

Appendix B Long List Options for Interim Management of Kerbside Organics until 2027-29

The following processing options have been assessed against preliminary criteria. The evaluation of options against these criteria is intended to assist Council’s decision on whether to engage with the community on options. A number of the options must be discounted due to barriers for implementation in either RMA approvals or willingness to accept Council’s organic material.

Table 10 1: Interim Processing Options for Organics

Option	Estimated cost (NPV)	Odour impacts	GHG emissions	Feasibility/ certainty risk	Govt and Council policy	Behaviour change	Public consultation
Option A: Continue all mixed composting at the Organics Processing Plant (OPP)							
A1 Composting at OPP with lessons learnt (Status Quo)	\$112m	Medium	Low–Medium	Achievable, ongoing compliance risk	Aligns with existing Council and Govt	No impact	Not required
A2 Composting at OPP with operational improvements (second screen)	\$128m	Medium	Low–Medium	Achievable, ongoing compliance risk	Aligns with existing Council and Govt	No impact	Not required
A3 Composting at OPP, all indoors	\$171m	Low	Low–Medium	Significant structure required, 18-24 months to implement	Aligns with existing Council and Govt	No impact	Required
A4 Reducing the quantity of organics processed onsite (<i>*remainder to landfill</i>)	\$133m	Medium	Medium	Achievable, ongoing compliance risk	Not re Kate Valley	Possible negative impact	Required –impact on levels of service
A5 Compost at the OPP but immediately transfer all compost offsite for maturation and screening. (<i>*Range reflects different locations in Canterbury</i>) eg to New facility at Kate Valley, Intelligro, Canterbury Landscape Supplies	*\$150m–203m	Low	Low–Medium	Potentially achievable, dependant on alternative site having RMA approvals in place	Aligns with existing Council and Govt	No impact	Required – rates implication
Option B: Either partial or all mixed composting at different sites							
B1 Composting at alternative commercial site (<i>*EnviroFert, Tuakau</i>)	*\$293m	Low	High	Potentially achievable, dependant on alternative site having RMA approvals in place	Aligns with existing Council and Govt	No impact	Required – rates implication
B2 Composting at alternative Council site (e.g. TDC or SDC)	N/A	Medium	N/A	Not achievable	Aligns with existing Council and Govt	No impact	Required – depending on costs/rates implications
B3 Composting at combination of alternative sites (<i>*Range reflects different locations in Canterbury – CLS, Intelligro, community gardens</i>)	*167m–213m	Low	Low–Medium	Potentially achievable, dependant on alternative sites having RMA approvals in place	Aligns with existing Council and Govt	No impact	Required – rates implication
B4 Composting a fixed volume at OPP and remainder at alternative sites (<i>*Range reflects different locations in Canterbury – e.g. CLS, Intelligro, community gardens</i>)	*142m–227m	Medium	Low–Medium	Potentially achievable, dependant on alternative sites having RMA approvals in place, ongoing compliance risk	Aligns with existing Council and Govt	No impact	Required – rates implication
Option C: Separate the waste stream (to open up other processing options) by separated garden and food bins							
C1 Compost food organics only at the OPP, process garden waste at alternative site(s) (<i>*Range represents use of 4th bin or mechanical separation</i>)	*\$150m–213m	Medium	Low–Medium	Potentially achievable, dependant on screening, ongoing compliance risk	Aligns with existing Council and Govt	Negative impact	Required – rates implication / levels of service
C2 Compost garden waste only at the OPP, process food organics via anaerobic digestion at EcoGas in Reparoa	\$248m	Medium	Low	Potentially achievable, dependant on screening, ongoing compliance risk	Aligns with existing Council and Govt	Negative impact	Required – rates implication / levels of service
C3 Compost/process all separated organics at alternative sites	\$213m	Low	Low	Not fully achievable	Aligns with existing Council and Govt	Negative impact	Required – rates implication

