

## **APPLICATIONS CRC175344 AND CRC175345 – CANTERBURY LANDSCAPE SUPPLIES LIMITED**

### **MATTERS TO BE ADDRESSED**

#### Waimakariri District Council (WDC) Land Information Memorandum (LIM)

1. Based on advice from the Waimakariri District Council, it is normal to identify resource consents on adjoining properties as part of a LIM. WDC typically do include resource consents on adjacent properties on a LIM. Therefore, based on WDC's advice, properties adjacent to the property on which the composting facility is located will have the resource consents held by the composting facility shown on their LIM.

#### Investment Value of Canterbury Landscape Supplies

2. Under the Resource Management Act 1991 (RMA) I am not able to consider the value invested by the applicant already. Section 104 of the RMA only says that the consent authority must have regard to the value of investment of the existing consent holder if affected by section 124 of the RMA. These applications are not affected as there are no existing consents.

#### Status of a Lessee as an Occupier

3. In terms of a lessee being classified as an occupier, based on internal legal advice we would consider a lessee as an occupier. As written approval has not been obtained from the occupier of the southern land parcel, as shown on Plan CRC175344B attached to the recommended conditions for CRC175344 in the s42A report, the application will need to be amended to exclude the southern land parcel, Lot 2 DP 25643.

#### Contaminated Land Status

4. I sought advice from the Canterbury Regional Council Environmental Science and Hazards Team regarding the potential contaminated land status of composts. Scientists from this team state that composting facilities are not technically Hazardous Activities and Industries List activities as none of the contaminants are considered to be persistent. There is the potential for contamination if for example the leaf litter is in fact road sweepings which will likely contain heavy metals, hydrocarbons and polycyclic aromatic hydrocarbons. And if treated timber does come onsite this could be another source of contamination as well as if the sawdust is from treated timber.
5. Additionally, I sought advice on the potential contamination of the paunch grass. The Environmental Science and Hazards Scientists cannot see any reason why paunch grass would contain high concentrations of cadmium unless the cows were eating freshly applied fertiliser which, it is noted, is unlikely to occur.

#### Kainga Site – Canterbury Landscape Supplies Limited

6. The applicant holds CRC145364 to discharge contaminants to land and to air and CRC145359 to use land for composting and stockpiling. The s42A report for these consents state that the applications were for existing unconsented activities.
7. The materials authorised by these consents are detailed in the following table.

Location	Legal Description	Material	Maximum Quantity
Front Block	Lot 1 DP 28036	Raw bark & sawdust	10, 000 m <sup>3</sup>
		Composting bark fines, finished bark products	6, 000 m <sup>3</sup>
Back Block	Part RES 1360, RS 38814, Lot 1 DP 53987	Raw unscreened bark	20, 000 m <sup>3</sup>
		Sawdust	12, 000m <sup>3</sup>
		Finished horticultural bark products	2, 000 m <sup>3</sup>
		Other untreated bark or sawdust products and topsoil	8, 000 m <sup>3</sup>

#### Rainfall Intensity in the Last Year

8. I requested the rainfall events for the past year from Mr Nick Griffiths (CRC, Senior Scientist, Environmental Science and Hazards). Mr Griffiths provided me with the three most notable rainfall events since April last year. These were 22/23 July 2017, 11/12 January 2018 and 21/22 February 2018. Rainfall totals and return periods (based on HIRDS V3) for these three events are as follows:

Date	Location of Rainfall Measurements	
	Kainga Yard	Cust Main Drain
<b>July 2017</b>	24 hr = 47.5 mm ~ Mean Annual 48 hr = 61 mm ~ Mean Annual	24 hr = 41 mm < Mean Annual 48 hr = 42 mm < Mean Annual
<b>January 2018</b>	24 hr = 45.5 mm < Mean Annual 48 hr = 75 mm 2 – 5 yr ARI	24 hr = 43 mm < Mean Annual 48 hr = 74 mm ~ 2 yr ARI
<b>February 2018</b>	24 hr = 83 mm ~ 10 yr ARI	24 hr = 95 mm ~ 10 yr ARI

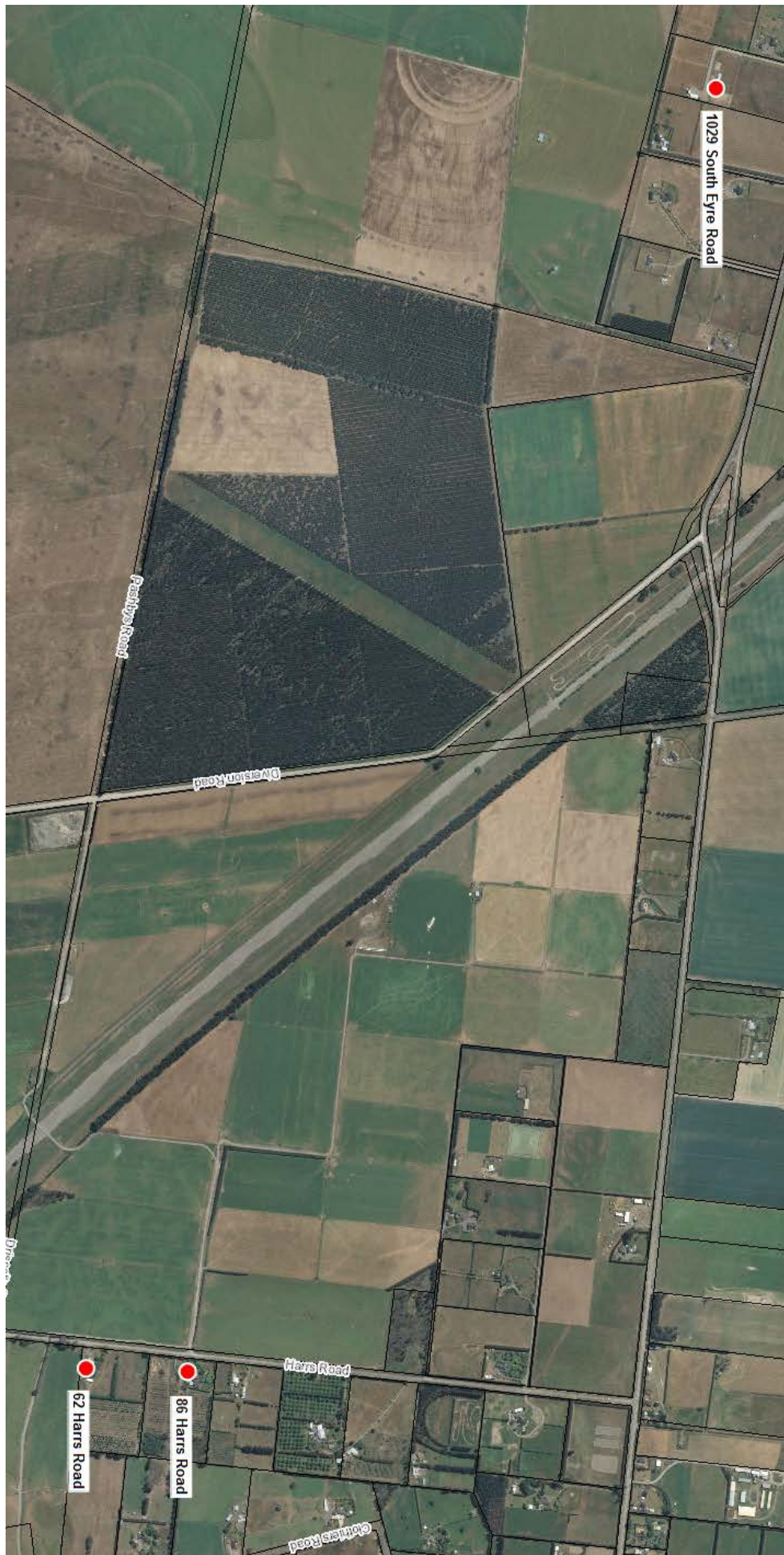
	48 hr = 89.5 mm ~ 5 yr ARI	48 hr = 100 mm 5 – 10 yr ARI
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9. The table below is to provide clarification around the rainfall events and the likelihood of them occurring in any one year.

