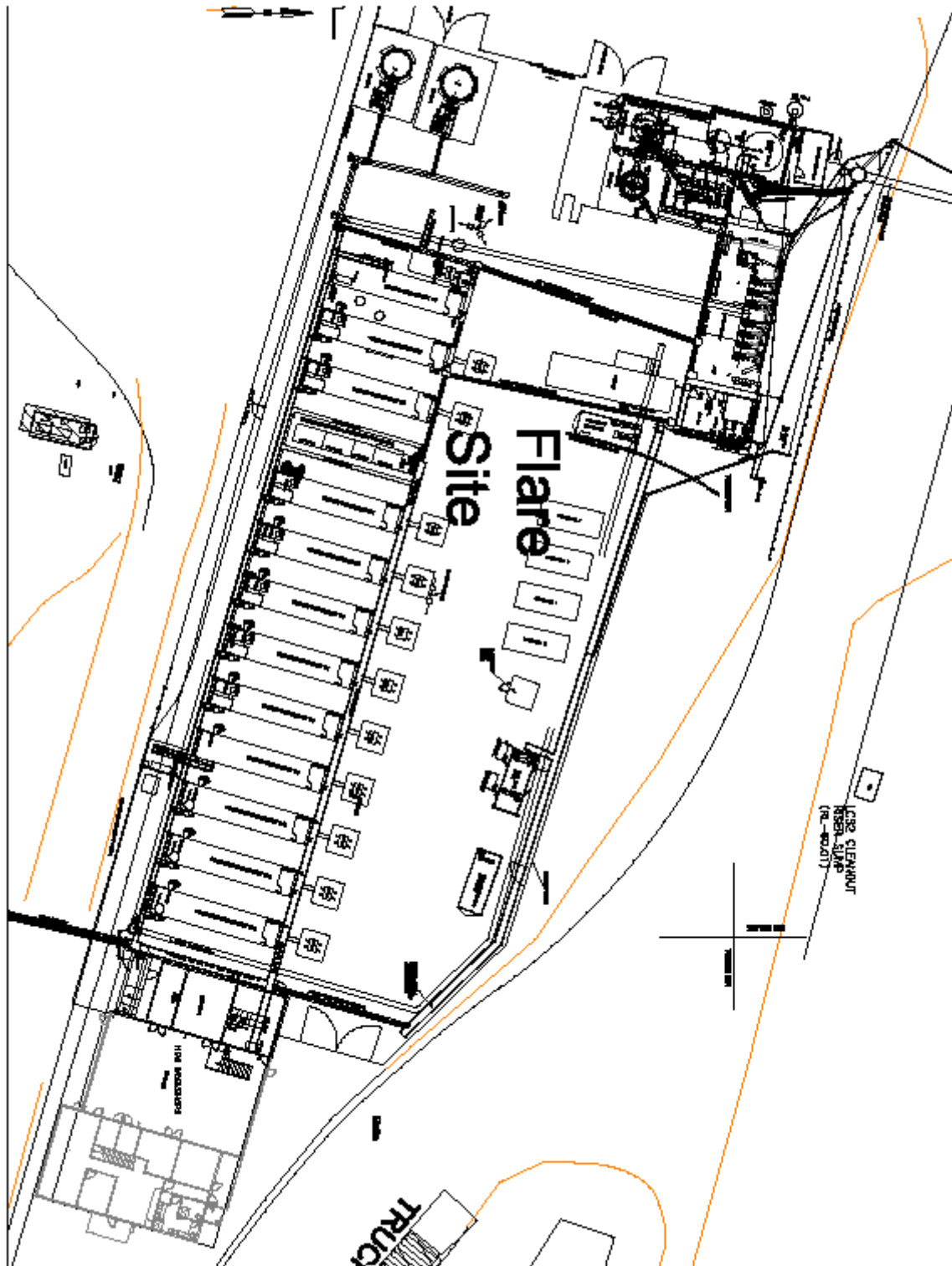
Landfill Operations Manager
Compliance Officer
Generation Manager
Regional Manager

Vada Ross
Kayla James
Cawood McCall
Glen Jujnovich

**Address:**

Waste Management NZ Ltd, Redvale Landfill, Landfill Access Road, Dairy Flat.
(Off SH17, opposite Dairy Flat School, 10km north of Albany, Auckland)





Please print clearly

Name:

Contact Phone No: Email Address:

Job Title:

Employer: Employer Phone No:

Please tick relevant box

Permanent staff ☐

Contractor: ☐

Sub-Contractor: ☐

Sub-Contracting to:

Casual Worker: ☐

Supplier: ☐

Visitor: ☐

I have read & understood the Redvale Gas/Flare Site Rules for Visitors, Suppliers, and Casual Workers & Contractors and agree to comply with them.

