STRADEGY
Urban, Environmental & Strategic Planning

Resource Consent Application for Land Use

174 to 176 Brookvale Road, Hastings

The Te Mata Mushrooms Company Limited

17013AP1
26 September 2018

APPLICATION DETAILS

Consent Authority: Hastings District Council

The Applicant: The Te Mata Mushrooms Company Limited

Address for Service: Stradegy Planning Limited, PO Box 239, Napier 4140

Address for Invoice: PO Box 8137, Havelock North 4157

Site Details:

Street Address: ..... 174-176 Brookvale Road, Hastings
Legal Descriptions: ..... Lots 1 & 2 DP 16311, Lot 2 DP 7771 and Lot 3 DP 28543

Activity for which Consent is sought:

Resource Consent is sought to expand an existing Intensive Rural Production Activity as a **Discretionary Activity** under Rule PP25 of the Hastings District Plan.

Prepared by:

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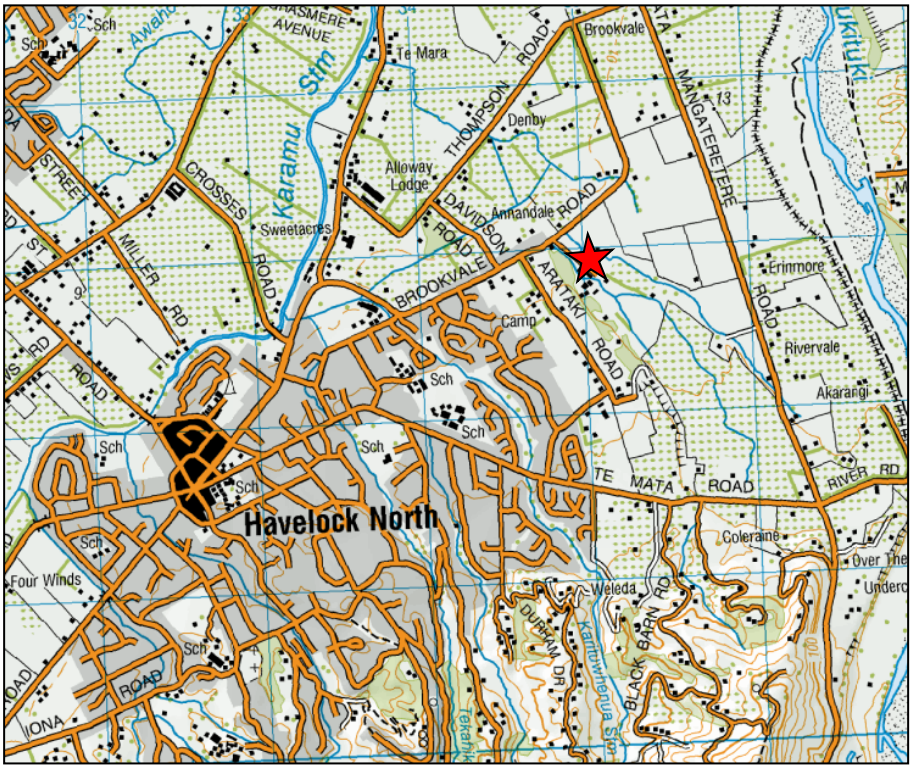
1. INTRODUCTION

The Te Mata Mushrooms farm was established in 1967. The operation generally involves the storage of materials used in the production of compost, the production of compost over two core phases, the growing of mushrooms and the management of spent compost.

Although once located far from nearby urban centres, owing to urban growth and development it now finds itself on the periphery of Havelock North and within an area that is essentially characterised by a mix of residential and rural land uses and influences. The location of the site can be seen in **Figure 1** below.

Figure 1: Location of Activity



The farm currently operates under Hawkes Bay Regional Council Resource Consent DP100128A to discharge contaminants arising from a composting and mushroom growing operation and associated activities into air. Although DP100128A is not due to expire until 31 May 2025, an application has been lodged to provide for changes in the operation and associated odour control procedures. This application has been publicly notified and is currently on hold awaiting this landuse application to be made under Section 91 of the RMA as requested in a submission made by Hastings District Council.

The approach under which the new odour control measures have been developed is based around changing the way activities are carried out so that the potential for odour generation is minimised, including the hedonic tone of any residual odour i.e. reducing the potential for

that odour to be regarded as offensive or objectionable due to its degree of unpleasantness, and where sufficient reduction of odour generation is not possible, a focus on odour capture and treatment at source.

Full details of the technical assessments undertaken to inform the proposed process changes and odour control measures are outlined in the Odour Assessment prepared by AQP and are summarised in Section 3 below in describing the details of the proposal in relation to its landuse aspects. A copy of the AQP report is provided.

The following report has been prepared in accordance with Schedule 4 of the Resource Management Act (**RMA**) and meets the requirements of Form 9. The level of detail provided is commensurate to the scale and significance of effects that the activity may have on the environment. In addition to the Odour Assessment, expert Acoustic and Traffic assessment reports are provided.

2. SITE DESCRIPTION

The site is located at 174 to 176 Brookvale Road, Havelock North, as shown in **Figure 2** below, and falls within the Plains Production Zone of the Hastings District Plan as shown in **Figure 3**. It is currently comprised of four titles, being Lots 1 and 2 DP 16311, Lot 2 DP 7771 and Lot 3 DP 28543, and has a total area of 22.8928 hectares.

Figure 2: Site

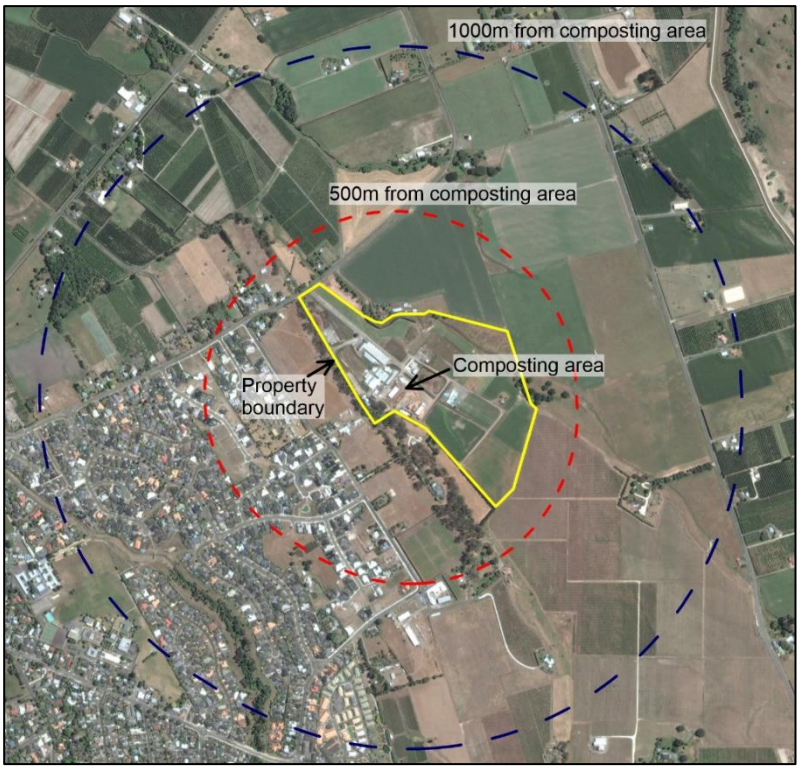


Figure 3: District Plan

The Plains Zone comprises much of the Heretaunga Plains, which is acknowledged to contain some of the most fertile soils in New Zealand. These resources, combined with the climatic conditions, make this area suitable for many intensive horticultural, viticulture and agricultural uses.

Orcharding and cropping are the most predominant activities on the Heretaunga Plains, but activities such as viticulture, wineries, craft shops and some industries have also developed over time. This diverse range of activities has been acknowledged by the Hastings District Council as an important factor in terms of the district's economy, and to this end, the proposed activity is among many land based primary production and intensive rural production activities provided for as permitted and controlled activities under Rules 6.7.1 and 6.7.2 of the District Plan.

The activity had operated under existing use rights for some time. In 2013 however, a resource consent was obtained to increase the scale of the growing facilities by constructing additional mushroom growing rooms, effectively consenting the entire operation from a land use perspective (refer RMA20130216).

As part of the recent District Plan review however, Lot 3 DP28543, Lot 2 DP 7771 and part of Lot DP 16311, the specific lots containing the mushroom growing operation, were included as a Scheduled Activity (S37) in Appendix 26 of the Hastings District Plan where the following are provided for as Permitted Activities:

1) Mushroom growing and activities associated with the growing of mushrooms,

2) Composting operations for the purposes of mushroom growing,
3) Retail sales of mushrooms and compost produced on the site.

Scheduled Activities are introduced in Section 1.1.5.6 of the Hastings District Plan where they are described as uses that are not classified as a Permitted Activity in a zone but are longstanding activities recognised by Council as providing for the social wellbeing of the community. The extent of the Schedule Site is also shown in **Figure 3** above.

In terms of buildings, the site is currently characterised by a number of growing, packing and storage sheds, composting and raw material bunkers and concrete pad areas. An oxidation pond is also present. These features are shown on the aerial photograph provided in **Appendix 1**, which specifically identifies the pond and associated plant. Appendix 1 also contains the Plan showing the footprint of the buildings approved under RMA20130216. The previous pond with the outline of existing pond alongside can been on this approved plan. The existing 'farm shop' is approximately 20m^2 and acts as a retail facility as well as the entry to the operation for all aspects including customer sales, deliveries, trades and business management.

Earthworks undertaken at the end of 2012 on Lot 3 DP 28543 involved the removal of trees, improved drainage and the construction of a building platform to accommodate a new growing room on land secured from the Hastings District Council (as identified under Subdivision consent RMA20130305) and a car parking area.

In terms of actual operations, average compost production is up to 80-120 tonnes per week with up to 25 tonnes of mushrooms (per week) being produced. The mushroom growing operation is seven days a week, with staff typically working in shifts. The busiest shift is during the day when up 56 employees are on-site.

The on-site farm shop is operational seven days a week (not 6 as reference in the Traffic Assessment). A maximum of two employees operate the shop during the day.

The existing composting process, including the storage of compost materials, existing odour control measures and the management of compost by-products are outlined in Sections 3.1-3.3 of the AQP Report and are summarised in **Figure 4** and **Table 1** below.

In summary, straw is wetted and mixed with gypsum and chicken litter to form a substrate which is then left to compost in a bunker. The substrate is then removed mid-process and turned where further water is added if necessary. The substrate is then placed back into a bunker to complete the composting process. The compost is then removed from this Phase 1 bunker, turned once again, and transferred to the Phase 2 pasteurisation tunnels before it is used to form the compost beds upon which the mushrooms are grown in the mushroom growing sheds. The spent compost is stored on-site for sale. Any remaining spent compost is removed after a set period of time. Runoff from the composting pad is stored and treated in an effluent pond (to control odour) and is the primary source of the water used in the process as referred to above. These various process steps essentially form the odour sources that characterise the activity.

Figure 4 and Table 1 explain the compost process and demonstrate how each part of process (and potential source of odour) is rated for odour impacts. The rating of each source's potential for adverse odour impacts to occur at sensitive receptors is based on the analysis of odour sources in Section 8 of the AQP Report provided. The rating system is qualitative, based on AQPs' observations of odour strength from each source, size and volumetric flow rates from each source, the time of day when sources are present and the author's experience with the typical rate of downwind dispersion of odours from such sources.

This analysis identified key areas around which to focus future operational and mitigation improvements. In summary, the analysis concluded:

- The transfer of compost from the Phase 1 bunkers to the Phase 2 tunnels on a Tuesday presents the highest potential odour impact i.e. a 'high',
- The first and second turning processes as part of the Phase 1 composting process on a Monday and Friday present the second highest potential odour impact i.e. 'moderate-high',
- The bale breaking and mixing process on a Thursday presents the third highest potential odour impact i.e. 'moderate',
- All other processes present a 'low' or 'low-moderate' potential impact.

Refer to Figure 4 and Table 1 below for the full details of the odour rating assessment.

Figure 4: Existing Process

Day	Batch 1	Batch 2
Thursday	Pre-Wet	
Friday		
Saturday		
Sunday		
Monday		
Tuesday		
Wednesday	Pre-Wet finished	
Thursday	Bale break, bunker filled	Pre-Wet
Friday		
Saturday		
Sunday		
Monday	Bunker-to-bunker transfer	
Tuesday		
Wednesday		Pre-Wet finished
Thursday		Bale break, bunker filled
Friday	Bunker-to-bunker transfer	
Saturday		
Sunday		
Monday		Bunker-to-bunker transfer
Tuesday	Remove, mix, enter Phase 2	
Wednesday		
Thursday		
Friday		Bunker-to-bunker transfer
Saturday		
Sunday		
Monday		
Tuesday	Remove compost from Phase 2	Remove, mix, enter Phase 2
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		
Monday		
Tuesday		Remove compost from Phase 2

Composting Stage:	
Pre-Wetting	
Phase 1	
Phase 2	

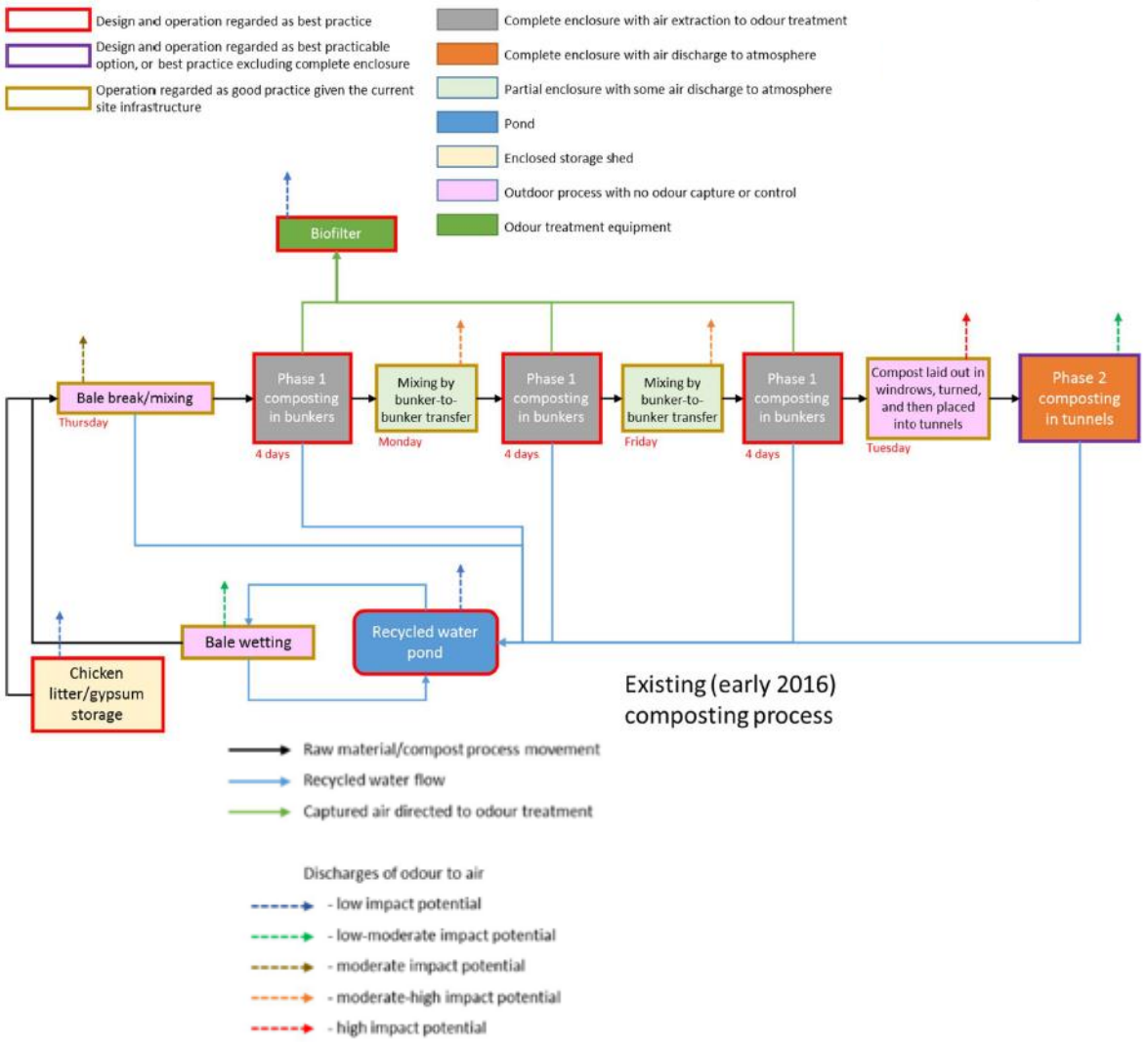


Table 1: Sources of Odour and Nature of the Discharge

Process	Explanation	Potential for Odour
Bale wetting	• Up to 5,000 straw bales (increasing to 25,000 straw bales under full production levels) will be stored on site at any one time. • Odour is generated from the spraying of recycled water over the bales. • The process occurs for approximately 30 hours over a seven day period. • The spraying action is via a low pressure delivery system from a moving irrigation arm, which minimises aerosol formation. • The magnitude of odour emissions is highly dependent on the quality of the recycled water.	Low-moderate
Chicken litter/gypsum storage and handling	• Chicken litter and gypsum is mixed off site. • The premixed chicken litter is stored in a three-sided roofed bunker with a tarpaulin draped over the opening to keep the litter dry. • Up to 50 tonnes (increasing to 200 tonnes under full production levels) will be stored on site at any one time.	Low
Laying out bales and spreading chicken litter/gypsum mix on bales, then breaking and mixing bales and placing mix into bunker.	• Odour emissions during this process are driven by the quality of the inner material in the bales and the chicken litter. If either of these materials has become anaerobic and started to rot, odour emissions can be elevated. • This process occurs every Thursday over the period from 6.30am to about 3pm (approximately 8.5 hours). • This process is considered to be the main cause of complaints on Thursdays.	Moderate
First and second turning of compost in Phase 1 bunkers	• The compost is currently turned twice during Phase 1 on Monday and Friday (4 and 8 days after initial mixing). The process takes about 8 hours, starting at 6.30am (Monday and Friday). • There is potential for odour to occur while the bunkers are open and while the compost is transferred from bunker to bunker in the bucket of a front end loader. • When full of compost, the bunkers are not long enough to accommodate the turning machine and windrow of turned compost that is subsequently formed.	Moderate-High
Transfer of compost from Phase 1 bunkers, mixing and placement into Phase 2 tunnels	• The compost is removed from the Phase 1 bunkers, turned and placed into the Phase 2 tunnels on a Tuesday (12 days after initial mixing). • The method of transferring the compost from Phase 1 to Phase 2 involves unloading the compost from the Phase 1 bunker using a front end loader, forming the compost into a long windrow outside that is turned (with water added) using the moving turning machine, and then placement of the compost into an empty Phase 2 tunnel. • The full process is carried out on Tuesdays only, from 6.30am until about 4.30-5pm (10-11 hours).	High
Phase 2 composting	• Once the compost is loaded into one of the two Phase 2 tunnels, the doors at both ends of the tunnel are sealed. The only means of odour emission is from the portion of recirculated air which is passively vented to atmosphere from a vent on the roof of each tunnel.	Low-Moderate

Emptying of Phase 2 tunnels	• Compost is removed from the Phase 2 tunnels on Tuesdays so that the tunnels can be cleaned ready to receive new Phase 1 compost on the same day. • The compost is relatively mature by this time and is placed directly into a hopper beside the tunnels which conveys the compost into a building for placement into mushroom growing trays.	Low
Stockpiling and removal of spent compost (after use for mushroom cultivation)	• Spent compost is sterilised (to kill mushroom spores) and taken by truck to the compost stockpile area towards the front of the site. This process usually occurs on Friday afternoon to Sunday morning. • Odour emissions are only significant from the stockpile area when large volumes of compost in poor condition are disturbed. This can occur after extended periods of wet weather when removal trucks are unable to access the storage piles.	Low-Moderate
Recycled water drainage/collection	• Drainage water is a consequence of outdoor operations, however runoff areas have been reduced over previous months through the installation of additional drainage channels in the concrete slabs and the removal of outdoor windrows as a consequence of the first turning process occurring within the bunkers. • Use of water within the process is essential to the compost production process so runoff water is stored in a pond for re-use. • Odour emissions from the pond are dependent on the condition of the recycled water. • With the introduction of the new aerated storage pond in August 2015, the recycled water is now retained in aerobic condition which minimises the potential for emission of odours whilst the recycled water is draining on the yard. The decommissioning of the aerated sump is also likely to have removed an odour source.	Low
Recycled water storage pond	• A new recycled water pond was constructed in 2015. Aeration was removed from the initial collection sump with a new high-rate aeration system installed in the new pond. Dissolved oxygen levels are monitored continuously. • The new recycled water pond consistently reports dissolved oxygen levels exceeding 2 mg/L, twice the concentration required by the current resource consent. This is considered sufficient to maintain the recycled water in aerobic condition in the pond.	Low
Biofilter	• The biofilter design has been independently reviewed and found to be fit for current purpose. • The odour from the biofilter was found to be a musty, earthy character typical of biofilters.	Low

The nature of existing traffic generation is outlined in Table 3 of the TDG report provided in **Appendix 2**, which is reproduced in **Table 2** below.

Table 2: Existing Trip Generation

Activity	Vehicle Type	Arrivals	Departures	Total
Supply Delivery & Mushroom Pickup	Light Goods Vehicle	9	9	18
Supply Delivery & Mushroom Pickup	Heavy Goods Vehicle	5	5	10
Seasonal Straw Delivery	Heavy Goods Vehicle	6	6	12
Retail Shop	Light Goods Vehicles	80	80	160
Staff – Mushroom Pickers	Light Goods Vehicles	32	32	64
Staff – All Other	Light Goods Vehicles	23	23	46
	Total	**155**	**155**	**310**

The site is accessed off Brookvale Road by two existing vehicle crossings adjacent to one another. The western driveway provides access to the retail shop and is generally used by customers, staff and other visitors. The eastern driveway provides access to the servicing area alongside and to the rear of the main complex, and as such, is predominately used by delivery vehicles / trucks.

There are two main car parking areas, one for staff on a terrace along the western boundary and one for customers outside the retail shop. The existing staff parking area is reported by TDG to be capable of accommodating up to 70 vehicles, which is in excess of the District Plan requirements. In addition to the access points referred to above, the car parking area on the terrace can also be accessed via an existing vehicle crossing providing access to the HDC pumpshed.

3. DESCRIPTION OF PROPOSAL

The proposal is to increase production from 25 tonnes of mushrooms per week up to 100 tonnes per week. The following changes are anticipated/proposed. Further detail in terms of the proposed odour control measures is provided below:

- Compost production will increase progressively up to 500 tonnes per 7-day period,
- Changes will be introduced to the compost production process and new structures erected as part of progressive upgrades to control odour – these are expanded upon

below, with the associated new buildings (in addition to those associated with RMA20130216) shown on the Plan provided in **Appendix 3**,

- Full time staff per day will increase over time by approximately 43 to just under 100,
- Vehicle movements are anticipated to increase by 102 per day as presented in Table 6 of the TDG report. This represents a 30% increase (approx.) and is mainly comprised of increased staff movements,
- Operations will be managed such that access to the staff car park will be via the internal on-site network rather than direct from Brookvale Road i.e. via the pumpshed vehicle crossing,
- An additional accessible car park will be established outside the shop,
- The two 'side by side' vehicle crossings off Brookvale Road will be formalised into a single vehicle crossing and entrance/accessway upgraded as outlined in the TDG Report,
- Ten bicycle stands will be established,
- Noise sources are described in the Earcon report provided in **Appendix 4,** which generally concludes that noise will remain within the existing characteristics of the operation.

The proposed increase in mushroom production is not expected to increase the level of services currently provided at the farm shop as sales are customer driven rather than production driven.

It has also been confirmed in the TDG report that the existing level of on-site car parking and loading areas are sufficient to accommodate the proposed increases.

Odour Control

From the information derived and shown in Figure 4 and Table 1, the greatest potential odour impact arises from the transfer of compost from the Phase 1 bunkers to the Phase 2 tunnels on a Tuesday, and the first and second turning processes as part of the Phase 1 composting process on a Monday and Friday.

The approach in developing the proposed odour control measures has focused on the following three principles, as determined in Section 5 of the AQP report:

1. Accommodating increased production levels within a management/treatment process,
2. Changing the way activities are carried out so that the potential for odour generation is minimised, including the hedonic tone of any residual odour (i.e. reducing the potential for that odour to be regarded as offensive or objectionable due to its degree of unpleasantness),
3. Where sufficient reduction of odour generation is not possible, focus is on odour capture and treatment at source.

The AQP Report should be read in conjunction with this application report as it contains a full review of local meteorology, complaint patterns and odour sources carried out to inform the development and assessment of the following odour control measures. A helpful summary of the odour control/mitigation measures in relation to each odour source, together with the

proposed upgrades and implementation triggers is provided in **Appendix 5** of this application. Otherwise, refer to the full AQP report in **Appendix 6** of this application.

As outlined above, an application to discharge odour, based on the AQP Report findings, has already been lodged with the Hawkes Bay Regional Council. This application may also be referred to for further detail and the context under which this aspect of the proposal has been developed and assessed in terms of the policy framework of the RMS and Regional Plan.

The first set of upgrades focuses immediate works on those sources of greatest potential impact and are proposed to occur within 8 months of consent being granted. These upgrades allow time to consolidate and operate the site effectively after the initial investment. The second set of upgrades correspond to a greater level of production i.e. generating 200 – 500 tonnes of compost per week. Both sets of upgrades are summarised below:

Within 8 months of granting the HBRC consent:

- Extend the length of existing bunkers by approximately 10m to contain the turning machine and turned compost within the bunker during the bunker to bunker transfer process, and construct a canopy over the extended bunker entrance containing additional air extraction to the existing biofilter to assist capturing odour while doors are open during the process,
- Construct a new building to the west of the Phase 1 bunkers adjacent to the Phase 2 tunnels with a hopper under an extended eave alongside. This building will incorporate loading of the turned compost into the Phase 2 tunnels so that final turning and mixing can be undertaken in a semi enclosed environment - the building will be ventilated to a new biofilter with sufficient design capacity.
- Spent compost will be stored on a concrete pad in the centre of the site - any remaining compost will be removed from the site within 7 days.

Upon increasing to 200 Tonnes of compost per 7-day period:

- Bale spiking/dunking,
- Pre-wetting over an aerated pad draining to the existing sump,
- Bale mixing and breaking using a bale breaker machine,
- Constructing a semi enclosed bale blending line with targeted air extraction.

Figure 5 below illustrates how each part of the compost and mushroom growing activity is to be managed and incorporates the upgrades detailed above, so that the final potential odour levels on the environment are either "low impact" or "low-moderate".

Importantly, the overall approach to developing the compost and mushroom farm is to invest in upgrades to meet the *best practicable option*[1] (or better) by no later than 8 months of consent being granted. This is expanded upon in Section 7 of this report as part of the Assessment of Environmental Effects.

[1] As referred to in the RPS – Refer Section 7.2 below.

New Structures

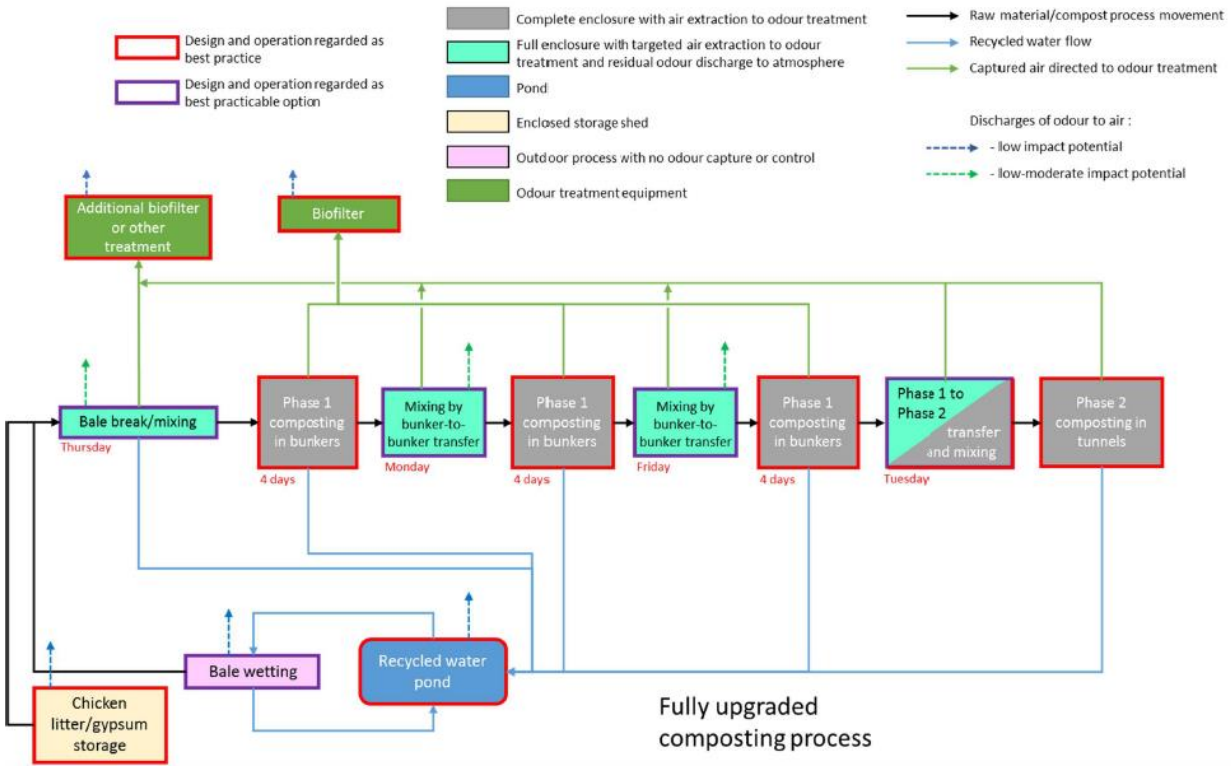
The Plans provided in **Appendix 3** provide conceptual drawings of the upgrades across both timeframes and include:

(1) Bale breaking process proposed to be established alongside the Phase 1 bunkers,
(2) The proposed extensions to the Phase 1 bunkers,
(3) The new 'filling room' to reduce odour derived from transferring the compost from the Phase 1 bunkers to the Phase 2 tunnels.

Figure 5: Activity / process following all Upgrades

Day	Batch 1	Batch 2
Thursday	Pre-Wet	
Friday		
Saturday		
Sunday		
Monday		
Tuesday		
Wednesday	Pre-Wet finished	
Thursday	Bale break, bunker filled	Pre-Wet
Friday		
Saturday		
Sunday		
Monday	Bunker-to-bunker transfer	
Tuesday		
Wednesday		Pre-Wet finished
Thursday		Bale break, bunker filled
Friday	Bunker-to-bunker transfer	
Saturday		
Sunday		
Monday		Bunker-to-bunker transfer
Tuesday	Remove, mix, enter Phase 2	
Wednesday		
Thursday		
Friday		Bunker-to-bunker transfer
Saturday		
Sunday		
Monday		
Tuesday	Remove compost from Phase 2	Remove, mix, enter Phase 2
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		
Monday		
Tuesday		Remove compost from Phase 2

Composting Stage:	
Pre-Wetting	
Phase 1	
Phase 2	



4. STATUTORY CONSIDERATIONS

Section 88 of the RMA allows any person to make a resource consent application, provided it is in the prescribed form and includes, in accordance with Schedule 4, an assessment of environmental effects in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

Schedule 4 of the Act lists those matters that should, and must be included in an assessment of environmental effects, as well those matters that should be considered. These matters are referenced throughout the body of this report confirming that the application meets all the requirements of Section 88.

In accordance with Section 104(1), and when considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2 of the Act, have regard to:

a) Any actual and potential effects on the environment of allowing the activity; and

(ab) Any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and

b) Any relevant provisions of:
   - i) a national environmental standard
   - ii) other regulations
   - iii) a national policy statement
   - iv) a New Zealand coastal policy statement
   - v) a regional policy statement or proposed regional policy statement
   - vi) a plan or proposed plan; and

c) Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

An assessment of the activities actual or potential effects in terms of Section 104(1)(a) is undertaken in Section 7 of this report, the conclusions of which are considered in relation to notification in Section 8. The relevant provisions of the Hastings District Plan in terms of Section 104(1)(b) are considered in Section 9.

Part 2 of the Act contains Sections 5, 6, 7 and 8. Section 5 outlines the purpose of the Act, which is to "*promote the sustainable management of natural and physical resources*", and the meaning of the "sustainable management". Sections 6 and 7 contain "matters of national importance" and "other matters", while Section 8 provides for the principles of the Treaty of Waitangi. Part 2 of the Act is considered in Section 10 of this report where an overall assessment is arrived upon.

5. PLANNING DOCUMENTS

The proposal is subject to the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (**NESCS**) and the City of Napier District Plan.

5.1 National Environmental Standard for Assessing Managing Contaminants in Soil

The "National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (**NESCS**)" applies to the following activities where they are undertaken on land on which an activity or industry included on the "Hazardous Activities or Industries List" (**HAIL**) has been, is or is more likely than not to have been undertaken;

- The removal of underground fuel storage system and associated soil
- Soil sampling
- Soil disturbance
- Subdivision of land
- Change in land use

Of these, the proposal will involve the disturbance of soil as part of the works undertaken to prepare the foundations of the new structures. It is therefore necessary to consider whether or not the land where the structures are proposed to be constructed are pieces of land as outlined in Regulation 5(7) to be covered by the NES. If they are not, then the proposal is not subject to the NES.

The land where new bunkers will be constructed is located within the general footprint of the existing mushroom farm. Neither a mushroom farm nor a composting operation is listed on the HAIL list in Appendix C of the MFE 2012 User's Guide. Furthermore, the operation is not characterised by the use of any of the compounds referred to in Appendix B of the MFE 2012 User's Guide. The mushroom farm operation uses only chicken litter, gypsum and hay bales in the composting process, each of which are stored in dedicated areas and bunkers. The mushroom farm has been in operation since 1967, and therefore occupied the site entirely for a considerable time. No other activities using potential hazardous substances have been operating on the site.

As such, the areas of the new bunkers are not considered to be a piece of land as outlined in Regulation 5(7) to be covered by the NES. The NES for Assessing and Managing Contaminants in Soil to Protect Human Health is therefore not applicable to this proposal.

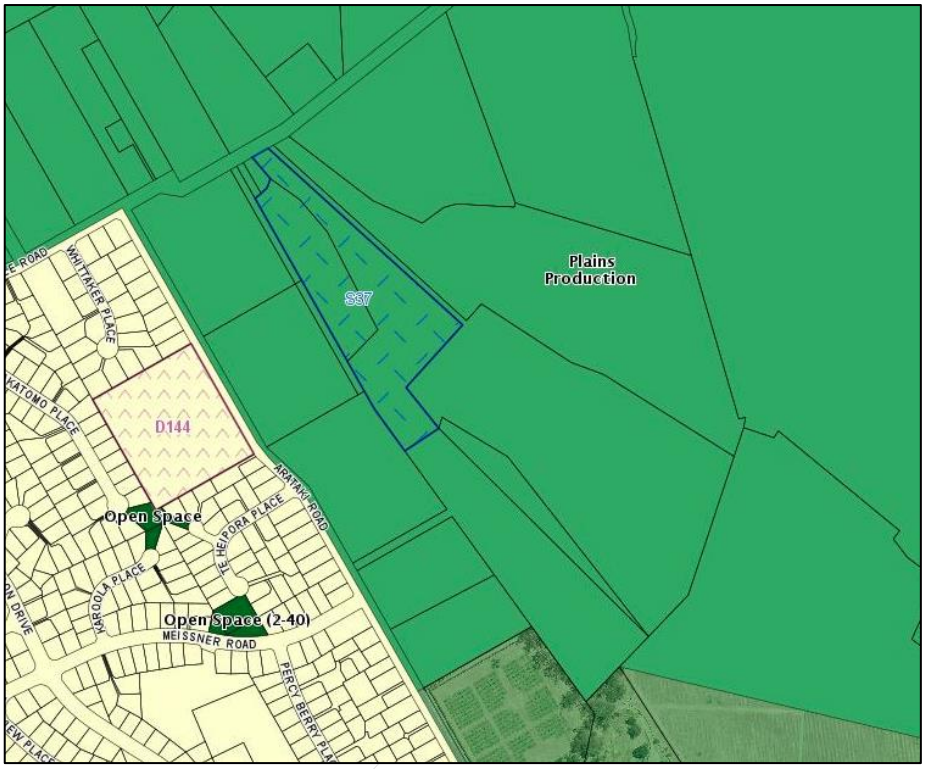
5.2 Hastings District Plan

5.2.1 Activity Status

As outlined above, composting, mushroom growing, and retail sales of mushrooms and compost are classified as a Permitted Activity under Rule PP12 where they are undertaken on Lot 3 DP28543, Lot 2 DP 7771 and part of Lot DP 16311 as shown in **Figure 6** below -

provided they comply with the General Performance Standards and Terms for the Zone and District Wide Activity rules.

Figure 6: Scheduled Sites



It is Councils view however that the proposal will be greater in character, intensity and scale to those upon which the Scheduling of the existing activity was based, and that Rule PP12 does not actually apply. Similarly, it is Councils view that the nature of the proposal is substantially different to the activity granted under RMA20130216.

The result of this is that the proposal is seen to 'start' as a Restricted Discretionary Activity under Rule PP22. It is noted that the proposed Phase 2 tunnel extension would extend onto a lot that is not within the Scheduled Site in any case.

Intensive Rural Production Activities not meeting one or more of the General Performance Standards and Terms in Section 6.2.5 and/or Specific Performance Standard 6.2.6A fall to be assessed as a Discretionary Activity under Rule PP25. The relevant Performance Standards and Terms are considered in **Appendix 7**, where it is determined that the proposal is unable to comply with the following:

- 6.2.5J – Total Building Coverage
  - with the infringement limited to the extension of the Phase 2 tunnels
- 6.2.6A(b) – Yard setbacks applying to the storage, treatment, and utilisation of organic matter

- although the extension of the Phase 2 tunnels will be no closer to the buildings on 108 Arataki Road, they will be within 150m, while the Phase 2 tunnel extension and existing effluent pond will be within 50m of boundaries.

- 6.2.6L – A Schedules Site not complying with the General Performance Standards and Terms for the Zone
  - i.e. 6.2.5J – Total Building Coverage
- 26.1.6A(1)(c) – Widths of Access Ways
  - There will be no pedestrian footpath or cycle lane within the access way

As such, the proposal is to be assessed as a **Discretionary Activity** under Rule PP25.

6. CONSULTATION

In accordance with Schedule 4 of the RMA, an application for resource consent should:

1. Identify the persons affected by the proposal,
2. The consultation undertaken,
3. Any response to the views of any person consulted.

To avoid doubt, while the applicant is not obliged to undertake consultation, nor is there any grounds for expecting the applicant to consult with any person, the applicant is obliged to report on who may be affected by the proposal. This is expanded upon in Section 8.

In terms of (2) and (3), no formal consultation has been undertaken in regard to this landuse proposal, however a pre-hearing meeting with those who have already submitted on the HBRC application to discharge odour is expected to be occur shortly.

7. ASSESSMENT OF ENVIRONMENTAL EFFECTS

It is stated in 6.2.8C of the District Plan that in assessing Resource Consent applications for Intensive Rural Production activities Council will have regard to the following effects and to what extent, and by what means, these are able to be avoided, remedied or mitigated:

(a) The potential for the activity to create unreasonable noise,
(b) The potential for a noxious, offensive or objectionable odour beyond the boundary of the site,
(c) The impact of traffic associated with the activity on the road network,
(d) The impact on the versatile land resource and the class 7 soils of the Roys Hill Winegrowing District,
(e) The potential impact on existing amenity values.

These matters are considered in Sections 7.1 – 7.5 below, together with the Outcomes of the provisions with which the proposal fails to meet.

7.1 Noise

As outlined in the Earcon Report provided in **Appendix 4**, the proposal complies with District Plan limits. Effects in regard to noise can therefore be considered to be less than minor on the environment and on adjoining or adjacent properties.

7.2 Odour

Odour requires consideration in terms of the Assessment Criteria in 6.2.8C and the Outcome associated with 6.2.6A(b) pertaining to setback distances as follows:

> Outcome
> Neighbouring activities will not be adversely affected by odour associated with the storage, treatment or utilisation of organic matter and effluent from the Intensive Rural Production Activity.

The proposed odour control measures have been outlined above. Further detail is provided in the AQP report provided in **Appendix 6,** while a full assessment of the potential odour impact arising from the proposal against the context of the Regional Policy Statement and Regional Plan is provided in the Resource Consent Application currently lodged with the Hawkes Bay Regional Council (HBRC). It is anticipated that the outcome of the HBRC's consent process will guide the District Councils assessment of odour. The following summary (of that assessment) is nevertheless provided below to meet the requirements for this application process. In terms of the setback infringements associated with the Phase 2 tunnel extension and existing effluent pond, we note that both these sources have a low/low-moderate potential odour impact rating.

Key findings in terms of the context set by the Regional Policy Statement and Regional Plan include:

(1) Objectives 17 and 18 of the RPS seek the 'extent' of nuisance effects to be remedied or mitigated,
(2) The 'bar' in the RPS for existing activities and the expansion of existing activities to meet is the *'best practicable option',*
(3) The Policy framework recognises that conflict between incompatible land uses has generally arisen as a result of past land use planning decisions, and that as a result there is a need for a collaborative approach to prevent and resolve problems moving forward,
(4) Implementation of Guideline 1 in Policy 69 does not anticipate the prevention of odour beyond the boundary outright, rather the avoidance of *offensive or objectionable* odour – applying a *best practical option,*

The HBRC application narrows the assessment of actual and potential effects down to 5 fundamental questions, or areas as follows and considered below:

1) What are the effects during the progressive upgrades?
2) Will the upgrades work?
3) Can the upgrades be done more quickly?
4) What's the effect of increased compost production levels?

5) How do the progressive upgrades compare with the requirements of the existing consent?

What are the Effects during the Progressive Upgrades?

The assessment in the HBRC application considered the effects of the proposal during:

- The first 8 months while the first round of upgrades is undertaken,
- The period commencing 8 months after the granting of consent until increasing production to 200 tonnes of compost per 7 days,
- The period following the increase in production to 200 tonnes and thereafter.

These assessments are summarised below.

The following upgrades are proposed to be undertaken within 8 months of granting the HBRC consent:

- Extend the length of existing bunkers by approximately 10m to contain the turning machine and turned compost within the bunker during the bunker to bunker transfer process, and construct a canopy over the extended bunker entrance containing additional air extraction to the existing biofilter to assist capturing odour while doors are open during the process,
- Construct a new building to the west of the Phase 1 bunkers adjacent to the Phase 2 tunnels with a hopper under an extended eave alongside. This building will incorporate loading of the turned compost into the Phase 2 tunnels so that final turning and mixing can be undertaken in a semi enclosed environment - the building will be ventilated to a new biofilter with sufficient design capacity.
- Spent compost will be stored on a concrete pad in the centre of the site - any remaining compost will be removed from the site within 7 days.

With these upgrades completed:

- The *best practicable option* bar (or better i.e. best practice) will be met across all aspects of the process with the exception of those processes associated with bale wetting, breaking and mixing,
- The potential for odour to impact sensitive receptors will overall be 'low' to 'low-moderate', with only the bale breaking and mixing processes presenting a 'moderate' risk on a Thursday - representing a considerable reduction in the extent of nuisance effects in terms of Objectives 17 and 18 of the RPS,
- The *best practicable option* bar (or better i.e. best practice) can be met across all process days with the exception of Thursdays – here we note that Thursdays, during which the bale wetting, breaking and mixing processes will be carried out, have attracted the lowest number of complaints (refer Table 7 of the AQP Report) – confirming the sources of greatest potential impact have been the first to be focused on and reduced.

A comparison of the potential odour impact and practice rating compared the existing operation is outlined in **Table 3** below. Although the operation will continue as it currently does while the first round of upgrades is being undertaken, a lead-in time is required, and the 'higher' potential risk and associated actual or potential effects will only occur for a limited

and somewhat short duration in the context of the term of the odour permit. This lead in period is expanded upon below. It was also noted in that that AEE that the outcomes by this time will exceed those envisaged under the existing discharge permit - DP100128A.

Table 3: Outcome Analysis following upgrades due 8 months following the grant of THE HBRC consent

Odour Source		**Potential Impact Rating** (taking into account the time of day when the activity is actually carried out)						
	Stage	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Bale wetting	Current	GP	GP	GP	GP	GP	GP	GP
	After 8 months	GP	GP	GP	GP	GP	GP	GP
Chicken litter/gypsum storage and handling	Current	BP	BP	BP	BP	BP	BP	BP
	After 8 months	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**
Chicken litter/gypsum mixing	Current							
	After 8 months							
Laying out bales/breaking/ mixing/placing into bunker	Current				GP			
	After 8 months				**GP**			
First and second turning of compost in Phase 1 bunkers	Current	GP				GP		
	After 8 months	**BPO**				**BPO**		
Transfer of compost from Phase 1 to Phase 2	Current		GP					
	After 8 months		**BPO/BP**					
Phase 2 composting	Current	BPO	BPO	BPO	BPO	BPO	BPO	BPO
	After 8 months	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**
Emptying of Phase 2 tunnels	Current		BP					
	After 8 months		**BP**					
Recycled water drainage / collection	Current	BP	BP	BP	BP	BP	BP	BP
	After 8 months	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**
Recycled water storage pond	Current	BP	BP	BP	BP	BP	BP	BP
	After 8 months	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**

Potential for adverse odour impacts at sensitive receptors

Not active	Low	Low-Moderate	Moderate	Moderate – High	High

Practice Rating

Good Practice	GP
Best Practicable Option	BPO
Best Practice	BP

Having already implemented the above upgrades, the following upgrades are proposed to be undertaken upon increasing production to 200 tonnes per 7 days:

- Bale spiking,
- Pre-wetting over an aerated pad draining to the existing sump,
- Bale mixing and breaking using a bale breaker machine,

- Constructing a semi enclosed bale blending line with targeted air extraction.

These upgrades combined with those above will go on to accommodate progressive increases in production through to the maximum volume authorised by the consent (500 tonnes). A third bunker will also be constructed within the Phase 1 composting process to maintain the *best practicable option* in regard to this process. A comparison of the potential odour impact and practice rating compared prior to increasing production to 200 tonnes per 7 days is outlined in **Table 4** below.

As illustrated, these final upgrades will see all components of the operation meeting the *best practicable option* bar, with only 'low' to 'low-moderate' potential for odour to arise across the boundary.

Table 4: Outcome Analysis upon increasing production beyond 200 tonnes per 7 days.