AEP (%)	50%	20%	10%	5%	2%	1%	0.5%	0.2%	0.1%
Return period (yrs)	2	5	10	20	50	100	200	500	1000

Domestic Wells– Frampton, Rouse, Randle

10. Rouse well M35/3312, 86 Harrs Road:
- 11.3 metre deep
  - 11.2 mg/L 16 February 2018
  - 11.0 mg/L 21 October 2014
11. Randle well M35/2596, 62 Harrs Road:
- 15.3 metres deep
  - 10.4 mg/L 16 February 2018
12. Frampton well M35/10452 and M35/5618, 1029 South Eyre Road:
- 23.7 metres deep
  - 8.6 mg/L 11 August 2016



## **SUMMARY FOR HEARING APPLICATIONS CRC175344 AND CRC175345 – CANTERBURY LANDSCAPE SUPPLIES LIMITED**

### **INTRODUCTION**

1. Since writing the s42A report for these applications, amendments have been proposed which are within the scope of the application. I will address these amendments as well as the key points of the applications.

### **DESCRIPTION OF THE PROPOSAL**

2. The applicant no longer proposes to store mature mushroom compost on site.
3. The applicant proposes to place the active phase composting materials (up to 12 weeks old) onto a series of materials forming a composting base surface to mitigate the discharge of contaminants. The base consists firstly of an impermeable layer, potentially a plastic material, then an aggregate/clay mix approximately 400 millimetres deep, lastly a 500 millimetre sawdust and/or bark fines layer which will sit beneath the compost.

### **LEGAL AND PLANNING MATTERS**

4. At the time of writing my hearing report the Proposed Canterbury Air Regional Plan (decision version) (pCARPd) was not fully operative, therefore the objectives and policies of Chapter 3 – Air Quality in the Natural Resource River Plan were considered. The Canterbury Air Regional Plan is now fully operative therefore the objectives and policies of the NRRP will no longer be considered.
5. As the application was lodged under the Proposed Canterbury Air Regional Plan (decision version) the proposal is assessed against the rules and activity class of this version of the plan.
6. The Canterbury Land and Water Regional Plan (LWRP) was fully operative at the time the consent applications were lodged, therefore the proposal is assessed against the rules of this plan.

#### Permitted activities/activities not requiring consent

7. Onsite the applicant has piles of sawdust, bark fines, gib board offcuts, wood pallets, timber and soil. The discharge to air of dust from these materials is a permitted activity under rule 7.36 and 7.37 of the pCARPd and therefore do not need consent. For the abundance of clarity, if an activity is a permitted activity under the plan rules, the discharge from the activity, that is the discharge from the above bulk materials, cannot become an activity that requires consent. If the applicant wishes they can obtain a certificate of compliance.
8. There are no rules within the Canterbury Land and Water Regional Plan for the use of the land for the storage of bulk materials therefore resource consent is not required.
9. The applicant originally applied for a land use consent to use land for composting of organic matter. I note that after discussion with Kirstie Wyss (Wynn Williams, Associate), Andrea Richardson (CRC, Consent Planner II) and Zella Smith (CRC,

Team Leader Consents Planning) it was determined that Rules 5.38 to 5.40 of the Canterbury Land and Water Regional Plan was directed at farming composting activities. Therefore, it is considered that this rule does not apply to this composting activity which is an industrial trade premise and the applicant does not need to apply for a land use consent as they are not contravening a rule in a regional plan.

10. Additionally, it is not considered that a consent to discharge stormwater is needed. The discharge of contaminants will be covered by the current consent application.

#### Discharge to air of odour and dust

11. The discharge of contaminants to air (odour and dust) from the composting activity can meet all the conditions of Rule 7.63 as a discretionary activity as the composting site is:
- i. An industrial or trade premise;
  - ii. Not managed by Rules 7.47 – 7.62; and
  - iii. Not a prohibited activity.

#### Discharge of liquid waste where contaminants may enter groundwater

12. The discharge to land where a contaminant may enter water is classified as a discretionary activity under Rule 5.92 of the LWRP as the proposed activity cannot comply with Rule 5.91. The proposal cannot meet the requirements of Rule 5.91 condition (4)(f) as the discharge is within a Nutrient Allocation Zone identified as 'Water Outcomes Not Met' (Red) and may contain nitrogen or phosphorous.

### **DESCRIPTION OF AFFECTED ENVIRONMENT**

13. The Description of the Affected Environment in the s42A report is still relevant to these applications.
14. I would like to clarify that to determine the distance from the composting site and dwellings I have measured from the lease boundary and used the nominal 20 metres setback from the residential dwelling.
15. I have stated in my s42A report that the nearest downgradient domestic supply bore is located approximately 1020 metre north-east of the site. After Ms Mongillo's evidence I agree that this bore can be considered cross-gradient and the closest downgradient domestic supply well is located approximately 1450 metres from the site.

