



Tukanga Wairākau

*Green Waste Processing Facility
Keepa Road, Whakatāne*

Operational Management Plan

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1.0 Introduction

1.1 Purpose and Objectives

Whakatāne District Council (WDC) *propose to* operate a green waste composting operation on WDC owned land adjacent to the current wastewater oxidation ponds off Keepa Road, Whakatāne, the site location and access way is shown in Fig 1.



Fig 1: Location of WDC green waste processing site

This document serves as the Operational Management Plan (OMP) for the site and **will be amended to be complementary to and comply with, any related resource consents**. This document includes details of operational practices, health and safety and environmental management, quality control and consent compliance. This document also forms part of any contractual agreement to operate the site.

The format of this document is based upon the Waste Management Institute of New Zealand and Ministry for the Environment's 'Outline of a Composting Operation Site Management Plan'.

1.2 Resource Consents and Assessment of Environmental Effects

The operation of this site is subject to the following resource consents and conditions therein (see Appendix A):

An Assessment of Environmental Effects (AEE) was undertaken as part of the resource consent application process for this site and a copy of this is included in Appendix B.

1.3 Risk Assessment

A number of potential health and safety and environmental hazards have been identified as part of these operations. These include; incident and accident reporting, training, traffic management, leachate and stormwater contamination, odour, dust and noise. Each of these are addressed in later sections of this document.

1.4 Definitions

Aerobic	In the presence of, or requiring oxygen
Anaerobic	In the absence of, or not requiring oxygen.
Ammonia	A gaseous compound comprised of nitrogen and hydrogen which has a pungent odour.
Bund	A containment wall to prevent the loss of liquids from a specified area.
Compost	Organic matter that has undergone controlled aerobic composting to achieve pasteurisation, stability and maturity. Compost has at least 95% by mass of material that has passed a 20mm sieve.
Feedstock	Organic material used for composting, including those generated by domestic and commercial gardening and landscaping sources. Includes leaves, plants, branches, tree trunks and stumps.
Green waste	See Feedstock
Moisture Content	The fraction or percentage of a material comprised of water. Moisture content equals the weight of the water portion divided by the total weight (water plus dry material).
Mulch	Any pasteurised or composted organic product that is suitable for placing on soil surfaces. Mulch has at least 20% by mass of material that has passed through a 20mm sieve.
Organic	Substances of animal or vegetable origin consisting of hydrocarbons and their derivatives. (This site will only receive organic matter of vegetable origin).
Pasteurisation:	The process whereby organic materials are treated to kill plant and animal pathogens and weed propagates.
Pathogen:	Microorganisms capable of producing disease or infection in plants or animals. Pathogens can be killed by heat produced during composting.
pH	A measure of the hydrogen ions in a solution. The lower the pH the more acidic a substance is. The higher the pH the more alkaline a substance is. A pH of 7 is considered neutral.

Thermophilic	Temperatures above 45°C. The stage of composting in which high temperatures are sustained resulting in high rates of decomposition and pasteurisation of organic material.
Turning	An operation which mixes and agitates material in the windrow pile. Its effect is to increase porosity of the windrow to enhance aeration. It can be achieved with a front end loader or specially designed machinery.
Soil Conditioner	Any pasteurised or composted organic product, that is suitable for adding to soils. Soil conditioner has at least 95% by mass of material that has passed through a 20mm sieve.
Windrow	System of composting involving horizontally extended piles formed by a front end loader or specially designed machinery. The extended piles are 1.5 to 3m in height and the length is limited by the operation pad. Aeration of the pile is achieved through turning.

2.0 Description of Operation

2.1 Site Owner and Operator

The site and composting operation are both owned by WDC. Following an initial 'establishment' period (time to be determined), the allocation of a contract for the operation and management of the site will follow WDC procurement and tender procedures. The tender process will determine the level of composting experience and other attributes required.

2.2 Contractual Arrangements

The appointed contractor reports to the Solid Waste Manager at WDC and is responsible for determining their internal staff structure, responsibilities, duties, induction and training.

