

## EXECUTIVE SUMMARY

The City of Penticton has committed to replacing their existing wastewater solids composting facility at Campbell Mountain. The Regional District of Okanagan-Similkameen (RDOS) is partnering with the City of Penticton for an opportunity to build a facility that can compost the wastewater solids as well as food organics.

The proposed composting operation would have separate streams for composting solids and organic food waste and would be located east of the Campbell Mountain Landfill (CMLF). It would be designed to accommodate up to 35,000 tonnes of organic materials per year. The current CMLF service area includes all or parts of Electoral Areas B, D, E, F, G, and I, City of Penticton and Village of Keremeos.

### Improved Composting Process

The proposed composting process uses Gore-Tex (a waterproof, windproof and breathable material) that covers the decomposing organic material to contain odorous emissions and moisture under the covers. Air is injected from under the compost pile to stimulate aerobic decomposition of organic matter to produce a peat-like humus. Channels under the pile also collect leachate which is later reincorporated into the organic materials.

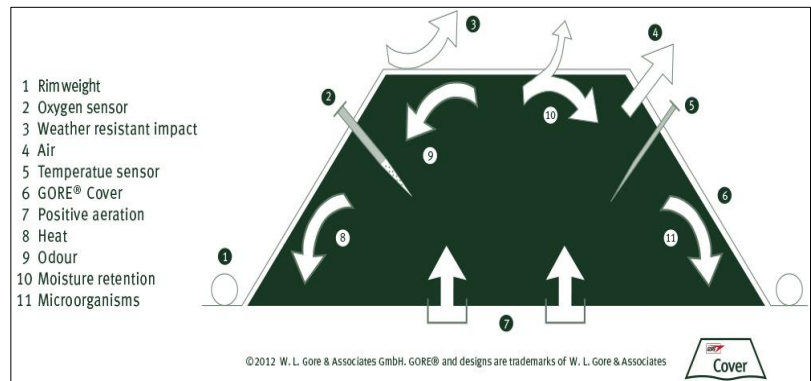


Figure 1 - System dynamics of the GORE Cover System.

Most of the composting activities would also be conducted inside a building that will act as a secondary level of containment so that any residual emissions from the composting process would be captured and treated using a biofilter. This type of composting process called in-vessel composting.

### Odour Controls

The first level of defense is the GORE cover membrane that will be used for Step 2 and Step 3 of the composting process. The membrane serves as a waterproof yet breathable material that maintains pile moisture by trapping water molecules along the underside of the membrane, preventing evaporation. The membrane also reduces direct odour emissions, as it creates a “bubble” around the pile, allowing minimal air flow between the pile and the environment. The moisture layer on the underside of the membrane also captures any generated odour molecules, trapping them inside the water droplets.

The second level of defense is the biofilters that industry best practices recommend controlling odours from organic processing facilities. Biofilters are generally comprised of wood chips and mulch and are replaced periodically to maintain optimal odour control capabilities. These features are designed to capture and treat odours, mitigating them from entering the environment. Two large biofilters will be installed to ensure strict odour control.

The combined treatment from these two odour control improvements is calculated to reduce odour emissions from the existing composting operation by nearly 70%.

### Leachate Controls

The entire composting operation would be paved so that any leachate generated would be collected and prevented from entering the environment.

Leachate from inside the in-vessel composting process and from the rest of the paved areas will be contained into a large storage tank or stormwater pond. The stored leachate would be recirculated or aerated before being reused in the active composting process to maintain moisture and nutrient levels.

### Material Handling and Process Flow

As shown in Figure 2, the upgraded composting facility will work in the following manner. Table A describes the various steps in the handling and processing of the organic materials received.

