MAPPING REUSE, REPAIR, AND SHARE

DEVELOPING A ZERO WASTE ASSETS MAP

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About the Author

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Executive Summary

The concept of reuse, repair, and share are growing in popularity as consumers become increasingly aware of the environmental impacts of their consumption habits. Engaging in reuse activities like buying, selling, donating, repairing, and sharing second-hand items play a critical role in waste reduction and avoidance efforts by providing alternatives to purchasing new and disposing used items.

One way for residents to engage more actively in reuse activities is through donating, selling, purchasing, repairing, and sharing goods. Vancouver is home to a wide range of establishments that support reuse activities; however, while there are several reuse, recycling, and disposal resources online for residents to consult when purchasing, reusing, or disposing of goods, there is no consolidated resource that compiles zero waste assets into one platform. A zero waste assets map can fill this gap and provide a public-facing tool for residents to refer to when seeking to practice reuse, repair, sharing, and other zero waste activities. This map can also be used to measure the existing state and evolution of a zero waste culture in Vancouver over time and inform policy. This report aims to inform the City of the value of engaging in a mapping process that identifies zero waste assets in an easy-to-use tool.

This report focuses particularly on the following questions:

» How can a zero waste assets map contribute to or support the development of a zero waste culture in Vancouver?

» How can a zero waste assets map help to measure progress towards developing a zero waste culture in Vancouver?

» What methodology should be employed to develop a zero waste assets map?

The objectives of the study are to:

» Identify the potential uses for a zero waste assets map by residents and policymakers in Vancouver;

» Identify what information should be collected in the mapping process to support those uses; and

» Develop a draft methodology for completing the zero waste assets mapping process.

Terminology

Zero waste mapping

A process of collecting, recording, analyzing, and synthesizing information to illustrate zero waste assets in a given community.

Zero waste activity

Practices that avoid and reduce the generation of solid waste.

Zero waste asset

Various elements that contribute to zero waste, whether natural, built, social, economic, or service. These assets facilitate waste avoidance, reuse, repair, sharing, associated skills development, etc.

Zero waste culture

Waste is avoided and minimized throughout product lifecycles and zero waste activities are highly visible cultural norms.

Methods

This research focuses on developing a methodology that may inform a future mapping project to identify zero waste assets in Vancouver. The research questions and methodology were developed in collaboration with the project mentor to satisfy the research objectives. Overall, a literature review, five case studies, and six semi-structured interviews were completed.

Drawing from community based asset mapping theory, this report applies a participatory mapping framework to propose a methodology for developing, maintaining, and analyzing a zero waste assets map. Community based asset mapping is a process of mapmaking that centers on the values and experiences of a particular community to define and identify social, cultural, and economic assets that contribute to the community's sense of place.

Recommendations

This report offers recommendations for developing, maintaining, and evaluating a zero waste assets map that should be taken into consideration by different stakeholders looking to engage in a participatory mapping project.

Use an integrated approach to define, collect, visualize, maintain, and analyze a zero waste assets map. This approach includes both internal efforts led by staff and extensive community engagement in the process of defining and identifying assets, visualizing and maintaining a map, and evaluating the use of the map to inform future policy direction.

Address barriers that prevent residents from engaging in zero waste activities. The four main challenges identified are cost, time and convenience, awareness and access to information, and norms and perception. Addressing these barriers with different community groups will increase the likelihood of the map's usage.

Develop a map that is easy to use, up-to-date, accessible, and convenient. To ensure that the map is used by residents and supports the expansion of zero waste activities in Vancouver, a map must satisfy these requirements.

Create an inclusive map. There are a wide range of zero waste activities that are already practiced by many different cultures and communities. Recognizing the knowledge and expertise from diverse communities will make the map a more valuable resource and may encourage more residents to use the map.

Consider regional integration. Vancouver is part of an integrated metropolitan area where communities may define and identify zero waste assets differently based on their values and needs. Not all residents in the metropolitan area can access zero waste establishments in Vancouver. Expanding the map may be done through partnerships with other municipalities.

Introduction

The concept of reuse, repair, and share are growing in popularity as consumers become increasingly aware of the environmental impacts of their consumption habits. While these activities have always been practiced historically, this heightened awareness is attributed to "a greater concern with ethical responsibility, social justice, and environmental stewardship" as part of a wider movement within the field of sustainable consumption and cradle-to-cradle economics.[1] In contrast to recycling which diverts materials in the waste stream from landfills and incinerators, reuse, repair, and sharing extend the lifecycle of whole products and help create a closed loop system that keeps items out of the waste stream and redistributes them locally.[2]

In order to streamline sustainable consumption and disposal behaviours, zero waste activities must become increasingly visible to encourage people to engage in these activities more easily. Fostering a zero waste culture requires residents to modify their habitual behaviours away from current high consumption patterns that 'take, make, purchase, and dispose' and towards more sustainable consumption and disposal patterns. In a zero waste culture, reuse, repair, and sharing would be prioritized over the consumption of new products and disposal of useable items and materials.

While further research is required to gain a complete understanding of the uses of a zero waste assets map by residents, businesses, and other stakeholders, this project asks: How can a zero waste assets map contribute to or support the development of a zero waste culture in Vancouver? How can a zero waste assets map help to measure progress towards developing a zero waste culture in Vancouver? What methodology should be employed to develop a zero waste assets map?

The objectives of the study are to:

» Identify the potential uses for a zero waste assets map by residents and policymakers in Vancouver;

» Identify what information should be collected in the mapping process to support those uses; and

[1] Lorenzo, L. (2013). Understanding the scope of reuse in Vancouver: final report.
[2] NYC Department of Sanitation. (2017). 2017 NYC reuse sector report.

» Develop a draft methodology for completing the zero waste assets mapping process.

In addition to waste reduction efforts targeted at household consumption, there is an opportunity for solid waste management authorities to move up the waste hierarchy and prioritize reuse, repair, and share over their historical role in collection, recycling, and disposal. De Paoli (2015) states that:

> "Government policy needs to look at more than just managing waste and its impacts: policies that solely concentrate on improving resource recovery through waste diversion and recycling, while important, amount to nothing if waste generation levels continue to increase."[3]

This statement reinforces the idea that we cannot recycle and compost our way to zero waste – a concept recognized in Zero Waste 2040, the City of Vancouver's strategic plan to become a zero waste community by 2040. Rather, achieving zero waste requires a larger societal shift in which reuse, repair, share, and waste avoidance behaviours are normalized and easily practiced to the extent that a zero waste culture becomes increasingly visible as well.

This report is an attempt to begin to understand how reuse activities can be highlighted and measured through the development of a zero waste assets map. The research findings from a literature review, selected case studies, and qualitative interviews will inform how the City can begin to think about zero waste asset mapping as a tool to help residents engage in zero waste activities more easily and to measure these activities to inform policy.

Scope of the project

A zero waste assets map is concerned with activities related to the consumption of products and materials. It is not intended to include assets and activities related to product design and manufacturing, food waste reduction, or food rescue. The findings presented in this report focus on the development of a zero waste assets map for use by residents as a public-facing tool and by policymakers as a means of measuring zero waste activity. It does not include considerations for businesses and other stakeholders.

[3] De Paoli, A. (2015). Towards the circular economy: identifying local and regional government policies for developing a circular economy in the fashion and textiles sector in Vancouver, Canada. *Vancouver Economic Commission*.

Policy Context

The Greenest City Action Plan was approved by Council in 2011 and established:

» a goal to create zero waste, and

» a 2020 target to reduce solid waste from all sources disposed to landfill and incinerator by 50 percent from 2008 levels.

In support of these goals, in May 2016, Council directed staff to develop a long-term plan for transforming Vancouver to a zero waste community by 2040. Zero Waste 2040: The City of Vancouver's Zero Waste Strategic Plan (approved by Council in June 2018) was developed in response to this direction.

The Zero Waste 2040 strategy calls for pursuing options to support and grow product reuse and sharing in Vancouver as ones of its priority actions. The strategy states that:

> "Any long term strategy must anticipate the impacts from factors such as economic growth, increasing consumption and a growing population. Without additional zero waste programs and a community-wide shift towards zero waste, Vancouver's total solid waste disposed to the landfill and incinerator is expected to increase each year due to these factors."[4]

Prior to establishing additional zero waste programs to support a societal shift towards zero waste, it is critical to understand the existing state of zero waste today. A zero waste asset map is one approach to identifying zero waste assets towards this end. Further, it can also act as a tool used by residents to increase visibility and awareness of zero waste establishments and activities.

Becoming a zero waste community requires residents, businesses, and visitors to think differently about everything that is currently disposed. This is achieved by avoiding and reducing waste, keeping materials in circulation as long as possible, and then recycling, composting, and producing renewable energy from the materials that remain.[5]

[4] City of Vancouver. (2018). Zero Waste 2040.
[5] Ibid.

Methodology

Literature Review

Section 1 summarizes the research completed in the literature review and selected case studies. The background literature frames this project within community based mapping theory and points to two common sub-types: food mapping and cultural mapping. This theoretical framework provides the foundational knowledge of community asset mapping as a planning tool and explores how this framework can be applied to the development of a zero waste assets map.

Case Studies

To supplement this theoretical knowledge, five case studies were identified as relevant examples of asset maps within and outside of the context of zero waste. These asset inventories, directories, and maps were consulted to inform the development of the purpose, uses, methodology, and application to this project.

Interviews

Six semi-structured interviews were completed to explore the potential uses of a zero waste assets map, to identify the challenges and barriers that impede the practice of zero waste activities, and to determine what performance metrics can be used to measure the development of a zero waste culture in Vancouver. Participants were chosen based on four criteria:

1. Industry experience as a zero waste leader;
2. Experience developing an asset map or directory;
3. Knowledge of zero waste in the Vancouver context; and
4. Potential user of the map.