As part of the procurement process any contractor is required to provide details of how they will manage any health and safety, and environmental hazards. This OMP forms part of any contractual agreement and they are required to comply with any consents or permits related to the operation.

2.3 Customer Service and Quality Management Procedures

There is no public 'drop-off' at the site which reduces health and safety risks and customer interactions. The contractor is required to maintain high levels of customer service with all parties that they interact with as part of these operations. They are also required to report any customer service concerns to the Solid Waste Manager (WDC) on an as-need basis.

The Composting Contractor is responsible for ensuring that the compost meets regulatory requirements including meeting the standards in NZS 4454:2005 (New Zealand Standard for Composts, Soil Conditioners and Mulches). The contractor is responsible for undertaking the appropriate testing and analysis of the composting and final products, and for ensuring that results are communicated to any interested parties as required.

The contractor is responsible for marketing and selling the final products.

2.4 Site Layout and Activities Undertaken

Except for the provision of a portaloos there are no buildings on the site related to the composting operations. There is no weighbridge as truck loads are weighed at the Whakatāne Refuse Transfer Station. (Note: An existing farm shed is located to the south of the concrete pad at the western end of the site; however this farm shed does not form part of the operations).

Site access is from Keepa Rd as shown in Fig 1. A 30km/hr speed limit applies to the access road and passing bays are provided. Engineering drawings are included as Appendix C and this shows the main features of the site including the access road, surrounding bund which

provides for stormwater and leachate control, drainage features, concrete pad, hardstand and operational areas.

The main activities on site are:

- Drop off and storage of incoming materials (feedstock)
- Shredding and materials preparation
- Composting and processing
- Screening
- Product storage

Each of these are discussed in further detail later in this document.

It is expected that these activities will result in the following traffic movements:

- Green waste delivery trucks, 1 - 3 per day
- Non organic waste removal (skip bin), every 2 weeks
- Compost collection trucks, 1 - 4 per day
- Site operational staff vehicles, 1 - 4 per day
- Equipment transport trucks:
 - Excavator/loader/windrow turner: (if not held permanently on site) every 6 to 7 weeks, removed 2 - 3 days later
 - Shredder/hogger: every 3 – 4 weeks, removed 2 - 3 days later
- Small buses for site visits and educational purposes.

It is estimated that the operation will result in a maximum of 8 but typically only 3 truck movements per day on a regular basis, mainly comprising trucks bringing feedstock material to the site. There will also be seasonal variability in the amount of green waste received and product (compost) transported off site. Approximately 1 - 4 small vehicles (utility size) are expected to access the site every day.

Vehicle movements on Saturday and Sunday are restricted to feedstock drop-off and this also is seasonal with 1 to 2 trucks per weekend during the summer months.

2.5 Surrounding Land Uses

The site is bordered by cropping and grazing land to the north and south-east. The proposed BOPRC Kope Canal remediation site is situated directly to the south. Further to the south is an industrial zone. Four operating wastewater oxidation ponds are situated to the west. To the east the site is bordered by a pony club (on WDC owned land) with a plant nursery and a Church building further to the east.

2.6 Material Flows

Green waste brought to site originates from two sources; kerb-side domestic collections and drop-offs at council refuse transfer stations.

Green waste collected from kerbside collections remains in the collection trucks and go via the Whakatane Refuse Transfer Station to be weighed. The trucks then drive directly to the composting facility where they off-load. Kerb-side collected green waste is not transferred or processed at the transfer station.

The general public and contractors can dispose of green waste at the Whakatane and Murupara refuse transfer stations. Green waste collected at the transfer stations is transported by the transfer station operator to the composting facility.

The green waste (feedstock) then passes through the processing stages outlined in the next section. The resulting products (compost) are stored on site and sold by the operations contractor.

A refuse skip bin will be stored on site for the reception of any feedstock contaminants. The bin will be sent to the refuse transfer station for emptying on an as-need basis (i.e. when full).