### **COMPLAINT HISTORY**

16. I have reviewed the complaint history for the site since both the new management measures have been implemented and the odorous compost windrows have been removed. Removal of the compost windrows was completed by the 15 December 2017. I have obtained the complaint history from 15 December 2017 to the 27 February 2018.
17. Below is a summary of the most recent complaint history:
- a. A total of 15 pollution events have been recorded;

- b. One pollution event was substantiated;
- c. Eight pollution events were unable to be attended;
- d. Two pollution events were verified by complaint;
- e. One pollution event was recorded as having no environmental impact; and
- f. Three had no comment.

18. Mr Nathan Dougherty (CRC, Senior Resource Management Officer) has provided a description of classifications below:

- a. Event substantiated – Odour beyond the boundary with the same characteristics as that discharged from the site. While we would normally only apply this to offensive odour discharges, as there are no authorisations in this situation you could take the position that any odour discharge like this is substantiated. In practice we use a higher threshold of offensive to determine this.
- b. Event not substantiated – If odour is so weak or transient that certainty about origin can't be proved beyond reasonable doubt.
- c. Verified by complaint – this is when an activity complies with regional rules or resource consents while still being underway or occurring. E.g. an odour which is present but is at a low enough intensity that complies with regional rule around offensiveness. Or a dust discharge that is permitted, and not causing offensive deposition or suspended particulate beyond the site boundary.
- d. Provided education – In this situation officers determine that the effects of the activity are minor enough or the attitude of the resource user warrants no more than advice or education to effect changed behaviour. It could be appropriate for a very minor breach of a regional rule that was not intended and the person responsible wants to prevent further non-compliance.
- e. No environmental impact – Where an officer cannot determine any environmental effect from the activity, or is unable to determine whether an activity has occurred. It probably has similarities to "Verified but compliant".



## TECHNICAL MEMORANDUM

**DATE** 8 March 2018

**Project No.** 17900053\_7403\_004

**TO** Tegan Wadworth  
Canterbury Regional Council

**CC**

**FROM** Cathy Nieuwenhuijsen

**EMAIL** [cnieuwenhuijsen@golder.co.nz](mailto:cnieuwenhuijsen@golder.co.nz)

### CANTERBURY LANDSCAPES SUPPLIES AIR DISCHARGE PERMIT APPLICATION

#### Introduction

1. Golder provided Canterbury Regional Council (CRC) with a review of the odour and health risk assessment aspects of the Assessment of Environmental Effects (AEE) that was prepared by Canterbury Landscapes (Golder letter dated 6<sup>th</sup> November 2017). This review was used to assist in the preparation of the Section 42A Officer's report prepared by Ms Wadworth. Following the issuing of the S42A report on 6<sup>th</sup> December, the hearing was rescheduled and evidence relating to the resource consent application was provided by Barry Loe (Loe Pearce and Associates), Michele Dyer and Prue Harwood (both from Beca Limited) and Helen Mongillo (Sephira). This Technical Memorandum comments on these evidence briefs, and particularly updates and changes to the site operation and proposed consent conditions.

#### Changes to input materials and site layout

2. No mushroom compost is now proposed to be stored onsite at the Canterbury Landscapes (CLS), site at Swannanoa (the site). Site odour reviews by Beca and by CLS indicate that compacted spent mushroom compost had turned anaerobic, which had potentially caused offsite odour effects. The cessation of mushroom compost storage onsite eliminates this as a potential odour source.
3. The mature and curing compost (mostly made from paunch grass and bark) is now stored at the southern and south-eastern corner of the site. This is slightly further away from the nearest neighbours to the site but more importantly is understood to be with an area that is drier.
4. Previously there was indications (in the Beca AEE) of limited percentages of some materials that have a higher risk of resulting in anaerobic compost. This includes grease trap waste, and of lesser concern egg shells. A limit of 1% grease trap waste has now been incorporated in the conditions (condition 5 as attached to Mr Cleary's evidence). I agree with this limit. In my opinion this is not particularly due to the inherent odour of this raw material, rather the risk of the grease trap waste contribution increasing the risk of anaerobic conditions in the compost.
5. I also note that in the Beca AEE that the high grade biosolids are proposed only to be mixed with bark fines rather than composted. I **understand** this to be due to the high quality of biosolids means that they do not need to be composted to be used. I have reviewed the biosolids grade A/B criteria as proposed in the conditions and consider biosolids that reach this grade are considered stable and have already been through a sterilisation process.



## Site visit observations

6. My colleague Mr Cudmore visited the Diversion Road site on 26<sup>th</sup> October 2017, as noted in our review (appendix 2 of the S42A report) anaerobic odour was noted as occurring at the base of mature piles and this in combination of our review of complaints led the view that significant odour nuisance has likely occurred in 2017 and this was likely to be due to anaerobic conditions onsite. It is understood that all existing anaerobic material onsite was removed prior to 15<sup>th</sup> December 2017.
7. I visited the site on 1<sup>st</sup> March 2018. During my site visit I did not observe any areas on site that appeared to have anaerobic compost or leachate. Additionally during the site walk around I did not observe anaerobic type odours. I observed odour in the immediate vicinity of the receivables area where a fresh batch of paunch grass had been mixed with bark this odour was very localised, and I would not expect this odour to be observable offsite.
8. I also observed a compost odour approximately 50 m from where turning and screening of less than 8 week old compost was being completed. Again, this was a relatively low level of odour and I would expect that only an odour with weak intensity or less would be observed beyond a distance of a few hundred metres.
9. I reviewed the condition of the mobile water tanker (which I understood to be used to store the standing water collected by the trash pump) and found it to be slightly stale, but not anaerobic or in my opinion (based on lack of odour) have a high potential to become anaerobic.

## Changes to onsite procedures

10. Golder's key finding, as identified in our initial review (attached to the Section 42A report) regarding odour is the generation of anaerobic compost conditions due to excessive underlying water. Improved measures proposed by CLS that help address this concern is the use of a composting pad (made of compacted aggregate) for initial mixing and active composting and a 500mm sawdust/bark layer beneath the active and curing compost. It is noted that mature compost is still proposed to be stored on the ground.
11. The aggregate pad is proposed to 400mm thick and this is expected to be sufficient to ensure there is minimal waterlogging via ground water or surface water of the bark layer that sits beneath the compost, or the base of the compost itself.
12. Regarding the bark/sawdust layers, these are understood to be designed to adsorb compost leachate and excess rain water, then excess water would be incorporated back into the composting process. Excess ponded water is proposed to be pumped to an onsite storage tank. Based on review of Ms Harwood, Dyer and Mongillo's evidences, these measures appear to be designed to minimise groundwater contamination and elevate the composting piles above the ground area to minimise water logging and anaerobic conditions. From the evidence of Ms Mongillo, the ability of the compost piles and bark/sawdust layers to absorb water appear to have been evaluated for a 1 in 5 year and 1 in 50 year event. Ms Mongillo concludes that for the 1 in 5 year event there is absorption capacity within the bark layer to hold rain water inputs, but not for the 1 in 50 year event.
13. The absorption of water by the compost/bark fines is expected to be sufficient to avoid ponding and water logging of the bark layer to the extent that compost piles avoid anaerobic conditions. A net water balance has not been completed for the site, or a detailed evaluation of whether the site can cope with an extended period of wet weather such as that experienced last year. This is potentially a concern for the mature compost which is not stored on a raised layer of sawdust/bark or aggregate. While I would usually consider mature compost relatively stable, there still the potential for anaerobic conditions to develop if the base of the pile become water logged. The relocation of the mature compost to a dryer area of the site will assist with this and the use of sawdust around the base of the