Case Studies

» Vancouver Food Assets Map
» Vancouver Cultural Spaces Map
» Vancouver's Share Map
» donateNYC
» New York Reuse Sector Report

Interview Participants	1	2	3	4
Christopher Diplock, Thingery Sharing Inc.	•	•	•	•
William Pritchard, Cultural Services, City of Vancouver		•		•
Rosemary Cooper, One Earth	•		•	•
Eszter Csicsai, NYC Department of Sanitation Kate Kitchener, NYC Department of Sanitation Dr. Lorena Fortuna	•	•		
Kathy Romses, Vancouver Coastal Health		•		•
Meg O'Shea, Vancouver Economic Commission Pietra Basilij, Vancouver Economic Commission	•		•	•

Data Analysis

The information gathered from the literature review, case studies and semi-structured interviews informed the key research findings discussed in Section 2. Qualitative data was analyzed from all six interviews to extract themes that were then grounded in the background literature and the theoretical framework.

Recommendations

Section 3 summarizes the research findings to propose a draft methodology for completing a zero waste assets map, a six-stage mapping process, and five recommendations. These recommendations are written to inform the future engagement processes, design, and maintenance of a zero waste assets map.

SECTION 1
WHERE ARE WE TODAY?

Understanding Zero Waste Activities

In this report, zero waste activities are defined as practices that avoid and reduce the generation of solid waste. In terms of the City of Vancouver's Zero Waste Approach (an adaptation of the well-known 'Three Rs'), zero waste activities fall within the "Avoid," "Reduce," and "Reuse" levels of the pyramid. Whereas "Recycle," "Recover," and "Dispose" describe end-of-life management for products and materials, "Avoid," "Reduce," and "Reuse" are concerned with their purchase, use, and maintenance.

Image retrieved from City of Vancouver, (2018), Zero Waste 2040.

Avoid and Reduce

"Avoid" and "Reduce" are zero waste activities that primarily take place when residents are making purchase decisions. They might choose higher-quality items designed to last longer than cheaper alternatives, items designed for repair, or food and products that use little to no packaging. Zero waste assets included in the scope of this project include assets that enable waste avoidance and reduction, such as grocery stores with bulk sections and zero waste packaging stores.

Reuse

Reuse is among one of the oldest forms of solid waste management practiced before recycling was technologically possible.[6] Historically, reuse was practiced as a means of conserving the products that we already own while avoiding the need to purchase new items and reducing the disposal of goods.

[6] NYC Department of Sanitation. (2017). 2017 NYC reuse sector report.

The reuse sector in Vancouver is active and varied. According to a study commissioned by Vancity, of a total of 917 British Columbians surveyed, 97 percent stated that they participate actively in the second-hand economy through buying, selling, and/or donating used goods.[7] While this illustrates the prominence of reuse today, understanding reuse as simply buying, selling, and donating goods is a narrow approach to the broad range of activities that constitute the reuse sector.

A wider range of reuse activities are defined in the 2017 NYC Reuse Sector Report. The Department of Sanitation New York defines reuse as "the use of a product more than once (often multiple times) in its original form, for the same purpose or for a different purpose, by:

» selling or giving away items, or donating items to charity or a community group;
» renting or sharing products, which reduces the need for manufacturing new products; or
» extending the useful life of products through repair instead of discarding and replacing them with new products."[8]

This definition reveals that reuse activities can be practiced at multiple stages during product lifecycles: residents can purchase second-hand, gain access to products through sharing instead of purchasing, maintain and repair products to extend their useful life, and donate or sell unwanted items instead of throwing them away.

Repair

The fixer movement "looks beyond the throwaway culture and encourages people to repair and reuse broken items" to extend product lifecycles and move towards more efficient use of resources.[9] This movement includes commercial fixing establishments that promote repair of their own products as well as more informal establishments like Repair Cafes and events.

Repair Cafes – first established in Amsterdam in 2009 – are an example of informal repair establishments that have become popularized as free meeting places where expert volunteers help visitors repair broken objects and provide resources like tools and manuals to complete repairs. In 2017, there were over

[7] Vancity. (2016). Thrift Score: An examination B.C.'s second-hand economy.
[8] NYC Department of Sanitation. (2017). 2017 NYC reuse sector report.
[9] Ellen Macarthur Foundation. (2016). Empowering Repair.

1,000 Repair Cafes worldwide with approximately 300,000 successful repairs, 50,000 monthly visitors, and 20,000 volunteers.[10]

In Vancouver, an iteration of the Repair Café was established in 2015: Repair Matters. [11] This group hosts semimonthly events which helps bring community members together – those with repair and maintenance skills and those seeking assistance – to fix a variety of goods from appliances and household wares, to clothing, to electronics and other objects. Other Vancouver-based organizations such as Vancouver Fix-It Collective[12] and Frameworq Fix-It Society[13] host similar types of repair events.

Share

Sharing has always been a part of urban life through public libraries', community spaces, and informal exchanges with friends and family. Recently however, there has been an increase in sharing innovation and activities, particularly through online platforms and among millennials.[14]

The Sharing Economy "aims to unlock the idling capacity found in untapped social, economic, and environmental value of underutilized assets. It promotes access to goods instead of ownership in many, but not all, experiences and spaces."[15] Vancouverites are most likely to share physical objects and spaces including: transportation, physical media, recreation, event and entertainment equipment, tools, household appliances, clothing, and space. The sharing of these objects and spaces is made easier and more convenient through online platforms that facilitate the distribution of goods between networks of people and assets.[16]

> *"All the physical goods and spaces that a community needs exist within our neighbourhoods. Sharing has the potential to connect the people who have things with the people who need them in efficient and meaningful ways."*
> *Diplock, C. (2016).*

[10] Ellen Macarthur Foundation. (2016). Empowering Repair.
[11] https://www.facebook.com/repairmatters/
[12] https://www.facebook.com/VancouverFixItCollective/
[13] Frameworq Fix-It Society. https://www.frameworq.ca/
[14] One Earth. (2015). Local governments and the sharing economy.
[15] Ibid.
[16] Diplock, C. (2016). The sharing project: a report on sharing in Vancouver. *The Sharing Project.*

Theoretical Framework

Community Based Asset Mapping

Community based mapping "is a process of mapmaking that centers on the experience of local people and identifies the social, cultural, economic, and ecological assets that contribute to a sense of health and belonging. The maps created using community based mapping not only validate local knowledge, they provide a guiding vision for future planning of local resources."[17]

This process begins by asking communities to identify what assets already exist in their communities as opposed to asking what may be missing. By focusing on existing assets and their value to a particular community, this theory is inherently a bottom-up approach.

While the range of assets vary dependent on the mapping project and area, all community assets are rooted in some way on shared values, ideals, and needs. An example of the range of community asset categories is highlighted in the sidebar to the right.

The mapping process requires the collection of an inventory that is bounded by a specific neighbourhood, municipality, or region, a ranking of the most valued assets in this area, and an understanding of why community members value these assets.[18] Generally speaking, community mapping can be used for educational purposes, providing baseline information for policy and planning, and tracking community development over time.

Once the inventory is compiled and visualized, these maps may be used to understand or question the relationship between assets and place. This visualization can enable residents, policymakers, and stakeholders to understand the patterns or gaps that exist in the distribution of resources. The information collected can be used as a baseline dataset to create indicators for which future development and changes can be measured against and eventually can be used to inform planning policy direction based on the identified opportunities and gaps.

Community based mapping will serve as the foundational theory for understanding how a zero waste assets map can inform future policy and planning direction for the City, how it can be used by residents, and how it

Putenney, D. (2014) identifies the following six types of assets:

» **Individuals:** members of the community itself and their skills, abilities and talents, characteristics like kindness and generosity, and core qualities such as experience and interests

» **Local groups or associations:** groups of people who gather on a formal or informal basis for pursuing a common interest

» **Organizations and institutions:** local institutions such as libraries, hospitals, businesses, non-profits or government agencies

» **Physical space and infrastructure:** buildings, lots, community spaces that can be further developed to suit community needs

» **Economic characteristics:** formal, informal, and illicit economic activity

» **Culture**: the diverse cultural aspects of any community that shape its identity

Fuller et al. (2002) identifies the following five types of assets:

» **Natural**: environment and water

» **Built**: physical things that we build including infrastructure

» **Social**: the social aspect of living in a community

» **Economic**: jobs and a varied economy that people and communities draw on for their livelihoods

» **Service**: such as health and educational services

[17] Rosenblatt, S. (2001). Mapping Food Matters. Victoria: Common Ground and OXFAM-Canada.
[18] Fuller, T., Guy, D., & Pletsch, C. (2002). Asset mapping: a handbook.

should be developed according to these identified uses. Although there is no academic research studying the use of community based mapping specifically for zero waste assets such as reuse, repair, and share, there is a growing body of literature on both food and cultural asset mapping, of which principles are applied generally to this project.

Food Asset Mapping

Mapping food assets is a method used to collect and share information about what food resources exist in our communities including where people grow it, sell it, and eat it. This method is used to "create a snapshot of our food system and to build awareness of the many resources and alternatives that exist locally to provide for food needs."[19] The visualization of community maps can then be used to illustrate community resources that reconnect people to places and things, thereby fostering a greater sense of community and decreasing social isolation.[20]

Mapping food assets helps illustrate the geographic distribution of food access in the City and can be used to indicate where there may be a lack of affordable, healthy, or cultural options. As one tool of many, it can help planners determine where to possibly locate different services and provide health care professionals or social services providers with a resource to connect people with food and information. Food needs are specific to a community's values, cultural identity, and existing assets, thereby making the food mapping process unique to each community. The purpose, type of assets, and problem that is being addressed varies from map to map.

An example of food asset mapping is the Vancouver Food Asset Map.

Cultural Asset Mapping

"Cultural mapping is a way of defining what culture means to the community, identifying the elements of a culture that add value (both social and economic), recording, preserving or building on these elements in new and creative ways."[21]

Cultural mapping is recognized by UNESCO as a tool to preserve these tangible and intangible assets that often shape our community development and

[19] Rosenblatt, S. (2001). Mapping Food Matters.
[20] Ibid.
[21] Taylor, K. (2013). Cultural mapping: Intangible values and engaging with communities with some reference to Asia. *The Historic Environment: Policy & Practice*, 4(1), 50-61.

planning processes which in turn, influence our perception of place.[22] This form of community based mapping documents both tangible and intangible cultural elements – tangible cultural assets may include shops, distinctive landmarks, and local events while intangible assets include those such as memories, personal histories, and values.

