The future of organic waste processing in Christchurch – public report

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Context

The Organics Processing Plant is a Council-owned composting facility that processes organic waste from the kerbside green bins, food waste, green waste and riverweed. It is operated under contract by Living Earth, a division of Waste Management NZ Ltd. Environment Canterbury has issued an Abatement Notice to cease all offensive and objectionable odour travelling beyond the boundary of the facility by 31 January 2022. This has prompted the requirement for an upgrade of the processing plant.

On 9 December 2020 the Three Waters and Waste Infrastructure and Environment Committee approved resolution TWIA/2020/00033 supporting the upgrade of the plant's composting technology and the construction of a new building so all processing and screening of material is enclosed. On 25 March 2021 the Finance and Performance Committee approved the procurement

plan for the project. This consisted of a multi-stage tender process for a design and build contract. A total of $21.7 million was allocated to this project in the Long Term Plan.

All compliant proposals received through the tender process were over budget. The tender evaluation team selected a top-ranked proposal. Staff have developed a number of variations to this proposal to be considered by the elected Council.

Due to the difference between the tender offers (costs) and the approved budget, the elected Council requested staff to evaluate the viability of building a new organics processing facility.

Interim compliance measures

The Council and Living Earth have implemented interim measures to mitigate odour from the facility, these measures are detailed in a Transitional Plan and include:

- Reducing the volume of compost stored outside by over 50 per cent
- Stopping the acceptance of pre-consumer food organics
- Trialing the use of a probiotic additive.

Further interim measures to enable compliance with the aforementioned Abatement Notice during the process of building a new facility or upgrading the existing facility will be required.

This will include stopping all outside processing of material. The Council are working through options for all compost to be removed from site following the fully enclosed tunnel composting phase of the process. We are committed to doing everything practicable to comply with the Abatement Notice whilst we work through the options on the future of organic waste processing in Christchurch.

Options being considered by the elected Council

The options that will be considered by the elected Council on 9 September 2021 will be:

- **Option 1** – Progress with the upgrade of the current facility.
- **Option 1a** - Progress with the upgrade of the current facility, with minor changes to the proposal.
- **Option 1b** - Progress with the upgrade of the current facility, with limited changes to the proposal including a smaller new processing building.
- **Option 1c** - Progress with the upgrade of the current facility, with some changes to the proposal including enclosing the screening operation but stabilisation and storage of material happening outside.
- **Option 1d** - Progress with the upgrade of the current facility, without building a new processing building.
- **Option 2** – Request staff pause progression with the upgrade of the current facility whilst building a new organics processing facility is investigated. Request staff report findings back to the Council in March 2022.

Under all options, it is recommended interim measures to remove all outside processing of compost are implemented.

Staff will be recommending that the elected Council progress with Option 2.

Top-ranked proposal

The top-ranked proposal was supplied by a consortium of companies with extensive experience in complex large-scale construction projects, including organic waste processing facilities. The proposed upgrades include:

- A full upgrade of the 18 in-vessel tunnels, including new pipework, fan systems and doors
- The construction of new biofilters
- A new processing building.

The proposal is compliant with the Council's requirements and allows for a fully enclosed solution, with no outdoor processing, storage or load-out of material. Staff are confident this solution will be effective at eliminating offensive and objectionable odour travelling beyond the boundary of the facility.

Alternative upgrade options

Staff have developed four variations to the top-ranked proposal for the elected Council to consider. All reduce costs to varying degrees and result in slightly different risk profiles.

Option A

The first option to reduce costs does not change the risk profile of the final facility in regards to odour (i.e. it will enable the plant to comply with the consent conditions regarding odour). Changes to the proposal relate to materials used, sequencing and general specifications. Savings are limited but the final outcome is a fully enclosed solution.

Option B

The second option to be considered by the elected Council also retains most of the key features of the full proposal, including all processing of material happening indoors and a full upgrade of the in-vessel tunnels. However, load-out of finished product would not be enclosed. Further, the new processing hall would be reduced in size and process air from this building would not be discharged via a biofilter.

