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DEVELOPING A  
METHODOLOGY FOR  
MEASURING  
ENVIRONMENTAL,  
ECONOMIC AND SOCIAL  
WELLBEING IMPACTS OF

# THE FREE STORE

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# Developing a Methodology for Measuring Environmental, Economic and Social Wellbeing Impacts of The Free Store

An Interactive Qualifying Project report submitted to the faculty  
of Worcester Polytechnic Institute in partial fulfillment of the  
requirements for the Degree of Bachelor of Science

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## ABSTRACT

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While many people cannot pay for the food they need, some eateries throw away unspoiled food at the end of every day. As a solution to this problem, The Free Store, a food redistribution organization located in Wellington, New Zealand, distributes fresh surplus food from inner-city eateries to those in need. However, there is no framework to analyze their community impact. Our project evaluated methods to measure the store's economic, environmental, and social wellbeing impacts. We used participant observation and semi-structured interviews to generate a framework and survey for social data collection. Additionally, we developed procedures to quantify the store's environmental and economic impacts. Our final deliverable will allow future research projects to conduct a complete analysis.



Figure i: Volunteer at The Free Store

*“So long as the marginalised and vulnerable are problems to solve instead of friends to know, our community will remain divided.”*

*— Benjamin Johnson, Founder*

# EXECUTIVE SUMMARY

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The Free Store is a food redistribution nonprofit in Wellington, New Zealand and is founded on mutual respect between those who give and receive food. Food waste and food insecurity are issues that plague society, even in developed nations. In order to combat these issues, The Free Store collects unsold food from over 65 of Wellington's eateries to be given away later that same evening. The difference between The Free Store and similar organizations is the social benefits provided in addition to meeting physical needs. The Free Store believes their next phase of growth requires an extensive formal analysis of its impact on their community. While methods and models exist to analyze traditional food redistribution organizations, the Free Store's uncommon community-based concept of operation warrants a tailored analysis to properly gauge its effect on improving environmental, economic, and social well-being outcomes in the greater Wellington area. The aim of this project was to assist The Free Store in developing a framework for analysis of their impact on the Wellington community.

## Methodology

The goal of this project was to provide The Free Store with a methodology to assess its impacts on the Wellington community on three impact levels: environmental, economic, and social. To accomplish this goal, we outlined three objectives. The objectives and the resulting methodology were as follows:

### 1. Establishing familiarity and building a foundation of mutual respect with the community of The Free Store.

To accomplish this objective, our team gathered data through participant observation. The aim of the participant observation was to understand the current perceptions of The Free Store by the customers, volunteers and eateries, our stakeholders. We primarily volunteered at The Free Store for the first two weeks of our project. We began by volunteering at the store during operational hours from 3:00 pm until 7:30 pm on weekdays. The first portion of this timeframe was spent collecting food along the various routes established by the store. This allowed us to identify the roles of stakeholders and forge relationships with them. Due to the nature of our involvement it was not possible to take detailed notes concurrently with the interactions. However, we used proven strategies for managing field notes.

### 2. Learning the perspectives of our stakeholders

After identifying and familiarizing with our stakeholders, we conducted interviews. We developed one set of questions for eatery employees and another for volunteers and customers due to the different nature of question and responses. We performed structured interviews when interviewing eatery employees. Our main goal with these interviews was gauging their perspectives on the issues that The Free Store aims to combat: food waste and food insecurity. On the other hand, we performed semi-structured interviews with customers and volunteers at the store. We chose the three main areas of need, physiological, psychological, and self-actualization, as "overarching themes", and developed questions to find out about the store's impact in each of these

areas. In conducting both of these interviews we divided into two teams of two. Within each group there was one person asking the questions and one person taking notes about the interview.

### 3. Developing and refining repeatable and systematic methods for gathering data for social impacts economic and environmental impacts

In order to measure the impacts of The Free Store, we required not only rich data, but plentiful data. After gathering and analyzing stakeholder perspectives through the methods previously mentioned we developed ways to collect quantifiable data in each of the impact areas of The Free Store. For the social impacts, we constructed a framework on which to base pilot surveys. We created this framework by coding the interview results from each stakeholder group to identify common indicators for the development of survey questions. Unlike the social analysis, we gathered data for calculating economic and environmental impacts through empirical methods. These methods were mostly counting people or items around The Free Store.

## Findings

Prior to the beginning our of project, we expected our study to be the first half of a two year analysis. We framed our study such that the results would inform the second part of the study. Through our research we arrived at two key sets of findings. The first is a comprehensive methodology for next year's project team to fully analyze the environmental, economic, and social well-being impacts of The Free Store. The second are preliminary conclusions drawn about the impacts of The Free Store based on the data we collected. This second set will be further explored by next year's team.

## Steps to Assess The Free Store's Impacts

1. Understand how The Free Store operates
  - a. Volunteer in different roles to experience all aspects of how the store is run
2. Develop a relationship with people at The Free Store
  - a. Hold conversations with customers and volunteers at the store
3. Gather data about The Free Store
  - a. Conduct surveys of customers, volunteers, and eateries
  - b. Collect counts of people served, food gathered, and consumables used in the store's operation
4. Analyze the information gathered
  - a. Use a framework based on Maslow's Hierarchy of Needs to assess social impact data from surveys
  - b. Use scientific studies to quantify empirical data in terms of environmental and economic impact
5. Deliver a report with collective findings to The Free Store
  - a. Provide materials to allow the store to effectively demonstrate their model and impact to sponsors, legislators, or those looking to expand the movement



## Conclusions about the Free Store's Impacts

1. Customers and volunteers find a place of belonging at The Free Store
2. The Free Store provides healthy options to those who otherwise may not be able to afford it
3. The Free Store promotes empathy and understanding for its customers and volunteers
4. The Free Store provides structure for customers and volunteers

## Recommendations

After analyzing the results from our participant observation and stakeholder interviews, our team developed a set of recommendations for The Free Store to implement, as well as recommendations for further analysis to next year's project team. These recommendations are as follows:

### Recommendations to The Free Store

1. We recommend that The Free Store develop a set of specific and strategic goals or outcomes in order to allow for a concise evaluation of impacts.
2. We recommend that The Free Store establish a system of consistent contact with partner eateries
3. We recommend that The Free Store opens multiple times during the holiday season
4. We recommend that The Free Store records visited eateries on collection runs

### Recommendations for Future Research

1. Developing and administering the pilot survey/administering surveys
2. Future research in economic and environmental impacts of The Free Store
3. Future research in social impacts of The Free Store



*Figure ii: The Free Store During Opening Time*

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*Figure iii:* Our research team with the community of The Free Store

# Table of Contents

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<b>ABSTRACT .....</b>	<b>III</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>IV</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>VII</b>
<b>TABLE OF CONTENTS .....</b>	<b>VIII</b>
<b>TABLE OF FIGURES.....</b>	<b>X</b>
<b>TABLE OF TABLES.....</b>	<b>X</b>
<b>CHAPTER 1. INTRODUCTION .....</b>	<b>1</b>
<b>CHAPTER 2. BACKGROUND .....</b>	<b>3</b>
2.1 FOOD INEQUITY ON A GLOBAL SCALE.....	3
2.2 GLOBAL APPROACHES TO FOOD INEQUITY.....	4
2.3 FOOD INEQUITY IN NEW ZEALAND .....	6
2.4 APPROACHES TO FOOD INEQUITY IN NEW ZEALAND .....	7
2.5 THE FREE STORE.....	8
2.6 SUMMARY .....	10
<b>CHAPTER 3. METHODOLOGY.....</b>	<b>11</b>
3.1 ESTABLISHING FAMILIARITY AND BUILDING A FOUNDATION OF MUTUAL RESPECT WITH THE COMMUNITY OF THE FREE STORE.....	11
3.1.1 <i>Volunteering at The Free Store</i> .....	11
3.1.2 <i>Recording Stakeholder Interaction and Communication</i> .....	13
3.2 LEARNING THE PERSPECTIVE OF OUR STAKEHOLDERS .....	13
3.2.1 <i>Interview Eateries</i> .....	13
3.2.2 <i>Interviewing Customers and Volunteers</i> .....	14
3.3 DEVELOPING AND REFINING REPEATABLE AND SYSTEMATIC METHODS FOR GATHERING DATA FOR SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS .....	14
3.3.1 <i>Social Impacts</i> .....	15
3.3.2 <i>Economic and Environmental Impacts</i> .....	16
3.4 SUMMARY .....	18
<b>4. FINDINGS AND ANALYSIS .....</b>	<b>19</b>
4.1 OUR DEVELOPED METHODOLOGY.....	19
4.1.1 <i>Necessary Steps to Analyze the Impacts of The Free Store</i> .....	19
4.1.2 <i>Best Practices for Integrating into Community and Collecting Data</i> .....	20
4.1.3 <i>Data Analysis Methods</i> .....	25
4.2 OUTCOMES OF THE FREE STORE.....	26
4.3 DISCUSSION OF FINDINGS .....	28