Option	Estimated cost (NPV)	Odour impacts	GHG emissions	Feasibility/ certainty risk	Govt and Council policy	Behaviour change	Public consultation
Option D: Alternative processing technologies/options							
D1 Dispose of kerbside mixed organics as a form of land reclamation (e.g. Lyttelton Port reclamation)	N/A	Low	High	Not achievable, Prohibited	Does not align with Council or Govt Policy	Possible Negative impact	Unknown
D2 Dispose of kerbside mixed organics as a form of land remediation (e.g Mine remediation)	N/A	Low	High	Not achievable, Environmental risks associated	Does not align with Council or Govt Policy	Possible Negative impact	Unknown
D3 Separate solid and liquid fractions of the waste stream to allow processing via Anaerobic Digestion at the Christchurch WWTP. <i>(*Range represents use of 4th bin or mechanical separation/insinkers) – does not provide for all of the waste</i>	*\$194m– \$226m	Medium	Low	Not fully achievable, Requires mechanical separation and outlets for the solid fraction	Aligns with existing Council and Govt	No impact	Required – rates / potential change tPossibly o levels of service
D4 Process part (up to 21,000 tonnes) of mixed kerbside organics via large scale wormfarming (e.g. MyNoke located in the North Island) and process the remainder at an alternative site(s).	Not Priced at time of assessment, additional information required.	Low	Low	Achievable	Aligns with existing Council and Govt	No impact	Possibly required depending on costs and rates impact

Option E: Dispose of organics to landfill							
E1 Continue collecting green bin but send to Kate Valley landfill	\$132m	Low	High	Achievable	Does not align with Council or Govt Policy	Negative impact	Required – rates implication / levels of service
E2 Do not collect green bin, and increase red bin collection, meaning all kerbside organics enters the general waste stream and/or use of private organics collectors, and EcoDrops increase	\$123m	Low	High	Achievable, increased volumes at EcoDrops could cause issues	Does not align with Council or Govt Policy	Negative impact	Required – rates implication / levels of service
E3 Compost/process as a priority but send remainder to Kate Valley Landfill	Dependant on volume required, model on E1 NPV	Medium	Medium– High	Achievable, ongoing compliance risk	Partially aligns with Council or Govt Policy	Possible Negative impact	Required – rates implication / levels of service

Assessment Criteria Rationale:

The above preliminary high level options evaluation has been developed from investigations relying on technical advice from a range of Council and external experts in the development of the options.

There are wide uncertainties in this initial assessment.

The Assessment considers the following criteria:

1. Cost - Lifecycle cost (5 year NPV assumed), includes all capital equipment and operating costs for the interim period of 5 years commencing January 2024. These are preliminary indications that will be further refined.
2. Rates - The total impact on rates of all operational expenditure, expressed on an annual basis.
3. Odour impacts - The likelihood of ongoing odour issues associated with the processing type and location. Considers existing odour issues with the current site.
4. GHG emissions – The likely processing and transport related emissions associated with each option.
5. Feasibility/ certainty risk – The achievability of each option, includes consideration of RMA approvals, likely timeframes and capacity to provide a solution.
6. Govt and Council policy – Alignment with Council’s existing targets and policies including its Carbon reduction targets and the Waste Management and Minimisation Plan 2020. Alignment with central government direction including the Emissions Reduction Plan and NZ Waste Strategy.
7. Behaviour change – Consideration of the potential impacts on peoples behaviour towards organics diversion (and other waste minimisation activities) and risks to ongoing objectives and targets of each option.

1. Cost

Consultants provided a preliminary initial cost comparison. In order to measure the operating and capital costs associated with each option a Net Present Value (NPV) has been developed. The NPV is based on costs over a 5 year period.