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3.0 Processing Methodologies and Standard Operating Procedures

This facility processes green waste into a soil conditioning product via a composting process. The methodologies and operating procedures applied to achieve this goal comply with New Zealand Standard 4454:2005 - Composts, Soil Conditioners and Mulches. The site contractor is required to familiarise themselves with this standard and apply it to all relevant aspects of the site operations.

3.1 Incoming Materials Reception and Storage

Contamination of the feedstock is a major concern for both the composting process and environmental effects (such as litter). The following contamination control steps are to be followed by the kerbside collection contractor, refuse transfer station and composting facility staff:

3.1.1 At Source: Kerbside

1. When kerbside green waste wheelie bins are emptied, each bin will be inspected by the collections contractor via an on-board camera.
2. If green waste is contaminated with materials that are not suitable for the composting feedstock, the wheelie bin will not be emptied and will be returned to the kerb.
3. A sticker will be placed on the bin to advise the customer. Approximately 10 to 20 wheelie bin loads are stickered each week using this methodology.

3.1.2 At Source: Transfer Station

1. Green waste delivered directly to the transfer station by customers will be inspected by at the weighbridge.
2. If green waste is identified at the weighbridge to be contaminated with materials that are not suitable for the composting feedstock, the customer will be advised to remove the contaminants. If it is not possible to remove any contaminants, the green waste will be placed in the refuse bin.
3. Transfer station staff will regularly (several times a day) visually inspect the open top green waste bins at the transfer station.
4. If any contamination of feedstock is identified in the bins, where possible it will be removed, otherwise the contents of the bin will be blended with the refuse and sent to landfill.

3.1.3 Green Waste Processing Facility: Incoming Materials

1. If contractor staff are on site at the time green waste is dropped off, it will be visually inspected prior to and during the creation of windrows.

2. Retrievable contaminants will be removed and placed in the skip bin on site for removal to the transfer station.
3. If it is not possible to remove contaminants, the green waste will be treated as refuse and returned to the transfer station for dispatch to landfill.

3.1.4 Green Waste Processing Facility: Processing

1. Prior to shredding, prior to sieving and following sieving, the green waste will be visually inspected by the composting contractor.
2. Retrievable contaminants will be removed and placed in the skip bin on site for removal to the Transfer Station.

3.1.5 Green Waste Processing Facility: Site Maintenance

1. Whenever composting contractor staff are on site, the site and feedstock will be inspected.
2. Loose refuse, litter and feedstock contaminants will be retrieved and placed in the skip bin for removal to the Transfer Station.

3.2 Batch Recording

Each load of green waste taken to the facility is weighed at the transfer station prior to delivery. Each load is therefore recorded in the weighbridge data, this includes, date, time, weight and source (kerbside or transfer station drop-off).

3.3 Equipment

Apart from staff vehicles and trucks, equipment that will be held on site or brought to site includes an excavator/loader/windrow turner, a shredder/hogger and a screen.

3.4 Materials Preparation and Shredding

The collections contractor's trucks will unload the green waste either onto the hardstand area or at the end of existing windrows. A loader/excavator/windrow turner will form the feedstock into windrows no more than 3m high. The unprocessed green waste will be allowed to compost aerobically for 2 – 4 weeks.

The green waste will then be shredded to a finer particle size by a shredder/hogger every 3 – 4 weeks. Shredding is necessary for woody branches and larger materials that cannot be composted effectively without size reduction. Shredding will also increase surface area of raw materials exposed to microbes, increase bulk density and air space, which promotes optimum thermophilic composting conditions (rapid microbial activity, appropriate temperature build-up and moisture content).

A loader/excavator/windrow turner will place the shredded green waste into windrows for composting. Turning the feedstock into windrows aids the mixing process which further aids management of the particle size and moisture content.

3.5 Composting and Processing

The compost will mature over a period of 4 – 6 months. During this time it will be turned once a month to ensure all materials maintain the temperatures and other characteristics required to achieve pasteurisation.

