

CIRCULAR ECONOMY IN PLANNING

The Summit Landfill Soil Fabrication Pilot Project

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ABSTRACT

Cities are rapidly growing and the systems of production and consumption that support this growth contribute to the depletion of natural resources and pollution of the environment. (Circular Innovation City Challenge, n.d.). The Circular Economy model offers an alternative approach to the predominant linear “take-make-dispose” economic system. It aims to keep materials in the cycle through restoration, regeneration, and recycling practices (Bolger and Doyon, 2019). Municipalities can employ the Circular Economy model as an important tool to achieve policy objectives and sustainable development goals. In Collaboration with Becky Raddatz, Environmental Planner at the City of Winnipeg, this case-in-point highlights success and challenges associated with the Summit Landfill soil fabrication pilot project and identifies innovation, pilot projects, and collaboration as the three main components for supporting the Circular Economy in planning.

1.0 / INTRODUCTION

Resource consumption and waste production had been unprecedentedly increasing across the world. Today, cities account for around 50% of global solid waste generation and 70% of greenhouse gas emissions (Circular Innovation City Challenge, n.d.). This leads to social and environmental challenges. The Circular Economy model offers an alternative approach to the

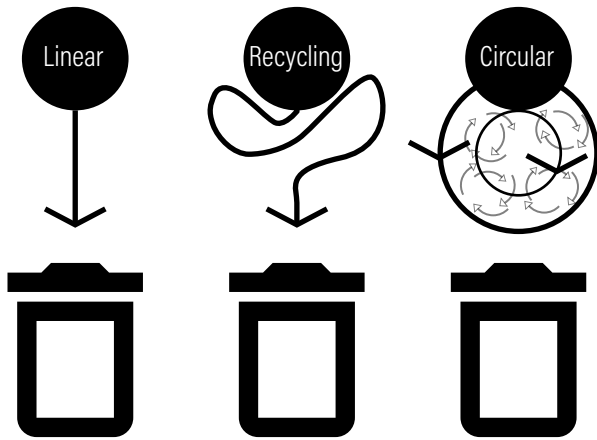


FIGURE 1 | The Circular Economy Model

predominant linear “take-make-dispose” economic system. This model seeks to find new ways to close the resource and material loop through reusing or renewing materials, or safely returning to nature.

A brief review of the academic literature reveals that discourse on Circular Economy has gained momentum in response to growing concerns for climate mitigation, sustainable development, and resource security (Kirchherr et al., 2017). For example, Wijkman and Skånberg (2015) emphasize the significance of public policy and investment for the transition to a Circular Economy in cities. Bolger et al. (2019) assert that the Circular Economy concept can assist local governments to realize sustainable visions. Moreau, Sahakian, van Griethuysen, and Vuille (2017) point to the importance of institutional conditions for the Circular Economy.

Despite making its way into academic and professional discourse, some may consider it as being too vague to be implementable (Kirchherr et al., 2017). The key challenge involves transforming Circular Economy principles into practice. Other challenges include a lack of integrated guiding framework (political and legal), limited tools, and technological barriers (Bolger et al., 2019). Research has indicated that further investigation is



FIGURE 2 | Circular Economy: New Lifecycle

needed to identify the tools and methodologies that are needed to enable urban leaders to transition to a Circular Economy and regulatory barriers that prevent the shift towards a more circularity (Ellen Macarthur Foundation, 2017).

However, there is evidence to suggest that best practice exist that can improve the chances that the Circular Economy can be employed as a tool to achieve objectives in plans and policy documents. In collaboration with Becky Raddatz, Environmental Planner at the City of Winnipeg, the following components emerged as being important for supporting a local circular economy in planning:

1. Innovation is key in finding solutions to design out waste. Municipalities can overcome the challenges associated with a linear take-make-dispose economic system through encouraging innovation and creativity for finding a beneficial use option for materials considered to be waste.
2. An environment where pilot projects can happen is critical for moving towards a Circular Economy. Pilot projects are the efficient means to test and carry out new initiatives that intend to promote circular economy approaches in planning.
3. Collaboration and communication could help identify work areas that intersect between different departments in a municipality and increase the capacities of municipalities to address complex problems.