Cultural mapping is a valuable tool that has been used to generate new perspectives and resources that residents access, can boost advocacy to support the expansion of cultural assets in different areas, and can point to problems and gaps that need to be addressed in order to make the case for greater investment in cultural development.[23]

Just as food needs vary from one community to the next, so does cultural identity which suggests that any cultural mapping process will vary in scope, purpose, and results.

An example of a cultural asset map is the Vancouver Cultural Spaces Map.

Zero Waste Assets Mapping

Food assets and cultural assets mapping are two examples of how community based mapping is used to address issues like food insecurity and a lack of cultural spaces. They also provide a resource for residents to reference when accessing these assets and for policymakers to measure and analyze the distribution of these assets.

In the context of zero waste, there are tangible assets such as physical places like buildings and establishments, and intangible assets such as attitudes and values as well as volunteer work, community gathering, and social connections more broadly. By mapping tangible establishments that enable residents to engage in zero waste activities like packaging avoidance, reuse, repair, and sharing, we are also attempting to understand how these assets foster the more intangible aspects of zero waste such as a shift towards culture that prioritizes reuse over recycling and disposal. While it may not be possible to physically map intangible assets like events, memories, and zero waste practices, identifying intangible zero waste assets is a critical step as it may influence what tangible assets are identified in the mapping process and shape the desired outcomes.

A series of case studies are highlighted below.

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[22] UNESCO Bangkok. (2017, July 4). Cultural mapping.

[23] Stewart, S. (2007). Cultural mapping toolkit. Vancouver: 2010 legacies now and creative city network of Canada.

Case Study | Vancouver Food Asset Map

Background

The idea for the Vancouver Food Assets Map was developed in 2014 by a group of four Vancouver Public Health Dietitians working for Vancouver Coastal Health in hopes of further understanding neighbourhood vulnerabilities and strengths in relation to food assets. Previously, multiple food asset maps had been created by some Vancouver Neighbourhood Food Network Groups; however, these maps were inconsistent in what assets were mapped and we difficult to maintain. Vancouver Coastal Health, Vancouver Neighbourhood Food Networks, UBC, Fresh Roots and the City of Vancouver worked collaboratively to develop the Vancouver Food Asset Map using a Google Map application as well as supporting resources.

The goals of the map are:

To provide a tool to community members and partners for locating community food assets that is current, easy to use and easily updated; to build community capacity to support community members dealing with food insecurity; and to make it easier for community partners to view and use community food assets strategically.

Quick Facts

The Vancouver Food Asset Map working group defines food assets as "place[s] where people can grow, prepare, share, buy, receive or learn about food."

Date launched: 2016

Number of assets: Approximately 1200

Food assets mapped:

- » Free or Low Cost Meals
- » Growing Food
- » Vancouver Neighbourhood Food Networks
- » Retail Food Stores or Markets
- » Community Organizations
- » Free or Low cost Grocery Items
- » Kitchens or Food Programs
- » Schools

Collection

Data collection: The initial dataset was compiled by students in the University of British Columbia's Land and Food Systems program using existing food asset maps. Currently, users are able to suggest additional food assets by contacting the program administrator via email with the following information about the asset: full name, website and URL, phone number, email, physical address including postal code.

Maintenance

Data validation: Manually by contacting organizations and verifying their existence. If a data point cannot be verified, it is not included in the map. Note that organizations may request not to be included in the map for any reason such as already being at capacity (for example, low-cost meal providers already operating at capacity).

Data maintenance: Manual

Analysis

Data analysis: Little analysis has been completed to inform policy however, the map has been consistently evaluated throughout the mapping process to ensure that it is accessible and easy-to-use for community members.

Takeaways

» At each stage of its development, community support, feedback, and evaluation remained a cornerstone to the project to ensure that the map remains up-to-date, easy to use, simple, and searchable for those using the map.

» Creating a food map allows people to find accessible food options; however, it does not provide a solution to food insecurity (as the root problem for food insecurity in lack of income).

» Creating clear and consistent definitions is an important step in the mapping process for two reasons:

1) to ensure that residents of different languages can understand what food assets are available and

2) to ensure that food asset maps developed in different municipalities can be compared easily by residents, stakeholders, and policymakers.

Sources referenced:

Personal communications, July 11, 2018.

http://www.vch.ca/public-health/nutrition/food-asset-map

Case Study | Vancouver Cultural Spaces

Background

The Culture Plan for Vancouver 2008-2018 aims to "develop, enliven, enhance, and promote arts, culture, and cultural diversity" in part through the pilot of a cultural spaces mapping project. The Cultural Spaces database was developed out of the City of Vancouver Cultural Spaces Map Pilot Project in 2013 following a mandate from Council to identify and protect cultural spaces in Vancouver.

Quick Facts

City of Vancouver defines cultural spaces as "places where people come together to express themselves through art and culture."

Date launched: 2013

Number of Assets: Approximately 400

Cultural Spaces Mapped:

» Museums and galleries
» Studio and rehearsal
» Community space
» Theatre and performance
» Educational
» Café, restaurants, and bars
» Other

Collection

Defining cultural spaces: Prior to launching the cultural spaces map, different types of cultural spaces were defined by employees in the Cultural Services Department. This process laid the foundation for which cultural spaces were to be included and excluded from the map.

Data collection: Initial dataset was collected internally from public sources such as websites and brochures, and then crowdsourced through a month-long campaign which included public announcements, press releases, and social media advertisements.

Maintenance

Data validation: City staff contact each establishment to validate their information. If a space cannot be validated, it is not included in the map.

Data maintenance: Updated annually following a month-long crowdsourcing campaign which surveys stakeholders in the cultural community. The webpage allows users to add or update a space through an online forum indicating space name, website URL, primary use, address, cultural activity, and rationale.

Analysis

Data analysis: Following the annual crowdsourcing campaign, an update is undertaken with some analysis. The results from this analysis are presented to Council and include information such as ownership type and number of spaces. The Cultural Spaces Map has been used to inform policy primarily by identifying existing cultural spaces and has led to increased city protection of these spaces through acquisition.

Takeaways

» An annual month-long crowdsourcing campaign allows individuals to suggest additional spaces. Crowdsourcing is inexpensive and requires less staff time to update the map.

» Following the annual update, a report is presented to Council which includes information such as property ownership to inform policymakers about the ways in which cultural spaces are changing over time.

Sources referenced:
Personal communications, July 6, 2018.
https://vancouver.ca/parks-recreation-culture/cultural-spaces-online-map.aspx

Case Study | Vancouver's Share Map

Background

Vancouver's Share Map was developed with the objective of connecting Vancouverites to the growing sharing economy movement through a centralized online hub that serves as a resource center for sharing organizations, residents, community groups, and partner organizations that are interested in sharing initiatives. Its development was led by Share Vancouver, which is an organization that "seeks a more robust, resilient local economy that fosters stronger, more connected communities and lowers the region-wide environmental impact."

Quick Facts

Date launched: 2014
Number of assets: Approximately 300
Sharing assets mapped:
» Lending libraries » Neighbourhood spaces » Transportation » Co-working & creative spaces
» Neighbourhood initiatives

Collection

Data collection: Content was originally collected through a City of Vancouver CityStudio project. A preliminary map was presented at a community MapJam event held on April 9, 2013 where participants were invited to suggest additional assets. As of April 2014, the page was crowdsourced by members of the local sharing community and updated by members of the Share Vancouver working group; resources can be added to the map by posting on the Share Vancouver Facebook page.

Maintenance

Data validation: None
Data maintenance: None, there is no stewardship.

Analysis

Data analysis: None, there is no stewardship and so no analysis has been completed.

Takeaways

» Following the completion of the CityStudio project and the MapJam, there was a lack of stewardship for the Sharing Vancouver map. Consequently, the map is not updated and is not used to measure the state of sharing in Vancouver over time.
» The methodology used to collect and present the map represented an integrated approach that involved both internal research as well as community input.

Sources referenced:
Personal communications, July 5, 2018.
https://www.shareable.net/cities/vancouver-bc-canada

Case Study | donateNYC

Background

donateNYC is an online platform that connects residents, businesses, and non-profits with second-hand goods. This tool was launched in 2016 as a reconfiguration and consolidation of several previously used platforms like the NYC Stuff Exchange (2007) NYC WasteMatch (2006), and ReuseNYC (2010). donateNYC helps New Yorkers "give goods, find goods, and do good" with tools that make it easy to donate or find second-hand and surplus items.

donateNYC Directory: where residents can find places to donate or buy second-hand goods.

donateNYC Exchange: where businesses and nonprofits can donate or receive gently used and surplus commercial goods.

Quick Facts

Date launched: 2016

Registered businesses: approximately 650

Reuse assets mapped:

» art supplies	» automotive	» books and media	» building products
» clothing	» collectibles	»containers and packaging	» electronics
» food and beverages	» glass	» home appliances	» household furniture
» housewares	» lubricants	» medical equipment and furniture	» musical instruments
» office furniture	» office supplies	» paper and cardboard	» shoes
» sporting equipment	» textiles (non-clothing)	» toys/games	

Collection

Data collection: Baseline data was collected over time from the Stuff Exchange (2007) and involved many interns and temporary staff to add businesses to the directory. The Reuse Sector Report helped identify additional organizations to be included in the directory (see details in the following case study).

Maintenance

Data validation: Manually (phone and online) by NYC Center for Materials Reuse at the City College of New York

Data maintenance: Maintenance of existing and additional establishments is manually verified by staff by consistently recruiting by phone and email. Businesses can register themselves (which is often the case for the Exchange) whereas most businesses registered to the Directory are recruited by staff. Since launching the directory in 2016, the number of registered organizations has doubled.

Analysis

Data analysis: Detailed analysis was completed in the Reuse Sector Report. See following page for further details.

Takeaways

» The directory allows residents to search by item category or vendor location to find donation locations, second-hand retail outlets, and vendors that buy used goods. Includes information about hours, location, and contact info.

» Provides separate search functions for users who are residents versus businesses.

» donateNYC seeks to build strategic partnerships with organizations by providing a platform for collaboration, opportunities for training, data management support, and ongoing government engagement in materials reuse advocacy. These partners include nonprofit thrift stores, social service organizations, creative-reuse programs, and salvage centers. A condition of partnering with the platform is sharing data to help inform policy and analysis.