The contractor will aim to apply the commonly quoted optimum parameters for aerobic decomposition which are:

- C:N ration 25-30 to 1
- Moisture content 50-60%
- Oxygen concentrations 12-14% (never less than 5%)
- Average wet bulk density 200-300kg/m³, increasing to 500-700kg/m³ during composting
- pH 6.5-8
- temperature 45-65°C, including 3-4 days at greater than 55°C to achieve pasteurisation

The composting process can be split into two major stages:

1. an initial high rate phase with high temperatures, high oxygen uptake, rapid biological solid reduction and pasteurisation
2. a secondary low rate phase with reduced oxygen uptake, lowering temperatures and a product moving towards stabilisation

The temperature of the composting pile is a good indicator of the process and should be monitored regularly. Temperature will fall if oxygen becomes scarce resulting in decreased microbial activity. Conversely if oxygen content and microbial activity increases the temperature can rise above 70°C. To achieve pasteurisation the temperature must exceed 55°C for more than 3 days. The temperature of the pile can be controlled by turning, extending the composting period or insulating the outer layers (these methodologies also help to control odour).

While aeration (turning) may be used to cool the temperature it may also remove moisture content. Temperature, aeration and moisture content should be managed together to maximise aerobic microbial activity and the composting process.

During the secondary stage, microbial activity continues and the pile must still be kept hydrated and aerobic for the compost to mature. Feedstock contamination and pathogen regrowth of the maturing compost must be avoided.

3.6 Screening

Once the compost has matured sufficiently, it will be passed through a screen/sieve. The screen/sieve separates waste products (plastic, flax, etc.) and larger material from the compost.

Waste products will be placed in a skip bin for removal to the Transfer Station. Large green waste material will be returned to the windrows for further processing.

3.7 Product Storage and Sale

The finished volume of compost will be less than 50% of the original green waste feedstock volume.

The final product will be stored on site until marketed and sold by the operations contractor. The final product will be sold 'in bulk' and not packaged in any form.

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4.0 Complaint Procedures

The contractor and WDC will maintain a complaints register in relation to these issues which will record the following details:

- date, time,
- location of the complaint
- nature of the complaint
- complainants details (name, address, telephone number)
- weather information (including wind direction)
- investigation undertaken and findings
- operating parameters at the time of the complaint
- action undertaken to resolve the complaint if necessary
- feedback given to complainant

5.0 Contingency Planning

As part of the contract, the operations contractor will be expected to manage any equipment failures and internal staffing issues while continuously providing the required service.

In the event that the site is temporarily unable to operate (e.g. flood) an alternative temporary site or composting service will be acquired, or the green waste will be sent to landfill.

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6.0 Health and Safety

Responsibility for hazard identification and control at the site lies with WDC, the contractor and all users of the site. Anyone visiting the site is required to adhere to all health and safety requirements.

The contractor is required to implement a health and safety management system which includes hazard identification and control, recording of incidents (including near-misses) and resulting actions taken. Hazards which have been identified and require control include, but are not limited to; traffic, heavy machinery, noise, dust, fire, water bodies, lone working, emergency management and evacuation.

All operational staff shall be made aware of all hazards on site and will be trained in the use of all hazardous equipment. Records of such training will also be maintained. The contractor is required to notify WDC of any health and safety related incidents (including near-misses).

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7.0 Environmental Management

This site has the potential to generate environmental effects. Operations at the site are subject to resource consent (Appendix A) and all users of the site are required to adhere to the conditions of this resource consent.

A number of specific environmental risks have been identified and these are discussed below with control measures.

7.1 Feedstock Contamination and Litter

A series of feedstock contamination and litter control steps have been put in place and these are described in 'Incoming Materials Reception and Storage' section above.

7.2 Odour Control

Composting processes generate significant amounts of gasses including carbon dioxide (under aerobic conditions), methane (under anaerobic conditions) and hydrogen sulphide. Therefore, they have the potential to produce odours if they are not operated correctly. Causes of odour include:

- oxygen levels less than 5% during the initial 21 days of composting
- low porosity, inhibiting air-flow
- high moisture levels, eliminating free airspace
- low carbon to nitrogen ratio (C:N), promoting ammonia volatilisation
- high pH, also promoting ammonia volatilisation

All these factors can be addressed through material preparation, composting and processing practices as described earlier in this document. Therefore, these processes are important in ensuring aerobic conditions are maintained and controlling odour.