Odour Source		Potential Impact Rating (taking into account the time of day when the activity is actually carried out)						
	Stage	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Bale wetting	Current	GP	GP	GP	GP	GP	GP	GP
	After 8 months	GP	GP	GP	GP	GP	GP	GP
	Final	**BPO**	**BPO**	**BPO**	**BPO**	**BPO**	**BPO**	**BPO**
Chicken litter/gypsum storage and handling	Current	BP	BP	BP	BP	BP	BP	BP
	After 8 months	BP	BP	BP	BP	BP	BP	BP
	Final	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**
Chicken litter/gypsum mixing	Current							
	After 8 months							
	Final							
Laying out bales/breaking/ mixing/placing into bunker	Current				GP			
	After 8 months				GP			
	Final				**BPO**			
First and second turning of compost in Phase 1 bunkers	Current	GP				GP		
	After 8 months	BPO				BPO		
	Final	**BPO**				**BPO**		
Transfer of compost from Phase 1 to Phase 2	Current		GP					
	After 8 months		BPO/BP					
	Final		**BPO/BP**					
Phase 2 composting	Current	BPO	BPO	BPO	BPO	BPO	BPO	BPO
	After 8 months	BP	BP	BP	BP	BP	BP	BP
	Final	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**
Emptying of Phase 2 tunnels	Current		BP					
	After 8 months		BP					
	Final		**BP**					
Recycled water drainage / collection	Current	BP	BP	BP	BP	BP	BP	BP
	After 8 months	BP	BP	BP	BP	BP	BP	BP
	Final	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**
Recycled water storage pond	Current	BP	BP	BP	BP	BP	BP	BP
	After 8 months	BP	BP	BP	BP	BP	BP	BP
	Final	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**	**BP**

Potential for adverse odour impacts at sensitive receptors

Not active	Low	Low-Moderate	Moderate	Moderate – High	High

Practice Rating

Good Practice	GP
Best Practicable Option	BPO
Best Practice	BP

The following was provided in regard to the remaining areas of the AEE:

Will the upgrades work?

One of the key aspects of the approach is that all sources of odour with a 'moderate' or greater potential impact will involve capture and treatment 'at source' via biofilters. Although detailed design has not been undertaken at this stage, it is anticipated that a condition will be imposed requiring new/increased biofilters to be designed by a suitably qualified expert once all design criteria is established. Biofilter treatment is a proven mitigation tool and is accepted as standard industry practice.

The proposed upgrades have been assessed by AQP in terms of meeting the best practicable option bar, and having undertaken a full review of odour sources, local meteorology and complaint patterns in respect to the sensitivity of the receiving environment, a considerable reduction in potential odour impact has been confirmed.

Can the upgrades be done more quickly?

As outlined above, investments have already been made in an array of process refinements, site works and statutory approvals to reduce odour and establish a 'platform' for further odour control measures to the implemented. These have involved:

- *Having the chicken litter and gypsum delivered to the site as one substrate - costs to facilitate this process will be $24,000 - $40,000 per annum,*
- *Installing a larger effluent storage and treatment pond at a cost of approximately $100,000,*
- *Refining Phase 1 processes to avoid any potential odour generation activities occurring on a Wednesday – at an ongoing cost of approximately $50,000 per annum,*
- *Obtaining further resource consents (in advance) to facilitate various aspects of further upgrades i.e. stormwater management.*

Moving forward, an array of further works are proposed as part of the first round of upgrades, which will reduce the potential odour impact arising from the Phase 1 turning and transfer processes from 'high' to 'low' to 'low-moderate', representing a considerable reduction in the extent of nuisance effects in terms of Objectives 17 and 18 of the RPS. These works will require detailed design of structures and biofilters, as well as Building Consent and fabrication before construction can even commence. Minor variations to RMA20130216 (land use consent for buildings) and DP140244W (discharge of stormwater from hardstand and buildings) maybe required. This would involve providing for a minor re-configuration of buildings rather than increasing site coverage or runoff however. As such, it is not considered necessary for these applications to be lodged in terms of Section 91 of the RMA to better understand the effects of the air discharge.

The proposed 8 month period allows 2 months for detailed design, 2 months for statutory approvals and 4 months for fabrication and construction. Although under ideal scenarios the works will be completed quicker, we believe the proposed 8 month period presents a reasonable timeframe for completion taking relevant timeframes into account.

We are advised that these upgrades are expected to cost $750,000-$850,000 [recent pricing now indicates $1.1-1.2M]. *While income from increased production beyond the current limit of 120 tonnes of compost per 7 day period will assist to finance this investment, it is not until further increases in production to beyond 200 tonnes per 7 day period that the next round of upgrades will be required or affordable, which are expected to be in order of $1.8-1.9M* [recent pricing now indicates $2.6-3M].

Indeed, the upgrades to the bale wetting and mixing processes together with the construction of the 3rd bunker are largely required to accommodate the increased production levels within the 'timeframe footprint' of the current processes. This combined with the additional treatment at source will go on to mitigate the effects of increased production and further reduce odour arising from the broader operation.

Overall, the approach around the proposed upgrades can be considered reasonable taking design timeframes, statutory approval processes, effects and financial implications into account.

What's the effect of increased compost production levels?

The proposed upgrades have been devised and potential odour impact ratings determined taking the increased production levels into account. Key points include:

- *Increased raw materials will be stored in the same manner as is currently the case – being the best practice and producing a low potential odour impact,*
- *Upgrades to the bale wetting and mixing processes at the time of increasing beyond 200 tonnes of compost per week will enable this process to be undertaken within the same duration as it is currently but involving less odour emissions,*
- *Once extended, the existing Phase 1 bunkers will have sufficient capacity to process up to 200 tonnes of compost per 7 day period, after which the new third bunker will be constructed to accommodate the additional compost (biofilters will be upgraded/constructed as required subject to conditions),*
- *Although there will be a greater volume of compost to transfer between the Phase 1 bunkers and Phase 2 tunnels, processes will be largely enclosed enabling the odour to be captured and treated at source, thereby avoiding any significant change in potential odour impact despite the increase in volume.*

Overall, increased production levels will enable the proposed upgrades to be implemented, and will enable the operation together with its contribution to the economic and social wellbeing of the community to sustain itself without increasing the potential odour impact. Without increased production the operation will not be viable under the type of odour control measures required to manage the reverse sensitivity effect it now confronts.

How do the progressive upgrades compare with the requirements of the existing consent?

The key upgrades required under DP100128A are outlined in Conditions (9), (11), (12) and (13) as follows:

9. *By 1 March 2012 all chicken litter, gypsum, and chicken litter/gypsum mix shall be stored in three-sided and roofed bunkers that are enclosed with soft door flaps.*

11. *By 1 December 2012 the consent holder shall ensure that the aeration of wastewater is sufficient to maintain dissolved oxygen (DO) concentrations at no less than 1.0 mg/L at all times.*

12. *By 1 March 2015 the consent holder shall ensure that all Phase 1 composting and turning as defined in Condition 3(b), and 3(c), is undertaken in a fully enclosed building, or buildings, that is/are ventilated to a biofilter with sufficient design capacity.*

    Note: The physical emptying and loading of the Phase 1 bunkers during the Phase 1 turning processes will involve compost being transferred from one bunker to another via a front-end loader operating in an outdoor environment; with one door of each bunker being open at any one time to facilitate this process.

13. *By 1 March 2017 the consent holder shall ensure that all Phase 1 turning, as defined in Condition 3(d), is undertaken in a fully enclosed building, or buildings, that is/are ventilated to a biofilter with sufficient design capacity.*

    Note: The physical emptying of the bunker containing the compost and the loading of the bunker containing the turning machine will involve compost being transferred from one bunker to another via a front-end loader operating in an outdoor environment; with one door of each bunker being open at any one time to facilitate this process.

    Note: The transfer of compost from the Phase 1 bunker containing the turning machine to the Phase 2 bunker will involve compost being transferred from one bunker to another via a front-end loader operating in an outdoor environment; with one door of each bunker being open at any one time to facilitate this process.

Conditions (9) and (11) [and 12 are considered to have been met] ~~*have already been met, and the outcome associated with Condition (12) will be met within 8 months of the consent being granted, with improved outcomes being achieved by the extended canopies to assist in capturing odour while the doors of the bunker are open as part of the process.*~~

Condition (13) through its reference to Condition 3(d) requires the final turning of the compost to be undertaken in a fully enclosed building (or buildings) that is ventilated to a biofilter by 1 March 2017. This will be achieved within 8 months of granting the consent, with improved outcomes being achieved in relation to filling of the Phase 2 tunnels as well.

In summary, the outcomes envisaged under DP100128A in relation to the first and second turning processes will be realised, if not exceeded, albeit slightly later. This proposal also has the added value of introducing additional odour control to that required under DP100128A in relation to broader processes, in particular:

- *Bale spiking*[/dunking],
- *Pre-wetting over an aerated pad draining to the existing sump,*
- *Bale mixing and breaking using a bale breaker machine,*
- *Establishing a semi enclosed bale blending line with targeted air extraction,*

- *Constructing a canopy over the Phase 1 Bunker entrances containing additional air extraction to the existing biofilter to assist capturing odour while doors are open during the process,*
- *Constructing a new filling room to accommodate final turning and mixing and loading into the Phase 2 tunnels,*
- *Ducting the Phase 2 tunnel vents to a biofilter,*
- *Improving the management of spent compost.*

Despite the proposed increase in compost production, the proposed outcome is considered superior to the outcome currently provided for under DP100128A.

Having taken the above matters into account, the following findings were arrived upon:

- There will be a consideration reduction in the extent of odour effects within 8 months of consent [HBRC] being granted as a result of the proposed upgrades, with the *best practicable option* bar (or better or better i.e. best practice) being met for odour sources with the greatest potential impact,
- The odour profile across the processes involved in the operation upon the upgrades associated with increasing production levels to 200 tonnes per 7-day period will be characterised by 'low' and 'low-moderate' potential odour impacts. This represents a considerable reduction in the extent of nuisance effects in terms of Objectives 17 and 18 of the RPS. The *best practicable option* bar (or better i.e. best practice) will be met across all processes,
- One of the key aspects of the approach is that all sources of odour with a 'moderate' or greater potential impact will involve capture and treatment 'at source' via biofilters. Biofilter treatment is a proven mitigation tool and is accepted as standard industry practice,
- The initial 8 month lead in time is reasonable, taking time for detailed design, statutory approvals, fabrication and construction into account,
- Without increased production the operation will not be viable under the type of odour control measures required to manage the reverse sensitivity effect it now confronts. Nevertheless, the proposed upgrades have been devised and potential odour impact ratings determined taking these increased production levels into account,
- Despite the proposed increase in compost production, the proposed outcome is considered superior to the outcome currently provided for under DP100128A,
- The proposed upgrades will result in a consideration reduction in the extent of nuisance effects in terms of Objectives 17 and 18 of the RPS,
- The approach towards this reduction represents a collaborative approach as provided for under Policy 5 of the RPS,
- The approach embodied in this proposal will enable the general thrust of Policy UD12(I) of the RPS - that reverse sensitivity effects should be avoided, remedied or mitigated when/at the time of dealing with urban growth, to still be achieved.

7.3 Traffic

Effects arising from Traffic have been considered by TDG and are reported on the Transportation Assessment provided **Appendix 2.** In summary:

- The existing road network is described,
- A traffic survey was conducted to establish existing traffic flows,
- A total of four collisions have been recorded in the vicinity of the site since 2013. Of these, only one resulted in an injury which was categorised as minor,
- From the analysis of crash data undertaken, is stated that there is nothing to suggest that there are any existing safety concerns that would be exacerbated in respect of the current proposal and to subsequently require attention,
- There will be sufficient on-site car parking for staff and customers,
- Loading can be provided in accordance with the District Plan,
- Average vehicle movements per day are likely to increase by 102 with 51 vehicles entering and 51 vehicles exiting the site throughout the day,
- It is stated that this level of increase is not considered significant and that it will not impact upon the operational safety and / or the capacity of the local road network,
- The two 'side by side' vehicle crossings off Brookvale Road will be formalised into a single vehicle crossing and entrance/accessway upgraded,
- It is recommended that staff access the car parking area via the internal road network rather than direct from Brookvale Road (via the pumpshed vehicle crossing),
- It is not necessary to seal the internal access network/car parking areas,
- No pedestrian footpaths or cycle lanes are required within the access way,
- No intersection improvements or other road network upgrades are required.

On this basis, effects in relation to traffic can be considered to be less than minor on the local road network, and no persons considered adversely affected.

7.4 Soils Resource

As outlined above, the Plains Production Zone comprises much of the Heretaunga Plains, which is acknowledged to contain some of the most fertile soils in New Zealand, and the continued and sustainable economic utilisation of the Zone by current and future generations is a key component of Council's strategy. This is reflected in the following outcomes of 6.2.5J pertaining to Total Building Coverage, which the proposal fails to meet:

> *Outcome*
> *The life-supporting capacity of the Plains soil resource will be safeguarded and the amenity of the Plains Production Zone will be protected by limiting the total scale of buildings on and sealed areas over smaller sites.*
>
> *The potential negative environmental effects associated with the increase in stormwater runoff created by the development activity will be avoided, remedied or mitigated.*

Managing the Plains soil resource is a balancing act; however these matters have already been taken into account Scheduling the site for the very activity proposed, and as part of RMA20130216, which authorized the construction of a number of buildings on the site.

Overall, and despite the minor building coverage infringements, the proposal falls within what has been deemed acceptable in relation to the Plains soil resource as established by the allowable effects of the Scheduled Site process and RMA20130216. Furthermore, the actual building extensions are limited to an extension of the Phase 2 tunnels only. Effects on the Plains Soil resource can therefore be considered to be less than minor.

7.5 Amenity Values

In terms of the Assessment Criteria in 6.2.8C, it is the effects of the proposal on 'existing' amenity values that are to be taken into account.

'Amenity values' are defined in the RMA as:

> *"Meaning those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes"*

On the basis that the activity is in principal anticipated and provided for on the site as a Permitted Activity, that effects in relation to noise and traffic will be less than minor, and that there will be a considerable reduction in the extent of nuisance effects, the potential impact on existing amenity values, as referred to in 6.2.8C, will be progressively reduced to improve such existing amenity values.

7.6 Summary

This assessment has demonstrated that the effects of the proposal on the soil resource and in relation to noise and traffic will be less than minor, and that it is in relation to odour where there is the greatest area of potential effect.

Owing to the Regional Council having functions for the discharge of odour, the outcome of the Regional Council Discharge Permit application will be influential in deciding upon this application. This was the reason why that application was made first. This application has been notified and is currently in process.

8. NOTIFICATION

There is no presumption in the RMA itself as to whether or not an application will be notified, and a consent authority has discretion in determining whether or not notification is necessary. This assessment is primarily governed by Section 95A and 95B of the RMA. Here we note:

- Effects on the soil resource and in relation to noise and traffic will be less than minor,

- The activity is in principal anticipated and provided for on the site as a Permitted Activity,
- Potential impacts on existing amenity values will be progressively reduced to improve existing amenity values.

On this basis, it is only in relation to odour where notification may be justified. This is the sole focus of the HBRC application, which has already been notified, thus the Council will need to determine whether further notification on the same matter is required.

9. RELEVANT OBJECTIVES AND POLICIES

In accordance with Section 104(1)(b) of the RMA, a consent authority must, subject to Part 2 of the RMA, have regard to the relevant provisions of any statutory plans and policy statements. This includes any relevant provisions of:

i) National Environmental Standards (**NES**)
ii) Other regulations
iii) National Policy Statements
iv) The New Zealand Coastal Policy Statement (**NZCPS**)
v) Regional Policy Statements or proposed Regional Policy Statements (**RPS**)
vi) A Plan or Proposed Plan

In terms of the District Plan, the provisions relating to the Plains Production Zone in which the site is located are outlined in Section 6.2.3 of the Plan. Objective PPO1 seeks to ensure that the versatile land across the Plains Production Zone is not fragmented or compromised by building and development. This is supported by a number of Policies, of which Policies PPP3 and PPP4 are relevant. These state:

> **Policy PPP3**
> Limit the number and scale of buildings (other than those covered by Policy PPP4) impacting on the versatile soils of the District.
>
> **Policy PPP4**
> To enable land based primary production, including by providing for directly associated accessory buildings where they are not of such a scale as to adversely affect the life-supporting capacity of the versatile land resource and which are consistent with the rural character of the Zone.

As outlined above, the site has already been scheduled for the activity proposed and effects on the soil resource have been demonstrated to be less than minor taking the existing operation into account and also in terms of how the District Plan applies to this particular site.

Objective PPO2 is to provide for flexibility in options for the use of versatile land. This has been achieved by Scheduling the site and the proposal can be considered consistent with this approach and the limits established in the Plan in this regard.

Objective PPO3 is to retain the rural character and amenity values of the Plains Production Zone. This is supported by Policies PPP13-PPP15 as outlined below:

> **Policy PPP13**
> Require that any new development or activity is consistent with the open and low scale nature that comprises the rural character and amenity of the Plains Production Zone.
>
> **Policy PPP14**
> Require that any new activity locating within the Plains Production Zone shall have a level of adverse effects on existing lawfully established land uses that are no more than minor.
>
> **Policy PPP15**
> Noise levels for activities should not be inconsistent with the character and amenity of the Plains Production Zone.

The actual expansion works are minor in terms of built structures and are unlikely to result in any significant increase compared the existing in regard to PPP13. Noise levels have also been determined to comply with District Plan limits in terms of PPP15.

Although upgrades to reduce odour will take to time to implement, the proposal has been developed to meet the outcomes sought by Policy PPP14.

Objective PPO4 seeks to enable the operation of activities relying on the productivity of the soil without limitation as a result of reverse sensitivities. In support, Policy PPP16 states that any activity locating within the Plains Production Zone will need to accept existing amenity levels and the accepted management practices for land based primary production activities.

In some respects, these provisions are not overly applicable to this proposal, as they apply primarily to production activities relying on soil and to other activities establishing in the Plains Zone as opposed to other adjoining Zones. The provisions in the RPS pertaining to reverse sensitivity are therefore considered to be provide the best guidance in terms of this matter. As outlined above, key findings of the RPS as it applies to conflicting landuses and odour have been considered in developing the odour control approaches and setting the context of the assessment of environmental effects, and the proposal is considered to be consistent with this approach.

Objectives PPO5, PPO6 and PPO7 relate wineries, regional transport infrastructure and the integrated management of land and water resources and are not overly applicable.

Objective PPO8 goes onto 'recognise and provide as scheduled activities, land uses that are long established on a site, or previously zoned industrial sites, that have a proven economic benefit to the community'. Although the proposal is not considered by Council to fall completely within the Permitted Activity falling out of this Policy, the activity is consistent with the scheduled use allocated to the site and seeking to continue operations on this site is consistent with the Plan.

Finally, Objective PPO9 and Policy PPP22 relate to the Heretaunga Plains Unconfined Aquifer identified in Appendix 59. The site is not located within this area.

Overall, the proposed activity is consistent with the sites scheduled purpose, and on the basis of the proposed mitigation in relation to odour improving existing amenity values, the proposal can be considered to be consistent with the direction of the policy framework.

10. PART 2 OF THE RESOURCE MANAGEMENT ACT 1991

The assessments contained in Sections 7 and 9 of this report are subject to the matters contained in Part 2 of the RMA, which contains sections 5, 6, 7 and 8.

Section 5 sets out the purpose of the RMA, which is to promote the sustainable management of natural and physical resources and is supported by sections 6, 7 and 8. Sections 6 and 7 contain the "matters of national importance" and "other matters" and section 8 provides for the principles of the Treaty of Waitangi. These sections are hierarchical and provide for a different level of consideration to be given to each.

In terms of Section 6(a), the site is not located within an outstanding natural feature or landscape, significant amenity landscape or rural and coastal landscape character area identified in the District Plan, and although there are various landscape values beyond, the actual expansion works are minor and unlikely to result in any significant increase compared the existing in this regard. Similar views can be applied to Section 6(b) and (c). Likewise, access along rivers as provided for in Section 6(d) is not a relevant matter in this particular case.

There are no heritage values that maybe compromised in terms of Section 6(f), nor will the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga be threatened as a result of the activity. Similarly there are no Section 7(a), 7(aa) or 8 matters.

In terms of Section 7(b), being the efficient use and development of natural and physical resources, the proposal represents the on-going use of a highly valuable physical resource in a manner where it has responded to its surrounds, and having been guided by the Regional Policy framework, struck a balance with Sections 7(c) and 7(f), being the maintenance and enhancement of amenity values and the quality of the environment.

In this sense, the economic value and contribution of the activity to the District and Region, particularly the wellbeing of employees, has been considered and balanced against the extent and rate of odour reduction, which has been demonstrated to be consistent with the methods and outcomes sought in the Regional Policy framework.

In addition to national and international clients, Te Mata Mushrooms is also valued and supported by a large local wholesale and direct sales cliental that frequently visits the site and relies on the operation to purchase a high-quality product. Retaining such operations and enabling the utility derived from such opportunities is valued by the broader community

also and can establish a sense of identify around locally produced foods. These values manifest themselves in positive social effects, which must also be weighed and considered in regard to the scale of any adverse social and environmental effects, as have been considered throughout the body of this report.

Having considered all these matters, and in light of the meaning of sustainable management, the proposal, represents an approach and final outcome that can be considered consistent with the principles and purpose of Part 2 of the RMA and deserving of consent.

11. CONCLUSION

The proposal is to expand an existing composing and mushroom growing operation. Although the activity occurs on a site scheduled for the very purpose proposed, and is therefore provided for and anticipated, the rule/condition framework still results in a Discretionary resource consent being required, albeit for relatively minor infringements in terms of the building coverage and yard setback distances.

Development and assessment of the application has been informed by expert traffic, acoustic and odour input, and it is only in relation to the discharge of odour where there is a potential effect. Considerable process changes, upgrades and investment are proposed see to all components of the operation meeting the *best practicable option* bar, with only 'low' to 'low-moderate' potential for odour to arise across the boundary.

Discharges of odour are regulated by the Hawkes Bay Regional Council, and an application for resource consent to this effect has already been made and publicly notified. The outcome of the Regional Council Discharge Permit application will be influential in deciding upon this application.

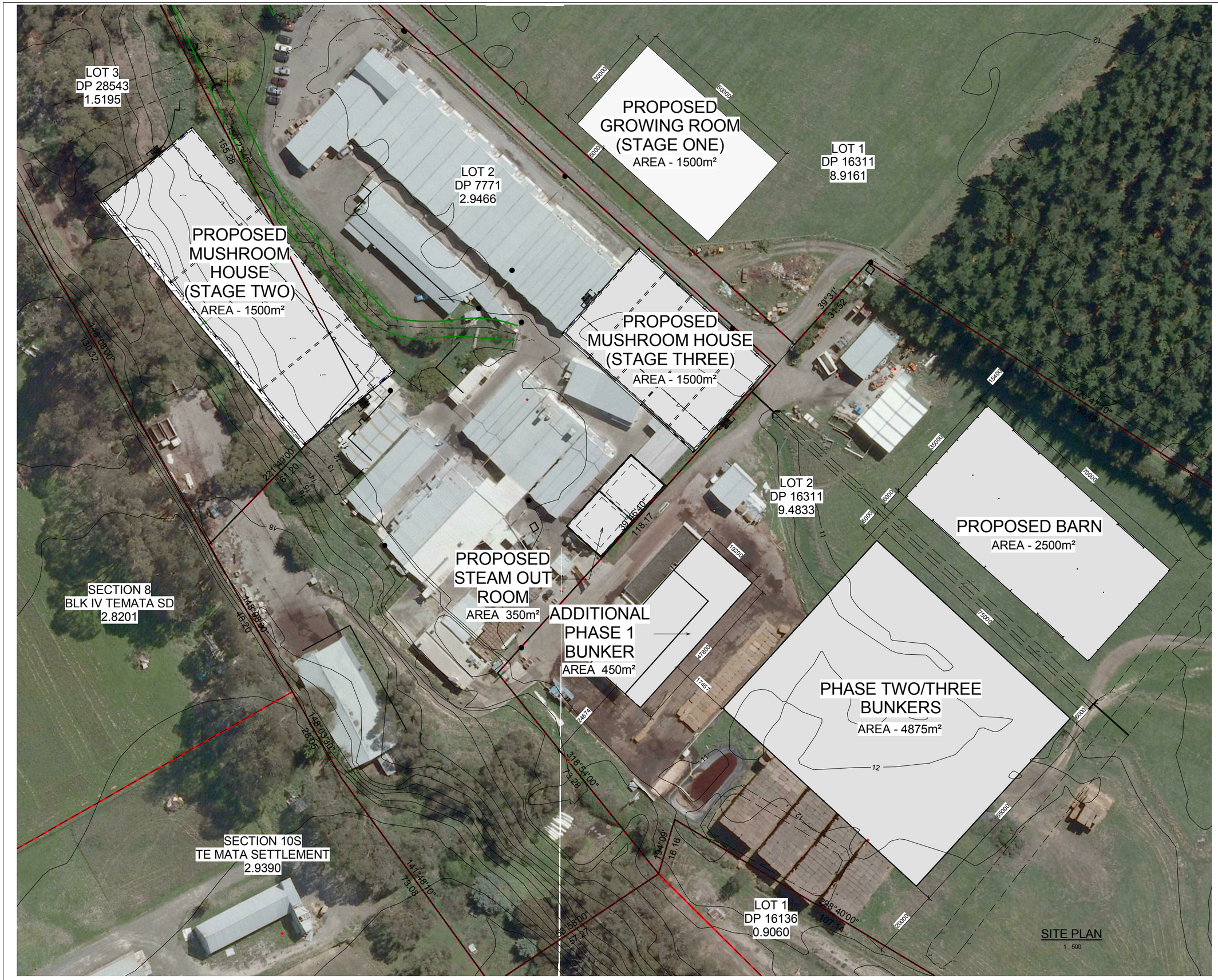
The Hastings District Council will need to determine whether further notification on the same matter is required.

Overall, the proposal will not be contrary to the relevant Objectives and Policies of the District Plan, and taking all matters into account, can be considered consistent with Part 2 of the RMA.

Appendix 1

Existing Site and Approved Plan under RMA20130216


ARATAKI



SITE PLAN
1 : 500

Revision	Reason For Issue	Date	By
2	ISSUED FOR INFORMATION	02.08.2013	DR
1	ISSUED FOR INFORMATION	31.07.2013	AM

THE CONTRACTOR IS TO BE AWARE OF ALL INSPECTIONS TO BE MADE BY THE ENGINEER AS A REQUIREMENT OF THE PRODUCER STATEMENT PS4 CONSTRUCTION REVIEW DOCUMENTATION, THE ENGINEER WILL REQUIRE 24 HOURS PRIOR NOTIFICATION WHEN ALL STRUCTURAL ELEMENTS ARE READY TO BE INSPECTED.

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Structural Fire Geotechnical Civil Strategic Planning

Client

TE MATA MUSHROOM COMPANY

Project

TE MATA MUSHROOM FARM
174 BROOKVALE ROAD
HAVELOCK NORTH

Title

SITE PLAN

Designed	RN	A1 Scale	1 : 500
Drawn	AM		
Checked	RN	A3 Scale	1 : 500
Date	JULY 2013		

Project No.	Sheet	Revision
J3114	C002	2

Appendix 2

Traffic Assessment

Te Mata Mushroom Company

Increase in Production (25t-100t per week)

Transportation Assessment

April 2018

TDG Ref: 14910 180426 te mata mushrooms ta final.docx

Te Mata Mushroom Company

Increase in Production (25t-100t per week)

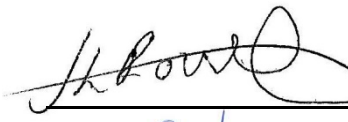
Transportation Assessment

Quality Assurance Statement

Prepared by:

Jamie Rowe

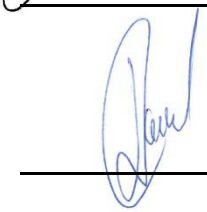
Project Transportation Engineer



Reviewed by:

Cobus de Kock

Associate



Approved for Issue by:

Glen Randall

Principal Transportation Engineer

Status: Final report

Date: 26 April 2018

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Table of Contents

1. Introduction

Traffic Design Group (TDG) has been commissioned by Te Mata Mushrooms Company Ltd to examine and describe the transportation requirements and subsequent impacts associated with the intensification of the sites current mushroom production operations at 174 Brookvale Road, Havelock North.

The Te Mata Mushroom Company ("TMM") is currently operational on the site whose operations include the growing of mushrooms, packaging and distribution together with other associated activities such as composting and retail sales.

The development proposal intends to intensify current production from 25 tonnes of mushrooms a week to between 50-100 tonnes a week. Accordingly, the TMM require an investigation with regards to the impact these operations will have on traffic generation and its impact on the local road network.

This Transportation Assessment Report (TAR) therefore provides an assessment on the condition of the existing roads that are expected to provide vehicle, and also potentially pedestrian, access to and from the site and the extent to which these roads will be able to safely support the development proposals.

For the purposes of this TAR, and to provide the most robust assessment possible, the maximum increase to 100 tonnes per week has been assumed to illustrate the 'worst-case' scenario. Therefore, any increase in production below this 100-tonne maximum will only result in a lesser impact upon the local and strategic road network from an operational safety and capacity perspective to that which has been assessed within this TAR.

This TAR has been prepared to form part of the resource consent application for the intensification of production at the site as outlined above and has been progressed with due regard to the policies and standards contained within the Hastings District Plan[1] (HDP) involving access, sightlines and parking.

[1] 2003 Operative District Plan

2. Site Location

The site is located on the outskirts of Havelock North and generally surrounded by farmlands to the north, and residential housing to the south. The mushroom growing activities are limited to several buildings / warehouses, which are surrounded by vacant farmland. The extent of the site is vast, comprising four land parcels collectively equating to some 22.9ha in size.

The site is located within the 'Plains Production' zone as defined by the HDP as shown in **Figure 1**, which also shows the site's location within a regional context. Access to the site is via a priority-controlled access, located along Brookvale Road some 215m to the east of Arataki Road**. Figure 2** shows site location within a local context.

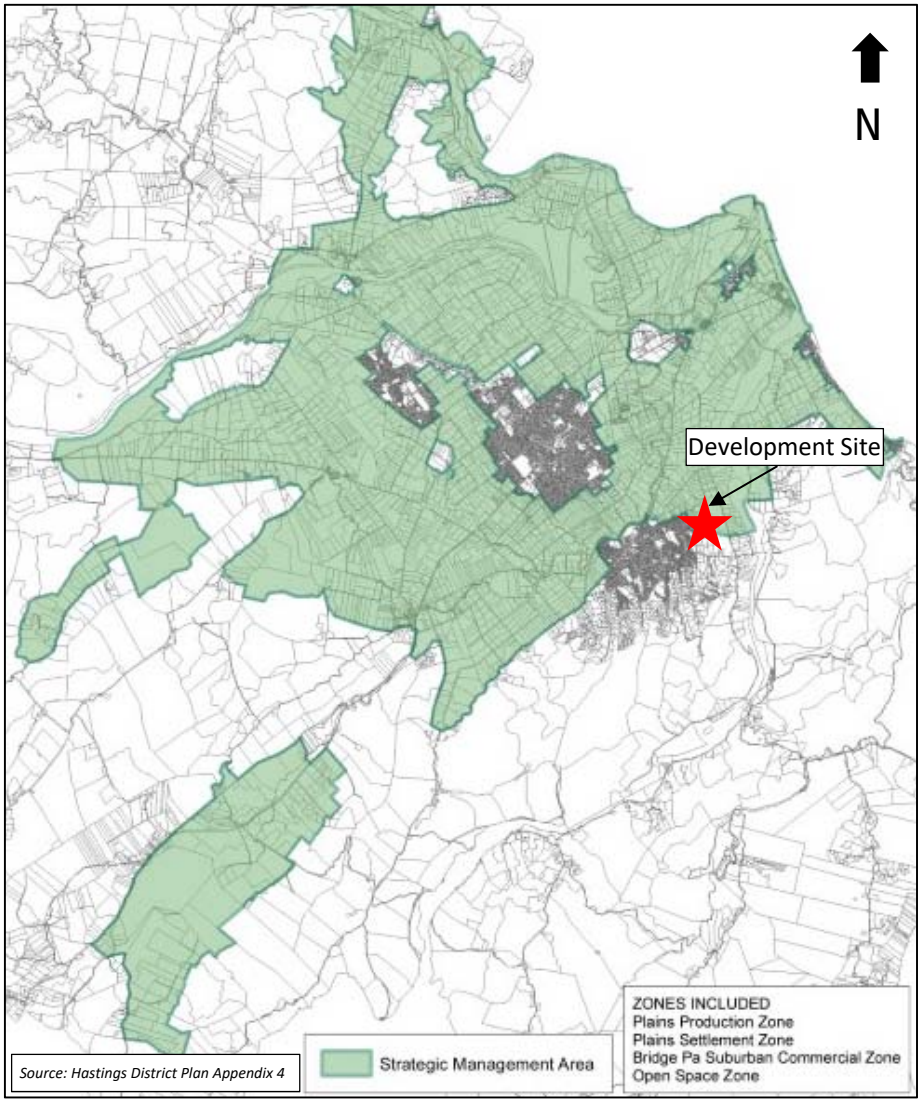


Figure 1: Site Location within the Current District Plan

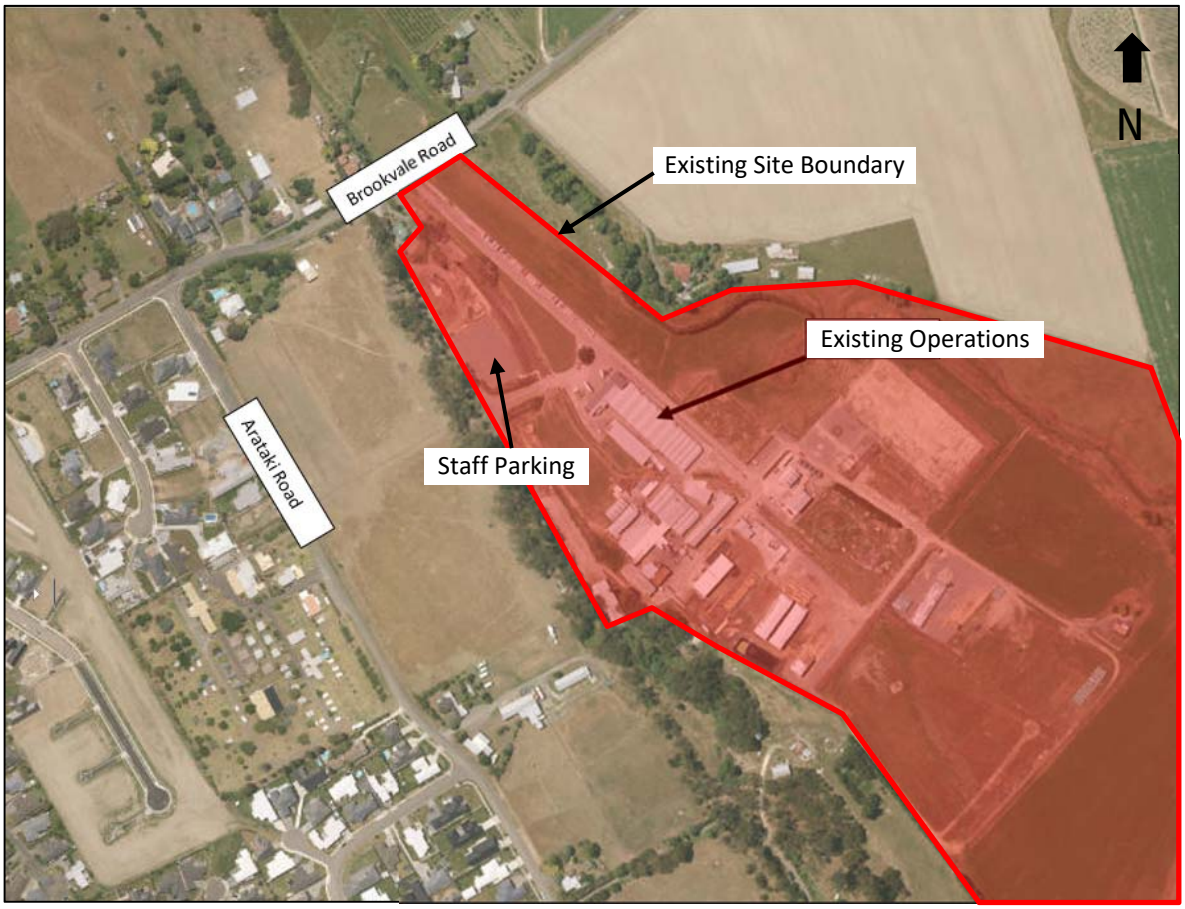


Figure 2: Site Location (Aerial taken from Emap)

Land use activity around the site comprises predominantly of Plains Production zoning to the north, south (with special character) and east. To the west, the area is predominantly residential.

3. Existing Roads and Traffic

3.1 Existing Road Infrastructure

Figure 3 shows the location of the site in the context of the surrounding road hierarchy as defined within Appendix 69 of the HDP. All roads within proximity of the site are within HDC's control.

Figure 3: District Plan Road Hierarchy

3.2 Existing Roads

3.2.1 Brookvale Road

Brookvale Road is located to the north of the proposal site and runs in a northeast / southwest direction, providing access north of Havelock North as well as to Te Mata Mangateretere Road, via Thompson Road to the northeast. Brookvale Road is classified as a Local Road within the HDP.

The portion of Brookvale Road fronting the site has a 50km/h speed limit in place although the speed limit changes to 100km/h at a point 25m north of the site access. Along this section the road is 11m wide with no kerbing either side. Brookvale Road becomes derestricted at a point 240m east of the intersection with Arataki Road. The width of Brookvale Road also narrows to 5.5m at this location. This portion of Brookvale Road

therefore has limited carrying capacity. The full length of Brookvale Road lies within a 20m road reserve.

The western segment of Brookvale Road (west of Arataki Road), being noticeably wider, has several urban features such as kerbing, footpaths and closer intersection spacings that encourage urban operating speeds. The southern edge has recently been kerbed together with the addition of a footpath as part of the newly constructed residential units. The western segment of Brookvale Road, however, has limited carrying capacity on account of its narrow width.

Photographs 1 and **2** illustrate the existing carriageway provisions along Brookvale Road.

Photo 1: Brookvale Road looking West

Photo 2: Brookvale Road looking East

3.2.2 Arataki Road

Arataki Road is a single carriageway with two-way traffic. The road, which generally provides access to single residential dwellings, is classified as a Local Road and has a speed limit of 50km/h (recently reduced from 70km/h). A pedestrian footpath is located along the southwestern side of the road. Streetlights have recently been installed along its length as part of the urban upgrade of the road.

Arataki Road is kerbed along the western edge, with an open drain along the eastern edge.

To the north-west, Arataki Road joins Brookvale Road in the form of a give-way priority-controlled intersection. **Photograph 3** shows the existing intersection while **Photograph 4** shows Arataki road.

Photo 3: Brookvale Road looking West towards Arataki Road Intersection

Photo 4: Arataki Road looking North

3.2.3 Te Mata Mangateretere Road

Te Mata Mangateretere Road is located to the east of the proposal site and runs in a north-south direction, providing access to Waimarama Road to the south and the newly constructed Whakatu Roundabout via Pilcher Road, to the north. Te Mata Mangateretere Road is classified as a Collector Road within the HDP.

3.2.4 Te Mata Road

Te Mata Road is classified as an Arterial Road within the HDP and serves as the primary east-west route connecting Havelock North with Te Mata Mangateretere Road to the east.

3.2.5 Napier Road

As shown in **Figure 3,** Napier Road is classified as an Arterial Road and is therefore of significance with regards to its connectivity to the wider region. Napier Road provides the most direct link from Havelock North to State Highway 2 (SH2) via the newly constructed Whakatu roundabout.

Napier Road has a posted speed limit of 80km/h reducing to 50km/h some 120m north of the intersection with Romanes Drive. This essentially defines the start of the urban area and Napier Road continues to have a 50km/h speed limit into the Havelock North Village.

3.3 Existing Accesses

3.3.1 Site Access

The site is currently served by two existing vehicle crossings adjacent to one another[2] which connect Brookvale Road to the internal road network of the site (see **Photograph 5**). The western driveway provides access to the retail shop and is generally used by customers.

[2] The eastern most vehicle crossing is currently fenced off and non-operational. These two vehicle crossings are to be formalised in to one crossing under the proposal.

Staff are also able to use this access to enter the dedicated staff car park. The western driveway also provides access to the servicing area and as such is predominately used by delivery vehicles / trucks.

Austroads Guide to Road Design part 4A requires a minimum sightline distance of 97m for a 50km/h speed limit for drivers to see approaching vehicles. The existing sightline distances were measured to be 140m to the left and 450m to the right (see **Photographs 6** and **7**). Good sightline distances therefore exist.

Photo 5: Existing Site Access

Photo 6: Visibility to Right

Photo 7: Visibility to Left

In addition to the two site accesses a third access exists some 40m to the west. This access is intended to be used to access the pumphouse operated by the Ministry of Public Works (see **Photograph 8**). At present staff from the TMM utilise this access to enter / exit a dedicated staff car park. The existing sightlines are shown in **Photographs 9** and **10** and show that visibility to the left is wholly substandard.

Photo 8: Pumphouse Access

Photo 9: Pumphouse Visibility to Right

Photo 10: Pumphouse Visibility to Left

3.4 Existing Traffic Flows

For this investigation, traffic surveys were conducted at the Brookvale Road / Arataki Road intersection to measure the volumes passing the site. Turning volumes were taken for the morning (8:00am to 10:00am) and evening (4:00pm to 6:00pm) to coincide with typical peak periods. The existing peak hour turning movements are shown in **Figure 4**.

AM Peak	***PM Peak***
32 → 17 ↴ **Brookvale Road** ↰ ↱ 32 17 ← 26 ↓ 7 **Arataki Rd** 35 → 14 ↴ ↰ ↱ 20 3 ← 13 ↓ 1 **Site Access**	28 → 33 ↴ **Brookvale Road** ↰ ↱ 37 23 ← 32 ↓ 15 **Arataki Rd** 37 → 14 ↴ ↰ ↱ 20 3 ← 27 ↓ 1 **Site Access**

Figure 4: Existing Traffic Volumes

Supplementary traffic data available on HDC's webpage was also used as part of this investigation and confirmed the following:

- Brookvale Road (Arataki Road and Thompson Road) = 250 vehicles per day (VPD) with a peak volume of 87 vehicles per hour (vph) at 09:00am on a weekday.

Both the traffic counts and HDC traffic data appear to correlate well and confirms that the portion of Brookvale Road passing the site carries low vehicular volumes and currently operates with levels of service that are proportionate with its hierarchical function.

3.5 Existing On-site Parking

The existing staff car park is approximately 1,700m^2 in size and can accommodate between 60 – 70 vehicles located on higher lying area as shown in **Photographs 11** and **12**. At present the area is gravel and unmarked. Access to the parking area is either via an internal gravel road which passes the main entrance before rising up to the car park or via the pumphouse access. The car park is reserved for staff use only and no customers from the retail shop utilise this parking area.

Photo 11: Existing Staff Parking

Photo 12: Access to Staff Parking Area via Pumphouse access

3.6 Sustainable Transport Modes

3.6.1 Existing Footpaths and Cycle Routes

Generally, the wider Havelock North area has a high proportion of active users who presently make good use of existing walking and cycling paths. The iWay cycle project has received national recognition and continues to expand its network. The closest iWay network to the site starts at the intersection of Napier Road and Crosses Road, some 2km from the site.

On-road cycle lanes exist along Napier Road and Romanes Drive, terminating at the roundabout intersection with Brookvale Road. In addition, an off-road shared footpath / cyclepath exists along the southern edge of Romanes Drive, providing access to both the sports fields and the BMX track.

No cycle facilities exist along Brookvale Road although a pedestrian footpath exists along the southern edge terminating at the intersection with Arataki Road. This portion of Brookvale Road passing the site is therefore not conductive for either cycling or walking. Due to the existing nature of the TMM site and operations, walking and cycling are not seen to be a desirable method of transport, therefore the lack of provisions for such, in the vicinity of the site, is not considered an existing concern from a safety perspective. This point is further illustrated in **Section 4**, where it is demonstrated that none of the recorded collisions involved a pedestrian and / or cyclist.

3.6.2 Existing Public Transport

The site is not conveniently located to a public transport network. No bus services operate within the area, the nearest bus stops being within Havelock North town centre. It is not anticipated that staff or visitors would travel to the site by bus.

4. Road Safety

For the purpose of reviewing road safety on the surrounding road network in proximity to the site has been obtained from the industry available Crash Analysis System (CAS), for the latest complete five-year period 2013-2017, including any records for 2018. The accident record is summarised below in **Table 1**.

Location on Road Network	Collision Description	Road Conditions	Causation Factor	Severity
Brookvale Road	Car1 travelling northbound on Brookvale Road lost control whilst turning left.	Dry, Fine	Alcohol suspected leading to loss of control	Minor
Te Mata Mangateretere Road	Car1 travelling southbound on Te Mata Mangateretere Road lost control turning right and hit a fence and a tree.	Dry, Dark	Tested above the limit for alcohol or test refused	Non-injury
Te Mata Mangateretere Road	Van1 travelling northbound on Te Mata Mangateretere Road hit Moped2 turning right whilst overtaking.	Dry, Fine	Moped2 turned from incorrect position in the road	Non-injury
Davidson Road	Car1 travelling westbound on Brookvale Road hit rear of Car2 turning right from centre line. Car1 hit a fence.	Wet, Dark	Car1 lost control trying to avoid another party and failed to notice Car2 slowing	Non-injury

Table 1: Summary of Collision Record

A total of four collisions have been recorded in the vicinity of the site since 2013. Of these four collisions, only one resulted in an injury which was categorised as minor.

Only one collision occurred along Brookvale Road in any relative proximity to the access driveways of the proposal site and is likely to have occurred as a result of alcohol consumption. As such, there is no historical collision record to suggest that the existing driveway access poses a risk in terms of the operational safety and capacity of Brookvale Road.

Two collisions were recorded at the Thompson Road / Te Mata Mangateretere Road intersection. These collisions were seen to be unrelated with an average collision rate of 0.4 collisions a year. This is not considered significant.

One collision occurred at the Davidson Road / Brookvale Road intersection. Only one collision has occurred at this location and was likely due to a combination of the weather conditions and human error. For these, reasons, this type of collision, occurring at a rate of 0.2 collisions a year, is not considered significant.

Overall, from the analysis above, there is nothing to suggest that from these records, there are any existing safety concerns that would be exacerbated in respect of the current proposal and subsequently require attention.

5. Proposed Development

5.1 Current Operation

By way of providing some context, the site is currently fully operational with an average output of some 25 tonnes of produce per week. The mushroom growing operation is seven days a week, with staff typically working in shifts. The busiest shift is during the day when up 56 employees are on-site.

The on-site farm shop is operational six days a week, Monday to Saturday, as well as being operational on a Sunday at the Hastings Farmers Market (off-site from the proposal site). A maximum of two employees operate the shop during the day.

5.2 Proposed Development

The proposal plans provide for the intensification of the sites current operations from 25 tonnes of mushrooms per week, up to as much as 100 tonnes per week. Whilst it is acknowledged that 100 tonnes a week may not be achieved as part of the final chosen operational capacity, this level of intensification is the maximum the site can accommodate. As such, this TAR focuses on an increase to 100 tonnes per week in order to provide a worst-case scenario, as well as the most robust analysis of the road network as possible.

Whilst intensification of production at the site is being proposed, this will not impact upon the level of services currently provided at the farm shop as sales are customer driven rather than production driven. The scale and size of the retail store will remain unchanged and therefore no increase in activity is anticipated and this is reflected within this TAR.