» By publicizing the directory, residents are able to understand where and how to donate or shop second-hand as well as the environmental and social impacts of these consumption behaviours.

Sources referenced:
Personal communications, July 10, 2018.
https://www1.nyc.gov/assets/donate/giveandfind/residents.shtml
NYC Department of Sanitation. (2017). 2017 NYC reuse sector report.

Case Study | NYC Reuse Sector Report

Background

The aim of the report is "to provide a census overview of reuse activity in New York City and to expand the knowledge about the enterprises that contribute to product reuse and waste prevention in the City."

The information presented in the Reuse Sector Report is intended to inform the public of the benefits of reuse and support the reuse sector as an important form of sustainable waste management.

Quick Facts

Department of Sanitation (DSNY) defines reuse as "the use of a product more than once (often multiple times) in its original form, for the same purpose or for a different purpose, by: selling or giving away items, or donating items to charity or a community group; renting or sharing products, which reduces the need for manufacturing new products; or extending the useful life of products through repair instead of discarding and replacing them with new products."

Date published: 2017

Number of assets collected: 2257 across 3654 locations

Reuse Activities:

» Retail
» Rental and product sharing
» Repair
» Cooperative retail
» Reuse drives
» Social services
» Online and virtual reuse outlets

Collection

Prior to the 2017 Reuse Sector Report, the Department of Sanitation New York (DSNY) conducted a poll of reuse outlets in 1995 and a survey or reuse non-profit organizations in 2008 for the 2008 Reuse Sector Assessment. The data compiled in this report was collected internally based on entities that redistribute used products, operate a venue or website when used goods can be purchased, rented, or shares, and/or provide repair services.

Data collection: DSNY and NYC Center for Materials Reuse (CMR) identify businesses and nonprofits organizations considered likely to be conducting reuse activities in New York. They identified 8426.

Data validation: individual phone calls and online research were used to confirm basic information about these identified entities and to determine if they were actively operating and engaged in reuse activities as previously defined. This process reduced the number of entities from 8426 to 2257.

Analysis

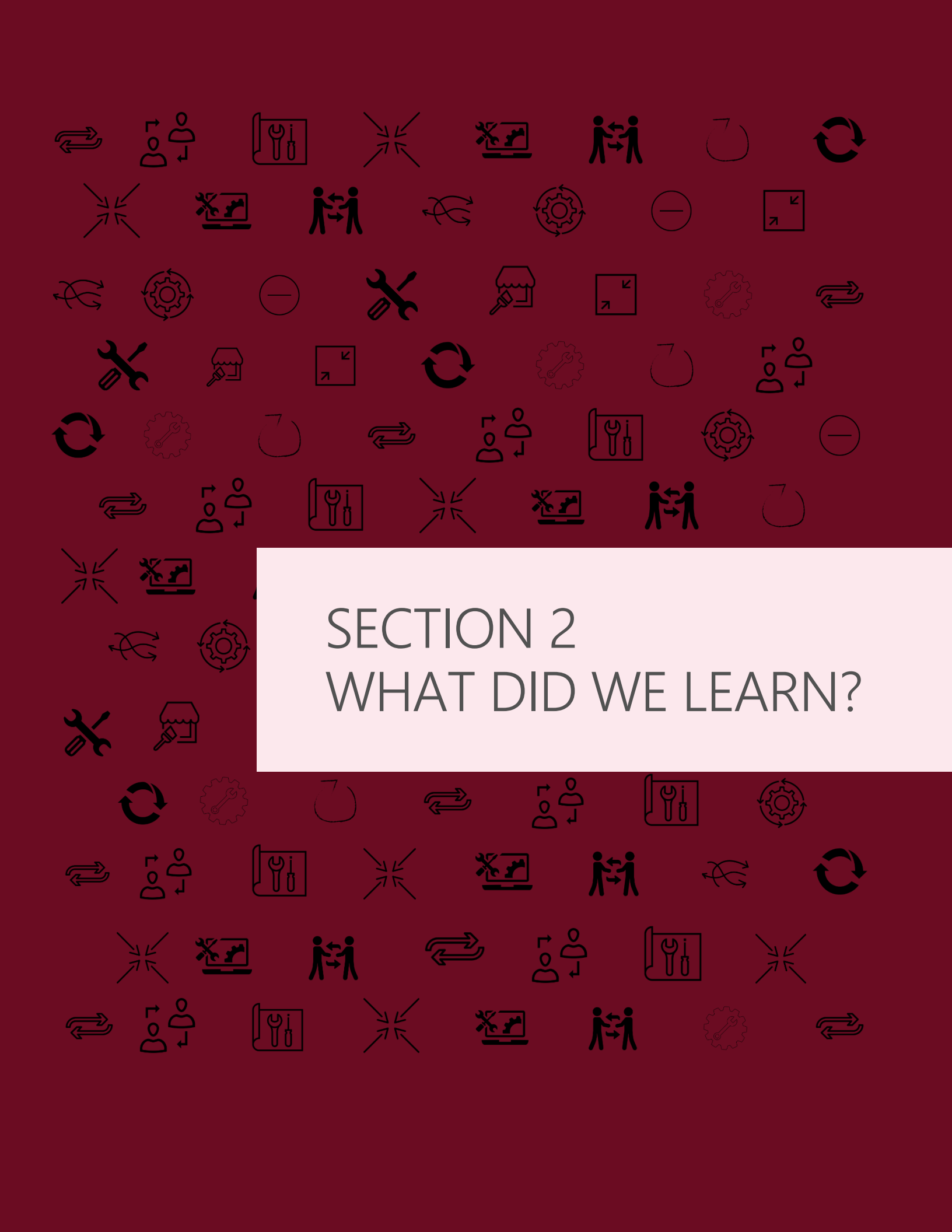
Data analysis: A thorough analysis includes categories such as reuse activity by product, reuse by platform, reuse activity by sector, and reuse sector outlets by location across the five boroughs

Takeaways

» The Reuse Sector Report is an example of a top-down approach to collecting and analyzing data about reuse assets to draw conclusions and inform policy to support the sector and illustrate the benefits of reuse to residents.
» The Reuse Sector Report is used primarily to inform policy and profile reuse outlets, their clients and community, and environmental and zero waste impact – an excellent example of highlighting zero waste champions.

Sources referenced:

Personal communications, July 10, 2018.
NYC Department of Sanitation. (2017). 2017 NYC reuse sector report.



SECTION 2
WHAT DID WE LEARN?

Research Findings

What is a zero waste culture?

A key part of this research was to define a zero waste culture. According to Zero Waste 2040, developing a zero waste culture requires "changing people's lifestyles and business practices to emulate natural cycles, in which all discarded materials are designed to become resources for others to use."[24] However, a zero waste culture is not specifically defined in the plan.

A key finding from the interviews is that there is no single definition of a zero waste culture. Descriptions made reference to the management of materials and products across their lifecycles as well as cultural norms related to the use of materials and products. Other descriptions went beyond solid waste management to reference other aspects of sustainability such as local food and active transportation.

Some participants focused on end-of-life management, stating that many people assume zero waste means they will not see garbage bags on the curb, but that's not necessarily true. They explained that instead of garbage bags, you'll see materials on the curb that are going to places where they still have value like thrift stores, redistribution centers, and social services.

Other participants suggested that there is a gap between the existing state and an aspirational future for zero waste culture. In its existing state, a zero waste culture is understood as one where people reduce waste through reuse, repair, and share. This state focuses mainly on a product's usage phase. As an aspirational concept, a zero waste culture is one where we plan for material preservation in decision-making around design, material selection, transportation, and recapture. This description goes beyond the usage phase to encompass the whole product lifecycle.

Another participant defined a zero waste culture in terms of cultural norms related to materials and products. They stated that in a zero waste culture, sharing, repairing, and reducing would be standard practice and zero waste assets would be highly visible and equally part of solid waste management systems as recycling, composting, donating, and disposing are today. The

[24] City of Vancouver. (2018). Zero Waste 2040.

natural thing to do would be to consume less and seek options for reduce, repair, and share first before buying new or disposing of something used.

Finally, another participant defined a zero waste culture as a utopian concept where people prioritize walking, biking, and public transportation over less sustainable modes and where localized food production is the norm. This definition reveals that for some, the concept of zero waste is associated with sustainable practices in general, not only solid waste management. This finding will be an important consideration when developing communication and outreach materials associated with a zero waste assets map.

Taken together, the participants' answers constitute a rich description of a zero waste culture. In a zero waste culture, products and materials are used for as long as possible through reuse, repair, and sharing activities; materials and products are kept from going to landfill and incinerator due to decisions made all along the product lifecycle and end-of-life management systems serve to recapture materials and products for their highest and best use; and these activities are highly visible cultural norms that are embedded within a larger cultural context of lighter footprint living.

Scope of the Map | What is a zero waste asset?

Just as our understanding of a zero waste culture varies, so too does our understanding of what is a zero waste asset. Defining the types of community assets to be mapped is one of the most important first steps before the mapping process can begin. The assets defined by the interview participants are categorized following five asset types described by Fuller et al. (2002): natural, built, social, economic, and service.

Natural

A natural zero waste asset might include resources extracted to create new products, resources saved from extraction through the process of reuse, repair, and share, as well as resources lost or recovered at the end of a product lifecycle depending whether the product is disposed or recycled.

Built

Built assets were the most commonly cited example of zero waste assets that participants referenced. These assets include establishments that enable the practice of zero waste activities through waste avoidance, share, repair, and reuse activities. As these built assets become more visible and accessed by more and more people, zero waste activities may become increasingly normalized.

Social

A variety of social assets were identified by interview participants including intangible assets such as programs, support groups, meetups, as well as social pressure and norms. In Vancouver, these assets may include online community groups such as the Zero Waste Vancouver Facebook group; the Talking Trash podcast; programs like the Master Recycler Vancouver which supports volunteers in waste reduction techniques; and more broadly, norms and social pressures that encourage people to reduce waste.

Social assets communicate and normalize zero waste activities through daily conversations and gatherings and may foster the development of a zero waste culture. Although these social assets may not be possible to map, they are important assets to consider as they shape our perceptions and values of more tangible assets that can be mapped.

