

Organics Processing Plant Community Liaison Group Meeting

Agenda

6:30pm to 8pm, Tuesday 12th December 2023

Waitai Coastal-Burwood-Linwood Community Boardroom

180 Smith Street, Woolston, Christchurch 8062

Welcome to the Community Liaison Group (CLG), a community forum to discuss consent compliance for the Organics Processing Plant; discharging contaminants to air, discharging contaminants to water, and use of land to store organic matter and decaying organic matter.

Agenda

1. Welcome and introduction – Chair (*5 minutes*)
2. Confirm previous meeting's minutes – Chair (*5 minutes*)
3. Update from CCC regarding short term options consultation results and 6 December short term options reports to Council (*15 minutes*)
4. Resident lived experiences since last meeting including the Geoffrey King odour report (*10 minutes*)
5. Living Earth & CCC discuss current site management and suggested processes moving forward (*10 minutes*)
6. Living Earth answer any questions arising from their CLG report (*10 minutes*) **Note: The report will be taken as read.**
7. Environment Canterbury (ECan) answer questions arising from their CLG report (*10 minutes*) **Note: The report will be taken as read.**
8. General business (*5 minutes*)
9. Concluding remarks – Chair (*5 minutes*)

Attachments

- a. Previous CLG meeting minutes, Tuesday 15th August 2023
- b. CCC CLG meeting report, Tuesday 12th December 2023
- c. Living Earth CLG meeting report, Tuesday 12th December 2023
- d. ECan CLG meeting report, Tuesday 12th December 2023
- e. Tonkin + Taylor technical review of OPP biofilter refurbishment, November 2023

Any questions or feedback can be sent to Bromley@ccc.govt.nz

Organics Processing Plant Community Liaison Group Meeting

Minutes

6:30pm to 8pm, Tuesday 12 December 2023

Waitai-Coastal-Burwood-Linwood Community Boardroom

180 Smith Street, Woolston, Christchurch 8062

1. Executive summary of minutes

Carl Pascoe (Chair) opened the meeting by acknowledging the progress that is being made, as shown in the media. Paired with support from Council which has not been seen before. Carl added an apology from community member Bruce King who is prioritising stress related health issues.

Actions from previous meeting

Action 1: Christchurch City Council (CCC) Chief Executive (CE) Dawn Baxendale and Environment Canterbury (ECan) CE Stefanie Rixecker in attendance as requested by the community. Carl reiterated no abuse will be tolerated during these meetings whilst acknowledging the intense emotions and debating.

Action 2: Carl Pascoe (Chair) had not received any commentary on the proposed Terms of Reference (ToR) tabled at the last meeting and moved them to be accepted. Some members of the community said they had not seen the proposed ToR and declined to vote.

Action 3: Request for two sets of minutes, executive summary and verbatim, actioned.

Action 4: Request for CCC May 2022 report actioned and attached to the last meeting's minutes.

Action 5: Living Earth (LE) confirmed they have scheduled an independent review of the biofilter for late August as requested by the community.

Action 6: ECan confirmed legal advice is being sought regarding the current operation and the resource consent as requested by the community, and they will deliver an update on 31 August.

Action 7: LE confirmed an order has been placed for a second screen and it is expected to be on site late October and before the upcoming peak season.

CCC update on the 21 June 2023 report and subsequent interim options consultation

David McArdle (CCC staff) clarified there are two separate workstreams currently underway and staff will present options for both to Council in December for a decision on both to be made together:

1. Long term solution procurement process.
2. Exploring interim options until the new long-term solution is operational.

The 21 June report focused on exploring the interim options with staff spending two months investigating 23 alternative locations and 20 different processing options. From the report Council resolved to engage with the community and mana whenua on the below three shortlisted options:

1. Sending kerbside organics (KSO) to alternative processors.
2. Sending KSO to Kate Valley Landfill.

3. Continue operating at the current site with operational improvements.

Resulting in a city-wide consultation from the end of August to the start of October. It was shared with the group that the reason for it being city wide is the decision being made impacts all residents and agreements made under the Long Term Plan. Members of the community expressed concern other residents would not care. From the discussion that followed Dawn Baxendale proposed the community members in attendance to be provided with a draft version of the consultation document and have the opportunity to provide feedback.

ECan's position as the regulator and their complaint response process

Stefanie Rixecker (ECan staff) shared her frustrations with the current and insufficient legislation in New Zealand for dust, waste and odour, whilst acknowledging they must operate within the law. Discussing ECan's work interpreting the Ministry for the Environment's lengthy Guidelines for Assessing Odour and leading the way with this nationally. Explaining the Resource Management Act and requirement of evidence to prosecute in a court of law. This led to the Smelt It app and ECan shared they have spent over \$300,000 developing it and have been happy to given the many questions asked by the community over the years. The conversation covered that ECan sought to have a period of working with CCC to test the app and the technology has allowed them to leapfrog ahead in terms of gathering data. Followed by a statement that ECan will no longer be playing nicely. Later ECan shared they would be conducting their annual compliance review in October, ahead of the peak season and hotter months.

Nathan Dougherty (ECan staff) clarified their process when they receive a complaint which included 10-minute odour assessments grading the intensity and character every 10 seconds and if odour is identified going upwind to eliminate other sources. The discussion also covered acute versus chronic odour.

Greg Brynes (ECan elected member) mentioned the ceasing of compost use on the paddocks of the Wastewater Treatment Plant (CWTP) and acknowledged progress being made from these meetings,

CCC & Living Earth current site management discussion

David McArdle (CCC staff) followed on from the earlier CCC update and set the context for this discussion as what is being done between now and December. Reassuring the community their concerns are being heard and resulting in changes, referencing the ceasing of compost use at the CWTP.

Jaco Kleinhans (LE staff) talked to the biofilter refurbishment being complete and the process that was undertaken, exploring new end markets with the CWTP no longer being used, no tailings currently being stored on site, increased screening capacity from the new screen that has been ordered, and dust monitoring procedures and independent third-party analysis. From the dust discussion Nathan Doherty offered to be a direct contact for Carol Anderson (community) regarding dust.

The topic of issues with the biofilter refurbishment and the two problematic tunnels at the start of June was discussed between Yani Johanson (CCC elected member), David McArdle (CCC staff) and

Paul McMahon (CCC elected member). The community were informed as soon as LE and CCC found out there was an issue. Carl Pascoe (Chair) summarised with the need for proactive communication with the community and not waiting until something happens.

Any questions or feedback can be sent to Bromley@ccc.govt.nz

2. Verbatim Minutes

Chair – Carl Pascoe

CCC staff – Dawn Baxendale, Lynette Ellis, Alec McNeil, David McArdle

CCC elected members – Yani Johnson, Jackie Simmons, Paul McMahon

ECan staff – Stefanie Rixecker, Judith Earl-Goulet, Nathan Doherty

ECan elected members – Greg Brynes, Genevieve Robinson

Living Earth (LE) staff – Jaco Kleinhans

Community – Andrew Walker, Daniel O’Carroll, Don Gould, Geoffrey King, Katinka Visser, Margaret MacPherson, Michael Williams, Tony Planicka, Vickie Walker

Minutes – Corey Sutton

Apologies – Bruce King, David Howie, Jolene Terrier, Max Terrier

1. Welcome and Introduction

Carl Pascoe, Chair – *Introduced the meeting.*

Shared Bruce King’s apologies and noted he is prioritising stress related health issues.

Shared Jolene and Max Terrier’s apologies and noted they had submitted written questions which will be addressed later in the meeting.

Jaco Kleinhans, LE – *Added an apology from David Howie*

Carl Pascoe, Chair – *Acknowledged progress is being made as shown in the media and there is support from the Council, as noted by Councillor Johanson, which has not previously been shown.*

Michael Williams, community – *Enquired about the progress.*

Carl Pascoe, Chair – *Assured Michael this will be explained later in the meeting.*

Michael Williams, community – *Acknowledged Bruce King and showed appreciation his 15 years of effort. Asked about a direct way to acknowledge him from the community group.*

Carl Pascoe, Chair – *Determined that is entirely a community group issue.*

2. Confirm previous meeting’s minutes

Carl Pascoe, Chair – *Assumed confirmed.*

3. Report back on actions from previous meeting

Action 1: Formal request from the community to Carl Pascoe, Chair to arrange a meeting with Chief Executive and next tier of Managers from the local authorities to meet with the residents.

Carl Pascoe, Chair – *Reiterated no abuse will be tolerated during these meetings, despite intense emotions and debating.*

Michael Williams, community – *Speaks up to confirm they can still disagree before thanking both Dawn Baxendale and Stefanie Rixecker for attending.*

Action 2: Request to the community for them to review the proposed ToR and provide any feedback to Carl Pascoe, Chair.

Carl Pascoe, Chair – *Commented tabled last meeting after being included with the agenda for that meeting and no commentary had been received since therefore moved to be accepted.*

Community - *Some members of the community said they had not seen the proposed new ToR.*

Action 3: Going forward two sets of minutes will be taken. Verbatim minutes of meeting available on request and executive summary of the minutes to be circulated.

Actioned as requested.

Action 4: CCC to share the May 2022 report to Council (with the cost breakdown to send materials to Kate Valley) with the CLG.

Actioned as requested, attached to the last meeting's minute when dispatched.

Action 5: CCC/Living Earth to arrange for an independent review of the biofilter operation.

David McArdle, CCC staff – *Offered comment and said it will be addressed in the reports later in the meeting.*

Action 6: The community asked to find out whether the plant can operate under the current resource consent with the changes have been made to process. Nathan Dougherty from ECan will arrange an independent advisor to answer this request. Bruce and Jeffery have already asked me the same question and I have chased it up.

Stefanie Rixecker, ECan staff – *Confirmed an update is due 31st August.*

Yani Johanson, CCC elected member - Commented *the consent review is possible by the last weekend of March each year and when he asked ahead of the last March deadline, he was told it is a very complicated process. The impression he took from that is that it is not possible under the Resource Management Act (RMA).*

Lynette Ellis, CCC staff – *Responds this is different to what was raised and resulted in Action 6, adding they are two different issues,*

Nathan Dougherty, ECan staff – *Confirmed legal advice is being sought.*

Q. Yani Johanson, CCC elected member – *Checked if this was an external and independent legal advice?*

A. Nathan Dougherty, ECan staff – *Yes*

Action 7: Timeline of when the second screen is arriving to be communicated to the CLG.

Jaco Kleinhans, LE – *Shared this will be addressed in the reports later in the meeting.*

4. Update on CCC resolutions regarding June 21 report to Council

David McArdle, CCC staff – *Clarified two separate workstreams;*

- 1. The procurement process to relocate the facility.*
- 2. What we do in the interim until the new facility is opened, which was the focus of the 21 June report to Council.*

Continued to explain 21 June report to Council covered wide range of options being considered until the new facility is opened. Staff spent two months investigating 23 alternative locations and 20

different processing options, and odour, implementation time, costs and other considerations for each.

From this report Council resolved to engage with the community and mana whenua on the shortlisted options:

1. Sending kerbside organics (KSO) to alternative processors. Noting there are none in the South Island that have the relevant resource consent, the only alternative processors are in the North Island.
2. Sending KSO to Kate Valley Landfill.
3. Continue operating at the current site with operational improvements.

Shared there will be a city-wide consultation starting at the end of the month and running until the start of October. The reasoning for it being city-wide is the changes will affect the whole city and agreements that have been set with the Long Term Plan. The consultation document is being finalised and we are presenting on the document to the Community Board next Thursday.

Vickie Walker, community – Expresses concern residents on the other side of city will not care.

Lynette Ellis, CCC staff – Reassured Vicky and the community that it is not a poll, we are merely collecting feedback. Continued to explain we (staff) have an obligation under the Local Government Act as staff when advising elected members to provide them with the views of the community, the facts and then they weight those up against those who are affected and the implications.

Carl Pascoe, Chair – Suggested it would be appreciated if the local community could be given an opportunity to go through the consultation document and provide their opinion on what should be included in the consultation document, such as their status in the process, being the residents most affected by the OPP.

Paul McMahan, CCC elected member – Supported the community having input and added Councillors are not looking for reasons not to close the OPP, they just have to go through the process otherwise they would open the Council up for judicial challenge.

Dawn Baxendale, CCC staff – Suggested if the draft consultation document is going to the Community Board next Thursday, that it is circulated to the community before then for feedback.

Carl Pascoe, Chair – Summarised for the group, a document is going to the wider community to consult on the options for closing the OPP, the three previously mentioned by David, and that it will be shared with this community for comment before it is finalised and goes public.

Yani Johanson, CCC elected member – Welcomed the opportunity for the liaison group to feed into the draft and commented it encourages direct involvement. Acknowledged it is a quick turnaround for staff as Council wants this resolved as soon as possible. Welcoming constructive feedback and specifically mentioned if you think the language is not plain to provide feedback on this.

David McArdle, CCC staff – Stated he would work towards sharing a draft of the consultation document with the group by Thursday which would give them a week to provide feedback. Proposed feedback is sent directly to him through the Bromley@ccc.govt.nz email account.

Continued the CCC update. In December staff will present to Council on the interim options and the long-term solution together.

Margaret MacPherson, community – Suggested CCC are stalling.

David McArdle, CCC - Reassured the community this timeline is to ensure the procurement process is robust.