<b>CHAPTER 5. RECOMMENDATIONS AND CONCLUSION.....</b>	<b>31</b>
5.1 RECOMMENDATIONS TO THE FREE STORE.....	31
5.1.1 <i>Recommendations to The Free Store to make data collection better.....</i>	31
5.1.2 <i>General Recommendations to the Free Store.....</i>	32
5.2 RECOMMENDATIONS FOR FUTURE RESEARCH.....	33
5.2.1 <i>Developing and Administering the Pilot Survey.....</i>	33
5.2.2 <i>Future Research in Economic and Environmental Impacts of The Store.....</i>	34
5.2.3 <i>Future Research in Social Impacts of The Store.....</i>	34
5.3 CONCLUSION.....	34
<b>CHAPTER 6. REFLECTIONS .....</b>	<b>36</b>
<b>CHAPTER 7. REFERENCES .....</b>	<b>39</b>
<b>APPENDIX A .....</b>	<b>43</b>
<b>APPENDIX B .....</b>	<b>44</b>
<b>APPENDIX C .....</b>	<b>46</b>
<b>APPENDIX D .....</b>	<b>48</b>
<b>APPENDIX E .....</b>	<b>49</b>
<b>APPENDIX F.....</b>	<b>50</b>

# Table of Figures

---

FIGURE I: VOLUNTEER AT THE FREE STORE .....	III
FIGURE II: THE FREE STORE DURING OPENING TIME.....	VI
FIGURE III: OUR RESEARCH TEAM WITH THE COMMUNITY OF THE FREE STORE.....	VII
FIGURE 2.1: VOLUNTEER WITH TROLLEY FILLED WITH FOOD .....	9
FIGURE 3.1: CONVERSATION HELD DURING "HANGOUT" TIME .....	12
FIGURE 3.2: MASLOW'S HIERARCHY OF NEEDS .....	15
FIGURE 4.1: THE UNDERCROFT OF THE CHURCH .....	21
FIGURE 4.2: COFFEE AND TEA STATION .....	22
FIGURE 4.3: VIEW FROM THE SIDEWALK OF WILLIS ST .....	23
FIGURE 4.4: MEMBERS OF OUR TEAM INTERACTING WITH PEOPLE AT THE STORE .....	27

# Table of Tables

---

TABLE 3.1: OXFORD STUDY ENVIRONMENTAL FOOTPRINT FACTORS.....	177
TABLE 3.2: GANTT CHART SHOWING ESTIMATED TIMELINE.....	188
TABLE 4.1: PROS AND CONS OF METHODS TO COUNT THE NUMBER OF CUSTOMERS AT THE FREE STORE .....	244
TABLE 4.2: IMPLEMENTATION OF OXFORD FOOTPRINT FACTORS .....	255
TABLE 4.3: TRIALS OF COUNTING CUSTOMERS.....	255

# CHAPTER 1. Introduction

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Inequity in the food industry is a worldwide problem, manifesting in many ways. For the third year in a row, there has been a rise in world hunger. The absolute number of undernourished people, i.e. those facing chronic food deprivation, increased to nearly 821 million in 2017, from around 804 million in 2016 (Shaw, 2017). Beyond those facing constant food deprivation, there are those who go hungry in order to pay bills and other expenses when necessary. This dilemma affects the least fortunate among us. While hunger is a critical issue, the obstacle is not lack of food available to eat. Due to a variety of factors, such as poor storage and transport conditions, accidental post-consumer surplus and regulations regarding packaging, food waste is a widespread problem (Papargyropoulou, Lozano, K. Steinberger, Wright, & Ujang, 2014). European think-tanks including Climate Analytics and Ecofys have found that over a third of the food the world produces each year, 1.3 billion tonnes, is wasted (Food and Agricultural Organization (FAO), 2016). The effects of these issues present themselves in many ways, but can chiefly be categorized into environmental, economic, and social impacts.

Food insecurity and waste are a concern in New Zealand, as they are worldwide. In 2011, New Zealand industries generated over 103,000 tonnes of food waste (Christian, Miroso, & Clothier, 2016). A substantial amount of food waste is produced towards the end of the food supply chain, such as restaurants and other eateries that dispose of unsold food at the end of every day. These practices carry grave economic and environmental consequences, amounting to \$1.8 billion USD lost annually while contributing to greenhouse gas emission and expending finite natural resources (Carter, Tolotea, Kruse, & Gorton, 2010). The weight of this waste is highlighted further when juxtaposed against the country's food insecure population. In 2004, over 15% of the country's population was classified as food insecure (Salter, 2016). Despite producing enough food annually to feed twenty million people with a population of just five million, around 270,000 school children go without breakfast or dinner each day. This is a growing social, environmental, and economic problem in New Zealand (Anderson, 2018).

Around the globe, many avenues have been explored to curb the impact of food waste while addressing food insecurity. This includes action from both governments and non-profit organizations. In some cases, like a series of measures passed in Italy in 2016, legislation has been used to encourage conservation-conscious behaviors from businesses and consumers. These laws included reducing waste taxes for businesses that donate, removing sanctions for giving away food past its sell-by date, and funding grants to develop more effective food transit and promote public anti-waste awareness campaigns (Staufenberg, 2016). Typically, such legislation will support actions by food non-profit actors. The most common type of nonprofit is known as a front-line organization. Front lines, like food pantries or soup kitchens, serve directly to those in need (Baglioni, Pieri, & Tallarico, 2017). Another type of nonprofit is logistical. These groups distribute food from restaurants, grocery stores, and other retailers to front-line organizations. One such logistical group is the English charity FareShare, who operates a nationwide supply chain of donations from a variety of businesses to a network of recipient charities (Alexander & Same, 2008). A third model, hybrid organizations, merges the two other types by redistributing food from restaurants and food retailers to the hungry.

In Wellington, New Zealand, non-profit The Free Store takes a hybrid approach to food insecurity and waste. The Free Store gathers food daily from over 70 local businesses and redistributes it out of a repurposed shipping container. They have a relationship-centric approach that focuses on developing a sense of community, both for those in need who use the store, and the network of volunteers who make the operation possible (Salter, 2016). The Free Store not only distributes food to those in need, but also reduces food waste in the Wellington area while creating volunteering and leadership opportunities for its social network. While their food recovery model is thriving, they are looking to further expand the movement. The Free Store believes their next phase of growth requires an extensive formal analysis of its impact on their community. While methods and models exist to analyze traditional food redistribution organizations, The Free Store's uncommon community-based concept of operation warrants a tailored analysis to properly gauge its effect on improving environmental, economic, and social well-being outcomes in the greater Wellington area.

The goal of our project was to develop, test and refine a methodology for measuring The Free Store's impact at three levels: environmental, economic and social well-being. We gathered data from food suppliers in order to deduce the environmental impact of The Free Store. Furthermore, we accounted for the various processes utilized in the context of The Free Store that have purposefully been implemented to aid in reducing environmental impact. We measured the cost savings for food donors and recipients, as well as the added value of skills and capacity-building for volunteers, especially the unemployed. We utilized qualitative community wellbeing indicators to gather evidence for a range of positive effects afforded by community participation. This methodology can be used by next year's project team to assess the impacts of The Free Store. Our sponsors can use these findings to garner fundraising support, influence public policy, and expand the model.

## CHAPTER 2. Background

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The purpose of this chapter is to present our preliminary research into the topic of food inequity as well as its impacts, and what has been done in the past to mitigate the issue. First, we discuss food inequity in two parts: food waste and food insecurity. This is done to establish the various environmental, economic, and social impacts food inequity has on a global scale. We also present examples of the steps that have been taken by government action and non-profits to intervene. After this, we focus on the same issues and actions taken to resolve them that are specific to New Zealand. This is done to narrow the focus of a seemingly unsolvable worldwide crisis. Lastly, we introduce The Free Store as one organization acting against food waste and insecurity through an innovative model that is rooted in community.

### 2.1 Food Inequity on a Global Scale

World farmers currently produce more than 1.5 times the amount of food needed to feed the 7.53 billion people of the world. However, in 2017 almost 821 million people faced chronic food deprivation ("The state of food security and nutrition in the world", 2018).