Option C

This option includes the full upgrade of the 18 in-vessel composting tunnels and a new building to enclose the screening of material. Under this proposal curing, storage and load-out of material would happen outside. With the upgrades to the tunnels, the improved maturity of product following the tunnel composting phase allows the stabilisation and storage of material to take place in covered bunkers rather than windrows if required.

Option D

Staff have also developed the option for only upgrading the composting tunnels, with screening happening within the existing structures and curing/storage of material happening outside. Similar to option C, stabilisation and storage could happen within covered bunkers if required.

Viability assessment of building a new facility

Staff have undertaken an initial viability assessment of building a new facility. Reviewing technology options, potential land options, cost estimates and timeframes.

Technology options

In-Vessel composting

This is the technology currently in place at the organics processing plant in Bromley, although it is under specified for the waste volumes required. It consists of concrete tunnels with pipework embedded in the floor. Fans are used to manage temperature and oxygen levels within the tunnels. All air is extracted and treated via a biofilter prior to release. The technology is widely used in Europe, Canada and Australia. Properly sized systems have low risk of odour and can process multiple feed stocks, including mixed food and garden waste. As this system can be fully enclosed, facilities do not necessarily require large setbacks and are often located in industrial areas rather than rural locations.

Aerated Static Pile/GORE® covers

An Aerated Static Pile (ASP) is similar to a tunnel, in that pipework is embedded in a concrete pad and fan units are used to blow air through composting material. They predominantly use positive aeration (blow air out) but can also use negative aeration (pull air through). This technology can be complemented by the use of GORE® covers that allow air in (providing oxygen) but manage airflow out (reducing the risk of odour). This system is used at Hampton Downs in the North Island which processes organic waste from the likes of Tauranga City Council. This system is not enclosed and the risk of odour is relatively high when managing the volume of waste the Council does. This would only be appropriate in a rural location with large buffer areas.

Wet Anaerobic Digestion (AD)

Wet Anaerobic Digestion (AD) processes organic waste without oxygen, producing the by-products of methane and digestate. Methane can be used to generate electricity. Digestate is a type of fertiliser and is typically applied to land in a similar manner to synthetic fertilisers. The process requires a feedstock composition of less than 5 per cent organic solids, this means it is not appropriate for a mixed food waste and garden waste. To implement this technology the Council would need to change its collection methodology to collect food waste only (or food waste and garden waste as separate waste streams) or separate the food waste through a sorting plant at the composting plant (although it is unclear if technology is available to successfully separate material post-collection, and it may incur significant additional capital and operational costs). Wet AD is used around the country, including at the Christchurch Wastewater Treatment Plant. However, there are currently no facilities processing food waste with this technology. EcoGas are currently constructing a Wet AD facility to process food waste from Auckland City Council in Reporoa in the central North Island.

Dry Anaerobic Digestion (AD)

Dry Anaerobic Digestion (AD) also processes waste without oxygen but in a manner that can manage a higher organic solid content. It is typically used as a pre-process to in-vessel composting, with methane harvested for energy during the dry AD phase and the solid output product used as feedstock for an aerated composting process. The system produces lower methane than wet AD, but is more resilient to contamination and would be able to process organic waste collected through our existing kerbside system (food waste and garden organics). Dry AD systems are used to manage organic waste streams in many locations around Europe but no facilities have been built in Australia or New Zealand to date.

Development site/Land options

An initial assessment of potential options for suitable alternative sites/land has been undertaken.

Key avenues explored include Council-owned land, land owned by neighbouring councils and the regional council, industrial-zoned private land and rural locations.

Following the initial assessment, it was concluded that there may be potential sites for a new facility, but all sites considered have limiting factors. Further investigation is required to determine the viability of the potential options. This would include detailed conversations with Environment Canterbury regarding consenting requirements. If a suitable alternative site is found, and the Council decides to progress that option in March when officers report back, we anticipate it may take three years to secures consents and construct the new plant. In the meantime the current Bromley site would continue to operate under the odour mitigation measures described above.

Timeframes

There are a number of factors that could impact the timeframe significantly, including purchasing land/appropriate land being available, applying for and gaining resource consents as well as procuring and constructing the new facility. We anticipate three years would be a minimum timeframe. However, many aspects of the timeframe fall outside of Council's control and the process could extend to four or five years in some circumstances.