Geoffrey King, community – Commented he has been sleeping in his car and that the OPP was meant to close three years ago.

Q. Carl Pascoe, Chair – Called upon Yani Johanson to comment on the timeline.

A. Yani Johanson, CCC elected member – Explained CCC are required to consult even though his preference would be to just do it. Mentioned we are still awaiting ECan's review and given the

regulatory action questioned why we are not consulting on becoming compliant. Continued to explain the interim options require significant public investment hence why the advice given has been to consult. Shared it makes sense to make both decisions simultaneously. Confirmed the CCC Councillors asked staff to consult as soon as possible as there is no perfect solution. Commented on the road to the permanent solution being long and complicated but Council is on track. Commented on the interim solution also being complicated due to contracts, the material that needs to be processed, locations and other factors. Complimented staff's work to provide options and said it is then up to Councillors to decide taking into account feedback, budget amongst other considerations.

Q. Geoffrey King, Community – Questioned the integrity of some of the Councillors and commented they are not affected by the dust.

A. Yani Johanson, CCC elected member – Responded there was a decision last week not to stay at the current site, which was near unanimous. Acknowledged it is frustrating and unacceptable how much people have suffered but things are in motion and this Council, this Mayor, are absolutely committed to moving the OPP. Mentioned the staff reports included options for the current site to reduce the impacts in the meantime. Commented in the past 12 years a lot of progress in getting a greater level of detail of understanding what's happening at the plant and when things go wrong what is being done. Stated Pattle Delamore Partners identifying cases of offensive and objectionable odour is objective evidence that the OPP needs to move. Credited staff for conducting independent monitoring. Asked to be judged when we make those decisions in December.

Margaret MacPherson, community – Shared her appreciation for Yani's efforts.

Q. Don Gould, community – Asked through the Chair if rates implications would be stated in the consultation document?

A. David McArdle, CCC staff – Yes, as both a dollar figure and a percentage increase, both over a five-year period, against a baseline of the current operation.

Don Gould, community – Raised concerns that any rise in rates for those not effected will not induce empathy.

Jackie Simmons, CCC elected member – Responded Council and staff have an obligation to provide context for different impacts.

Q. Will feedback from the consultation be provided to the community?

A. Yes, the results will be made public along with analysis and reporting on the results.

Q. Will the community have the opportunity to have input on how that feedback is provided?

A. Still to be decided but we will aim to keep open communication with the community.

5. Resident lived experiences since last meeting including the Geoffrey King odour report

Geoffrey King, community – Did not bring the report or provide to the Chair. Questioned ECan on during June there was 19 complaints made but only one visit made to verify.

Stefanie Rixeter, ECan staff – Acknowledged this is not the first time she has interacted with the community on this matter, having met Bruce (acknowledging his apologies) and Geoffrey.

As a regulator stated, "as Minister Parker has heard me on this", it is utterly infuriating that settings in this country for dust, waste and odour are insufficient and that she agrees with the community. However, they must work within the law, even if she disagrees with it.

Explained there is a guide to assessing odour, which is equivalent to “not just a doorstep but five bibles stuck together”, and that ECan have done more to read and interpret the guide than any other Council up and down the country. Frankly others are waiting for us to see how it goes as no one else wants to test it. She has been working to understand, before she was Chief Executive and Director of Science at ECan, how to determine if there is odour.

Explained the RMA requires if they were to go to court to prosecute evidence is required as proof and beyond reasonable doubt, like a criminal conviction. Stated no one in New Zealand has used any app to prove this and Smelt It has allowed them to leapfrog ahead thanks to technology. As a Council they have spent over \$300,000 developing this app and they were happy to because of the questions the community have raised over the many, many years. Explained ECan sought to have a period of time of working with CCC to test the app in order to gather data. Stefanie stated ECan had to draw a line in the sand and say they are “no longer playing nicely”. Acknowledged this is difficult as the community are all ratepayers for both Councils. Shared they are learning as they go and acknowledged mistakes have been made.

Commented they are relatively small team but with the largest geographical region, and the same team has to prioritise and effectively triage dead fish in rivers, oil pollution, any other spills within rivers across the region, and rural issues. Resulting in her response team having a list of items and then they go out as quickly as they can.

Q. Michael Williams, community – *Questioned why have resource consents if you can't enforce them?*

A. Steffanie Rixecker, ECan staff – *Acknowledged that it was a good question of our government and a good question of the RMA. Referred to the consent that odour shall not exceed the boundary. Shared they would like to show empathy but are bound by the law.*

Q. Michael Williams, community – *Asked what would be considered a reasonable number of complaints?*

A. Steffanie Rixecker, ECan staff – *Responded there is no single number and talked about the difference between acute and chronic odour because that is part of what they need to prove.*

Jackie Simmons, CCC elected member – *Expressed her frustration through the Chair.*

Nathan Dougherty, ECan staff – *Explained the process when they receive a call, they review it against a range of other issues. Perhaps the officer will attend the location where the call was received from and, expanding on Steffanie's acute versus chronic comment, ascertaining if its continuing. If it is not continuing and its low, it's disappointing but not necessarily worthwhile continuing to pursue. If there is a hint of odour it is likely the officer will conduct a ten-minute assessment grading the intensity and character of the odour every ten seconds, either electronically or using an assessment sheet. If reoccurring and scoring a three out of six, known as “Distinct”, this could lead to the odour being charged as offensive. If limited or fleeting, then it cannot be graded as offensive. Once completed and if an odour source has been identified you then have to go upwind to eliminate other odour sources and characterise them, in accordance with the Ministry for the Environment guidelines.*

Q. Geoffrey King, community – Asked if Notice of Non-Compliance can carry a fine of up to \$600,000 and/or up to \$10,000 per day for breaching the consent?

A. ECan – Responded these amounts can be set in court but this has not gone to court yet.

Greg Brynes, ECan elected member – Discussed when he came to see Geoffrey over Christmas and material was being spread by Breezes Road roundabout and the smell was sickening on hot days. Acknowledged a benefit of these meetings is that the Council has stopped spreading material over that area.

Mentioned Paul has been good on social media and posting when there has been odour, and there has been times when he went down on his push bike and the odour has been quite different in the space of 20 to 30 minutes. From his view it certainly has improved where he lives which to him has been a positive outcome. Greg did acknowledge he does not live as close as Geoffrey though.

Stefanie Rixecker, ECan staff – Added they have no intention of stepping away and plan to continue being committed to the cause.

Commented ECan will be conducting their annual compliance review in October, particularly before the warmer season.

Acknowledged she is aware of the impact as Geoffrey texts her every time and she shares the texts with the team.

Commented further even as the prosecutor it must be reviewed by a team. ECan want more power to prosecute to prevent this kind of thing happening. Mentioned it is deemed a criminal matter and those responsible can be sent to prison. Clarified when they do prosecute, she is the only person who signs off a prosecution on behalf of ECan.

Yani Johanson, CCC elected member – Raised ECan's timing of providing feedback on the consent review by the 31st of August and Council opening the consultation on the 30th of August.

Stefanie Rixecker, ECan staff – Responded that from their perspective, they respect that Councillors have made decisions and created resolutions and asked staff to take certain actions, we wouldn't want to get in the way of that. We can certainly take that on board and to be honest there's nothing stopping anyway from putting information out alongside the consultation document.

6. Living Earth & CCC discuss current site management and suggested processes moving forward

David McArdle, CCC staff – Followed on from what was discussed previously about decision being made in December, discussed what action is being taken until then. As previously raised by ECan, as of June no more compost is being sent to the Wastewater Treatment Plant (CWTP) and spread on the paddocks there. As part of that process, we are now finding alternative end markets for the product. You can take away from the CLGs that we are listening. Your concerns are being heard and resulting in changes.

Q. Community – Where is it being stored now if it's not being taken to the CWTP?

A. David McArdle, CCC staff – Confirmed it is still temporarily being stored on site and moved off site once sold to customers. It's just sold to different customers now.

Jaco Kleinhans, LE – Continued the update.

Confirmed the biofilter refurbishment is complete with the final layer of biofilter media added two weeks ago.

Expanded on now sending the product to the on market which includes larger customer such as horticulture and viticulture. Explained this does present operational challenges as wet weather impacts their ability to take the product as they cannot access the paddocks.

Currently no tailings on site as consumed or removed from site all tailings.

Shared LE have placed an order for an additional screen to double screening capacity for the peak season.

Q. Michael Williams, Community – Asked Jaco if he is confident the OPP will be able to process what's coming in for the next peak season?

A. Jaco Kleinhans, LE – Answered the additional screening capacity will allow him to screen quicker and should result in less product on site waiting to be screened. The next challenge is making sure the product has somewhere to go. Confirmed LE are working on this now to line up orders for the Christmas period when truck drivers, like everyone else, take leave and shut down.

Lynette Ellis, CCC staff – Added Jaco, David and the team are working hard to have those solutions in place beforehand and having learned from the lessons from last season.

Q. Carl Pascoe, Chair – Raised a question submitted from Jolene and Max who could not attend tonight; will the new screen be enclosed?

A. Lynette Ellis, CCC staff – This is part of the consultation material and one of the options being consulted on.

The topic of dust and dust monitoring was raised.

Jaco Kleinhans, LE – Responded LE engage an independent third party to conduct their dust analysis and their reports are within the consent limits. The dust monitors are buckets containing filters which are placed downwind of the OPP. The filters are removed and analysed.

Q. Don Gould, community – Asked if electronic dust monitoring is available?

A. Jaco Kleinhans, LE - No

Carol Anderson, community – Mentioned dust on her patio and Nathan had agreed to visit six months ago but has not.

Q. Carl Pascoe, Chair – Asked Margaret if she is getting dust on her patio?

A. Margaret MacPherson, community – Yes, my concrete patio just goes black.

Paul McMahon, CCC elected member – Requested someone from ECan goes to look at Margaret's patio.

Carol Anderson, community – Commented it is too late as it has already been spray washed.

Q. For the peak period is it possible to send everything to Kate Valley Landfill?

A. Lynette Ellis, CCC staff – Replied this is one of the options being proposed in the consultation. Explained Kate Valley Landfill cannot currently take all of CCC's KSO due to limits on truck movements on their resource consent with Hurunui District Council. We have discussed the possibility with Waste Management, but it is Transwaste's consent, and they manage it.

Yani Johanson, CCC elected member – Suggested at the next meeting it would be good for the community to hear about the work being done to find solutions for the upcoming peak season.

Q. Requested a point of contact at ECan for Carol.

A. Nathan Doherty, ECan staff – Volunteered himself to be the point of contact for Carol.

Q. Margaret MacPherson, community – Asked if there was any research done into what people should put into their green bin?

A. Carl Pascoe, Chair – Proposed this information is captured in the consultation document.

Further discussion around bin sizes and again Carl proposed this information is captured in the consultation document.

Waimakariri District Council's KSO was discussed, and Lynette confirmed there is a contract in place for the OPP to accept the material as they do not have a facility to process it themselves. Carl summarised it as a business transaction which would stop if it needed to.

Q. Carl Pascoe, Chair – Raised Jolene and Max's last question; at the last meeting was it said piles were left outside and became anaerobic if they aren't moved fast enough to the screen?

A. Jaco Kleinhans, LE – Clarified he said there is a risk they can go anaerobic and that is why they keep moving the piles to keep them aerated.

Q. Don Gould, community – Questioned how the piles are moved?

A. Jaco Kleinhans, LE – Front end loaders

Q. Geoffrey King, community – Asked for more information about the biofilter rebuilt.

A. Jaco Kleinhans, LE – Confirmed it was rebuilt. Then further explained the biofilter media/material is removed every three years and the floor is then inspected before new material is added back. They found damage to the floor which you cannot see when there is 1.3 metres of material on top. So the decision was made to remove and rebuild the floor in two by four wooden sections, and this was done in two sections.

Q. Geoffrey King, community – So it isn't new technology, "it's still the same World War One technology?"

A. Jaco Kleinhans, LE – Confirmed it was rebuilt to the original design.

Vickie Walker, community – Commented the community were unaware.

Jaco Kleinhans, LE – Added the full replacement was brought forward one year and done in winter being the low season.

Lynette Ellis, CCC staff - Continued the biofilter discussion and mentioned at the last meeting we committed to an independent review of the newly refurbished biofilter. We needed to let the new material settle and microbe growth to reestablish. Now this has been completed in the past two weeks the review has been scheduled and we'll pass on feedback to the community once more information is available.

Jaco Kleinhans, LE – Added data points need to be built up for the review.

Q. Carl Pascoe, Chair – Raised another question from Jolene and Max; how long does it take the biofilter to be fully functional after it's been rebuilt?

A. Jaco Kleinhans, LE – Explained the biofilter refurbishment was completed in two sections, with one section functioning whilst the other is refurbished. Therefore, the biofilter remained functional throughout.

Q. Yani Johanson, CCC elected member – Asked if the community were notified when there were issues with the biofilter refurbishment?

A. David McArdle, CCC staff – Council sent an update to the community as soon as they found out there was an issue with the biofilter refurbishment, and the compost being produced.

Paul McMahon, CCC elected member – Added the update was once there was issues, not proactively about the work being completed.

Carl Pascoe, Chair – Summarised there has been a theme throughout about the need to be proactive with the community and not wait until something happens.