Food inequity is a major concern globally and can be analyzed by breaking the issue down into two integral components: food insecurity and food waste. Food insecurity applies to people who are chronically undernourished, have to skip meals in order to make ends meet, or somewhere in between. Eleven and a half percent of all adults and seventeen and a half percent of all children reside in food insecure households. Food insecurity has detrimental impacts on physical and mental health, such as disease and mental distress (Hartline-Grafton, 2017). The most accurate indicator of food insecurity is low income ("Sustainability pathways: Food wastage footprint", 2018). Approximately 40 percent of the world population earns less than \$2.60 USD per day (\$3.78 NZD), which is not enough to afford a nutritional amount of food ("World Development Indicators", 2008).

While many people cannot pay for the food they need, most eateries and retailers throw away unspoiled food at the end of every day. Food waste is a massive concern and refers to the general disposal of uneaten food that was edible before going to waste. The impacts of this issue are extensive, including environmental as well as economic effects. For example, if food waste were a country it would be the third largest emitter of greenhouse gases ("Food Wastage Footprint & Climate Change", 2015). Greenhouse gases in Earth's atmosphere contribute to environmental issues such as global warming and climate change ("Greenhouse Effect", 2018). As food waste rots in landfill it releases methane, a very strong greenhouse gas. Also, the production of food as well as transport release greenhouse gases from the machines required to execute these processes ("Food and Climate Change", 2018). In addition to greenhouse gas emissions, food waste accounts for major waste of water and agricultural land. Each year, A volume of water equivalent to three times the size of Lake Geneva, 89 cubed kilometers, is used to produce food that is wasted. Additionally, 1.4 billion hectares of land, nearly twice the size of Australia, is used to grow food that is wasted ("The Environmental Impact of Food Waste", 2015).

The economic impact of food waste is also large-scale. In total, the global cost of food wastage amounts to about USD 2.6 trillion each year, including USD 700 billion environmental costs and USD 900 billion of social costs ("Sustainability Pathways: Food Wastage Footprint", 2018). It is



evident that food inequity is a major concern globally with its alarming impacts directly affecting the world population. In recent years there has been growing concern about these environmental and economic costs and how they can be reduced by food rescue conservation methods. Food rescue consists of recovering and later redistributing fresh, quality food that would otherwise be wasted to those in need. This method centers around the idea that food insecurity and food waste each can be seen as a solution to the other. There are many people going hungry every day while at the same time there is a large amount of food going to waste. This juxtaposition demonstrates a severe moral cataclysm with the current food establishment.

## 2.2 Global Approaches to Food Inequity

With such expansive issues, many food recovery approaches have been taken worldwide to combat food inequity. National governments are the largest organizations contributing to the solution. Many countries around the world have passed legislation to incentivize eateries to donate unsold food instead of throwing it away. One incentive is to free business owners of legal liability for donating potentially spoiled food. In the United States, the Bill Emerson Good Samaritan Food Donation Act protects food donors and nonprofit groups that distribute food from liability associated with the consumption of donated food (Karidis, 2018). In Italy, supermarkets no longer face sanctions for giving food away past its sell-by date (Staufenberg, 2016). These incentives can also come in the form of tax breaks instead of redirecting liability. In the United States, the Federal Enhanced Tax Deduction for Food Donation allows businesses to value their food donations to qualified nonprofits (Karidis, 2018). Alternatively, some countries look to sanction businesses instead of incentivizing them. In France, supermarkets are banned from throwing away unsold food and face fines if they don't sign contracts with food redistribution organizations (Payton, 2016).

While legislation is the primary medium for enacting change, governments also control welfare programs that aim to assist low income citizens with essential costs like food. In America, the largest government program fighting hunger is the Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program. SNAP offers nutrition assistance to millions of eligible, low-income individuals and families and provides economic benefits to communities. While this program covers many food insecure families, there are still those that are hungry in every nation. Potentially as low as 50% of families eligible for SNAP claim benefits. There are two main issues why people do not participate in programs intended for them. The first issue is that they do not receive substantial benefit from the program. The second is that people do not think they are eligible for benefits at all. Other reasons include stigma surrounding government reliance, and medical issues that take precedence over food security (Daponte, Sanders, & Taylor, 1998).

Governments can have an effect on social issues in other ways. They even take direct action towards citizens suffering from food insecurity. In Italy the highest court ruled that stealing a small amount of food due to hunger is not a crime (Staufenberg, 2016). Additionally, states help out non-government organizations in their efforts in food redistribution. In Italy, the Agricultural Ministry funded a €1mil campaign to raise awareness about food waste. The Brazilian Agricultural Research Corporation in a partnership with the office of the Food and Agriculture Organization launched a campaign aiming to halve food waste by 2030. The initiative aims to raise consumer awareness about food waste and create a positive impact on food consumption habits. It uses digital media to educate people about the negative consequences of food waste for the environment, household

finance, and food security (Adjuto & Foster, 2016). Government programs are well-intended and wide-reaching actions. However, these programs do not cover everyone they intend to. This is where non-profit action comes in.

Where there are voids in government care, non-profit organizations step in to provide services to address food inequities. At their functional level, nonprofit organizations can be categorized into three main groups: front-line, logistical, and hybrid. Front-line organizations deliver food directly to those in need, while logistical organizations coordinate with restaurants, grocery stores, or other sources to distribute food to front-line groups. As the name suggests, hybrid organizations fall into both categories, both collecting and serving food. The following paragraphs will provide examples of each type of food redistribution organization and their operation (Baglioni, Pieri, & Tallarico, 2017).

Organizations that are strictly front line tend to be smaller in size, serving their local community directly. Their operation may be serving meals for direct consumption, as in a soup kitchen, or giving away food for later preparation, like a food pantry. In either case, their actions are in turn supported by larger logistical distributors (Gentilini, 2013).

Logistical organizations are larger in size and scope, with regional or sometimes even national reach. Each year, 60 million people in high income countries around the globe are supported by logistical food banks (Gentilini, 2013). With broader reach, the missions of many of these organizations are multifaceted, addressing both hunger and waste. For example, the British charity FareShare was founded with the aim of minimizing waste in the food retail sector to support those in need. FareShare operates across Great Britain, with a central London depot as well as eight regional distribution points. They collect food daily from a variety of retailers at various points in the consumer chain, ranging from a few leftover sandwiches from a cafe to truckfuls of one particular product from a supermarket. With so many sources, the methods of donation vary to meet retailers' needs, from drop off points to ad hoc pickups. For businesses, their partnerships not only offset food waste going to landfill, but also save on disposal costs. For charities, the food FareShare provides not only helps feed those in need but cuts down costs. In 2006, FareShare donated 15,000 tonnes of surplus food, giving 3.3 million meals to over 12,000 people (Alexander & Same, 2008).

Lastly, some groups play the role of both coordinator and distributor, featuring hybrid models with networks to collect and redistribute food, also known as food charities. In Germany, the Die Tafel, or dining table, movement has a central office in Berlin that supports a network of 916 local agencies around the country. These agencies rely on a network of over 50,000 volunteers, some of whom are unemployed or homeless themselves as part of a reintegration program. The national organization manages broad logistical and administrative tasks, such as lobbying, public relations, and coordinating with major donors. The specifics of each agency vary, but each works with local businesses to seek donations and run a series of distribution points –over 3,000 in total– to get food to where it is needed (Baglioni, Pieri, & Tallarico, 2017). For example, one local agency, LAID and SEELE in Berlin, allows those who meet a set of eligibility criteria to pick up food weekly at its distribution points, mainly produce and bread. Adults using the service pay a fee of one Euro, intended to avoid the embarrassment of not being able to pay for food (Tinnemann, Pastätter, Willich, & Stroebele, 2011). Similar organizations that focus within a particular area can be found in the United States. For example, in the state of Delaware, the Food Bank of Delaware (FDB) serves an

estimated 90,000 clients, about 11.5% of the state's population. The FBD conducts traditional logistical and front-line tasks, but also operates an innovative social enterprise called The Market. Following market research, a pilot store was opened based on the concept of salvage markets in Amish Pennsylvania. The Market buys damaged goods –not up to standards for regular retail sale, but still fine for human consumption– and sells them out of its store at a reduced price. All proceeds directly support overhead costs, so that The Market's business model is self-sustaining (Popielarski & Cotugna, 2010).