5.2.1 Increase in Staff

It is acknowledged that the total number of staff on-site will increase to account for the intensification of activities. However, the relationship of staff numbers versus the volume of produce is not linear. As such the number of full time staff required during the average weekday in expected to increase from 56 persons to 98 persons, an increase of 43.

During the weekends, the number of staff on-site will be lower. At present approximately 48 staff are currently on-site on an average Saturday. This is expected to increase to approximately 90 persons, an increase of 42 persons.

5.3 Parking

The parking requirements for the various activities are based on the HDP and presented in **Table 2** below.

Land-use	Activity	Parking Rate	Size / No of Employees	Vehicle Parking Required
Manufacturing	Industrial Activities	1 space per 2 persons usually employed on the site at any one time	Weekday - 98 employees	49
			Saturdays - 90 employees	45[3]
Retail Shops	Retail Shop	1 per 33m^2 GFA	50m^2	2
Total				**51**

Table 2: District Plan Parking Requirements

As mentioned earlier the existing staff parking area is capable of accommodated up to 70 vehicles which is in excess of the District Plan requirements. The District Plan requires two parking spaces for the retail shop. The area in front the shop has space for up to 20 vehicles and although informal, the area can easily accommodate any customer peaks visiting the shop. No additional parking space is required to serve the retail shop.

Within this allocation, one accessible car parking space is proposed and provided closest to the shop. One parking space for less mobile users is also proposed and provided adjacent to accessible space. These spaces are to be clearly marked.

Due to the current layout and space afforded within the site boundary, it is concluded that this level of increased staff activity can be accommodated within the existing layout, without impacting negatively upon the safety and operational capacity of the internal road network which serves the existing site.

The existing sightlines at the pumphouse access are deemed substandard and it is proposed that the staff car park only be accessed via the internal road.

5.3.1 Parking Design

All parking bays are shown as being 2.5m wide, 5.4m in length with an aisle width in excess of 5.8m in accordance with the National Standard[4].

Sufficient operating space is also provided throughout the site to allow flexibility to enter and exit the parking spaces shown on the site layout plan.

The car park is not intended to be sealed and will continue to operate as existing. The current car park has been operating for some time under the existing gravel arrangement and is still deemed sufficient for the operational safety and capacity of the car park under the proposal within this TAR.

[3] Parking demand at the weekend will be lower than for a weekday
[4] Standards New Zealand AS/NZS 2890.1.2004 – Parking Facilities Part 1: Off-street car parking

5.3.2 Bicycle Parking and End of Journey Facilities

The HDP requires staff cycle spaces at a ratio of one bicycle stand per 5 carpark spaces, equating to a requirement of 10 bicycle stands. These spaces are required predominately for staff and the stands will be provided close to the changing rooms.

The current changing rooms include dedicated male and female shower and changing areas that can be utilised by anyone who chooses to cycle / walk to work (although this is not considered likely).

5.4 Trip Generation

The level of traffic generated at the site is influenced by the intensity of activities taking place. During an average weekday, the site currently generates a number of vehicle movements relating to different activities required for the site to operate successfully. The type of activity, and the number of vehicles associated with this activity has been provided below in **Table 3**.

Activity	Vehicle Type	Arrivals	Departures	Total
Supply Delivery & Mushroom Pickup	Light Goods Vehicle	9	9	18
Supply Delivery & Mushroom Pickup	Heavy Goods Vehicle	5	5	10
Seasonal Straw Delivery	Heavy Goods Vehicle	6	6	12
Retail Shop	Light Goods Vehicles	80	80	160
Staff – Mushroom Pickers	Light Goods Vehicles	32	32	64
Staff – All Other	Light Goods Vehicles	23	23	46
	Total	**155**	**155**	**310**

Table 3: Average Weekday Vehicular Movements - Existing

Table shows that the site generates approximately 310 vehicle movements a day, predominantly consisting of LGVs (288 vehicles) compared to 22 HGVs. From the data provided, the busiest period was seen to occur between 11:00 and 17:00 when between 29 to 37vph entering / exiting the site. The peak hour for the site in terms of traffic generation occurs between 14:00 and 15:00 with a total of 37 vehicle movements; 14 arrivals and 23 departures. This works out to be an average of one vehicle accessing or egressing the site every 1 to 2 minutes.

The expected increase in daily vehicular volumes is summarised in **Table 4** below.

Activity	Vehicle Type	Existing (IN and OUT)	Additional (IN and OUT)	Total
Supply Delivery & Mushroom Pickup	Light Goods Vehicle	18	+4	22
Supply Delivery & Mushroom Pickup	Heavy Goods Vehicle	10	+2	12
Seasonal Straw Delivery	Heavy Goods Vehicle	12	+12	24
Retail Shop	Light Goods Vehicles	160	+0	160
Staff – Mushroom Pickers	Light Goods Vehicles	64	+64	128
Staff – All Other	Light Goods Vehicles	46	+20	66
Total		**310**	**102**	**412**

Table 4: Weekday Vehicular Activity – Existing and Post Development

Overall, there will be an additional 102 vehicles generated by the site during an average weekday, with 51 vehicles entering and 51 vehicles exiting the site throughout the day. The peak traffic generation of the site occurs between 14:00-15:00 where the site is expected to generate 43 vehicle movements, 15 arrivals and 28 departures. This rate of traffic generation still equates to one vehicle accessing egressing the site every 1 – 2 minutes. This level of increase is not considered significant and will not impact upon the operational safety and / or the capacity of the local road network.

5.5 Weekend Traffic

During an average Saturday, the type and intensity of activities are slightly different, and the site subsequently generates a slightly higher number of vehicular trips, predominately due to the higher turnover of customers visiting the retail store. The type of activity, and number of vehicle trips for an average Saturday is provided below in **Table 5**.

Activity	Vehicle Type	Existing (IN and OUT)
Supply Delivery & Mushroom Pickup	Light Goods Vehicle	12
Supply Delivery & Mushroom Pickup	Heavy Goods Vehicle	4
Seasonal Straw Delivery	Heavy Goods Vehicle	12
Retail Shop	Light Goods Vehicles	200
Staff – Mushroom Pickers	Light Goods Vehicles	62
Staff – All Other	Light Goods Vehicles	32
Total		**322**

Table 5: Saturday Vehicular Activity – Existing

Table 5 shows that the site generates approximately 322 vehicle movements on an average Saturday, predominantly consisting of LGVs (306 vehicles) compared to 16 HGVs. From the data provided, the busiest period was seen to occur 12:00-13:00 with a total of 44 vehicle movements; 16 arrivals and 28 departures. This works out to be an average of one vehicle accessing or egressing the site every 1 to 2 minutes.

The proposed increase in vehicular activity due to the intensification is outlined in **Table 6** below.

Activity	Vehicle Type	Existing (IN and OUT)	Additional (IN and OUT)	Total
Supply Delivery & Mushroom Pickup	Light Goods Vehicle	12	+4	16
Supply Delivery & Mushroom Pickup	Heavy Goods Vehicle	4	+2	6
Seasonal Straw Delivery	Heavy Goods Vehicle	12	+12	24
Retail Shop	Light Goods Vehicles	200	0	200
Staff – Mushroom Pickers	Light Goods Vehicles	62	+64	126
Staff – All Other	Light Goods Vehicles	32	+20	52
Total		**322**	**102**	**424**

Table 6: Saturday Vehicular Activity – Existing and Post Development

Overall, there will be an additional 102 vehicles generated by the site during an average Saturday, with 51 vehicles entering / exiting the site throughout the day. The peak hour is expected to increase from 40vph to 50vph due to the development proposals (17 arrivals and 33 departures). This rate of traffic generation still equates to one vehicle accessing egressing the site every 1 – 2 minutes. This level of increase is not considered significant and will not impact upon the operation safety and / or the capacity of the local road network.

5.6 Trip Distribution

The anticipated trips travelling to and from the site has been based on existing turning movements and distributed as follows:

- to / from the West, 85% has been assumed to travel from either Napier, Hastings or Havelock North; and
- to / from the East, 15% has been assumed to travel using Te Mata Mangateretere Road and Thompson Road.

5.7 Intersection Analysis

Based on the distribution described above, the Brookvale Road / Arataki Road intersection was analysed for both the existing and future (post development) scenarios and the results are shown in **Figure 6** below. The analysis has confirmed that no improvements are required. The overall performance both the Brookvale Road / Arataki Road intersection and the site access remains at a Level of Service (LOS) A for both the AM and PM peak periods with the full development in place. The available spare capacity at these intersections therefore remain high, as expected, given the small volumes. It is however recommended that some improvements are undertaken to improve safety and visibility. These improvements will involve:

- on-carriageway directional arrows;

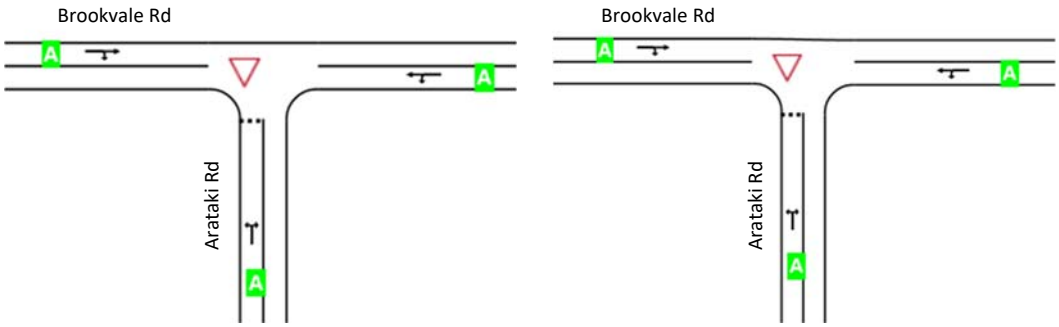
- on-carriageway give-way information; and
- roadside signage provided to improve conspicuity of intersections.

The proposed intersection layout can be seen in **Figure 5**.

Figure 5 – Proposed Junction Layout

The weekend period has not been analysed on account that the background traffic volumes are expected to be lower than the weekday peak periods. The slighter higher trips generated on a typical Saturday is therefore likely to be offset by the reduced background traffic volumes.

2018 AM and PM – Existing



2018 AM and PM – With Development

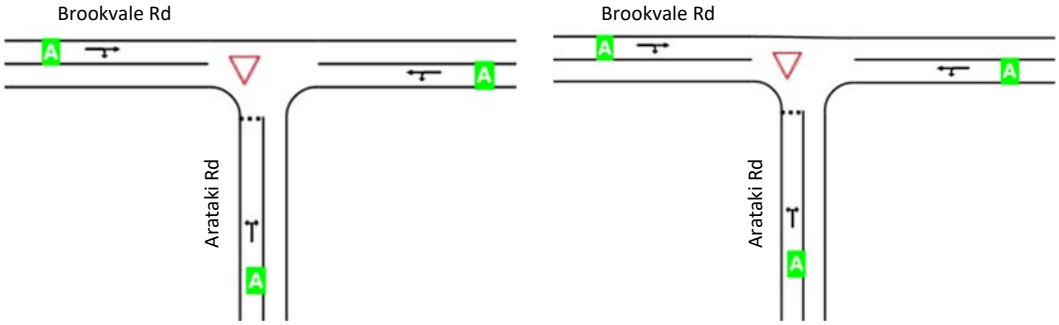


Figure 6 – Intersection Analysis Results

6. District Plan Requirements

General Performance Standard and Term 26.1.6 of the District Plan relates to the requirements for Permitted Activities in respect of parking, servicing and site access. The proposed development is assessed against each of these rules in **Table 7** as follows:

Paragraph		GENERAL PERFORMANCE STANDARDS	COMPLIANCE
26.1.6A		**Access**	
1		**Access to Property**	
(a)		Every owner or occupier shall provide a legal, safe and effective vehicular access to any activity undertaken on a site, and required parking or loading areas from an existing, formed legal road, to enter the site, except where the site has Designated Retail Frontage (see Appendix 30) or where the site is within the Flaxmere Commercial Zone.	**Complies -** Safe and effective vehicle access is provided to accommodate all expected vehicle types as deemed appropriate to the specific development requirements.
(b)		There shall be a maximum of one vehicle crossing per property within the Residential Zone. Where a property is bordered by 2 or more roads the vehicle access to the property shall be from the lower category road. The category of the road will be determined by its hierarchy status in Appendix 69 or traffic volumes when hierarchy status is equal.	**Complies –** The site will have one access onto Brookvale Road. Access to the site will be concentrated through the main entrance which will be formalised as part of the works. No staff will access the area of parking under the proposal.
(c)		The minimum legal widths for private access are contained in Table 26.1.6.1-1. Private access to properties shall allow the safe passage from the edge of the road to the legal boundary of the lot for a single site or household unit. For two or more sites or household units or for any Right of Way, formation of the access to the activity undertaken on the site is required in compliance with Table 26.1.6.1-1.	**Complies -** The existing access is 7.5m wide and therefore compliant with the Rule.
		Minimum widths of private access to commercial, industrial and other activities for 1-2 sites (Table 26.1.6.1-3): (i) Target speed = 10km/h (ii) Minimum legal access width = 6m (iii) Max grade = 12.5% (iv) Pedestrian movement = Shared in movement lane (v) Passing, parking, loading and shoulder = No (vi) Cyclist movement = shared in movement lane (vii) Minimum traffic movement lane = 3m	 **Compliant** **Compliant** - Existing access width = 6.4m. **Compliant** – The internal roads are generally flat. **Not Compliant**, no pedestrian footpath is currently present along Brookvale Road. **Compliant** **Not Compliant** – No cycle specific facilities along Brookvale Road **Compliant**

2		**Distance of Accesses from Road Intersections**	
(a)		Residential, Industrial and Commercial Zones The distance that a vehicle access to any property may be sited from any Local Road intersection as defined in the Roading Hierarchy in Appendix 69, shall be a minimum of 15m or the extent of the property boundary whichever is the least. Vehicle access to any property shall not be sited within 30 metres of an intersection of a State Highway. *Note: Vehicle access in relation to Collector or Arterial Road intersections as defined in the Roading Hierarchy in Appendix 68* [sic] *shall be subject to Road Safety Audit as deemed necessary by the Road Controlling Authority.*	**Compliant** - the nearest access is some 40m away. The nearest intersection is 210m away. N/A

Paragraph		GENERAL PERFORMANCE STANDARDS	COMPLIANCE
26.1.6B		**Safe Sightline Distance**	
1		Intersections shall be located to ensure that Safe Sightline Distances are maintained. Note: For vehicle accesses fronting a Local, Collector or Arterial Route (as defined in the Roading Hierarchy in Appendix 69) compliance with Austroads Standards is deemed an acceptable means of compliance. The minimum sight distance required for 50km/h roads is 55m (without grade corrections).	**Compliant** – the visibility along Brookvale Road exceeds the minimum required for a 50km/h speed limit in both directions.
26.1.6C		**Loading**	
1		**All Activities except Residential Activities**	
(a)		**Provision of Loading Spaces**	
	(i)	Every owner or occupier who proposes to construct or substantially alter, reconstruct or add to a building on any site, or change the activity carried out on the site shall provide a Loading Space. The Loading Space shall provide for the suitable or efficient accommodation of any loading or fuelling of vehicles which are likely to arise from the use of any building or activity carried out on the site, except where a service lane is designated or provided, or where the site has Designated Retail Frontage (see Appendix 30). Separate Loading Spaces shall be provided for each occupier of the site if there are more than one. The Loading Space shall be additional to the parking required in Table 26.1.6.1-3.	**Compliant** – Adequate loading space available on-site to accommodate the needs of the cidery and tasting room. It can accommodate site specific appropriate turning movements.
	(ii)	Every Loading Space, together with access, shall be designed so that it is not necessary to reverse vehicles either on to or off the street. The Loading Space shall not be stacked or located within vehicle manoeuvring areas.	**Compliant** - All loading/unloading is undertaken off-street and vehicles are able to enter/exit the property in a forward direction with turning space provided on-site.

	(iii)	The provision of a Loading Space in respect of any site may be made as part of the side and / or rear yard space, but not as part of the front yard space of that site.	**Compliant** - A dedicated loading area is available to accommodate service vehicles.
	(iv)	The method of loading shall ensure that the footpath or access to adjacent properties shall remain clear at all times and ensure traffic safety is maintained on the roads.	**Compliant** - No loading space is across any footpath or access within the property.

Paragraph		GENERAL PERFORMANCE STANDARDS	COMPLIANCE
26.1.6C		**Loading**	
(b)		**Design of Loading Spaces**	
	(i)	Activities requiring loading facilities or servicing from heavy vehicles: A "Single Unit Bus / Truck" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 73 for the dimensions of this vehicle.	**Compliant** – The loading area is large enough to accommodate both an 11.5m truck.
	(ii)	Where articulated vehicles or trucks and trailers are anticipated: A "Prime Mover and Semi-Trailer" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 73 for the dimensions of this vehicle.	**Compliant** – The loading area can accommodate an 18m semi-trailer vehicle for commercial activities.
	(iii)	The following minimum dimensions are provided as a means of compliance: Retail activities, offices, manufacturing premises and similar must have a minimum length of 8.5 metres and a minimum width of 3 metres.	**Compliant** - A dedicated loading area is available on-site.
26.1.6D		**Parking**	
1		**Provision of On-Site Parking**	
		Every owner or occupier who proposes to construct or substantially reconstruct, alter or add to a building on any site, or change the activity carried out on any land or in any building, shall provide suitable areas on the site for parking in accordance with the requirements listed in Table 26.1.6.1-3 below.	**Compliant** – The development requires 51 parking spaces based on the number of FTE staff. The staff parking area is capable of accommodating 70 parking spaces and 20 spaces for the retail shop.
3		**Parking Spaces for People with Disabilities**	
		Developers, owners or occupiers when constructing carparks shall make provision for disabled carparks in compliance with Appendix 72 and they shall be clearly marked or signposted as such.	**Compliant** – two accessible parking bays are proposed and will be clearly marked outside the retail shop.

5		**Design and Construction of Parking Areas**	
(a)		Vehicle Dimensions All parking spaces and access and manoeuvring areas, including ramps shall be of a sufficient size and suitable layout to accommodate a "passenger vehicle" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 72 for the dimensions of this vehicle.	**Compliant** - The proposed car park dimensions are 2.5m x 5.4m with aisle widths in excess of 5.8m, this is within the requirements as stipulated by the District Plan.

Paragraph		GENERAL PERFORMANCE STANDARDS	COMPLIANCE
26.1.6D		**Parking**	
5		**Design and Construction of Parking Areas**	
(c)		General Design and Construction Details All public and required parking areas, and any outdoor display areas (such as car, caravan or boat sales yards) shall comply with the following general requirements:	
	(i)	Parking areas in any Commercial or Industrial Zone shall be formed and sealed with an all-weather surface.	**N/A –** the site is not within a Commercial or Industrial Zone**.** The current car park has been operating in an unsealed capacity for some time; this has not been observed to impact upon the operational safety and / or capacity of the car park.
	(ii)	Parking areas shall be designed and constructed to ensure that stormwater runoff from the parking area does not adversely affect adjoining properties.	**Can Comply**
	(iii)	Parking areas, together with access and turning space, shall be designed to ensure that vehicles negotiate the parking area at a safe speed and are not required to reverse either on to or off a street, provided that this requirement shall not apply in any Residential Zone where a single accessway serves not more than two residential buildings. Vehicles using the parking area shall only enter or leave the site by the accessway.	**Compliant** - All access and egress movements will be made in a forward direction.
	(iv)	Where a public or non-residential parking area is within or adjoins a Residential Zone, a 1.8-metre-high, fully enclosed screen shall be erected or a landscape strip of a minimum width of 5 metres adjoining the boundary or the Residential Zone shall be provided. These requirements may be reduced or waived with the consent of the adjoining neighbour.	N/A

	(v)	A reservoir space shall be provided within public carparks to prevent vehicles queuing on the street.	**Compliant** – The existing access does not have any barrier/gate restrictions and vehicles are able to enter the property freely. No queuing on the street should ever occur.
	(vii)	Non-residential parking spaces required to be sealed by standard 26.1.6.D.5(c)(i) shall be marked out and where there is a separate requirement for staff parking such spaces shall be clearly identified.	**N/A**

Paragraph	GENERAL PERFORMANCE STANDARDS	COMPLIANCE
26.1.7B	**Specific Performance Standards and Terms**	
1	**Bicycle Spaces**	
	Where on-site car parking is required provision shall also be made for purpose-built bicycle stands on site. These shall be provided at a rate of 1 bicycle stand per 5 carpark spaces that are required except for supermarket where the ratio shall be 1 bicycle stand per 20 carpark spaces that are required. The bicycle stands shall meet the following requirements: (a) They shall be securely attached to a wall or the ground and shall support the bicycle frame. (b) Each cycle stand shall be adequately spaced to allow a cyclist to manoeuvre and attach a bicycle to the stand. (c) They shall allow the bicycle to be secured. (d) They shall be visible and signposted.	**Compliant –** 10 bicycle stands are proposed located close to the changing rooms.
2	**Bicycle End of Journey Facilities**	
	Commercial or Industrial Activities which employ more than 15 FTE staff members shall provide one male and one female shower and changing facilities for staff to encourage the use of alternative transport modes.	**Compliant** – the existing currently has dedicated male and female changing rooms for staff.

Table 7: District Plan Standards and Proposed Development Compliance

7. Conclusions

This assessment has examined the anticipated traffic impacts related to the proposed intensification of production, from 25 tonnes of mushrooms per week to a maximum of 100 tonnes per week. The findings have indicated that the intensified TMM operations are likely to generate an additional 102 vehicle trips per day. This equates to an additional 37 vehicle movements; 14 arrivals and 23 departures during the peak hours.

The analysis shows that the priority-controlled intersection of Brookvale Road / Arataki Road and the site access will not experience any deterioration in capacity and performance due to the development.

The existing parking available on-site is large enough to accommodate the additional parking required due to an increase in employees. The expected demand is easily met and no over-spill of parking onto Brookvale Road will occur.

No pedestrian and cycle linkages are available along the frontage of the site. Due to the location and associated activities the development, it is not considered that people will walk or cycle to the site. In addition, none of the recorded collisions involved pedestrians of cyclists. The collision records therefore confirm that there is currently no evidence to suggest that pedestrians and cyclists are at particular risk within the vicinity of the site.

Two existing accesses are provided at the site. The eastern most access is to be formalised under the proposals, with access via the pump house access being removed for all staff. TDG note that the collision records, for the most recent five-year period, show that there is no existing safety issue because of the current arrangement. It is concluded that the introduction of this proposal will not impact upon the operational safety of the two access points; the consolidation of the accesses will actually improve the road safety nature of Brookvale Road by removing a potential conflict point.

TDG is satisfied that the existing vehicle crossing, existing on-site parking and existing servicing arrangements will provide sufficient capacity to accommodate the anticipated increase in vehicle demand generated by the development proposals. Considering that the current arrangement (operational site with a 25-tonne production) operates without any impact on the local road network and that the proposed increase in production is not likely to generate significantly higher levels of traffic, it is assessed that the proposals would not cause adverse effect on the function, safety or capacity of the adjacent road network.

TDG

Appendix 3

Proposed Plans

Architectural Drawing Index

Drawing No:	Drawing Title	Issued
A01	Site Plan	☒
A02	Proposed Plan - 1:400	☒
A03	Proposed Plan	☒
A04	Proposed Plan	☒
A05	Elevations	☒

Compost Bunker Extension For: Te Mata Mushrooms At: 176 Brookvale Road, Havelock North Hawkes Bay 4130

SDC Design Ltd
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06 8775366
sdcdesign@xtra.co.nz
LICENSED BUILDING PRACTITIONER BUILDING CONFIDENCE www.dbh.govt.nz
Rob Collins
BP113177

Te Mata Mushrooms
176 Brookvale Road,
Havelock North

PROJECT #: 1649

2/05/2017

RevID	ChID	Change Name	Date
01			16/12/2016

Document Transmittal

Issue	Sheet	Rev	Sheet Name	Change ID
01, BC/construction, 16/12/2016 11:57 a.m.				
		01	Document Transmittal	
		01	Sheet Index	
	A01	01	Site Plan	
	A02	01	Proposed Plan - 1:200	
	A03	01	Proposed Plan	
	A04	01	Proposed Plan	
	A05	01	Elevations	

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Te Mata Mushrooms
176 Brookvale Road,
Havelock North

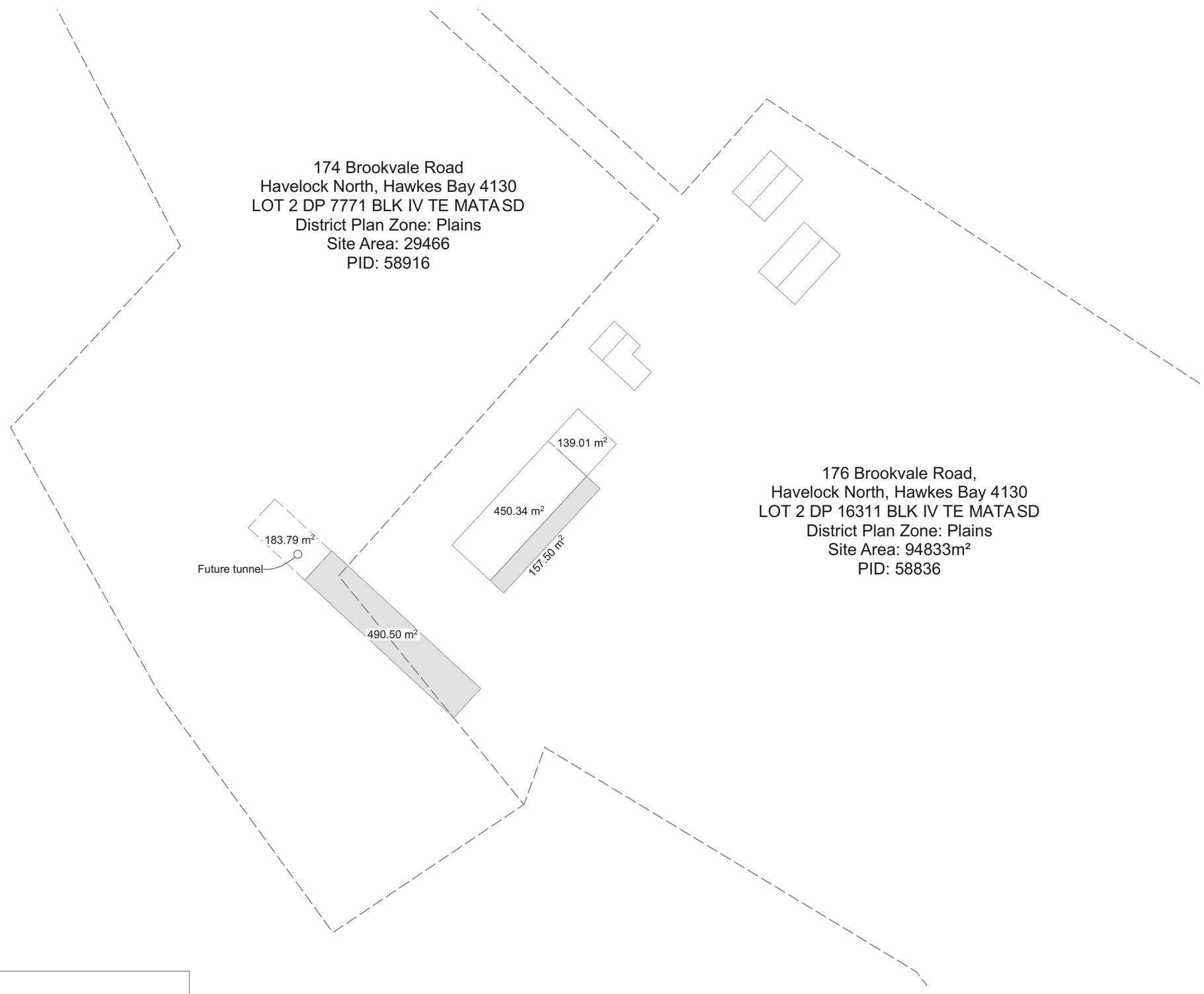
PROJECT #: 1649

2/05/2017

RevID	ChID	Change Name	Date
01			16/12/2016

174 Brookvale Road
Havelock North, Hawkes Bay 4130
LOT 2 DP 7771 BLK IV TE MATA SD
District Plan Zone: Plains
Site Area: 29466
PID: 58916

176 Brookvale Road,
Havelock North, Hawkes Bay 4130
LOT 2 DP 16311 BLK IV TE MATA SD
District Plan Zone: Plains
Site Area: 94833m²
PID: 58836



NOTES:
-All work shall comply in all aspects with the New Zealand Building Act 2004
-It is the contractors and his subcontractors responsibility to check all dimensions on the job before commencing any work.
-All materials to be installed in accordance with the manufacturers instructions
-Read drawings in conjunction with the specification.
-This building is located in a HIGH Wind Zone.
-This building is located in Exposure Zone B.

Site Plan
SCALE: 1:1000

N

Rev/ID	ChID	Change Name	Date
01			16/12/2016

2/05/2017

PROJECT #:
1649

A01

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176 Brookvale Road,
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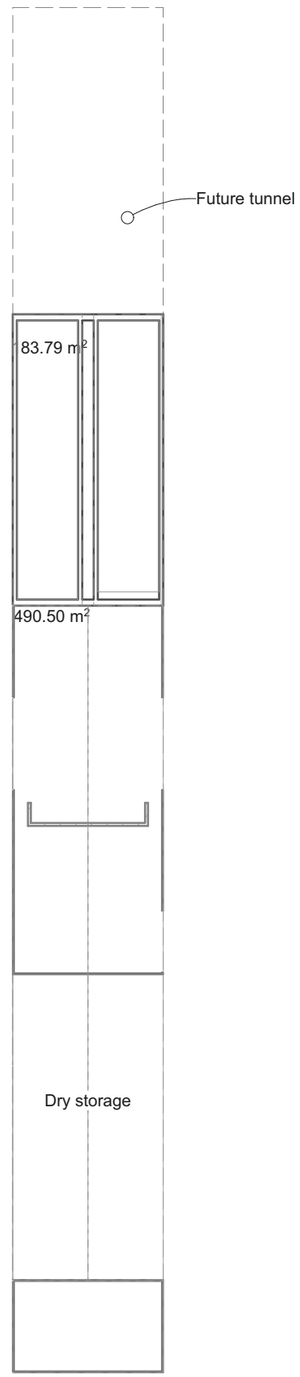

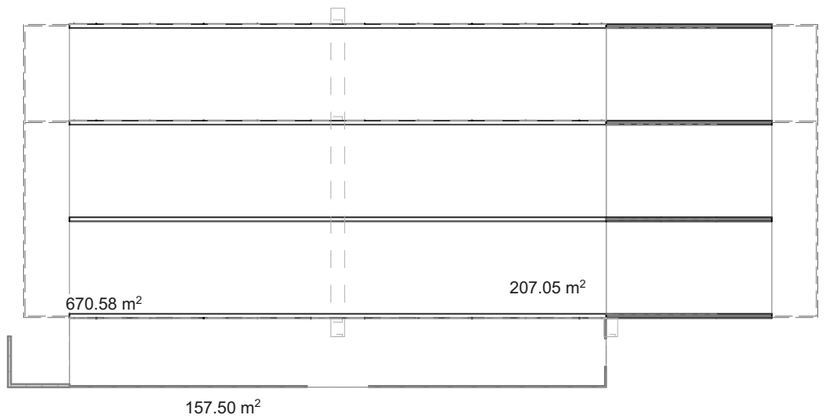

Proposed Plan 1:400

SCALE: 1:400

N

Rev/ID	ChID	Change Name	Date
01			16/12/2016

2/05/2017

PROJECT #:
1649

A02

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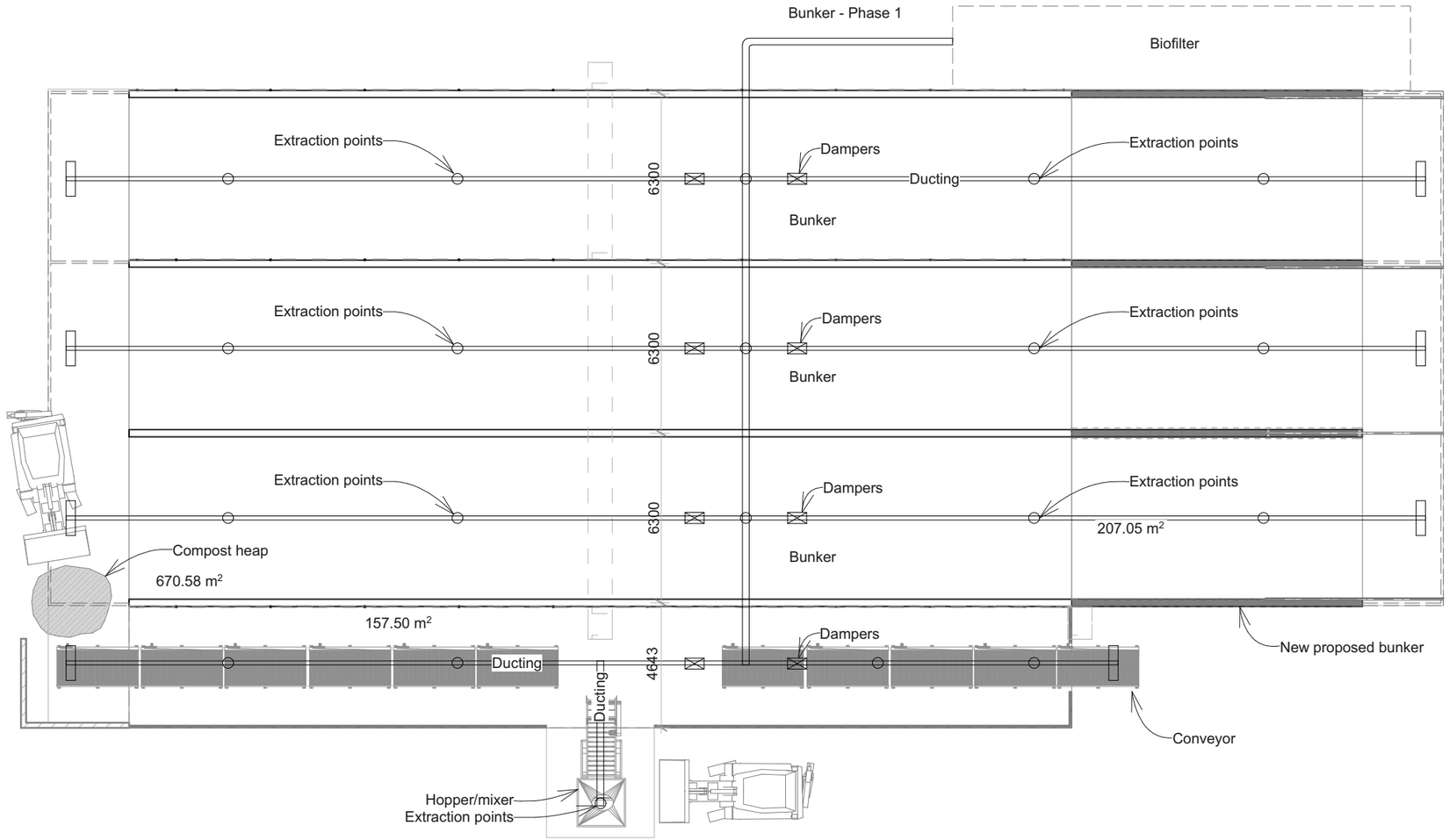

2
A05

1
A05

Proposed Plan

SCALE: 1:200

N

Rev/ID	ChID	Change Name	Date
01			16/12/2016

2/05/2017

PROJECT #:
1649

A03

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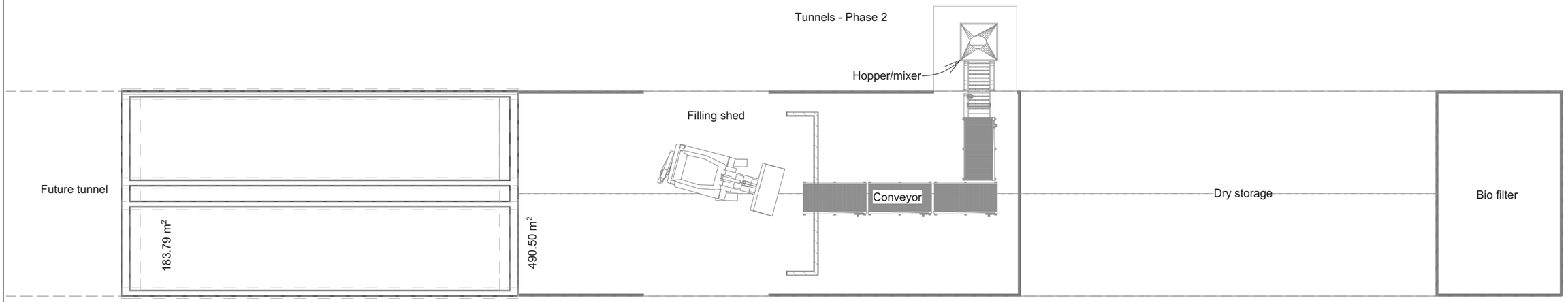

Proposed Plan

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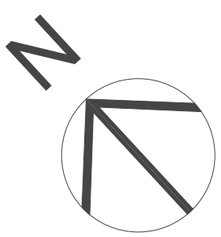

Rev/ID	ChID	Change Name	Date
01			16/12/2016

2/05/2017

PROJECT #:
1649

A04

Te Mata Mushrooms
176 Brookvale Road,
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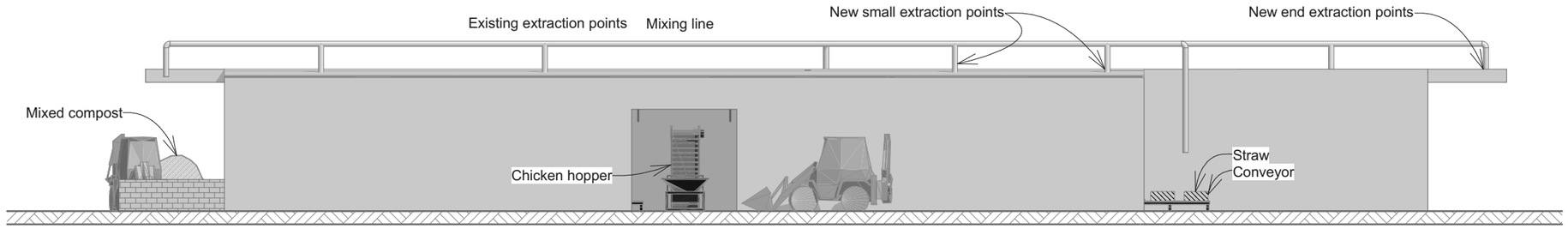
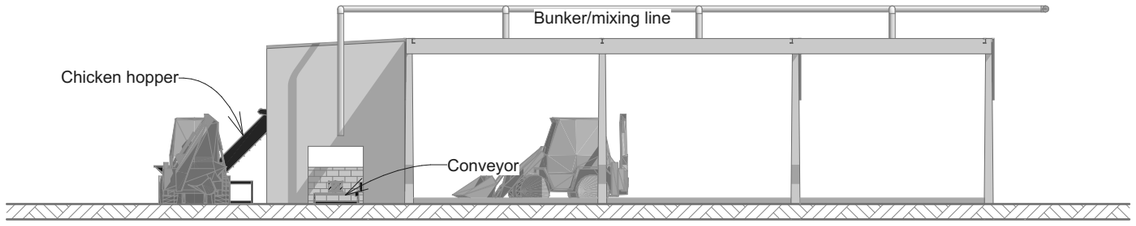


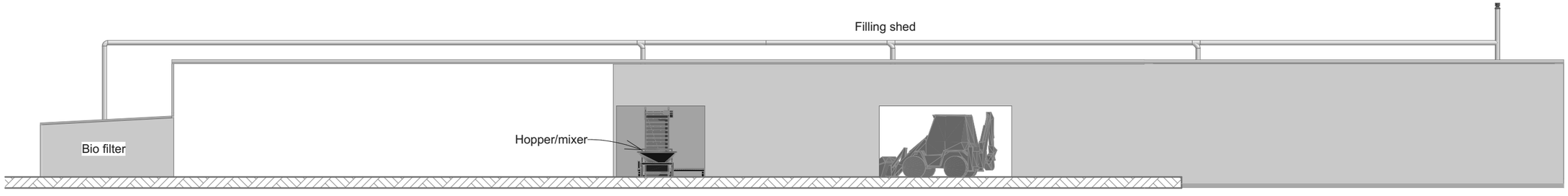
Elevation 1

SCALE: 1:200



Elevation 2

SCALE: 1:200



Elevation 3

SCALE: 1:200

Rev/D	ChID	Change Name	Date
01			16/12/2016

2/05/2017

PROJECT #:
1649

A05

Te Mata Mushrooms
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Appendix 4

Acoustic Assessment

TE MATA MUSHROOM COMPANY
BUNKER EXTENSION

174 & 176 BROOKVALE RD
LOT 2 DP 7771
HAVELOCK NORTH, HASTINGS

for
Te Mata Mushroom company

ACOUSTIC REPORT

=

Prepared by
Earcon Acoustics Limited

For Resource Consent

November 2017
Ref J002074

Level 27, PWC Tower - 188 Quay St – Akld 1010
PO Box 301561 Albany - North Shore – Akld 0752
Tel: 09 443 6410 **Fax:** 09 443 6415 **Mob:** 021 437893

QUALITY ASSURANCE

Document: **Te Mata Mushroom Company – Bunker Extension**
Acoustic Report – For Resource Consent

Contact	Issue	Date	Rev
Fadia Sami fadia.sami@earcon.co.nz 021 437893	For Resource Consent	3/11/2017	B

Level 27, PWC Tower - 188 Quay St – Akld 1010
PO Box 301561 Albany - North Shore – Akld 0752
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1. Introduction

This report addresses the requirements for the proposed development at the Te Mata Mushroom Company to meet the noise limits at surrounding sites in accordance with the requirements of the Hastings District Plan. This report has been prepared for resource consent.

The report is based on the architectural drawings prepared by SDC Design Limited, dated 16/12/2016.

2. Site

The proposed development involves the extension of existing bunkers at the Te Mata Mushroom Company Facility at 174 and 176 Brookvale Road in Havelock North. The extensions are to be located as shown in the figure below. The primary sources of noise are expected to be from the operation of the facility, (primarily wheeled loaders) and HVAC equipment.

The Site is zoned *Plains Production,* and is in proximity to areas to the West zoned *Havelock North General Residential* and to the South zoned *Te Mata Special Character Area*

Figure 1- Site Location

Figure 2 - Zoning

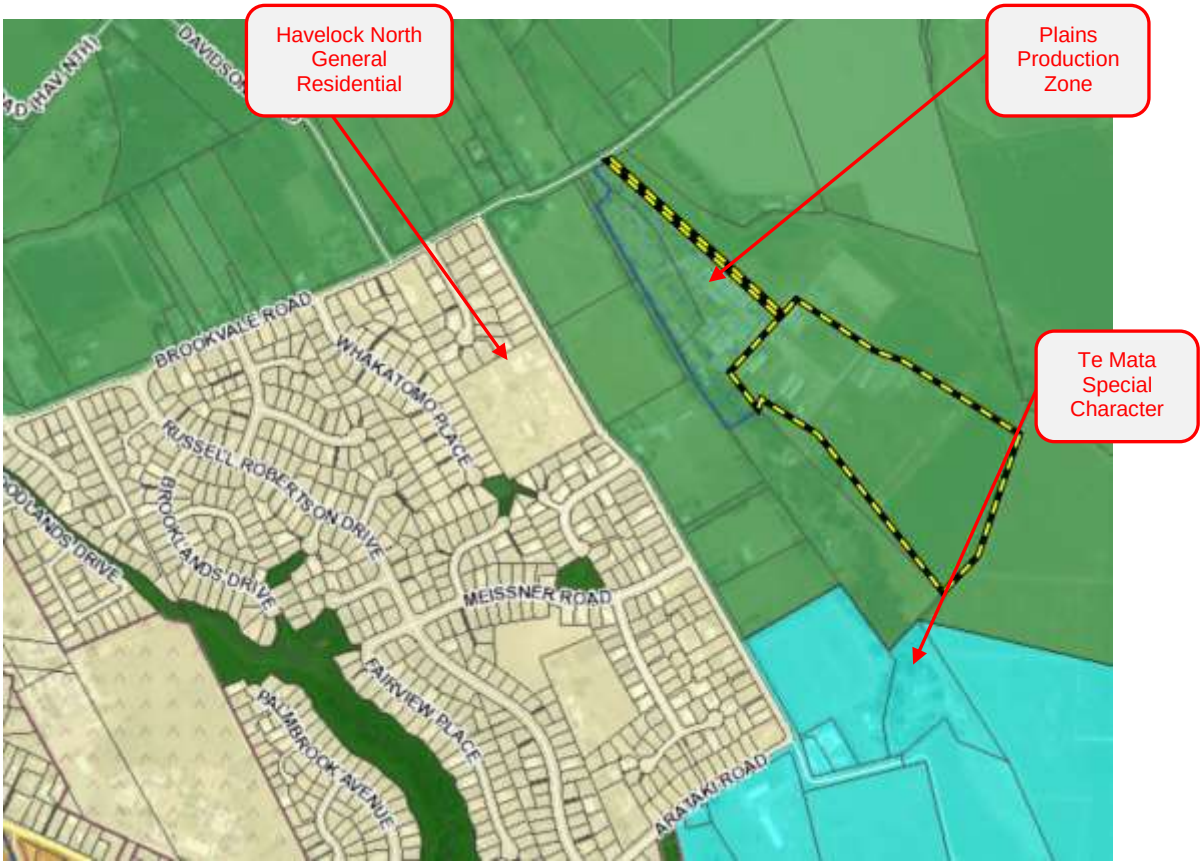
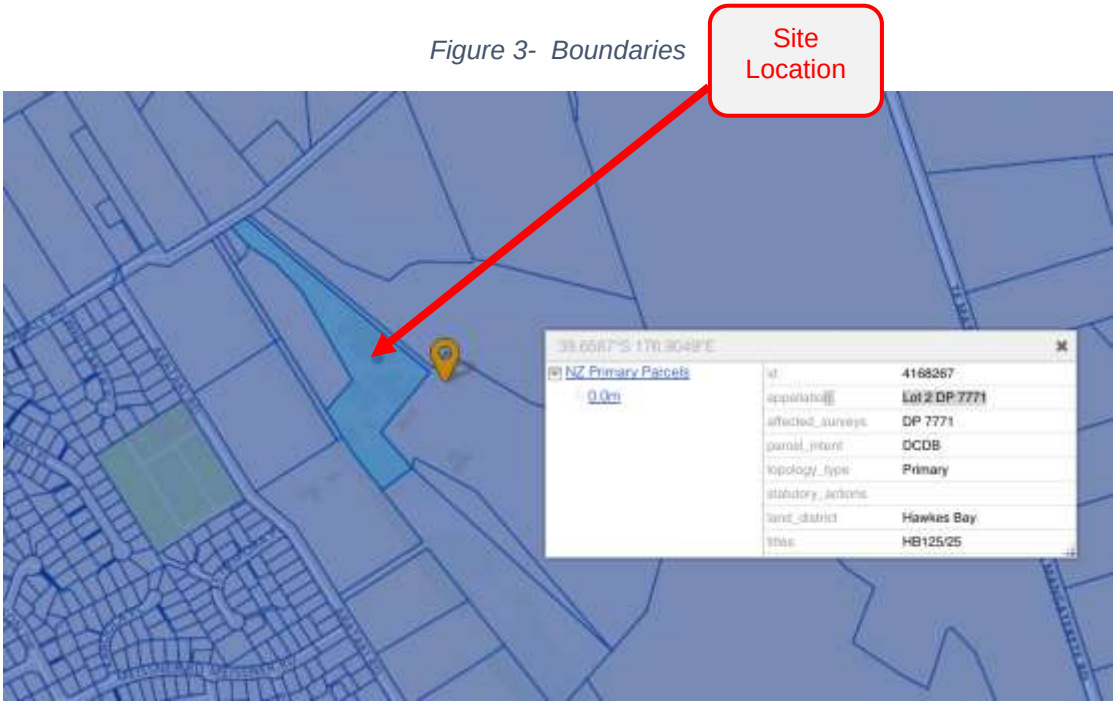


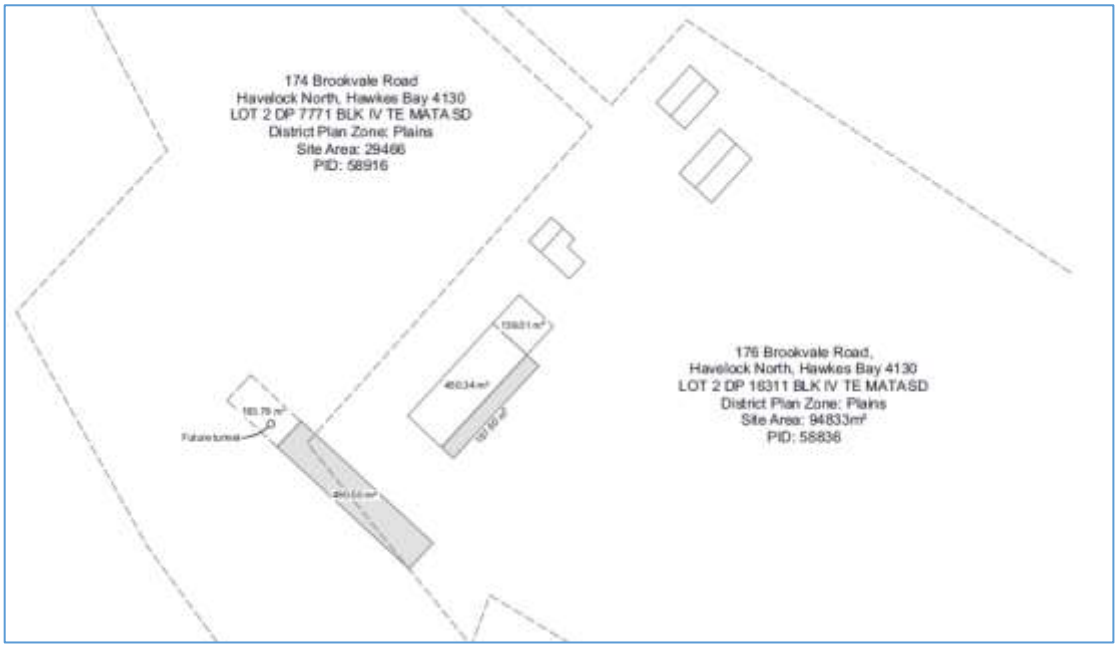
Figure 3- Boundaries



3. Proposed Development

The proposed development involves the extension of the existing compost bunker as shown in the figure below.