11. Concluding remarks – Chair

Carl Pascoe, Chair – Shared his appreciation for a civilised and direct meeting, and his opinion that it had been one of the better meetings. Thanked everyone for their contribution. Shared he will be away in Scotland for September and back in November for the next meeting.

Organics Processing Plant Community Liaison Group Meeting

CCC CLG meeting report

6:30pm to 8pm, Tuesday 12 December 2023

Waitai-Coastal-Burwood-Linwood Community Boardroom

180 Smith Street, Woolston, Christchurch 8062

Short term options consultation results

As many of you will be aware, public consultation on five short-term options for managing kerbside organics was held from Wednesday 30 August to Sunday 1 October with 2,764 submissions received.

We received 76 submissions from Bromley residents with 41% indicating Option 2, sending organics to Kate Valley Landfill, as their first preference. Option 5, partial processing of material at the plant, was identified as the first preference for 34% of Bromley respondents. While more Bromley submitters supported the Kate Valley option as their first preference, the partial processing option received the highest ranking overall, indicating that Option 5 was still favourable among Bromley submitters.

Overall, 51% of submitters ranked Option 5 (partial processing of material at the plant) as their first choice out of the five.

Feedback from submitters highlighted concerns about the environmental and financial impacts of the various options, with many acknowledging the impacts that odour has had on some nearby residents.

33 submitters took the opportunity to speak to Council on their submission on Wednesday 8 November.

Short term report to Council, 6 December 2023

This report recommended a short term options involving two stages of organics processing.

The first stage would see kerbside organics being processed indoors at the OPP in Bromley. This involves mixing organics with garden waste, shredding the material, then moving the material into the composting tunnels.

Partially composted material would then be loaded into trucks directly from the tunnels inside the processing hall and transported to Kate Valley Landfill. Once at Kate Valley Landfill, the second phase of processing would occur with material matured in outdoor rows, screened and then sold to the market. This process could be implemented by April 2024.

“This recommendation takes into consideration feedback from the community, the risk of offensive and objectionable odour affecting the local community, and the environmental, financial and other impacts used to assess the options as part of the consultation,” the report says.

The second stage of processing at Kate Valley Landfill couldn't occur before April 2024 because Waste Management, who operate the site, require a change to their resource consent to allow for the additional daily truck movements to the site.

In the meantime, organics would continue to be processed at the Bromley plant. Work has been underway this month to clear existing material stored outside on-site. The material is being transported to Kate Valley to be used as landfill capping, with work expected to be completed by the end of December.

If the recommended option is approved, it is estimated to cost an additional \$276,000 per year. This would be funded through existing budgets, where possible.

Noting this agenda has been approved for release before the 6 December Council meeting. We will discuss details of the decision at the 12 December CLG meeting.

Long term solution report to Council, 6 December 2023

This report, and subsequent discussion, on the long term processing solution was closed to the public due to commercial sensitivity, but details of the decision were released afterwards.

Noting this agenda has been approved for release before the 6 December Council meeting. We will provide and discuss details of the decision at the 12 December CLG meeting.



Living Earth's Organics Processing Plant Community Liaison Group Report

August 2023 to October 2023

Prepared by: Jaco Kleinhans

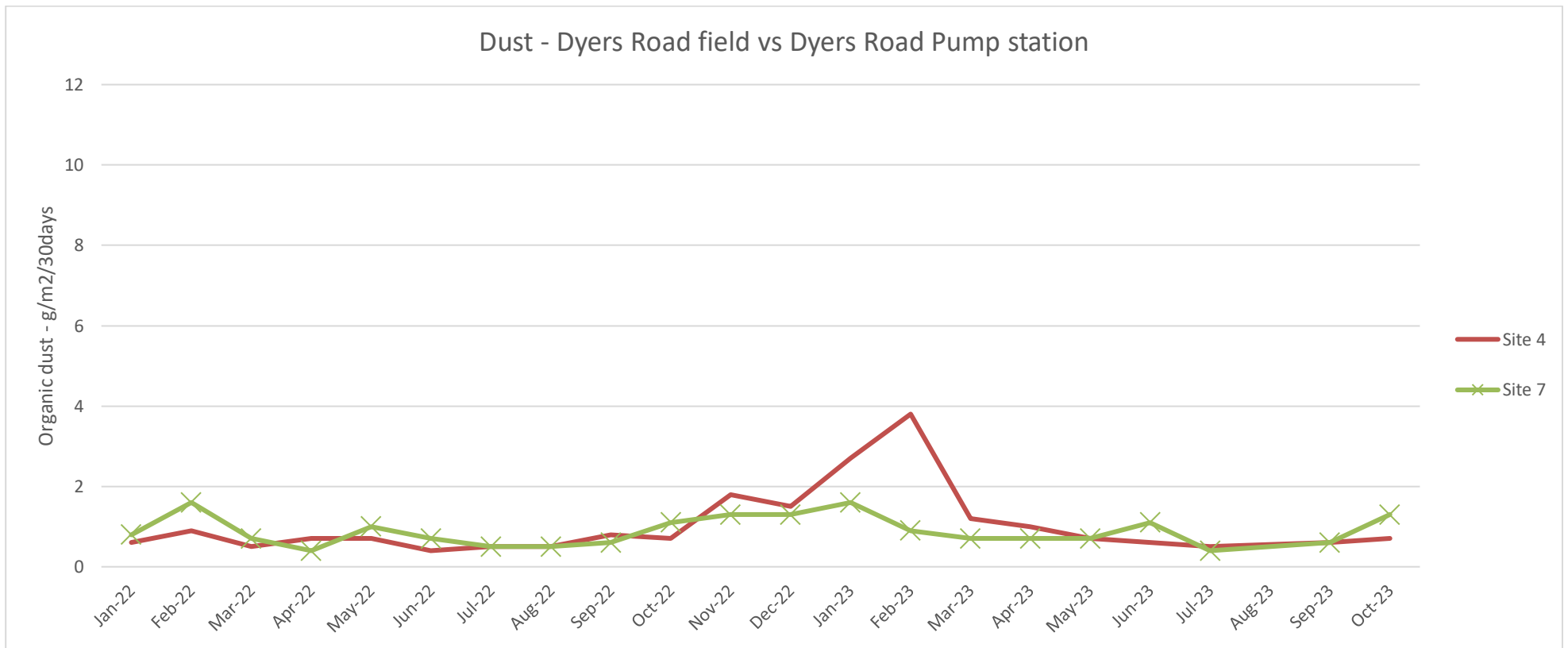
27 November 2023

The consent conditions of CRC 080301.1 are detailed in this report and comments are provided on the status. Key matters are discussed below:

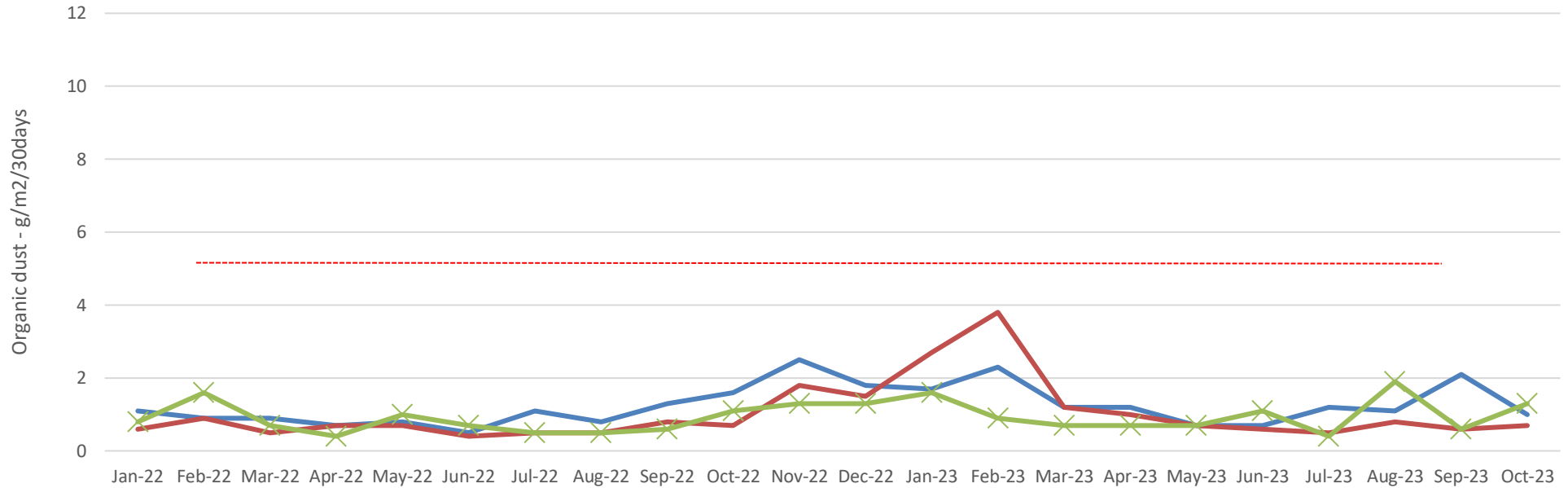
Dust (c25)

No dust complaints received during this period.

We have two deposition gauges located along Dyers Road. One is situated in a field North of Metro Place (Site 4 (control), upwind of the Organics Processing Plant (OPP)) and the other is at the old pump station near the end of Maces Road (Site 7, downwind of the OPP and near the residential area of Bromley).



Dust - Background vs Dyers Road Pump station



	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
Site 1	1.1	0.9	0.9	0.7	0.8	0.5	1.1	0.8	1.3	1.6	2.5	1.8	1.7	2.3	1.2	1.2	0.7	0.7	1.2	1.1	2.1	1
Site 4	0.6	0.9	0.5	0.7	0.7	0.4	0.5	0.5	0.8	0.7	1.8	1.5	2.7	3.8	1.2	1	0.7	0.6	0.5	0.8	0.6	0.7
Site 7	0.8	1.6	0.7	0.4	1	0.7	0.5	0.5	0.6	1.1	1.3	1.3	1.6	0.9	0.7	0.7	0.7	1.1	0.4	1.9	0.6	1.3

Offsite dust monitors 4 and 7 located along Dyers Road and downwind of the site.

Dust monitors located closer to the site boundary and on site remained well below the 4g/m²/30 consent limit for the period.

Dust control and monitoring procedures remains in place.

Boundary plantings (c25)

Clear buffer zone created and maintained on-site. Perimeter replacement trees planted and maintained.

Odour (c27/c14)

No Infringement Notices issued for odour during this period.

Ongoing site odour assessment conducted by staff with calibrated noses and proactive odour assessments completed by external odour consultant Pattle Delamore Partners.

On-site operations

1. Heavy metal contamination levels reduced and is back within limits.
2. Biofilter refurbishment review complete with applicable recommendations implemented.
 - a. Ongoing monthly monitoring of back pressure, PH, moisture and media levels.
 - b. Changes to the media will be made as required.
3. Peak season plan implemented,
 - a. Material outside the OPP is screened for the on market.
 - b. Excess tailings are carted off site daily to maintain minimum levels.
 - c. Material from the tunnels is carted to Kate Valley as part of the top cover project.
 - d. We are working on clearing the outside material by the end of December 2023. Once the site is cleared material from the tunnels will be hauled off site directly.

RMA Authorisation Number: **CRC 080301.1**

Description		Compliance (Y/N)	Findings Comments & Problems
1	The discharges shall be only odour and dust from an organics processing plant and green waste composting facility located at 40 Metro Place, Bromley, Christchurch at map reference NZMS 260 M35: 8627-4087 and indicated as "Applicant's Site" on plan CRC080301A attached as part of this consent.	Yes	No discharge except odour and dust occurs from the facility other than storm and wastewater that are covered under different consents.
2	The organics processing plant shall process not more than 90,000 tonnes of organic material per year.	Yes	The plant operates under the set limit.
3	The discharges of odour and dust shall only occur from the following sources: <ul style="list-style-type: none"> a. From construction activities associated with the establishment of the organics processing plant; b. From an odour extraction system on the process building that discharges to air via biofilters; c. From composting of organic material in managed windrows; and d. From screening, blending, packaging and stockpiling of matured compost. 	Yes	<ul style="list-style-type: none"> a. n/a during this period b. Activity was undertaken during this period c. Activity was undertaken during this period.
Construction of Organics Processing Plant			
4	The consent holder shall provide to the Canterbury Regional Council a Construction Management Plan to be submitted for approval before commencement of the works on site that includes but is not limited to the following requirements: <ul style="list-style-type: none"> a. Regular watering of dusty surfaces during dry windy conditions; b. Restricting traffic speed within the site to less than 15 kilometres per hour; c. Covering loads of excavated soil whenever visible dust occurs from this source; d. Locating stockpiles in areas that are less likely to be affected by prevailing winds and at least 50 metres from boundaries; and e. Stabilisation of exposed areas as soon as possible after work is completed. 	Yes	No construction during this period
Organics Processing Plant			
5	The consent holder shall provide to the satisfaction of the Canterbury Regional Council a Facilities Operation Manual before operating the organics processing plant.	Yes	A copy was provided in 2012 as required under the consent.
6	The material processed shall only include the following: <ul style="list-style-type: none"> a. Green waste; b. Food waste; and c. River weed. 	Yes	No other items are accepted.
7	Organic waste containing putrescible material {food waste} shall be processed in a tunnel compost system contained within the process building.	Yes	All kerbside organics collection vehicles are emptied inside the processing hall and processed in the tunnels.