Food recovery organizations fundamentally address food insecurity, while producing many beneficial impacts. These may include reducing waste, environmental and economic benefits, and not simply increased access to food, but increased access to nutritious food for lower income families (Tinnemann, Pastätter, Willich, & Stroebele, 2011). With the window in which food nonprofits operate, many organizations face common challenges. As significant capital resources or extensive staffing beyond networks of volunteers are not typical, many organizations lack the proper strategic mindset and management needed for a sustainable model. Despite holding missions promoting general welfare, it is still essential for nonprofits to employ business strategies to ensure success (Samuel, Wolf, & Schilling, 2013). Further, with regional and seasonal variability among produce availability and the storage and transportation of perishable goods, sourcing and distribution can become a complex puzzle that organizations must keep up with to maintain an adequate selection of food (Wetherill, White, Rivera, & Seligman, 2018).

While food rescue charities face obstacles in their operation, there are also challenges when it comes to assessing their impact. Hard statistical evidence needs to be collected to understand the big picture. This understanding is key to finding practical solutions and interventions for change. Reducing food wastage in the U.S. and other developed economies can contribute substantially to local and global food security and sustainability (Dou et al., 2016). Further, there is little consensus on how to assess the social impacts of food rescue charities. Although studies have been conducted, there is no comprehensive framework for their assessment (Vittuari et al., 2017).

## 2.3 Food Inequity in New Zealand

Our sponsor is located in Wellington, New Zealand. A developed country, New Zealand has an industrial global economy with modern cities and infrastructure and is well known for its myriad of natural wonders and progressive society. However, despite this, the country still faces issues such as poverty, homelessness, and hunger (The World Factbook: New Zealand, 2018). This section examines the scope of food inequities in New Zealand and preventative steps that have been taken by government and non-profit organizations.

A 2010 study found that 20% of New Zealand households are food insecure (Carter, Tolotea, Kruse, & Gorton, 2010). The problem of food insecurity is inseparable from the problem of food waste. 122,547 tonnes of avoidable household food waste is sent to New Zealand landfills annually ("New Zealand Food Waste Audits 2014 – 2015", 2015). Households are not the only source of food waste. The food service industry wastes up to an estimated 20% of food entering their operations (Chisnall, 2018). The impacts of this waste are considerable. For example, New Zealand food wastage produces 325,975 tonnes of carbon dioxide emissions ("Here's One Easy Way To Tackle Climate Change You May Not Know About", 2018). As explained in the previous section, carbon dioxide is a major contributor to the negative environmental effects of greenhouse gas emission. On

top of these environmental effects, the economic impact of food waste accounts for approximately NZD 872 million worth of edible food per year ("New Zealand Food Waste Audits 2014 – 2015", 2015). The extent of food inequity in New Zealand, a developed nation, is unacceptable.

## 2.4 Approaches to Food Inequity in New Zealand

Similar to other countries, New Zealand's primary method for addressing the issue is through legislation. In an effort to encourage food donation, a "good Samaritan" clause was added to the Food Safety Act in 2014 to "protect people who donate food that is safe at the time of donation" (Fletcher, 2018). Additionally, like all developed nations in the world, New Zealand has some form of benefits and payouts for low income citizens who struggle to cover essential costs. This includes a variety of assistance programs for food, housing, health, automobile, and even bereavement ("Benefits and Payments: Food," 2018). While the government tries to provide resources for needy citizens, not all needs are met. As explained in an earlier section, a big concern with government welfare programs is that they do not cover as many citizens as one might think. There is paperwork and bureaucracy that people have to go through that curbs the volume of applicants (Staufenberg, 2016). In food equity models like this, marginalized people are often treated as problems to solve more so than people.

In addition to legislation and welfare, New Zealand gives money and other resources to public campaigns. In 2016 New Zealand joined Love Food Hate Waste, a collaboration between the Waste Management Institute New Zealand, the Ministry for the Environment and 59 councils from around New Zealand. The goal of the campaign is to reduce the amount of food households are sending to landfill each year. Action steps include a website and events that engage with the community. The Love Food Hate Waste website features helpful tips, storage guides and recipes. One community event included organizing volunteers to pick fruit at the end of season and distribute it to food banks nearby ("New Zealand Joins the Global Fight Against Food Waste," 2016). An issue with public campaigns is that they don't strike at the heart of the issues they are trying to solve. Awareness of an issue is good but doesn't usually result in concrete steps that help people in need. Community organized philanthropy events such as the one mentioned above do fill that need, but are often one-time events that don't result in sustainable solutions to chronic problems (Dumensil & Verger, 2009).

There are a variety of different food rescue services in various cities of New Zealand. Their aim is to deliver perishable food to community charity groups. Working with volunteers on rescuing food from supermarkets and bakeries these organizations act as community support distribution hubs. A prominent food rescue service is KiwiHarvest. Founded in 2012, the group KiwiHarvest adapted a similar model to that of the British institution FareShare. Based on the existing model, KiwiHarvest coordinates a network of volunteers from its headquarters in Auckland to deliver food to 220 charities across the country (About kiwi harvest). The organization is bolstered by partnerships with supermarket chains Foodstuffs and Countdown, who have set progressive waste reduction targets. Thanks largely in part to KiwiHarvest, Foodstuffs boasts a recycling rate north of 80%, and Countdown has reduced waste going to landfill by 43% despite a 37% increase in selling space (Gibson, 2016). The distinction between KiwiHarvest and other nonprofits like food banks is that KiwiHarvest is classified as a logistical nonprofit, as opposed to a front-line one. Both types have their benefits and drawbacks. The drawbacks led to the rise of

hybrid nonprofits, which attempt to combine the best of both styles. Hybrid nonprofits or food rescue charities across New Zealand actively participate to ensure that less food is wasted. (“Food Recovery NZ”,n.d.)

## 2.5 The Free Store

Our sponsor, The Free Store, is an example of a hybrid food non-profit organization. While they both collect and redistribute surplus food it, their work goes beyond giving out food; they seek to create a community by forming relationships with its members. The Free Store started as an art project of an organization called Letting Spaces. Through art projects this organization promotes urban revitalization through community engagement (Paton, 2012). Kim Paton, the lead artist, created a small retail grocery store in a vacant commercial building in Central Wellington. She set up a shop with food on shelves for people to take for free. The project did not last long but this idea inspired a group of individuals to create a sustainable food supply for people around the area. In November 2010, The Free Store was founded as an organization that collects and redistributes fresh, quality surplus food that would otherwise be destined to landfills. The Free Store takes an explicitly inclusive approach to food redistribution, not always found in government actions and other organizations.

The Free Store operates out of Wellington, New Zealand. It is a food rescue organization that combines the charity work of food reallocation with the social impact of a community center. This organization currently collects food from around 70 cafes, restaurants, bakeries and catering companies and serves around 100 people each day. Those who use The Free Store include the homeless, unemployed, students, backpackers, elderly people, and more. The welcoming space provided by The Free Store is built on a foundation of mutual respect, generosity and friendship (“The Free Store,” 2016). This foundation creates a community that helps this project succeed. Target customers of The Free Store include individuals who may be skeptical of top-down institutions that give out food. The nature of the charity prevents participants from being scrutinized and vetted as they may have been with other NGOs (Diprose, 2014). Food pantries and other similar organizations often require that customers present government identification, proof of residency, or other paperwork. However, The Free Store does not have any rules or regulations as to who can access the store.

The Free Store relies on volunteer support for the success of its day to day operation. In many cases, frequent customers eventually step into volunteer roles. Other volunteers are recruited from friends and family, word of mouth, or other means. There are three main volunteer opportunities: collecting food, serving coffee and tea, and giving out food. All the jobs described are directed under the instruction of supervisors. The pool of supervisors consists of 4-5 trained volunteers that have been working on The Free Store for an extended period and know the ins and outs of the store.

A normal day at The Free Store starts with the first set of volunteers collecting food. The volunteers are directed to meet at The Free Store to receive instructions from the Collection Supervisor regarding the collection at 3:15pm. Around 3:20pm the Collection Supervisor starts the day with a check in activity. This is done to make sure everyone knows each other, hence creating a sense of community. In addition to this all volunteers are required to wear name tags while volunteering. Shortly after, the Collection Supervisor assigns all volunteers to different collection



pick-ups. There are five collection routes, with one or two volunteers per route, that pick up, and usually one or two volunteers are assigned to each one, depending on the number of volunteers for the day.