compost piles is likely to be sufficient to absorb standing water. However, given the sites recent problems with anaerobic compost, I consider this needs more certainty. During my site visit I discussed with Mr Wylie the use of oxygen monitoring to test the mature compost pile oxygen levels. Mr Wylie indicated that the site was purchasing an oxygen probe and this would be practical.

14. Currently Condition 12d (Mr Cleary) proposes temperature, oxygen and moisture content measurements at least once every 14 days until composting is completed. I recommend that oxygen probe monitoring is maintained every 2 weeks throughout the period that the compost remains onsite. This is a relatively simple modification to the existing proposed condition 12d. The records and trends of oxygen probe monitoring will provide useful warning for the site of reducing oxygen levels and allow proactive management and significantly reduce the risk of anaerobic compost onsite.
15. Regarding leachate water management. As I understand, current site management is to absorb water around the composting area with sawdust, then reuse this sawdust in the composting process. I consider this to be a good solution to minimise standing water onsite as well as minimising the potential for compost to turn anaerobic due to standing water inhibiting oxygen transfer into the composting piles.
16. To maintain fresh water in the mobile water storage tank, it is recommended that the trash pump is only used to pick up water on the site where there is a low potential for it to contain compost leachate.
17. I recommended a consent condition which has been incorporated in the currently proposed conditions (condition 15, Mr Cleary) to avoid standing water around the compost piles. I also recommend that the onsite water management is incorporated in the site management plan.

## Management Plan review

18. The compost management plan (CMP) outlines detailed procedures for managing odour and dust discharges from CLS. Golder has reviewed this and overall agrees with the measures outlined in the CMP. However, as discussed above, procedures relating to leachate/water management are not currently covered in sufficient detail to be confident that this will not cause offsite odour issues.
19. Additionally In Table 4.1 of the CMP, turning the pile in restricted wind conditions as suggested procedure to mitigate an anaerobic compost windrow. It is uncertain whether simply turning a pile is sufficient to effectively restore aerobic conditions. The incorporation of aerobic compost, additional bark or sawdust may be required to restore aerobic conditions to the pile and it is recommended this is included as a measure that can be employed if necessary. Following turning, the oxygen content at the base and near centre of the pile should be checked to ensure that all anaerobic material is well distributed.

## Recent odour complaints

20. Recent odour observations/complaints (since anaerobic material was removed from the site) by neighbours and Environment Canterbury include descriptions such as sulphurous and rotten that are indicative of anaerobic conditions still occurring at the CSL site. While the strength of the odour described by the complainants is stronger than observed by Environment Canterbury or Beca staff, in my opinion this difference is not unusual and consistent with observations by neighbours that have been experiencing regular recognisable anaerobic type odour. Additionally, it is unclear from the evidence of Ms Dyer whether drainage flow conditions (that are identified in complaints) were experienced in the monitoring programme.
21. Based on a review of the changes in site procedures (as documented in the evidences of Ms Dyer, Mr Loe and Ms Harwood) I considered the most likely cause of onsite anaerobic conditions and therefore offsite anaerobic odours would be potentially from compost leachate management and/or anaerobic

conditions at the base of mature piles. Although I did not observe any sources of anaerobic odours during my site visit, this was a one-off site visit and I have recommended conditions that further mitigate likelihood of anaerobic conditions occurring.

22. I have further considered the cause of the anaerobic odours being observed by neighbours. While I have not completed a full analysis of the complaint data, Mr Wylie's statement may have provided some insight into a potential source of the anaerobic odours observed. Mr Wylie states that the anaerobic material that was removed from the site prior to Christmas was supplied to local farms as a fertiliser and soil conditioner. I would expect that some of those farms stored the compost and have applied this to their farms at various times over the last 2-3 months. I would be unsurprised, if this anaerobic compost spreading was the source of at least some of the odour experienced by the neighbours. My experience with land spreading of compost/effluent/manures, is that if they are spread in an anaerobic state, they have the potential to cause significant odour effects both when they are being spread and for 2 – 8 hours thereafter. Odours are often noticed in cool air drainage conditions as there is often a relatively large area source (i.e. a paddock) of anaerobic material. This raises potential questions regarding product stewardship, which while not the subject of this hearing I would suggest that CLS provide advice to the purchasers of their product regarding storage and use to prevent potential odour issues from landspreading in the future.

## 23. Other Matters

24. In addition to odour, submitters have raised concerns about dust, bioaerosols and bees.
25. Dust: I agree with Ms Harwood regarding site management procedures including wetting and not carrying out dusty operations during particular wind directions and wind speeds greater than 5 m/s are appropriate to mitigate dust emissions from the site given the distance to the nearest neighbours. '
26. Bioaerosols: Both Ms Harwood and Mr Cudmore and myself have reached the conclusion that health risks for due to bioaerosols containing pathogens are less than minor. As further comment on this I refer the evidence of Dr Kelly (as presented at the Southern Horticultural Products Limited (SouthHort) Hearing (CRC156387). SouthHort have 13 residences within 250 m of their site and compost pig and chicken litter. Key site operational procedures considered by Dr Kelly are inline with what is proposed for this site. Dr Kelly concluded the risk to residents was low to no more than minor. In the decision by DC Caldwell, he considered monitoring should be completed with 1 – year as part management plan. I am not aware whether this was completed or is available. Given the increased distance to the nearest sensitive receptors I do not consider monitoring is necessary for the CLS diversion road site.
27. Bees: Like Ms Harwood, I have no experience in the evaluation of odour on bees. But I would generally agree with her opinion on the basis that odour effects for human receptors are acceptable at sensitive locations then overall the effects of odour on bees is likely to be minor or less.

## 28. Overall Summary

29. CLS has changed its procedures significantly since the odour problems last year. With the mitigation proposed by the applicant and the additional procedures outlined above, it is considered that composting operation can be effectively managed so that odour discharges do not cause objectionable or offensive effects at sensitive receptor locations beyond the site boundary.