8	Organic waste not containing putrescible material may be composted in managed windrows.	Yes	
	Tunnel Compost System		
9	The tunnel compost system shall consist of a process building, outdoor uncovered windrows and screening and stockpiling.	Yes	
10	The process building shall: <ul style="list-style-type: none"> a. House all receiving, shredding and blending of organic waste that is to be composted in the tunnel composting process; and b. Be operated under a negative pressure system with all discharges to air being treated via a biofilter. 	Yes	<ul style="list-style-type: none"> a. All receiving, shredding, and blending of materials is completed in the process hall before being loaded into tunnels. b. The negative pressure of the biofilter fan (tunnel exit) is typically maintained at -100Pa and monitored via a computer control system.
11	The incoming organic material shall be placed into the tunnel composting system on a daily basis within 24 hours of receipt.	Yes	This is completed. OPP operates on public holidays in line with the kerbside collection trucks. We are open and processing on all days that collection occurs.
12	The tunnel composting process shall have a duration of not less than seven days, which includes an allowance of up to half a day for tunnel emptying, cleaning and filling. During the tunnel composting process, the temperature of all the compost shall be maintained at greater than 55 degrees Celsius for a minimum of three continuous days or less at higher temperatures, so that pathogen destruction has occurred in compliance with New Zealand Composting Standard NZ4454. At the same time or after the tunnel composting process, the compost shall be aerobically treated for 14 days or longer, during which time the temperature must always be over 40 degrees Celsius and the average temperature must be higher than 45 degrees Celsius.	Yes	During this period typical time was 16 days in the tunnel.
13	Records shall be maintained showing compliance with Condition (12). Such records shall be available to Canterbury Regional Council on request.	Yes	Reports were recorded via a computer control system recording time and temperature.
14	The maturation composting stage shall be an uncovered windrow system that allows the process to meet Condition (27) of this consent.	Yes	
	Greenwaste Windrow Compost System		
15	Organic wastes not containing putrescibles are to be shredded, blended and formed into windrows within 24 hours of receipt.	Yes	
16	Any organic waste which contains putrescible material is to be redirected into the tunnel composting system.	Yes	
17	Not more than 30,000 tonnes per annum of green waste shall be composted in full in the outdoors windrows.	Yes	
18	The uncovered windrows shall meet the following criteria: <ul style="list-style-type: none"> a. The windrow shall be maintained in an aerobic state throughout; and b. The state of the windrows shall be monitored for oxygen, temperature and moisture as follows (and records retained): 	Yes	

	<ul style="list-style-type: none"> a. Oxygen: Weekly for the first four weeks after the row is constructed and thereafter if the row is suspected of turning anaerobic; b. Temperature: Weekly; c. Moisture Content: Every second day 		
	Odour Extraction System – Organics Processing Plant		
19	The odour extraction system on the process building shall be designed by a person competent in this area of technology to industry best practices.	Yes	n/a during the period
20	The odour extraction system shall be of sufficient capacity to prevent any fugitive discharge of odours from the process building under all operating conditions.	Yes	n/a during the period
21	The discharge shall exhaust via a biofilter with an average loading of not greater than 80 cubic metres of air per hour per cubic metre of bed material	Yes	Biofilter size 20.7m x 42.5m size. Maximum airflow ex fan is 90,000m ³ /hr. If media is > 1.17m deep, then 80m ³ /hr/m ³ of media cannot be exceeded. Bed depth is typically 1.3 – 1.5m. fan speed typically <90% of max. The fan can be limited in the control system to maximum speed as required. Fan operation is measured, controlled, and monitored by a computer control system.
22	The odour extraction systems shall operate at all times during processing of raw materials or products.	Yes	Operates 24/7 and is monitored by a computer system.
23	<p>The bio filters shall be maintained in such a way as to effectively reduce odours from the organics processing plant so Condition (27) is met. This shall include but not be limited to:</p> <ul style="list-style-type: none"> a. Maintaining satisfactory moisture levels in the biofilter. b. Maintaining an appropriate pH range, typically 4 to 8. c. Maintain aerobic conditions at all times. d. Replace the biofilter media at an appropriate time, determined when any of the above operating parameters, odour levels, or, airflow backpressure are unable to be maintained within their operating limits. 	Yes	<ul style="list-style-type: none"> a. Moisture tested for the period is 62% b. pH recorded in for this period 6.6 c. Oxygen levels >20% d. Back pressure monitored for bed media condition.
	Dust Control		
24	<p>The consent holder shall implement the following measures to minimise the generation and discharge of dust:</p> <ul style="list-style-type: none"> a. Use water sprays with any mechanical handling of compost when conditions are likely to generate dust. b. Provide an impervious base to all outdoor composting areas. c. Limit the height and slope of outdoor piles to less than five metres in height. d. Bulk carriers removing material from site shall be covered. e. Use water tankers and/or sprinklers to dampen down areas of heavy vehicle access when wind speed exceeds five metres per second (five-minute average) during dry conditions. 	Yes	<ul style="list-style-type: none"> a. Misterters and water trucks are used b. Site is asphalt sealed c. Input piles are under 5m in height d. Bulk loads covered e. Monitored on-site, data reported each minute.

	<p>f. Suspend all product load-out and windrow turning operations during dry conditions when the wind speed measured by the on-site meteorological station, blowing from between 10 degrees and 130 degrees, exceeds 10 metres per second for two consecutive five-minute averages. Recommencement of load-out and windrow turning operations may occur if recorded wind speeds from that sector are less than 10 metres per second for two consecutive five minute averages.</p>		
25	<p>a. Within 12 months of this consent coming into effect the consent holder shall establish and maintain suitable tree windbreaks around all areas where compost is stored.</p> <p>b. Notwithstanding condition 25(a), a further line of tree shelter shall be established along the boundary with Affordable Storage Limited and the boundary with Dogwatch Sanctuary Trust, to fill in gaps in the existing tree shelter plantings where establishment or growth has been poor such that a continuous shelter belt more than 1.8 metres high has not been formed. These additional shelter trees shall be planted within six months of commencement of the change to conditions. All shelter trees shall have a minimum height of 1.8 metres and shall be maintained and irrigated until they reach a height of at least five metres. Any dead, diseased or damaged trees shall be replaced immediately. The trees shall be protected from the prevailing wind during at least the initial three years of establishment of the trees by wind cloth fencing or similar in order to optimise tree growth.</p> <p>c. A plan showing planting and landscaping works to be undertaken to comply with Condition 25(b) shall be prepared by a suitably qualified person and shall be submitted to the Canterbury Regional Council within three months of commencement of the change to conditions.</p>	Yes	The open area is regularly cleaned.
26	On-site vehicle speeds in the outside windrow, compost storage and compost screening areas shall be restricted to not more than 15 kilometres per hour. A sign, capable of being read at a distance of five metres, shall be erected at the main vehicle entrance to the outside storage area to inform all drivers of this requirement.	Yes	Signs in place, all drivers, and contractors inducted with specific mention made of consent compliance.
27	The discharges to air shall not cause odour or dust which is offensive or objectionable beyond the boundary of the site on which this consent is exercised.	Yes	No Infringement Notice issued for this period.
28	Notwithstanding Conditions 24 and 27, all product load-out, heavy vehicle operation and windrow turning activities shall cease at any time when these activities cause visible suspended particulate matter beyond the western site boundary, including at properties occupied by Affordable Storage Limited, Dogwatch Sanctuary Trust or their successors.	Yes	Monitored daily. Reduced operational area, lined with water cannons and misters.
29	<p>The consent holder shall maintain records of any odour or dust complaints received by the consent holder. These records shall include:</p> <p>a. Location of complainant when odour or dust was detected;</p> <p>b. Date and time of odour or dust detection;</p> <p>c. Weather conditions, including wind direction, at the composting facility when odour or dust was detected;</p> <p>d. Strength of the odour complained of, assessed on a scale of 1 to 5 by the complainant with the following rating system: 1 odour noticeable but not persistent; 2 odour clear and persistent; 3</p>	Yes	Complaints made to Environment Canterbury are recorded by Environment Canterbury.

	<p>odour unpleasant and persistent; 4 odour strong, offensive and persistent; 5 odour very strong and offensive.</p> <p>e. The amount of dust complained of, assessed on a description of the visible quantities and extent of dust deposits on a scale of 1 to 5 by the complainant with the following rating system: 1 noticeable and not extensive; 2 clear and minor coverage; 3 nuisance and moderate coverage; 4 objectionable and extensive coverage; 5 significant extensive deposits, offensive. A description of the appearance of the dust shall also be recorded;</p> <p>f. Any possible cause for the odour or dust complained of; and</p> <p>g. Any corrective action taken.</p> <p>Records demonstrating compliance with the above condition shall be provided to the Canterbury Regional Council on request and shall be summarised as part of the Annual Environmental Report required under Condition 36.</p>		
	Monitoring		
30	<p>The consent holder shall undertake site-boundary odour assessments at least once per day, in a manner consistent with Work Instruction WI30 Issue 6, dated 1 September 2010, submitted with the application, or an equivalent later document. These assessments shall occur at no fewer than eight locations around the site boundary, including at least one location downwind of the composting tunnels and the maturation windrows. In the event of strong odours being detected, that may create adverse effects beyond the site boundary, then the consent holder shall take all practicable efforts to mitigate the odour using measures that may include the use of masking agents, capping the source, and returning odorous material to the tunnels. Records shall be kept that include the date and time of the assessment, meteorological parameters at the time, odour descriptions and odour intensities at each monitoring location. Staff members responsible for these assessments shall have calibrated noses, determined by suitably qualified persons at an accredited laboratory. These staff members shall be recalibrated for odour sensitivity at least once every three years.</p>	Yes	Completed.
31	<p>The consent holder shall, prior to unloading a tunnel, undertake an odour assessment of the compost material, in a manner consistent with Work Instruction WI4 Issue 6, dated 1 September 2010, submitted with the application, or an equivalent later document. In the event of strong odours being detected, that may create adverse effects beyond the site boundary, then the consent holder shall return the assessed material to the tunnel and shall not empty the tunnel until it has been determined that the material is no longer odorous to the point where it may create an adverse effect beyond the site boundary. Staff members responsible for these assessments shall have calibrated noses, determined by suitably qualified persons at an accredited laboratory. These staff members shall be recalibrated for odour sensitivity at least once every three years.</p>	Yes	Odour assessments are completed on a continuous basis when tunnels are being emptied.
32	<p>a. At all times during exercise of this consent, wind speed and wind direction shall be measured by an anemometer established on the site.</p> <p>b. The anemometer shall be installed at a height of at least five metres above ground level at a location free from any obstruction that has potential to significantly affect wind flow.</p>	Yes	Weather station located on site.

	<p>c. Wind speed resolution of measurement shall be not more than 0.1 metres per second and wind speed accuracy of measurement shall be at least within +/-0.2 metres per second.</p> <p>d. The anemometer shall be established, located and operated to the satisfaction of the Canterbury Regional Council.</p> <p>e. Wind speed and direction shall be continuously recorded with an averaging time for each parameter of not more than five minutes.</p> <p>f. These data shall be:</p> <p>(i) recorded using an electronic data logging system; and</p> <p>(ii) provided to the Canterbury Regional Council upon request.</p>		
33	<p>a. Dust deposition monitoring shall occur in at least two dust gauges sited near to the boundary with Affordable Storage Limited or successor and the boundary with Dogwatch Sanctuary Trust or successor and at least one further control dust gauge. The location of the dust deposition gauges shall be determined by a suitably qualified person and shall be provided in writing to the Canterbury Regional Council. The method of monitoring shall be ISO DIS-4222.2 or a similar method to the satisfaction of the Canterbury Regional Council. Samples shall be collected monthly and the monitoring results shall be included and summarised in the Annual Environmental Report required under Condition 36.</p> <p>b. Dust control measures shall be implemented to maintain the rate of dust deposition at the consent holder's boundary, measured in accordance with Condition 33(a), at less than 4g/m²/30 days above the background concentration measured at the control site. Any exceedance of this trigger level shall be reported to the Canterbury Regional Council, including the likely reasons for exceedance and any remedial action undertaken.</p>	Yes	A total of eight dust gauges are used as controls (2), onsite (3) and offsite (3). Offsite gauges are in the immediate neighboring properties, and these are used to monitor compliance against this consent.
	Management Plan		
34	<p>(a) The consent holder shall prepare and implement an Environmental Management Plan (EMP) that addresses the control of discharges to air from the site.</p> <p>(b) The EMP shall be prepared and provided to the Canterbury Regional Council: attention: RMA Compliance and Enforcement Manager, within three months of the granting of this consent variation and within one month of the completion of annual reviews.</p> <p>(c) The EMP shall be reviewed annually.</p> <p>(d) The EMP and any revisions shall include all measures necessary to achieve compliance with the conditions of this consent.</p> <p>(e) The EMP shall include, but not be limited to:</p> <p>a. A description of the dust and odour sources on-site;</p> <p>b. The methods to be used for controlling dust and odour at each source;</p> <p>c. A description of consent and monitoring requirements;</p> <p>d. A system of training for employees and contractors to make them aware of the requirements of the EMP; and</p>	Yes	