Economic

Economic assets are closely related to both built and service assets as they include jobs and a diverse economy where residents across the livelihoods

spectrum are able to access different zero waste assets. Another economic asset mentioned is the number of funding dollars available to support zero waste opportunities and grow the reuse sector. Funding sources are important assets to consider for the business community but is a consideration beyond the scope of this project.

Service

There are several examples of service assets as they can be both tangible and intangible. An important community asset is waste services including waste bins, routes, collection systems, and disposal and recovery methods. A municipality's role in waste management, collection, and disposal is crucial in the waste system.

In addition to these services, educational services such as community centers and repair events (these are also social assets) provide people with the opportunity to gain maintenance and repair skills that will enable them to extend product lifecycles. Educational campaigns that raise awareness about waste avoidance and reduction over recycling and disposal are also service assets.

An important service that facilitates reuse and sharing are online platforms like Craigslist, Bunz, and Quupe that ease transactions between people.

A final example is social services that service communities through donation, redistribution, and education. These services include non-profits that redistribute or resell many of the items that are donated for reuse to those in need.

While the range of assets described by the interview participants is categorized into five asset types, many of these assets overlap with one another. A preliminary glossary of zero waste assets was developed to help identify potential assets that can be mapped and reflect the findings from the literature review and interviews. See following page.

The following table defines zero waste assets and asset types that may be included in an assets map.

Zero Waste Assets Map Glossary			
Zero Waste Asset	Any community asset that promotes and/or supports waste prevention and reduction by facilitating product and material donation, education and skills learning, exchange, resell, reuse, repair, and sharing for residents.		
Donation (Product/Material)	Built, social, and service	Establishment or drop-off location that accepts donations of either products and/or materials.	
Education and Skills Learning	Built, social, and service	Establishment, center, or community event that supports learning skills in repair and maintenance, reuse, sharing, zero waste, etc.	
Exchange	Built and social	Establishment, center, or community event that facilitates the exchange, trade and swapping of items.	
Online or Virtual Reuse Platforms	Social and service	Online platform such as consignment, exchange, resell, trade, sharing, etc.	
Reduced or No Packaging	Built	Establishment that sells products with reduced or no packaging to enable waste avoidance during consumer purchasing.	
Repair	Built, social, and service	Establishment or event that facilitates repair through events, workshops, or services in order to extend the lifecycle of consumer products.	
Retail and Resell	Built	Establishment that resells second-hand materials and products for profit.	
Reuse	Built	Establishment that supports reuse through reselling.	
Share	Built and social	Establishment that supports sharing activities such as rentals, lending libraries, neighbourhood spaces, mobility shares, etc.	
Social Services	Built, social, and service	Nonprofit establishment whose services benefit communities through donation, redistribution, and education.	

Value and Uses | What are the potential uses of a map?

It was heard during the interviews that Vancouver is a good place to culturally enact change and reinforce existing zero waste practices because there is a strong sense of a reuse culture here. If people already reuse, repair, and share in Vancouver, how can the development of a zero waste assets map reinforce these existing activities so that share, reuse, and repair become second nature for more residents?

The potential uses discussed in detail in this section are to identify resources and activities, measure zero waste assets, and inform policy.

Identify resources and activities

For those actively engaged in zero waste activities, it is likely that they have some sort of a list of zero waste establishments in their head, on a sticky note posted to the refrigerator, or in a shared list among friends. However, for those beginning to engage more thoroughly in zero waste, these activities and establishments may be difficult to find.

According to the interview participants, of those who seek out zero waste assets, they turn to internet searches, personal networks, and word of mouth to find alternative options for purchasing new items and disposing old items, but this varies based on what it is they are looking for.

Appendix A provides a list of online resources that exist for reuse, sharing, repairing, and disposal alternatives both in Vancouver and abroad. This list (although not comprehensive) illustrates that there is no one-stop-shop for finding zero waste opportunities, businesses, and events. Of the resources available, they tend to focus primarily (but not entirely) on disposal and donation options. There is an opportunity to create a resource that residents can easily reference when looking for waste avoidance and reduction alternatives.

To create a one-stop-shop that residents can turn to for reuse, repair, sharing, maintenance and repair skills, etc., options, the map needs to accessible in different languages, contain accurate and up-to-date information, and be easy to use. Some lessons learned are:

» Include a link to further information like a website where users can find contact and business information
» Make the map a living resource – a PDF or print copy will quickly be out-of-date

» Create a way for users to alert the map's stewards of any errors or changes over time

» Design the map in a way that it quickly shows which assets are located closest to the users

» Ensure that the map is searchable by product type and asset type

» Design a process for validating and maintaining the data over time

Measure Zero Waste Assets

Accurately measuring the contribution of zero waste activities to overall waste prevention is challenging as it is facilitated through various platforms, both formal and informal.[25] A comprehensive map can provide indispensable data to calculate performance metrics that may be monitored over time.[26]

Interviewees with mapping experience suggested that a zero waste assets map be used to establish a baseline of existing zero waste assets in Vancouver and measure how they are changing over time. There are two levels of analysis that can be completed: map usage statistics which indicate the success of the map as a public resource, and analysis of the state of zero waste in Vancouver (requires more in-depth analysis). State of zero waste metrics may include distribution by neighbourhood, accessibility by transportation mode, affordability, membership, usage by asset type, types of users, and types of asset. Some of these metrics would rely on voluntary reporting of data by the organizations included in the map.

Map Usage - Numbers of views and downloads

A simple measure of success is to count the number of views and downloads that the map and map instructions receive. How many people have downloaded the instructions in different languages? How many people have viewed the map monthly or annually? Are there any usage patterns such as more frequent use during holiday seasons or at the beginning of a new school year?

Action required: Perform basic data analytics through the mapping platform chosen.

State of Zero Waste - Number of assets

It may seem intuitive that as a zero waste culture grows in Vancouver and more people are engaging in reuse, repair, and share that the number of these

[25] NYC Department of Sanitation. (2017). 2017 NYC reuse sector report.
[26] Stewart, S. (2007). Cultural mapping toolkit. Vancouver: 2010 legacies now and creative city network of Canada.

assets will increase, however, studies have suggested that the second-hand economy is at its peak when the firsthand economy is also thriving.[27] A more accurate metric to determine if a zero waste culture is developing may be to measure if the number of new purchases is decreasing over time as well as if the number of repair, share, and educational organizations is growing. While this metric may help measure the development of a zero waste culture, this kind of purchase data is not available for a municipality.

To measure the change in assets over time, the number of assets by type should be monitored. An additional measure is the frequency of use and users of all assets, which would require a self-reporting mechanism and could be developed through partnerships that involve voluntary data sharing.

Action required: Tally the total number of assets by asset type and track how the number changes over time. Explore opportunities to collect usage data through discussion with asset owners.

Accessibility - Location and mode

One interviewee explained that different types of assets are accessed at different scales. For example, residents may seek out donation opportunities and community centers in their own neighbourhood but be willing to go to other parts of the city to access second-hand clothing stores or repair services; residents may travel elsewhere in the region in search of education institutions, or niche products such as mid-century modern furniture. Analysis of the distribution of asset types should reflect these considerations of access across scales.

As a first step, this map is likely to be developed at a neighbourhood or city scale. As such, the analysis would focus on these assets. However, if expanded regionally, the analysis may be carried out more broadly. An example of this type of analysis was completed in the 2017 Reuse Sector Report which analyzes the distribution of reuse activity across the five boroughs of New York City and highlights that the majority of this activity occurs in Manhattan. If expanded to a regional scale across Metro Vancouver (perhaps through partnership with other municipalities), what concentrations and gaps of each asset type exist regionally? How does our regional context support or impede the practice of zero waste activities?

[27] Vancity. (2016). Thrift Score: An examination B.C.'s second-hand economy.

The accessibility of these assets is an important consideration if the City of Vancouver is striving towards becoming a zero waste community by 2040, considering how connected the region is to its neighbouring municipalities, the equitable distribution of these assets should extend beyond City of Vancouver. Measuring accessibility across different areas is an important metric to help understand the equitable distribution of zero waste assets. Where are assets concentrated? Where are the gaps? Are assets accessible by walking, cycling, public transportation, or private transportation?

This scale-sensitive analysis can inform the development of strategic targets in the future such as 'ensure that all residents live within *x* kilometers of a repair shop,' with further distances targeted for asset types accessed at the city or regional scale.

Action required: An analysis should be completed at a neighbourhood, city, and regional scale depending on the type of asset and scale of the map.

» At a neighbourhood scale: Measure the average distance to asset types by mode. Gather resident feedback on what asset types they feel are missing in their neighbourhood. What types of assets already exist and what assets does the community want to see in their neighbourhood?

» At a city scale: Tally total assets and asset types by neighbourhood across the city. Measure the average distance to asset types by mode. Are some types of assets more prevalent in particular neighbourhoods?

» At a regional scale: Keep track of assets submitted by map users that are located outside of Vancouver. When a Vancouver map is completed and consistently being maintained, reach out to other municipalities to explore opportunities to develop zero waste assets maps in the region using a similar approach to allow analysis across maps. Are some types of assets missing in Vancouver but available in neighbouring municipalities?

Affordability

All participants stressed that affordability is both a motivation and barrier to engaging in zero waste activities.[28] As such, affordability is an important consideration that influences who can participate in zero waste activities. Ensuring that zero waste activities are affordable is also important when encouraging people to engage in activities like repair that are often equally as expensive as buying something new in the era of fast fashion and changing

[28] Refer to section: Overcome the Barriers – Affordability.

product technologies. But even more, affordability is an important issue in Vancouver as housing prices place significant strain on families and millennials in particular. Is it affordable to engage in zero waste activities?

Information about the cost difference between replacing versus repairing an item can influence consumption and disposal behaviours. Making this kind of information available through the map in some way would be valuable to demonstrate the potential cost savings of engaging in zero waste.

Action required: As a City, discuss how to gather and share information on affordability of different zero waste assets.

Inform Policy

A final identified use of a zero waste assets map is to inform policy. A key finding from the interviews is that some interviewees who developed a map went into the project with the intention of informing policy with the information gathered. However, due to limited resources and time, further analysis was never completed. If it was, it mainly focused on map usage statistics and not necessarily what the data indicates about the system that is being mapped and how policy should respond. For this map to help inform policy on zero waste, the State of Zero Waste analysis is a step that cannot be missed.