Cathy Nieuwenhuijsen  
*Senior Air Quality Consultant*

# Memo

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Date	08/03/18
To	Tegan Wadworth
cc	
From	Zeb Etheridge

**Subject: Review of potential for groundwater quality impacts from Canterbury Landscape Supplies composting facility**

## Current water quality

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The CLS site is located in the catchment of Silverstream, a spring-fed stream which issues approximately 4 km downgradient of the site. Nitrate concentrations in Silverstream are very high, and exceed the National Bottom Line limit of 6.9 mg/L nitrate-N specified in the National Policy Statement for Freshwater. Environment Canterbury has a statutory obligation to implement control measures in order to reduce nitrate concentrations to below 6.9 mg/L in Silverstream. This means that any additional nitrogen discharge from the CLS site would have to be balanced by an equivalent reduction from another discharge source (e.g. farmland) within the catchment. On this basis any ongoing nitrogen discharge from the site is highly undesirable.

As noted in my memo dated 6/11/17 (attached to the Section 42A Officer's Report), groundwater nitrate concentrations are high in this catchment. A survey of shallow wells in the undertaken in 2015 showed an average nitrate-N concentration of 9 mg/L. This means that a relatively small increase in nitrate discharged to groundwater could cause drinking water standard exceedance in some wells. I note that a number of shallow domestic water supply wells are present in the area downgradient of the site, and that submitters Graeme and Rosina Rouse have recorded nitrate concentrations very close to the drinking water limit in their domestic supply well, for instance.

## Contaminants of concern

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The assessment of effects has focused on nitrogen species as the primary contaminants of concern for the composting facility. I agree that nitrogen is the main contaminant associated with composting facilities, but note that a number of submitters and the hearing panel have asked whether additional contaminants could discharge to soil and groundwater beneath the composting area.

Previous studies have shown that dissolved organic matter in compost leachate can effectively sorb and mobilize heavy metals. Published results from a compost leachate investigation undertaken in 1984 found that leachate exceeded drinking water concentration standards for the seven heavy metals that were tested (cadmium, nickel, cobalt, zinc, copper, lead and chromium). The study notes that each compost feedstock will be different, so that specific studies would be required to assess the exact quantity and nature of materials leached from a given compost. A site specific-assessment of the concentrations of these (and any other) metals in the compost leachate, together with analysis of their mobility/sorption in the soil and vadose zone beneath the site, would be required to determine whether they pose a contamination risk.

Taste and odour impacts in groundwater downgradient of the site are also a potential cause for concern. Research has shown that some naturally occurring organic compounds can have detectable taste and odour at extremely low concentrations (e.g. 0.0038 parts per billion for geosmin). It is possible that some of these compounds could be present in any leachate discharged from the compost. Given the low detection thresholds and relatively close proximity of downgradient wells, drinking water taste and odour may be the most sensitive groundwater quality contaminant associated with the proposed activity. I consider that there is a reasonable probability that dilution rates will be insufficient to mitigate taste and odour impacts in groundwater if these substances were discharged to groundwater beneath the

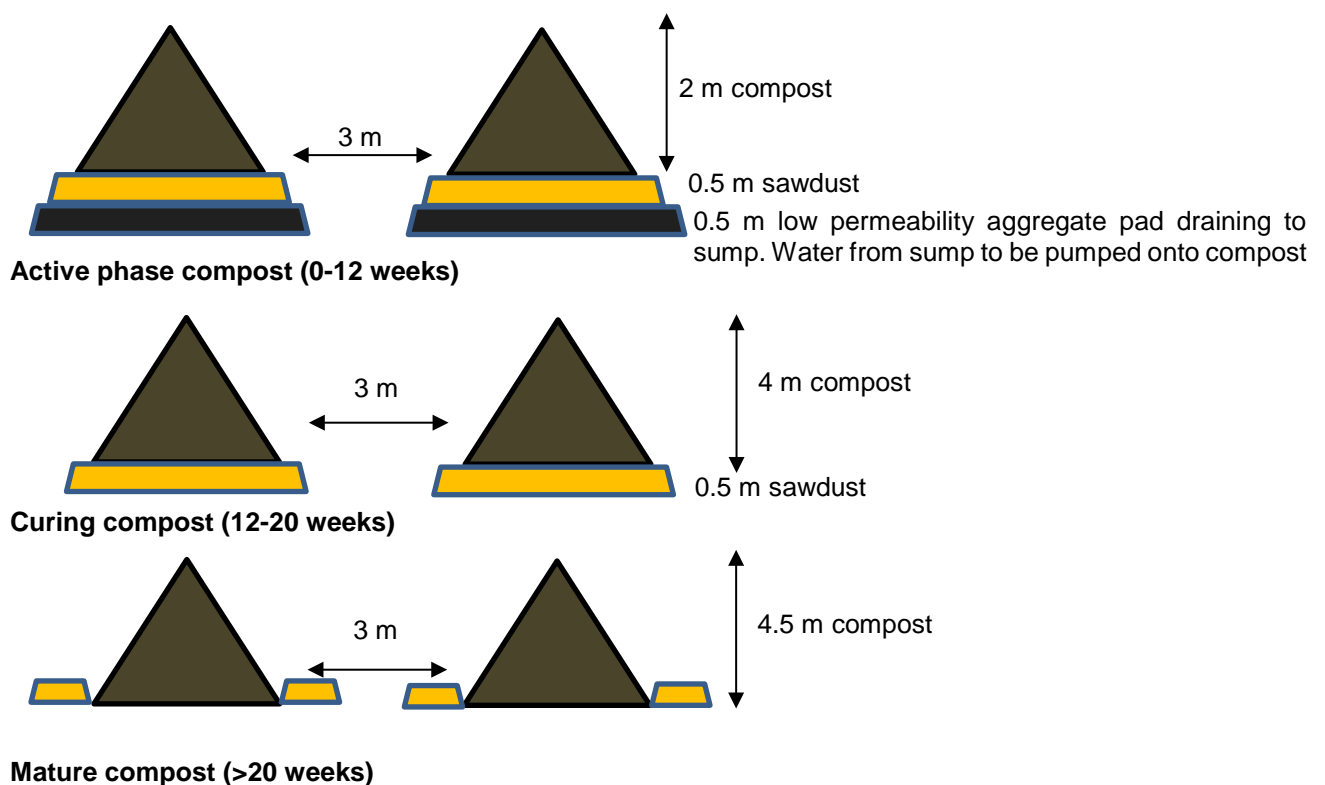
site. Very robust mitigation measures are therefore required, in my opinion, to ensure that the likelihood of even small rates of contaminant discharge to ground is very low.