	e. Identifying staff responsible for implementing and reviewing the EMP.		
	Community Liaison Group		
35	<p>a. Within one month of the commencement of the change of conditions, the consent holder shall invite local residents and interested people to attend a meeting to establish a Community Liaison Group. The invitation to attend and establish a Community Liaison Group shall be extended to include:</p> <p>(i) all property owners and occupiers with boundaries adjoining, or but for the presence of roads, with boundaries immediately next to the site; and</p> <p>(ii) all parties who made a submission on the application to change consent conditions.</p> <p>b. A representative of the consent holder shall attend all meetings of the Community Liaison Group. The Canterbury Regional Council shall be invited to send a representative to attend all meetings.</p> <p>c. The consent holder shall ensure that members of the Community Liaison Group are provided with the opportunity and facilities to meet at least once every three months.</p> <p>d. The main purposes of the Community Liaison Group shall be to:</p> <p>a. Identify and address any adverse effects of discharges to air from the site, including possible remedial action; and</p> <p>b. Discuss the results of all monitoring and reporting required under this consent.</p>	Yes	Ongoing Community Liaison Group meetings are held as required, including this meeting.
	Reporting		
36	The consent holder shall, no later than the 30 th of June of each year, provide an Annual Environmental Report to the Canterbury Regional Council setting out all monitoring and reporting results required by conditions of consent and their interpretation by an appropriately qualified person, including dust deposition monitoring and complaints recording undertaken in relation to this consent over the previous period. Where the result of any test or monitoring undertaken in relation to this consent exceeds the relevant limit/trigger level or does not comply with the relevant condition, then the steps that were taken to rectify the non-compliance shall be specified.	Yes	The Annual Environmental Report (AER) for 2022/2023 report submitted.
	Administration		
37	This consent shall not be exercised concurrently with CRC930514.	Yes	
38	<p>The Canterbury Regional Council may annually, on or about the last working day of March each year, serve notice of its intention to review the conditions of this consent for the purposes of:</p> <p>a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent; or</p> <p>b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or</p> <p>c. Complying with the requirements of an operative regional plan.</p>	Yes	

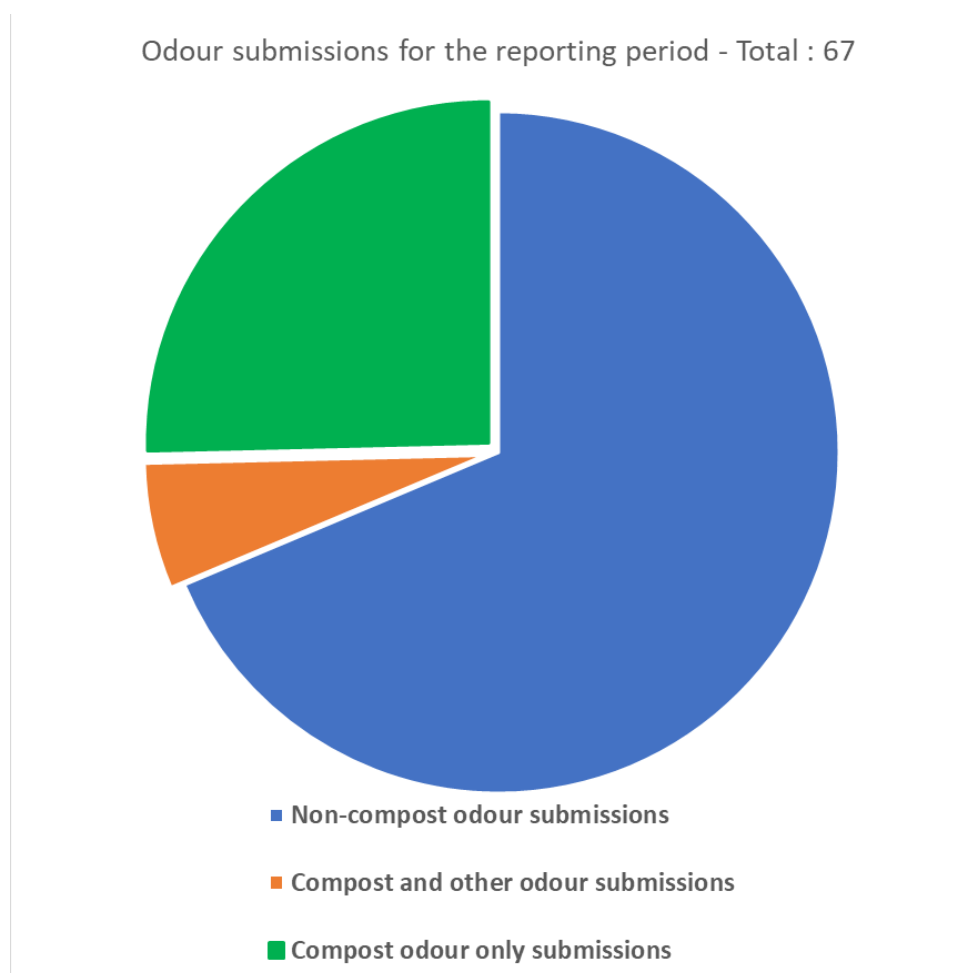
Environment Canterbury Odour and Dust Report August 2023 – November 27, 2023

(Prepared for the Community Liaison Group meeting 6 December 2023)

Odour Monitoring – August to October 2023

A total of 19 incidents regarding compost odour were logged with Environment Canterbury during the standard reporting period of August – October 2023. There may be multiple Smelt Its assigned to one incident for administration purposes.

In the standard reporting period of August – October 2023, Environment Canterbury received a total of 67 Smelt It submissions. Of these 67 submissions, 21 reported a compost odour, along with other characteristics. Submitters often mention a range of other odour types, making it difficult for Environment Canterbury to determine the source. Of these 21 submissions, 17 reported the odour as having a compost only characteristic.



During the standard reporting period of August – October 2023, 6 assessments were carried out by Warranted Officers in Bromley. Officers did not detect odour on any of these assessments.

Warranted Officers spent 7.25 hours responding to reports of compost-type odour in Bromley during this reporting period. The average response time was 45 minutes.

Each time an officer substantiates an offensive and objectionable compost-type odour, a thorough 360-degree assessment is undertaken in accordance with Ministry for the Environment Guidelines. This allows the officer to rule out other potential odour emitters in the area, such as the estuary and the Wastewater Treatment Plant, and therefore confirm Living Earth as the source.

Odour Monitoring – November 1, 2023 – November 27, 2023

This section has been added to this report to cover the time period stipulated above, in recognition that the date of the Community Liaison Group Meeting has been pushed back.

Between November 1, 2023, and November 27, 2023, a total of 12 incidents regarding compost odour were logged with Environment Canterbury. Between November 1, 2023, and November 27, 2023, a total of 44 Smelt Its were received by Environment Canterbury. Of these 44 Smelt It submissions, 22 reported a compost odour, along with other characteristics. Of these 22 submissions, 18 reported compost-only type characteristics.

During the period of November 1, 2023, and November 27, 2023, 6 assessments were carried out by Warranted Officers. On 1 of these occasions, compost odour was identified at a low intensity. This means the odour would only be considered offensive and objectionable if it occurred on a regular or frequent basis.

Warranted Officers spent a total of 5.25 hours responding to odour reports in Bromley during the period of November 1, 2023 to November 27, 2023, taking on average 30 minutes to arrive.

October Compliance Monitoring of CRC080301.1

Environment Canterbury Compliance Officers undertook a compliance monitoring site visit to Living Earth on October 6, 2023, to inspect for compliance with the conditions of the site's air discharge consent – CRC080301.1. Officers spent three hours on-site inspecting site procedures and discussing site operations with staff.

Following this site inspection, a thorough review of compliance records was undertaken, and a comprehensive compliance monitoring report produced. The site inspection and review of records demonstrated most activities on-site are compliant but has identified a few minor non-compliances. Environment Canterbury are working with Living Earth to resolve these.

2023/2024 Compliance programme and consent condition review

External legal advice has confirmed Environment Canterbury has a sound basis to review the conditions of this consent.

Over the 2023/2024 summer and autumn Environment Canterbury's compliance monitoring programme will include compliance site visits and increased capacity for responding to odour incidents. Environment Canterbury will take information gathered from two additional compliance site visits to be undertaken within this period, and from increased odour response capacity, to help it determine whether to review the conditions of this consent at the end of March 2024.

Dust Monitoring

There was one report received by Environment Canterbury relating to dust in the Bromley area in the reporting period. This was not related to Living Earth.

Bromley Reporting Area

The data used in this report relates to incidents received within the Bromley area, as outlined by the pink area in the map below. For consistency of reporting, only Smelt Its within the pink boundary are considered.





**Technical review of the
Organic Processing Plant
biofilter refurbishment**

Prepared for
Waste Management NZ Limited

Prepared by
Tonkin & Taylor Ltd

Date
November 2023

Job Number
1091827 v2



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Document control

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Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
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1 Introduction

1.1 Overview

Waste Management New Zealand Limited (WMNZ), trading as Living Earth, operates an Organics Processing Plant (OPP) at 40 Metro Place, Bromley. The discharges to air from organics processing and green waste composting activities at the site are authorised by resource consent CRC080301.1, which expires on 15 February 2033.

The OPP uses a biofilter to treat odorous air extracted from the processing hall and in-vessel composting (IVC) tunnels at the site. The biofilter was refurbished in March to June 2023.

Living Earth advises that the Community Liaison Group (CLG) has requested an independent review of the biofilter refurbishment. In this context, WMNZ has commissioned Tonkin & Taylor Limited (T+T) to provide a technical review of the refurbished biofilter and its performance. The purpose of this report is to describe the scope, methodology and findings of the technical review and to provide recommendations for the biofilter as required.

This report has been prepared in accordance with our letter of engagement dated 27 September 2023.

1.2 Scope of review

The scope of our review includes the following:

- **Review refurbishment:** Review information provided by Living Earth describing the refurbishment of the biofilter.
- **Review design:** Review key design and operating parameters of the refurbished biofilter against published good practice guidance for the operation and design of bark biofilters.
- **Assess odour:** Assess the performance of the refurbished biofilter by undertaking field odour observations in/around the biofilter.
- **Recommendations:** Provide recommendations about ongoing monitoring and maintenance for the biofilter. Recommendations will consider how long the composting operation is proposed to continue at Metro Place.

2 Process and biofilter description

2.1 Overview

This section summarises the composting process undertaken at the site, the biofilter used to treat odour and the recent refurbishment of the biofilter. The details are based on information provided by Living Earth and our own observations at the site and form the basis for our review of the biofilter and its performance.

2.2 Summary of composting process

The OPP processes municipal organic material (e.g. material collected from green kerbside bins, including food waste) and green waste into compost. A simplified description of the composting process is as follows:

- 1 Food and garden organic materials from green kerbside bins are delivered to the site and unloaded inside the processing hall.
- 2 These are shredded and blended with green waste within the processing hall.
- 3 Shredded material is transferred to the in-vessel composting (IVC) tunnels to undergo composting for 14-25 days. Within the IVC tunnels air is blown through the compost to provide oxygen and to control the temperature.
- 4 Compost from the IVC tunnels is removed and placed outside and managed until it is screened.
- 5 Compost is screened and then removed from site.

The OPP could continue operating on the current site for three to five years. A diagram of the process from Living Earth is shown in Figure 2.1.