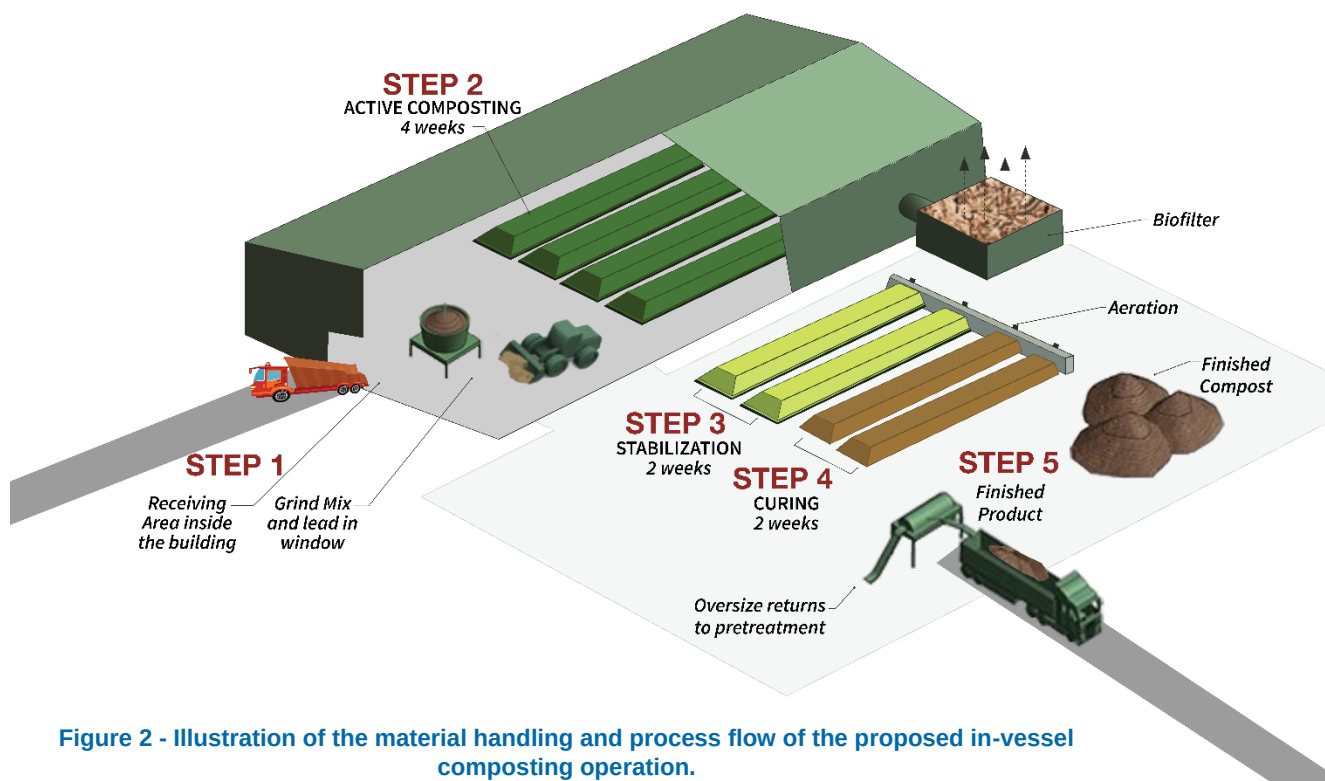


**Figure 2 - Illustration of the material handling and process flow of the proposed in-vessel composting operation.**

**Table A: Summary of Material Handling and Composting Process**

| Step | Step Description                             | Summary of Activity                                                                                                                                                                                                                                                                                                                                               |
|------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Receiving &amp; Feedstock Preparation</b> | <ul style="list-style-type: none"> <li>Receipt of organic feedstocks (food/yard waste and solids in separate streams)</li> <li>Organic material is ground-up and mixed to the desired compost recipe.</li> </ul>                                                                                                                                                  |
| 2    | <b>Phase 1 (Active Composting Phase)</b>     | <ul style="list-style-type: none"> <li>Mixed organic materials loaded into bunkers</li> <li>Gore-Tex covers placed and secure over the bunkers.</li> <li>Aeration system activated to maintain optimal operating conditions such as temperature, oxygen, and moisture levels</li> <li>Active composting phase occurs for at least four (4) weeks</li> </ul>       |
| 3    | <b>Phase 2 (Stabilization Phase)</b>         | <ul style="list-style-type: none"> <li>Post active composting phase, the organic materials are moved to bunkers outside.</li> <li>Gore-Tex covers are placed and secured on the organic materials and the aeration system is activated again to stabilization of the organic materials.</li> <li>Stabilization phase occurs for another two (2) weeks.</li> </ul> |

|   |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | <b>Phase 3 (Curing Phase)</b>         | <ul style="list-style-type: none"> <li>▪ The mostly composted organic materials moved to the curing bunkers to complete the composting process.</li> <li>▪ At this point, the amount of decomposition activity should be minimized, resulting in very little decomposition and odourous emission being released.</li> <li>▪ Aeration is continued (without covers) to cure the compost and prepare the soil amendment for market.</li> <li>▪ Curing takes another two (2) weeks.</li> </ul> |
| 5 | <b>Screening and Finished Product</b> | <ul style="list-style-type: none"> <li>▪ Cured compost is screened to remove contaminants and “oversized” materials from the finished compost.</li> <li>▪ Finished compost is stored in large piles to be distributed to end-markets.</li> <li>▪ Oversized materials are used in the feedstock preparation to stimulate decomposition of fresh organic material.</li> </ul>                                                                                                                 |

### Socio-Environmental Benefits

The proposed improvements would change the existing composting operation from an open-air system with minimal odour controls, to a two-stream in-vessel system that has extensive odour mitigation measures (enclosed buildings, biofilters, GORE covers) resulting in a 70% decrease of odour release to the environment.

The composting operation is proposed to be located on the adjacent property that is east of the CMLF. This will increase the disposal capacity at the landfill and move the composting operation farther away from most residents thereby reducing potential nuisance impacts.

Besides the operational benefits, the organics composting facility also promotes a circular economy for the organic waste stream. The end product is compost which can be re-used within the region to grow food, hold nutrients in the soil and support local demand from residents and the agricultural sector for high-quality soil, thus completing the circular economy.

Diverting organic materials from the landfill also reduces potential greenhouse gas (GHG) emissions. Landfilled organic waste results in methane, a powerful GHG. Reducing or diverting organic materials away from the landfill reduces decomposing organic waste which can reduce methane production and the Regional District’s environmental or carbon footprint.

### Economic Benefits

In addition to the socio-environmental benefits listed above, the proposed improvements will save in the operational costs of the landfill as the cost to compost is less expensive than that of landfilling. The cost of creating a joint, two-stream composting facility for food, yard and waste solids will reduce capital costs by nearly \$2.5M and processing cost by \$26 per tonne (without the grant) or \$66 per tonne (with the grant).

The property located at 1313 Greyback Mountain Road is the most fiscally responsible option for the facility as it is anticipated to save capital costs, create approximately \$11 to \$16M worth of additional landfill airspace, and easily facilitate sharing staff and equipment between the two sites. Relocating the current solids composting facility and reduction or organics will extend the life of the landfill, deferring future costs that will save taxpayer dollars.