Figure 4 - Proposed Development



4. Standards

Hastings District Plan – Decisions Version July 2017

The Hastings District Plan provides, inter alia, a regulatory framework defining the noise levels permitted within the jurisdiction of the Hastings District Council. These limits are references in this report and assessed against for compliance analysis.

NZS 6801: 2008 – Acoustics – Measurement of Environmental Sound

This standard defines the parameters, quantities and metrics to describe noise in community environments, in addition to the procedures and methodologies of measuring and acquiring these quantities.

NZS 6802: 2008 – Acoustics – Environmental Noise

This standard defines procedures for the assessment of noise against compliance criteria.

NZS 6803:1999 - Acoustics – Construction Noise

This standard provides, for the purposes of noise level predictions, guideline noise levels expected from different machinery. NZS 6803:1999 includes reproduced annexes from the British Standard BS 5228: Part 1: 1997. These are cited in this report as “pertaining to BS5228 as referenced in NZS6803”.

5. Requirements - Hastings District Plan – Decisions Version

In accordance with the rules of the Hastings District Plan, the following rules apply:

25.1.6K EXPLANATION OF ZONES FOR NOISE PURPOSES

For the purposes of this Section:

(a) **Residential Zones** include: all zones within the Hastings Residential Environment and Havelock North Residential Environment, Flaxmere Residential, Flaxmere Community Residential, Clive-Whakatu and Haumoana-Te Awanga Residential, Coastal Settlements, Waimarama Settlement and Plains Settlement.

(b) **Commercial Zones** include: all zones within the Hastings Commercial Environment, Flaxmere Commercial, Flaxmere Commercial Service, Havelock North Mixed Use and Retail Zones, Clive-Whakatu, Haumoana-Te Awanga, Bridge Pa and Waimarama Suburban Commercial Zones and Regional Hospital Zone.

(c) **Industrial Zones** include: Light Industrial Zone, General Industrial Zone, Tomoana Food Industry Zone and Havelock North Business and Industrial Zones.

(d) **Rural Zones** include: Rural, Plains Production, Rural Residential, Te Mata Special Character, Tuki Tuki Special Character, Havelock North Rural Residential, Nature Preservation Zone, Deferred Hastings General Residential Zone, Deferred Haumoana-Te Awanga Residential, Deferred General Industrial Zone, Deferred Havelock North Residential Zone, Deferred Regional Sports Park.

(e) **Open Space Zones** include: Open Space Zone and Hawke's Bay Regional Sports Park.

25.1.6D RURAL ZONES

The following noise conditions shall apply to all land uses within all Rural Zones, other than those exempted in Rule 25.1.6B and 25.1.7E (Wind Farm Noise):

(a) The following noise limits shall not be exceeded at any point within the notional boundary of any noise sensitive activity on any other site within a Rural Zone, or at any point within the boundary of any site, in any Zone other than an Industrial Zone:

Control Hours	Noise Level
0700 to 1900 hours	55 dB $L_{Aeq\ (15\ min)}$
1900 to 2200 hours	50 dB $L_{Aeq\ (15\ min)}$
2200 to 0700 hours the following day	45 dB $L_{Aeq\ (15\ min)}$
2200 to 0700 hours the following day	75 dB L_{AFmax}

25.1.6C RESIDENTIAL ZONES

The following noise conditions shall apply to all land uses within all Residential Zones (including noise from fixed plants such as air conditioning units and other similar devices but excluding noise from emergency service facilities), other than those exempted in Rule 25.1.6B:

(a) The following noise limits shall not be exceeded at any point beyond the site boundary:

Control Hours	Noise Level
0700 to 1900 hours	50 dB $L_{Aeq\ (15\ min)}$
1900 to 2200 hours	45 dB $L_{Aeq\ (15\ min)}$
2200 to 0700 hours the following day	40 dB $L_{Aeq\ (15\ min)}$
2200 to 0700 hours the following day	70 dB L_{AFmax}

6. Equipment and Activities

The following table lists relevant noise generating equipment and mechanical plant expected to be used at the facility. Noise data is quoted below in accordance with previously done tests for the site, and with NZS 6803:1999, and BS 5228: Part 1:1997.

Table 1 - Equipment and Machinery SPL

Equipment	Sound Power	Sound Pressure
	L_{WA} [dB]	**LA_{eq} at 10m [dB]**
Wheeled Loader	101	73
Wheeled Loader	101	73
Compost Fan	79	51
Compost Fan	79	51
Bunker Fan	97	69
Chiller Compressor	87	59

7. Metrics

In accordance with the Hastings District Plan and NZ standards NZS6801, NZS6802, and NZS6803, the following metrics are used to quantify noise:

- L_{WA} [dB]: A-Frequency Weighted sound power level. This metric is primarily used to describe the power output from a sound source for the purposes of modelling.
- LA_{eq} [dB] or L_{eq} [dBA]: A-Frequency Weighted time average sound level. This metric represents the full audio range weighted against the response of the human ear. This is the primary descriptor of noise for receivers.
- LA_{max} [dB] or L_{max} [dBA]: Maximum sound pressure level.

8. Noise Assessment

This section details the assessment of noise levels on the site including models for prediction of noise from the proposed works, and noise predictions at surrounding receivers based on the models.

To predict noise propagation at the subject site from the proposed works, an environmental model was constructed for the operation using the CadnaA version 4.3 computer modelling program. The following applies to the modelling software CadnaA:

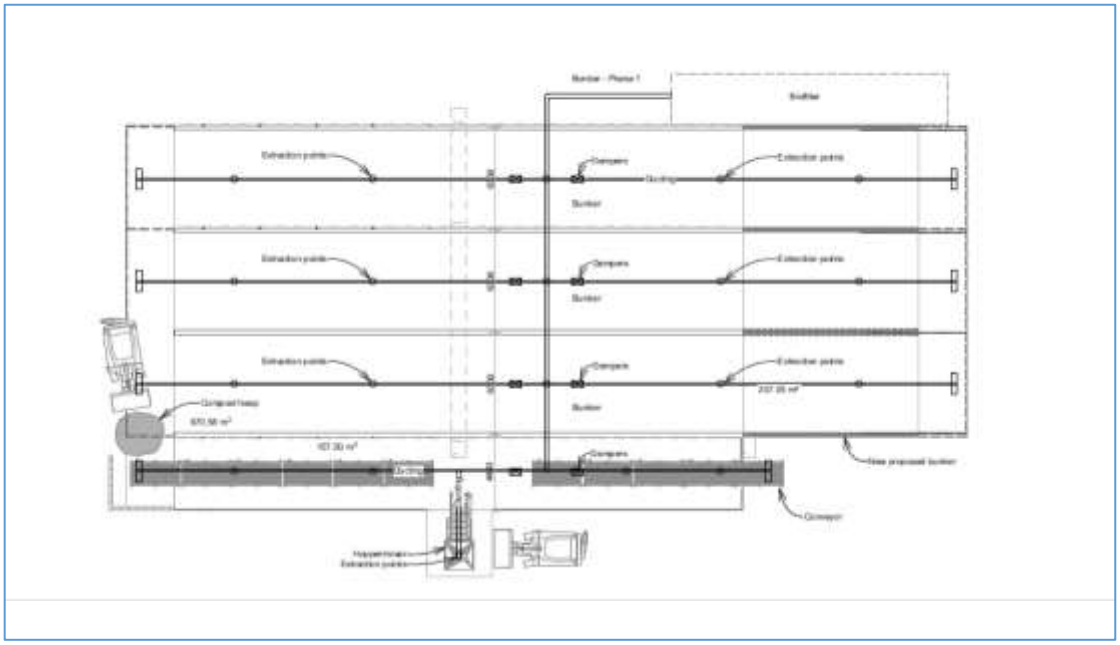
- The modelling method for noise propagation over distance is based on the international standard ISO 9613: “Acoustics – Attenuation of sound during propagation outdoors” methodology.
- The model allows importing digital ground elevation contours and data to define the topography and data for each of the noise sources, and the locations, geometry and elevations of the noise receivers.
- The program then calculates the LAeq dB level as the metric for the noise levels at the receivers for the purposes of this assessment.

Modelled Locations

The locations of the machinery and plant was modelled based on the following schematic pertaining to the operation of the site.

Worth noting that mobile machinery (wheeled loader) was modelled at ground level, and fixed HVAC equipment were modelled as roof mounted at circa 5m height.

Figure 5 - Equipment Location



Modelled Scenarios

The following scenarios were selected as representative of the operation with the machinery, and associated noise power levels, as noted in the table below. Modelling was done for receivers at 1.5m height representing the first floors of residential dwellings.

Table 2 - Modelled Scenarios

Scenario	Description	Equipment	Sound Power Level (dBA)
1	Daytime	Wheeled Loader	101
		Wheeled Loader	101
		Compost Fan	79
		Compost Fan	79
		Bunker Fan	97
		Chiller Compressor	87
2	Night time	Compost Fan	79
		Compost Fan	79
		Bunker Fan	97
		Chiller Compressor	87

Modelling Considerations

The following conservative assumptions were inherent in the noise models for the subject site in this report.

- **Simultaneity**: In each modelled scenario, all machinery was assumed running at full capacity simultaneously. This does not usually occur in reality.
- **Time Averaging:** In all modelled scenarios, machinery was assumed to run continuously regardless of sample time period. In reality, operations are usually highly variable with machines, especially loaders, cycling from off (setting up), to idling (preparation) to on (operating.) Taking time averaging into account would usually reduce the noise level for the compliance criteria L_{Aeq}.

Application of time averaging can be achieved using equations in accordance with Standard NZS6803-1999 Appendix *D.3.6.2 Conditions varying during the assessment period – Equation D.9*

$$L_{A\,eq(T)} = 10\log_{10}\left(\frac{1}{T}\sum_{i=1}^{n}\left(t_i \times 10^{(L_1)/10}\right)\right)$$

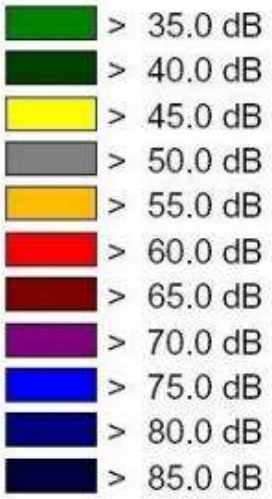
Where

- $L_{A\,eq(T)}$ = The combined equivalent continuous A-weighted sound pressure level (in dB) over a given time T_i
- L_1 = The individual equivalent continuous A-weighted sound pressure level, L_{Aeq}, for an item or a plan during a period t_i (in dB)
- n = The total number of individual equivalent continuous A-weighted sound pressure levels to be combined.

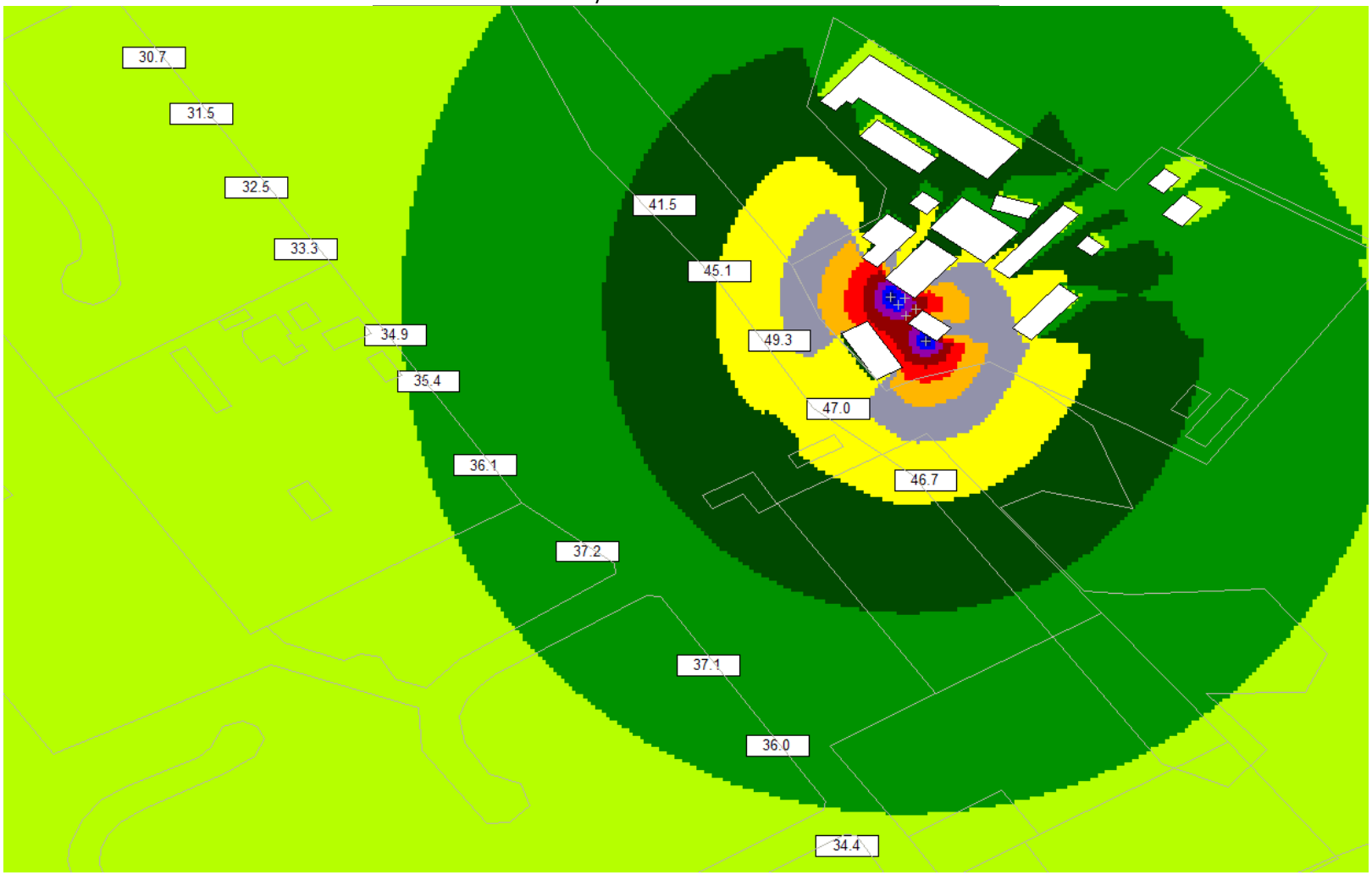
Noise Predictions

The following legend identifies the colour codes of the modelled figures in the following section:

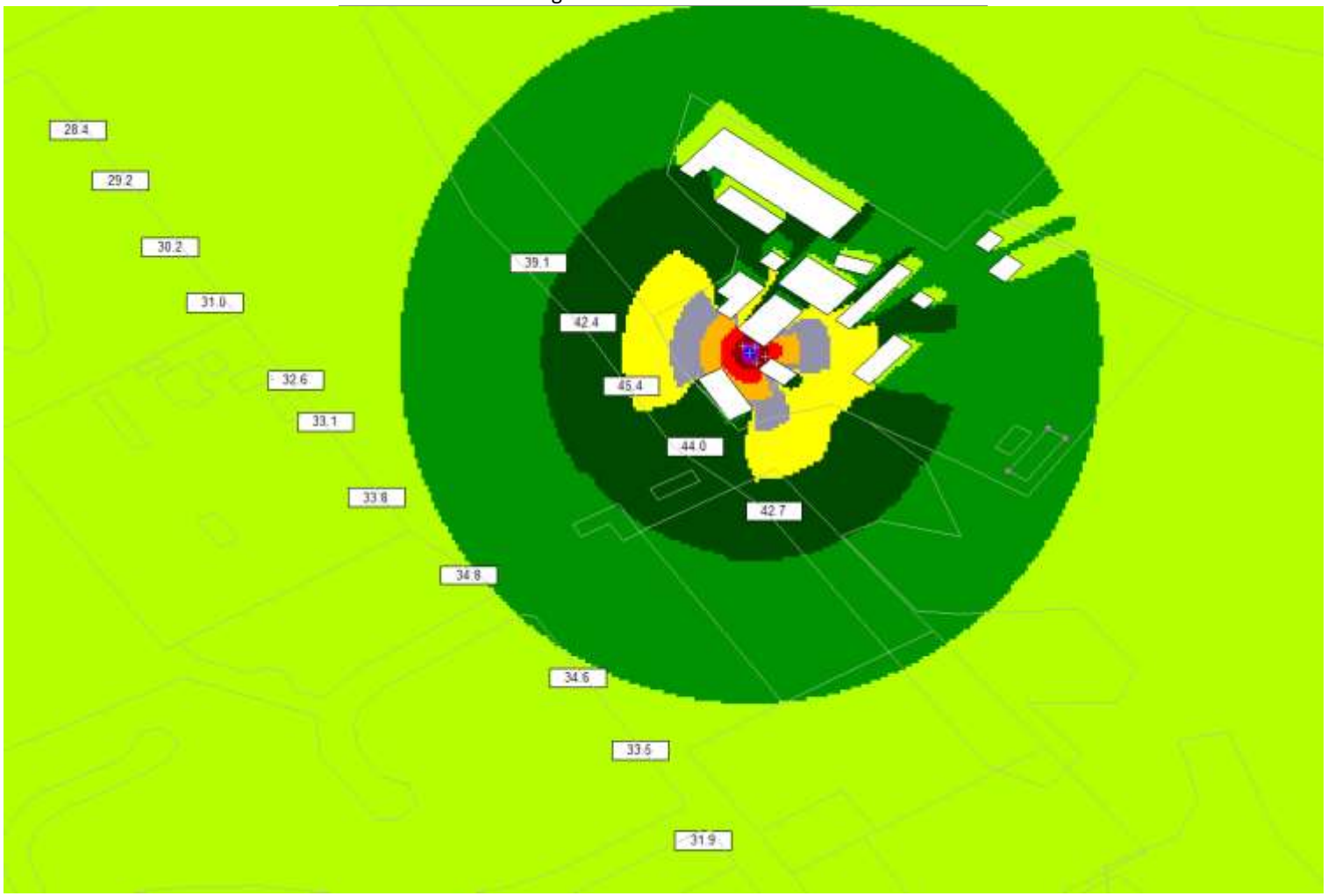
Figure 6 - Modelled Noise Level Colour Codes



Scenario	Description	Receiver Height
1	Daytime	1.5m



Scenario	Description	Receiver Height
2	Night time	1.5m



9. Receiver Analysis

Residential Zone

The noise sensitive environment to the west of the subject site is zoned residential.

In accordance with the requirements of the Hastings plan, the noise levels at this zone during the most sensitive night hours of 22:00-07:00 should be less than 40dB $_{LAeq}$.

Based on the modelled noise levels, the operation of the extended facility would generate noise levels at the boundary of the residential zone below this limit.

This is true even with the daytime operations of all equipment running including wheeled loaders.

As such, the operation of the extended facility is expected to comply with the noise levels at the boundary of the residential area to the West of the subject site,

Rural Zone

The site itself is in a rural zone in accordance with the Hastings Plan. The noise limits, in accordance with the plan requires noise at the boundary of the site to be less than LA_{eq} 55 during the daytime and less than LA_{eq} 45dB during night-time.

As per the modelled scenarios, and even with the conservative assumption that all machinery runs continuously, the noise levels at the boundary of the subject site complies with both the night-time and the daytime limits.

10. Conclusions

In accordance with the requirements of the Hasting District Plan, and based on conservatively modelled scenarios pertaining to the operation of the proposed facility, it is predicted that the noise levels from the operation of the proposed facility would comply with the relevant noise criteria at all assessed receivers at all times.

Appendix 5

Summary of Odour Controls

Proposed Upgrades and Best Practicable Option Analysis

Odour Source	Current Management/Mitigation	Current Practice Rating	Proposed Management/Mitigation	Implementation Date/Trigger	Upgraded Practice Rating
Bale wetting	• Drainage of recycled water back to storage pond • Recycled water stored in aerobic condition	Good Practice (given current site infrastructure)	• Bales spiking - recycled water is injected into the middle of the bales prior to laying the bales out for further wetting. This will: o Reduce the area required for bale wetting processes. • Pre-wetting over an aerated pad draining to the existing sump. This will: o Avoid the centre of the bails becoming anaerobic. o Minimise the footprint for bale wetting and recycled water drainage back to collection sumps. At full future production rates, the footprint for bale wetting will be similar to the current dimensions.	Upon increasing compost production to 200 tonnes	Best Practicable Option
Chicken litter/gypsum storage and handling	• Mixed off site • Stored in a three-sided roofed bunker with a tarpaulin draped over the opening to keep the litter dry	Best Practice	None required		Best Practice
Laying out bales and spreading chicken litter/gypsum mix on bales, then breaking and mixing bales and placing mix into bunker.	• Keeping the chicken litter/gypsum mix dry during storage • Storing recycled water in aerobic condition to reduce odour emissions from bales as they are opened and mixed	Good Practice (given current site infrastructure)	• Bale mixing and breaking using a bale breaker machine instead of laying out the chicken litter substrate over lines of bales. • The blending line (attached to the Phase 1 bunker) will be semi enclosed with a mixing hopper placed under an extended eave. An air extraction system within the blending line and eave will extract most of the odour from the blending line, eave and the immediate vicinity for filtration in the biofilter system. This will:	Upon increasing compost production to 200 tonnes	Best Practicable Option

			○ Speed up the mixing process - the duration per tonne of compost is expected to reduce about 4-fold ○ Reduce the potential odour footprint to the confines of a hopper as opposed to long lines of exposed bales. ○ Enable the blended inputs to be placed directly (via loader) into a Phase 1 bunker, again reducing the potential odour footprint/time of exposure due to avoiding rows of compost being laid out on the outdoor compost pad. ○ Remove odour from the extracted air via passage through the bio-filter.		
First and second turning of compost in Phase 1 bunkers	• Using a spare "half" bunker to enable direct bunker-to-bunker transfers without using an interim outdoor windrow	Good Practice (given current site infrastructure)	• Extend the length of existing bunkers by approximately 10m to contain the turning machine and turned compost within the bunker during the bunker to bunker transfer process, and construct a canopy over the extended bunker entrance containing additional air extraction to the biofilter to help capture odour that may escape the bunker while the door is open during the process. • Construct a third bunker long enough to contain the turning machine and turned compost, and construct a canopy over the new bunker entrance containing additional air extraction to the biofilter to help capture odour that may escape the bunker while the door is open during the process. • These measures will:	Within 8 months of consent being issued Upon increasing compost production to 200 tonnes	Best Practicable Option

			○ Enable the footprint of odour emissions from the mixing of compost to be fully retained within the bunkers ○ Capture most of the odours escaping from the bunker opening		
Removal of compost from Phase 1 bunkers, mixing and placement into Phase 2 tunnels	• Restriction of the process to one day per week	Good Practice (given current site infrastructure)	• Construct a new building to the west of the Phase 1 bunkers adjacent to the Phase 2 tunnels with a hopper underneath an extended eave alongside. The new building will incorporate loading of the turned compost into the Phase 2 tunnels. • This will allow the final turning and mixing processes to be undertaken in a semi enclosed environment. • The building and extended eave will be ventilated to a new biofilter with sufficient design capacity. • This will: ○ Eliminate the need for a temporary outdoor windrow for mixing and transfer of compost from Phase 1 and Phase 2, which is a significant current odour source. ○ Reduce the volume of compost exposed to the atmosphere i.e. compost will be retained within semi enclosed areas except when it is being transferred between the Phase 1 bunkers and the new hopper in a front end loader. ○ Speed up the process, enabling a later start thereby removing the potential for odour emissions early in the morning whilst meteorological conditions place odour nuisance at greater risk.	Within 8 months of consent being granted	Best Practicable Option/Best Practice

Phase 2 composting	• Passive ventilation of a portion of recirculated air to atmosphere from a vent on the roof of each tunnel	Best Practicable Option	Although not considered to be strictly necessary, vents from the tunnels will be ducted to the new biofilter servicing the conveyer and new building referred to above.	Within 8 months of consent being granted	Best Practice
Emptying of Phase 2 tunnels	None required		None required		
Stockpiling and removal of spent compost (after use for mushroom cultivation	• Removal of old, anaerobic stockpiled material from site • Introduction of practices for regular removal of spent compost from the site and reduction of stored volumes	Good Practice (given current site infrastructure)	• Spent compost will be stored within either of the following areas: o On a concrete pad in the existing spent compost area located at the front of the site under a canopy to keep the spent compost dry – any remaining compost will be removed from the site within 7 days, o On a concrete pad in the centre of the site - any remaining compost will be removed from the site within 7 days.	Within 8 months of consent being granted	Best practice
Recycled water drainage/collection	• Removal of intermediate sumps • Installation of new drainage channels in concrete pad	Best Practicable Option	None required - with previous upgrades completed the source is already well managed however it will be further improved through additional drainage channels and minimising the footprint of the bale wetting activity as outlined above.		Best practice
Recycled water storage pond	• Continuous aeration to retain dissolved oxygen concentration of at least 1 mg/m^3 • Continuous monitoring of dissolved oxygen and water temperature	Best practice	None required		Best practice
Biofilter	• The biofilter design has been independently reviewed and found to be fit for current purpose • The biofilter temperature is continuously monitored • Biofilter backpressure, moisture and pH is intermittently monitored	Best Practice	• Biofilter upgrades or new biofilters will be required when the proposed modifications are implemented to the: o Phase 1 composting system i.e. additional volumes of air will be extracted from the:	As required in relation to the above	Best Practice

	• The monitoring demonstrates that the biofilter is operating within normal parameters for optimum odour treatment efficiency		- extended bunkers, - new third bunker, - new extraction points in the canopies over the entrances to the bunkers, - conveyer/static turning building, phase 2 tunnel entrance and phase 2 tunnel vents, o Bale breaking process i.e. new extraction points in the eves under which the blending line and mixing hopper will be located.		

Appendix 6

Odour Assessment

ABN 92 160 694 011

Odour Assessment – Te Mata Mushrooms

Report prepared for:
The Te Mata Mushroom Company Limited

19 December 2016

Table of Contents

Appendices

1 Introduction

The Te Mata Mushroom Company (TMM) operates a mushroom growing factory near Havelock North, Hawke's Bay. The factory includes a compost making facility where the compost substrate for growing the mushrooms is prepared.

The composting facility has historically been surrounded by rural-type activities including a camping ground, but in recent times has been subject to urban encroachment with residential subdivision occurring close by.

The operation was granted a new resource consent on 13 April 2011, DP100128A. As part of the technical supporting information for that consent application, a report on odour emissions and mitigation options for the composting operation was prepared by Beca in 2010[1] (herein referred to as the Beca Report (2010)).

The frequency of complaints made to Hawke's Bay Regional Council alleging adverse odour impacts from the TMM site has increased in recent years. During this time, there have been no discernible changes in processes over recent times compared to previous years that an increase in complaints could be attributable to. On the contrary, the site has undertaken a number of odour reduction initiatives. The operation has for some 10 years plus continued to produce up to 120 tonnes of compost per week. However, due to the nearby subdivision, around 160 new dwellings have recently been constructed closer to the site.

The purpose of this report is to identify the current sources of odour at the composting plant on the TMM site, assess complaint information, and to document recent and proposed odour mitigation measures. The potential impact of the proposal by TMM to increase compost production to 500 tonnes per week coinciding with the implementation of odour mitigation measures is also assessed.

[1] Beca Infrastructure Ltd (2010), "Te Mata Mushrooms Odour Source Assessment", prepared for Te Mata Mushrooms Ltd, February 2010.

2 Receiving Environment

2.1 Site Location

The TMM site is located at 174-176 Brookvale Road, Havelock North. The location is shown in Figure 1. The site is bounded by farmland. A recent housing development known as "Brookvale" is located to the southwest.

Figure 1: TMM site location. Image source: Google Earth Pro, image flown 7 September 2015 UTC.

Other activities with potential for odour emissions include a neighbouring farm with a small number of pigs, as shown in Figure 2. Odours from these pigs have the potential to be confused with odours from the composting plant.

The current land use zone map for the area is provided in Figure 3. The TMM site is surrounded by land zoned "Plains Production", with a General Residential zone to the west of Arataki Road. It is understood that the area immediately west of Arataki Road was zoned General Residential in 2007[2], and was previously zoned for rural purposes.

[2] Jacobs (2015). Reverse Sensitivity Assessment for Arataki Re-Zoning Proposal, Phase One Advice on Odour. Prepared for Hastings District Council, Final dated 29 May 2015.

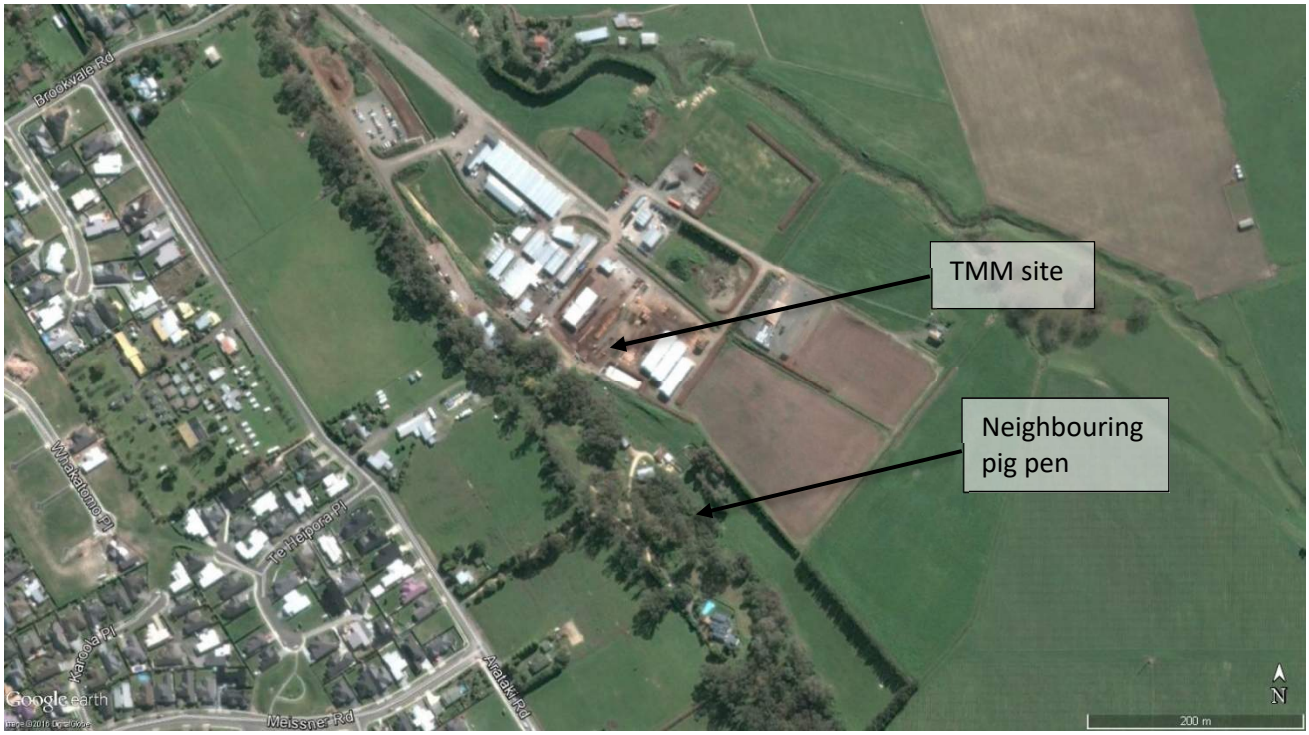


Figure 2: Location of TMM site and neighbouring pig pen. Image source: Google Earth Pro, image flown 7 September 2015 UTC.

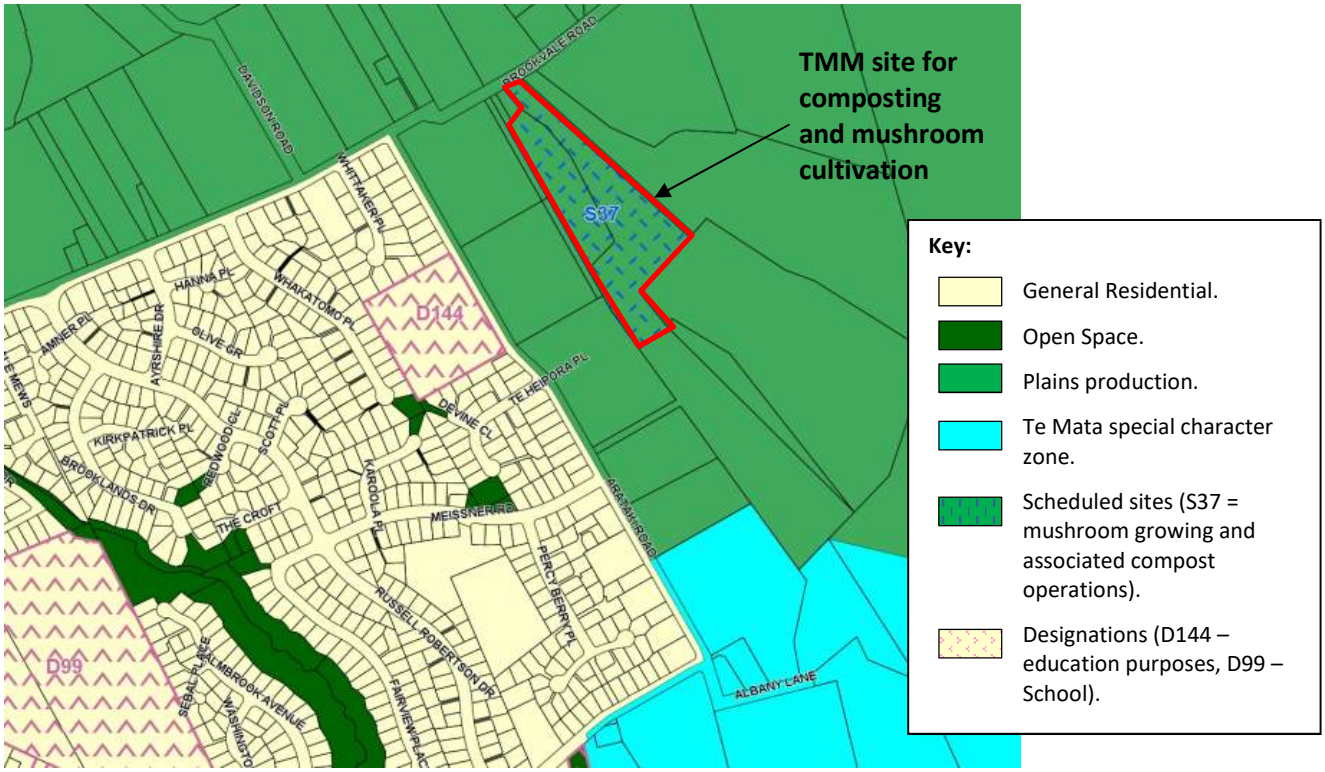


Figure 3: Land use zones around the TMM site, from Map 47 in Proposed Hastings District Plan as Amended by Decisions on Submissions, notified on 12 September 2015.

2.2 Change in Sensitivity of the Receiving Environment

The zoning of land to the west of Arataki Road as General Residential in 2007 has resulted in gradual encroachment of new houses towards the TMM site over the last nine years. The progression of residential development from 2003 to 2016 can be seen in the aerial photos in Appendix A.

The dramatic change in proximity of residential development from 2003 to 2016 shown in Appendix A, has brought about a number of challenges for TMM due to the change in sensitivity of the receiving environment to odour emissions:

- Odour emissions that were once acceptable are no longer acceptable.
- Odour mitigation is possible, but comes at a cost.
- Relocation is not economically viable (nor is it considered to be necessary).
- Increased production rates are required for the economies of scale necessary to compete with other producers and to make odour mitigation affordable.

3 Description of Activities

3.1 Composting

Compost is an essential part of the mushroom growing process and is used as part of the substrate that the mushrooms are grown on. Compost consists of straw, chicken litter and gypsum. Other additives such as maize are also used when available. The key components of the composting process are described in this section. A number of photos illustrating the various processes are included in Appendix B.

The layout of the site is shown in Figure 4.

Figure 4: Site layout. Aerial photo taken 7 September 2015 (Monday) UTC, or 8 September 2015 (Tuesday) in local time. Photo shows Phase 1 compost removed from bunkers into windrows, ready for transfer to Phase 2 tunnels.

Straw is kept on a gravel pad on site until it is required. Chicken litter, premixed with gypsum before delivery to site, is stored in a concrete bunker which consists of a concrete pad, three solid walls, a soft-covered opening on the fourth wall, and a roof (Photo B1, Appendix B). The premixed litter is usually delivered once per week, typically mid-afternoon on a week day.

Mulched maize is stored in a separate bunker to the northeast of the bale-wetting area (Photo B2, Appendix B). This material has a mild sweetish smell.

The composting facility consists of four Phase 1 bunkers which are progressively emptied and filled to facilitate turning of compost via bunker-to-bunker transfer without the need to place compost into an outside windrow for turning. These bunkers have a concrete floor, two concrete walls and insulated panel roof, and the end openings are closed with permanent sliding curtain doors when not in use (Photo B3). The Phase 1 bunker concrete floors have recessed lines which act in parallel as a leachate collection system and aeration lines.

During the composting in Phase 1 air is blown through the composting material to maintain aerobic conditions. Oxygen and temperature probes are placed into the material in each bunker. Temperature probes are also located in the headspace near the roof of the bunker. An oxygen content of 6-8% within the compost is maintained, however this is often higher if extra air is needed for temperature control. Foul air within the bunker is drawn from the top of each bunker and blown through a bark biofilter (refer Section 4.1). The biofilter is visible to the right of the picture in Photo B3.

The bunker is normally operated under a slight vacuum or negative pressure compared to outside air. At the completion of the Phase 1 process, the compost is removed from the Phase 1 bunkers and placed on an outdoor pad, and transferred to the Phase 2 tunnels by front end loader.

The Phase 2 tunnels are roofed with a concrete floor, walls, and solid doors at each end (Photo B4). Oxygen probes and temperature gauges are inserted into the compost at several points. During the Phase 2 cycle, air in the bunker is recirculated at one end of the bunker, and a portion of the air is passively vented to atmosphere via the vents at the other end of the bunker (also shown in Photo B4). During filling of the Phase 2 bunkers, the ends of the bunkers are open to atmosphere.

Approximately 100 tonnes of compost is currently produced per week on average. Phase 1 takes about 12 days to complete, and the whole process from pre-wetting of bales until the compost is ready to grow mushrooms is nearly four weeks. Multiple batches of compost are in various stages of production at any time so that one batch of compost is completed every week. The current composting timeline showing two staggered batches is provided in Table 1.

3.2 Recycled Water Collection and Storage

The composting is all conducted on a concrete pad and all stormwater and leachate from the composting system is collected into the recycled water system through drain lines recessed into the concrete.

The recycled water is pumped to a storage pond, where it is continuously aerated and circulated (Photo B5, Appendix B). Dissolved oxygen is monitored continuously by automatic logger.

The recycled water is used to wet the bales.

Further details about the recycled water storage pond are provided in Section 4.2.

Table 1: Production schedule for two concurrent batches of compost showing staggered starting days.

Day	Batch 1	Batch 2
Thursday	Pre-Wet	
Friday		
Saturday		
Sunday		
Monday		
Tuesday		
Wednesday	Pre-Wet finished	
Thursday	Bale break, bunker filled	Pre-Wet
Friday		
Saturday		
Sunday		
Monday	Bunker-to-bunker transfer	
Tuesday		
Wednesday		Pre-Wet finished
Thursday		Bale break, bunker filled
Friday	Bunker-to-bunker transfer	
Saturday		
Sunday		
Monday		Bunker-to-bunker transfer
Tuesday	Remove, mix, enter Phase 2	
Wednesday		
Thursday		
Friday		Bunker-to-bunker transfer
Saturday		
Sunday		
Monday		
Tuesday	Remove compost from Phase 2	Remove, mix, enter Phase 2
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		
Monday		
Tuesday		Remove compost from Phase 2

Composting Stage:	
Pre-Wetting	
Phase 1	
Phase 2	

3.3 Used Compost Disposal

After the compost has been used as a growing medium for mushrooms, it is pasteurised and then transferred by a truck to a storage area. Up to 150m^3 of spent compost is removed from the processing operation every Thursday. The transfer process occurs over the course of about 6 hours, usually commencing at 6.30am.

The storage area is located near Brookvale Road west of the main site access way. The storage area is located within land leased from the Hastings District Council for this purpose.

Each batch of spent compost is stored within the storage area in uncovered piles for a maximum period of two weeks. Up to 300m^3 may be stored at any time. The spent compost is either sold in bulk to various parties over the next few days, or removed by a contractor.

4 Existing Odour Treatment

4.1 Biofilter

A biofilter is used to treat the air ventilated from the compost during Phase 1 (Photos B6 and B7, Appendix B). During two site visits by AirQP in September and October 2015, visual inspection of the biofilter found that it appeared to be in good condition and damp under the surface. The biofilter emitted no recognisable composting odours other than the faint but characteristic earthy odours commonly associated with well-operating biofilters.

The biofilter design specification is provided in Table 2.

Table 2: Biofilter specifications (from Beca (2010))

Design parameter	
Dimensions (external, design)	24.6m x 6.6m
Dimensions (internal, approx)	24m x 6m
Surface area	144m²
Depth	2m (1.5m Bark 10-20mm, 0.25m bark 25-75mm, 0.25m river gravel 20-40mm)
Volume	252 m³ (excludes depth of river gravel)
Biofilter media	Radiata pine bark with washed river gravel base
Maximum air flow	20250 m^3/hr (from fan specification curve)
Maximum hydraulic loading rate	80 m^3/hr per m^3 media

The fan speed is regulated by using an electronic variable speed fan drive and is regulated to keep the "Phase 1" bunkers at approximately 38 – 40°C when the doors are shut. Fresh air is added by manual duct adjustment at the biofilter inlet as required to maintain the inlet air temperature at 40°C or less. The biofilter inlet temperature is measured continuously and automatically logged, as discussed further below. The biofilter moisture is maintained at 50 – 70% using an irrigation system and is tested weekly.

A water spray system is installed in the duct upstream of the biofilter blower. This increases the humidity of the air entering the biofilter and may also act as a partial wet scrubber, removing some ammonia from the air stream.

The performance of the biofilter was independently reviewed by Beca Infrastructure Ltd in 2011. The report on that review is provided in Appendix C. The report concluded that "*the biofilter design is fit for purpose based on the current operating conditions and loading rates. The existing bark media is expected to remain in reasonable condition for the next 3-5 years*".

Maintenance of the biofilter has included the addition of 1 cubic metre of lime in May 2015, and 50 cubic metres of bark in June 2015.

Backpressure across the biofilter bed is recorded usually twice per day from a manometer mounted on the side of the biofilter wall. The backpressure ranges between 0 and 100 Pa (10mm water gauge), varying with the air flow rate applied to the bed. This is within the normal operating range for a bark biofilter (Cudmore & Gostomski, 2005)[3]. Recent measurements show no trend of increasing backpressure. Increasing backpressure over time could indicate media consolidation and time for media replacement.

Biofilter media moisture content and pH is tested regularly by an independent laboratory. Historical test results provided by TMM are listed in Table 3. The biofilter shows consistent moisture content and pH with no significant changes since 2012.

Table 3: Biofilter media test results, moisture content and pH

Date of test	pH	Moisture content*
August 2011	4.2	69.8%
February 2012	7.0	66.1%
August 2012	5.9	68.7%
April 2013	6.1	63.3%
August 2014	6.3	68.8%
September 2015	6.4	63.3%

* Tested fortnightly, selection of results only shown to illustrate trends.

The temperature of the air stream entering the biofilter is closely monitored. A datalogger was installed in October 2015 allowing continuous monitoring and automatic logging of temperature data. Prior to the installation of the datalogger, temperature was manually recorded at least twice per day (morning and afternoon). Temperatures recorded manually from July 2014 to October 2015 are plotted in Figure 5. Temperatures recorded from July 2016 once consistent electronic logging of automatically monitored data was established are plotted in Figure 6. The recommended maximum temperature for a biofilter is less than 40 degrees, although brief excursions above this temperature are usually well tolerated. The biofilter is operating within the optimum range for microbial activity, important for good odour treatment.