Action required: Allocate sufficient time and resources to completing an analysis of number of assets, their accessibility and affordability, and refresh that analysis at regular intervals.

Next Steps

While these are the three primary uses identified through this research, a follow-up survey should be distributed to a larger group of residents to gain a more thorough understanding of the potential uses from their perspective to either support or challenge the ones discussed in detail above.

The following table briefly lists all possible uses of a zero waste assets map as informed by research to date.

List of additional uses of a zero waste assets map	
Zero Waste planning	Mapping is often the first stage of preparing a zero waste plan.
Increase knowledge and appreciation	Helps to define the local zero waste culture by demonstrating the breadth and variety of zero waste activities in the municipality.
Identify previously unknown resources and activities	Provide concise information to elected officials, tourist groups, branches of municipal government, the general public, and other stakeholders. Promote advocacy by drawing attention to zero waste establishments.
Gain a fresh perspective	Look at data from different points of view: cross-cultural, public access, concentration, networking, affordability, social impact.
Identify networks and hubs	Where do businesses and residents obtain zero waste assets and resources, how do they communicate with one another, who are the liaisons?
Locate gaps, needs, and overlaps	How much duplication or scarcity is there in a given sector or area of the city?
Is the distribution of resources effective?	How far does a population group have to travel (and by what mode) to engage in zero waste activities? Where can municipal resources support gaps or unequal distribution of these resources?
Evaluating projects	How large is the population served? How does the community view an initiative? Does a solution respond adequately to the problem?
Seeing the present, looking into the future	Identify existing resources and gaps and evaluating how these resources may change or adapt in the future considering population changes, cultural shifts, and municipal policy support.
Measure progress towards objectives of Zero Waste 2040	Measure progress towards objectives such as prioritizing reuse ahead of recycling and developing a zero waste culture.
Evolving understanding of zero waste	Provoke discussion about what constitutes a zero waste asset, what does it look like for residents, businesses etc. to practice zero waste.

Overcome the Barriers | What barriers exist that prevent residents and businesses from engaging in zero waste?

In order for this map to foster a zero waste culture, we must address three key challenges related to engaging in zero waste activities, as described by interview participants. These findings echo the primary challenges identified in Zero Waste 2040 (see sidebar).

Cost

Fast fashion and inexpensive consumer goods pose significant challenges when addressing waste generation as it may cost the same amount to buy something new as something used (like a tee shirt), or to replace an item instead of repairing it.

The affordability of goods should also be considered within the larger context of affordable living. While shopping second-hand and reducing purchases may be more financially viable than buying items new in some cases, engaging in zero waste activities like shopping second-hand are often time consuming. The connection between affordability and time or convenience was relayed by three interview participants. Considering the cost of housing in expensive cities like New York and Vancouver, people often hold multiple jobs to subsidize their rents or mortgages which may impede their ability to engage in zero waste activities. This financial and time burden is then amplified for families who also have childcare costs and cannot afford to spend time actively engaged in zero waste activities. The lack of time to engage in these activities is a distinct challenge in addition to the cost of goods that results from an affordability crisis that most significantly affects families, newcomers, millennials,[29] students, and marginalized groups.

Time and Convenience

Time and convenience were two additional barriers that every participant made specific note of. Buying something new is often more convenient and less time consuming because you do not have to seek out a new establishment that may or may not sell the exact item that you're looking for. One participant explicitly stated that to encourage people to engage more in zero waste, they want to know exactly how much it will cost compared to

According to Zero Waste 2040, there are four primary challenges to overcome to transition to a zero waste community:

» **Consumption** which contributes to economic growth;

» **Individual ownership** that is associated with convenience and status;

» **Low priced goods** which enables people to replace goods instead of repairing them;

» **Speed of technology and fashion** which encourages consumers to replace goods early and often.

[29] Vancity. (2016). Thrift Score: An examination B.C.'s second-hand economy.

buying something new and how far they have to go. This sentiment clearly demonstrates how closely time, convenience, and cost are connected.

When looking specifically at repair, time and convenience are major challenges that need to be addressed in order to mainstream the practice – repairing an item inherently takes time to either find a repair shop and pay someone to repair an item for you (like electronic devices) or to find replacement parts, tools, and instructions to repair the item yourself.

Awareness and Accessible Information

Many participants suggested that there is a lack of accessible and easy to find information about many zero waste activities. Although there are many resources that people can consult for recycling and disposal alternatives (for example: where do I drop off my dead batteries or how can I recycle Styrofoam), there is a lack of information regarding sharing and repairing organizations or events. This may be one reason that many people engage in reuse and sharing activities primarily within their personal networks. One participant suggested that although there are resources online, you really have to be 'in-the-know' in order to find and engage in zero waste activities easily; this may be a deterring factor for many.

Inaccessibility remains a challenge that prevents many people from engaging in sustainable initiatives where it is a privileged activity to have the time, capacity, awareness, and income to engage in sustainable behaviours like shopping organic or without packaging. For many who do not have the capacity, zero waste activities remain inaccessible.

Norms and Perception

The lack of awareness and information regarding zero waste alternatives suggests that zero waste activities are not highly visible and are perceived to be a niche behaviour. When defining a zero waste culture, two participants explicitly mentioned the importance of normalizing zero waste activities. For many residents, these activities have not yet been normalized culturally despite the fact that most of us have been informally engaged in reuse, repair, and sharing our entire lives in one way or another.

One participant suggested that one reason that zero waste is not mainstream is because it may be perceived as being unachievable by some. In fact, several participants suggested that the term 'zero waste' in itself remains foreign. Further discussion surrounding terminology can be found in Section 3, under 'Methodology, Defining Assets.'

Showcase the Benefits | What motivates people to engage in zero waste?

Understanding what motivates people to engage in zero waste activities is equally as important as identifying and overcoming potential barriers. Together, this provides a more complete understanding of the ways in which a zero waste assets map may be used to support zero waste activities. Zero Waste 2040 identifies social, economic, and environmental benefits associated with zero waste. Broadly speaking, zero waste activities can reduce new purchases, extend product lifecycles, prevent waste, lower living costs, provide decent jobs, build community, and foster happiness.[30]

Image retrieved from City of Vancouver, (2018), Zero Waste 2040.

Economic

As previously discussed, cost remains a barrier for many from engaging more actively in zero waste. On the other hand, engaging in zero waste activities can lower living costs by reducing spending on new purchases and increase access to goods and services without the financial burden of ownership.

Several participants stated that engaging in reuse, repair, and share has economic benefits that may be particularly important for young people living in expensive cities like Vancouver and New York who may have to work several jobs to pay for rent. The unaffordability of housing forces people to buy and own less which leads to sharing and exchanging more. In Vancouver in particular, the unaffordability of the existing housing stock may encourage residents – especially families, millennials, and students – to purchase fewer new items and own less altogether.

Social

Engaging in zero waste activities like repair events, sharing, and donating goods can build community by fostering social connections. One participant suggested that communities thrive when we can share and ask our neighbours: 'Hey Sam, where's my drill?' While less of a motivator for rural communities where people are more likely to already know their neighbours, zero waste activities are associated with improving social connectivity in urban centers. These social benefits are closely related to social zero waste assets that shape how we perceive and value various zero waste activities like repairing something at an event versus paying someone to repair something.

[30] Cooper, R. *Share, reuse, repair* [PDF presentation].

Environment

When engaging in zero waste, environmental awareness remains an important motivation. One of the goals of share, reuse and repair is to reduce the need to extract a finite supply of raw resources by decreasing new purchases and prevent excess waste generation by extending products' lifecycles. One participant suggested that in Vancouver especially where individuals are surrounded by beautiful natural landscapes, residents may be motivated to preserve the environment and shop more sustainably because of this: a zero waste culture is already being built by a desire to preserve our natural ecosystem that surrounds us in Vancouver.

Although waste avoidance and reduction are environmentally beneficial, environmental consciousness is not necessarily the primary motivation for engaging in zero waste. One participant suggested that it is not enough for people to know that donating and buying second-hand goods is environmentally friendly and sustainable, but that these actions have personal financial benefits and positive social impacts for their neighbours and community. As discussed in the previous section, the motivations for engaging in reuse, repair, and share are closely associated with cost, access, and perception over sustainability. Often, these economic and social impacts are more meaningful when promoting behaviour change.

Key Considerations to be Included in a Zero Waste Assets Map

The following four considerations were themes that emerged throughout interviews and analysis of the research findings. These considerations help summarize the research findings.

Easy, Accessible, Convenient Tool

Because our consumption and disposal behaviours are so closely related to key events like a new school year, weddings, or when something breaks, the map should be tied to these decisions. The map should become a resource that people refer to when deciding whether or not to repair an old item or buy something new, donate goods or dispose of them.

All participants emphasized that a zero waste asset map should be easy to use, accessible, and convenient to encourage residents who may be looking to engage in zero waste activities more often to use the map as a reference for point based decisions on where and what to buy.

Regardless of the platform used, participants suggested that it should be online or in an app and should include a search function but also needs to be available through forums such as community centers for people who may not turn to internet searches to find these assets. This map should become a one-stop-shop that is searchable and easy to use that can help people make the decision between buying something new or used, as well as donating/repairing/sharing or throwing something away.

More than a Map

While a map is a useful tool to illustrate how close different assets are to people, people also want to know how much it will cost to reuse, repair, and share as opposed to buying something new. Two participants suggested that developing a cost calculator or impact calculator to calculate cost savings and highlight the environmental benefits of repairing or sharing over buying something new. While this is an important consideration, further research is required to understand the feasibility of such a tool.

Additionally, there is an opportunity to include assets that cannot be mapped, like clothing swaps, repair workshops, garage sales, Christmas donation drives, etc., as well as zero waste champions in a panel embedded in the web platform.

Inclusivity

The City of Vancouver is a diverse and multicultural community, as is the metropolitan region. There should be a concerted effort to reflect the various cultures and values by providing instructions and definitions in multiple languages and engaging with various cultural communities throughout engagement sessions. This is a lesson learned from the Vancouver Food Asset Map that is offered in four different languages. Moreover, there is an opportunity to learn from other cultures who already practice sustainable consumption and disposal and integrate those practices into our culture by highlighting them as zero waste champions.