SIGNED: DATE:

Office Use Only:

Gas/Flare Induction Trainer:
(Please print clearly)

Please Note:

COPY ONLY of this page to be placed in Receptionists mail tray – All other pages to be kept by inductee.

Redvale Workshop Site Induction for Visitors, Suppliers, Casual Workers & Contractors

Version 5 – May 2019

This induction is specifically for access and working in the Redvale Workshop (inside red lines) for both Waste Management NZ Ltd (WMNZ) Contractors and Third parties. The WMNZ H & S Contractors Induction Training will also need to be completed. This does not give you access to the Flare site.

1. Sign In & Out

All visitors, suppliers & contractors are to park in the visitor car park & to sign in and out at reception upon arrival/departure from site, unless issued with a swipe card to use at the boomgate. Swipe cards must be returned to the white box at the exit swipe station when no longer required – unreturned swipe cards will be charged at \$50 + GST each.

2. Health & Safety Policy and Procedures

Waste Management requires all external workers working on our facilities to undertake a Health & Safety Induction Training Course prior to entry.

No site work may be undertaken unless a current signed and dated Certificate of Completion has been received by us or you are supervised at all times by a Waste Management representative.

3. Hazards - There are various hazards or risks on site and we need everyone to be aware of them and take precautions. The significant ones include Vehicle Pedestrian Interaction, Fire and Explosion, Electricity, Working at Height, Confined Space, Contractors, Visitors, Biological Chronic & Acute, Emissions to Water, Emissions to Air and Social Nuisance (Smell, Dust, Noise and Litter).

4. Parking / Driving – Parking is in front of the Workshop, the road rules apply including wearing seat belts and not using cell phones.

5. Small Vehicles on landfill – Must have flashing roof light and carry a radio to communicate with spotter before arrival at tip face. **Available at reception.**

6. Emergency – In an emergency please proceed to the far right pillar of the veranda. Follow the instructions of the nearest Emergency Warden.

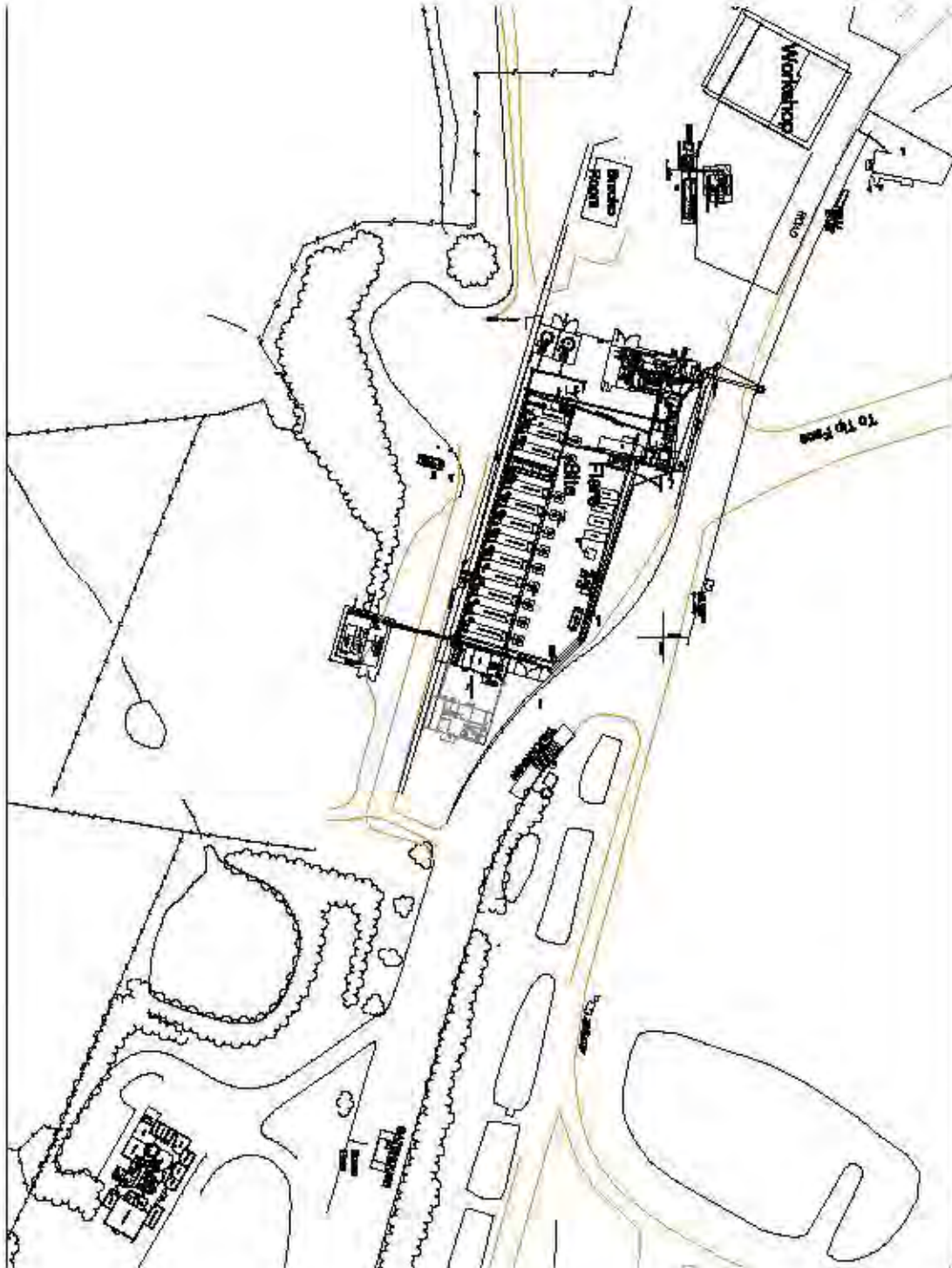
7. First Aid – There is a first aid kit in the Workshop located outside the Work Shop Managers Office.