Around 5:00pm as the trolleys arrive full of food, as shown in Figure 2.1, from their designated routes and a second set of volunteers help unload the food and organize it onto shelves inside the container. This food prep process consists of dividing the food into four different categories: sweet, savory, quality 1 and quality 2. Sweet and savory items often consist of scones, muffins and croissants. Quality 2 items are often considered small meals such as soups or salads and quality 1 include bigger meals such as sushi and sandwiches. Simultaneously, customers begin to arrive and simply hang out outside the container waiting for The Free store to open, as shown in Figure 2.1. At 5:30pm, another set of volunteers meets in the kitchen of the church located right in front of The Free Store to prepare coffee and tea to give out to people. At 6:15pm the Free Store opens and starts giving out food. Inside the trailer the last set of volunteers hands out food. The amount of food given varies from day to day and depends on the amount of food and the amount of people at the store.



*Figure 2.1: Volunteer with trolley filled with food*

The Free Store serves as more than a solution to curb waste, it creates a community food source as part of their movement. This organization not only facilitates great social interaction among the visitors but makes the problem of food waste and inequity visible. Additionally, two key roles within the store help develop customers physically and emotionally. The first of these roles is The Community Worker. This role involves helping connect customers with social services around the city such as government benefits and other nonprofits. The other role is known as Chaplain. The Chaplain meets with customers outside of store hours for check-ins and emotional counseling. Due to the success of The Free Store in Wellington, the movement has spread to other stores across the country. However, according to our sponsors, the problem is that there is no adequate model to

analyze the impacts of The Free Store. The lack of a systematic approach makes documenting the social, environmental, and economic impact of the store difficult (Diprose, 2014). The information gathered from this analysis would be used by The Free Store to legitimize and continue spreading their model on a national and international scale, gather fundraising and support, and influence public policy. The hope is that The Free Store will affect other organizations and result in more Free Store locations (B. Johnson & A. Hathaway, personal communication, December 2, 2018).

## 2.6 Summary

Our preliminary research improved our understanding of food inequity on a global scale as well as in New Zealand. Our findings cover many groups' efforts to combat food inequity. Specifically, we learned how different food rescue organizations operate, whether front-line, logistical, or hybrid. Our research also displays how The Free Store, as a food rescue charity, uses their community-centric model to reduce food waste and insecurity in the Wellington area. This research provides the information critical to the expansion of food rescue charity organizations in New Zealand and throughout the world.

## CHAPTER 3. Methodology

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The goal of this project was to provide The Free Store with a methodology to assess its impacts on the Wellington community on three impact levels: environmental, economic, and social. In doing so, we sought to collect information from key stakeholder groups, chiefly customers, volunteers, and donors. We also identified overarching themes, such as how The Free Stores meets human physiological, psychological, and self-actualization needs. These themes evolved as the project progressed and we learned more about the operation and dynamics of The Free Store. In this section we outline our methodology for developing research tools. We achieved these goals using the following objectives:

1. Establishing familiarity and building a foundation of mutual respect with the community of The Free Store.
2. Learning the perspectives of our stakeholders
3. Developing and refining repeatable and systematic methods for gathering data for:
  - i. Social impacts
  - ii. Economic and Environmental impacts

These objectives were completed sequentially over a time frame of seven weeks. We used a variety of methods, such as participant observation, interviews, and surveys to complete our objectives.

### 3.1 Establishing familiarity and building a foundation of mutual respect with the community of The Free Store.

Our first objective was to establish a sense of familiarity with The Free Store's community and to develop an understanding of how their model works. During this process, we used participant observation, a qualitative social research strategy, to develop relationships with our stakeholders. There were three groups of importance to this project: customers, volunteers and eateries. In this method, we gathered data by monitoring and interacting with each group while volunteering at The Free Store. Consequently, it was possible to explore the situation and provide data about the interaction of all three stakeholders. Hence, our goal as participant observers was to register, interpret, and conceptualize the social facts and meanings (Bruyn, 1963).

#### 3.1.1 Volunteering at The Free Store

We primarily volunteered at The Free Store for the first two weeks of our project. This allowed us to identify the roles of stakeholders and forge relationships with them. This included volunteers, who keep the operation running, donors, who provide the resources to the store, and customers, who utilize The Free Store's resources. While there was an overlap between groups, as many customers become volunteers, each one was integral to the completion of this project. Consequently, all stakeholder groups provided data on all three impact levels: economic, environmental, and social (Vittuari et al., 2017).

Many of the stakeholders we interacted with can be classified as marginalized people relative to the members of our team. Those marginalized are defined as people who have fewer

possibilities and options in their lives than those studying them (Moore, 2018). For our research it is important to take this into consideration due to the consequence of the integrity of our data. Our sponsors have indicated some community members are distrustful towards institutions. Given this, the most important thing we considered in our research with the customers is how The Free Store makes them feel empowered. In our research, we planned to implement methods that give equal footing to the members of the community.

To carry out participant observation we began by volunteering at the store during operational hours from 3:00 pm until 7:30 pm on weekdays. The first portion of this timeframe was spent collecting food along the various routes established by the store. During week one, each member of the team joined an experienced volunteer in order to observe how the process of collecting food worked. Each day we varied the routes we took to meet more volunteers and have different experiences. Going on these runs provided us the opportunity to have long conversations with volunteers of The Free Store and establish a sense of familiarity within this portion of the community. Throughout this process we experimented with different conversation starters and topics of discussion. This was done to discover what interactions influenced the volunteers to open up more about their experiences with The Free Store. After establishing familiarity through various conversation starters, we attempted to ask questions that would provide us with anecdotes about the volunteers' specific experiences. The length of each run varied but the goal for that period of time was to learn information that could give us a better understanding of The Free Store and its community. After we finished our collections runs, there were 30-60 minutes before the store began handing out food. During this time, known as "hangout" time, we attempted to familiarize ourselves with the quieter people at the store. An illustration of a conversation held during "hangout" time is shown in Figure 3.1.



*Figure 3.1: Conversation held during "hangout" time*

### 3.1.2 Recording Stakeholder Interaction and Communication

Due to the nature of our involvement it was not possible to take detailed notes concurrently with the interactions. However, we used proven strategies for managing field notes. Initially, at the time of the interactions we occasionally took jot or scratch notes in our phones. This type of note consisted mostly of short phrases or sentences that we recorded during the course of the day. These were later used to aid our memory in recalling the interactions of the day (DeWalt & DeWalt, 2010).

After The Free Store closed each day, our team debriefed, often during dinner. Discussion would include challenges or highlights of the day, people we met, and conversations we had. If someone had a particularly useful insight, for example a method they used to get someone to open up, the team would discuss so that others could employ it in their own interactions. After debriefing, we recorded these observations in a Google Sheets. The spreadsheet included a daily log of each team member's activities and interactions as well as a stakeholder register for customers, volunteers, and eatery employees. We created the stakeholder register to organize the team's activities by stakeholder group. For the customers and volunteers the recorded information included a short bio and topics of conversation. For the eateries this included the identification of employees who may have information about The Free Store. We later used this register to frame questions for our interviews and surveys as well as identify key players who could provide us with the most useful responses when interviewing.

## 3.2 Learning the Perspective of our Stakeholders

After identifying and familiarizing with our stakeholders, we worked with one of our sponsors, Max Robinson the Community Worker, to develop appropriate interview questions. We developed one set of questions for eatery employees and another for volunteers and customers. After conducting our interviews, we transcribed our field notes into Google Sheets. The sheet had rows for each interviewee and columns for the responses to each interview question.

### 3.2.1 Interview Eateries

When interviewing eatery employees, our main goal was to gauge their perspectives on the issues that The Free Store aims to combat: food waste and food insecurity. We wanted to learn if they donated to the store because they share similar convictions about social issues, or if they donated simply because it is convenient for them and it comes at zero cost. We asked questions about the manager's perspective on the charity aspect of The Free Store, any positive aspects of the partnership, and how much effort the manager and workers have to contribute in transferring leftover food from eatery to the store (see Appendix A for full list of questions). We initially asked Alana Hathaway, the General Manager, to email 20 eateries that would be willing to speak with us. After a week of only hearing two responses, we decided to go door to door to these 20 eateries instead. After seven interviews, we felt we had gathered an accurate assessment of eatery perspectives.

In conducting these interviews, we divided into two teams of two. We utilized the list given to us by The Free Store of names of people at each eatery who coordinate with the store. These were the names we asked for when inquiring within the eateries. If the individual agreed to



participate in the interview, we found a quiet place to sit within the eatery. One team member asked the questions while the other team member recorded responses on a mobile device. These interviews were structured in that during each interview the questions were presented in the same way and order.