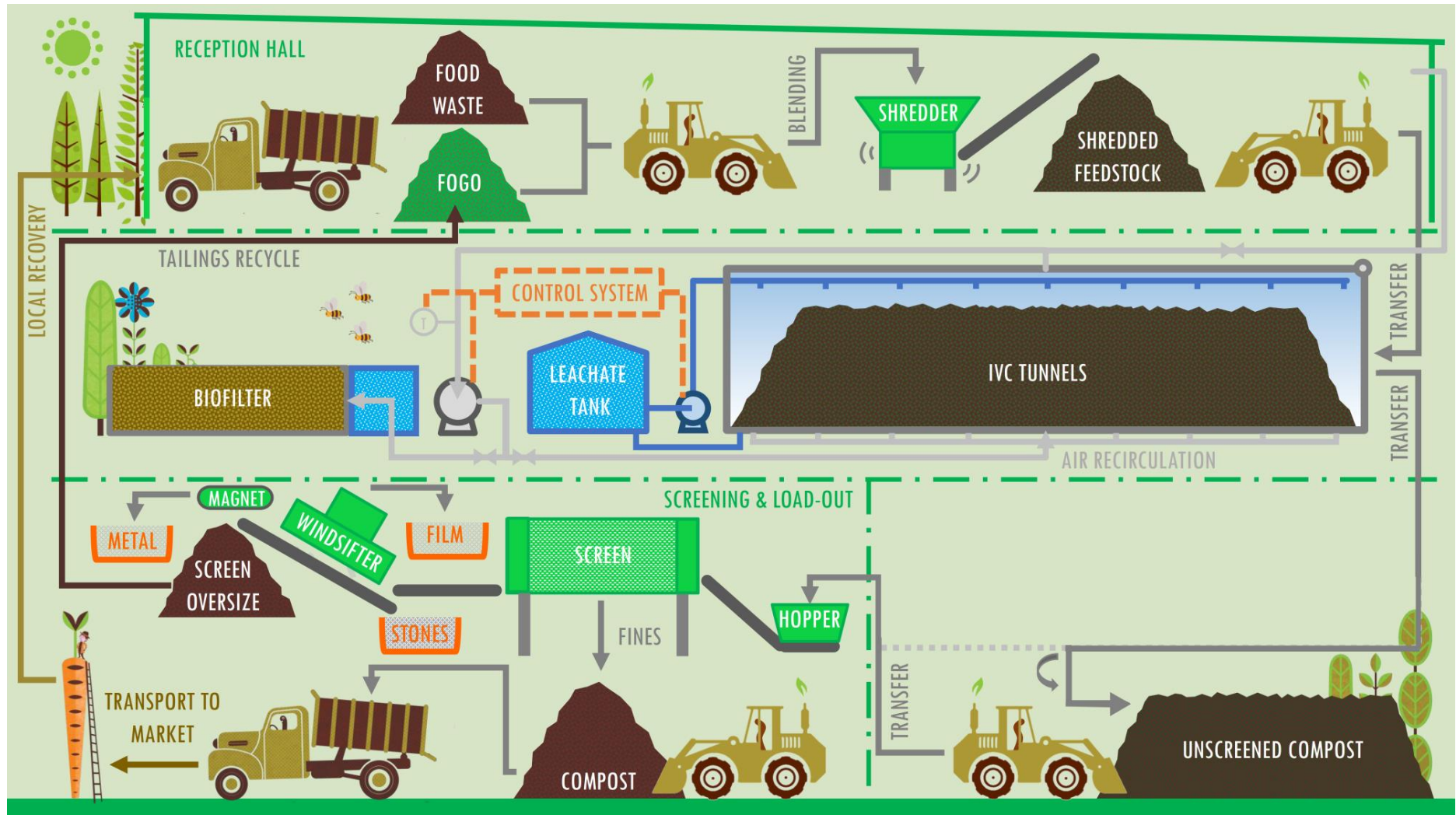


Figure 2.1: Diagram of composting process including biofilter at the OPP.

2.3 Biofilter description

2.3.1 Extraction of odorous air for treatment

The biofilter treats odorous air extracted from the processing hall and IVC tunnels prior to release to atmosphere. This air from the IVC tunnels and processing hall contains odorous compounds such as sulfur, ammonia and nitrogen containing compounds and volatile organic compounds [1].

The average measured rate of extraction from the tunnels is 24.3 m³/s. The maximum rate of extraction from the tunnels is 25 m³/s, which is limited by the maximum capacity of the extraction fan.

2.3.2 Biofilter design and operation

The biofilter is a 1.5 x 23.3 x 44.5 metre (1,555 m³) bed of solid media particles (bark chip and wood flakes). The air extracted from the processing hall and IVC tunnels is passed through the media bed before being release to atmosphere from the top surface of the bed. Microorganisms exist in a biofilm on the surface of the bark and wood, which convert odorous compounds into components such as water, dilute aqueous ammonia, dilute sulfuric acid and carbon dioxide, and results in significantly reduced levels of odour.

The biofilter features an open space (a plenum) underneath the media bed into which the extracted air is directed. The plenum allows for even distribution the extracted air into the biofilter media (i.e., the bark and wood). The plenum is covered with wooden slats that separate the plenum and the biofilter bark. The extraction air flows through the plenum and is distributed upwards through the biofilter bark.

A diagram of the biofilter is shown in Figure 2.2.

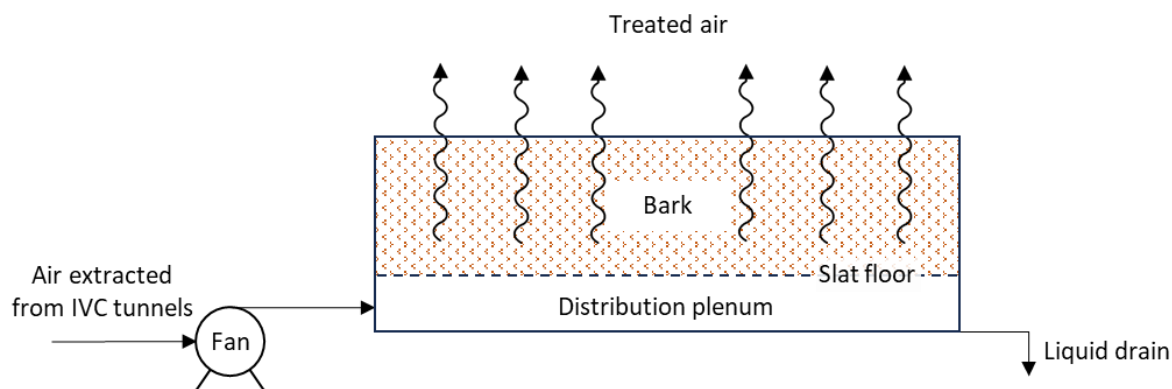


Figure 2.2: Diagram of biofilter.

2.4 Biofilter refurbishment

2.4.1 Overview of refurbishment

A major refurbishment of the biofilter was undertaken in March to June 2023. The refurbishment included removing old bark, replacing the plenum and placing new bark and wood media.

2.4.2 Plenum repair

During the refurbishment of the biofilter, Living Earth identified that parts of the wooden slat floor overlying the plenum had collapsed. A collapsed floor can result in:

- Uneven distribution and treatment of the incoming air.

- Media becoming saturated by sitting in the base of the plenum.
- Build-up of liquid in the base of the plenum due to drainage being blocked by media.

The plenum was completely rebuilt with new supporting beams and a new wooden slat floor.

Figure 2.3 shows the wooden slat floor media before and after replacement.



Figure 2.3: Wooden slat floor before (left) and after replacement (right) in 2023.

2.5 Media replacement

The biofilter media was removed and replaced with fresh bark chip and wood flakes during the biofilter refurbishment. Figure 2.4 shows the biofilter media after replacement.

Living Earth specified the following bark composition for the new media:

- Less than 5%, diameter 0 - 2 mm (by weight).
- 20-30%, diameter 2 - 10 mm (by weight).
- 65-75%, diameter 10 - 50 mm (by weight).



Figure 2.4: Biofilter media after replacement (right) in 2023.

3 Review of biofilter performance

3.1 Approach to review

Our review of the performance of the refurbished biofilter in treating odour has included the following:

- A literature review of published good practice guidance on design and operating parameters for biofilters to maximise odour treatment performance (described in Section 3.2).
- Evaluation of the design and operating parameters of the refurbished biofilter with published guidelines (Section 3.3).
- Observation of odour emitted from the biofilter (Section 3.4).

3.2 Biofilter good practice design and operating guideline review

3.2.1 Use of biofilters for odour treatment

Biofilters are commonly used throughout New Zealand [2] for the treatment of high-volume, low strength odorous gas in industries such as wastewater treatment, food processing (e.g. meat-works) and composting facilities. The Cornell Waste Management Institute notes that biofilters are widely used for the management of odour from commercial composting [3].

3.2.2 Key biofilter design and operating parameters

Based on the literature review and our previous experience, key design and operating parameters for biofilters in relation to odour treatment performance are as follows:

- Media composition.
- Media depth.
- Empty Bed Residence Time (EBRT).
- Temperature.
- Moisture content.
- pH.

The key parameters are summarised in Table 3.2.

3.2.3 Media composition and characteristics

The biofilter media is the structure on which the microorganisms that treat the odorous gas grow, so the composition and physical characteristics of media type are important to the biofilter. The media can also help to control the environment in which the microorganisms grow and biological conversion of odour occurs. Important considerations include:

- Porosity of the bed. Microorganisms within the media require some open space within the media bed, as the microorganisms require oxygen to be able to breakdown odorous gases. A media bed that has inadequate pore space limits the conversion of substances, as the access to oxygen is limited. Conversely, a media bed that has too much pore space can lead the biofilter to have inadequate microbial colonies to efficiently convert the odorous substances, or conditions that are unfavourable to maintain the colonies (such as being too dry).
- Media type. Media type is key in maintaining conditions within the biofilter that are favourable for the microorganisms. Biofilter media for low to moderate strength concentration, high flow air streams are typically bark and or bark/soil blends although various mixtures of other media types have been used successfully [4].

The media can provide or help maintain:

- Even pore space.
- Bed moisture
- Nutrients.
- Temperature within the biofilter.

Media that is resistant to breaking down is advantageous as it has a longer operational life and provides a more consistent environment for the microorganism colonies.

Wood chip breaks down rapidly in comparison to bark and therefore should be minimised within the media as it can block the pore space within the biofilter bed. Mixing in screened compost to the upper layers of a biofilter bed can be beneficial as it provides nutrients for the microorganism colonies [5] and can create even back pressure throughout the biofilter bed (which creates even distribution of air).

Media composition that has commonly been specified for biofilters is shown in Table 3.1 [6].

- **Media replacement.** Bark or bark and compost biofilters that are operating within the recommended operational ranges, and that are well maintained, typically require media replacement every 2 to 5 years. Biofilters that are operating outside of the media specification ranges may still function adequately but are likely to require more frequent maintenance or media replacement due to faster media break down.

Table 3.1: Biofilter media specification

Media composition	% Weight	Diameter of material
Wood	<10%.	N/A.
Crushed shell	5% depending on layer.	Diameter 5 to 15 mm.
Coarse compost content	0% - 20% depending on layer.	N/A.
Total bark chip content	75% - 100% depending on layer. Lower levels specify a higher percent of bark.	Variable as below.
• Bark composition	• <5%	• Diameter <2 mm
	• 20 to 30%	• Diameter 2-10 mm
	• 65 to 75%	• Diameter 10-50 mm

Note: The total fines content (soil and bark less than 2 mm in diameter) should be 5 - 25% depending on the layer.

3.2.4 Media depth

The media needs to be deep enough for a range of microbes to develop, and for the air to take a long enough path through it, without being so deep that the fan cannot effectively pass the air through.

Media depth is widely recommended to be between 1.0 m and 1.5 m [7] [8] [9] [10]. A shallower media depth can increase the potential for channelling or short-circuiting of flow through the biofilter, as preferential flow paths (short-circuits) are more easily established. A media depth of at least 1.0 m allows for the establishment of various microbial colonies within the media profile. Colonies that process sulfurous compounds typically establish in the lower depths of the biofilter and colonies that process volatile organic compounds (VOCs) establish towards the top of the bed [10].

Increasing the media depth can be used to decrease the biofilter area. However, media depths of greater than 1.5 m can cause high backpressure, which is operationally limiting on the biofilter

supply fan. Even placement and levelling of the media is required to minimise the potential for preferential flow paths to form.

3.2.5 Empty Bed Residence Time

Empty Bed Residence Time (EBRT) provides an indication of how long the air can be in contact with the biofilter media. This provides an indication of how much air the biofilter can treat.

EBRT is calculated by dividing the biofilter bed volume (media height x width x length) by the volumetric flow rate to determine the theoretical contact time that the air will have with the biofilter media.

EBRT allows for odorous gases to have enough contact time with the microbial colonies within the biofilter to be treated. As discussed in Section 3.2.4, different microbial colonies establish within the biofilter media. Microorganisms that convert sulfurous compound (primarily *Thiobacillus*) tend to live in the lower depths of the bed and convert sulfurous gases in approximately 15 - 30 seconds EBRT. Organic-compound removal tends to occur in the mid to upper depths of the bed and can require from 30 - 60 seconds. Organic compounds that are extremely difficult to degrade [11] can require up to 75 seconds of contact time in an organic media before complete removal occurs [4].

It is expected for composting that both sulfurous and organic odorant compounds will be present. However, extremely difficult to degrade organic compounds are not expected in to be present in significant quantities in the odorous air from the production of compost at the site due to the nature of materials comprising the compost.

Given the above considerations and allowing for variation of media properties throughout the bed, a design criteria of 90-120 second EBRT is recommended [2].

3.2.6 Temperature

The temperature of the media and the temperature of the air flowing through the biofilter can affect microbial growth within the bed and therefore odour treatment performance.

Operating temperatures within the media of bark biofilters that have similar feedstock (compost) to the OPP biofilter can range from 10°C to 40°C [2] [4] [5] [7] [8] [9] [10] [12] [13] [14] [15]. Microbial colonies likely to be present in the biofilter are likely to have an upper operating temperature of 50°C before the die-off of the colonies occur [16]. Typically, for biofilters of this kind, the optimum operating temperature within the bed, to promote microbial growth and odour treatment performance, is approximately 37°C.

3.2.7 Moisture content

Moisture content of the bed is important to microbial growth and the performance of the biofilter. Generally, a moisture content for the biofilter media of 40-70% is recommended [4] [7] [8] [9] [12] [13]. Moisture content that is too low or too high can have adverse effects on the biofilter function. If the bed is too dry:

- Microbial colonies can die due to the colonies drying out.
- Channelling can occur as preferential flow channels can form in localised dry spots.
- Media can compact due to contraction of dry media and cause increased back pressure.

If the bed is too moist:

- Microbial colonies can die as too much moisture restricts the oxygen available to the colonies.
- Anaerobic conditions can form as oxygen flow is restricted.
- Increased back pressure can occur due to decreased pore space.