2. Odour impacts of changes at the OPP site

The likely impacts on odour of the available options has been considered by our independent odour expert Pattle Delamore and Partners (PDP). PDP have provided advice to Council in relation to operational enhancements at the current site. That advice is that the sole way to completely avoid the risk of offensive and objectionable odour beyond the boundary of the site is to fully enclose all storage and all screening, or to ensure that the maturity and nature of the compost is such that it will not produce odour that could be categorised as offensive and objectionable.

2.1. Use of the OPP building as a transfer station

Use of the OPP building as a transfer station would also remove the primary odour source on-site that PDP have observed (the outdoor material).

Fugitive emissions from the OPP when the roller doors open is not a significant source of odour off-site. Ventilating the OPP through the main biofilter would be expected to continue to mitigate odour from within the OPP.

Conclusion – Low risk of offensive odour offsite with the proposed change.

2.2. Reducing the volume of material processed at the OPP

The purpose of reducing the maximum tonnage of green and food waste on the site would be for the OPP to operate more effectively at reducing odour. The time for waste in tunnels could then be optimised for odour reduction. Current operators have described this as 21-24 days in the tunnels. The objective of reduction in volume would ensure that there will be no outside storage of unprocessed waste.

PDP's assessment is that optimising the tunnel times would *in theory* produce a less odorous (but not odour free) product. But there would still be outdoor storage for screening. PDP cannot be certain that the reduced volume would be significant enough to prevent all offensive odours off-site.

Conclusion – There is the potential for an improvement. Evaluating the effect of this would likely be a case of try it and monitor the change.

2.3. Whether changing the material composted at the OPP would have a material impact on odour generated.

PDP have advised that processing solely garden waste will not materially change the maturity or odour levels of the compost, because food waste is a minor portion of the kerbside organics.

2.4. Whether enclosing all materials is a viable solution to odour risk

PDP have considered whether full enclosure of the outdoor piles and ventilation through a biofilter would reduce the risk of odour at the existing site. The outdoor material is the largest source of odour and is the odour character primarily detected off-site. Currently, the OPP biofilter odour is not detected offsite.

If the odour from the outdoor piles can be contained and treated, the operation will largely remove the largest odour source (assuming the biofilter performs well).

3. GHG emissions

Greenhouse Gas Emissions associated with the decision to change Council's current operation can be separated into transport related emissions and processing emissions.

In general the impacts of transport related emissions have been considered based on a set transport volume per load and multiplied by the distance to each processing option. The net result of this approach is that options within Christchurch and Canterbury score more favourably than those further afield including destinations in the North Island. Although alternative transport options including rail or coastal shipping could apply, no firm numbers were received for these at the time of comparison so road haulage only has been considered in this transport related calculation.

For processing emissions an emissions, rate per tonne of material processed has been used, with landfill operating gas recovery systems providing the highest emissions of those compared, then composting (all sites have been measured with the same emissions factor, regardless of the volume/methodology they use), then anaerobic digestion (which captures all gasses to generate electricity). Due to an absence of empirical data on the emissions of wormfarming, for the purposes of the comparison it was assumed that wormfarming would have similar emissions profile to composting (aerated breakdown of organic matter), but less operational equipment required to complete aeration. i.e. wormfarming has an assumed emissions factor averaged between 'Compost' and 'Anaerobic Digestion'.

Several assumptions were necessary to complete the GHG Emissions Table, such as: the locations of potential sites; the onward transportation of processed material; the gross vehicle weights; and the material composition. To mitigate the effect of the assumptions, a consistent methodology was applied for calculating the emissions by using identical gross vehicle weights across all options, using the same composition percentage across all options where applicable, and by following MfE's emissions calculation guides. Despite the efforts to reduce the impacts of the assumptions, the table should only serve as a reference to support decision making, and should not be regarded as a definitive calculation of emissions. It is advisable that a dedicated emissions assessment be conducted on the option when making a final decision.