### 3.2.2 Interviewing Customers and Volunteers

After the discussion with Max Robinson, we decided to view the development of individuals through Maslow's Hierarchy of Needs. This is a motivational theory in psychology comprising a five-tier model of human needs, often depicted as hierarchical levels within a pyramid. Needs lower down in the hierarchy must be satisfied before individuals can attend to needs higher up. We chose the three main areas of need; physiological, psychological, and self-actualization, as "overarching themes", and developed questions to find about the store's impact in each of these areas (McLeod, 2018).

These themes provided the foundation for an analysis framework presented by Dr. Andrea Ricketts in a 2008 thesis to the Victoria University of Wellington. This framework was relevant to our work as it was developed to study social wellbeing impacts of marginalized communities in New Zealand, much like that of The Free Store (Ricketts, 2008). For some sensitive or abstract topics, such as financial impacts or personal growth, we could not ask direct questions. Instead, questions and follow ups with varied wordings were developed that indirectly got at the desired topics. A list of interview questions and follow ups, color coded by topic are included in Appendix B. A mix of judgment and purposive sampling was used to select participants for interviews. This means we selected participants based on their familiarity with our team, allowing for interviews in which participants would open up, while attempting to select a range of regular and occasional volunteers and customers from all walks of life. This sample was approved by Alana.

When conducting the interviews, we again split into two groups. Within each group one team member asked the questions while the other team member recorded the responses. The order of the questions was not set in stone due to the fact that the interviews were semi-structured and we geared them to flow more like a conversation. Due to time restrictions, in some of our interviews we had to skip some questions, however, we made sure to include the same amount of questions from each level. Each level is color coded in Appendix B.

## 3.3 Developing and Refining Repeatable and Systematic Methods for Gathering Data for Social, Economic and Environmental Impacts

In order to measure the impacts of The Free Store, we required not only rich data, but plentiful data. The next sections show how we developed ways to collect quantifiable data in each of the impact areas of The Free Store.

### 3.3.1 Social Impacts

We gathered the majority of our data through interviews, but for a full scale analysis we believe that a survey will be a more effective method for collecting larger quantities of data. Surveys are easier to implement and analyze than interviews. After gathering and analyzing stakeholder perspectives through the methods previously mentioned, we constructed a framework on which to base pilot surveys. We created this framework by coding the interview results from each stakeholder group to identify common indicators for the development of survey questions.

Coding is a method of categorizing qualitative data by key words and phrases. The categories are analyzed to demonstrate how many times a specific word or phrase was used and by how many different people. This process produces quantitative data from qualitative, which makes the results easier to interpret.

We then further developed our framework based on Dr. Rickett's work. For each key overarching theme, which corresponded to an area of Maslow's Hierarchy of needs, shown in Figure 3.2, we identified aspects of The Free Store's impact related to that theme. These served as "dimensions" for our framework. Dimensions for physiological needs include how The Free Store meets customer need for food and income supplement. We aimed to assess to what extent The Free Store serves as a major source of food for customers and also supplements their income for other needs like healthcare and rent. Dimensions for belonging include sense of connectedness and meaningful relationship. We aimed to assess to what extent The Free Store gives people a community with individuals who care about them that they otherwise would not have in their life. Dimensions for self-actualization include growth, independence, and generosity. We aimed to assess to what extent individuals at The Free Store develop social and technical skills after they found belonging there. For each dimension, we then identified specific "indicators" of success to measure the impact. A visual representation of the framework is included in Appendix C (Ricketts, 2008).

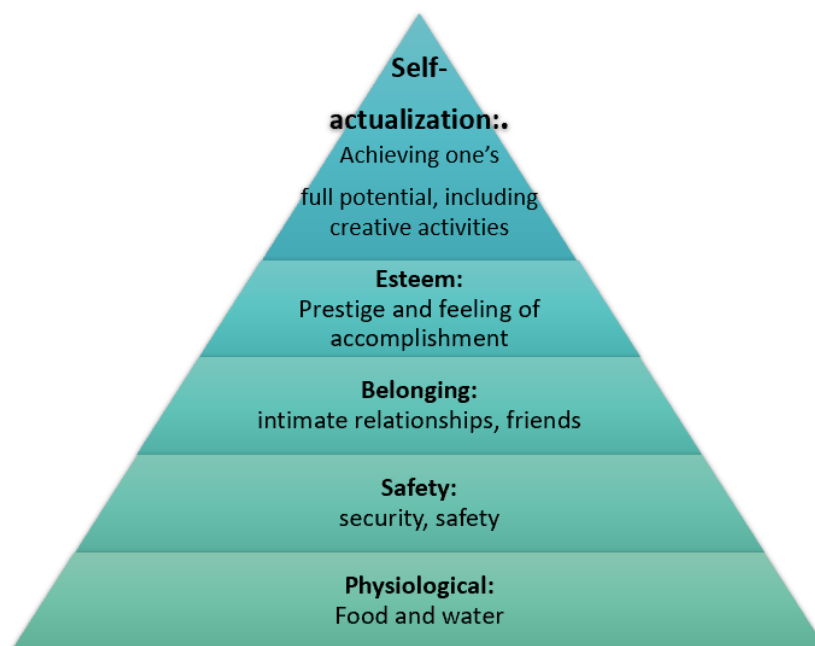


Figure 3.2: Maslow's Hierarchy of Needs

We then used the dimensions and indicators of our framework to build a codebook for analyzing interviews. Dimensions served as grandparent codes, which are broader categories to group together more specific child codes. Indicators served as child codes. As a team, we developed definitions for when to use each code. A copy of our codebook can be seen in Appendix C.

In the same google sheet we recorded our interviews we added a new tab and we created a codebook. The first column of our codebook consisted in our overarching themes followed by our grandparent codes. We colored this dimensions in the second column with staple color such as red, blue and yellow. Following, the third column consisted of child codes that belonged to a specific dimension. We colored all the child codes from a specific dimension using different shades of that staple color. This way of color coding allowed us to later analyze the data within Google Sheets. After our codebook was fully developed, our team members analyzed the same interviews that they had conducted. In the 3-4 spreadsheet cells to the right of each interview question answer, responses were labeled with code colors which corresponded to code words or phrases. Uncertainties were brought up for group discussion.

Once all the interview responses were recorded, we were able to conduct thematic analysis. Utilizing the features of Google Sheets, we were able to review and assign each response to one or more codes from our previously developed codebook. These codes were indicated by color coding the responses' cells. The features of Google Sheets include sorting cells by color, allowing us to essentially sort responses by code. From here we organized the codes from most common to least common (Bree & Gallagher, 2016). As explained previously, the codes are subsections of dimensions and dimensions are subsections of larger themes. Therefore, we can utilize the list of how common each code was to deduce how often certain dimensions and themes appeared in the interview responses. These results were integral in deciding what themes to address through the surveys for each stakeholder group.

### 3.3.2 Economic and Environmental Impacts

Unlike the social analysis our team conducted, we gathered data for calculating economic and environmental impacts through empirical methods. These methods were mostly counting people or items around The Free Store.

Throughout its history, The Free Store has employed various methods of quantifying metrics such as number of customers served, or amount of food gathered. However, due to lack of manpower and the store's rapid growth, these practices had fallen out of use at the time of our arrival. Further, additional metrics related to efforts the store has taken to reduce its environmental impact had never been collected before. Our team tested and employed various strategies to develop a reliable procedure for consistent information collection. This information could then be analyzed to measure environmental and economic impacts of the store.

Each night, at least one member of the team was tasked with counting the number of customers at the store. On some occasions, multiple team members counted, to try out different methods at once or compare counts for accuracy. Throughout the course of the project, various methods of counting were employed. These included counting tallies of customers one by one as they were served, counting the number of customers in line at the time the store opened and keeping a rough tally of additional customers to join the line, and using a GoPro camera to record the serving process and reviewing the footage to count customers afterwards. A spreadsheet was

used to record and track our observations. Our team evaluated each method based on its ease of execution and relative accuracy.

Due to the nature of the project, quantifying the amount of food collected was a more complicated endeavor. First, eateries were contacted to see if they already tracked the amount of food they donated or to encourage them to start tracking and sharing quantities. Counting was also conducted by multiplying the nightly allotment of food by the number of customers, and by taking photos of the amount of food collected and estimating number of items based on the photos. These methods were refined as the project went on.