"A zero waste map must appeal to more than white people with graduate degrees and mason jars."

Three participants suggested that the term 'zero waste' remains foreign for many people and may seem unachievable. The term zero waste may attract those who are already engaged in these activities while possibly making the map unapproachable for others.

For this reason, defining a zero waste asset and naming the map so that it resonates with different cultural communities is a critical step to make zero waste mainstream and highly visible. It is necessary to inform people about what zero waste is in the context of this map, and use terminology that makes sense in different languages to ensure that the map is accessible to more than English-speakers.

These considerations may help ensure that a zero waste asset map is used by those not actively engaged in zero waste activities as well as those who may not know where to begin.

Regional Integration

Because our waste management system is managed regionally, it is inherent that some zero waste assets exist on a regional scale as well. When asked about the scope of a zero waste assets map, most participants suggested that the map should extend beyond the City of Vancouver because people work, live, play, and study throughout the region and are not confined by one municipality or neighbourhood.

"Businesses and residents don't stop at Boundary Road."

"My son lives in Squamish, I work in Vancouver but live in North Vancouver, and I like to ski in Whistler."

One participant, on the other hand, stated that because Vancouver has the majority of zero waste assets, the map does not need to be expanded regionally. This perspective does not satisfy the previous consideration of creating an inclusive map.

This regional integration should be reflected in the development of an assets map, allowing residents to find different assets based on where they are or

will be. By integrating the map regionally or partnering with surrounding municipalities to develop a similar map, the map will be more inclusive by providing information about zero waste assets across the metropolitan area, allowing those who may not live or work in Vancouver to access local assets and engage in these activities regularly. This recognizes that not all residents that live in the metropolitan region can afford to travel to Vancouver to access zero waste activities.

Additionally, extending the scope will also allow for more thorough analysis of what assets exist in which neighbourhoods and regions, helping to identify gaps and future opportunities.

SECTION 3
WHERE ARE WE GOING?

Discussion

This research reveals that a zero waste assets map has several potential values and uses but must overcome key challenges like cost, time, and convenience while showcasing the economic, social, and environmental benefits of engaging in zero waste. Consequently, there are several methods of engaging in a mapping process and the desired approach is dependent on desired outcomes.

A key objective of this project was to develop a draft methodology for completing the zero waste assets mapping process. Because the primary uses of a zero waste assets map are to identify zero waste resources and activities, measure the state of zero waste and its development over time, and inform policy, the proposed methodology takes an integrated approach that combines both internal development and management with an involved participatory process.

A Note on Engagement

If the goal is to support the development of a zero waste culture, then engaging a larger set of users than those who are already aware of zero waste practices is crucial. Input from the wider Vancouver community is needed to articulate the challenges that the map needs to address. By participating in the mapping process, participants become more involved to the extent that they will not only be more engaged in zero waste activities but may also educate others and promote the map in their personal networks.

It is recognized that an ongoing challenge in community engagement is how to engage those who are not already actively engaged in the topic. This issue is a key challenge that should be addressed upon further research and collaboration with community engagement specialists to ensure that the process is participatory and inclusive.

The following methodology outlines the process of defining, collecting, visualizing, maintaining, and analyzing a zero waste assets map.

Proposed Methodology

The literature on community based asset mapping emphasizes engaging with the community to define, collect, and visualize community assets. As a bottom-up approach, this mapping process may require more time and resources but allows the community to take ownership of the map.

The research findings revealed that the development of a zero waste assets map should involve engagement with several communities and stakeholders to ensure that it is both inclusive and comprehensive. All interview participants who discussed the role of community engagement in the development of an assets map agreed that it is an important step when developing the map and collecting assets, marketing the map once compiled, and evaluating the success of the map upon completion. Community engagement should be pursued throughout the development and evaluation of the map to ensure that it is being used by its intended audience. One participant emphasized that engagement should always be extensive.

"Yes, public engagement should always be extensive!"

By engaging with communities and teasing out their needs and opportunities, an assets map can more accurately respond to an existing opportunity or need. One participant stated that the most successful online tools are the ones that are developed through community engagement and respond to a real need, not a 'need' imposed on a community in a top-down manner. While most participants who recommended engaging in community consultation emphasized its importance in developing a map that is reflective of community values, needs, and is useful, participants also recognized that the level of community engagement is dependent on internal resources and capacity. This idea supports engaging in an integrated community based mapping process.

The selected case studies and interviews revealed that there are several ways to approach the development of an asset map. Some, like the New York Reuse Sector Report, used a more top-down process. The most common method used an integrated approach that included a preliminary top-down identification of assets internally followed by community engagement and ongoing crowdsourcing; these include Vancouver Cultural Spaces Map, Vancouver Food Asset Map, and Vancouver's Share Map. These maps also reached out directly to businesses to ask if they would like to be included in the map.

The table below briefly summarizes the methodology used during five stages of the mapping process in the case studies.

Summary of the methodology used across five stages of the mapping process					
	Define	Collect	Visualize	Maintain	Analyze
Vancouver Food Assets Map	Completed by students from existing neighbourhood maps and evaluated through community evaluation	Completed by students using existing neighbourhood food maps and community food databases	Completed internally	Crowdsourced by map users, data validated internally	Shallow analysis (map usage data only), completed internally
Vancouver Cultural Spaces Map	Completed internally	Completed internally	Completed internally	Crowdsourced in month-long campaign, updated internally after validating suggested spaces	Shallow analysis completed due to limited resources. Informs Council reports (ownership and number)
Vancouver's Share Map	Completed by CityStudio students	Completed initially by CityStudio students then by participants at two MapJam events	Completed internally	Map was crowdsourced in 2014 but is no longer updated due to lack of stewardship	No analysis completed due to lack of stewardship
donateNYC Directory and Materials Exchange	Completed internally	Completed internally and as requested by businesses	Not applicable	Completed internally by reaching out to businesses as well as through crowdsourcing	No analysis completed
NYC Reuse Sector Report	Completed internally	Completed internally	Completed internally	Completed internally	Extensive analysis, completed internally

The following discussion integrates the findings from the literature review, interviews, and selected case studies to recommend a methodology that takes an integrated approach involving internal research and external consultation to create a comprehensive and useful map according to the potential uses that were previously defined.

Defining Assets

Two participants stressed that defining assets is a critical first step when developing an assets inventory as it determines what types of assets will be mapped based on the values held in the community. While some of the case studies defined assets internally, this report recommends defining assets through a participatory planning process. This approach will help ensure that the assets represented in the final map have value to the community.

As previously discussed, some individuals may perceive zero waste as being unachievable and as a foreign concept despite the fact that they have practiced zero waste activities like reuse, repair, and share often. This suggests that many do not associate these activities within the realm of zero waste. Defining assets using a bottom-up approach will help determine what activities are practiced, where these activities are practiced, and where these activities could be further supported.

An engagement session may begin with a series of simple questions aimed at gaining a more comprehensive understanding of people's consumption and disposal habits:

» List all the things (excluding food) that you bought this week. Where did you buy them?

» List any unwanted items that you got rid of in the past month. How did you get rid of them and why?

This process requires community engagement to understand how residents define zero waste activities and assets. Additionally, naming the map in a way that appeals most to a wide range of users (more than those who are already actively engaged in zero waste) should also be done during this stage.

Collecting Assets

After defining what assets are valuable to the community and which assets should be included and excluded, an engagement process to identify and collect zero waste assets should follow. Prior to beginning the engagement process, compile a sample of zero waste assets internally (through background research) and present the examples of assets to the community and prompt participants to identify additional assets. Once zero waste assets are gathered, compile both lists according to the previously defined asset categories. One interviewee stated that while accuracy is key for growing a user base, completeness is less important; the pursuit of a complete dataset should not impede making the data available for use by the public.

In addition to identifying assets through consultation, staff may begin by collecting specific types of assets such as those involving donation, repair, or share. This would allow staff to begin the collection process more quickly, provide something of value to the community sooner, and acquire knowledge and experience that could be applied to the development of a more fulsome assets map.

Note that the process of defining and identifying assets should be iterative and collaborative as peoples' understanding of zero waste activities and assets develops over time.

Visualizing Assets

There are several different ways of visualizing community assets: a hand-drawn map, a written inventory, a searchable online directory, a GIS map, or an open-source map. Within each of these options, there are several online platforms that can be explored based on available resources and capacity. Based on the findings from interview participants, the map should be visualized to reflect the intended use by residents. Regardless of the platform, it should satisfy the three primary uses previously listed – to identify resources and activities, measure zero waste assets, and inform policy.

The process of visualizing assets should be completed internally to ensure that the data is held centrally. Piloting different visualization techniques may be used in different neighbourhoods at a small scale.

Maintaining Assets

Research revealed that crowdsourcing assets and providing the opportunity for users to update and suggest additional assets (either an embedded survey or link) is a valuable method to keeping the map up-to-date as establishments change over time. This method was used by the Vancouver Food Asset Maps and the Vancouver Cultural Spaces Map. Crowdsourced assets should be validated internally to ensure that a) the organization suggested would like to be included on the map, b) the organization is represented as they see themselves, and c) to ensure that the organization fits the asset types included in the map.

The most common method of maintaining assets is done internally by the organization or group that stewards the map. Because two of the primary uses of the map are to measure the development of a zero waste culture and inform policy, the map should be held by an organization with the capacity to

complete this level of analysis. Based on the case studies and interviews, one of the main challenges to completing an in-depth analysis is a lack of resources.

Based on an internal audit of available resources, staff should determine how often the map will be updated and analyzed internally. This timeline should reflect usage of the map – for example, when the map is first released, a higher number of assets may be suggested through crowdsourcing which may require more frequent updates.

Analyzing Assets

Pursuing options to support and grow product reuse and sharing in Vancouver is a priority action in Zero Waste 2040: "the first step to increase the reuse and sharing of products is to increase understanding of how residents and businesses are engaged in those activities now."[31] As discussed as a potential use, a zero waste assets map can measure zero waste activity and inform policy. This analysis should be completed internally.

As alluded to previously, analyzing what the mapped assets reveal about the state of zero waste in Vancouver is a critical step that cannot be missed. To ensure that this level of analysis can be completed, structure the database and information to satisfy this analysis. Some mandatory fields include asset name, primary use, product types, address, and neighbourhood.