By combining the distance, volume of material to be processed and the processing emissions of each site, an overarching emission profile for each of the options has been developed, this figure, expressed in total Kg CO₂-e is included below:

GHG Emissions summary:

Table 1-1 Ser.	Option	Tonnes	Transport Emissions	Organic Emissions	Total kg CO ₂ -e (Sum of Transport and Organic Emissions)	kg CO ₂ -e Per Tonne of material (Total CO ₂ -e divided by total tonnes)	Remarks
A1/A2/A3/A5	Current	55,000	212,990 (Kerbside collection to OPP)	9,433,600	9,701,590	176	Calcs same for status quo, operational improvements, all indoors & Maturation elsewhere. Maturation elsewhere will need a separate TPT factor when a location is ID'd
A4/B4/E3	Reduced volume @ OPP	40,000	154,631	6,848,793	7,003,424	175	
A4/E3	*Remainder to KV	15,000	523,272	2,396,736	2,920,008	195	
B1	**Wairakau Ōtautahi	50,000	81,022.74	8,576,000	8,657,023	173	New operation at unconfirmed point on pound road
B1	**Envirofert	55,000	6,678,916.22	9,433,600	16,112,516	293	
B1/C1	**CLS	55,000	1,927,530	9,433,600	11,361,130	207	
B3	*Community Orientated Initiatives	200	2142	3440	5,582	28	Estimate based on available data and assumptions on other community initiatives
B3	**Envirofert	10,000	1,661,647.11	1,715,200	3,376,847	338	
B3/C1/C3	**CLS	30,000	1,053,295	5,145,600	6,198,895	207	
C1	OPP Food waste only	11,000	18,143	1,886,720	1,904,863	173	
C2	OPP Green waste Only	44,000	72,570	7,546,880	7,619,450	173	
C2	**Eco Gas	11,000	1,424,650	220,000	1,644,650	150	Food waste only

D1	*Land reclamation	55,000	81,022.74	88,407,000	88,488,023	1,609	Used Lyttelton Port as destination
D2	*Mine Rehab	55,000	1,593,447.24	88,407,000	90,000,447	1,636	Used Greymouth as Destination
D3	*WWTP - Food only	11,000	7,724.00	220,000	227,724	21	
D4	**Mynoke - Ohakune	11,000	1,141,170.10	105,336	1,246,506	113	Organic emissions is an average of 'Compost' and 'Anaerobic Digestion' as MfE holds no data for worm farming emissions - actual CO2-e for 'Organic Emissions' is likely to be lower
D4	**Mynoke - Taupo	10,000	1,306,041.71	95,760	1,401,802	140	Organic emissions is an average of 'Compost' and 'Anaerobic Digestion' as MfE holds no data for worm farming emissions - actual CO2-e for 'Organic Emissions' is likely to be lower
E1/E2	*Kate Valley Landfill	55,000	3,662,903	28,290,240	31,953,143	581	All Organics going from Consolidation point to Kate Valley
E2?	*No collection of green bin. Red bin only	11,000	523,272	20,691,000	21,214,272	1,929	Based on food waste going to KV but no greenwaste.
	**Eco Gas	55,000	5,698,599	1,100,000	6,798,599	124	Assuming 44k of greenwaste can be processed here

***Doesn't include Collection emissions or onwards movement of Processed compost*

**Doesn't include Collection emissions*

4. Feasibility/Risk

To summarise the likelihood of each potential option and assess risk associated with each approach, Council have commissioned WSP to provide an independent planning assessment of the available options. The WSP Planning Report is attached to this report.

At a high level the Planning Report summarises the RMA approvals and associated risk associated with each of the options and considers the pathway (and timeline) for necessary approvals. The report details the potential options, stepping through existing and required consents with a feasibility score attached to each option.

Of the options which were found to have a high feasibility rating, Envirofert in Tuakau was the only site which has expressed a commercial interest in receiving all of the Council's organic material.