[3] Cudmore, R. and Gostomski, P. (2005): *Biofilter Design and Operation for Odor Control – The New Zealand Experience*. In, Shareefdeen, Z. and Singh, A. (Eds): *Biotechnology for Odor and Air Pollution Control*, Springer (2005).

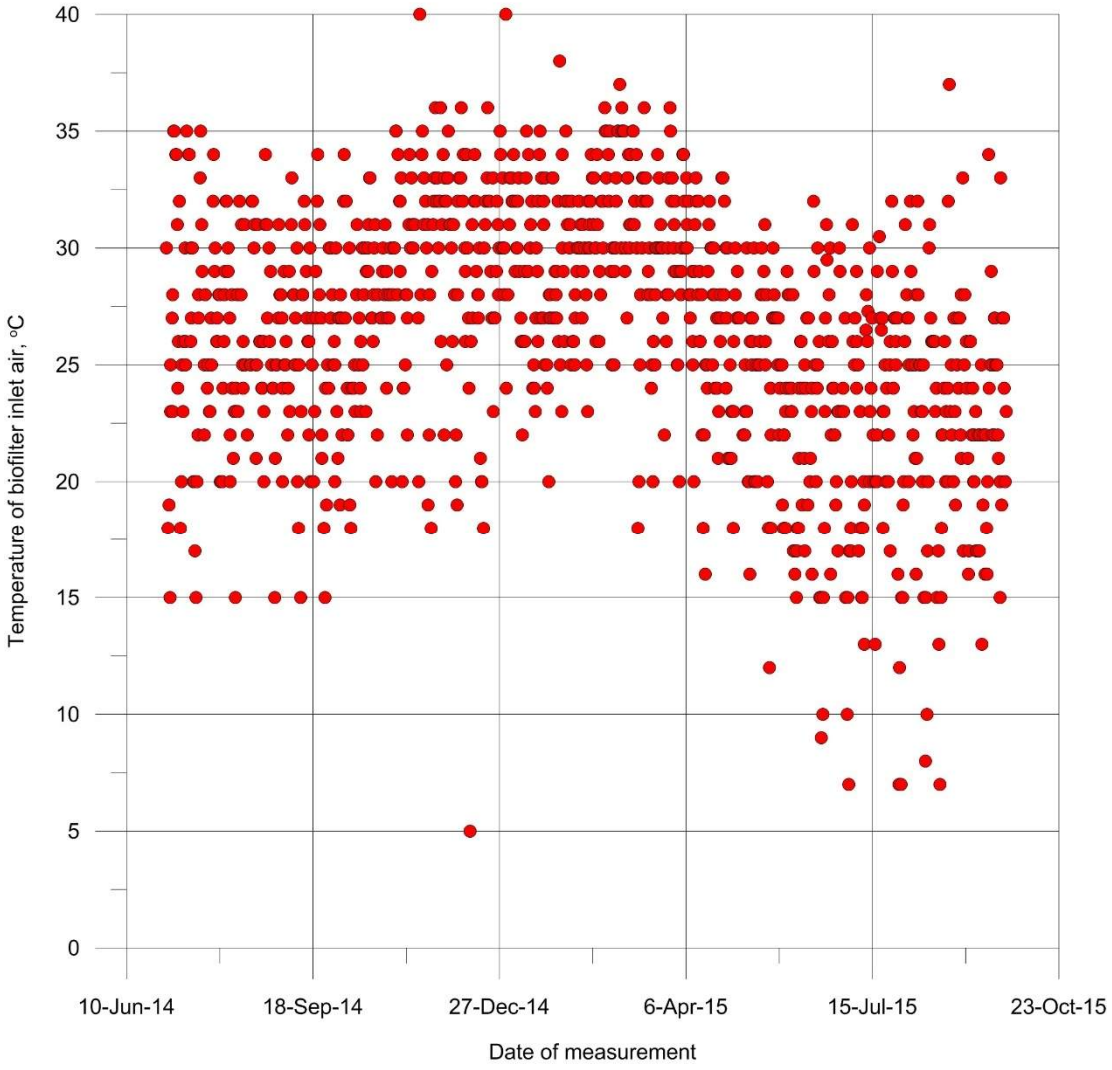


Figure 5: Biofilter temperatures recorded manually at inlet air duct, prior to commissioning of automatic logger in October 2015.

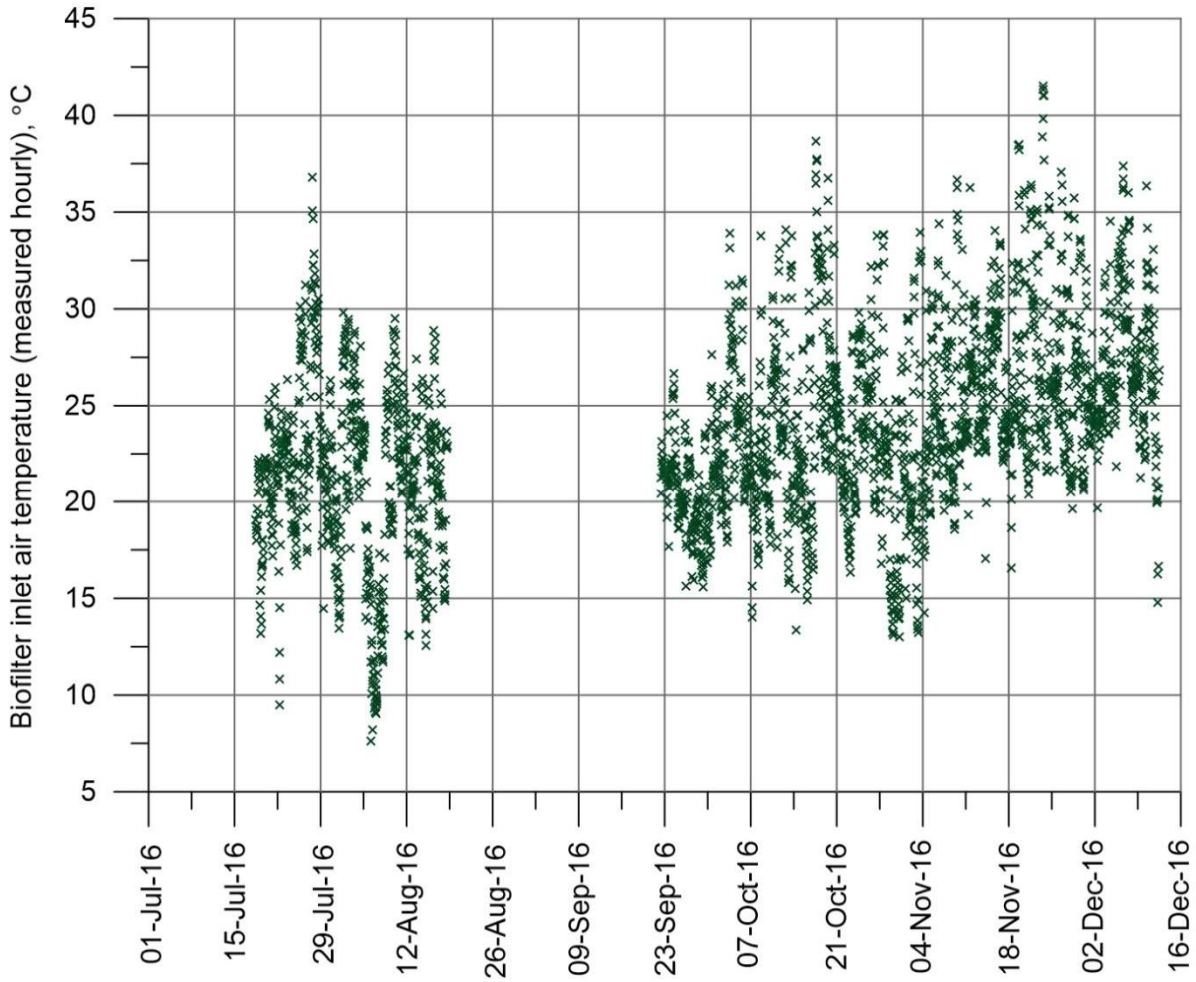


Figure 6: Biofilter temperatures recorded automatically at inlet air duct, from July 2016.

4.2 Recycled Water Storage Pond

At the time of the Beca Report (2010), recycled water collected at the site was aerated by recirculation through a collection sump (Photo B8) and then transferred to a holding pond that was not aerated (Photo B9). The Beca Report (2010) identified some potential issues with this recycled water management system that may lead to odour generation: "*Whilst the recycled water is aerated by recirculation though the sump, the recycled water is highly organically loaded and may be consuming the oxygen rapidly in the pond. The aeration provided in the sump may not be sufficient to maintain the recycled water in the pond in an aerobic state.*" It was recommended that *"Monitoring of dissolved oxygen levels in the pond is required, followed by review of aeration capacity of recycled water system if dissolved oxygen levels are less than approximately 1 mg/L. Degree of mitigation required will depend on the outcomes of this review."*

Monitoring of dissolved oxygen concentrations commenced following the production of that report. Monitoring indicated dissolved oxygen levels frequently below 1 mg/L. Following an internal review of management of recycled water at the site, a new recycled water pond was constructed at the site in 2015

(Photo B5), slightly to the south of the old pond. The new pond was fully commissioned in August 2015, with the old pond subsequently decommissioned and back-filled. Aeration was removed from the collection sump (Photo B10), and a new high-rate aeration system was introduced to the new pond.

The recycled water aeration system used in the new pond is an SAR™ Aerator from Hydro Processing and Mining Ltd (Canada)[4], proven in the field for mushroom composting farms. The aerator design recirculated recycled water through a land-mounted aerator, with the aerated water returned to the pond.

Following installation of an automatic datalogger in October 2015, dissolved oxygen levels in the pond are now monitored continuously. Prior to that installation, dissolved oxygen levels were recorded manually at least two times per day. Monitoring data for the period October 2015 to December 2016 is shown in Figure 7. The new recycled water pond consistently reports dissolved oxygen levels exceeding 2 mg/L, twice the concentration required by the current resource consent. This is considered sufficient to maintain the recycled water in aerobic condition in the pond.

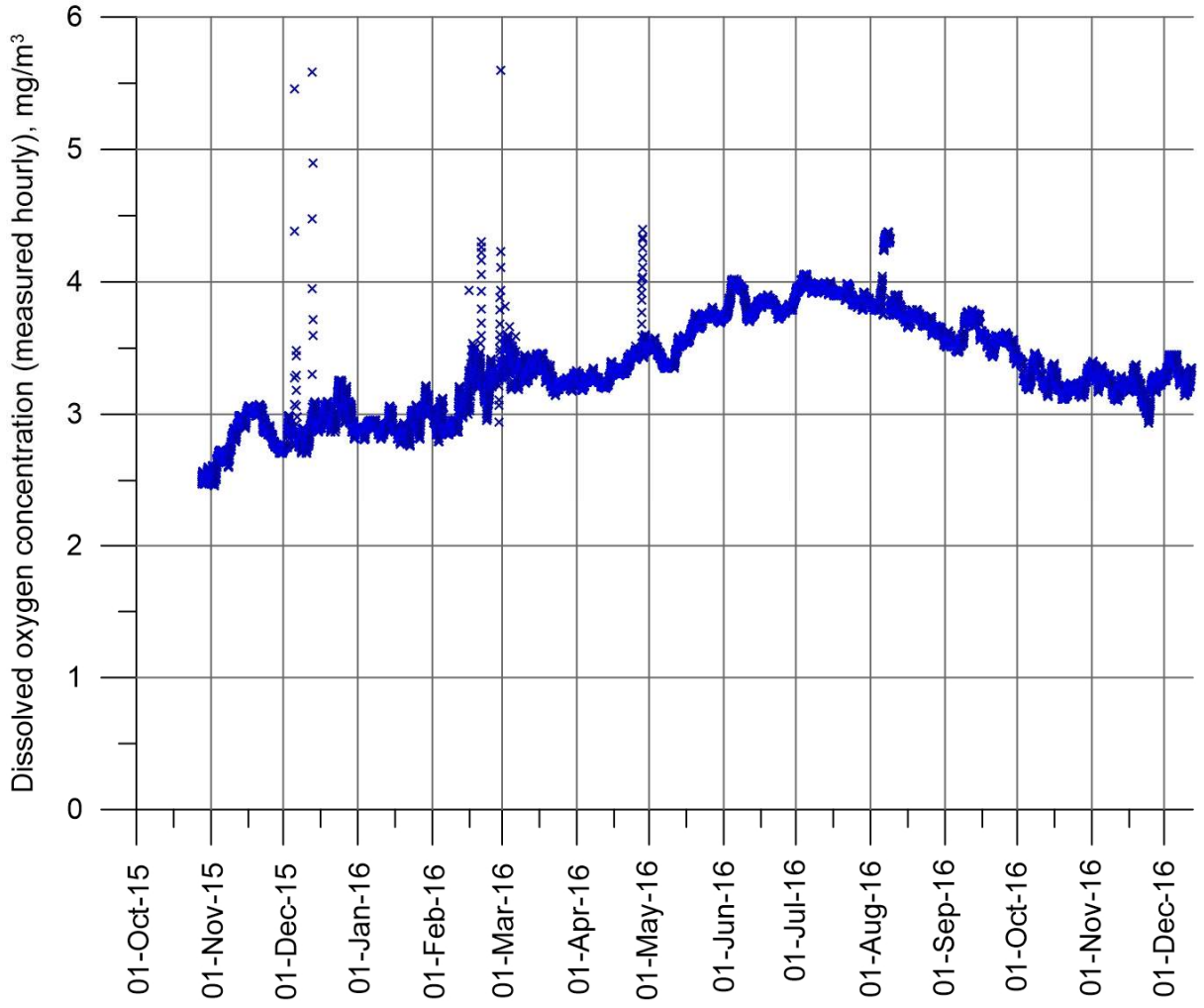


Figure 7: Dissolved oxygen monitoring results in recycled water pond, Oct 2015 – Dec 2016, hourly readings.

[4] http://www.hpmltd.ca/Aeration.html

4.3 Odour Control Sprays

Odour control sprays were historically provided around the composting yard at many fugitive odour emission points. The odour control chemical that was used was called “Super Spice” from Cyndan Chemicals (supplied by Hi-Chem NZ Ltd), and it is understood this was originally recommended by the Hawke’s Bay Regional Council.

TMM has ceased to use the odour control sprays in late 2014, as complaints had been attributed to the smell of the “Super Spice” and the sprays were considered by management to be of little benefit in the current form as an odour control mechanism. This decision was made in consultation with, and with the agreement of, HBRC. However, odour neutralising chemicals may be considered for use at air extraction points on the site following the upgrades described in Section 9, provided that the chemicals can be demonstrated to have no negative impact on compost quality and mushroom growth.

5 Additional Odour Mitigation Approach

5.1 Typical Best Practice Approach

When considering any activity that discharges an unacceptable amount of odour, each odour mitigation strategy is unique to the site in question. A strategy that works at one location may not necessarily be the most appropriate or effective at another site.

Best practice for identifying an odour mitigation strategy for any particular site, regardless of the type of product and materials handled at the site, follows the hierarchy of:

1. Identify the various odour sources and rate their contributions to off-site odour impacts, considering all of the FIDO[5] factors that describe any particular odour emission:
    a. Magnitude of odour emission
    b. Character of the odour emission
    c. Time of day when the odour is emitted, especially coinciding with complaints and meteorological conditions that are unfavourable for dispersion
2. Reduce the generation of odour and/or modify the character of the odour where possible by:
    a. Optimising processes and monitoring
    b. Reducing opportunities for anaerobic conditions in processes and wastes (unless this is a critical production requirement)
    c. Upgrading site infrastructure and maintenance to improve site cleanliness and reduce fugitive odours
3. Prevent release of odours from sources considered to have the potential to make a significant contribution to off-site odour impacts, by capturing these odours at the point of release and treating those captured odours to remove odour.
4. Discharge treated or untreated captured odours through a stack designed to optimise the rate of dilution and dispersion of the odours.

It is common when reviewing the relative contributions of various sources under (1) above to have one or more sources that are clearly significant contributors, one or more sources that are clearly minor contributors, and one or more sources that are difficult to categorise as either significant or minor at the outset. Therefore, odour mitigation strategies frequently take the form of a staged odour control approach whereby the most significant sources are dealt with first, then the odour compliance performance of the site is monitored and reviewed to determine whether additional mitigation is still necessary.

[5] FIDO – the frequency, intensity, duration and offensiveness of the odour noticed by a sensitive receptor

Sometimes, a site may decide to just enclose all of the odour sources and operate the enclosed space under negative pressure forced ventilation, with air extracted from the enclosed space treated to remove odour and/or discharged through a stack. Examples of where complete enclosure of Phase 1 composting has occurred or is proposed for sites carrying out composting to prepare mushroom-growing substrate can be found on the internet. However, it is usually not necessary for an established industrial/production site to move directly to a decision of full enclosure as there are significant associated engineering, materials handling, staff health/safety, and cost implications. In addition, complete enclosure results in a very large volume of weak odour requiring treatment in very large and expensive odour control systems, as opposed to targeted capture of odours at source which results in a smaller volume of air with stronger odour concentration which can be more sustainably treated.

5.2 Odour Control Objective

A production site like TMM cannot achieve 100% capture and treatment of odour, however this is not required to meet a "no offensive or objectionable odour" outcome. The objective is not to avoid detection of all odour, but to reduce the frequency, intensity, unpleasant characteristics, and duration of odour occurrence to the extent that any odour noticed at a sensitive receptor is not deemed to be offensive or objectionable.

5.3 Mitigation Approach Used at TMM

The approach used to identify an odour mitigation strategy at the TMM site has focussed on:

1. Changing the way activities are carried out so that the potential for odour generation is minimised, including the hedonic tone of any residual odour (i.e. reducing the potential for that odour to be regarded as offensive or objectionable due to its degree of unpleasantness).
2. Where sufficient reduction of odour generation is not possible, focus is on odour capture and treatment at source.

In order to identify the odour control measures required to achieve this strategy, a full review of local meteorology, complaint patterns, and site odour sources has been carried out and these are presented in the following sections of the report.

6 Meteorology

6.1 Influence of Meteorology in Odour Dispersion

The most important meteorological conditions affecting dispersion of odour after emission are wind speed and direction, and atmospheric stability.

Wind speed: For emissions occurring close to ground or entrained in building downwash eddies, low wind speeds (roughly less than about 2 - 3 metres per second, or 4 - 6 knots) tend to result in noticeable odour at greater downwind distances than at higher wind speeds.

Atmospheric stability: The atmospheric stability is a measure of the vertical mixing, or turbulence, of the atmosphere close to ground. During low wind speeds around sunset and sunrise, and overnight, the atmosphere can be very stable with "inversion" caps keeping pollutants emitted close to the ground from rising high into the atmosphere. If such conditions coincide with odour emissions from sources located close to the ground, such as the odour sources at TMM, the dispersion of odour downwind from the source can be slow with odour nuisance more likely to be noticed by downwind sensitive receptors. These stable atmospheric conditions do not occur during the daytime, so avoiding odour discharges during stable conditions (such as around sunrise) can be a good way of reducing or limiting the risk of odour nuisance.

6.2 Local Wind Records

The nearest long-term meteorological monitoring station with publicly available data is at Whakatu, about 10.5 km north-northwest of the TMM site (refer Figure 8).

Wind patterns at TMM may differ somewhat to those at Whakatu because the TMM site is closer to the hills at the southeastern end of the Bay and is also more distant from the coast. The main significant wind direction for carrying odour towards Brookvale is an easterly/northeasterly, and the frequency of occurrence of these winds are likely to be similar at both the Whakatu and TMM sites. However, overall wind speeds would be expected to be slightly lower at TMM than at Whakatu.

Hourly wind speed and direction data between January 2006 and December 2015 for Whakatu was downloaded from the online National Climate Database (also known as the NIWA Cliflo Database)[6]. Station information provided with the Cliflo data indicates that wind records from this station are expressed as a one-hour average (rather than a 10-minute average recorded once per hour, which is commonly used at airport stations such as Napier).

A windrose for Whakatu is shown in Figure 9. This shows that the prevailing wind is a southwesterly, which would carry odours from the site away from any sensitive receptors. This windrose is also shown overlaid on a site locality map in Figure 10. Any winds recorded from the north through to east-southeast wind directions (segment defined moving clockwise) are considered to have the potential to carry odours from TMM towards sensitive receptors in the Brookvale area.

[6] https://cliflo.niwa.co.nz/.

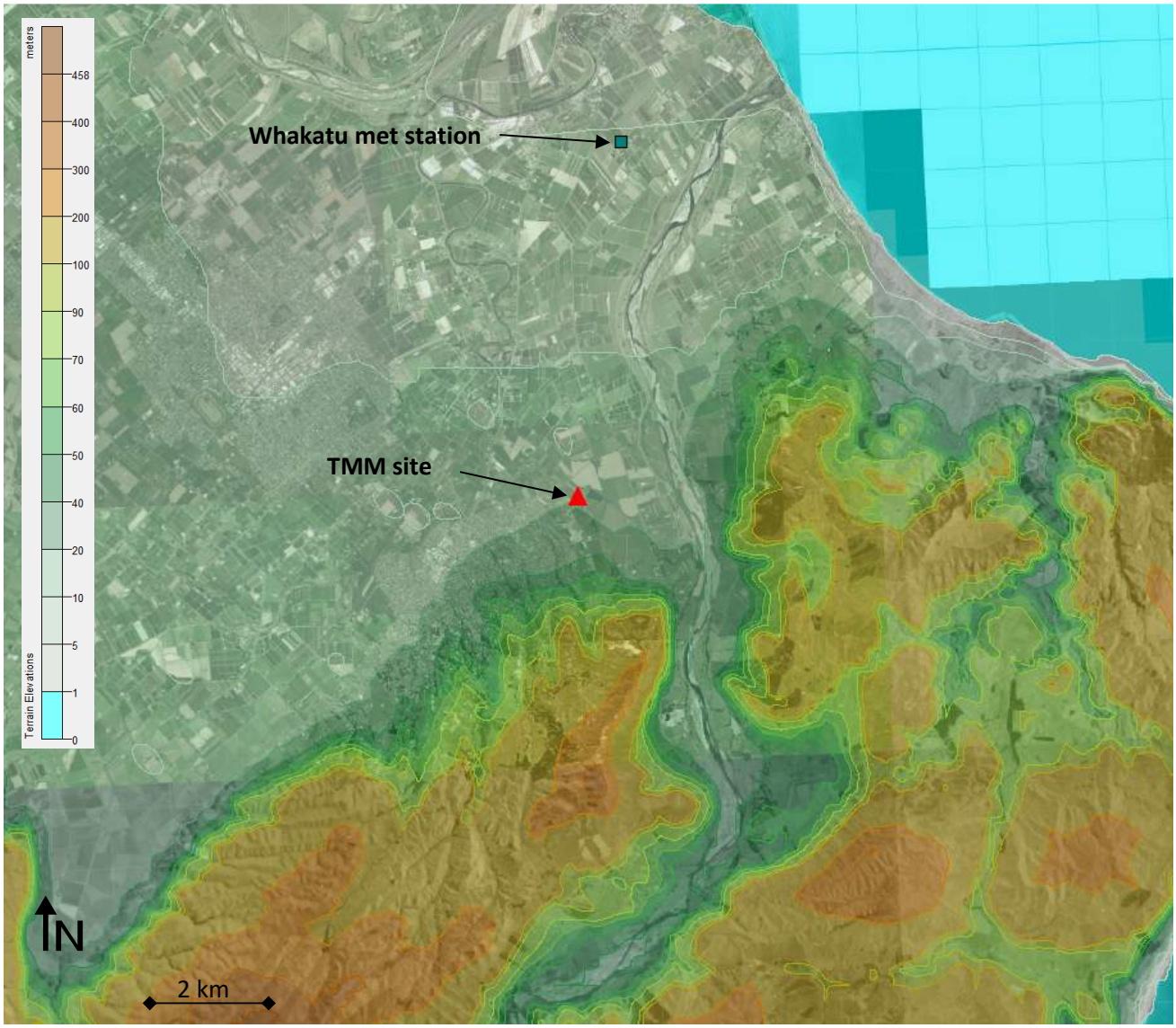


Figure 8: Regional terrain, and location of Whakatu meteorological data station and proximity to TMM site.

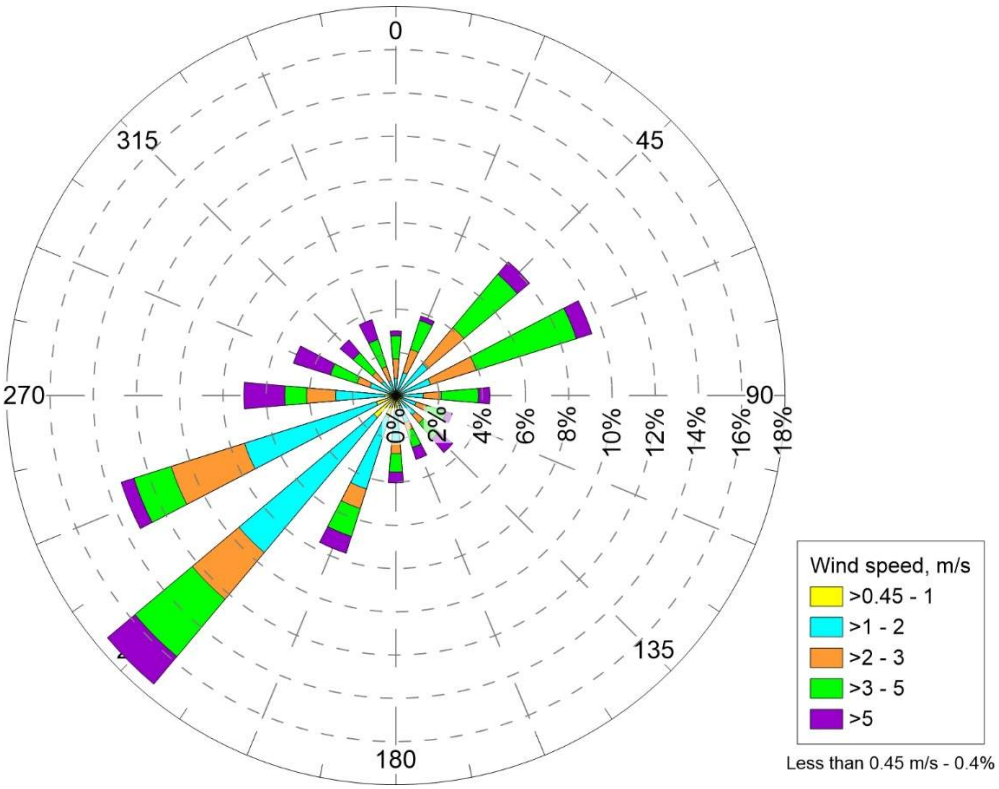


Figure 9: Windrose showing hourly-average wind observations from Whakatu meteorological data station January 2010 to December 2015.

Figure 10: Windrose from Figure 9 (monitoring data from Whakatu), overlaid on aerial map of TMM site and surrounds.

Wind patterns at TMM are also influenced by a ridge which lies along the southwestern boundary of the site (Figure 11). Terrain to the southwest of this ridge, where the new residential subdivision of Brookvale is located, remains at the same height as the ridge several metres higher in elevation than the TMM site. Wind directions are observed to fluctuate and swirl around the site, in response to the presence of the ridge. This ridge, as well as trees planted along the ridge which increase the effective height of the ridge, will help provide some enhanced initial dilution of any odours from the composting plant.

Figure 11: Ridge and trees on southwest boundary of TMM property.

6.3 HBRC Wind Monitoring in Arataki Rd

In 2013, HBRC established a wind monitoring site in Arataki Road. The site and location is shown in Figures 11 and 12. The wind sensor is a ball-and-vane type, mounted 2.4m above ground as confirmed by HBRC.

Whilst the site aims to monitor local wind conditions, which is to be supported, the site location is problematic due to the location and height of the wind monitoring equipment, which is inadequate to avoid interference from trees and nearby obstacles such as parked motorhomes. In addition, the cup-and-vane wind sensor type is not suitable for monitoring low wind speeds (less than about 0.4-1m/s depending on sensor make and model).

Data from the monitoring station was provided by HBRC for the period September 2013 to September 2015. The data is recorded at 10-minute intervals, and reported in units of kilometres per hour (km/h). It is assumed that the speed data is an average over the preceding 10 minutes. The minimum recorded wind speed was 1.26 km/h (0.35 m/s), with no wind speeds recorded as 0 m/s.

A windrose of the wind data records from the site for the full two years of data provided is shown in Figure 11. This windrose includes all data at the minimum reported wind speed, even though the reliability of wind speed and direction records at the minimum wind speed threshold is uncertain. Compared to the Whakatu windrose in Figure 9, the Arataki Road windrose shows a much higher frequency of low wind speeds. The Arataki Road windrose also shows markedly different wind direction trends, particularly for wind directions from the SW and ESE/SE sectors.

Figure 12: Location of HBRC wind monitoring site off Arataki Road.

The differences in wind speed distributions between the Arataki Road and Whakatu monitoring sites are likely to be due in a large part to the height and location of the Arataki Road wind sensor. No meaningful wind speed comparisons are therefore possible.

The windrose from Figure 14 is overlaid on an aerial map in Figure 15. It is considered that the dominant ESE/SE/SSE rays in the windrose, which are not present in the Whakatu data, are caused at least in part by the line of trees on the ridge which runs NNW-SSE between the TMM site and the wind monitoring site, as well as other obstacles in proximity to the monitoring mast. It is also considered likely that the absence of a dominant SW air flow in the monitored data is caused at least in part by the local sheltering of the treeline and obstacles.

Another factor affecting local winds at the Arataki Road site may be the proximity of the Tukituki River valley which opens out to the plains about 2.2km from the TMM site (refer Figure 8). However, air flows draining out of that valley would be expected to continue north/northeast towards the coast rather than swinging west/northwest towards the TMM site, unless regional-scale winds were also blowing from the west/northwest.

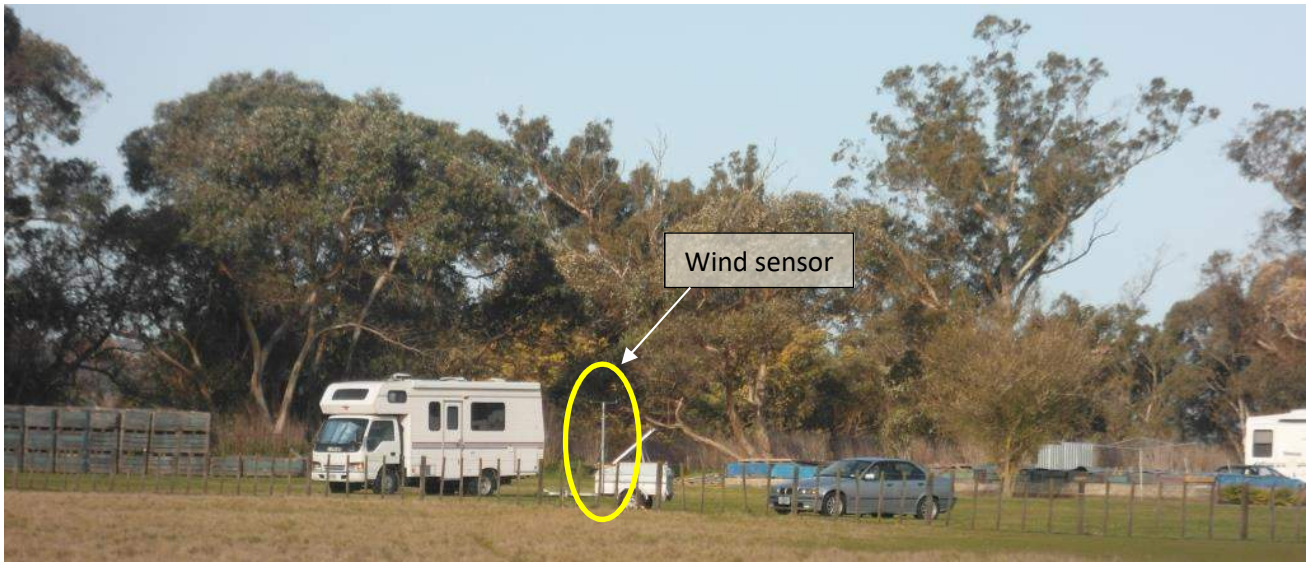


Figure 13a: Arataki Road wind sensor, photo taken from Arataki Road on 14 September 2015.

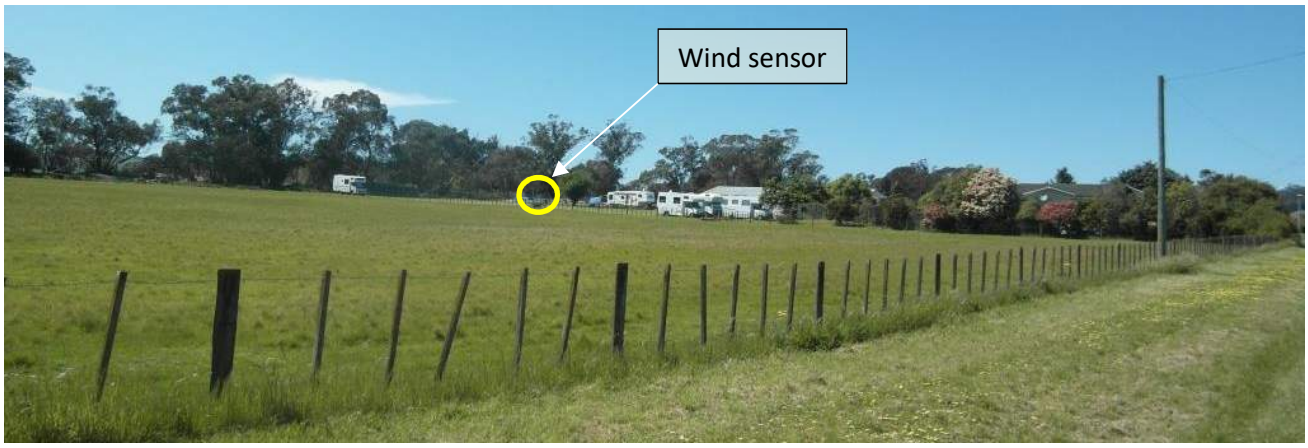


Figure 12b: Arataki Road wind sensor, photo taken from Arataki Road on 15 October 2015.

Figure 12c: Arataki Road wind sensor, photo taken from Arataki Road on 15 October 2015.

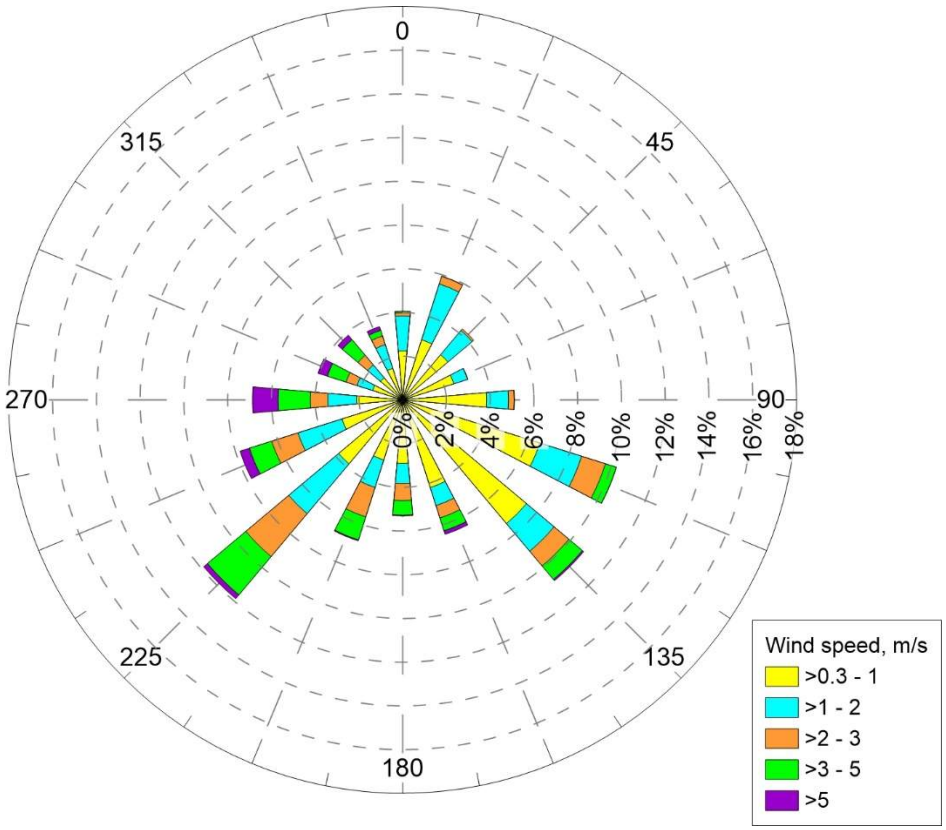


Figure 14: Windrose for wind records from Arataki Road monitoring station, 10-min frequency records September 2013 to September 2015. Raw data supplied by HBRC.

Figure 15: Windrose from Figure 14, overlaid on aerial map of TMM site and surrounds. Windrose centred on Arataki Road monitoring station.

6.4 Current On-Site Wind Monitoring

TMM has operated a wind monitoring station at the composting site for several years. The station is mounted on the roof of the Phase 1 bunker building (see Figure 16). The mast height was raised by several metres in November 2016, after the photo was taken. However, even at the new height the station is compromised due to swirling winds on the site affected by the ridge and tree line, as well as downwash eddies around the bunker building itself. Therefore, the data from the station is not representative of air flows beyond the site boundary and has not been used in the wind analysis contained in this report.

Figure 16: Wind monitoring station at TMM, mounted to Phase 1 bunker building. Mast height was raised by several metres in November 2016, after this photo was taken.

6.5 Regional Windfield Simulation

To provide additional information about wind fields in the vicinity of the TMM site, particularly during low wind speeds, the CALMET meteorological model was used to simulate wind fields in the southern Hawke's Bay area. The CALMET methodology is described in Table 4.

An input file for CALMET summarising key input and model settings for the innermost nested grid is provided in Appendix D.

Figure 17 shows a windrose for the TMM site compiled from hourly-average wind speed and direction records simulated by the CALMET model. The windrose is compared with the same time period for the Whakatu observation data in Figure 18. The simulated data for TMM shows a similar frequency of low wind speeds compared to Whakatu. Wind speed cumulative frequencies for both datasets are summarised in Table 5. Data from the Arataki Road monitoring station is not included in the analysis due to concerns over data reliability, as discussed earlier.

Table 4: CALMET input data

Input parameter	Settings and data sources
Software version	CALMET 6.5.0
User Interface	Calpuff View V8.1.0 and Calpro Plus 7.12.0.03_08_2011
Modelling datum and projection	WGS84, UTM60S.
Number of grids modelled	Three – with grids 1 and 2 being used as initial guess field inputs for grids 2 and 3 respectively. Grid 3 was used as the final CALMET wind field for analysis.
Grid extents and resolution	Grid 1: 90km x 90km, 1 km grid spacing Grid 2: 55km x 55km, 500m grid spacing Grid 3: 20km x 20km, 250m grid spacing
Geophysical data:	Terrain elevations supplied by Geographx Ltd at 8m grid spacing. Land use defined from aerial maps using "Land Use Creator" tool in Calpuff View.
Time period for model:	1 January – 31 December 2012.
Surface meteorological data:	4 stations used for some or all of the following data – wind speed, direction, station pressure, relative humidity, air temperature, cloud cover, ceiling height. The stations used were Napier, Whakatu, Waipawa, and Takapau Plains
Upper air soundings stations	Two stations used – Whenuapai and Paraparaumu.

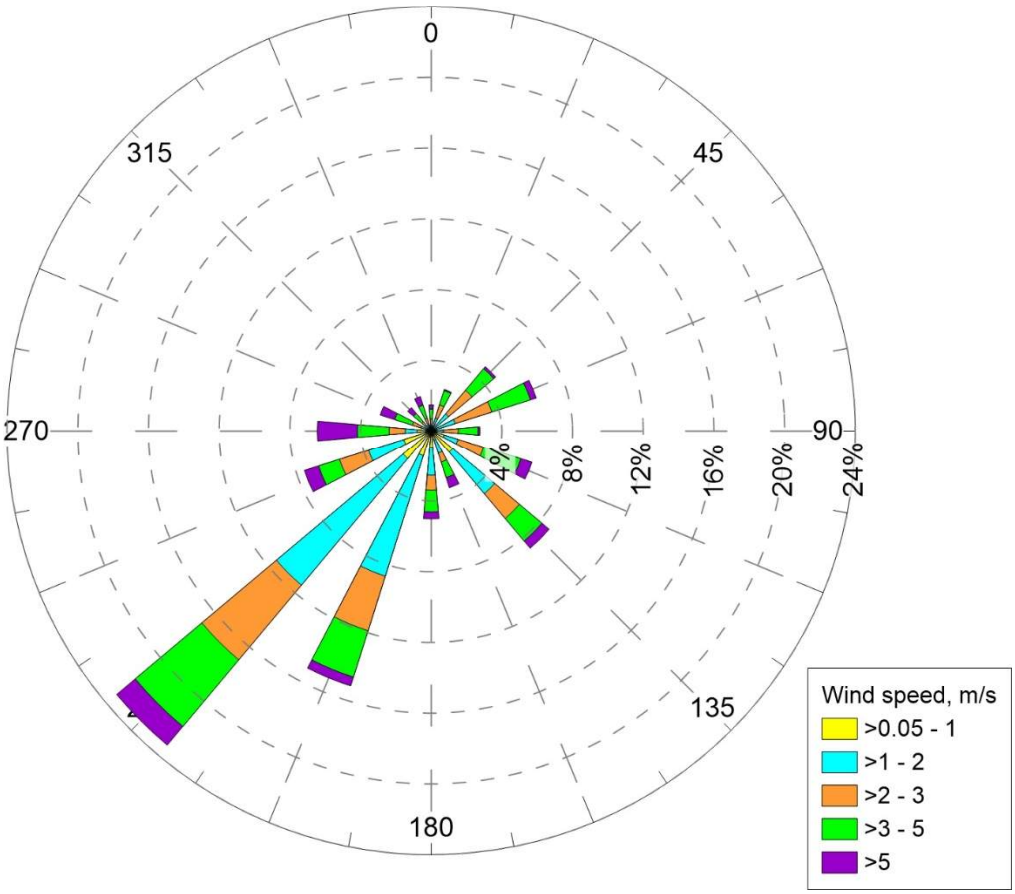


Figure 17: Windrose for CALMET simulation of wind occurrence at TMM site, hourly average winds 2012.

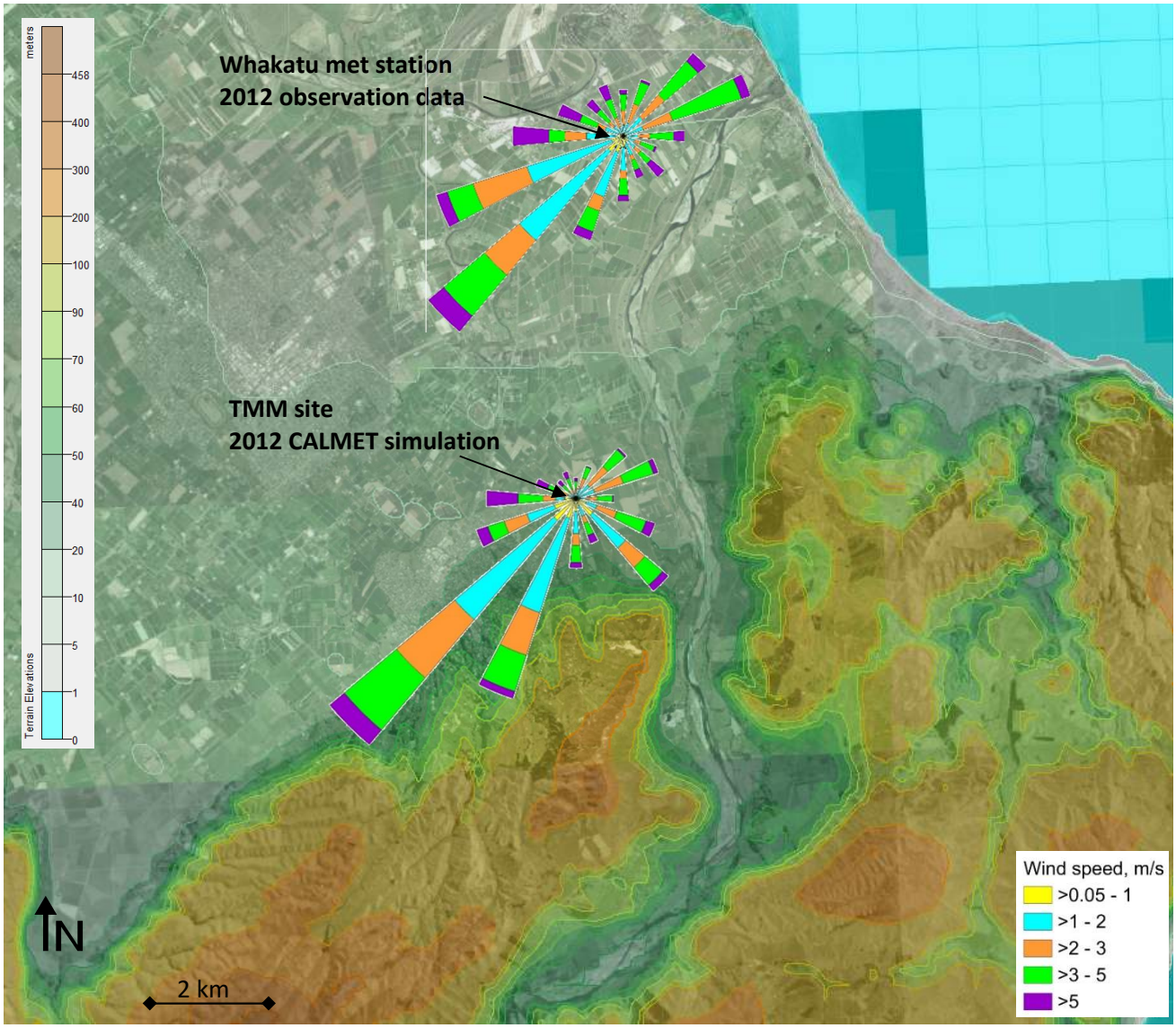


Figure 18: CALMET simulation of wind occurrence at TMM site, compared with observations over same period at Whakatu monitoring station.

Table 5: Comparison of wind speed frequencies at Whakatu monitoring station, versus simulated wind occurrence at TMM site.

Wind speed	Percentage of all wind records less than wind speed	
	Whakatu monitoring station	TMM site from CALMET
1 m/s	10.8%	8.1%
2 m/s	41.6%	39.5%
3 m/s	64.6%	59.6%
4 m/s	80.9%	76.1%
5 m/s	90.2%	87.4%
8 m/s	99.4%	98.6%
13 m/s	100%	100%

Wind directions considered to have the potential to carry any odour from the TMM site towards sensitive receptors are those from the N, NNE, NE, ENE, E, and ESE. The proportions of total winds that are blowing from these directions are similar in both the Whataku monitoring station data and the TMM site simulation data, as well as in the Arataki Road monitoring station data. This breakdown is shown in Table 6, with approximately 30% of all winds putting TMM upwind of a potentially sensitive receptor.