- More rapid breakdown of media can occur.

3.2.8 pH

The pH of a biofilter bed will affect the types of microbial colonies that grow within the bed. As discussed in Section 3.2.4, differing microbial colonies will form in different depths of the biofilter bed.

The microbial colonies in the lower part of the bed produce sulfuric acid (as part of the conversion process) so the lower parts of the bed may have a very low pH (acidic). Towards the middle and upper parts of the bed it is advantageous to increase or maintain the pH to 6-8 [4] (neutral) to allow different microbial colonies to grow to remove other compounds. To increase the pH to within the preferred operating pH, additives such as crushed shell (calcium carbonate) can be added, although these colonies will naturally occur once enough of the sulfurous compounds have been removed. Highly soluble lime is not recommended as this can deplete rapidly and clog the biofilter leading to excessive backpressure.

3.3 Biofilter design and operation evaluation

3.3.1 Media

Living Earth specified the following bark composition for the new media:

- Less than 5%, diameter 0 - 2 mm (by weight).
- 20-30%, diameter 2 - 10 mm (by weight).
- 65-75%, diameter 10 - 50 mm (by weight).

Observations of the newly replaced biofilter media shows a high proportion of wood within the media. As discussed, in Section 3.2.3, high levels of wood are unlikely to affect the treatment of odorous gases, however, the media is likely to require more frequent replacement to account for the faster breakdown of wood when compared to bark nuggets.

The porosity of the bed is determined by the size of the bark chip. The media specification is within the recommended ranges and appears to be within the recommended bark particle size. The specified bark parameters allow for adequate pore space, provided the media has not degraded into finer particles in lower levels of the biofilter where it could not be viewed.

3.3.2 Media depth

Based on engineering drawings for the biofilter and confirmation with operational staff, the biofilter media depth is 1.5 m.

Media depth is widely recommended to be between 1.0 m and 1.5 m. The OPP biofilter is within the recommended media depth, which decreases the likelihood of preferential flow paths establishing and is likely to allow varying microbial communities to form.

3.3.3 Empty Bed Residence Time

The EBRT was determined based on measured flow data for the biofilters. The data is recorded on the central control system for the plant. The minimum EBRT for the biofilter is 62 seconds and the average EBRT is 64 seconds (information used to determine this is provided in Section 2). By comparison, the recommended EBRT is 90-120 seconds.

As discussed in Section 3.2.5, sulfur odorant compounds, such as hydrogen sulfide (H₂S), are rapidly removed in approximately 15 - 30 seconds. Organic-compound removal can require from 30 - 60 seconds. Extremely hard to remove organic compounds are not expected in the gas stream.

Based on the calculated average EBRT, sulfur compounds are expected to be well controlled and organic compounds are likely to be mostly removed.

It has been considered whether the airflow rate through the biofilter could be reduced, which would increase the EBRT. The air through the biofilters is extracted from the IVC tunnels. The amount of air that is passed through the IVC tunnels is determined by the decomposition rate of the compost. The compost is required to be maintained with a certain oxygen content and temperature to optimise the composting process and minimise the generation of odorous air from anaerobic conditions. As a result, reducing the air going through the biofilter is not feasible as it could result in:

- Compost that becomes anaerobic due to the compost becoming too hot.
- Compost becoming anaerobic due to not enough oxygen being supplied.
- Temperature of the inlet air to the biofilter becoming too hot to maintain healthy microbial colonies.
- Untreated fugitive releases from the IVC tunnels and processing building.

As described in Section 3.4, odour observations were conducted by T+T at the biofilter to understand the performance of the biofilter. We note the following:

- A 'musty' odour associated with a well-functioning biofilter was observed immediately beside the biofilter.
- Sulfurous odour was not observed during the odour surveys (summarised in Section 3.4), which is consistent with the rapid removal of these compounds.
- No ammonia or leachate odour was observed from the biofilter, which indicates that these compounds are either not present in the inlet air or are largely able to be removed within the contact time.

In summary, the EBRT of the biofilter is lower than recommended. While the EBRT of the biofilter caters for the majority of odorant compounds typically treated by biofilters, residence time may be insufficient to adequately treat certain organic compounds. However, the nature of the feedstock into the compost, those compounds are unlikely to be present in the inlet air to the biofilter. Also, our observations of odour around the biofilter did not indicate the presence of anything other than the musty odour associated with a well-functioning biofilter.

3.3.4 Temperature

The review of temperature of the refurbished biofilter was based on measured bed temperature data supplied by Living Earth for June to September 2023. The temperature is measured at approximately 0.7 m below the surface of the biofilter. The average temperature during this period was 34°C with a range of 27°C to 42°C. A maximum temperature of 50°C was recorded prior to the biofilter refurbishment when the media was in a degraded state. While temperatures may increase in the bed in summer due to higher ambient temperature temperatures are less likely to approach 50°C after the refurbishment due to better air circulation through the media.

The recommended media temperature is from 10°C to 40°C with an optimum operating temperature of 37°C and a maximum temperature of approximately 50°C. The biofilter media is currently operating at approximately the optimum temperature, which will support the microbial population within the biofilter and provides the optimum temperature to convert the inlet air.

The temperature of the biofilter inlet air could be reduced by introducing fresh air into the inlet. The introduction of fresh air would be limited by the maximum rated capacity of the fan. However, increasing the airflow by introducing fresh air would further reduce the EBRT to the minimum time of 62 seconds. Reducing the EBRT from an average of 64 seconds to 62 seconds is not likely to

significantly reduce the treatment capacity of the biofilter, when balancing the effects of an increased biofilter bed temperature.

The inlet structure could be upgraded with the addition of a heat exchanger to reduce the temperature of the air prior to introduction into the biofilter. However, the operation of the facility at the current site is not expected to continue for more than 3-5 years. Considering the timeframes associated with the design and installation of a heat exchanger, that the bed temperature is currently within the optimal temperature range, it is likely to provide little benefit for the remaining period on site.

It is recommended to reduce the biofilter inlet temperature in the summer with introduced ambient air. This is limited by the maximum rated capacity of the fan and will reduce the EBRT to a minimum of approximately 62 seconds.

3.3.5 Moisture content

Living Earth measured biofilter media moisture content at a depth of approximately 0.7 m below the surface of the biofilter. The moisture content ranged from 61 to 65% over the period from June to September 2023. The recommended moisture content for the biofilter media is 40-70%. The biofilter is currently operating within the recommended moisture content values.

The inlet air is, on average, at 100% relative humidity. Although dry conditions in summer will lead to some drying of the bed, due to the high humidity of the inlet air, the media is expected to remain within the recommended operating range for moisture.

A consistently high inlet humidity (as occurs in this instance) may result in accelerated degradation of the media, especially given the portion of wood flakes comprising the media. Therefore, there is likely to be a shorter lifespan of the biofilter media than the typical timeframe of 2-5 years.

3.3.6 pH

Living Earth measured the biofilter media pH, which has a range of pH 5.1 - 6.7 at a depth of 0.5 m below the surface of the media (i.e., within the upper parts of the biofilter bed). An expected range in the mid to upper layers of the media is pH 6 - 8. As discussed in Section 3.2.8, various microbial colonies require different operating pH ranges. The measured pH of as low as 5.1 is not expected to reduce the effectiveness of the biofilter in treating odour as lower pH is formed when treating sulfurous gases. However, if pH in the upper bed were to be consistently between 5 and 6, this may result in the media breaking down more rapidly, which could result in the media requiring to be replaced sooner.

It is recommended to include crushed shell for the top 0.5 m of the biofilter bed when the media is replaced. Should the pH show a downward trend below pH 6 (more than three months of readings) then it is recommended that crushed shell to the surface of biofilter.

3.3.7 Summary of biofilter design and operation evaluation

The biofilter parameters of the OPP biofilter are compared to good practice design guidelines. A summary of the design guidelines, the OPP biofilter parameters and the implications are shown in Table 3.2.

Table 3.2: Comparison of biofilter to design guidelines

Parameter	Design guideline	OPP biofilter	Discussion
Media type	Bark with less than 10% wood	Bark with more than 10% wood	Increased wood content is unlikely to affect biofilter odour removal efficiency. However, more frequent media replacement is likely to be require (compared to the typical replacement period of 2-5 years).
	Fines content (screened compost and bark <2 mm) for upper levels ¹ of biofilter approximately 24%	Visual assessment only (fines content not measured). Visual assessment indicates a low level of fine material on the surface of the biofilter. This may not be reflective of the fines content throughout the bed.	Increasing the fines increases the backpressure on the fan. The current fan will dictate the allowable backpressure.
Media depth	1.0-1.5 m	1.5 m	Biofilter media depth is within the recommended values.
Empty Bed Residence Time	90-120 seconds	Minimum 62 seconds Average 64 seconds	Hydrogen sulfide and other sulfurous compounds are expected to be removed. Organic compounds are likely to be mostly removed. Extremely hard to remove organic compounds are not expected in the gas stream.
Temperature of biofilter bed	10°C to 40°C Maximum 50°C Optimum 37°C	27°C to 42°C Average 34°C	Biofilter bed temperature is generally within the recommended values.
Bed moisture content	40-70%	61-65%	Biofilter bed moisture content is within the recommended values.
pH	6-8 at the middle of the bed	5.1-6.8 measured at a depth of 0.5 m	pH in the upper bed is largely within or slightly lower than the recommended pH range. As noted below the pH range is not expected to reduce the effectiveness of the biofilter but may affect the rate of media degradation.

3.4 Odour observations

Odour observations of the biofilter were undertaken to determine the current effectiveness of the biofilter for treating odorous air extracted from the IVC tunnels and processing hall.

Odour observations of the refurbished biofilter were completed by T+T on the following dates:

- 10 October 2023.
- 11 October 2023.

¹ Top one third to two thirds of the media layer.

- 18 October 2023.

Observations undertaken upwind and 0 to 20 metres downwind of the biofilter during cool calm weather conditions, which give rise to low dispersion conditions.

Composting odour and leachate odour were not observed from the biofilter; however, some low-level leachate and sulfur odours were observed near other sources (fans, vents and drainage points). The biofilter emitted a distinct musty odour of wet bark/wet soil when observed directly next to the biofilter to approximately 20 m distance. No odour was observed when viewing the odour from about 20 m upwind of the biofilter.

A musty odour is expected from a biofilter and is indicative of a healthy and well-functioning biofilter. Odours for the biofilter were not able to be observed further downstream due to other processes occur within close proximity on the site. However, rapid dispersion of condensation from the biofilter was observed during cool calm conditions, which indicates that a high level of dispersion and dilution of treated air from the top of the biofilter would be expected in all weather conditions. Odour observation log sheets and observation location maps are presented in Appendix A.

3.5 Summary of review

Overall, our review indicates that the biofilter is generally operating within the recommended design parameters. The EBRT of the biofilter is lower than recommended. While the EBRT of the biofilter caters for the majority of odorant compounds typically treated by biofilters, residence time may be insufficient to adequately treat certain organic compounds. However, due to the nature of the feedstock into the compost, those compounds are unlikely to be present in the inlet air to the biofilter. Also, our observations of odour around the biofilter did not indicate the presence of anything other than the musty odour associated with a well-functioning biofilter.

Recommendations from our review for the biofilter operation and maintenance is in Section 4.

4 Recommendations

Recommendations for the biofilter based on our odour observations and the comparison of the biofilter to recommended design parameters are as follows:

- Scheduled replacement of the current media is recommended within 12-18 months. This is due to the high moisture content, occasionally elevated bed temperature and high wood content of the inlet air.
- Specify less than 10% wood content for future media replacement.
- Specify the addition of crushed shell for the top 0.5 m of the biofilter bed when the media is replaced.
- Continued monitoring of the pH of the bed. Should the pH show a downward trend below pH 6 (more than three months of readings) then it is recommended that crushed shell to the surface of biofilter.
- Require careful levelling of the media when it is placed to minimise the potential for preferential flow paths to form.
- Reduce the biofilter inlet temperature in the summer with introduced ambient air as discussed in Section 3.3.4. This is limited by the maximum rated capacity of the fan and will reduce the EBRT to a minimum of approximately 62 seconds.

5 Conclusions

The biofilter at the OPP was refurbished in March to June 2023.

T+T has conducted a review of the odour treatment performance of the refurbished biofilter. This has been based on a review of design and operation details of the refurbished biofilter, evaluation of the biofilter details against published good practice guidance for biofilter odour treatment performance and odour observations of the biofilter conducted by T+T.

The odour observed directly downwind from the biofilter was of a distinct musty odour, which is consistent with good performance of a biofilter used to treat compost exhaust air. At the time of the review, the biofilter was considered to be operating sufficiently to remove odour from the inlet air.

Our review of design and operating parameters found that the biofilter is generally operating within recommended values. The EBRT of the biofilter is lower than recommended in guidelines. The result of this is that there is a potential that certain organic compounds are not fully treated, however, those compounds are unlikely to be present in the inlet flow to the biofilter. Our observations of odour around the biofilter did not indicate a presence of odorants that are associated with insufficient treatment by the biofilter.

Due to the consistently high inlet moisture, sometimes elevated temperature and high wood content in the media, it is recommended that the biofilter media is replaced sooner than is usually required for biofilters of this type. When the biofilter media is next replaced, the wood content is recommended to be less than 10% and crushed shell is recommended to be mixed in the top 0.5 m of the media.