2.0

THEORETICAL BACKGROUND

The Circular Economy model aims to keep materials in the cycle through restoration, regeneration, and recycling practices (Bolger and Doyon, 2019). This model is based on three core principles: (1) design out waste and pollution; (2) keep products and materials in use; and (3) regenerate natural systems (Ellen McArthur Foundation, n.d.).

The concept of Circular Economy is centred on addressing human needs and fairly distributing resources without negatively affecting the functioning of the biosphere or exceeding the regenerative potential of ecosystems (Winnipeg Metropolitan Region, 2021).

The Circular Economy model calls for a paradigm shift to address unsustainable rates of consumption (Bolger et al., 2019). A shift towards a more circular economy is crucial to achieving a “sustainable development” which necessitates environmentally responsible development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (Hough 1995, p.5). The Circular Economy model is also associated with economic potentials (McKinsey Quarterly, 2017). There is, therefore, a strong interest among policymakers and planners in learning from international experiences in the transition to a Circular Economy in cities.

The Circular Economy encourages municipalities to find new ways to deliver services and redesign systems to reduce waste and extend resource lifecycles (City of Toronto, n.d.). Overall, local governments have a strong influence over the choice, design, use, and flow of materials in a city, and thus are key players in a transition towards a circular economy (Ellen McArthur Foundation, n.d.). A more circular economy approach to service delivery challenges the municipalities to rethink how they provide services to residents. In the following section, I

“A Circular Economy is based on the idea that there is no such thing as waste.”

— YouMatter, n.d.

will review the Summit Road Landfill pilot project in Winnipeg, to highlight opportunities and challenges associated with initiatives that support the Circular Economy’s principles.



FIGURE 3 | Summit Landfill Biosolids Soil Fabrication

3.0

CASE

The Summit Road Landfill is located northeast of the intersection of the Perimeter Highway and CentrePort Canada Way in Winnipeg, Manitoba. The land is owned by the City of Winnipeg and is designated as “Rural and Agricultural Area” in Complete communities, an “ourWinnipeg” Direction Strategy”. It is zoned “A” Agricultural, in the City of Winnipeg Zoning Bylaw 200/06, which allows landfills as a conditional use. The Summit Road Landfill site covers an area of approximately 76 hectares. The landfill was operated by the City of Winnipeg from 1964 until it closed in 1998. Since then, the closure stages have been ongoing. The City of Winnipeg intends to establish a native prairies landscape using a soil fabrication method to complete the landfill cap (City of Winnipeg, 2020).

Soil Fabrication

The City of Winnipeg is currently undertaking a pilot project at the Summit Road Landfill to create a “biosolids” fabricated soil that will be used for a final vegetative cover on the closed

landfill cap system (Winnipeg Free Press, 2020). Biosolids are nutrient-rich, solid by-products of wastewater treatment. The City of Winnipeg initiated the pilot project in 2018 to fabricate soil using mineral and organic residuals managed by the City of Winnipeg that includes:

1. municipal biosolid from the City's North End Water Pollution Control Centre (NEWPCC)
2. wood grindings from City tree removal operations, and
3. sand and grit from winter road maintenance operations (street sweepings)

Success

The results of this pilot project indicate that the use of biosolids fabricates soil to support a vegetated landfill cover is an operationally viable and environmentally protective management option for the City's biosolids (City of Winnipeg, 2020). The benefits associated with the project include:

- Using organic residuals (wood chips, sand, grit) in soil fabrication reduces the cost of soil importation while provides a beneficial use opportunity for regionally generated residuals (City of Winnipeg, 2020a);
- The beneficial use opportunity for residuals allows the City to divert more biosolids from being buried at the Brady Road Resource Management Facility (BRRMF);
- The project decrease the costs associated with managing the city-generated residuals (wood chips, sand, grit) (City of Winnipeg, 2020);
- The biosolids soil fabrication pilot project helps establish a native prairie habitat; and

- The biosolids fabricated soils could promote vegetation establishment and can be used in a variety of municipal contexts such as roadside plantings, gardens, and parks. In addition, the soil fabrication will restore the landfill to native prairies landscape (City of Winnipeg, 2020).

Following a successful pilot project, the City applied for an *Environmental Act License* in 2020 to make the program permanent (City of Winnipeg, 2020).