### Depth to groundwater beneath the site

I anticipate that the long-term average depth to water beneath the site is likely to be around 4 m, and the minimum seasonal depth to water is likely to be approximately 1.5 m below ground level. My assessment is based on a survey of 185 wells in the wider area undertaken by Environment Canterbury in September 2017, together with records from all other wells in the area. The depth to groundwater is likely to be slightly greater than the 0.85 m recorded in well M35/0658, which is listed in Section 54 s of the Section 42A Officer's Report, because the site is located ~2 km inland of this well. Groundwater generally becomes progressively shallower towards the coast.

### Groundwater quality effects assessment

I first reviewed this application in November 2017, at which time I raised questions over some of the assumptions and methods used to model potential groundwater quality impacts. Since that time, I have had a number of useful discussions and meetings with the applicant's consultant (Helen Mongillo, Sephira Environmental) focusing on the adsorptive capacity of the compost and sawdust and the proposed mitigation measures, using sawdust. The proposals for management of compost at the site have also been revised in the run-up to the hearing. I have provided a diagram of the applicant's proposal, as I understand it, below.



The adsorptive capacity of the compost was tested and reported on in a letter from Sephira Environmental to myself dated 14/2/2018, which shows that the compost can absorb 180% of its mass in water, and that the water absorption capacity of sawdust is over 300% of its mass. This means that a 0.5 m layer of sawdust alone could absorb all the rainfall from a one in five-year storm, for instance. Whilst the rainfall depth in a one in fifty-year storm could exceed the absorptive capacity of a 0.5 m thick layer of sawdust, and hence results in a possible discharge to groundwater, the infrequency of the event means that significant adverse groundwater quality effects are unlikely. The compost can adsorb a

much greater quantity of water. Calculations provided by Ms Mongillo in the above-referenced letter show that a 2 m tall pile of compost could adsorb 520 mm of rainfall.

I note submitter Mr Noel Fraser identified that 192 mm of rainfall occurred in July 2017, and correctly highlights the fact that that 0.5 m of sawdust could only adsorb around 130 mm of this. Under the assumption that all of the stormwater falling on the compost windrows runs off, the adsorptive capacity of the sawdust could be exceeded during such wet months. This highlights the need for regular checking and replacement of saturated compost during wet periods. The maximum daily rainfall recorded at the Christchurch Airport site between 1960 and 2017 was 110 mm, the maximum two-day total rainfall was 121 mm. This means that under the highly conservative assumption of 100% runoff from the compost, all of the maximum recorded two day rainfall could be adsorbed by the sawdust bunds.

The maximum two month total rainfall recorded at the Christchurch Airport site between 1960 and 2017 was 296 mm. The adsorptive capacity of a 2 m high compost windrow (520 mm) is therefore highly unlikely to be exceeded under very wet conditions.

Based on this information, I generally agree with the applicant's conclusion that the compost facility is unlikely to discharge contamination to groundwater, subject to implementation of consent conditions which ensure adequate control measures are in place.

### **Risk mitigation and consent conditions**

It is not clear to me why an aggregate pad is proposed for the active phase compost but not for the curing and mature compost. I appreciate that the risk of nitrogen leaching from this older material is lower, but am not convinced that it is so much lower that a lower level of mitigation is warranted. The risk of taste and odour-causing substances being discharged from this material may be similar to the active phase compost, for instance. Unless the applicant can provide a compelling justification to the contrary, my recommendation would be that all compost stored on the site is managed with the same degree of rigour to avoid leachate discharge to ground.

The applicant proposes to monitor groundwater quality in one upgradient and two downgradient monitoring wells which would be monitored quarterly for the first two years in the upgradient well and six monthly for the first two years in the downgradient wells, and yearly thereafter. Section 42 of Ms Mongillo's evidence notes that groundwater is likely to move slowly through the aquifer in the site area due to the flat gradient and relatively low permeability of the sediments.

I believe that groundwater velocities in the shallow aquifer in this area are generally relatively fast, probably in the order of several kilometres per year. This is based on an age tracer investigation Environment Canterbury commissioned GNS to undertake in 2016, which found that the average dry weather age of water in the spring-fed streams downstream of the CLS site is 5-6 years. I have also observed that nitrate concentrations in these streams respond relatively quickly (e.g. within 12 – 18 months) to "flush-throughs", when the nitrate which has accumulated in the soil profile and vadose zone during prolonged dry periods is flushed into the aquifer (and from there to the streams) during wetter periods.

Published research undertaken by ESR has shown that 98% of groundwater flow in the Canterbury Plains aquifers can occur in highly permeable channels within the aquifer. These comprise the open framework gravels of buried river channels. Groundwater is likely to travel fairly quickly through these buried channels in the site area (former braids of the Waimakariri River), such that the travel times between the stream recharge area (which includes the CLS site), and the spring-fed streams themselves, are relatively short – i.e. a few years. This explains the young average age of water determined from the age tracer investigation.

I agree that groundwater flow is likely to be very slow in the low permeability material described in the bore logs Ms Mongillo refers to in her evidence. If a monitoring well downgradient of the site was installed in such material, it may take a very long time for any contamination from the site to travel to this well. Water supply wells do not tap such low permeability material, however. They are more likely to target open framework gravel deposits (in order to obtain enough water for supply purposes), and hence travel times to water supply wells could be relatively quick (e.g. several years, or possibly less than a year).

The aquifer beneath the site is likely to be heterogenous, with most flow occurring in open framework gravel deposits associated with buried river channels. In order for water quality monitoring to provide a reasonable level of reassurance that the composting operation is not causing groundwater contamination, it would be necessary to install a large number of monitoring wells. This would maximise the chances of intercepting these preferential flow paths, but would be expensive. So whilst I see some value in groundwater quality monitoring to provide a means by which any widespread groundwater contamination associated with the composting activity could be detected, installing two downgradient wells would be unlikely to detect contaminant discharges from part of the site. Increasing the number of wells would increase the likelihood of detecting any groundwater contamination from sub-areas of the site.

In regard to the timing of groundwater monitoring, I have observed in a large number of monitoring wells across the region that the highest nitrate concentrations typically occur between August and November. This is likely to be due to the fact that most groundwater recharge occurs in the winter, when the soil profile is saturated due to low evapotranspiration rates, and slightly higher rainfall in the winter months. The winter recharge seems to flush-out nitrate stored in the soil and vadose zone from the preceding summer and autumn. On this basis I consider that sampling should be targeted to August and November, in order to maximise the chances of detecting contamination.

In regard to groundwater quality monitoring, I recommend that EC and pH should be included. The purpose of these parameters is to provide further information on the cause of any water quality trends observed in the nitrate/ammonia results. EC can also provide a useful early indicator of leachate in groundwater. No trigger levels would be set for these parameters.