If complaints are received or staff notice that an odour is being generated that is, or could be, creating a nuisance beyond the boundary of the site, the following site management methods can be implemented:

1. If an odour complaint is received, the complaints procedure (and register) will be initiated.
2. To manage the generation of odours, windrows of unprocessed green waste will be no higher than 3m to discourage anaerobic conditions within the windrows.
3. As described above, regular processing (turning etc) of materials will address odour issues.
4. If monitoring determines that odour is generated from a specific discrete source at the site, the amount of time the material spends in the turned windrows can be increased.

5. Odorous materials may be covered with non-odorous green waste or mature compost to a sufficient depth to prevent odour emissions. The cover materials will act as a bio-filter for odorous gasses.
6. Windrows may be turned at times that are least likely to cause offence to nearby land users and neighbours. Consideration will be taken into account to wind speed and direction or the occurrence of local 'public events'.
7. As described above high moisture content can cause odours. If ponding is found to occur, green waste and compost will be removed from the ponding area and the area will be re-contoured to avoid recurrence.
8. If monitoring determines that odour emissions are generating a nuisance beyond the boundary of the site on a regular basis (i.e. not related to specific loads), WDC could erect windbreak fences and a shelterbelt of pine trees in appropriate locations around the working area to inhibit the movement of odour.
9. If an odour persists that is causing a nuisance beyond the boundary of the site the council may decrease the amount of feedstock arriving on site.
10. Following any odour complaint, the cause will be investigated and if required, the operational management of the site will be reviewed, with the aim of implementing changes to address the problem. This procedure also forms part of complaints process.

7.3 Dust Control

If complaints are received or staff notice that dust is being generated that is, or could be, creating a nuisance beyond the boundary of the site, the following site management methods can be implemented:

1. If a dust complaint is received, the complaints procedure (and register) will be initiated.
2. A water cart or alternative dust suppressant as necessary may be used to control dust on the access road and main entry track to the site.
3. A sprinkler system may be used to control dust as necessary within the main body of the site at rates that wet the surface of the ground or compost but do not generate ponding or accelerate infiltration of leachate.
4. If dust emissions from the entry track are regularly causing a nuisance beyond the boundary of the site, WDC shall consider the implementation of permanent dust suppression measures (for example, a sprinkler system or application of a dust suppression polymer).
5. If dust emissions occur as a result of vehicle traffic, the access and on-site speed limit (30km/hr) can be lowered.
6. If dust suppression methods within the site prove ineffective, WDC may erect windbreak fences and shelterbelt trees at appropriate locations around the working area to inhibit the movement of dust.

7. Following any dust complaint, the cause will be investigated and if required, the operational management of the site will be reviewed, with the aim of implementing changes to address the problem. This procedure also forms part of complaints process.

7.4 Leachate and Stormwater Management

Leachate from composting facilities has the potential to pollute groundwater and surface water. It can be high in nutrients making it a favourable media for bacteria and other micro-organisms, which generate a high biological oxygen demand (BOD). Stormwater can also infiltrate the composting material and dilute the leachate. It can also transport the leachate, organic matter, pathogens and sediment off-site. This site has therefore been designed with an active leachate and stormwater management system.

The main contaminants in leachate and stormwater will be:

- Suspended sediment
- Nutrients: phosphorus and nitrogen, particularly ammoniacal nitrogen;
- Carbonaceous biochemical oxygen demand (CBOD);
- Bacterial/microbial loads;
- Colour/scums.

A flood protection/stormwater containment bund surrounds the site to contain internal runoff whilst excluding external flooding.

The existing open drain within the site will convey run-off to a stormwater pond located within the bund. The stormwater pond is located at the low-point within the site. Stormwater from the pond will be pumped to the wastewater oxidation ponds for treatment and disposal. Therefore no stormwater or leachate created on the site will discharge to natural water. To maintain the effectiveness of the stormwater treatment system regular maintenance and monitoring is required.