“We are using materials that could have otherwise ended up in the landfill”, said Becky Raddatz

— City of Winnipeg, 2020a.

Challenges

Although, the Summit Landfill soil fabrication is recognized as operationally and environmentally feasible project today, the project has come with its own challenges. One of the challenges associated with the soil fabrication pilot project at Summit Landfill was the understanding of how the project would fit in with the existing regulations. The land application of biosolids in winter is not allowed under the existing waste management regulation (City of Winnipeg, n.d.a). Given that the City's Biosolids Master Plan recommends beneficially reuse biosolids and the Province of Manitoba allows undertaking pilot projects, the City could receive approval from the Province to operate soil fabrication from November to April as a top cover at the Summit Landfill (City of Winnipeg, 2020). Making room for innovation allows the cities to rethink the ways services are delivered and is an important factor in shifting towards a Circular Economy model.

4.0 ANALYSIS

The soil fabrication project was introduced to address the City's problem of finding a beneficial use option for biosolids in terms of land application. While a Circular Economy model was not the goal of the Summit soil fabrication project, the outcomes of this project align with the principles of Circular Economy.



FIGURE 4 | Caption here

From the Summit Landfill soil fabrication project, the following components has emerged as important factors in shifting towards a Circular Economy model.

Making Room for Innovation

Constantly looking for a beneficial use option for materials could lead to building momentum. The biosolids soil fabrication was an innovative approach that was suggested as a beneficial use option for organic residuals and as an alternative to landfilling of biosolids. However, governments' structures and functions could negatively affect the promotion of innovation and creativity. Sometimes regulations, rules, processes, and procedures could impede innovation (OECD, n.d.). How governments function influences the capability and motivation to innovate. Therefore, making room for innovation could lead to finding new ways for using materials that otherwise could end up in landfills.

Planning by Doing

Pilot projects are living labs to quickly test ideas, engage stakeholders, and transform circular economy principles into actions. Pilot projects are usually low-risk and high-reward that allow exploring innovations and concepts. Decision-makers and stakeholders will be able to perform project-specific testing in a form of pilot projects to document the outcomes. The biosolids soil fabrication pilot project allowed the city to examine the viability of fabricating soil with biosolids. In 2018, the province of Manitoba approved the biosolids soil fabrication project under the Exemption Clause (6) of the Classes of Development Regulation. The results of this three-year pilot project demonstrated that soil fabrication is a viable option for completing the cap system at Summit Landfill while meeting environmental and human health criteria (City of Winnipeg, 2020). The pilot project was

beneficial since it was an efficient mean to carry out a new initiative, verify costs and benefits, determine opportunity viability, and serve as a way to educate and build support. In short, pilot projects in which innovations are tested on a small scale often show impressive results. Decision-makers and stakeholders should work to create an environment where pilot projects are allowed to happen since they are the efficient means to test and carry out new initiatives.

Collaboration for a Circular Economy

The three core principles of a circular economy can be transformed into actionable plans through promoting collaboration to foster coordination and effective management to meet challenges and capitalize on opportunities. The biosolids soil fabrication pilot project at the Summit Road Landfills in Winnipeg has involved many different stakeholders. In this project, collaboration was promoted through which interaction was allowed to establish relations and discussions. This process enabled participants to learn and understand the problems, the objective of the project, and the processes involved.

Research has shown that collaborative planning plays a significant role in dealing with the complexity and diversity of urban governance fields (Purbani, 2017). Collaborative planning encourages people to be engaged in a dialogue and share information to learn new ideas through mutual understanding, to create innovative outcomes, and build capacity. Collaboration could help identify working areas that intersect between different stakeholders. It allows to build up new discussions and relational networks with the capacity to address complex problems like finding a beneficial use option for the biosolids.

5.0 / **LESSONS LEARNED**

The Circular Economy model is a tool to achieve policy objectives and sustainable development goals. Becky highlights the following experiences from the Summit Landfill soil fabrication pilot project that should be taken into account for similar projects in the future:

- communicate early and often is essential to identify challenges ahead;
- start small and then expand and adjust as you learn; and
- share knowledge as it could help receive feedback and spark ideas



FIGURE 5 | Circular Economy Ecosystem

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Image Resources

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