I note that the applicant has proposed to collect moisture content samples in order to manage air emissions from the compost piles. I recommend that these samples should be tested for moisture content and water adsorption capacity. If the measured moisture content is less than 75% of the adsorption capacity content in all samples, I consider that the compost will be highly unlikely to leach contamination to the underlying aquifer.



**SUMMARY FOR HEARING APPLICATIONS CRC175344 AND CRC175345 –  
CANTERBURY LANDSCAPE SUPPLIES LIMITED**

**-ASSESSMENT OF ENVIRONMENTAL EFFECTS, OBJECTIVE AND POLICY  
ASSESSMENT, RECOMMENDATION**

**ASSESSMENT OF ENVIRONMENTAL EFFECTS**

**Potential adverse effects of the discharge to air including odour and dust and the  
potential adverse effect on health**

1. The main mitigation measures for the discharge to air of odour and dust and the measures set out in the Compost Management Plan (CMP) and providing aerated conditions for the compost piles through water management onsite to ensure the compost piles do not become water logged.
2. My understanding of the applicant's new proposal is that water logging of the active compost piles will be address through a raised aggregate/clay pad topped with a 500 millimetre layer of sawdust and/or bark fines. The most recent mitigation measures added to this is underlying the aggregate pad with an impermeable layer, potentially some type of plastic. This composting area with this base will be approximately 2500 square metres.
3. The applicant has proposed to capture any runoff/leachate from this area within a collection point for example a sump. The construction and operation of the collection point has not been determined. It is likely that it will constructed of an impermeable material. Any discharge collected will potentially either be stored for use or promptly reused back into the compost process.
4. This provides additional mitigation by providing a potentially drier area for the active phase compost to occur and provides further mitigation against the discharge of odour occurring from the compost piles.
5. I consider that the sawdust and/or bark fines bed beneath the mature compost piles would be an effective mitigation measure to avoid these piles becoming water logged and potentially anaerobic in period of high or long rainfall. I would recommend this as a condition of consent.
6. Based on technical advice, I consider the potential adverse effects on health from the composting facility are unlikely to occur.
7. The applicant provided a detailed Compost Management Plan outlining how key aspects of the composting process will be monitored and achieved. I recognise that placing constraints around when the applicant can carry out certain activities such as turning windrows and mixing new compost would place constraints on the composting process which may in the end result in worse odour conditions from not being able to manage to compost to maintain aerobic conditions. Based on technical advice, how to manage this and not discharge odour that effects downwind sensitive receptors can be adequately managed in the CMP.

8. Based on Ms Nieuwenhuijsen advice, I recommended additions to the CMP including:
  - a. Managing standing water onsite and around the all phases of compost piles by either by absorbing it with sawdust and/or bark fines or the trash pump;
  - b. Carrying out oxygen measurements at the base of the compost to ensure aerobic conditions are present every two weeks;
  - c. Managing the water stored from the trash pump in order to maintain aerobic conditions.
9. Ms Nieuwenhuijsen has recommended that the aggregate pad being installed underneath the active phase compost be recommended as a condition of the consent. I recommended this as a condition of consent.
10. Based on the above information, I consider it is possible to manage the discharge of odour and dust to an acceptable level provided the compost management plan is effectively implemented and the recommended conditions are adhered to.

**Potential adverse effects of the discharge to land on groundwater quality and hydraulically connected surface water and drinking water supplies**

11. It is not precisely clear how the aggregate pad or impermeable layer will be constructed or operated or how any runoff or leachate from the pad will be managed except for being collected. However, I do consider that this additional proposal does provide an extra level of protection for the discharge of contaminants and could provide an effective control against contaminants leaching to groundwater.
12. Based on advice from Mr Etheridge, the aggregate pad would be effective for all stages of compost not just the active phase composting. Therefore, I would consider that in order to provide certainty that contaminants did not leach to groundwater this would be appropriate for the composting site. I also note that a high level of certainty has been reached regarding how effective the sawdust and/or bark fines bed will be as well as the sawdust bunding. Taking into account this it is likely that the discharge of contaminants up to a 1 in 5-year storm event can be effectively managed with the sawdust bed underneath the curing and mature stage compost. In terms of conditions I would recommend that the mature compost as well as the curing phase compost in stored and the active phase compost be stored on the aggregate pad and sawdust and/or bark fines pad.
13. Based on Mr Etheridge's advice it would be more effective to increase the number of monitoring wells for groundwater monitoring. It is not certain what number would be appropriate to capture any potential groundwater contamination. If groundwater monitoring is to occur at least some sampling should occur between August and November in to maximise the changes of detecting any potential contamination.
14. Given the above and technical advice received and provided the applicant adheres to the recommended conditions, I consider the discharge of contaminants can be managed to a point that effects on groundwater quality are being avoided.

## **PART 2 MATTERS (PURPOSE AND PRINCIPLES OF THE RMA)**

15. I have considered Part 2 of the RMA, particularly, sections 6, 7 and 8 of the RMA. Given further certainty has been provided around the level of effects on water quality and mitigation measures, I consider that this activity will likely achieve the purpose of the RMA based on the assessments above that effects on the environment will be adequately mitigated for by the recommended conditions, proposed mitigations measures and the compost management plan.

## **OBJECTIVE AND POLICY ASSESSMENT (s104 RMA)**

### **National Policy Statement for Freshwater Management (NPSFWM)**

16. The provides objectives and policies around safeguarding fresh water and associated ecosystems and the health of people and communities. Amongst other things this is achieved by sustainably managing discharges of contaminants. As discussed above the effects on groundwater quality are likely to effectively managed, as such I consider the proposal is consistent with the NPSFWM.

### **National Environmental Standards for Sources of Human Drinking Water (NESSDW)**

17. As discussed above, the potential adverse effects on drinking water quality have been assessed as likely to be no more than minor as limits within the standards are unlikely to be breached due to the proposed activity. As such I consider the proposal is consistent with the NESSDW.

### **Canterbury Regional Policy Statement (CRPS)**

#### Chapter 6 – Recovery and Rebuilding of Greater Christchurch

18. I have discussed the intention of Chapter 6 with Carmel Rowlands (CRC Team Leader Planning – Regional Integration, Planning). From this discussion it is unlikely the development of a new composting facility was intended to be captured by Chapter 6 of the CRPS. Chapter 6 aims to provide for development within urban centres around the Canterbury Regional post-earthquake and to prevent disjointed developments. Additionally, Chapter 6 is more of a District Council concern, as it is the decision of the District Councils to decide where it is appropriate for certain activities to occur. I note that these consents are seeking to authorise the discharge of contaminants to air and to land. It is more appropriate to address Chapter 6 through the consent lodged with Waimakariri District Council for a land use consent for a waste transfer station. This is to be determined independently from whether it is determined the effects on the environment from the composting activity are considered to be acceptable.