Additionally, our team based our environmental analysis on a 2014 Oxford University study entitled Evaluating the Contribution of Fresh Food Redistribution Organizations to the Environmental Sustainability of Food Systems. This study included a table of calculation factors which detail the average carbon dioxide emissions, water use, and land use for a number of food items on a per tonne basis. From our experience volunteering, we agreed the most accurate descriptor of donated food was “Bakery (other)”. We used the per-weight metrics from the Oxford study, as shown in Table 3.1, to calculated outputs of the food recovered by The Free Store. Sample calculations shown in Appendix D.

**Table 8-1 (cont.) Footprinting factors used in study**

Commodity		Emissions (kgCO2e/tonne)				Water (cubic metres / tonne)			Land use and land use change	
Category	Food Item	UK	Europe	Rest of World	Retail	UK	Europe	Rest of World	Hectare/tonne	tonnesCO2e/tonne
Fruit	Strawberry	840	950	1410	38	256	0	209	0.07	0.10
	Tangerine	0	510	0	38	0	0	459	0.08	0.12
	Watermelon	0	1330	1330	38	0	155	0	0.04	0.05
Bakery	Bakery other	888	0	0	65	496	0	0	0.31	0.00
	Bread (multi)	949	0	0	65	496	0	0	0.31	0.00
	Bread (white)	888	0	0	65	496	0	0	0.31	0.00

*Table 3.1: Oxford study environmental footprint factors*

*Evaluation the Contribution of Fresh Food Organizations to the Environmental Sustainability of Food Systems (2014, Sep 1)*

In the interest of capturing a more holistic assessment of The Free Store’s environmental impact, our team decided to gather empirical data on non-food items around the store. Starting with the transport of surplus food from eateries, all food used to be loaded in plastic bags. The Free Store has since made it official policy to use reusable bags and repurposed containers for food collection. In our time volunteering, we noticed that the same number of bags and containers were used for each collection run each day. From this we decided that counting the total number of bags and containers once was sufficient. The Free Store also provides tea and coffee from 5:30-6 pm. In the early days of the store they provided single-use cups. These have since been replaced with a large collection of ceramic mugs. To measure the average number of cups used per day, we counted the number of mugs in the “dirty” bin for four days. For sanitary purposes, the store uses protective gloves and serving paper for certain items. In order to count the serving paper, a team member volunteered inside the container and counted the number of serving papers used over the four days. While we were unable to research environmental analysis tools for these items, the hard numbers should have some standalone value that can be researched further when a full-scale analysis is conducted.

### 3.4 Summary

The final deliverable of this project was to be a concrete methodology for assessing the environmental, economic, and social well-being impact of The Free Store on the community. We began by familiarizing ourselves with and integrating into the operation and community of The Free Store, ensuring that our process was rooted in relationship. From here, we developed a framework to analyze the impacts of The Free Store. This framework was tested and refined with a series of qualitative and quantitative data collection efforts including interviews. At the end of the seven week timeline the proposed methodology was presented to The Free Store and will be assessed by a separate team in year two of the project.

TASK	WEEK						
	1	2	3	4	5	6	7
Participant Observation	Volunteering at The Free Store						
Framework	Developing and Refining Repeatable and Systematic Methods for Gathering Data for Social, Economic and Environmental Impacts						
			Interviewed our stakeholders				
				Quantifying things at The Free Store			
					Developed a Pilot survey		Presented our framework to The Free Store

Table 3.1: GANTT Chart showing Estimated Timeline



## 4. Findings and Analysis

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Our team created three research objectives to complete our project goal, which was to develop a methodology to analyze the impacts of The Free Store on the Wellington community. Our objectives were to establish familiarity and build a foundation of mutual respect with the community of The Free Store, to learn the perspectives of our stakeholders, and to develop and refine repeatable and systematic methods for gathering data for social, economic and environmental impacts. The set of analysis methods for next year's project team to implement is described below. In addition to our expected findings, we also drew preliminary conclusions about the impacts of The Free Store from the data that we gathered. These findings will be further explored and supported by next year's research team.

### 4.1 Our Developed Methodology

This is our proposed methodology for next year's research team to implement.

#### 4.1.1 Necessary Steps to Analyze the Impacts of The Free Store

We developed five main steps to examine the impacts of The Free Store. We developed these five steps to identify, select, process, and analyze information about The Free Store.

**Step 1:** Understand how The Free Store operates

**Step 2:** Develop a relationship with people at The Free Store

**Step 3:** Gather data about The Free Store

**Step 4:** Analyze the information gathered

**Step 5:** Deliver a report with your findings to The Free Store

It is vital to understand how The Free Store operates in order to be able to analyze their impact. A complete understanding cannot be achieved by volunteering once or twice. To understand how The Free Store operates, it is necessary to volunteer in all different types of positions as further explained in section 4.1.2. Additionally, it is necessary to build relationships with the participants of The Free Store. Relationships are formed through interactions such as conversation with people at the store. We found that time we spent volunteering and conversing was necessary to building a foundation of mutual trust with the participants of The Free Store. As typical customers and volunteers come from marginalized backgrounds or are prone to be skeptical of institutions, it is important to build this foundation before collecting data. Step 2 is also vital because there needs to be a level of sensitivity and patience when gathering personal information. It is important to remember that, research and data aside, these are real people's' real lives. This considered, empathetic approach will ultimately ensure that any research findings are as authentic and accurate as possible.

The third step entails data collection from three different areas: social, environmental and economic. There are two main methods of data collection. Interviews and surveys will serve as the primary source of social data and be analyzed through the social framework we developed. Next,

the quantification of people served, food saved and distributed, and consumables used at the store will serve to analyze the economic and environmental impact. The last step is presenting results to The Free Store in a way that they can further use and understand.

#### 4.1.2 Best Practices for Integrating into Community and Collecting Data

In order to accomplish the steps outlined above, our team found functional approaches to completing steps 1-3. Below we outline best practices for becoming a part of the community of The Free Store and collecting data.

- **Volunteering as an Effective Way to Understand and Integrate into the Community of The Free Store**

Volunteering and being present in the community is a critical first step to understanding the community of The Free Store. There are a range of volunteer opportunities available. We began by collecting food, which provided opportunities to have conversations with the other volunteers. As we understood more about the store, we then moved into helping organize food in the container and giving out food. By volunteering in different roles, we also had the opportunity to get to know a wider range of volunteers. Each area of volunteering at The Free Store is filled by a mix of regulars and newcomers and varying the roles we took exposed us to a wide range of people and perspectives. The volunteers and customers of the store come from varied cultural and socioeconomic backgrounds and have differing levels of dependency on the services of The Free Store. Developing an understanding of these experiences was key in paving the way for the data collection and analysis to follow.

- **Holding Effective Conversations at The Free Store**

Inherently, a necessary step in familiarizing ourselves with the community of The Free Store is having rich conversations with its members. After some initial struggles with making conversation with other volunteers, the General Manager, Alana Hathaway, advised us that it often takes a single topic of conversation to get someone to open up. For different volunteers, these topics were frequently food, family, or music. Straightforward questions, such as “what are your interests or hobbies” were often an effective way to prompt these topics. We did not necessarily find certain questions that were ineffective. We found that different volunteers responded to different topics and we had to find the topic that allowed the volunteer to elaborate more and feel comfortable sharing. This took some time, but the investment was worth it as it allowed us to have a familiar ground to return to if we needed to talk to the same individual again. Similarly, another strategy for making conversation easier involved joining established circles of conversation instead of trying to start one-on-one. Starting a conversation with someone from scratch was more difficult and awkward than joining a conversation that was already in progress. The conversation flowed much more easily this way.

We identified a few key areas around the store as prime real estate for group conversation: the undercroft of the church, as shown in Figure 4.1, where tea and coffee are prepared, the tables where tea and coffee are served, and the various staircases around the church that made for great sitting. Each day we spent at The Free Store during participant observation was typically spent rotating between these three locations.



*Figure 4.1: The undercroft of the church*

Most of the regular volunteers were very welcoming and outgoing. However, getting to know other members of the community was difficult at times. The most effective method for meeting new people was having trusted members of the community introduce us to others. Once the connection between our team and The Free Store was made apparent, it was much easier to have an open conversation with timid members of the community.

- **Conducting Interviews or Surveys with Stakeholders of The Free Store**

After completing our interviews, we concluded that interviewing customers and volunteers was easier than interviewing eateries. Due to the nature of our first objective, we established relationships with many customers and volunteers before conducting interviews. It was therefore easier to get the interviewee to open up due to the prior connection, which we did not see with the eateries. The majority of customers and volunteers gave substantial responses to our questions, whereas many eateries gave short answers, or were unfamiliar entirely with the questions we were asking. We also found that during interviews people liked to have the space to talk and feel special. Many customers and volunteers enjoyed being able to share their experiences to someone giving them their full attention. This is evidenced by the breadth of responses we received for many questions. Furthermore, 9 out of the 15 customers and volunteers continued to share information when we asked, “is there anything else you would like to add?” at the end of the interview.