Table 6: Comparison of wind direction frequencies at Whakatu and Arataki Road monitoring stations, versus simulated wind occurrence at TMM site.

Wind direction	Percentage of wind records blowing from direction		
	Whakatu monitoring station, 2012	TMM site from CALMET, 2012	Arataki Road monitoring station, 2013-2015
N	1.5%	2.7%	4.1%
NNE	2.5%	3.7%	6.0%
NE	4.9%	7.1%	4.0%
ENE	6.1%	10.3%	3.3%
E	2.6%	4.3%	5.2%
ESE	8.7%	2.6%	10.6%
SE	6.0%	3.5%	10.4%
SSE	3.4%	3.1%	6.5%
S	5.2%	4.4%	5.2%
SSW	16.2%	7.9%	7.1%
SW	22.3%	17.5%	11.7%
WSW	7.3%	13.6%	7.9%
W	6.5%	8.4%	6.6%
WNW	2.8%	4.6%	4.1%
NW	1.8%	2.9%	3.8%
NNW	2.1%	3.4%	3.6%
Total winds where TMM is upwind of sensitive receptor (i.e. N, NNE, NE, ENE, E, and ESE)	**26%**	**31%**	**33%**
Total other winds	**74%**	**69%**	**67%**

6.6 Recommendation for Future Site Wind Monitoring

It is recommended that a wind monitoring station be installed at or near the TMM site as part of the proposed upgrade. It is important that the wind sensor is able to measure very low wind speeds accurately, that the mast height is at 10m above ground, and the mast is located carefully and consistent with the recommendations of "AS NZS 3580.14-2014 Methods for sampling and analysis of ambient air - Meteorological monitoring" so that wind measurements at the site are not influenced by nearby obstacles. This may require location of the mast away from the composting area, either at a remote location on the TMM site or on a neighbouring site.

The collection of wind data would serve three main purposes:

1. Verification of potential causes of complaints, if any complaints arise.
2. Assessment of odour risk through measurement of frequency and direction of wind patterns with the greatest potential to cause complaints due to offensive odour.
3. Measurement of data required for development of site-specific meteorological data files suitable for atmospheric dispersion modelling, if required in the future.

If a monitoring station is installed, the following measurements should be recorded as a minimum:

- Wind speed and wind direction at 10m above groundlevel, using an ultrasonic-type anemometer which is accurate at very low wind speeds,
- Temperature at both 2m and 10m above groundlevel,
- Relative humidity.

7 Complaints Analysis

7.1 Analysis

In late August 2016, HBRC provided a list of complaints received by the Council regarding odour issues alleged to occur from TMM. The last listed complaint was 9 August 2016.

Complaints for the last 24 months, starting September 2014, were reviewed and are detailed in Appendix E. HBRC stopped investigating complaints in December 2015, however as shown in the table even before that time many of the complaints were not able to be validated by HBRC officers. This report does not speculate as to the specific reasons that those complaints were not able to be confirmed, except to note that any of the following reasons may apply:

- The odour had dissipated by the time the HBRC investigating officer arrived, due to either changing meteorological conditions or the odour source ceasing.
- The odour plume had moved due to changing wind direction.
- The complaint regarded an odour that had been noticed earlier than the time of the call, or the previous day.
- The complaint did not relate to a specific odour event, rather an accumulated stress due to repeated odour exposure.
- The complaint was spurious and prompted by other agendas other than odour nuisance.

A very large number of complaints were received over the summer of 2015/2016 (90 complaints from 1 December 2015 to 31 March 2016, compared with 32 complaints for the same period 12 months earlier). Due to privacy restrictions, HBRC was not able to supply any information about the location of complainants over this latest period, or the number of different complainants involved in making these complaints. Comments recorded in the HBRC complaint logs at the time the complaints were made indicate that at least some of the callers were aware of the upcoming Environment Court hearing for prosecution of TMM for previous odour offences. It is possible that this knowledge influenced the number of complaints made during this period. Due to this, and the absence of HBRC investigations of complaints, the frequency of complaints made over the summer of 2015/2016 should not be taken as an indication of increased odour emissions over that summer compared to the previous summer 2014/2015.

Notwithstanding, the patterns of complaint occurrence, and particularly the day of week when the complaint occurred, can be used to identify activities occurring on the TMM site that contribute significant odour emissions. Assuming that each complaint in Appendix E is a genuine complaint about odour occurring on the day the complaint was made (unless the complaint records indicate it relates to a previous day or no specific day), and counting individual complaints made on the same day, the distribution of complaints in Appendix E by day of week has been tallied and is shown in Table 7.

Table 7: Breakdown of complaint frequency by day of week.

Day of week	Number of complaints in period			Principal odorous activities carried out on this day
	September 2014 – August 2016	September 2014 – 15th December 2015 (last day before HBRC stopped investigating complaints)	1 September 2015 – 15 December 2015 (period after installation of new pond and bunker-to-bunker transfer regime, until HBRC stopped investigating complaints)	
Sunday	1	0	0	Nil
Monday	37	26	6	Bunker-to-bunker transfer
Tuesday	110	66	24	Phase 1 to Phase 2 transfer
Wednesday	19	5	0	Nil
Thursday	35	14	3	Bale break
Friday	67	43	8	Bunker-to-bunker transfer
Saturday	4	4	2	Nil

7.2 Conclusions for Odour Mitigation Strategy

There is a clear trend of complaints being more likely on a Tuesday or Friday, followed by a Monday or Thursday. Complaints are less likely to occur on a Wednesday or weekend. This is consistent with the description of odour emissions by day of week related to site activities discussed in Section 8, and indicates that efforts to reduce the duration and intensity of odour emissions during site activities are likely to be successful at reducing complaint numbers.

8 Odour Sources and Mitigation

There are a number of potentially significant odour sources at the site. These are:

1. Bale wetting.
2. Chicken litter/gypsum storage and handling.
3. Laying out bales and spreading chicken litter/gypsum mix on bales, then breaking and mixing bales and placing mix into bunker.
4. First and second turning of compost in Phase 1 bunkers.
5. Fugitive emissions from Phase 1 bunkers.
6. Removal of compost from Phase 1 bunkers, mixing and placement into Phase 2 tunnels.
7. Phase 2 composting.
8. Emptying of Phase 2 tunnels.
9. Stockpiling and removal of spent compost (after use for mushroom cultivation).
10. Recycled water drainage/collection.
11. Recycled water storage pond.

Each of these sources of odour and associated mitigation options are discussed below.

8.1 Bale wetting

Odour from bale wetting is generated from the spraying of recycled water over the bales and drainage of that recycled water back to the storage pond. This process occurs for a total of about 30 hours over a seven-day period. The spraying action is via a low pressure delivery system from a moving irrigation arm, which minimises aerosol formation (see Photo B11, Appendix B).

The magnitude of odour emissions is highly dependent on the quality of the recycled water, as offensive odours from anaerobic decomposition of the recycled water can be emitted into the air during the spraying process and also from the surface of the bales after the irrigation arm has moved past.

Additional odour minimisation measures for the bale wetting activity are:

1. Storing the recycled water in an aerobic condition.
2. Improving site drainage so that recycled water running off from the bales does not pond over the concrete slab.
3. Minimising the overall time that bales are laid out for wetting and therefore reducing the overall area of bales laid out.

In the last few months, the commissioning of a new recycled water pond (August 2015) and improvements to site drainage (some works carried out, further works in progress) have allowed measures 1 and 2 to be implemented.

Measure 3 will be implemented with the proposed introduction of bale spiking, where recycled water is injected into the middle of the bales prior to laying the bales out for further wetting. The use of bale-spiking improves the quality of straw used in the compost process, whilst reducing the overall time that the bales need to be laid out for wetting. This helps to minimise the footprint required for bale wetting processes.

A further proposed mitigation measure is to carry out pre-wetting of the bales over an aerated pad that will drain to the existing sump. The design of the aerated pad will further reduce the footprint for bale wetting and recycled water drainage back to collection sumps due to the ability to stack bales two or three levels high, with additional odour avoidance being achieved through the proposed aeration lines which will avoid the centre of the bails becoming anaerobic (which is occasionally an issue with the current bale-wetting design). At full future production rates, the footprint for bale wetting will be similar to the current dimensions.

Following the implementation of these proposed measures, it is considered that the method of bale wetting represents the best practicable option for minimisation of both odour emission rates and the potential offensiveness quality of the residual odour emitted. Residual odour emissions are expected to be minor.

8.2 Chicken litter/gypsum storage and handling

Significant changes were made to this activity in 2015, with the chicken litter and gypsum being mixed offsite since April 2015.

Prior to this change, chicken litter was stored at the site separately to gypsum, with the two material mixed onsite and the resultant mix stored until required. Unmixed chicken litter was stored in a bunker with three walls and a roof, but no covering over the opening. The mixed litter was stored in an adjacent bunker consisting of a concrete pad and three half-height concrete walls, and a tarpaulin was used to cover the mix during rain.

Now, the roof over the main chicken litter storage bunker has been extended to cover the adjacent bunker as well, and a tarpaulin cover over the open side of the bunker has been installed. The premixed chicken litter/gypsum is stored in both partitions of the bunker, with the tarpaulin being used to protect the mix from weather at all times except when the premix is brought onto site (once per week) or when it is removed to spread onto the bales (once per week).

The previous and current storage facilities can be compared in Photos B12 and B13 in Appendix B, as well as Photo B1.

Overall, the change in management of the chicken litter/gypsum mixing and storage has resulted in a reduction in opportunity for odour emissions, as follows:

1. The best way to minimise odour emissions from chicken litter is to keep the litter dry in storage. The improved sheltering now provided at the storage bunker minimises the chance of the litter becoming wet.
2. The process of mixing the litter/gypsum used to take about 3 hours, normally on a Wednesday or Thursday.

No additional odour minimisation measures are required for this activity. It is considered that the method of chicken/litter mixing and storage represents best practice for minimisation of both odour emission rates and the potential offensiveness quality of the residual odour emitted. Residual odour emissions are expected to be minor.

8.3 Laying out wetted bales, breaking, mixing, and material placement in bunkers

The current process of mixing the bales and chicken litter/gypsum mix requires the bales to be laid out in long rows prior to the chicken litter/gypsum mix being placed on top of the rows by front end loader. The bales are then broken and mixed with the chicken litter/gypsum using a turning machine that moves slowly down the rows, one row at a time. The mixed material forms a windrow as it leaves the rear of the turning machine, and is then moved into a vacant Phase 1 bunker using a front end loader.

Photos of the current method of mixing the bales are shown in Photos B14 and B15.

This process occurs every Thursday, over the period from 6.30am to about 3pm (approximately 8.5 hours). This process is the main cause of complaints on Thursdays, now that mixing of chicken litter and gypsum onsite has ceased.

Opportunities for odour emissions during this process are driven by the quality of the inner material in the bales, and the chicken litter. If either of these materials has become anaerobic and started to rot, odour emissions can be elevated.

Odour minimisation from this process therefore involves the following:

1. Keeping the chicken litter/gypsum mix dry during storage and only accepting material onto site which has been appropriately stored off-site.
2. Keeping the recycled water aerobic so that odorous by-products of anaerobic decomposition do not accumulate inside the bales.
3. Aerating the bales.

Measures 1 and 2 have been implemented at the site in 2015, and measure 3 is proposed for future development at the site as discussed in Section 8.1.

To further reduce the potential for odour to arise from this process, the site proposes to introduce bale mixing and breaking using a bale breaker machine instead of laying out the chicken litter substrate over lines of bales. This will speed up the mixing process and will reduce the potential odour footprint to the confines of a hopper as opposed to long lines of exposed bales. Furthermore, the change in process will enable the blended inputs to be placed directly (via loader) into a Phase 1 bunker, again reducing the potential odour footprint/time of exposure due to avoiding rows of compost being laid out on the outdoor compost pad and remaining in this form for up to 8 hours as is currently the case.

The blending line will be placed under an extended eave attached to the Phase 1 bunker building. A targeted air extraction system in the eave will extract odour for filtration in the biofilter system – further reducing the potential for odour in relation to this aspect of the process.

Advantages of using a bale breaker for odour mitigation are summarised as follows:

1. There is no need to lay out the bales in rows with chicken litter/gypsum placed on top before mixing.
2. The breaking of bales and mixing with chicken litter/gypsum occurs at a single point that can be sheltered with capture of odour emissions for treatment.
3. The mixed substrate is deposited in a small area and can be picked up immediately by a front end loader for placement in the Phase 1 bunkers.
4. The overall footprint of the bale breaking area is greatly reduced.
5. The duration of the bale breaking activity is reduced as one bale can be processed approximately every minute. At full future production (500T per week), the total duration of processing will still take about 7.5 hours. However, the odour emission from this activity will be smaller than current bale-breaking activities, due to the advantages described above.

The targeted air extraction system in the eave will capture a large proportion of the odours emitted during bale breaking, but not all odours. The design of the air extraction system will require specialist engineering design to optimise the degree of odour capture whilst keeping the volumes of air extracted to manageable levels for treatment. Details of the design of this system are not yet available.

Subject to confirmation of the design of the proposed targeted air extraction and treatment system, the method for bale breaking, mixing and placement into Phase 1 bunkers in combination with the method for bale wetting and chicken litter/gypsum storage is considered to represent the best practicable option for minimisation of both odour emission rates and the potential offensiveness quality of the residual odour emitted.

It is noted that bale break occurs on Thursdays, which is a less common day for odour complaints, so it is likely that the current bale breaking activity is not as significant as some of the other odour sources on the site. With the improvements in odour emissions anticipated by the proposed odour mitigation method for bale breaking, even after production increases to 500T per week, it is considered unlikely that the bale breaking activity will be a frequent cause of odour complaints.

If necessary at a later stage, further measures may include keeping the duration of the bale breaking activity to the shortest number of hours possible and avoiding conducting this activity during early morning (say, before 9am) when atmospheric conditions may be unfavourable for odour dispersion.

8.4 First and second turning of compost in Phase 1 bunkers

The compost is currently turned twice during Phase 1, on Monday and Friday (4 and 8 days after initial mixing). Prior to August 2015, the method of turning the compost involved unloading the compost from the Phase 1 bunker using a front-end loader and forming the compost into long windrows outside that could then be turned, with water added, using the turning machine which moves slowly along the windrows. This was identified in the Beca Report (2010) as a process with high potential for odour emissions causing nuisance impacts offsite.

The preferable method for turning the compost is to remove it from the bunker using a front-end loader and immediately place the compost into a spare bunker; this is known as “bunker-to-bunker” transfer. The front-end loader deposits the compost into the hopper of an in-vessel turning machine inside the spare bunker, which turns the compost and then spreads it evenly inside the bunker.

This method was not possible at the site prior to 2015 because there was no spare bunker. TMM plans to construct a third bunker once consent is granted for increased production, but in the interim, has divided the two existing bunkers into four bunkers of half length, so that one “half” bunker can be spare for bunker-to-bunker compost mixing. Therefore, bunker-to-bunker transfer without using a temporary windrow now can occur. The process takes about 8 hours, starting at 6.30am.

The current method of mixing the compost by bunker-to-bunker transfer is shown in Photo B16.

This has achieved a significant reduction in odour emissions on Mondays and Fridays, due to the outdoor windrow turning process being removed. On Mondays, the duration of activities with odour emission potential has been halved as compost is only moved once. On Fridays, about one third of the duration of activities with odour emission potential has been removed.

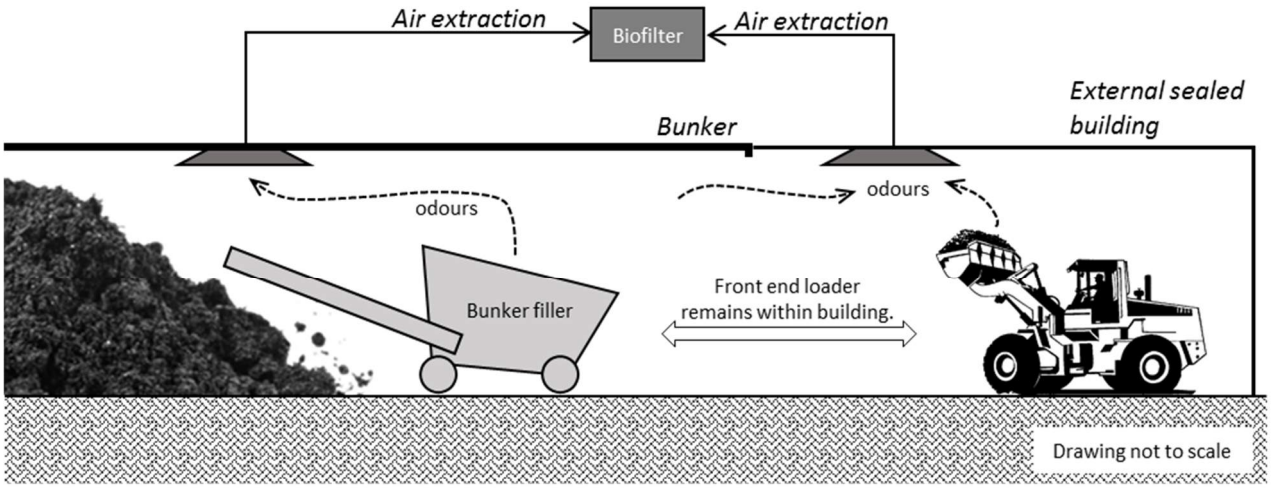
However, whilst the bunker air extraction system is operated at maximum capacity during the bunker-to-bunker extraction process, odour is still emitted during the process from the compost in the bucket on the front end loader whilst the loader is moving from bunker to bunker, and from the bunker filler when the machine is near the bunker entrance (Photo B16). In addition, as each “half” bunker only has one entrance, with two bunker entrances facing east and two bunker entrances facing west, at times a front-end loader must carry a load of compost from one end of the bunker to the other along the length of the building, increasing the total exposure time for odour emissions.

In this project, a distinction is made between the definitions of “full enclosure” and “complete enclosure” of Phase 1 composting:

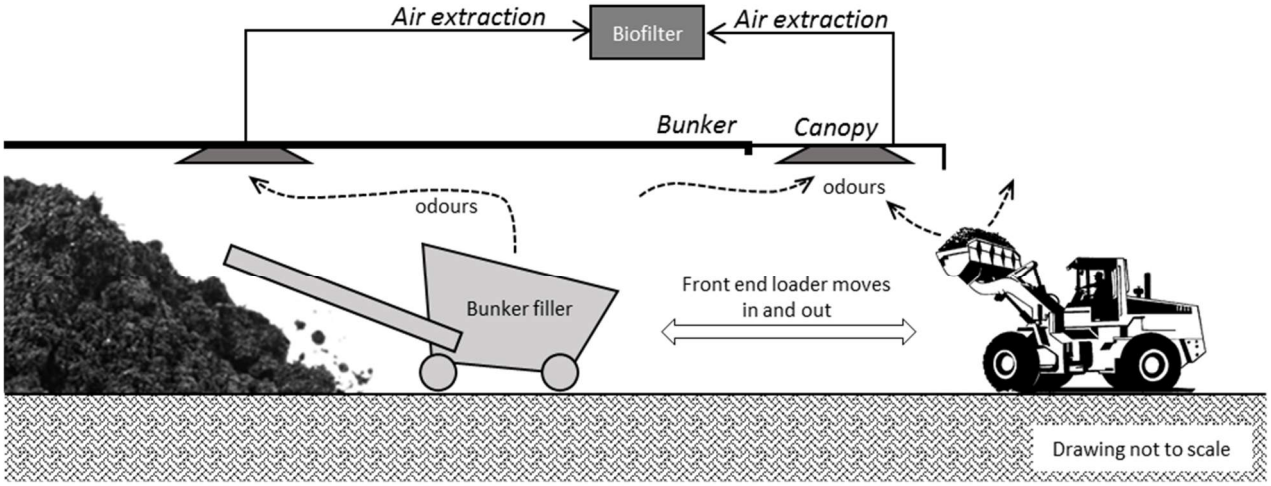
1. “Complete enclosure” implies that all odour sources within Phase 1 are subject to extraction and odour treatment 100% of the time, including when front-end loaders are moving compost between bunkers (image (a) in Figure 19).

2. “Full enclosure” implies that filling and emptying of bunkers is conducted by a turning machine which remains completely within the bunker, but with the door of the bunker open to allow movement of front-end loaders between bunkers. Loader movements between bunkers are outdoors (image (b) in Figure 19).

It is understood that this definition of “full enclosure” represents the intention of the reference to “full enclosure” included in the conditions of TMM’s current resource consent.



(a) Complete enclosure concept



(b) Full enclosure concept

Figure 19: Schematic representation of "complete enclosure" and "full enclosure" ventilation options for Phase 1 composting during bunker-to-bunker transfers. Drawings not to scale, and not necessarily representative of final ventilation design options to be implemented.

In theory, best practice for odour control from this activity would comprise complete enclosure including the loader movement area outside the bunker openings. However, TMM advises that full enclosure of the area outside the bunker entrance where the front-end loader operates is not possible for health and safety reasons, particularly poor visibility due to steam build-up. There are no currently operating mushroom composting facilities in New Zealand using complete enclosure.

Instead, TMM proposes to minimise this odour emission once the third full-size bunker is constructed using full enclosure. The length of each bunker will be extended by 10m and a canopy built over the bunker entrance with additional air extraction. Extending the length of each bunker by 10m will allow room for the

bunker filler and the front-end loader to be contained within the bunker during the bunker-to-bunker transfer process even when the bunker is full.

Once the third bunker is constructed, the current practice of using the front-end loader to move compost from the east end of the bunker to the west end of the bunker during bunker-to-bunker transfers will not be necessary, thereby minimising loader travel distances and the duration of compost exposure outdoors.

Odour capture during the bunker-to-bunker transfer process will comprise operation of the bunker air extraction system at maximum capacity, as well as operation of additional extraction fans within the canopy over the bunker entrance to capture any odours escaping from the mouth of the bunker. The intended extraction system will capture a high percentage of the odour emissions, but not 100% of the odour emissions as some odours are still expected to escape from the canopy due to eddies created by the wind and vehicle movements in and out of the bunker.

This is considered to represent the best practicable option for minimisation of odour emissions from the transfer process. As discussed in the previous section, the design of the air extraction system will require specialist engineering design to optimise the degree of odour capture whilst keeping the volumes of air extracted to manageable levels for treatment. Details of the design of this system are not yet available.

Bunker-to-bunker transfers are the main potentially-odorous activities occurring on Mondays and Fridays, which are common days for odour complaints, so any improvement in odour control for this activity is likely to reduce the occurrence of complaints.

TMM has advised that at full proposed production rates of 500 tonnes per week, the duration of bunker-to-bunker transfers will be no longer than currently used. If necessary at a later stage, further measures may include operational management to keep the duration of the bunker-to-bunker transfer activity to the shortest number of hours possible, and avoiding conducting this activity during early morning (say, before 9am) when atmospheric conditions may be unfavourable for odour dispersion.

8.5 Removal of compost from Phase 1 bunkers, mixing and placement into Phase 2 tunnels

The compost is removed from the Phase 1 bunkers, turned and placed into the Phase 2 tunnels on a Tuesday (12 days after initial mixing). The method of transferring the compost from Phase 1 to Phase 2 currently involves unloading the compost from the Phase 1 bunker using a front end loader, forming the compost into a long windrow outside that is turned, with water added, using the moving turning machine, and then placement of the compost into an empty Phase 2 tunnel.

This process used to be carried out on both Tuesdays and Wednesdays from 6.30am until 1pm, with half of a full-sized bunker removed each day. This was identified in the Beca Report (2010) as a process with high potential for odour emissions causing nuisance impacts offsite.

Now, the full process is carried out on Tuesdays only, from 6.30am until about 4.30-5pm. This change has extended the hours of operation on a Tuesday, but now means there are no operations on the yard on Wednesdays.

TMM proposes to change this process by introducing turning in a new building to the west of the Phase 1 bunkers at the same elevation as the Phase 2 tunnels (a few metres higher elevation than the Phase 1 bunkers). Compost from the Phase 1 tunnels will be carried by front-end loader to a new hopper adjacent to the new building, which will convey the compost up and into the new building. Inside the building, the compost is turned and mixed, and then loaded into the Phase 2 tunnels. The turning operation and the entrance to the Phase 2 tunnels will all be incorporated within the new building. Air from within the new building will be extracted to a dedicated biofilter for treatment. The new hopper adjacent to the building will be covered by an extended eave with targeted extraction, and air extracted from this canopy as well as from the covered conveyor will also be directed to the biofilter for treatment.

Introducing the new turning operation would mean emptying Phase 1 Bunker would start at 11.30am and be finished by 4pm.

Introduction of the new turning operation and new building will substantially decrease the footprint and odour emission potential from the transfer process, as well as removing the potential for odour emissions early in the morning whilst meteorological conditions place odour nuisance at greater risk. Therefore, this proposal is considered to represent the best practicable option for minimisation of odour emissions during the transfer of compost from the Phase 1 bunkers to the new turning shed, and then best practice for the turning/mixing and transfer of compost into the Phase 2 tunnels.

8.6 Phase 2 composting

Once the compost is loaded into one of the two Phase 2 tunnels, the doors at both ends of the tunnel are sealed. The only means of odour emission is from the portion of recirculated air which is passively vented to atmosphere from a vent on the roof of each tunnel. Following the increase in production to 500T per week, the Phase 2 tunnels will be upgraded to a 100T capacity with the existing two tunnels extended and additional tunnels constructed close to the existing tunnels.

Currently there is no treatment of odour vented from the tunnels. This odour source is considered to have a low potential to cause offensive odours beyond the site boundary due to the small volume of air discharged. However, TMM proposes to duct these odour emissions to the new biofilter to be constructed for air extracted from the new building housing the Phase 1 to Phase 2 compost mixing and transfer operations.

8.7 Emptying of Phase 2 tunnels

Compost is removed from the Phase 2 tunnels on Tuesdays, so that the tunnels can be cleaned ready to receive new Phase 1 compost on the same day. As described above, this process used to occur on both Tuesdays and Wednesdays, but is now carried out only on Tuesdays.

The compost is relatively mature by the time it is removed from the Phase 2 tunnels. It is placed directly into a hopper beside the tunnels which conveys the compost into a building for placement into mushroom-growing trays.

Site observations Air Quality Professionals staff have previously found this odour source to be minor compared to other odour sources from the Phase 1 composting process. No additional odour control for this process is currently proposed.

8.8 Stockpiling and removal of spent compost (after use for mushroom cultivation)

Spent compost is sterilised (to kill mushroom spores) and then taken by truck to compost stockpile areas on the site. This activity has been carried out for a number of years with little change. However, in recent months the area has been cleaned up by TMM, with the volume of stored compost reduced and problematic anaerobic piles removed from site.

Odour emissions are only significant from the stockpile area when large volumes of compost in poor condition are disturbed. This can occur after extended periods of wet weather when removal trucks are unable to access the storage piles.

The proposed site management for spent compost is that it will be stored within either of the following areas:

- On a concrete pad in the existing spent compost area located at the front of the site under a canopy to keep the spent compost dry – with any remaining compost being removed from the site within 7 days, or
- On a concrete pad in the centre of the site – with any remaining compost being removed from the site within 7 days.

8.9 Recycled water drainage/collection

A consequence of the outdoor yard operations such as bale wetting and outdoor windrow compost turning is the runoff of excess recycled water and the need to capture that runoff and return it to the storage pond. The recycled water runoff areas have been reduced over previous months, through the installation of additional drainage channels in the concrete slabs and also the removal of the need for outdoor windrows for turning of intermediate Phase 1 compost on days 4 and 8.

Overall, the potential for recycled water to pond on the yard and in drains has been reduced. In addition, the previously aerated sump at the edge of concrete yard has now been decommissioned as a recycled water storage vessel, and is now used only as a common drainage point for immediate pumping of recycled water to the new storage pond.

As similarly discussed in Section 8.1, odour emissions from ponded recycled water (and previously the recycled water in the aerated sump) are dependent on the condition of the recycled water. With the introduction of the new aerated storage pond in August 2015, the recycled water is now retained in aerobic condition which minimises the potential for emission of odours whilst the recycled water is draining on the yard. The decommissioning of the aerated sump is also likely to have removed an odour source.

TMM proposes to further improve yard recycled water drainage through additional drainage channels, and to minimise the footprint for the bale wetting activity. This is unlikely to make a lot of difference to the potential for this odour source to cause adverse effects in the receiving environment, as the source is already well managed and is relatively minor compared to other site sources. However, the goal of minimising the potential for odour emissions from this activity is supported.

8.10 Recycled water storage pond

The design and operation of the new recycled water storage pond was described earlier in Section 4.2. Odour emissions from this source are minor, and no additional mitigation measures, other than maintaining the current monitoring regime and responding to issues identified by the monitoring as soon as possible, are recommended.

The management of recycled water on the site is considered to represent the best practicable option.

8.11 Biofilter

The design, operation and monitoring of the existing biofilter was described in Section 4.1. The monitoring demonstrates that the biofilter is operating within normal parameters for optimum odour treatment efficiency. The biofilter design has also been independently reviewed and found to be fit for current purpose. The odour from the biofilter was found to be a musty, earthy character typical of biofilters during both of the AirQP site visits in September and October 2015.

The use of the biofilter for odour treatment is considered to represent the best practice for the existing composting operation.

When the proposed modifications to the Phase 1 composting system are implemented to increase production, additional volumes of air will be extracted from both the new third bunker, and new extraction points in the canopies over the entrances to the bunkers, the bale breaker, and the static turner. The detailed design process required to identify these air flows and appropriate odour treatment methods has not been carried out. However, TMM has advised that appropriate odour treatment for these additional air flows will be provided.

9 Summary of Recent and Future Proposed Process Modifications

Since the publication of the Beca Report (2010), a number of process modifications have been made to the composting production process at the site. Further changes are also proposed subject to the granting of resource consents.

The modifications made to date are summarised below:

1. A larger recycled water storage and treatment pond and aerator has been installed along with continuous monitoring of recycled water dissolved oxygen levels.
2. Drainage and capture of recycled water from the pre-wetting area has been improved.
3. The chicken litter and gypsum is now mixed off-site and delivered as one substrate. This avoids mixing on-site.
4. The mixed chicken litter and gypsum is stored in a shed to minimise rainwater ingress.
5. The original two-bunker design has been subdivided into four smaller bunkers, allowing for compost mixing by bunker-to-bunker transfer using a Bunker Filler rather than by turning the compost in a temporary outdoor windrow. The previous mode of operation was that after being placed in the first bunker for 5 days, the compost was removed and placed in a windrow for 6 to 8 hours during which it was turned, then placed back into another bunker as a means of turning the substrate.
6. Phase 1 composting processes have been concentrated to a smaller window of time as follows:
    a. Tuesdays previously involved emptying half a Phase 1 bunker, turning and adding water if required and filling one of the Phase 2 tunnels. The remaining Phase 1 bunker was then emptied on a Wednesday together with turning and water being added if required with the second Phase 2 tunnel being filled that day. Alongside this, the chicken litter and gypsum was placed on the hay bales on a Wednesday morning and left overnight until Thursday.
    b. Tuesdays now involve emptying a full Phase 1 bunker, turning and adding water if required and filling both Phase 2 tunnels within the same day.
    c. Similarly, the chicken litter and gypsum is no longer placed on the hay bales on a Wednesday morning to be left overnight until Thursday, rather processes on a Thursday start from 4.30am in order to complete this process within one day over the course of Thursday.
    d. These changes result in activities occurring over a longer period on a Tuesday and commencing earlier on a Thursday, but avoid any potential odour generation activities occurring on a Wednesday.
7. Continuous monitoring and datalogging of dissolved oxygen concentrations in the recycling pond, and temperature in the inlet air entering the biofilter.

Subject to the business being granted resource consent, the following additional modifications are proposed to reduce odour emissions from the site:

- A bale breaking machine being used on each side of the Phase 1 process,
- The establishment of additional Phase 1 bunker capacity plus lengthening of the existing bunkers,
- An upgraded air extraction and biofilter or ozone odour treatment system,
- An extended roof with air extraction over the bale breaking machine, and
- A new building to house turning and conveying operations for transferring compost from Phase 1 bunkers to Phase 2 tunnels. Air from the new building will be ventilated to odour treatment prior to discharge to atmosphere.

Further details of these proposals are as follows:

1. Pre-wetting
    a. Pre-wetting of the bales is now proposed to occur over an aerated pad that will drain to the existing sump.
    b. The footprint required to accommodate this process, and therefore exposure potential for odour, will be reduced, with further odour avoidance being achieved through the proposed aeration lines.
    c. Pre-wetting will also include the practice of “bale-spiking”.
2. Phase 1 Mixing
    a. Rather than laying out the chicken litter substrate over lines of bales, a bale breaking machine/blending line will be established. This will speed up the mixing process and will reduce the potential odour footprint to the confines of a hopper as opposed to long lines of exposed bales.
    b. The blended inputs to be placed directly (via loader) into a Phase 1 bunker, again reducing the potential odour footprint/time of exposure. This will avoid rows of compost being laid out on the outdoor compost pad for up to 8 hours as is currently the case.
    c. The blending line will be placed under an extended eave with a targeted air extraction system to remove odour for treatment.
3. Additional Phase 1 Bunker Capacity and Odour Capture
    a. Additional Phase 1 Bunker capacity is proposed to accommodate bunker-to-bunker transfers mid-way through the Phase 1 composting process. Whilst this already occurs due to the division of the existing two bunkers into four half-sized bunkers, the additional bunker will be needed for the proposed increased compost production.
    b. The length of the existing bunkers will be extended by approximately 10m to contain the turning machine, turned compost and the front-end loader within the bunker during the bunker-to bunker transfer process, and a canopy will be constructed over the extended bunker entrance containing additional air extraction to biofilter treatment. This will enable the footprint of odour emissions from the mixing of compost to be fully retained within the bunkers, and capture odours escaping from the bunker opening.

4. Phase 1 to Phase 2 Transfer
    a. The final step of the Stage 1 composting process is final turning where water is added to the compost substrate prior to it being loaded into the Phase 2 tunnels. This currently involves the compost being laid out in a windrow and turned over a period of 7 to 11 hours.
    b. It is now proposed to establish turning operations enclosed in a new building that allows the compost to be extracted from the Phase 1 bunker in individual loads and immediately turned and placed into the Phase 2 tunnels as one continuous process. This will avoid a windrow being laid out on the pad and will retain the compost substrate within the Phase 1 bunker where odour will be managed by the biofilter system for almost all of the process. This will again significantly reduce the potential odour footprint as well as the time of exposure.
    c. An air extraction system in the new building will extract odour for filtration in a new biofilter system – further reducing the potential for odour in relation to this aspect of the process. Odorous air ventilated from the Phase 2 tunnels will also be treated in this new biofilter.
5. Upgraded Main Biofilter
    a. The existing biofilter is adequate for current ventilation capacity, however with the additional bunker and extended eaves over both the blending machine and static turner, this will be upgraded to capacity requirements or additional biofilter units added. Alternatively, an appropriate ozone system will be installed. If ozone treatment is identified as a cost-effective option, trials would first be carried out to demonstrate the effectiveness of the option compared to biofiltration.

10 Rating of Odour Emissions

Tables 8, 9 and 10 list the odour sources within the composting plant at three stages of the development and evolution of the site, and provide a qualitative rating of the contribution each source makes to the potential for adverse odour effects at sensitive receptors beyond the site boundary.

The three stages represented are:

- Pre-2015 (prior to mitigation and management improvements undertaken at the site in 2015),
- Current (early 2016), and
- Future Upgraded and Expanded, following completion of all site upgrades and increase in compost production to 500 tonnes per week.

The rating given to each day takes into account the quantity and degree of unpleasantness of the odour emission, and the time of day when the activity is carried out (particularly early in the morning whilst meteorological conditions place odour nuisance at greater risk).

The rating system is qualitative, based on Air Quality Professionals' observations of odour strength from each source, size and volumetric flow rates from each source, time of day when sources are present, and the author's experience with the typical rate of downwind dispersion of odours from such sources.

Odour emissions from the site before and after the proposed upgrades are also shown schematically in Figures 17 and 18.

Despite the clear reduction in odour potential anticipated as the site undergoes future upgrades and expansion, there will always remain the potential for some residual odour emissions. It is unrealistic to expect that the site will be able to completely control the emission of all odour, despite the application of the best practice for odour mitigation in some parts of the process (and, in the remaining parts of the process, best practicable option). Overall consideration of the activity is therefore subject to the Planning framework.

Nevertheless, a significant reduction in the potential for offsite odour impacts is expected following the proposed site upgrades.

Table 8: Rating of odour impact potential from different site odour sources, pre-2015 (prior to mitigation and management improvements undertaken at the site in 2015).

	Day of week (rating takes into account time of day when activity is carried out)						
Odour source	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Bale wetting							
Chicken litter/gypsum storage and handling							
Chicken litter/gypsum mixing							
Laying out bales, then breaking, mixing and placing into bunker							
First and second turning of compost in Phase 1 bunkers							
Transfer of compost from Phase 1 bunkers into Phase 2 tunnels							
Phase 2 composting							
Emptying of Phase 2 tunnels							
Recycled water drainage/collection							
Recycled water storage pond							

Potential for adverse odour impacts at sensitive receptors

Low	
Low-Moderate	
Moderate	
Moderate-High	
High	
Source not active	

Table 9: Rating of odour impact potential from different site odour sources, Current (early 2016).

	Day of week (rating takes into account time of day when activity is carried out)						
Odour source	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Bale wetting							
Chicken litter/gypsum storage and handling							
Chicken litter/gypsum mixing							
Laying out bales, then breaking, mixing and placing into bunker							
First and second turning of compost in Phase 1 bunkers							
Transfer of compost from Phase 1 bunkers into Phase 2 tunnels							
Phase 2 composting							
Emptying of Phase 2 tunnels							
Recycled water drainage/collection							
Recycled water storage pond							

Potential for adverse odour impacts at sensitive receptors

Low	
Low-Moderate	
Moderate	
Moderate-High	
High	
Source not active	

Table 10: Rating of odour impact potential from different site odour sources, Future Upgraded and Expanded.

	Day of week (rating takes into account time of day when activity is carried out)						
Odour source	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Bale wetting							
Chicken litter/gypsum storage and handling							
Chicken litter/gypsum mixing							
Bale break and place into Phase 1 bunkers							
First and second turning of compost in Phase 1 bunkers							
Transfer of compost from Phase 1 bunkers into Phase 2 tunnels							
Phase 2 composting							
Emptying of Phase 2 tunnels							
Recycled water drainage/collection							
Recycled water storage pond							

Potential for adverse odour impacts at sensitive receptors

Low	
Low-Moderate	
Moderate	
Moderate-High	
High	
Source not active	

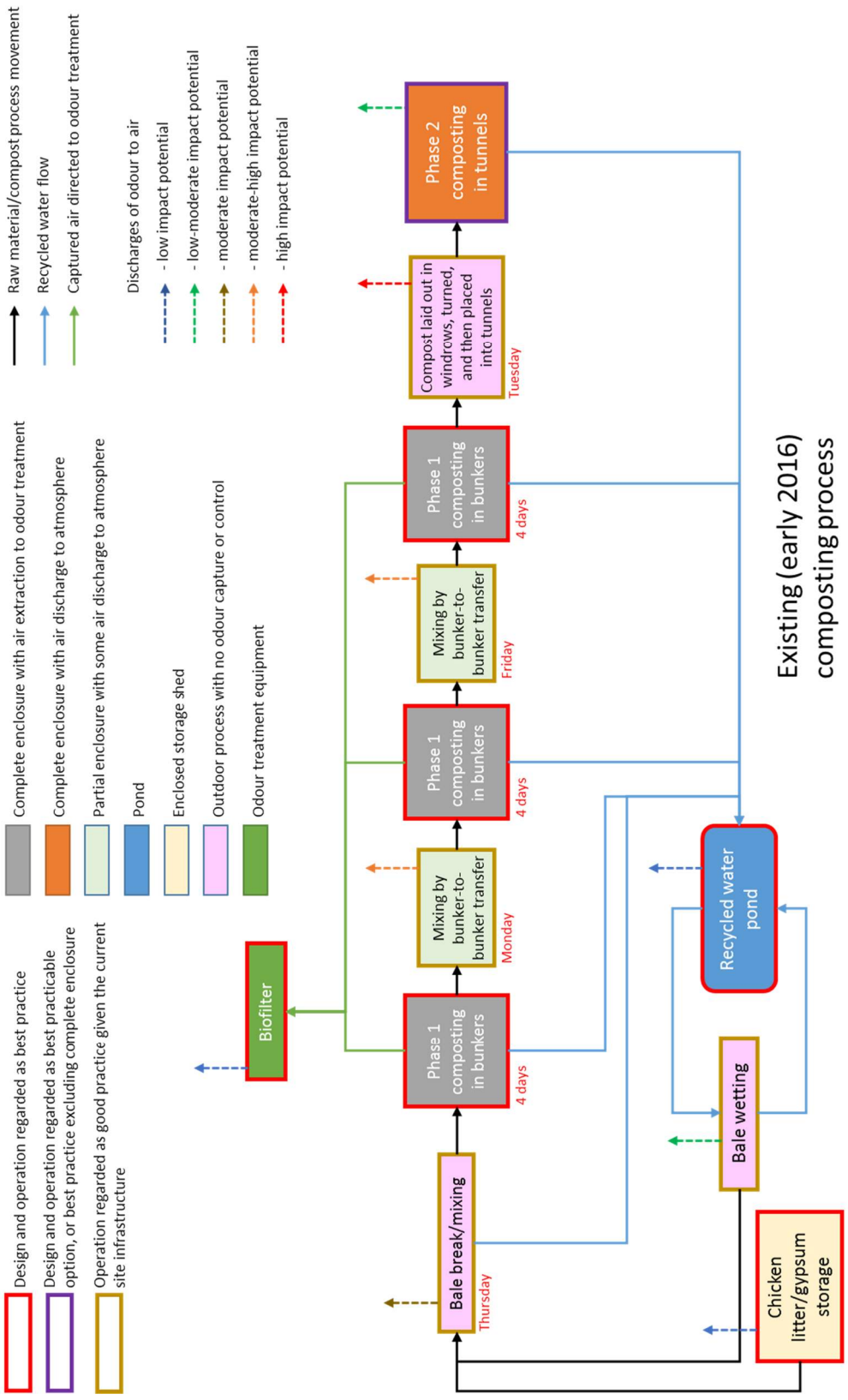


Figure 20: Schematic representation of odour emissions from various stages of the composting process, current (early 2016) site.

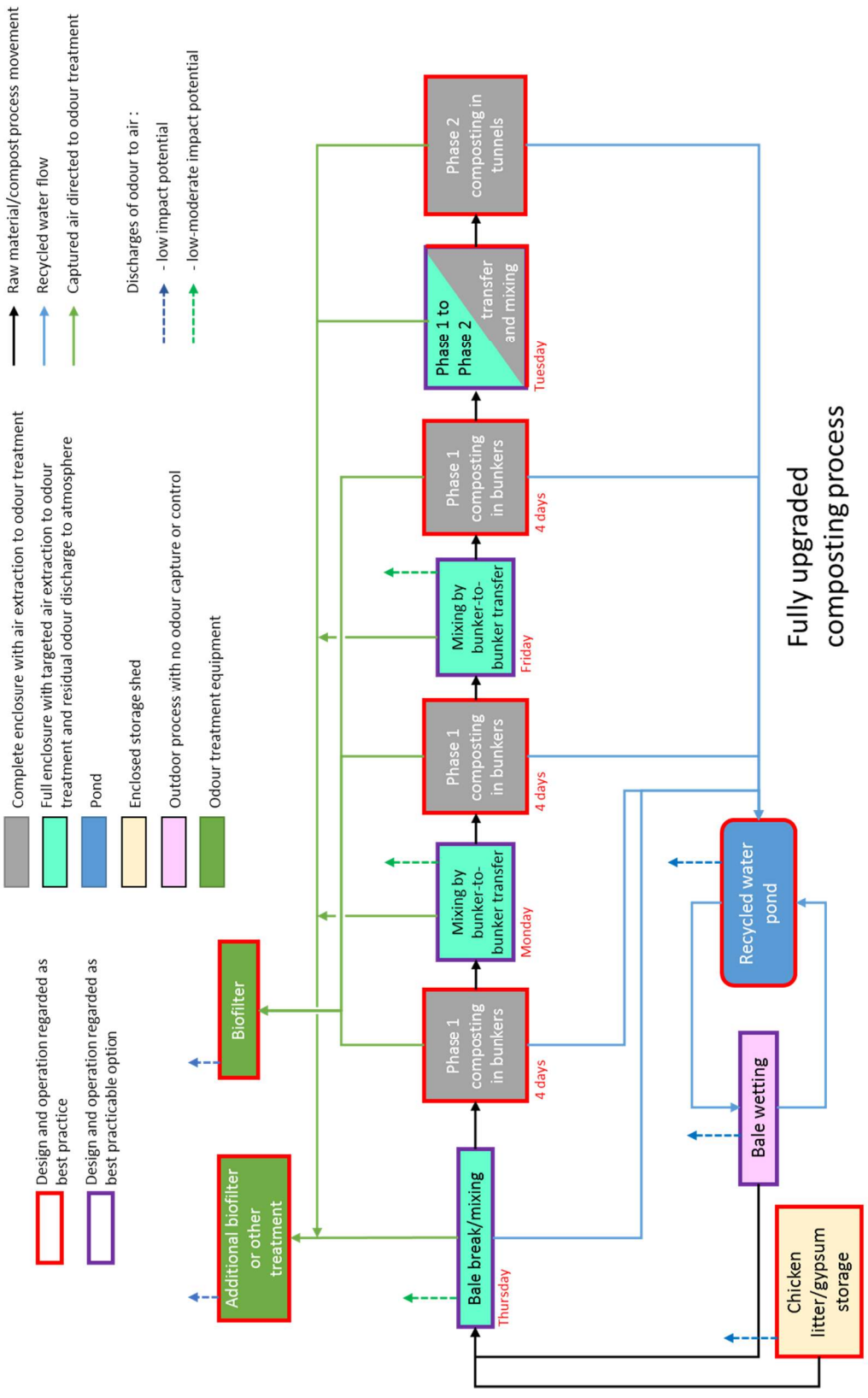


Figure 21: Schematic representation of odour emissions from various stages of the composting process, future site following full proposed upgrades.

11 Summary

Site management has demonstrated a willingness to continuously explore, and implement where feasible, options for management and operational improvements to minimise odour emission potential. This is evident in the improvements to site management implemented over the last 12- 18 months.

Although there will always be the potential for residual odour to occur, the proposed strategy outlined for reduction of odour from the current composting activities at the TMM site is considered to represent the best practice for odour mitigation in some parts of the process and, in the remaining parts of the process, the best practicable option or best practice except for the option of complete enclosure.

In the future after the proposed upgrades are implemented (which includes the proposed increase in production rate), greatly reduced odour emissions are anticipated on Mondays, Tuesdays, Thursdays and Fridays. Where possible, these odours will also be emitted outside of the times of day when meteorological conditions are most conducive to poor atmospheric dispersion (i.e. around sunrise and sunset), further reducing the potential for any residual odour emissions to cause offensive or objectionable odours.

