# MECH 45X Capstone Project 2020-21
# University of British Columbia

Liaison: Prasanna Balakrishnan. prasanna@growingcity.ca

## Growing City – Sustainable Waste Bins

Growing City (GC) was founded by Lisa Von Sturmer in 2009 with the intention of changing the world. This proud, Vancouver-based company became the first in North America to provide corporate organics recycling services and continues to divert roughly 2,000,000 kgs of waste from landfill every year.

In the past 11 years, Growing City has expanded its expertise to a full suite of recycling services across the Lower Mainland. It has received various awards and best-in-industry recognitions. Most famously, Growing City is also the second Most Impressive Pitch of all time on Dragon's Den.

### Introduction

Growing City is calling on a group of dedicated students to work on its next big project. This project was inspired by the growing importance and awareness of using sustainable materials instead of traditionally selected ones. For GC, this is an opportunity to evaluate its own processes and products. Two of these products are the actual bins and the compostable liners used to line organic waste bins. The bins currently in use are made from plastic (recycled, when possible) with elements of stainless steel.

Growing City wants to explore the possibility of developing bins using only sustainable materials. This product would be introduced to our client's offices as an added element of our commitment to sustainability.

Additionally, the compostable liners often do not provide adequate leak protection or break under unsuspecting loads. Many times, service inefficiencies are caused by needing to clean spills caused by fragile liners.

For GC, this posed the need to understand if indeed there were materials better than those available in the market used for the construction of the bin and the compostable liners for organics waste bins. While designing this new bin and liner system, it was further thought to develop a system of cleaning and relining full bins that was efficient and tidy.

### Brief Project Description

Develop a leak-proof, odour-proof receptacle made from compostable materials for collecting household / office organic waste using sustainable materials. The receptacle must have a "bin" and "liner".

**Material Identification**

The "bin" and "liner" construction must be made from sustainable materials. Specifically, the "liner" must be compostable. GC encourages experimentation with materials that can be repurposed after

their primary uses (ex. ChopValue, a Vancouver-based company uses recycled chopsticks to make furniture).

**Mechanical Requirements**

- Since our company provides cleaning / emptying and re-lining of the compost bin, we are curious to identify a process that is less messy (less risk of spills), efficient
- The construction must be leak-proof, and odour-proof as most organic waste material is semi-liquid
- The capacity of typical office / household bins is either 30 L or 50 L. The design must allow a mess-free swap-service possible.
- A hands-free (ex. foot-pedal operated) design is usually preferred

## Expected Outcomes

The following are some desired outcomes from the Capstone Project. The important aspect is in seeing tangible progress that may be taken further by future students and project participants

**Material**

- A clear understanding and identification of material(s) suitable for the bin and liner
- Understanding the ease of manufacturing, replicability, and scalability

**Mechanical**

- Detailed design drawings and literature of new features, specifications, and integration with bin
- A standard operating procedure on how to use the bin / liner and how to service a bin (i.e. emptying out its contents and preparing its re-use)

If a physical prototype is not possible, then detailed drawings of the design and/or instructional video would be accepted.

## Resources Available from the Customer

- Financial Support: Funding up to a maximum of $2500 will be available for the project. The release of funds however is contingent on the strength ideas and strategies pitched by students and under the discretion of Growing City.
- Supervisory: Growing City staff is open to guiding students with weekly check-ins to help set goals, brainstorm, review work, offer suggestions, answer queries and general supervision
- Site Visits: In-person office visits may be discussed based on the recommendations of Public Health and prevailing office environment

## Customer Requirements & Priorities

| | |
|---|---|
| HIGH PRIORITY | • Identify material(s) that can be sustainably produced or sourced for this application |

| | |
|---|---|
| MEDIUM PRIORITY | • Improve or maintain the user experience of servicing a bin i.e. removing a full bin without leaks or tears, cleaning, and relining of the bin. |
| LOW PRIORITY | • Aesthetic appeal while essential, is a lower priority for the first generation of this product |

**Additional Information**

Here are some examples of our existing bins. These are made from a combination of plastic (recycled when possible) and elements of stainless steel.


*Figure 1: 50L Office Bin*


*Figure 2: 30L Office Bin*