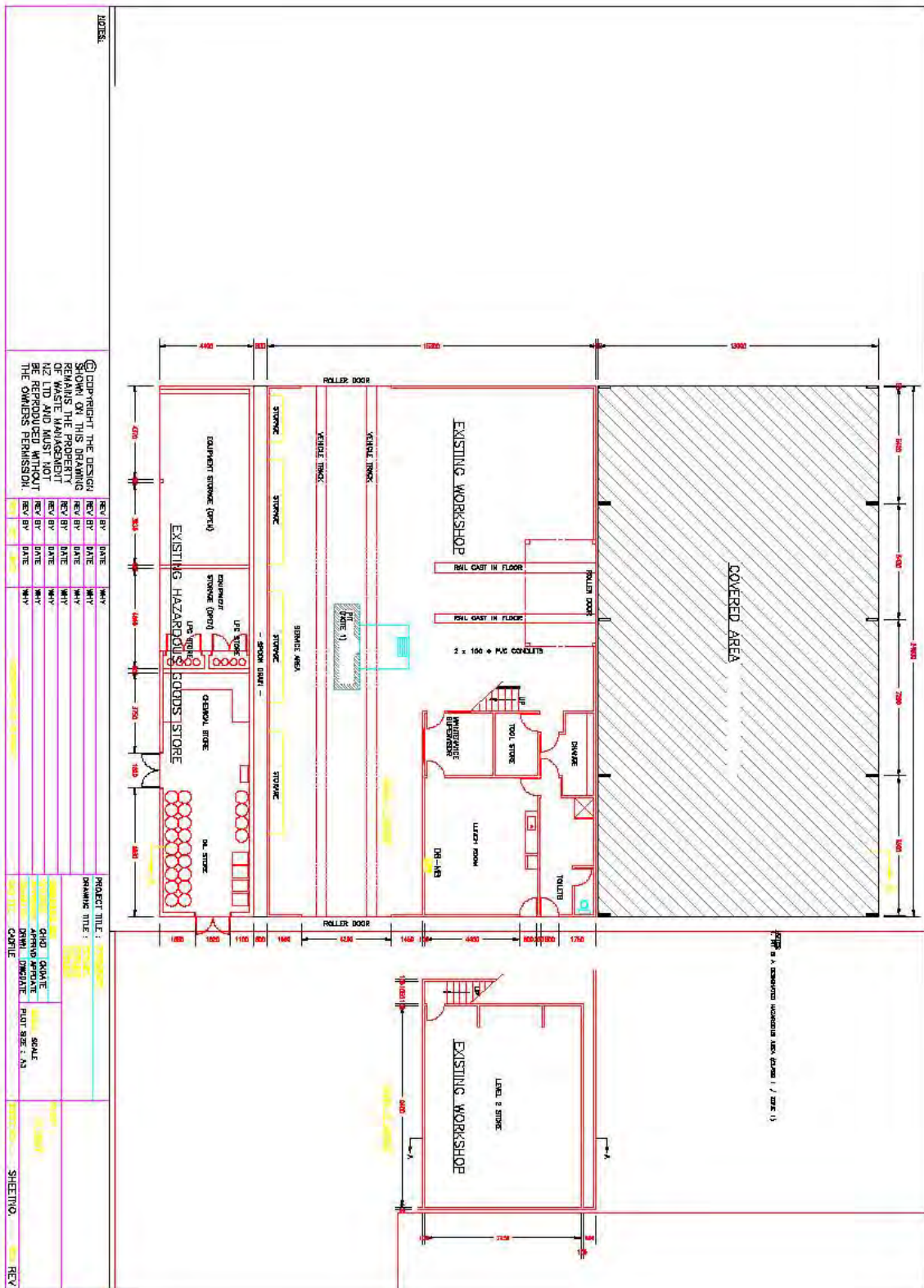
8. Toilets and Lunch Room – Toilets are located in the Workshop, access to the lunch room facilities are limited to Workshop Staff and Contractors only. Space is limited and WMNZ staff have priority at the nominated break times.