#### Chapter 19 – Waste Minimisation and Management

19. I consider the proposal is consistent with the relevant objectives and policies of Chapter 19 as the composting on site will assist in diverting waste away from landfills and reuse the potential waste to produce a useful product.

### **Chapter 7 – Fresh Water CRPS and Canterbury Land and Water Regional Plan (LWRP)**

20. I note that there are recordings of high levels of nitrate nitrogen concentrations already around the area of the proposed composting activity, however given the mitigation measures proposed and that these mitigation measures will be effective I do not consider that the composting proposal will be contributing to any potential increase in nitrate nitrogen concentrations or ammonia nitrogen concentrations. Given this consider the proposal is consistent with the relevant objectives and policies contained in Chapter 7 of the CRPS and the objectives and policies of the LWRP.

#### **Chapter 14 – Air Quality CRPS and Canterbury Air Regional Plan**

21. Based on technical advice received regarding the discharge to air of odour and dust and any potential adverse effect on health from the composting facility, I consider the proposal is consistent with the relevant objectives and policies of Chapter 14 of the CRPS and the objectives and policies of the LWRP. Additionally, I consider nuisance effects from odour will be addressed through the improved compost practices, the recommended conditions and the CMP.

#### **Matters relevant to certain applications (Section 105(1))**

22. In accordance with section 105, I have had regard to:
- a. the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
  - b. the applicant's reasons for the proposed choice; and
  - c. any possible alternative methods of discharge including discharge into any other environment.
23. For the reasons discussed in this report, I consider the proposal does meet s105(1) as discussed above effects on the environment will be adequately managed.

#### **Restrictions on grant of certain discharge permits (Section 107(1))**

24. Under Section 107(1) of the RMA a consent authority may not grant a consent for the discharge of a contaminant into water, or onto or into land, if after reasonable mixing the discharge is likely to give rise in the receiving waters, to:
- "(c) The production of conspicuous oil or grease films, scums, foams, floatable or suspended material:*
  - (d) Any conspicuous change in the colour or visual clarity:*
  - (e) Any emission of objectionable odour:*
  - (f) The rendering of fresh water unsuitable for consumption by farm animals:*
  - (g) Any significant adverse effects on aquatic life."*
25. As discussed earlier, I consider the effects on groundwater quality have been shown to be likely no more than minor. I consider that there is now sufficient certainty to determine that the proposal is unlikely to cause any of the issues covered by section 107(1), particularly (f) and (g).

## **Duration**

26. The LWRP does not provide duration guidance for the proposed activity. However, Policy 4.74 could be extended to cover part of the proposal. Part of Policy 4.74 of the LWRP covers farming activities and associated nutrient discharges in catchments that are within a red Nutrient Allocation Zone. The policy recommends that resource consent is not granted for a term exceeding 15 years in these situations.
27. I acknowledge that the proposal does not relate to a farming activity, however the proposal does include associated nutrient losses in a red Nutrient Allocation Zone. As such I consider Policy 4.74 could be taken into account when considering the duration of the proposal.
28. In addition, I consider potential adverse effects from the discharge to air and the discharge to land should play a significant role in determining an appropriate duration for a proposal.
29. Based on the assessment of environmental effects discussed above, the applicant has demonstrated that the mitigation measures for mitigating effects on groundwater quality are likely to be effective in avoiding the discharge of contaminants to land where it may enter groundwater and hydraulically connected surface water. Additionally, the applicant has proposed mitigation measures and a detailed CMP to manage the discharge to air of odour.
30. I have also had regard to the NPSFWM due to the previous uncertainty around the potential for the exceedance of the national bottom line for nitrate nitrogen. The NPSFWM requires the regional council to implement the NPSFWM no later than the 31 December 2025 (Policy E1). I consider that the discharge associated with the composting facility is no longer at significant risk of breaching the limits set out in the NPSFWM, therefore a longer duration may be appropriate.
31. Taking into account the above I consider a duration of 10 years.

## **Grant or Decline**

32. In accordance with section 104(1) of the RMA 1991 the consent authority must, subject to Part 2 have regard to any actual and potential effects on the environment of allowing the activity.
33. The main effects relating to this proposal are the effects from the discharge of contaminants to air, specifically odour, and the effects of the discharge to land on groundwater quality and users and hydraulically connected surface water.
34. Regarding the discharge to air, I consider that there have been adverse effects at a significant level occurring on surrounding neighbours due to the discharge of odour resulting from the past and current operation of the site. The applicant has proposed further changes to their composting practice and since removed anaerobic material from site. Based on technical advice the detail of the compost management plan set out good procedures to manage the discharge of odour and to avoid effects on surrounding residents. The proposed measures will also better provide for water logging issues on site.

35. Taking into account the above and provided all the recommended conditions are adhered to, I consider the effects of the discharge of odour will be managed appropriately to avoid off site effects such that I recommend granting this application.
36. Regarding the discharge to land of contaminants that may enter groundwater, previously I considered there to be uncertainty to a level that the actual level and nature of the effects could not be determined. The applicant has since provided certainty around the effectiveness of the mitigation measures, in particular to absorptive capacity of the compost, sawdust and/or bark fines. I consider that it has been proven that the effects on groundwater, surface water and drinking water quality will be mitigated and that water quality standards will not be exceeded. Therefore, I recommend granting this application.
37. I note that I do not consider that either of the applications to discharge contaminants to air and to discharge contaminants to land can be granted without the other.
38. In summary, in accordance with section 5 of the RMA 1991, I consider that the potential adverse effects from the composting activity will be mitigated appropriately and are able to be avoided, remedied or mitigated subject to the recommended conditions, therefore, I consider the proposal meets section 5 of the RMA 1991.
39. In accordance with section 104(1)(b) of the RMA 1991, I have had regard to all the relevant objectives and policies for this application. The relevant objectives and policies are identified above. I consider the application to discharge contaminants to air and the discharge of contaminants to land is generally consistent with the objectives and policies of the relevant planning provisions provided the proposed mitigation measures are implemented and adhered to by the applicant.
40. In accordance with section 104(1)(c) of the RMA 1991, I have had regard to any other matters relevant to this application including the Mahaanui Iwi Management Plan as discussed above under the "Potential adverse effects on Tangata Whenua values" of the s42A report.
41. Under section 104B, a consent authority may grant or refuse applications for a discretionary activity, and has discretion to impose conditions under section 108.