Appendix A

Aerial Photos Showing Residential Encroachment

19 December 2016

Land use surrounding TMM site, October 2003. Image from Google Earth Pro.

Land use surrounding TMM site, October 2009. Image from Google Earth Pro.

Land use surrounding TMM site, September 2012. Image from Google Earth Pro.

Land use surrounding TMM site, April 2014. Image from Google Earth Pro.

Land use surrounding TMM site, January 2016. Image from Google Earth Pro.

Appendix B

Photos

19 December 2016

Photo B1 – Storage shed for premixed chicken litter/gypsum mix.

Photo B2 – Maize mulch storage.

Photo B3 – Phase 1 bunkers (left of picture). Biofilter with growing sheds in the background is shown at right of picture.

Photo B4 – Phase 2 tunnels with doors closed.

Photo B5 – New effluent storage pond (commissioned August 2015).

Photo B6 – Biofilter

Photo B7 – Biofilter surface

Photo B8 – Old effluent collection sump (aerated), prior to August 2015. Image from Beca Report (2010)

Photo B9 – Old effluent storage pond, now decommissioned (effective August 2015). Image from Beca Report (2010).

Photo B10 – Current mode of operation for effluent collection sump, since August 2015.

Photo B11 – Bale wetting, September 2015.

Photo B12 – Previous storage facility for chicken litter (unmixed) (left bunker) and mixed chicken litter/gypsum (right bunker). Photo taken 2009, published in Beca Report (2010).

Photo B13 – Current (late 2015) storage facility for premixed chicken litter/gypsum.

Photo B14 – Bale breaking and mixing, 15 October 2015. Shows bales laid out in a row with chicken litter/gypsum mix and maize mulch on top of bales, waiting for turning (row turner visible in background).

Photo B15 –Bale breaking and mixing, 15 October 2015. Shows freshly mixed compost (foreground) after passing through row turning, and waiting to be loaded into Phase 1 bunker.

Photo B16 – Phase 1 compost being turned by bunker-to-bunker transfer. Loader (left bunker) places compost into the in-vessel turner (right bunker) which mixes the compost and disperses it into the bunker. As right bunker is nearly full at the time this photo was taken, turner machine is not fully within the bunker.

Appendix C

Biofilter Test Report, Beca Infrastructure Ltd 2011

19 December 2016

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Te Mata Mushrooms
Brookvale Rd
Havelock North

14 November 2011

Dear Chris,

Te Mata Mushrooms Composting Biofilter Compliance Testing

Scope

Beca Infrastructure Ltd was commissioned by Te Mata Mushrooms Ltd to undertake gas velocity sampling at their Brookvale Road, Havelock North site. This work was undertaken in accordance with our letter of engagement dated 5 September 2011 (and subsequently our email of 16 November 2011), in order to assess compliance with condition 16 of Hawkes Bay Regional Council discharge permit DP100128A. Condition 16 states:

"the loading rate of the biofilter, or biofilters shall not exceed 50m^3 air per hour per m^3 of bark"

If this condition is not complied with, Condition 17 of the resource would be triggered:

"If the biofilter existing at the time this consent was granted does not comply with the loading rate stated in Condition 16, the consent holder shall, by 1 December 2011, engage a professional biofilter designer to provide written evidence, to the satisfaction of the Council (Manager Compliance), that the biofilter design will be fit for purpose over a specified period of time."

This letter outlines the methods used and reports the results of this sampling.

Methods

The references for the testing methods used are as follows:

- Selection of Sampling Positions – AS 4323.1 – 1995
- Determination of Gas Flow Data – ISO 10780:1994(E)

Conditions during testing and calculations

Measurements were taken on Monday 17 October 2011 between 0900 and 1300 during an unloading and loading operation of the compost bunkers. When loading and unloading the composting bunkers, Te Mata Mushrooms run the biofilter extraction fan at full speed (50Hz) to reduce odour discharge from the main bunker entrance. A further set of flow rate data was obtained whilst running the fan at half speed (25 Hz) for comparative purposes. The results for both sets of measurements are presented in Table 1. The higher rate applies to consent compliance testing as this is the standard operating flow rate during this phase of the operating schedule.

The biofilter hydraulic loading rate was calculated by dividing the flow rate through the duct (m^3/hr) by the volume of biofilter bark (m^3).

The biofilter media volume of 252m^3 was calculated using the dimensions of the biofilter enclosure (inner dimensions) minus the layer of gravel which occupies the lower part of the enclosure. The dimensions used for this calculation were obtained from the report "*Te Mata Mushroom Odour Source Assessment*" dated 24 February 2010, prepared for Te Mata Mushrooms by Beca Infrastructure Ltd.

Results

Results for the flow rates measured on 17 October 2011 are presented in **Table 1**. The calculation sheets are attached as appendix A.

Table 1 - Airflow Results

Fan Speed (Hz)	Gas Temp (°C)	Gas Velocity (m/s)	Gas Flowrate (m^3/s)	Gas Flowrate (m^3/s 0°C, dry, 1 ATM)	Gas Flowrate (m3/hr)	Gas Flowrate (m^3/hr/m^3 media)
50	24	14.9	4.1	3.68	14663	58.2
25	24	7.9	2.2	1.95	7769	30.8

Condition 16 - Discussion

When operating at maximum fan speed, the hydraulic loading flow rate for the Te Mata mushrooms biofilter exceeded the limit of 50m^3 /hr/m^3 of bark imposed by condition 16 of Hawkes Bay Regional Council discharge permit DP100128A.

It is noted that the sampling point was not ideal according to the requirements of AS 4323.1 due to an upstream disturbance (a bend) being too close to the sampling plane, and causing an uneven air distribution across the duct at the sampling plane. Despite this, the loading rate limit of 50m^3/ hr/ m^3 of bark is likely to be exceeded when maximum fan speed is used. To comply with the consent limit, the fan could be run slower at about 45 Hz, however there is then a small risk of fugitive odour emissions during unloading of the bunkers.

As Condition 16 was measured to be slightly exceeded during times when the fan operates at maximum speed, Condition 17 is triggered which requires an assessment of whether the biofilter design "*will be fit for purpose over a specified period of time*". The response to this condition is outlined below.

Condition 17 – Biofilter Design

The assessment of "fit for purpose" has been based on the design recommendations in "Biotechnology for Odor and Air pollution Control", Cudmore and Gostomski, 2005.

The biofilter operation was inspected during the site visit on the 17th October 2011.Visual inspection of the biofilter surface indicated the biofilter appeared to be in good condition and the treated air flow appeared humid (visible) and to be fairly evenly distributed across the biofilter surface. The odour

emitted from the biofilter surface was considered to be an organic/ earthy odour, typical of what is commonly emitted from a properly operating biofilter.

The key biofilter design criteria are:

- Loading rate (ratio of gas volume to bed cross sectional area);
- Gas composition;
- Bed depth;
- Bed media specification; and
- Air distribution system.

In addition, the inlet air stream temperature, composition and humidity are important design / operating criteria.

Loading rate

At maximum fan speed the measured loading rate exceeds the typical recommended maximum loading rate of 50 $m^3/hr/m^3$ media, however under normal operation the loading rate was measured to be 30 $m^3/hr/m^3$ media, which is well within the good practice design operating range.

At maximum fan speed, the retention time in the biofilter is 60 seconds, which should be adequate for odour treatment during short term peak flows.

Gas composition

Ammonia is one of the main components of odour generated in the composting process. Nitrogen based odour causing compounds such as ammonia are readily biodegraded in biofilters. Ammonia and Hydrogen sulphide concentrations of the inlet air stream to the biofilter were measured during the loading rate compliance testing on 17th October. A maximum ammonia concentration of 35 ppm was measured at the biofilter inlet with the shutter closed so that 100% of the inlet air to the biofilter was drawn from the closed bunker. It is noted that this shutter arrangement would be infrequently used, as fresh air is required to be introduced to reduce the temperature. Therefore 35 ppm is likely to be at the high end of the ammonia load that the biofilter would typically see.

Hydrogen sulphide levels were measured to be below the limit of detection of the Gastec tubes i.e. <1ppm. An ammonia range of 10 – 30 ppm is sometimes conservatively recommended if pH adjustment is to be avoided. However there are reports of successful operation at higher concentrations in the literature. On this basis, while the ammonia concentration was higher than this range, the pH is monitored twice a year as part of the consent requirement and the current design appears to be sufficient to treat this gas stream composition.

Bed depth and media type

The biofilter bed depth (2 metres, including 0.25 metres river gravel) and use of bark media is considered suitable for the existing application. It is likely that ammonia is the primary source of odour in this air stream. It is acknowledged that there is some evidence that a soil- bark composition

is more effective than straight bark in applications with high ammonia loads[1], however soil-bark biofilters are also more prone to build up in bed pressure which causes insufficient air extraction and treatment. The bark media was first installed in 2003 and replaced in September 2009.

Air distribution

The air distribution system consists of a PVC pipe manifold with 150 mm laterals at 780 mm centres, and holes at 100 mm distance spiralled around the pipe. There is no external access to the central manifold to be able to routinely inspect this for blockages. Ideally, this would have been included in the design, however, in this application it is considered the air stream is relatively clean (i.e. no tars or fats that could build up) and so is considered acceptable. It is recommended that the laterals are inspected for blockage or damage the next time the media is replaced.

Temperature and moisture content

The compost temperature and bunker air temperature can be relatively high if the bunkers are closed for a period of time, however this can be controlled through changing shutter positions and introducing fresh air. The shutter positions are recorded when they are changed and temperatures are measured inside the bunkers and at the inlet to the biofilter. It is recommended that biofilters are operated at less than 40°C. This system is considered fit for purpose.

Moisture content can be controlled by a sprinklers system on the bed surface, mainly used during summer time and also a spray nozzle is installed in the biofilter inlet duct. This spray nozzle is switched on when the bunkers have been closed for 2-3 hours and the gas flow to the biofilter is assumed to have a higher odour concentration. This spray nozzle may also act as a partial wet scrubber , removing some of the ammonia from the air stream.

Summary

Based on the above discussion, it is considered that the biofliter design is fit for purpose based on the current operating conditions and loading rates. The existing bark media is expected to remain in reasonable condition for the next 3- 5 years.

Yours sincerely
Camilla Borger
Associate – Environmental Engineering

on behalf of
Beca Infrastructure Ltd
Mobile 0272 810 856
Email: camilla.borger@beca.com

[1] Biotechnology for Odor and Air pollution Control, Cudmore and Gostomski, 2005

Appendix D

CALMET Input File

19 December 2016

CALMET.INP 2.2 Generated by CALPUFF View 8.2.0 - 04-Aug-16

---------- Run title (3 lines) ----------

CALMET MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

Subgroup (a)

Default Name Type File Name
--- --- ---
GEO.DAT input ! GEODAT = ..\TeMata_UTM_obs_no_Napier_wind\TeMata_UTM_obs_geo\GEO.DAT !
SURF.DAT input ! SRFDAT = ..\TeMata_UTM_obs_no_Napier_wind\TeMata_UTM_obs_no_Napier_wind_met\SURF.DAT !
CLOUD.DAT input * CLDDAT = *
PRECIP.DAT input * PRCDAT = *
WT.DAT input * WTDAT = *

CALMET.LST output ! METLST = CALMET.LST !
CALMET.DAT output ! METDAT = CALMET.dat !
PACOUT.DAT output * PACDAT = *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case ! LCFILES = F !
F = UPPER CASE

NUMBER OF UPPER AIR & OVERWATER STATIONS:

Number of upper air stations (NUSTA) No default ! NUSTA = 2 !
Number of overwater met stations
(NOWSTA) No default ! NOWSTA = 0 !

NUMBER OF PROGNOSTIC and IGF-CALMET FILEs:

Number of MM4/MM5/3D.DAT files
(NM3D) No default ! NM3D = 0 !

Number of IGF-CALMET.DAT files
(NIGF) No default ! NIGF = 0 !

!END!

Subgroup (b)

Upper air files (one per station)

Default Name Type File Name
--- --- ---
UP1.DAT input 1 ! UPDAT=..\..\..\Models\TeMata\UPPER2~2\03145up.dat! !END!
UP2.DAT input 2 ! UPDAT=..\..\..\Models\TeMata\UPPER2~2\01410up.dat! !END!

Subgroup (c)

Overwater station files (one per station)

Default Name Type File Name
--- --- ---
* OVERWATERFILES = *

Subgroup (d)

MM4/MM5/3D.DAT files (consecutive or overlapping)

Default Name Type File Name
--- --- ---

```
* M3DDATFILES = *
------------------------------------------------------------------------------
Subgroup (e)
------------------------------------------------
IGF-CALMET.DAT files (consecutive or overlapping)
------------------------------------------------
Default Name  Type      File Name
------------  ----      ---------
* IGFDATFILES = *
------------------------------------------------------------------------------
Subgroup (f)
----------------
Other file names
----------------

Default Name  Type      File Name
------------  ----      ---------
DIAG.DAT      input     * DIADAT = *
PROG.DAT      input     * PRGDAT = *

TEST.PRT      output    * TSTPRT = *
TEST.OUT      output    * TSTOUT = *
TEST.KIN      output    * TSTKIN = *
TEST.FRD      output    * TSTFRD = *
TEST.SLP      output    * TSTSLP = *
DCST.GRD      output    * DCSTGD = *

------------------------------------------------------------------------------

                  !END!

------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Starting date:   Year  (IBYR) --   No default   ! IBYR = 2012 !
                    Month (IBMO) --   No default   ! IBMO = 1 !
                    Day   (IBDY) --   No default   ! IBDY = 1 !
   Starting time:   Hour  (IBHR) --   No default   ! IBHR = 0 !
                    Second (IBSEC) --  No default   ! IBSEC = 0 !

   Ending date:     Year  (IEYR) --   No default   ! IEYR = 2012 !
                    Month (IEMO) --   No default   ! IEMO = 1 !
                    Day   (IEDY) --   No default   ! IEDY = 2 !
   Ending time:     Hour  (IEHR) --   No default   ! IEHR = 0 !
                    Second (IESEC) --  No default   ! IESEC = 0 !

    UTC time zone       (ABTZ) -- No default      ! ABTZ = UTC+1200 !
      (character*8)
      PST = UTC-0800, MST = UTC-0700 , GMT = UTC-0000
      CST = UTC-0600, EST = UTC-0500

   Length of modeling time-step (seconds)
   Must divide evenly into 3600 (1 hour)
   (NSECDT)                  Default:3600     ! NSECDT = 3600 !
                          Units: seconds

   Run type          (IRTYPE) -- Default: 1      ! IRTYPE = 1 !

     0 = Computes wind fields only
     1 = Computes wind fields and micrometeorological variables
        (u*, w*, L, zi, etc.)
     (IRTYPE must be 1 to run CALPUFF or CALGRID)

   Compute special data fields required by CALGRID (i.e., 3-D fields of W wind components and temperature)
   in additional to regular          Default: T    ! LCALGRD = T !
   fields ? (LCALGRD)
   (LCALGRD must be T to run CALGRID)

    Flag to stop run after SETUP phase (ITEST)          Default: 2      ! ITEST = 2 !
    (Used to allow checking
    of the model inputs, files, etc.)
```

ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of
COMPUTATIONAL phase after SETUP

Test options specified to see if they conform to regulatory
values? (MREG) No Default ! MREG = 0 !

0 = NO checks are made
1 = Technical options must conform to USEPA guidance

!END!

INPUT GROUP: 2 -- Map Projection and Grid control parameters

Projection for all (X,Y):

Map projection
(PMAP) Default: UTM ! PMAP = UTM !

UTM : Universal Transverse Mercator
TTM : Tangential Transverse Mercator
LCC : Lambert Conformal Conic
PS : Polar Stereographic
EM : Equatorial Mercator
LAZA : Lambert Azimuthal Equal Area

False Easting and Northing (km) at the projection origin
(Used only if PMAP= TTM, LCC, or LAZA)
(FEAST) Default=0.0 ! FEAST = 0.0 !
(FNORTH) Default=0.0 ! FNORTH = 0.0 !

UTM zone (1 to 60)
(Used only if PMAP=UTM)
(IUTMZN) No Default ! IUTMZN = 60 !

Hemisphere for UTM projection?
(Used only if PMAP=UTM)
(UTMHEM) Default: N ! UTMHEM = S !
N : Northern hemisphere projection
S : Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0) No Default ! RLAT0 = 0.00N !
(RLON0) No Default ! RLON0 = 0.00E !

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 30S !
(XLAT2) No Default ! XLAT2 = 60S !

Datum-region

Datum-region for output coordinates
(DATUM) Default: WGS-84 ! DATUM = WGS-84 !

Horizontal grid definition:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX) No default ! NX = 90 !
No. Y grid cells (NY) No default ! NY = 90 !

Grid spacing (DGRIDKM) No default ! DGRIDKM = 1 !
Units: km

```
   Reference grid coordinate of SOUTHWEST corner of grid cell (1,1)

     X coordinate (XORIGKM)       No default    ! XORIGKM = 430 !
     Y coordinate (YORIGKM)       No default    ! YORIGKM = 5560 !
                          Units: km

   Vertical grid definition:
   -------------------------

     No. of vertical layers (NZ)   No default    ! NZ = 10 !

     Cell face heights in arbitrary vertical grid (ZFACE(NZ+1))   No defaults   Units: m
     ! ZFACE = 0.00,20.00,40.00,80.00,160.00,320.00,640.00,1200.00,2000.00,3000.00,4000.00 !

!END!

------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output Options
--------------

  DISK OUTPUT OPTION

    Save met. fields in an unformatted
    output file ?           (LSAVE)  Default: T    ! LSAVE = T !
    (F = Do not save, T = Save)

    Type of unformatted output file:
    (IFORMO)                    Default: 1    ! IFORMO = 1 !

       1 = CALPUFF/CALGRID type file (CALMET.DAT)
       2 = MESOPUFF-II type file    (PACOUT.DAT)

  LINE PRINTER OUTPUT OPTIONS:

    Print met. fields ?  (LPRINT)      Default: F    ! LPRINT = F !
    (F = Do not print, T = Print)

    Print interval (IPRINF) in hours              Default: 1    ! IPRINF = 1 !

    Specify which layers of U, V wind component to print (IUVOUT(NZ)) -- NOTE: NZ values must be entered
    (0=Do not print, 1=Print) (used only if LPRINT=T)       Defaults: NZ*0
    * IUVOUT = *
    ----------------------

    Specify which levels of the W wind component to print
    (NOTE: W defined at TOP cell face --  6  values) (IWOUT(NZ)) -- NOTE: NZ values must be entered
    (0=Do not print, 1=Print) (used only if LPRINT=T & LCALGRD=T)
    -----------------------------------
                          Defaults: NZ*0
     * IWOUT = *

    Specify which levels of the 3-D temperature field to print
    (ITOUT(NZ)) -- NOTE: NZ values must be entered
    (0=Do not print, 1=Print) (used only if LPRINT=T & LCALGRD=T)
    -----------------------------------
                          Defaults: NZ*0
     * ITOUT = *

    Specify which meteorological fields
    to print
    (used only if LPRINT=T)          Defaults: 0 (all variables)
    ----------------------

     Variable          Print ? (0 = do not print, 1 = print)
     --------       ------------------

   ! STABILITY = 0 ! - PGT stability class
   ! USTAR = 0 ! - Friction velocity
   ! MONIN = 0 ! - Monin-Obukhov length
   ! MIXHT = 0 ! - Mixing height
   ! WSTAR = 0 ! - Convective velocity scale
```

```
! PRECIP = 0 ! - Precipitation rate
! SENSHEAT = 0 ! - Sensible heat flux
! CONVZI = 0 ! - Convective mixing ht.


 Testing and debug print options for micrometeorological module

  Print input meteorological data and
  internal variables (LDB)       Default: F      ! LDB = F !
  (F = Do not print, T = print)
  (NOTE: this option produces large amounts of output)

  First time step for which debug data
  are printed (NN1)              Default: 1      ! NN1 = 1 !

  Last time step for which debug data
  are printed (NN2)              Default: 1      ! NN2 = 1 !

  Print distance to land
  internal variables (LDBCST)    Default: F      ! LDBCST = F !
  (F = Do not print, T = print)
  (Output in .GRD file DCST.GRD, defined in input group 0)

 Testing and debug print options for wind field module (all of the following print options control output to
  wind field module's output files: TEST.PRT, TEST.OUT, TEST.KIN, TEST.FRD, and TEST.SLP)

  Control variable for writing the test/debug wind fields to disk files (IOUTD)
  (0=Do not write, 1=write)      Default: 0      ! IOUTD = 0 !

  Number of levels, starting at the surface,
  to print (NZPRN2)              Default: 1      ! NZPRN2 = 1 !

  Print the INTERPOLATED wind components ?
  (IPR0) (0=no, 1=yes)           Default: 0      ! IPR0 = 0 !

  Print the TERRAIN ADJUSTED surface wind components ?
  (IPR1) (0=no, 1=yes)           Default: 0      ! IPR1 = 0 !

  Print the SMOOTHED wind components and the INITIAL DIVERGENCE fields ?
  (IPR2) (0=no, 1=yes)           Default: 0      ! IPR2 = 0 !

  Print the FINAL wind speed and direction fields ?
  (IPR3) (0=no, 1=yes)           Default: 0      ! IPR3 = 0 !

  Print the FINAL DIVERGENCE fields ?
  (IPR4) (0=no, 1=yes)           Default: 0      ! IPR4 = 0 !

  Print the winds after KINEMATIC effects are added ?
  (IPR5) (0=no, 1=yes)           Default: 0      ! IPR5 = 0 !

  Print the winds after the FROUDE NUMBER adjustment is made ?
  (IPR6) (0=no, 1=yes)           Default: 0      ! IPR6 = 0 !

  Print the winds after SLOPE FLOWS are added ?
  (IPR7) (0=no, 1=yes)           Default: 0      ! IPR7 = 0 !

  Print the FINAL wind field components ?
  (IPR8) (0=no, 1=yes)           Default: 0      ! IPR8 = 0 !

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 4 -- Meteorological data options
--------------

 NO OBSERVATION MODE          (NOOBS)  Default: 0    ! NOOBS = 0 !
    0 = Use surface, overwater, and upper air stations
    1 = Use surface and overwater stations (no upper air observations)
      Use MM4/MM5/3D for upper air data
    2 = No surface, overwater, or upper air observations
      Use MM4/MM5/3D for surface, overwater, and upper air data
```

```
   NUMBER OF SURFACE & PRECIP. METEOROLOGICAL STATIONS

     Number of surface stations   (NSSTA)  No default     ! NSSTA = 4 !

     Number of precipitation stations
     (NPSTA=-1: flag for use of MM5/3D precip data)
                          (NPSTA)  No default     ! NPSTA = 0 !

   CLOUD DATA OPTIONS
     Output option - output a CLOUD.DAT file (yes or no)  0=no, 1=yes
                          (ICLDOUT) Default:999      ! ICLDOUT = 0 !

     Method to compute cloud fields:
                          (MCLOUD)  Default: 999     ! MCLOUD = 1 !
     MCLOUD = 1 - Clouds data generated from surface observations
     MCLOUD = 2 - Gridded CLOUD.DAT read from CLOUD.DAT file (no output
          is possible since already exist)
     MCLOUD = 3 - Gridded cloud cover from Prognostic Rel. Humidity
          at 850mb (Teixera)
     MCLOUD = 4 - Gridded cloud cover from Prognostic Rel. Humidity
          at all levels (MM5toGrads algorithm)

   FILE FORMATS

     Surface meteorological data file format
                          (IFORMS)  Default: 2     ! IFORMS = 2 !
     (1 = unformatted (e.g., SMERGE output))
     (2 = formatted   (free-formatted user input))

     Precipitation data file format
                          (IFORMP)  Default: 2     ! IFORMP = 2 !
     (1 = unformatted (e.g., PMERGE output))
     (2 = formatted   (free-formatted user input))

     Cloud data file format
                          (IFORMC)  Default: 2     ! IFORMC = 1 !
     (1 = unformatted - CALMET unformatted output)
     (2 = formatted   - free-formatted CALMET output or user input)

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 5 -- Wind Field Options and Parameters
--------------


   WIND FIELD MODEL OPTIONS
     Model selection variable (IWFCOD)     Default: 1      ! IWFCOD = 1 !
       0 = Objective analysis only
       1 = Diagnostic wind module

     Compute Froude number adjustment
     effects ? (IFRADJ)                 Default: 1      ! IFRADJ = 1 !
     (0 = NO, 1 = YES)

     Compute kinematic effects ? (IKINE)   Default: 0      ! IKINE = 0 !
     (0 = NO, 1 = YES)

     Use O'Brien procedure for adjustment
     of the vertical velocity ? (IOBR)     Default: 0      ! IOBR = 0 !
     (0 = NO, 1 = YES)

     Compute slope flow effects ? (ISLOPE) Default: 1      ! ISLOPE = 1 !
     (0 = NO, 1 = YES)

     Extrapolate surface wind observations
     to upper layers ? (IEXTRP)           Default: -4     ! IEXTRP = 4 !
     (1 = no extrapolation is done,
      2 = power law extrapolation used,
      3 = user input multiplicative factors for layers 2 - NZ used (see FEXTRP array)
```

4 = similarity theory used -1, -2, -3, -4 = same as above except layer 1 data
at upper air stations are ignored

Extrapolate surface winds even
if calm? (ICALM) Default: 0 ! ICALM = 0 !
(0 = NO, 1 = YES)

Default: NZ*0
! BIAS = 0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0 !

Minimum distance from nearest upper air station to surface station for which extrapolation
of surface winds at surface station will be allowed (RMIN2: Set to -1 for IEXTRP = 4 or other situations
where all surface stations should be extrapolated) Default: 4. ! RMIN2 = 4 !

Use gridded prognostic wind field model output fields as input to the diagnostic
wind field model (IPROG) Default: 0 ! IPROG = 0 !
(0 = No, [IWFCOD = 0 or 1]

Timestep (seconds) of the prognostic
model input data (ISTEPPGS) Default: 3600 ! ISTEPPGS = 3600 !

Use coarse CALMET fields as initial guess fields (IGFMET)
(overwrites IGF based on prognostic wind fields if any)
Default: 0 ! IGFMET = 0 !

RADIUS OF INFLUENCE PARAMETERS

Use varying radius of influence Default: F ! LVARY = F !
(if no stations are found within RMAX1,RMAX2,
or RMAX3, then the closest station will be used)

Maximum radius of influence over land
in the surface layer (RMAX1) No default ! RMAX1 = 20 !
Units: km
Maximum radius of influence over land
aloft (RMAX2) No default ! RMAX2 = 20 !
Units: km
Maximum radius of influence over water
(RMAX3) No default ! RMAX3 = 0 !
Units: km

OTHER WIND FIELD INPUT PARAMETERS

Minimum radius of influence used in the wind field interpolation (RMIN) Default: 0.1 ! RMIN = 0.1 !
Units: km
Radius of influence of terrain
features (TERRAD) No default ! TERRAD = 6 !

Units: km
Relative weighting of the first guess field and observations in the
SURFACE layer (R1) No default ! R1 = 8 !
(R1 is the distance from an Units: km
observational station at which the
observation and first guess field are equally weighted)

Relative weighting of the first guess field and observations in the
layers ALOFT (R2) No default ! R2 = 8 !
(R2 is applied in the upper layers Units: km
in the same manner as R1 is used in the surface layer).

Relative weighting parameter of the
prognostic wind field data (RPROG) No default ! RPROG = 0 !
(Used only if IPROG = 1) Units: km

Maximum acceptable divergence in the divergence minimization procedure
(DIVLIM) Default: 5.E-6 ! DIVLIM = 5E-006 !

Maximum number of iterations in the
divergence min. procedure (NITER) Default: 50 ! NITER = 50 !

Number of passes in the smoothing procedure (NSMTH(NZ))
NOTE: NZ values must be entered Default: 2,(mxnz-1)*4 ! NSMTH = 2,9*4 !

Maximum number of stations used in each layer for the interpolation of
data to a grid point (NINTR2(NZ))
NOTE: NZ values must be entered Default: 99. ! NINTR2 = 10*99 !

Critical Froude number (CRITFN) Default: 1.0 ! CRITFN = 1 !

Empirical factor controlling the influence of kinematic effects
(ALPHA) Default: 0.1 ! ALPHA = 0.1 !

Multiplicative scaling factor for extrapolation of surface observations
to upper layers (FEXTR2(NZ)) Default: NZ*0.0
* FEXTR2 = *
(Used only if IEXTRP = 3 or -3)

BARRIER INFORMATION

Number of barriers to interpolation
of the wind fields (NBAR) Default: 0 ! NBAR = 0 !

Level (1 to NZ) up to which barriers
apply (KBAR) Default: NZ ! KBAR = 10 !

THE FOLLOWING 4 VARIABLES ARE INCLUDED ONLY IF NBAR > 0
NOTE: NBAR values must be entered No defaults
for each variable Units: km

X coordinate of BEGINNING of each barrier (XBBAR(NBAR)) * XBBAR = *
Y coordinate of BEGINNING of each barrier (YBBAR(NBAR)) * YBBAR = *

X coordinate of ENDING of each barrier (XEBAR(NBAR)) * XEBAR = *
Y coordinate of ENDING of each barrier (YEBAR(NBAR)) * YEBAR = *

DIAGNOSTIC MODULE DATA INPUT OPTIONS

Surface temperature (IDIOPT1) Default: 0 ! IDIOPT1 = 0 !
0 = Compute internally from hourly surface observations or prognostic fields
1 = Read preprocessed values from a data file (DIAG.DAT)

Surface met. station to use for
the surface temperature (ISURFT) Default: -1 ! ISURFT = -1 !
(Used only if IDIOPT1 = 0)

Temperature lapse rate used in the Default: 0 ! IDIOPT2 = 0 !
computation of terrain-induced circulations (IDIOPT2)
0 = Compute internally from (at least) twice-daily
upper air observations or prognostic fields
1 = Read hourly preprocessed values from a data file (DIAG.DAT)

Upper air station to use for
the domain-scale lapse rate (IUPT) Default: -1 ! IUPT = 1 !
(Must be a value from 1 to NUSTA
or -1 to use 2-D spatially varying lapse rate)
or -2 to use a domain-average prognostic lapse rate (only with ITPROG>0)
(Used only if IDIOPT2 = 0)

Depth through which the domain-scale
lapse rate is computed (ZUPT) Default: 200. ! ZUPT = 200 !
(Used only if IDIOPT2 = 0) Units: meters

Initial Guess Field Winds
(IDIOPT3) Default: 0 ! IDIOPT3 = 0 !
0 = Compute internally from observations or prognostic wind fields
1 = Read hourly preprocessed domain-average wind values from a data file (DIAG.DAT)

Upper air station to use for

```
    the initial guess winds (IUPWND)   Default: -1    ! IUPWND = -1 !
    (Used only if IDIOPT3 = 0 and noobs=0)
    ---------------------------------------

    Bottom and top of layer through which the domain-scale winds are computed
    (ZUPWND(1), ZUPWND(2))       Defaults: 1., 1000. ! ZUPWND= 1.0, 1.00 !
    (Used only if IDIOPT3 = 0, NOOBS>0 and IUPWND>0)    Units: meters
    -------------------------

  Observed surface wind components
  for wind field module (IDIOPT4)  Default: 0     ! IDIOPT4 = 0 !
    0 = Read WS, WD from a surface data file (SURF.DAT)
    1 = Read hourly preprocessed U, V from a data file (DIAG.DAT)

  Observed upper air wind components
  for wind field module (IDIOPT5)  Default: 0     ! IDIOPT5 = 0 !
    0 = Read WS, WD from an upper air data file (UP1.DAT, UP2.DAT, etc.)
    1 = Read hourly preprocessed U, V from a data file (DIAG.DAT)

  LAKE BREEZE INFORMATION

    Use Lake Breeze Module  (LLBREZE)
                        Default: F      ! LLBREZE = F !

     Number of lake breeze regions (NBOX)          ! NBOX = 0 !

   X Grid line 1 defining the region of interest   * XG1 = *
   X Grid line 2 defining the region of interest   * XG2 = *
   Y Grid line 1 defining the region of interest   * YG1 = *
   Y Grid line 2 defining the region of interest   * YG2 = *

    X Point defining the coastline (Straight line)
          (XBCST)  (KM)   Default: none    * XBCST = *

    Y Point defining the coastline (Straight line)
          (YBCST)  (KM)   Default: none    * YBCST = *

    X Point defining the coastline (Straight line)
          (XECST)  (KM)   Default: none    * XECST = *

    Y Point defining the coastline (Straight line)
          (YECST)  (KM)   Default: none    * YECST = *


  Number of stations in the region     Default: none * NLB = *
  (Surface stations + upper air stations)

  Station ID's  in the region   (METBXID(NLB))
  (Surface stations first, then upper air stations)  * METBXID = *

!END!

--------------------------------------------------------------------------------

INPUT GROUP: 6 -- Mixing Height, Temperature and Precipitation Parameters
--------------

  EMPIRICAL MIXING HEIGHT CONSTANTS

    Neutral, mechanical equation
    (CONSTB)                    Default: 1.41   ! CONSTB = 1.41 !
    Convective mixing ht. equation
    (CONSTE)                    Default: 0.15   ! CONSTE = 0.15 !
    Stable mixing ht. equation
    (CONSTN)                    Default: 2400.  ! CONSTN = 2400 !
    Overwater mixing ht. equation
    (CONSTW)                     Default: 0.16   ! CONSTW = 0.16 !
    Absolute value of Coriolis
    parameter (FCORIOL)              Default: 1.E-4  ! FCORIOL = 0.0001 !
                            Units: (1/s)

  SPATIAL AVERAGING OF MIXING HEIGHTS
```

Conduct spatial averaging
(IAVEZI) (0=no, 1=yes) Default: 1 ! IAVEZI = 1 !

Max. search radius in averaging
process (MNMDAV) Default: 1 ! MNMDAV = 1 !
Units: Grid cells
Half-angle of upwind looking cone
for averaging (HAFANG) Default: 30. ! HAFANG = 30 !
Units: deg.
Layer of winds used in upwind
averaging (ILEVZI) Default: 1 ! ILEVZI = 1 !
(must be between 1 and NZ)

CONVECTIVE MIXING HEIGHT OPTIONS:
Method to compute the convective
mixing height(IMIHXH) Default: 1 ! IMIXH = 1 !
1: Maul-Carson for land and water cells

Threshold buoyancy flux required to sustain convective mixing height growth
overland (THRESHL) Default: 0.0 ! THRESHL = 0 !
(expressed as a heat flux units: W/m3
per meter of boundary layer)

Threshold buoyancy flux required to sustain convective mixing height growth
overwater (THRESHW) Default: 0.05 ! THRESHW = 0.05 !
(expressed as a heat flux units: W/m3
per meter of boundary layer)

Option for overwater lapse rates used in convective mixing height growth
(ITWPROG) Default: 0 ! ITWPROG = 0 !
0 : use SEA.DAT lapse rates and deltaT (or assume neutral conditions if missing)

Land Use category ocean in 3D.DAT datasets
(ILUOC3D) Default: 16 ! ILUOC3D = 16 !
Note: if 3D.DAT from MM5 version 3.0, iluoc3d = 16
if MM4.DAT, typically iluoc3d = 7

OTHER MIXING HEIGHT VARIABLES

Minimum potential temperature lapse rate in the stable layer above the
current convective mixing ht. Default: 0.001 ! DPTMIN = 0.001 !
(DPTMIN) Units: deg. K/m
Depth of layer above current conv.
mixing height through which lapse Default: 200. ! DZZI = 200 !
rate is computed (DZZI) Units: meters

Minimum overland mixing height Default: 50. ! ZIMIN = 50 !
(ZIMIN) Units: meters
Maximum overland mixing height Default: 3000. ! ZIMAX = 3000 !
(ZIMAX) Units: meters
Minimum overwater mixing height Default: 50. ! ZIMINW = 50 !
(ZIMINW) -- (Not used if observed Units: meters
overwater mixing hts. are used)
Maximum overwater mixing height Default: 3000. ! ZIMAXW = 3000 !
(ZIMAXW) -- (Not used if observed Units: meters
overwater mixing hts. are used)

OVERWATER SURFACE FLUXES METHOD and PARAMETERS
(ICOARE) Default: 10 ! ICOARE = 10 !
0: original deltaT method (OCD)
10: COARE with no wave parameterization (jwave=0, Charnock)

Coastal/Shallow water length scale (DSHELF)
(for modified z0 in shallow water) (COARE fluxes only)
Default : 0. ! DSHELF = 0 !
units: km

COARE warm layer computation (IWARM) ! IWARM = 0 !

```
        1: on - 0: off (must be off if SST measured with
        IR radiometer)              Default: 0

        COARE cool skin layer computation (ICOOL)        ! ICOOL = 0 !
        1: on - 0: off (must be off if SST measured with
        IR radiometer)              Default: 0

   RELATIVE HUMIDITY PARAMETERS

      3D relative humidity from observations or
      from prognostic data? (IRHPROG)      Default:0      ! IRHPROG = 0 !

        0 = Use RH from SURF.DAT file     (only if NOOBS = 0,1)
        1 = Use prognostic RH             (only if NOOBS = 0,1,2)

   TEMPERATURE PARAMETERS

      3D temperature from observations or
      from prognostic data? (ITPROG)       Default:0      ! ITPROG = 0 !

        0 = Use Surface and upper air stations          (only if NOOBS = 0)
        1 = Use Surface stations (no upper air observations)
          Use MM5/3D for upper air data           (only if NOOBS = 0,1)
        2 = No surface or upper air observations
          Use MM5/3D for surface and upper air data  (only if NOOBS = 0,1,2)

      Interpolation type
      (1 = 1/R ; 2 = 1/R**2)             Default:1       ! IRAD = 1 !

      Radius of influence for temperature
      interpolation (TRADKM)             Default: 500.    ! TRADKM = 500 !
                                  Units: km

      Maximum Number of stations to include
      in temperature interpolation (NUMTS)  Default: 5       ! NUMTS = 5 !

      Conduct spatial averaging of temp-
      eratures (IAVET)  (0=no, 1=yes)      Default: 1       ! IAVET = 1 !
      (will use mixing ht MNMDAV,HAFANG
       so make sure they are correct)

      Default temperature gradient        Default: -.0098 ! TGDEFB = -0.0098 !
      below the mixing height over        Units: K/m
      water (TGDEFB)

      Default temperature gradient        Default: -.0045 ! TGDEFA = -0.0045 !
      above the mixing height over        Units: K/m
      water (TGDEFA)

      Beginning (JWAT1) and ending (JWAT2)
      land use categories for temperature                ! JWAT1 = 999 !
      interpolation over water -- Make                   ! JWAT2 = 999 !
      bigger than largest land use to disable

    PRECIP INTERPOLATION PARAMETERS

      Method of interpolation (NFLAGP)     Default: 2      ! NFLAGP = 2 !
       (1=1/R,2=1/R**2,3=EXP/R**2)
      Radius of Influence  (SIGMAP)        Default: 100.0 ! SIGMAP = 100. !
       (0.0 => use half dist. btwn         Units: km
        nearest stns w & w/out precip when NFLAGP = 3)
      Minimum Precip. Rate Cutoff (CUTP)   Default: 0.01 ! CUTP = 0.01 !
       (values <CUTP = 0.0 mm/hr)          Units: mm/hr
!END!


---------------------------------------------------------------------------

INPUT GROUP: 7 -- Surface meteorological station parameters
--------------

   SURFACE STATION VARIABLES  (One record per station --  12  records in all)
```

```
      Name    ID    X coord.  Y coord.   Time  Anem.
                    (km)      (km)      zone  Ht.(m)
    ------------------------------------------------------------
! SS1  ='S1'    15876  487.870  5632.054     12   10.000  !
! SS2  ='S2'    31620  467.293  5577.556     12   10.000  !
! SS3  ='S3'    25820  437.556  5567.214     12   10.000  !
! SS4  ='S4'     2980  492.358  5617.743     12   10.000  !
-------------------

!END!

------------------------------------------------------------------------------

INPUT GROUP: 8 -- Upper air meteorological station parameters
--------------

   UPPER AIR STATION VARIABLES    (One record per station --  3  records in all)

      Name    ID     X coord.  Y coord.  Time zone
                     (km)      (km)
    ------------------------------------------------
! US1  ='Para'   3145  330.967  5469.851     12 !
! US2  ='When'   1410  288.527  5925.766     12 !
-------------------

!END!

------------------------------------------------------------------------------

INPUT GROUP: 9 -- Precipitation station parameters
--------------

   PRECIPITATION STATION VARIABLES  (One record per station --  2  records in all)
   (NOT INCLUDED IF NPSTA = 0)

      Name   Station   X coord.  Y coord.
             Code      (km)      (km)
     ------------------------------------

-------------------

!END!
```

Appendix E

Complaints

19 December 2016

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
10-Sep-2014	Wednesday	Not spec	Raw sewage	Y	115 Arataki Rd	Odour fading	Chook poo/gypsum mix on bales, loading finished by 11.30am. Mixed chook/gypsum for next week, finished by 1.30pm
11-Sep-2014	Thursday	Not spec	Smell	Y	115 Arataki Rd	Not as bad as prev pm	Mixing wetted bales and putting in bunkers 6am - 2pm, all in shed and door closed by 3pm
12-Sep-2014	Friday	Morning?	Odour	Y	115 Arataki Rd	Plume worst outside 115 Arataki Rd.	Breeze shifty NNE. Odour consistent with compost and superspice. Odour identified as from turning activity started at 6am due to finish early afternoon
12-Sep-2014	Friday	Smelled at 6.30am walking the dog, 11am driving	Odour	Y	Cnr Arataki and Te Heipora		Still to complete turning activity, expect to be finished by 3pm
19-Sep-2014	Friday	Morning	Odour, "This morning its bad". Little or no wind	Y	99 Arataki		Very weak at complainants address, stronger elsewhere in neighbourhood. Turning in progress, starting to refill bunker
23-Sep-2014			General complaint about odour, not specific to date or time	N		No odour at time of call	
24-Sep-2014	Wednesday	Not spec			Arataki and at complainant	Barely detectable, not O/O	Still conditions, 360 degree check using Te Mata Rd and te Mata Mangateretere Rd - no odour
14-Oct-2014	Tuesday	Not spec	Not spec	Y	Not spec	Strong odour for 5 of 10 mins surveyed, strong easterly	Turning of bales being undertaken, standard practice, no superspice.
14-Oct-2014	Tuesday	Not spec	Odour	Y, already there	Not spec	2nd complaint for day. Staff already onsite. Odour strong	Turning of bales being undertaken, standard practice, no superspice.
16-Oct-2014	Thursday	Not spec	Strong composting smell	Y	Not spec	Odour not strong at time of visit to complainant	
23-Oct-2014	Thursday	Not spec	Odour	Y	Not spec	Odour not offensive at time of response	
21-Nov-2014	Friday	Not spec	Odour	Y	See next column	No odour along Arataki Rd and Te Heipora Pl, light west breeze. Weak odour plume on Te Mata Mangateretere Rd	
24-Nov-2014	Monday	Not spec	Odour	Y	Not spec	Not O/O	
30-Dec-2014	Tuesday	Not spec	Odour	Y	Not spec	Confirm odour.	2 complaints plus 1 neighbour reported odour also when saw officer doing assessment. Neighbour said started at 0800, strong most of the day.
30-Dec-2014	Tuesday						
30-Dec-2014	Tuesday						
09-Jan-2015	Friday	Not spec	Bad odour	Y	Arataki Rd	Light odour, not offensive	Light wind, shifting, generally NE to E. Complainant said odour had gone by time of assessment, strong an hour earlier.
13-Jan-2015	Tuesday	Not spec	Odour, ongoing issues	Y	Arataki Rd	Odour detected and assessed on Arataki Rd, no odour at	Breeze unstable and shifty. Onsite - minimal aeration odour, DO 1mg/L, clear upwind
16-Jan-2015	Friday	Not spec	Odour	Y	Arataki Rd	Found odour at complainants address. Went to Arataki Rd to conduct assessment. Normal turning activity, returning compost to bunker, some odour from aeration DO 1.0mg/L	
19-Jan-2015	Monday	7.24 am	Odour	Y	Not spec	Visited complainant at 9.15am, no odour. Wind NW	
30-Jan-2015	Friday	Not spec	Odour	Y	Not spec	No odour	No odour at all detected, light wind from W.
02-Feb-2015	Monday	Not spec	Odour	Y	Arataki Rd	Not off	Odour no longer at complainants address, some odour on Arataki Rd. Not offensive
02-Feb-2015	Monday	Not spec	Odour	Y	Arataki Rd		2 more complaints same day as above. Wind variable, unable to detect odour in one place for more than 5 mins. Little to no odour Arataki Rd
02-Feb-2015	Monday						
11-Feb-2015	Wednesday	Not spec	Rotten egg smell	Y	Not spec	Prompt reponse, no odour	
12-Feb-2015	Thursday	Not spec	Strong composting smell	Y	Not spec	Odour confirmed	4 complaints
12-Feb-2015	Thursday						
12-Feb-2015	Thursday						
12-Feb-2015	Thursday						
13-Feb-2015	Friday	Not spec	Strong composting smell	Y	Not spec	Odour confirmed	3 complaints
13-Feb-2015	Friday						
13-Feb-2015	Friday						