Of the options assessed to have a medium (1-2) year feasibility of being implemented, Kate Valley as either a composting site or as landfill and Canterbury Landscape Supplies for composting were the only two sites identified.

Several sites were assessed as having high feasibility of second stage composting, if the Council continues to use the OPP for the first (indoors) stage.

All other sites either had a low feasibility (circa 3-4 years to implement) or did not supply enough information to be assessed.

In addition to the RMA approvals, legal risk and overall capacity to deliver a solution or part solution were considered.

Legal risks overlap with certainty/feasibility risks:

1. Risks of enforcement by Environment Canterbury at the current site. We have some information about this.
2. Risks of enforcement by regulators at alternative sites. If not consented/operated by the Council, these are not direct risks for the Council, but could result in operational problems with processing waste at the other sites.
3. New RMA approvals not being obtained in time, or not obtained at all.
4. Negotiating and drafting new contracts.

5. Govt and Council policy

Government and Council policy is described in the staff report. Core strategic and policy drivers for the diversion of organics from landfill include:

- Waste Minimisation Act 2008 - The purpose of this Act is to encourage waste minimisation and a decrease in waste disposal in order to (a) protect the environment from harm; and (b) provide environmental, social, economic, and cultural benefits.
- Waste Management and Minimisation Plan 2020 – make sure the organics facilities support climate change emissions targets
- Ōtautahi Climate Resilience Strategy 2021 - Maximise composting or organics & reduce transport emissions
- The NZ Waste Strategy/Te rautaki para (March 2023) – Requires all councils to have an organics diversion system in place by 2026 or 2030 where facilities do not exist. This means 2026 for this council.
- Emissions Reduction Plan 2022 – need to reduce biogenic methane emissions

6. Behavioural change

Dependant on the approach taken by Council, there are likely to be a number of impacts on residential behaviour and satisfaction with Council's kerbside services.

Options have been considered which change the collections system, whether by changing the frequency of the green bin service (to reduce volume) or changing the size of the bins provided (including removing the green bin entirely). In evaluating the options, the potential for a particular change to influence established and highly successful residential behaviour towards Council's overarching waste system, has been considered, as follows:

Should Council decide to reduce the frequency of its service, or stop collecting the green bin entirely, it is likely that this change would impact other collection services, including a high likelihood that organic material would be transferred to the red bin and potentially to the fortnightly recycling bin. The inclusion of organics and putrescible material in the yellow bin is a significant issue as it can lead to contamination of kerbside recycling.

Costs of a change in behaviour (both marketing spend and operational costs as a result of behaviour change):

The below figures are a result of the behaviour change that occurred when residents were able to put rubbish into their recycling bin during the Covid lockdown. This

was only meant to be for the lockdown period but the impacts of the behaviour change has been extensive. It has taken 2.5 years to achieve 99% of trucks being recycled following the decision to use the recycling bin for rubbish.

Cost incurred to prevent contamination of residential recycling:

- 19/20 – 634 trucks sent to landfill @ \$1000 a truck
- 20/21 – 1638 trucks @ \$1000 a truck plus \$229k marketing spend
- 21/22 – 735 trucks @ \$1000 a truck plus \$177 marketing spend
- 22/23 – 134 Trucks @1000 a truck plus \$94K marketing spend to date

In total, since 2019/20 when the kerbside contamination issue arose, the following costs have been incurred:

- \$3,141,000: Total cost of rejected trucks for this period- i.e. a total of 3,141 rejected trucks from 2019 (WK 1) to 13 March 2023 (WK 150)
- \$500,000 (to date): Total cost of marketing spend for this period

Council's communications team have also advised that due to the volume of material involved in the organics waste stream, and the fact that every household would need to be targeted for any system change related communications, then it is considered that a change of the organics stream may require even higher level marketing investment.

Likely Consultation costs

It would be approximately \$50,000-\$60,000 (estimated cost only) to engage Christchurch residents to provide feedback on the proposed changes.