9. Smoking – Smoking is not permitted anywhere on site. Redvale is a smoke free area, this includes e-cigarettes and vaping.

10. Personal Protective Equipment (PPE) – Long sleeve shirt, long pants, steel capped boots and high viz vest are required **at all times**. Gloves must be carried and used when required. Goggles and Ear Protection are required when the warning light is on. Hard Hat is also required when working outside the Workshop area. Additional PPE may be required due to the nature of the work.

11. **Safety** – Before undertaking any job, remember the safety process **SLAM**. Stop, Look, Assess (the risks) and Manage.
12. **Isolation of Energy Sources**. All machinery under repair or maintenance **MUST BE LOCKED AND TAGGED OUT**. Failure to follow this directive could lead to dismissal from site.
13. **Permit to work** – A permit to work is required for certain works as per Work Permit. Authority is required for Hot Work (welding), Working at Heights (boots above 1.8m) and Confined Space. Please **do not** commence work until this is completed.
14. **Job Safety** – Contractors and Third Parties need to provide a safe job method statement and may also need to complete with (the assistance of a WMNZ employee) and sign a Job Safety and Environment Analysis (JSEA).
15. **Tools and equipment** – If you intend to use WMNZ tools and equipment you will need specific permission from a WMNZ employee. They all must be returned to the correct place. Any damage must be reported.
16. **Licences** - Licences are to be current for all work undertaken on site and a copy yearly must be provided. If you do not have a current licence **do not** operate the equipment.
17. **Warning Light** - When your work creates noise and or dust, activate the warning light. e.g. Welding and Grinding
18. **Incidents** – report all incidents and near hits/misses to Workshop staff.
19. **Spills** – All fluids should be contained, spill kits are available, call for assistance and report incident to Workshop staff.
20. **House Keeping** – Please keep your area of work safe, clean and tidy at all times. Before entering the cab, make sure your footwear is clean, use plastic floor covers.
21. **Hours of work** – 6AM - 6PM Monday to Friday, 7AM-2.30PM Saturday / Sunday / Public Holidays.
22. **Working alone** – If working alone (without contact with other personnel), for more than 2 hours an Isolated Work Audit Checklist (F1121-1) will need to be completed.
23. **Authorised** – Once you have completed this process you are now authorised to enter the workshop (inside the red lines) and undertake work. Please retain this for your information.





Please print clearly

Name:

Contact Phone Number: Email Address:

Job Title:

Employer/Company Name: Employer Phone No:

Please tick relevant boxContractor: ☐Sub-Contractor: ☐ Sub-Contracting to:Casual Worker: ☐ Supplier: ☐ Visitor: ☐

I have read & understood the Redvale Workshop Site Induction for Visitors, Suppliers, Casual Workers & Contractors and agree to comply with them at all times.

Signed Date

Office use onlyWorkshop Induction Trainer
(please print clearly)**Please note**

This page only to be placed in Receptionists tray – Others to be kept by inductee.