7.5 System Monitoring and Maintenance

WDC will ensure that the following system monitoring and maintenance is carried out:

1. If a stormwater or leachate related complaint is received, the complaints procedure (and register) will be initiated.
2. If ponding is identified on site the topography will be graded to aid free-flow of run-off to the pond.
3. The stormwater system will be inspected by an appropriately qualified person following every rainfall event exceeding 10% AEP. In particular, the outlet structures, pond bunds and perimeter drains will be inspected to determine whether there is any damage or blockage to be repaired. Any repairs required will be implemented within 4 weeks of the inspection or earlier if required.

4. All perimeter and internal drains, and all stormwater infrastructure, will be inspected by an appropriately qualified person at least annually. In particular, will be inspected for erosion, short circuiting, damage, and blockages. Any repairs required will be implemented within 4 weeks of the inspection or earlier if required.
5. The depth of the sediment detention pond will be measured at least annually to determine the amount of sediment deposited. If the amount of sediment equates to 50% or more of the total volume of the pond, the sediment will be removed within 4 weeks of the inspection.
6. The removed sediment may have an elevated loading of organic material and nutrients but few other contaminants are considered likely. Therefore, the excavated material will be spread on the site or incorporated into the compost windrows.
7. All stormwater system monitoring and maintenance activities will be recorded by WDC.
8. Following any stormwater or leachate related complaint, the cause will be investigated and if required, the operational management of the site will be reviewed, with the aim of implementing changes to address the problem. This procedure also forms part of complaints process.

7.6 Environmental Monitoring

WDC will undertake monitoring required by BOPRC under the conditions of resource consent for the site. Such monitoring is expected to include sampling and measurement of water from drains around the site for contaminants and environmental parameters. Results will be reported to BOPRC as required. Should the results indicate that the treatment system is not performing as expected, WDC will engage an appropriately qualified professional to review the system design and recommend appropriate remedial measures.

7.7 Noise

WDC have employed a suitably qualified engineer to undertake a Noise Assessment in relation to the construction and operation of this site. Conclusions from this assessment are:

"We consider that noise from the day to day operation will comply with the District Plan noise limits which apply at rural dwellings and the Gateway industrial area. Noise from construction activities, such as the earth bund around the site, will also comply with the Construction Noise limits at the nearest rural dwellings, or industrial properties in the Gateway industrial area."

Compliance with the conclusions of the Noise Assessment will be achieved under the proposed operational management of the site in relation to traffic volumes, equipment use, and facility operating times.

If complaints are received regarding noise the complaints procedure (and register) will be implemented. The cause will be investigated and if required, the operational management

of the site will be reviewed, with the aim of implementing changes to address the problem. If required, WDC engage an appropriately qualified and experienced practitioner to develop options for noise management.

7.8 Vermin

Nuisance levels of vermin are unlikely at this type of composting operation. If they are present they are most likely to be rats or seagulls.

If monitoring determines that vermin are generating a nuisance beyond the boundary of the site, the following site management methods will be implemented:

1. If complaints are received regarding noise the complaints procedure (and register) will be implemented.
2. Habitat modification including covering the unprocessed green waste stockpiles with previously processed material.
3. Harassment measures such as gull distress calls and visual scare devices.
4. A qualified practitioner may establish a programme of vermin control using methods considered appropriate to the site.
5. Any traps will be checked at a frequency sufficient to avoid inhumane treatment of affected vermin.
6. Following any vermin related complaint, the cause will be investigated and if required, the operational management of the site will be reviewed, with the aim of implementing changes to address the problem. This procedure also forms part of complaints process.

8.0 Management Plan Review

This site management plan will be reviewed:

- following the issue of any related consent or consent change
- at the request of any relevant authority
- annually on the anniversary of any contract awarded
- following any valid complaint
- following any health and safety or environmental incident
- at the discretion of the site operator and WDC

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Appendix A – Resource Consent

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**Appendix B – Application for Resource Consent including
Assessment of Environmental Effects**

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Appendix C – Engineering Drawings

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