One lesson learned throughout the interviews is that it is useful to time the crowdsourcing campaign and annual update to ensure that an analysis can be incorporated into Council reports and help inform policy. There is an opportunity to analyze zero waste assets alongside key dates such as reports to Council.

An evaluation form should be offered at all community engagement sessions to gather information regarding residents' perception and use of the map. This feedback will be used to determine how the map can be improved to encourage more residents to use it.

[31] City of Vancouver. (2018). Zero Waste 2040.

Based on the research findings and proposed methodology above, a six-stage mapping process was developed to outline the suggested planning process to develop a comprehensive and inclusive zero waste assets map.

STAGE 1

PLANNING

» Determine potential uses and opportunities internally and through community engagement sessions

» Determine objectives internally and with community

STAGE 2

MAPPING DESIGN

» Determine fundamental questions and define zero waste assets with community

» Develop database and initial internal dataset

STAGE 3

COMMUNITY SUPPORT AND INSIGHT

» Host community engagement sessions to collect assets

» Distribute surveys to collect additional assets from those other stakeholders and community members

» Compile both datasets

STAGE 4

CREATING THE MAP

» Based on community insight and identified objectives, create the map using a platform to satisfy its uses.

» Obtain community feedback based on current rendition of map

STAGE 5

FINALIZING THE MAP

» Present the map to engaged stakeholders and community members

» Speak with different audiences to garner support and interest

» Complete preliminary analysis and present result to the target audience and community participants

STAGE 6

MONITORING AND EVALUATION

» Analyze and interpret the results

» Monitor assets over time

» Present data analysis and performance metrics to policymakers, stakeholders, and residents

Recommendations

Use an integrated approach to define, collect, visualize, maintain, and analyze the zero waste assets map

There are several different methods for developing, maintaining, and analyzing an assets map. The background literature review grounded this project in community based assets mapping theory which supports a bottom-up planning approach. The case studies and interview respondents revealed that a more integrated approach with internal management and community based development would satisfy the potential uses identified in this report. An integrated approach satisfies the desired outcomes to identify zero waste resources and activities, measure the existing state and evolving changes of a zero waste culture in Vancouver, and to inform policy.

Note that further research and consideration should be completed in collaboration with engagement specialists to ensure that the methodology proposed is inclusive and participatory at all relevant stages of its development.

Address barriers

Research concluded that there are multiple motivations and barriers that influence people's consumption and disposal habits. While an assets map is a great tool to show residents how close they are to a particular asset, it does not address other barriers like cost, time, and convenience. These barriers are closely interrelated and have different significance based on socioeconomic positions for groups like students, seniors, families, newcomers, and disadvantaged communities. Further consideration and engagement should seek out these groups to gain a deeper understanding how a zero waste assets map may suit these populations and address barriers particular to them.

Ensure the map is easy to use, up-to-date, accessible, and convenient

Creating a zero waste assets map is one approach for illustrating what zero waste activities are currently practiced, the distribution of these activities across various geographic areas, and what challenges exist to growing these assets. In order for the map to satisfy the potential use of being a one-stop-shop resource for residents to reference when engaging in reuse, repair, share, donation, etc., the map should be easy-to use with the following functions:

» Definitions and instructions available in multiple languages
» Searchable by product, asset type, and location

» Online
» Up-to-date and accurate
» Highlights events and initiatives of zero waste activities not mapped
» Includes option to suggest an update or additional asset
» Embedded feedback form
» Regularly review feedback

Create an inclusive map

Zero waste activities like reuse, repair, and share, (although widely practiced in our inner circles or family and friends), is not yet a mainstream behaviour. In order to create a map that supports zero waste activities and increases access to find information about how and where to practice these activities, the map must be inclusive.

» Develop definitions that are easily understood by different communities
» Name the map in a way that resonates with community members
» Identify assets that are culturally relevant
» Engage with diverse and varied audiences
» Map the assets that are identified by community participants
» Highlight zero waste practices from the many diverse cultures in Vancouver

Consider regional integration

In the first stages of the mapping process, a zero waste assets map will likely be undertaken beginning at a community scale and extending to cover the municipality. However, one of the key research findings is that Vancouver is regionally connected and people do not stop living, working, and playing at Boundary Road. Throughout the planning process of a zero waste assets map, it is important to keep a potential regional boundary in mind to ensure that if the map is extended or other municipalities follow suit and develop their own, that a standard number of assets are defined consistently to allow cross-municipality analysis in the future.

References

City of Vancouver. (2012). Greenest City 2020 Action Plan.

City of Vancouver. (2015). Healthy City Strategy.

City of Vancouver. (2018). Zero Waste 2040.

Cooper, R. *Share, reuse, repair* [PDF presentation]. Retrieved from https://www.rcbcconference.ca/uploads/3/8/4/1/38412063/session_6_-_share_reuse_repair_cooper.pdf

De Paoli, A. (2015). Towards the circular economy: identifying local and regional government policies for developing a circular economy in the fashion and textiles sector in Vancouver, Canada. *Vancouver Economic Commission*. Retrieved from http://www.vancouvereconomic.com/wp-content/uploads/2016/04/Textiles_policyreport.pd

Diplock, C. (2016). The sharing project: a report on sharing in Vancouver. *The Sharing Project.*

Ellen Macarthur Foundation. (2016). Empowering Repair. Retrieved from https://www.ellenmacarthurfoundation.org/assets/downloads/ce100/Empowering-Repair-Final-Public1.pdf

Frameworq Fix-It Society. (nd). https://www.frameworq.ca/

Fuller, T., Guy, D., & Pletsch, C. (2002). Asset mapping: a handbook. Retrieved from https://ccednet-rcdec.ca/sites/ccednet-rcdec.ca/files/asset_mapping_handbook.pdf

Lorenzo, L. (2013). Understanding the scope of reuse in Vancouver: final report. Retrieved from https://sustain.ubc.ca/sites/sustain.ubc.ca/files/uploads/pdfs/2013%20GCS%20Reports/GC%20Scholars%20-%20Final%20Report%20-%20Lorenzo%20Lane%20-%202013.PDF

Moore, S. & Borrup, T. (2012). Chapter nine: cultural mapping. In Borwick, D. (2012). *Building communities, not audiences: the future of the arts in the United States.* Winston-Salem. Retrieved from https://www.artsengaged.com/chapter-nine

NYC Department of Sanitation. (2017). 2017 NYC reuse sector report. Retrieved from https://www1.nyc.gov/assets/dsny/docs/2017-NYC-Reuse-Sector-Report-FINAL

One Earth. (2015). Local governments and the sharing economy. Retrieved from http://www.localgovsharingecon.com/uploads/2/1/3/3/21333498/localgovsharingecon_report_full_oct2015.pdf

Puntenney, D. (2014). Asset mapping. *The SAGE Encyclopedia of Action Research*. SAGE Publications Ltd.: London.

Rosenblatt, S. (2001). Mapping Food Matters. *Victoria: Common Ground and OXFAM-Canada*.

Stewart, S. (2007). Cultural mapping toolkit. Vancouver: 2010 legacies now and creative city network of Canada. Available: http://www.creativecity.ca/database/files/library/cultural_mapping_toolkit.pdf

Taylor, K. (2013). Cultural mapping: Intangible values and engaging with communities with some reference to Asia. *The Historic Environment: Policy & Practice*, 4(1), 50-61.

UNESCO Bangkok. (2017, July 4). Cultural mapping. Retrieved from http://bangkok.unesco.org/content/cultural-mapping

Vancity. (2016). Thrift Score: An examination B.C.'s second-hand economy. Retrieved from https://www.vancity.com/SharedContent/documents/pdfs/News/Vancity-Report-Examination-of-the-Second-Hand-Economy-in-BC-2016.pdf

Appendix A - Existing Mapping Resources

Mapping

Greenest City Projects Map: *Map of the City of Vancouver, City Studio students, Greenest City Fund grant recipients, and business and institutional partners are collaborating to accomplish Greenest City 2020 targets.*
https://vancouver.ca/green-vancouver/greenest-city-projects-map.aspx

Resourceful PDX: *Online platform that connects Portland residents to free or low-cost options for living more resourcefully. Includes ideas and tips, events, and a map.*
http://www.resourcefulpdx.com/map/

Recycling and Disposal

Metro Vancouver Recycles: *Online directory for residents and businesses to find recycling options for various materials and items in Metro Vancouver.*
http://www.metrovancouverrecycles.org/

Vancouver Waste Wizard: *Online platform that informs residents how to recycle or safely dispose of items in Vancouver.*
https://vancouver.ca/home-property-development/waste-wizard.aspx

Recycle BC Recyclepedia: *App that directs residents to disposal and recycling options for household materials based on location. Available online and as a mobile app.*
https://www.rcbc.ca/recyclepedia/search

City of Edmonton WasteWise App: *App that directs residents to disposal, recycling, and reuse options for household materials. Available online and as a mobile app.*
https://www.edmonton.ca/programs_services/garbage-recycling-waste.aspx

Reuse Directories

Vancouver Reuses Online (not active): *Online directory to promote reuse of various items in Vancouver (not active).*
http://www.vancouver.reuses.com/

Surrey Reuses Online: *Online directory to promote reuse of various items in Surrey.*
http://www.surreyreuses.com/

DonateNYC: *Online platform for residents and businesses to quickly and easily find nearby places for donation and second-hand goods.*
https://www1.nyc.gov/assets/donate/giveandfind/residents.shtml

Zero Waste DC Reuse Directory: *Reuse directory offered as an informal resources to shop, donate, and repair establishments. The list is not exhaustive of all similarly focused shops in the local area, but rather, a preliminary list with an option to suggest additional establishments.*
https://docs.google.com/spreadsheets/d/1C9bg3k5jdkA6TyDandTfsWAdXV1aUvB7dBqTmdezCx0/edit#gid=676612746

Sharing Maps

Shareable Vancouver: *Online platform providing information about local organizations, resources, and sharing initiatives in Vancouver.*
https://www.shareable.net/cities/vancouver-bc-canada

Repair Maps

Repair Café Map: *Online map of repair cafes around the world with contact information.*
https://repaircafe.org/en/visit/