6 References

- [1] United States Environmental Protection Agency, *Compost Yard Trimmings and Municipal Solid Waste*, 1994.
- [2] R. Cudmore and P. Gostomski, "Biofilter design and operation for odor control - the New Zealand experience," in *Biotechnology for odor and air pollution control*, Germany, Springer, 2005, ch. 11.
- [3] Cornell Waste Management Institute, "Odor Treatment - Biofiltration," Cornell University, 1996. [Online]. Available: <https://compost.css.cornell.edu/odors/odortreat.html>. [Accessed 10 10 2023].
- [4] Water Environment Federation, "Odor Control and Air Emissions," in *Design of Municipal Wastewater Treatment Plants MOP 8*, 5th ed., McGraw-Hill, 2010, ch. 7, sec. 7.2.2.
- [5] I. Showqi, F. A. Lone, M. Ashraf, M. A. Mehmood and A. Rashid, "Biofilter in mitigation of odour pollution - A review," *Nature Environment and Pollution Technology*, vol. 15, no. 4, pp. 117-1185, 2016.
- [6] CH2M Beca, *Living Earth - Biofilter Media Specification Review*, 2015.
- [7] Sniffer, *Understanding biofilter performance and determining emission concentrations under operational conditions. Final report - Project Number ER36*, Scotland, 2014.
- [8] Environment Agency, *Biofilter performance and operation as related to commercial composting*, Bristol: Env. Agency, 2013.
- [9] I. Datta and D. Grant Allen, "Biofilter Technology," in *Biotechnology for Odor and Air Pollution Control*, Z. Shareefdeen and A. Singh, Eds., Springer, Berlin, Heidelberg, 2005, p. 125–145.
- [10] H. E. Archer and et al., "Odour control improvements, Watercare Wastewater Treatment Plant Mangere, Auckland," *NZWWA Conf.*, 1995.
- [11] M. Yoshikawa, M. Zhang and K. Toyota, "Biodegradation of Volatile Organic Compounds and Their Effects on Biodegradability under Co-Existing Conditions," *Microbes and environments*, vol. 32, no. 3, pp. 188-200, 2017.
- [12] C. Easter, C. Quigley and J. Witherspoon, "Biofilters and biotowers for treating odors and volatile organic compounds," *Proceedings of the Water Environment Federation*, pp. 328-346, 2006.
- [13] L. Chen and S. J. Hoff, "Mitigating odors from agricultural facilities: A review of literature concerning biofilters," *ASABE App. Eng in Agriculture*, vol. 25, no. 5, pp. 751-766.

- [14] European Commission, "Biofilters," in *Integrated Pollution Prevention and Control - Reference Document on Best Available Techniques for the Waste Treatment Industries*, 2006, ch. 4, sec. 4.6.10, pp. 463-469.
- [15] J. Luo and A. J. Van Oostrom, "Odour-control biofilters: design, operation and maintenance," *NZWWA Conf.*, 1998.
- [16] R. J. Kadner and K. Rogers, "Brittanica - Biosynthesis, nutrition, and growth of bacteria," [Online]. Available: <https://www.britannica.com/science/bacteria/Physical-requirements>. [Accessed 18 October 2023].
- [17] E. David and V.-C. Niculescu, "Volatile Organic Compounds (VOCs) as Environmental Pollutants: Occurrence and Mitigation Using Nanomaterials," *International journal of environmental research and public health*, vol. 18(24), no. 13147, 2021.

7 Applicability

This report has been prepared for the exclusive use of our client Waste Management NZ Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:



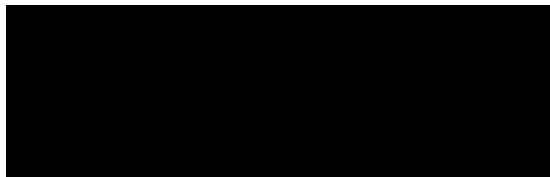
Senior Environmental Engineer

Reviewed by:



Principal Environmental Engineer

Authorised for Tonkin & Taylor Ltd by:



Project Director

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Appendix A Odour observations

Activities occurring onsite: Composting within tunnels, Emptying tunnel to row, Screening, Moving row						Activities occurring onsite: Composting within tunnels, Emptying tunnel to row, Screening, Moving row								
Day: Wednesday		Time of initial Impression: 8:30		Wind Direction: E-NE		Day: Wednesday		Time of initial Impression: 8:47		Wind Direction: E-NE				
Date: 11/10/2023		Initial Odour Intensity: 0		Wind Velocity: 0-1		Date: 11/10/2023		Initial Odour Intensity: 0		Wind Velocity: 0-1				
Location#: 1		Character: n/a		Cloud Cover: 0		Location#: 2		Character: n/a		Cloud Cover: 0				
Surveyor: Michele Dyer		Initial general hedonice tone: n/a		Precipitation: 0		Surveyor: Michele Dyer		Initial general hedonice tone: n/a		Precipitation: 0				
Start Time: 8:30		Plume width: n/a		Temperature: 6		Start Time: 8:47		Plume width: n/a		Temperature: 7				
	Intensity	Characteristic/Notes		Intensity	Characteristic/Notes		Intensity	Characteristic/Notes		Intensity	Characteristic/Notes			
1st Min	0	0	6th Min	0	0	1st Min	0	0	6th Min	0	2	musty		
	10	0		10	0		10	0		10	2	musty/leachate		
	20	0		20	0		20	0		20	3	musty		
	30	0		30	0		30	2		30	3	musty		
	40	0		40	0		40	2		40	2	musty		
	50	0		50	0		50	2		50	2	musty		
2nd Min	0	0	7th Min	0	0	2nd Min	0	3	musty	7th Min	0	2	musty	
	10	0		10	0		10	3	10		2	musty		
	20	0		20	0		20	2	20		2	musty		
	30	0		30	0		30	1	30		0			
	40	0		40	0		40	0	40		1			
	50	0		50	2		50	2	50		3	musty		
3rd Min	0	0	8th Min	0	2	musty	3rd Min	0	0	8th Min	0	3	musty	
	10	0		10	2	10		0	10		3	musty		
	20	0		20	0	20		0	20		3	musty		
	30	0		30	0	30		0	30		3	musty		
	40	0		40	0	40		0	40		3	musty		
	50	0		50	2	50		2	50		3	musty/leachate		
4th Min	0	0	9th Min	0	2	musty	4th Min	0	3	musty	9th Min	0	3	musty/pine
	10	0		10	2	10		3	10	2		musty		
	20	0		20	2	20		3	20	3		musty		
	30	0		30	3	30		3	30	3		musty		
	40	0		40	0	40		3	40	2		musty		
	50	0		50	0	50		3	50	2		musty		
5th Min	0	0	10th Min	0	0	5th Min	0	3	musty	10th Min	0	2	musty	
	10	0		10	0		10	2	10		2	musty		
	20	0		20	0		20	2	20		3	musty		
	30	0		30	0		30	3	30		3	musty		
	40	0		40	0		40	3	40		3	musty		
	50	0		50	0		50	2	50		3	musty		

Activities occurring onsite: Composting within tunnels, Emptying tunnel to row, Screening until 8:30, Moving row				Activities occurring onsite: Composting within tunnels, Emptying tunnel to row, Screening until 8:30, Moving row									
Day: Wednesday		Time of initial Impression: 8:25		Wind Direction: NE		Day: Wednesday		Time of initial Impression: 8:43		Wind Direction: ENE			
Date: 18/10/2023		Initial Odour Intensity: 0		Wind Velocity: 0-3		Date: 18/10/2023		Initial Odour Intensity: 3		Wind Velocity: 2-3			
Location# 1		Character: n/a		Cloud Cover: 0		Location# 2		Character: leachate/musty		Cloud Cover: 0			
Surveyor: Michele Dyer		Initial general hedonice tone: n/a		Precipitation: 0		Surveyor: Michele Dyer		Initial general hedonice tone: -2		Precipitation: 0			
Start Time: 8:25		Plume width: n/a		Temperature: 7		Start Time: 8:44		Plume width: n/a		Temperature: 9			
	Intensity	Characteristic/Notes		Intensity	Characteristic/Notes		Intensity	Characteristic/Notes		Intensity	Characteristic/Notes		
1st Min	0	0	6th Min	0	0	1st Min	0	3	6th Min	0	3		
	10	0		10	0		10	2		10	3	10	3
	20	0		20	0		20	2		20	2	20	2
	30	0		30	0		30	2		30	2	30	2
	40	0		40	0		40	3		40	3	40	3
	50	0		50	0		50	2		50	2	50	3
2nd Min	0	0	7th Min	0	0	2nd Min	0	2	7th Min	0	2		
	10	0		10	0		10	3		10	2	10	2
	20	0		20	0		20	2		20	2	20	3
	30	0		30	0		30	2		30	2	30	3
	40	0		40	0		40	3		40	3	40	2
	50	0		50	0		50	3		50	3	50	2
3rd Min	0	0	8th Min	0	0	3rd Min	0	3	8th Min	0	3		
	10	0		10	0		10	3		10	3	10	3
	20	0		20	0		20	2		20	2	20	3
	30	0		30	0		30	3		30	3	30	3
	40	0		40	0		40	3		40	3	40	3
	50	0		50	0		50	3		50	3	50	3
4th Min	0	0	9th Min	0	0	4th Min	0	3	9th Min	0	3		
	10	0		10	0		10	3		10	3	10	3
	20	0		20	0		20	3		20	3	20	3
	30	0		30	0		30	3		30	3	30	3
	40	0		40	0		40	3		40	3	40	3
	50	0		50	0		50	3		50	3	50	3
5th Min	0	0	10th Min	0	0	5th Min	0	3	10th Min	0	3		
	10	2		10	0		10	3		10	3	10	3
	20	0		20	0		20	3		20	3	20	3
	30	0		30	0		30	3		30	3	30	3
	40	0		40	0		40	3		40	3	40	3
	50	0		50	0		50	3		50	3	50	3

Activities occurring onsite: Composting within tunnels, Emptying tunnel to row, Screening						Activities occurring onsite: Composting within tunnels, Emptying tunnel to row, Screening									
Day: Tuesday		Time of initial Impression: 9:00		Wind Direction: ENE		Day: Tuesday		Time of initial Impression: 9:15		Wind Direction: ENE					
Date: 10/10/2023		Initial Odour Intensity: 0		Wind Velocity: 2-3		Date: 10/10/2023		Initial Odour Intensity: 2		Wind Velocity: 2-3					
Location#: 1		Character: n/a		Cloud Cover: 0		Location#: 2		Character: musty/pine		Cloud Cover: 0					
Surveyor: Michele Dyer		Initial general hedonice tone: n/a		Precipitation: 0		Surveyor: Michele Dyer		Initial general hedonice tone: 0		Precipitation: 0					
Start Time: 9:02		Plume width: n/a		Temperature: 12		Start Time: 9:16		Plume width: n/a		Temperature: 12					
Intensity			Characteristic/Notes			Intensity			Characteristic/Notes						
1st Min	0	1	?	6th Min	0	0	1st Min	0	3	bark/musty	6th Min	0	3	musty	
	10	1	?		10	0		10	3	leachate		10	3	musty	
	20	1	?		20	0		20	3	musty		20	3	musty	
	30	1	?		30	0		30	3	musty		30	3	musty	
	40	1	?		40	0		40	3	musty		40	3	musty	
50	1	?	50	0	50	3	musty	50	3	musty					
2nd Min	0	1	?	7th Min	0	0	2nd Min	0	3	musty	7th Min	0	3	musty	
	10	1	?		10	0		10	3	musty		10	3	musty/leachate	
	20	1	?		20	0		20	3	musty		20	3	musty	
	30	1	?		30	0		30	3	musty		30	3	musty	
	40	0			40	0		40	3	musty		40	3	musty/sulfur	
50	0		50	1	?	50	3	musty	50	3	musty				
3rd Min	0	0		8th Min	0	1	?	3rd Min	0	3	musty	8th Min	0	3	musty
	10	0			10	1	?		10	3	musty		10	3	musty
	20	0			20	1	?		20	3	musty		20	3	musty
	30	0			30	0			30	3	musty/bark		30	3	musty
	40	0			40	0			40	3	musty/sulfur		40	3	musty/leachate
50	0		50	0		50	3	musty	50	3	musty				
4th Min	0	0		9th Min	0	1	maybe sea	4th Min	0	3	musty	9th Min	0	3	musty
	10	0			10	0			10	3	musty		10	3	musty/sharp/sulfur
	20	0			20	0			20	3	musty		20	3	musty
	30	0			30	0			30	3	musty		30	3	musty/leachate
	40	0			40	0			40	3	musty		40	3	musty
50	0		50	1	?	50	3	musty	50	3	leachate				
5th Min	0	0		10th Min	0	1	?	5th Min	0	3	musty	10th Min	0	3	musty
	10	0			10	1	?		10	3	musty		10	3	musty
	20	0			20	0			20	3	musty		20	3	leachate
	30	0			30	0			30	3	musty/leachate		30	2	musty
	40	0			40	0			40	3	musty		40	2	musty
50	0		50	0		50	3	musty	50	3	musty				

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