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
13-Feb-2015	Friday						
17-Feb-2015	Tuesday	Not spec	Strong smell of compost and sewage	Y	Cnr Arataki and Te Heipora	Odour present by not O/O	Noted odour while talking to complainant, went to take assessment at Ar/TH Rds but wind had died off, odour present by not strong enough to be O/O
17-Feb-2015	Tuesday	1415 hrs	Very strong odour	N			HBRC already been to site today for another complaint
20-Feb-2015	Friday	Not spec	House subject to strong composting odour	N			
24-Feb-2015	Tuesday	Not spec	Odour alleged TMMC and sewage smell, NM wind	Y	Arataki Rd	Not O/O	At complainant, no odour, wind ESE, unsettled breeze, likely wind change. Found plume lower down Arataki Rd Motor camp and below, odour not O/O.
24-Feb-2015	Tuesday	Not spec	Strong smell of compost and sewage	N	Not spec	Odour confirmed	Total 6 complaints this day. See above line also. Visit to another complainant found odour distinct to strong, wind shifty so odour came and went. Site mixing chook poo for applic Thurs morning.
24-Feb-2015	Tuesday						
24-Feb-2015	Tuesday						
24-Feb-2015	Tuesday						
24-Feb-2015	Tuesday						
27-Feb-2015	Friday	Not spec	Odour on and off all day, wind dir at time of call ENE	Y	Not spec	Not O/O	Odour present at time of visit, fluctuating wind consistently changed location of odour plume.
02-Mar-2015	Monday	Not spec	Quite strong odour, wind light and from the east	Y	Not spec	Not O/O	Initial distinct odour detected, not consistent. Odour considered light when present, but not detectable for most of the inspection.
02-Mar-2015	Monday	Not spec	Odour	Y	Arataki Rd cnr	Not spec	4 complaints this day including the line above. Paraphrased - HBRC could only find slight odour/very weak odour in neighbourhood, wind dir changeable made odour hard to find but very weak when did find it
02-Mar-2015	Monday						
02-Mar-2015	Monday						
03-Mar-2015	Tuesday	Not spec	Odour	Y	Not spec	Not O/O	6 complaints this day. Breeze light and shifty through 90 degrees NE-SE. Smell considered weak at worst except for last inspections, see next line
03-Mar-2015	Tuesday	Not spec	Odour	Y	Outside camp ground	Confirmed O/O	Consistent disctinct/strong impressions at camp ground. This was not where the complaint was though (Devine Close).
03-Mar-2015	Tuesday						
03-Mar-2015	Tuesday						
03-Mar-2015	Tuesday						
03-Mar-2015	Tuesday						
05-Mar-2015	Thursday	Not spec	Odour	Y	Outside camp ground	Light intensity odour	Not detected at complainant, odour plume detected at camp ground area, wind fluctuation and odour intensity light
06-Mar-2015	Friday	Not spec	Odour	Y	Arataki Rd	Slight odour, not O/O	No odour detected on Russell Robinson Rd, slight odour on Arataki Rd but not O/O
06-Mar-2015	Friday	Morning see comments	Odour	Y	Arataki Rd		8 complaints this day including line above. 8.40am - odour detected on Arataki Rd wind from NE. Wind shifting to N then NE. Compost in 2 stacks out on yard at 9.10am.
06-Mar-2015	Friday						
06-Mar-2015	Friday						
06-Mar-2015	Friday						
06-Mar-2015	Friday						
06-Mar-2015	Friday						
06-Mar-2015	Friday						
09-Mar-2015	Monday	Morning see comments	Odour	Y	Not spec	No odour	3 complaints this morning between 0810 and 0830 hrs, 4th complaint 1217hrs from 107 Arataki Rd. HBRC on site at 0845 to 0910 hours, wind nil to very light, from W to NW, no odour detected. Contacted 107 Arataki Rd at 1430 hrs, no odour reported, wind now from the west.
09-Mar-2015	Monday						
09-Mar-2015	Monday						
10-Mar-2015	Tuesday	Morning see comments	Odour	Y	Not spec	No odour	2 complaints, 2nd at 0835 was a neighbour of the 1st complainant. Wind nil to very light when responded, from SW. No odour detected. Spoke to locals who confirmed an odour earlier at about 0830.
10-Mar-2015	Tuesday						
13-Mar-2015	Friday	Not spec	Odour caused by fans	Y	Te Heipora Pl	Not strong enough to warrant assessment	Light odour found at TH Place, plume very narrow and only occasionally detected, onsite 25-30 mins. Complainant called who confirmed fans had switched off and odour dissipated.
23-Mar-2015	Monday	Not spec	Wind E, light, odour coming and going	Y	Te Heipora Pl	Not O/O	2 complaints. Odour not detected at complainants, odour plume located around TH Rd, not
23-Mar-2015	Monday						
24-Mar-2015	Tuesday	Not spec	Odour very strong, Wind light NE.	Y	Not spec	Odour confirmed	2 complaints. Odour source identified onsite (but not specified)

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
24-Mar-2015	Tuesday						
25-Mar-2015	Wednesday	Morning	Odour very strong, Wind light, odour on and off all morning	Y	111 Arataki Rd	Not O/O	Odour not detected at complainants address, plume located across from 111 Arataki Rd, odour detected for 1-2 min on and off over 10 min period at low intensity. Not O/O
26-03-2015	Thursday	Morning	Odour, quite putrid, on and off all morning, Wind dire NNW	Y	Not spec	Odour found	Initial assessment 1310hrs, odour found, wind light and shifty NNW to E. Odour mainly weak to very weak sometimes distinct for a few secs. Short period of strong odour. Depart approx 1.50pm. Typical Thursday, no site visit. Very shifty breeze
31-03-2015	Tuesday	Not spec	Strong odour, wind light from NE	Y	Devine Place	Confirmed O/O	2 complaints (2nd from 2 Devine Place asked to be added when saw officer conducting assessment). Odour obvious, full assessment made. 360 deg assessment on site. Nil odour upwind. Compost blending and restacking in progress.
2-04-2015	Thursday	Not spec	Strong odour	N	Not spec		
6-04-2015	Monday	Not spec	Odour	Y	Not spec	Odour confirmed	2 complaints. Identified source as compost in open air for turning, standard Monday ops. Wind blowing from E-NE.
6-04-2015	Monday						
7-04-2015	Tuesday	Not spec	Odour bad today.	Y	Not spec	Confirmed O/O	2 complaints, one from Devine Close. Visited TMM, odour source confirmed but not specified
7-04-2015	Tuesday						
7-04-2015	Tuesday	Not spec	Odour, strong, wind NE light, odour present for a few hours	Y	Not spec	Confirmed O/O	Further complaint this day. Odour assessments established a confirmed off odour. Odour due to compost being stored outside in rows and machinery disturbing the piles.
17-04-2015	Friday	Not spec	Shocking smell	Y	Not spec	Odour detected, not O/O	4 complaints. Found odour type compost and deodoriser. TMM advised now finished for the day, doors shut and would turn off deod.
17-04-2015	Friday						
17-04-2015	Friday						
17-04-2015	Friday						
20-04-2015	Monday	Not spec	Composting odour	Y	Not spec	Not O/O	Low level of odour, light wind.
21-04-2015	Tuesday	Not spec	Composting odour	Y	Not spec	Distinct to strong	Odour bouncing frm distinct to strong, standard Tues ops, Superspice also being used. Complainant called back at 1551 hrs to notify that odour was still present. Another complaint (different complainant?) later in the day, record only. No other complaints during the evening or night.
24-04-2015	Friday	Not spec	Odour	Y	Arataki Rd	Not spec	Light wind, variable mostly NNE almost parallel to Arataki Rd. Also a smoky fire in the area, could smell deodoriser and compost but smoke was strongest but only distinct. Called TMM, 1507hrs now finidhed turning, would turn down deodoriser.
27-04-2015	Monday	Not spec	Odour	Y	Not spec	Not spec	Distinct compost odour picked up on arrival for approx 1 min then dissipated. Wind shifty and plume variable. Deod detected but very light to light intensity, onsite 35mins. No assessment undertaken
1-05-2015	Friday	Not spec	Odour	Y	Arataki Rd	Not spec	2 complaints. Detected odour at complainants. Returned to Arataki Rd, walked up and down Arataki rd. Odour from compost and deodoriser, deodoriser worse. Phoned TMM, finished Friday turning and would turn off deod.
1-05-2015	Friday						
5-05-2015	Tuesday	Not spec	Composting odour	Y	Not spec	Not spec	3 complaints. Slight air drift from TMM to complainant, odour distinct and different tone to usual; more sour. On light breeze, distinct odour but mostly weak to v.weak. Called TMM, at 1645hrs had 45min to finish, was not using deodoriser.
5-05-2015	Tuesday						
5-05-2015	Tuesday						
8-05-2015	Friday	Not spec	Composting odour, was strong for 20mins, has now dulled	N			
11-05-2015	Monday	Not spec	Composting odour, light NE wind	Y	Not spec	Not spec	Confirmed odour present. Odour light, varying intensity 2-3 out of 5 but steady, some odour present most of the time. Nil odour upwind of TM
12-05-2015	Tuesday	Not spec	Composting odour. Smelled at 4.15pm when out walking dog, 5pm on Meissener Rd, also 2pm on cnr Brookvale and Arataki	Y	Arataki Rd	No odour detected	No odour detected on Arataki Rd.
19-05-2015	Tuesday	Not spec	Composting odour drifing to Nimon St	N			Call not received till next morning. Unclear whether odour occurred on 18 or 19th.
6-06-2015	Saturday	Not spec	Composting odour, considered offensive. Same last weekend too	Y	Not spec	Not O/O	Very light odour detected near complainants. Sweet compost with some smoke odour. Occasional light ammonia smell. Odour assessment primarily 1-2, occasional 3.
8-06-2015	Monday	Not spec	Composting odour	Y	Arataki Rd		No compost odour found in Arataki Rd to Meissener or Te Heipora. Fires in area, only faint smell of smoke
13-06-2015	Saturday	Not spec	Composting odour "over the weekend" when walking near TMM	N			No other complaints received Saturday

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
26-06-2015	Friday	Not spec	Composting odour in Arataki Rd. Wind very light, mainly from NW but shifty	Y	Arataki Rd	Not O/O	Visited Arataki Rd, light but infreq odour due to wind dir changing. On TMM site, 360 degree check no odour upwind. Straw bales being irrigated.
3-07-2015	Friday	Not spec	Strong TMM odour	Y	Not spec	Not spec	Strong odour detected but far too windy and shifting to be a problem.
14-07-2015	Tuesday	Not spec	Composting odour	Y	Not spec	Not spec	3 complaints. Odour confirmed from stockpile of spent anaerobic compost being loaded onto a truck
14-07-2015	Tuesday						
14-07-2015	Tuesday						
23-07-2015	Thursday	Not spec	Composting odour	Y	Not spec	Not O/O	Odour not a problem, detected but not O/O
5-08-2015	Wednesday	Not spec	Composting odour	Y	Not spec	Not O/O	Odour strong on arrival, scored distinct to weak when assessed. Not quite O/O
18-08-2015	Tuesday	Not spec	Strong odour	Y	Not spec		4 complaints, all of bad odour. One complaint said noted odour yesterday too (17th). Another complainant said present from yesterday (Monday) lunchtime, again today all morning. Site visit confirmed odour.
18-08-2015	Tuesday						
18-08-2015	Tuesday						
18-08-2015	Tuesday						
25-08-2015	Tuesday	Not spec	Odour	Y	Not spec	Not O/O	Northerly wind
28-08-2015	Friday	Not spec	Composting odour	Y	Not spec		3 complaints. Odour assessment 113 Arataki Rd "earlier in the afternoon". Odour confirmed but inconsistent and weak for much of the 10 mins. One complainant said odour was dreadful all week. Another complainant said was home at lunchtime, noticed quite a compost odour for >30min, also at weekend (presume last weekend)
28-08-2015	Friday						
28-08-2015	Friday						
5-09-2015	Saturday	Not spec	Composting odour	Y	Not spec		2 complaints. Very light wind drift from W, away from Arataki Rd. No compost type odour detected. Any other odour detected very light. No compost odour detected along Te Mata Mangateretere Rd. 2nd complaint said currently strong odour off an on since 2pm, light winds. Check of met service says Napier and Hastings both SW wind (but Hastings doesnt record wind?). Trailer wind data said light and shifty, from N quadrant.
5-09-2015	Saturday						
15-09-2015	Tuesday	Morning	Strong odour, before work.	Y	Not spec	No odour detected	New complainant. House is further 500m back from trailer. No smell at trailer at 8am, no air movement which seems contradictory with complaint.
6-10-2015	Tuesday	Not spec	Compost smell getting bad again, has a 'sting' in it at present	Y	Arataki Road	Not spec	Confirmed odour on Arataki Rd. Spoke to 2 neighbours, 'worst day for months', 'good lately', and 'not as bad as last year'. Site visit 'normal Tuesday', turning and loading tunnels. Breakdown of spreader had caused delay. Clear upwind
6-10-2015	Tuesday	Not spec	Upset and embarrassed as has house guests exposed to odour		Not spec	Not spec	Occasional weak odour over 10 minutes
6-10-2015	Tuesday	Not spec	Strength 3-4 out of 5		Te Heipora Pl.	Not spec	Odour not up higher in Arataki Rd. Odour similar to earlier in afternoon. At least 1 hr to go with site activities still due to spreader breakdown
9-10-2015	Friday	Morning and afternoon	Similar odour to yesterday. Was light this morning but progressively got worse.	Y	115 Arataki Rd	Not spec	Light wind. Odour found at 1540hrs. 10min odour assessment. Odour present for most of the time, intensity 3-4 most of the time. Character described as chook manure/compost leachate. Only site activities were bale wetting. Odour downwind of leachate pond and collection sump were very similar to that detected in Arataki Rd.
9-10-2015	Friday		Putrid sewage odour. Complainant did not think it was TMM. Light to no wind		Toward Russell Robinson end of Meissener Rd.	Not spec	HBRC officers confirmed odour as originating from TMM.
9-10-2015	Friday		Guest visiting, odour in air is awful.				Grouped with earlier investigation
12-10-2015	Monday		Complaint of odour thought to be TMM.	N			Caller failed to give name, address or any contact. Not responded to.
16-10-2015	Friday	Late morning	Thought to be from TMM. Odour 4.75/5, leaving house due to the odour.	Y		Complaint not upheld	HBRC arrived 35mins after complaint. Occasional weak odour consistent with TMM detected now and then for short durations. No discernible odour for most of the 30mins they were there. Site operations had finished (shut doors) at 1210hrs.
20-10-2015	Tuesday	All day	Strong odour going all day	Y	Arataki Rd	Not O/O	2 complaints from same person. Confirm initial strong odour band in Arataki Rd. At complainants property, slight odour only, 3 assessments carried out in Arataki Rd, none of which resulted in sufficient FIDOL to warrant visit to TMM. Site advised had a couple of breakdowns, filling tunnels, almost finished.
20-10-2015	Tuesday	All day	Strong odour going all day (same complainant as above)				
27-10-2015	Tuesday	Early morning	Arataki Rd resident; Distinct odour 2-3am, bad odour 7am, not bad by 8.45am	N			

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
29-10-2015	Thursday		Sewage type odour smell	Y	Brookvale Rd (moving with wind)	Not O/O	No odour at complainant's address, unable to locate plume on Arataki Rd, some odour on Brookvale Rd, but odour was not O/O
3-11-2015	Tuesday	Not spec	"Sickening" odour starting 1 hr ago. Time not spec	N			4 complaints. Unable to respond
3-11-2015	Tuesday	Not spec	Foul odour, not noticeable 2 hrs ago before complainant went out.	N			
3-11-2015	Tuesday	1820	Very bad, 5/5.	N			
3-11-2015	Tuesday	Not spec	Totally unacceptable odour	N			
9-11-2015	Monday	Not spec	Bad smell	Y	115 Arataki Rd	Odour acceptable	3 complaints. First complaint response says odour acceptable, passed FIDOL test. 2nd complaint says confirmed odour. On site, odour from leachate pond considered to be the
9-11-2015	Monday	Not spec	Strong composting/sewage odour			Unclear	
9-11-2015	Monday	Morning	Odour at its worst around 10am				
19-11-2015	Thursday	Not spec	Odour 4-5 out of 10	Y	117 Arataki Rd	Not O/O	Light odour found, rated varying 0 to 3, mainly 0 or 1 majority of time. Not O/O
20-11-2015	Friday	Early morning	Bad odour this morning, complaint at 0705 hrs	Y		Not O/O	2 complaints. Found light odour, occasional stronger wafts. Not O/O. Plume stronger further up road towards Arataki Honey.
20-11-2015	Friday		Presently 10/10. Had been out for walk this morning but particularly bad now				
23-11-2015	Monday	Not spec	Strong smell from TMM	N			Checked wind data. Wind shift coincided with complaint time. Turning about finished for the day. NFA unless another complaint
24-11-2015	Tuesday	Not spec	Odour currently consistently bad, has been odorous on and off but has started again with the warmer weather.	Y	Arataki Rd campground	Not O/O	Light odour consistent with TMM at campground entrance, no wind. No odour detected by complainants. Walked from 83-149 Arataki to find plume, only by campground and very light and intermittent
24-11-2015	Tuesday	Evening	Complaint received at 2107 hrs.				Complaint received while still attending above
24-11-2015	Tuesday	Evening	Strong compost smell tonight, also on Friday and Sat nights (last week?)				
26-11-2015	Thursday	Not spec	No details	Y	Not spec	Unclear	Inconsistent wind, plume moving in and out of assessment location. Strong when detected but small periods of time.
30-11-2015	Days deleted	Morning	Horrendous smell at Te Mata school which making a drop off. Sewage type smell, school said it was TMM.	Y			Odour confirmed, real sewage not earthy musty composty. Wind shifty, difficult to assess as O/O.
30-11-2015	Days deleted						
1-12-2015	Tuesday	Morning	No details	Y		Unclear	5 complaints. Seems to be several assessments carried out over the day. Composty odour present, 10min assessment, 2's mainly. No site insp. Odour plume from Te Haeipora Pl to top of Arataki Motor Camp site
1-12-2015	Tuesday	Not spec	No details	Y			
1-12-2015	Tuesday	Not spec	No details	Y		Confirmed O/O	Breeze stronger than earlier inspection, more consistent dir. Odour confirmed as
1-12-2015	Tuesday	Not spec	No details	Y		Unclear	Odour confirmed but wind too shifty to get consistent smell during 10min assessment
1-12-2015	Tuesday	Not spec	No details	Y		Not O/O	Located plume, odour detected but not O/O.
4-12-2015	Days deleted	Not spec	No details	Y			Property long distance from TMM, no odour detected at property or along Arataki Rd.
8-12-2015	Tuesday	Night	Extremely bad odour at 174 Brookvale Rd. Tonight worst it has ever been, first time complained even though they put up with it usually	N			Odour had gone when officer called complainant
11-12-2015	Friday	Not spec	No details	Y		Not O/O	2 complaints in 30 mins. Full assessment made, odour detected on average weak 2/6 but distinct now and then. Not considered O/O but marginal at times
11-12-2015	Friday						
14-12-2015	Monday	Not spec	Strong sewage odour, suspects TMM	Y		Not O/O	Odour not O/O, odour strength verring between distinct and not detected
15-12-2015	Tuesday	Not spec	No details	Y	Arataki Rd	Not O/O	4 complaints. Odour consistent with TMM, wind light and shifty, odour detected on and off, odour generally weak to distinct during full assessment, not O/O due to fickle conditions and light intensity
15-12-2015	Tuesday	Not spec	No details				
15-12-2015	Tuesday	Not spec	No details				
15-12-2015	Tuesday	Not spec	No details	N			After hours call
24-12-2015	Thursday	Not spec	Smells strong today, 5/6	N			Until Court date, recording calls only but encouraged to call when odour is strong
24-12-2015	Thursday	Not spec	Strong odour	N			
24-12-2015	Thursday	Morning	Strong odour all morning	N			
30-12-2015	Wednesday	Not spec	Strong again today	N			

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
30-12-2015	Wednesday	Not spec	Worst odour ever, going right through house	N			
5-01-2016	Tuesday	All day	Odour off and on all day, now very strong, odour makes you want to vomit, close doors and windows	N			
6-01-2016	Wednesday	All day	On and off all day, stronger now	N			
8-01-2016	Friday	Not spec	Strong odour, first time caller	N			
8-01-2016	Friday	Not spec	Odour bad today, went to work early to get out of smell	N			
7-01-2016	Thursday	Not spec	Strength 5/5 at time of call	N			
11-01-2016	Monday	Not spec	Odour has got increasingly worse over last 90	N			
11-01-2016	Monday	Not spec	Odour on and off all day, past half hour some 'strong blasts'	N			
12-01-2016	Tuesday	Not spec	Odour on and off all day, but really strong at the moment	N			
12-01-2016	Tuesday	Not spec	Odour on and off all day, but really strong at the moment	N			
12-01-2016	Tuesday	Not spec	Strong odour, suspect TMM	N			
14-01-2016	Thursday	Not spec	Odour over last 5-6 days has been really strong, complainant does not normally ring	N			
18-01-2016	Monday	Not spec	Odour 5/5, believed it was 'feral'	N			
19-01-2016	Tuesday	Not spec	Really bad odour, 11/10	N			
21-01-2016	Thursday	Not spec	Particularly strong odour today, strong all week but on and off dep on wind dir	N			
21-01-2016	Thursday	Not spec	Odour as bad as it has ever been, sickly sweet musty smell	N			
21-01-2016	Thursday	Not spec	Putrid smell, like vomit	N			
21-01-2016	Thursday	Night	Persistent odour over 8 hour period, worst he had smelt.	N			
22-01-2016	Friday	Not spec	Strong today, also noticeable past week	N			
26-01-2016	Tuesday	Not spec	Strong odour, 5.5/6	N			
26-01-2016	Tuesday	Not spec	New complainant just bought house. Woke up to smell had to close all windows.	N			
26-01-2016	Tuesday	Not spec	Smell consistent all day over last 12 months	N			
26-01-2016	Tuesday	Morning	Nauseous odour this morning. TMM has been bad at nights, needs to close windows	N			
26-01-2016	Tuesday	Not spec	Need to close windows, consistently offensive for a week	N			
26-01-2016	Tuesday	Not spec	Odour is foul today, worst it has ever been. Been at house 6 years, never called before	N			
26-01-2016	Tuesday	Not spec	House needs to be closed up, odour lingering in rooms	N			
26-01-2016	Tuesday	Not spec	Odour 4/5 intensity, kids had to close windows for whole day	N			
26-01-2016	Tuesday	Not spec	Regular strong odour	N			
26-01-2016	Tuesday	Not spec	TMM very foul today.	N			
2-02-2016	Tuesday	Not spec	Strong odour	N			
2-02-2016	Tuesday	Evening	Very bad smell	N			
2-02-2016	Tuesday	Evening	Very bad smell	N			
2-02-2016	Tuesday	Not spec	Strong odour	Y		Unclear	Odour confirmed. No 10min assessment
3-02-2016	Wednesday	Evening	Odour increased in intensity and freq, could not have BBQ outside, walkers past house cover noses	N			
3-02-2016	Wednesday	Not spec	Strong 'sulphury' odour, odour detected regularly often outside normal working hours in the evenings	N			
3-02-2016	Wednesday	Not spec	Very strong today, grandchild noticing the	N			
3-02-2016	Wednesday	Not spec	No details	N			

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
3-02-2016	Wednesday	Not spec	No details	N			
3-02-2016	Wednesday	Not spec	Worst its ever been (5 years at house), could not have BBQ outside	N			
3-02-2016	Wednesday	Not spec	First time caller, lived in house many years, odour has gotten worse for longer periods	N			
3-02-2016	Wednesday	Not spec	Odour has been a lot worse over last 2 months, seems to keep getting worse	N			
4-02-2016	Thursday	Not spec	Lived at house for 11 years, farm is the worst its ever been. Its been putrid and consistent	N			
4-02-2016	Thursday	Not spec	Consistent odour last 2 days, kids say smells like dog crap. Cannot go outside in the	N			
4-02-2016	Thursday	Not spec	Odour really bad at the moment, been home for last 30mins odour stayed consistent	N			
4-02-2016	Thursday	Not spec	Strong odour, has been strong for the last few days	N			
4-02-2016	Thursday	Not spec	Strong odour	N			
5-02-2016	Friday	Not spec	Terrible putrid smell, could smell at home, on Romanes Rd and Napier Rd. Could not site outside and have a coffee, smell was around for hours	N			
5-02-2016	Friday	Not spec	Odour from TMM is strong at the moment	N			
5-02-2016	Friday	Morning	Very strong odour	N			
5-02-2016	Friday	Not spec	Strong odour	N			
5-02-2016	Friday	Not spec	Complainant was gagging from the odour	N			
9-02-2016	Tuesday	Not spec	Odour so bad complainant said he was gagging	N			
9-02-2016	Tuesday	Morning	6-8am this morning	N			
9-02-2016	Tuesday	Not spec	Odour was revolting, could not site outside. Does not normally ring unless its very bad	N			
11-02-2016	Thursday	Not spec	Smells like chicken manure	N			
11-02-2016	Thursday	Not spec	Smells like sewage, rated 8/10 for	N			
12-02-2016	Friday	Not spec	Ammonia type odour, no wind	N			
16-02-2016	Tuesday	Morning	Heinously bad this morning between 7.30am and 8am. Odour is not as strong at time of complaint. Present yesterday also, on and off	N			
16-02-2016	Tuesday	Evening	1950hrs smelt like fish, strong enough to burn nose. Lives some distance from TMM, drove in car to Arataki Rd, smelt same odour there.	N			
16-02-2016	Tuesday	Not spec	Lived in area 30 years, first time odour detected, first time caller. Poultry/sewage smell, ammonia. (Unknown if this is confirmed TMM)	N			
16-02-2016	Tuesday	Not spec	Odour absolutely terrible	N			
17-02-2016	Wednesday	Night	Smell bad tonight, sickening	N			
18-02-2016	Thursday	Not spec	Smelt like rotten fish	N			
19-02-2016	Friday	Not spec	Odour very strong	N			
19-02-2016	Friday	Not spec	Smell like toilets in his back yard	N			
19-02-2016	Friday	Not spec	Smell of poo and vomit and ammonia and fertilizer	N			
29-02-2016	Monday	Prev evening and this morning	Smells like a portaloo that is full and been sitting around for a week	N			
4-03-2016	Friday	Not spec	First time it has been smelly in 3 weeks	N			
15-03-2016	Tuesday	Not spec	Incredible bad odour. Bunker activities being carried out, thinks this makes odour worse	N			
22-03-2016	Tuesday	Not spec	Odour 4/5, smells like a sewer	N			
22-03-2016	Tuesday	Not spec	No details	N			

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
31-03-2016	Thursday	Not spec	Strong yesterday, worse today. Intensity 8.5/10. Smells like human excrement	N			
31-03-2016	Thursday	Not spec	No details	N			
1-04-2016	Friday	Prev evening	Really bad odour at 1.30am. Similar odour type and intensity to yesterday	N			
1-04-2016	Friday	Not spec	Foul like rotten fish, disgusting and putrid. Complainant was concerned the Judge would go soft on TMM at the hearing.	N			
3-04-2016	Sunday	Not spec	Offensive smell	N			
13-04-2016	Wednesday	Prev evening	Very strong odour last evening	N			
19-04-2016	Tuesday	Not spec	Putrid odour, 3-4 out of 6	N			
19-04-2016	Tuesday	Not spec	Strong odour	N			
19-04-2016	Tuesday	Not spec	Strong odour	N			
19-04-2016	Tuesday	Not spec	No details	N			
6-05-2016	Friday	Not spec	Rotten meat smell from TMM, strength 2.5-3 out of 5	N			
16-05-2016	Monday	Not spec	Odour 4/5 in badness	N			
26-05-2016	Thursday	Not spec	Pungent manure/ammonia smell. This has been bad at times for the last few days, partic in the mornings	N			
26-05-2016	Thursday	Morning	7am to 8.25am. Odours have gotten worse over time, now have isues at night 10-11pm and 2-3am type of thing	N			
27-05-2016	Friday	Not spec	Really bad manure smell	N			
27-05-2016	Friday	Not spec	Has only phoned once before, it is really bad today	N			
27-05-2016	Friday	Morning	Strong odour this morning, still lingering	N			
30-05-2016	Monday	Prev evening	Strong odour last night from 10.30pm - midnight, chook run odour, very nauseating, strong enough to wake complainant up.	N			
6-06-2016	Monday	Evening	7pm, strongest odour I have smelt for a while noticed when I stepped outside, calm winds, no breeze.	N			
8-06-2016	Wednesday	Not spec	Strong tar-like spent compost smell	N			
10-06-2016	Friday	Morning	Very bad odour	N			
10-06-2016	Friday	Morning	Really bad odour this morning	N			
10-06-2016	Friday	Not spec	No details	N			
10-06-2016	Friday	Not spec	Odour noticeable last 3 days	N			
14-06-2016	Tuesday	Not spec	Odour strong today.	N			
14-06-2016	Tuesday	Afternoon	Fairly normal Tues pm odour, odour strong so worth a call, very light wind drift.	N			
17-06-2016	Friday	Not spec	No details	N			
20-06-2016	Monday	Not spec	Strong mushroom farm smell	N			
21-06-2016	Tuesday	Not spec	Strong smell	N			
21-06-2016	Tuesday	Not spec	Stinky, almost rotten meat type smell, odour 3/5 intensity	Y		Unclear	Confirmed odour in 107 Arataki - Meissener Rd cnr area at about 2.40pm
21-06-2016	Tuesday	Day	Brookvale Rd. Smell rates a 3-4, not as strong as yesterday.	N			Confirmed by HBRC earlier that afternoon
21-06-2016	Tuesday	Not spec	Horrible smell from the mushroom farm, happens constantly and fluctuates. Also horrible yesterday.	N			
28-06-2016	Tuesday	Not spec	Distinct odour, rated 3/5	N			
28-06-2016	Tuesday	Not spec	Pungent smell, 4/5 in strength	N			
4-07-2016	Monday	Not spec	Odour has just started and is strong	N			
12-07-2016	Tuesday	Not spec	No details	N			
12-07-2016	Tuesday	Not spec	Odour 3.4-4 out of 5	N			

Date odour noticed	Day of week	Time odour noticed	Odour description	Did HBRC attend or validate	Locations where odour found by HBRC	HBRC opinion	Other response comments
12-07-2016	Tuesday	Not spec	Ammonia smell, extremely bad.	N			
1-08-2016	Monday	Not spec	Odour is as bad as it has ever been	N			
1-08-2016	Monday	Not spec	Odour described primarily as tri-methyl and tetramethylenediamines and sulphur dioxide. Not nice, both toxic.	N			
9-08-2016	Day deleted s	N/A	Caller rang to say the smell had not been bad over the last 2 months. Reduced frequency and intensity of odour.	N			

Appendix 7

District Plan Compliance Analysis

Section 6.2 Plains Production Zone

	Performance Standards and Terms	Comment
6.2.5A	**Building Height** **1. Industrial, commercial, frost protection fans (measured to the tip of the blade), winery buildings or structures** Maximum height 15 metres. **2. All other buildings or structures** N/A **3. Height in relation to Bridge Pa Aerodrome** N/A	**Compiles**
6.2.5B	**Yards** The following setback distances are required: 1. **Residential Activities Residential Buildings (including supplementary units) on Plains Sites** N/A 2. **Residential Buildings on sites created by the Plains Lifestyle Sites Subdivision Provisions** N/A 3. **Industrial, Commercial and Winery Buildings and Structures, Frost Fans and Seasonal Workers Accommodation** Front yard 15 metres All other boundaries 15 metres 4. **Accessory Buildings (associated with residential and land based primary production) and Loading Ramps** N/A	**Compiles** **Complies**
6.2.5C	**Protection of Flood Channels**	**N/A**
6.2.5D	**Screening** a. Outdoor storage areas of commercial, industrial, and winery activities shall be fully screened by fencing and/or planting from adjacent or opposite commercial and residential activities and motorists using public roads. b. Outdoor display areas and parking areas of commercial, industrial, and winery activities shall have landscaping which consists of a mixture of ground cover and specimen trees with a minimum width of 2.5 metres. c. Outdoor storage and parking areas of seasonal workers accommodation shall be fully screened from adjacent residential activities in different ownership by fencing and/or planting.	**N/A** – the activity is an Intensive Rural Production Activity **N/A** – the activity is an Intensive Rural Production Activity **N/A**
6.2.5E	**Light and Glare** All external lighting shall be shaded or directed away from any residential buildings or roads, and shall be less than 8 lux spill measured at a height of 1.5 metres above the ground at the boundary of the site.	**Complies** – all external lighting will be shaded or directed away from any residential buildings or roads, and will be less than 8 lux spill measured at a height of 1.5 metres above the ground at the boundary of the site.
6.2.5F	**Traffic Sightlines, Parking, Access and Loading**	**Refer Table below**

	Activities shall comply with the provisions of Section 26.1 of the District Plan on Transport and Parking.	
6.2.5G	**Noise** Activities shall comply with the provisions of Section 25.1 of the District Plan on Noise.	**Refer Table below**
6.2.5H	**Shading or Land, Buildings and Roads** **1. Trees on Boundaries** **2. Trees Adjoining Public Roads** **3. Buildings on Sites Adjoining Residentially Zoned Land**	 **N/A** **N/A** **N/A**
6.2.5I	**Height in Relation to Bridge Pa Aerodrome**	**N/A**
6.2.5J	**Total Building Coverage (Including Hardstand and Sealed Areas)** The maximum building coverage (including hardstand and sealed areas) shall not exceed 35% of the net site area or 1500m^2, whichever is the lesser. With the exception of Processing Industries and Wineries where the maximum building coverage is 35% of the net site area or 2500m^2 whichever is the lesser.	**Non-compliance**
6.2.6A	**Intensive Rural Production** a. Buildings housing animals reared intensively and Yards accommodating animals reared intensively shall be located a minimum distance of: b. Organic matter and effluent storage, treatment and utilisation shall be located in accordance with the following minimum distances: i. 20 metres from a residential building on the same site. ii. 150 metres from a residential building or any building being part of a marae, place of assembly, commercial activity or industrial activity on another site. iii. 50 metres from a property boundary. iv. 20 metres from a public road. c. All other yard setbacks from site boundaries (not specified by (a) and (b) above) shall be 10 metres.	**N/A** **Complies** **Non-compliance** – although the extension of the phase 2 tunnels will be no closer to the buildings on 108 Arataki Road, they will be within 150m. **Non-compliance** – the phase 2 tunnel extension and existing effluent pond will be less than 50m from boundaries **Complies** **Complies**
6.2.6B	**Residential Buildings**	**N/A**
6.2.6C	**Supplementary Residential Buildings**	**N/A**
6.2.6D	**Commercial activities**	**N/A** - No Change to the retail component
6.2.6E	**Poultry Farming for More Than 60,000 Birds for Scheduled Activity 45**	**N/A**
6.2.6F	**Industrial Activities**	**N/A** – the activity is an Intensive Rural Production Activity
6.2.6G	**Site Area Thresholds**	**N/A** – applies to activities under 6.2.6D and 6.2.6E
6.2.6H	**Temporary Events**	**N/A**
6.2.6I	**Wineries**	**N/A**
6.2.6J	**Relocated Buildings**	**N/A**
6.2.6K	**Seasonal Worker Accomodation**	**N/A**
6.2.6L	**Scheduled Activities** Activities associated with Scheduled Activities shall comply with the General Performance	**Non-compliance** – see above

	Standards and Terms for the Zone and District Wide Activity rules with the following exceptions (a) Scheduled Activities No 21 – Hawke's Bay Showgrounds, No 35 Bridge Pa Aerodrome, and No 39 Hohepa Homes, Clive, No 40 Riverbend Church and Camp, and No 41 Tuki Tuki Campsite (as defined in Appendix 26 Fig 5) (b) Scheduled Activities No's 22 – 26, 29 - 31, 33, 43 and 44 (c) Scheduled Activity No 42 (d) Scheduled Activity No 45	**N/A** **N/A** **N/A** **N/A**
6.2.6M	**Temporary Military Training Activities**	**N/A**
6.2.6N	**The Storage, Handling or Use of Hazardous Substances within the Heretaunga Plains Unconfined Aquifer Overlay Appendix 59**	**N/A**
6.2.6O	**Retirement Village on Lot 2 DP 437278**	**N/A**

Section 26 Transport and Parking

Performance Standards and Terms		Comment
26.1.6A	**1. Access To Property** a) Every owner or occupier shall provide safe and effective vehicular access to activities undertaken on a site, and required parking or loading areas. b) There shall be a maximum of one vehicle crossing to a property in a Residential Zone. c) The minimum legal widths for private access are detailed in Table 13.1.6.1-1… d) A property access which crosses a rail network is not constituted as legal access… **2. Distance of Vehicle Accesses from Road Intersections** a) Residential, Industrial and Commercial Zones: b) Rural Residential, Rural, Plains and special Character Zones: Vehicle access to any property shall be sited a minimum of 100 metres from an intersection of a State Highway. **3. Vehicle access to Property Zoned Industrial 2 (Irongate) Deferred Industrial 2 (Irongate)…** **4. Distance of vehicle Access from Railway level Crossing…**	**Complies** – refer to the TDG report **N/A** **Non-compliance** – refer to the TDG report **N/A** **Complies** **N/A** **N/A**
26.1.6B	**Safe Sightline Distances** 1. Intersections shall be located to ensure that Safe Sightline Distances are maintained. *Note: For vehicle accesses fronting a Local, Collector or Arterial Route (as defined in the Roading Hierarchy in Appendix 69) compliance with Austroads Standards is deemed an acceptable means of compliance.* For vehicle accesses and intersections fronting a State Highway, compliance with the NZ Transport Agency's standards for entrance/access ways is deemed an acceptable means of compliance. 2. All existing and new accesses that cross the rail network via a level crossing…..	**Complies** **N/A**
26.1.6C	**Loading** 1. All Activities except Residential Activities (a) **Provision of Loading Spaces** (i) Every owner or occupier who proposes to construct or substantially alter, reconstruct or add to a building on any site, or change the activity carried out on the site shall provide a	**Complies** – there is sufficient area on site to accommodate multiple loading spaces

	Loading Space. The Loading Space shall provide for the suitable or efficient accommodation of any loading or fuelling of vehicles which are likely to arise from the use of any building or activity carried out on the site, except where a service lane is designated or provided, or where the site has Designated Retail Frontage (see Appendix 30). Separate Loading Spaces shall be provided for each occupier of the site if there are more than one. The Loading Space shall be additional to the parking required in Table 26.1.6.1-4.	
	(ii) Every Loading Space, together with access, shall be designed so that it is not necessary to reverse vehicles either on to or off the street. The Loading Space shall not be stacked or located within vehicle manoeuvring areas.	**Complies**
	(iii) The provision of a Loading Space in respect of any site may be made as part of the side and/or rear yard space, but not as part of the front yard space of that site.	**Not necessary**
	(iv) The method of loading shall ensure that the footpath or access to adjacent properties shall remain clear at all times and ensure traffic safety is maintained on the roads.	**Complies/N/A**
	(b) Design of Loading Spaces The design of Loading Spaces and the layout adopted will depend on the area and shape of the land available, the purpose for which loading is required, and the functional design of the building. The layout shall be of sufficient size to accommodate the following design vehicles:	
	(i) Activities requiring loading facilities or servicing from heavy vehicles: A "Single Unit Bus / Truck" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 73 for the dimensions of this vehicle.	**Complies** – there is sufficient area on site
	(ii) Where articulated vehicles or trucks and trailers are anticipated: A "Prime Mover and Semi-Trailer" as defined in the "Austroads Design Vehicles	**Complies** – there is sufficient area on site

	and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 73 for the dimensions of this vehicle. (iii) The following minimum dimensions are provided as a means of compliance: • Warehouses, Transport depots, bulk stores and similar must have a minimum length of 20 metres and a minimum width of 3 metres. • Retail activities, offices, manufacturing premises and similar must have a minimum length of 8.5 metres and a minimum width of 3 metres. • Non-residential activities such as day care centres and similar must have a minimum length of 5.5 metres and a minimum width of 3 metres.	**Complies** – there is sufficient area on site **N/A** **N/A**
26.1.6D	**Parking** 1. Provision of On-Site Parking: Every owner or occupier who proposes to construct or substantially reconstruct, alter or add to a building on any site, or change the activity carried out on any land or in any building, shall provide suitable areas on the site for parking in accordance with the requirements listed in Table 26.1.6.1-3 below 2. Exemptions 3. Parking Spaces for People with Disabilities: Developers, owners or occupiers when constructing carparks shall make provision for disabled carparks in compliance with Appendix 71 and they shall be clearly marked or signposted as such. 4. Jointly Used Parking Areas 5. Design and Construction of Parking Areas (a) Vehicle Dimensions: All parking spaces and access and manoeuvring areas, including ramps shall be of a sufficient size and suitable layout to accommodate a "passenger vehicle" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 72 for the dimensions of this vehicle. (b) Parking Spaces for Residential Activities: Parking spaces for Residential Activities in any Residential zone shall have a minimum internal	**Complies** – refer to the TDG report **N/A** **Complies** – provision can be made **N/A** **Complies** **N/A**

	dimension of 3m (width) by 5m (length). (c) General Design and Construction Details: All public and required parking areas, and any outdoor display areas (such as car, caravan or boat sales yards) shall comply with the following general requirements:	
	(i) Parking areas in any Commercial or Industrial Zone shall be formed and sealed with an all-weather surface.	**N/A**
	(ii) Parking areas shall be designed and constructed to ensure that stormwater runoff from the parking area does not adversely affect adjoining properties.	**Complies**
	(iii) Parking areas, together with access and turning space, shall be designed to ensure that vehicles negotiate the parking area at a safe speed and are not required to reverse either on to or off a street, provided that this requirement shall not apply in any Residential Zone where a single accessway serves not more than two residential buildings. Vehicles using the parking area shall only enter or leave the site by the accessway.	**Complies**
	(iv) Where a public or non-residential parking area is within or adjoins a Residential Zone, a 1.8 metre high, fully enclosed screen shall be erected or a landscape strip of a minimum width of 5 metres adjoining the boundary or the Residential Zone shall be provided. These requirements may be reduced or waived with the consent of the adjoining neighbour.	**N/A**
	(v) A reservoir space shall be provided within public carparks to prevent vehicles queuing on the street.	**Complies**
	(vi) Provision shall be made for the illumination of access drives and pedestrian areas within public carparks. Such illumination is to be directed away from adjoining residentially zoned sites.	**N/A**
	(vii) Non-residential parking spaces required to be sealed by standard 26.1.6.D.5(c)(i) shall be marked out and where there is a separate requirement for staff	**N/A**

	parking such spaces shall be clearly identified.	
26.1.7A	**Access** 1. Vehicle Standing Bay (a) Residential Zones	 **N/A**
26.1.7B	**Infrastructure to Support Alternative Transport Modes** 1. Bicycle Spaces Where on-site car parking is required provision shall also be made for purpose built bicycle stands on site. These shall be provided at a rate of 1 bicycle stand per 5 carpark spaces that are required except for supermarket where the ratio shall be 1 bicycle stand per 20 carpark spaces that are required. The bicycle stands shall meet the following requirements: (a) They shall be securely attached to a wall or the ground and shall support the bicycle frame. (b) Each cycle stand shall be adequately spaced to allow a cyclist to manoeuvre and attach a bicycle to the stand. (c) They shall allow the bicycle to be secured. (d) They shall be visible and signposted. 2. Bicycle End of Journey Facilities Commercial or Industrial Activities which employ more than 15 FTE staff members shall provide one male and one female shower and changing facilities for staff to encourage the use of alternative transport modes. 3. Exemptions Renewable Energy Generation Activities are exempt from the provisions of standard 26.1.7B	 **Complies** **Complies** **Complies** **Complies** **Complies** **N/A** – the activity is defined in the District Plan as an Intensive Rural Production Activity not a Commercial or Industrial Activity **N/A**

Section 25.1 Noise

Condition		Analysis
25.1.6A	**Measurement and Assessment of Noise** Unless stated by a rule or standard elsewhere in this Plan, noise shall be measured in accordance with New Zealand Standard 6801:2008 Acoustics - Measurement of Environmental Sound and assessed in accordance with New Zealand Standard 6802:2008 Acoustics - Environmental Noise.	**Complies -** noise will be measured in accordance with New Zealand Standard 6801:2008 Acoustics - Measurement of Environmental Sound and assessed in accordance with New Zealand Standard 6802:2008 Acoustics - Environmental Noise.
25.1.6B	**Exemptions**	**N/A**
25.1.6C	**Residential Zones**	**N/A**
25.1.6D	**Rural Zones** The following noise conditions shall apply to all land uses within all Rural Zones, other than those exempted in Rule 25.1.6B and 25.1.7E (Wind Farm Noise): (a) The following noise limits shall not be exceeded at any point within the notional boundary of any noise sensitive activity on any other site within a Rural Zone, or at any point within the boundary of any site, in any Zone other than an Industrial Zone: Control Hours — Noise Level 0700 to 1900 hours — 55 dB $L_{Aeq\ (15\ min)}$ 1900 to 2200 hours — 50 dB $L_{Aeq\ (15\ min)}$ 2200 to 0700 hours the following day — 45 dB $L_{Aeq\ (15\ min)}$ 2200 to 0700 hours the following day — 75 dB L_{AFmax}	**Complies** – see the Earcon Report
25.1.6E	**Commercial Zones**	**N/A**
25.1.6F	**Industrial Zones**	**N/A**
25.1.6G	**Whirinaki Industrial Zone**	**N/A**
25.1.6H	**Open Space Zones**	**N/A**
25.1.6I	**Construction Noise** (a) Any noise arising from construction, maintenance and demolition work in any zone shall comply with New Zealand Standard NZS6803:1999 Acoustics: Construction Noise. (b) Construction noise must be measured and assessed in accordance with New Zealand Standard NZS6803:1999 Acoustics: Construction Noise. (c) To avoid doubt, Standards 25.1.6C to 25.1.6H above shall not apply to construction noise	**Complies** - noise arising from construction work will be managed to comply with New Zealand Standard NZS6803:1999 Acoustics: Construction Noise **Complies** - construction noise will be measured and assessed in accordance with New Zealand Standard NZS6803:1999 Acoustics: Construction Noise
25.1.6J	**Temporary Events**	**N/A**
25.1.7A	**Audible Bird Scaring Devices**	**N/A**
25.1.7B	**Frost Protection Fans**	**N/A**
25.1.7C	**Noise Sensitive Activities in Commercial (excluding Suburban Commercial) and Industrial zones**	**N/A** – the site is not located within a Commercial or Industrial Zone
25.1.7D	**Noise sensitive activities within the major**	**N/A**
25.1.7E	**Windfarm Noise**	**N/A**
25.1.7F	**Aircraft noise - Bridge pa aerodrome**	**N/A**
25.1.7G	**Helicopter Depots**	**N/A**
25.1.7H	**Watercraft Noise**	**N/A**
25.1.7I	**Noise From New Or Altered Roads**	**N/A**
25.1.7J	**Events Within The Regional Sports Park Zone**	**N/A**

Section 27.1 Earthworks

Condition		Analysis
27.1.6A	**Extent Of Earthworks** Plains Production Zone: • Earthwork limit of 100m^3 per hectare of site • Importation of fill or removal of cut 50m^3 per hectare of site	**Complies** – earthworks to form the building foundations of the new bunkers are expected to comply with these limits
27.1.6B	**Vegetation** 1. Where vegetation clearance occurs (except where it is associated with the operation, maintenance or upgrading of lawfully established roads, tracks and drainage channels), disturbed areas shall be repastured or revegetated as soon as practicable within 18 months of the activity ceasing 2. Where soil is disturbed by prospecting such areas will be restored and rehabilitated within 6 months of the activity ceasing.	**N/A** **N/A**
27.1.6C	**Slope** **Rural SMA:** Earthworks shall not be undertaken on land with a slope of greater than 45° above horizontal. **All other SMA:** Earthworks shall not be undertaken on land with a slope of greater than 22°above horizontal	**N/A** **Complies**
27.1.6D	**Excavation** 1. No earthworks shall have a cut/fill face of overall vertical extent of greater than: (i) 5 metres in Rural Zone, Nature Preservation Zone & ONFL 7 (excluding ONFL 2 – 6 & 8) (ii) 2.5 metres in all other Zones. (iii) 2 metres in ONFL 2 – 6 & 8 2. No excavations shall be of greater than 1 metre vertical extent of cut/fill face, where the top of the excavation is within 10 metres of buildings or surcharge loads.	**N/A** **Complies** **N/A** **Complies**
27.1.6E	**Noise** Activities shall comply with the provisions of Section 25.1 of the District Plan on Noise.	**See above**
27.1.6F	**Flood Protection Works**	**N/A**
27.1.6G	**Location of Fill** Except when associated with fill faces on rural farm tracks, any fill of over: (a) 100m^3 volume; or (b) 0.5 meters total depth Shall only be permitted if a site plan is provided to Hastings District Council showing the location and extent of the fill.	**N/A** – no fill is expected to be necessary
27.1.6H	**Sediment Control** Sediment runoff into a council reticulated network shall not cause any conspicuous change in colour or visual clarity of water after reasonable mixing.	**N/A**