Another finding was that the community centric space of The Free Store allowed volunteers and customers to encourage others to interview with us. For example, one volunteer who is also a customer reached out to two other individuals and got them to interview with our team. In general, many people within the community would recommend customers and volunteers for us to talk to.

While conducting interviews, splitting into teams of two was simple and efficient. We found that a successful interview started with open ended questions that provided interviewees with the space to expand upon their responses. If the team felt that the response did not provide the information we needed, we would ask more specific questions as a follow up. For example, one of our questions was “tell me about The Free Store’s community”. Some of our follow ups to this question were “what are the good parts?”, “what are the bad parts?”, and “how would you describe your role in the community?” to be used as needed. For a given topic, we typically got the information we desired from a combination of questions like these. Lastly, we found that utilizing quiet spaces further away from the container made it easier to conduct an interview, but anywhere in the vicinity of the container still allowed for the interview to run. Some of the quiet spaces included the seating area behind the church as well as the undercroft of the church. Other areas for conducting interviews were the church steps and the coffee and tea station, shown in Figure 4.2. These areas were typically busy with people and some of these people would occasionally interrupt, so interviews in these places took longer than they would have otherwise. However, sometimes these interruptions provoked richer responses from subjects or encouraged others to be interviewed after.



*Figure 4.2: Coffee and tea station*

Due to the fact that data is collected through different methods, data triangulation is necessary to provide validity to the results. Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena



(Patton, 1999). Conclusions are then presented back to the research subjects, to ensure they appropriately captured the subject's intentions. In this context, this could mean presenting to interview or survey participants if time allows, or if not, the managers of the store, Max Robinson, Lynley Webster and Alana Hathaway. This will provide validity to the results by making sure that the data collected or generated is consistent with their model.



Figure 4.3: View from the sidewalk of Willis St

- **Collecting Quantitative Metrics about The Free Store's Environmental and Economic Impact**

Unlike the social analysis our team conducted, we gathered data for calculating economic and environmental impacts through empirical methods. These methods were mostly counting people or items around The Free Store.

We found the most effective method of counting customers was to do so from the sidewalk of Willis Street, as shown in Figure 4.3. Alternatively, counting from inside the store puts one in the way of volunteers and counting from inside the parking lot leaves part of the line obstructed from view. Other options considered included using replay video and using a ticket counter. Replay video was deemed inappropriate given the need for consent from those recorded. The importance of maintaining trust with the customers was more important than attempting this method. The ticket counter was deemed inappropriate given that it would add single-use waste to The Free Store. The pros and cons of each method are summarized in table 4.1 below.

Method	Pros	Cons
Counting from sidewalk	Quick and simple to conduct Reliable for obtaining a ballpark estimate of number of customers	Does not account for people who later join the line after it has started or get seconds
Counting from inside container or other locations around the store	Quick and simple to conduct Don't have to cut through the line to get to the sidewalk	Does not account for people who later join the line after it has started or get seconds Being in the container interferes with operations, picking a poor vantage point does not allow for accurate estimation
Replay video	More accurate than counting	Footage takes time to review Consent of customers and volunteers
Ticket counter	More accurate than counting	Produces consumable waste Requires volunteer training

*Table 4.1: Pros and Cons of methods to count the number of customers at The Free Store*

We found the most effective method for measuring the amount of food collected every day was multiplying the allotment for each customer by the total number of customers. In the short time between food collection and distribution, the store manager determines how many items each customer can take home every day. From our experience volunteering, we found most customers take as much as they are allowed to take. We found it impractical to count the food items as they are sorted in the container given the limited time and space of preparation.

In order to estimate the average weight of food collected by The Free Store on a daily basis, we used the Dixon Street delivery as a representative sample. The delivery occurs twice a week to 12 customers who are unable to access The Free Store due to medical reasons. The food is delivered in reusable bags that can be weighed with a luggage scale. The weight of the food for 12 people can be extrapolated to determine the total amount of food given out by the store that day.

As discussed in section 3.3.2, there are a number of single-use items employed by The Free Store every day. From our experience, we learned it is easy to get sidetracked with conversation or volunteering if one person is not focused on counting the single-use items. We found the most effective method for counting all of the items is to assign the responsibility to an individual member of the project team. The window for counting opens around 5:30, as the line is beginning to form and the store is preparing to open and closes just after 6, when the store begins to serve people food.



### 4.1.3 Data Analysis Methods

After completing the steps in 4.1.1 through the methods suggested in 4.1.2, next year’s project team will need to analyze the collected data. Below we outline methods we used on our interview transcripts and limited sample size of empirical data.

#### Interview Analysis

Once all the data is collected it is necessary to analyze it for impact. We found that an effective framework for analyzing social data, i.e. data from surveys, is based on Maslow’s Hierarchy of Needs. We used this framework for social analysis to form our interview codebook. We split up the codebook by themes, dimensions, and codes. We found that these categories provided an effective tool for measuring the social impact of The Free Store. This concept was discussed in previous sections and informed how we structured our pilot survey. In order to keep with the integrity of the project, the same framework developed from these interviews should be used to develop surveys. For example, the question “how did you first start at The Free Store?” was used to assess the indicator “unemployed,” as we learned many customers first come to the store after losing a job. These results can thus be analyzed to demonstrate The Free Store’s social impact on physiological, love and belonging, and self-actualization levels.

#### Empirical Analysis

Our best environmental analysis tool came from the Oxford study mentioned in section 3.3.2. While we weren’t able to test the method ourselves, we used hypothetical data to test the spreadsheet with the multiplication factors from the study. Next year’s team should easily be able to utilize this table for whatever sample they gather.

	A	B	C	D	E	F	G	H	I
1									
2				1 tonne = 1000 kg		bakery (other)	888	496	0.31
3	<b>day</b>	<b>date</b>	<b>total people</b>	<b>kg of bread dixon</b>	kg bread total	tonnes of bread total	CO2 emisson (kg)	water use (m^3)	land use (hectares)
4	not	real	65	10	54.16666667	0.05416666667	48.1	26.86666667	0.01679166667
5	these	are	60	8	40	0.04	35.52	19.84	0.0124
6	hypo	theticals	72	11	66	0.066	58.608	32.736	0.02046

Table 2.2: Implementation of Oxford footprint factors

While most of our methods revolved around gathering empirical data, some figures can be compared to historical numbers from when The Free Store used to track customer and food counts.

	A	B	C	D
1	Date	Counter	Method	Number of people
2	1/17/19	Van	Tallies in notebook	77
3	1/17/19	Sofia	Counter on phone	76
4	1/25/19	Van	Tallies in phone	65
5	1/28/19	Van	Counting the line	60
6	1/31	Van	Counting the line	60

Table 4.3: Trials of Counting Customers

A method we devised but weren't able to test involved a holistic measurement of waste generated by the store. There are organic and inorganic waste bins at the store. The organic waste is unserved food which goes to a pig farm. The inorganic waste goes to the curb to be collected by the city. At the end of each day, these bins should be weighed with the same luggage scale used for weighing collected food.

## 4.2 Outcomes of The Free Store

In developing a methodology to analyze The Free Store's impacts, we gathered a considerable amount of data. While incomplete, this data provides a brief snapshot of the store's reach and a starting point for further data collection from next year's team. These findings include outputs, the direct impacts of the store as shown in the tables in section 4.1.2, and outcomes, systemic changes seen as a result of the store. By analyzing the information gathered during this time, we developed four outcomes concerning The Free Store and various interactions of the stakeholders.

- **Customers and Volunteers Find a Place of Belonging at The Free Store**

The rare atmosphere that The Free Store provides presents a welcoming space for marginalized individuals who may not have a place elsewhere. Throughout our participant observation, we interacted with people who were homeless, socially awkward, lacking friends or family, affected by disabilities, or travelling on their own, who came to The Free Store and received not only food, but the opportunity for positive social interaction. In several of our interviews, members of the community likened the atmosphere to a family and indicated that a large part of their motivation for coming to the store was for "interesting conversations" or to "get to know different cultures." One interviewee noted that although they are social, "it allows nonsocial people to hang out and meet others... and there aren't repercussions" and they've "seen people become friends" in their time at the store. Another, who had recently immigrated to New Zealand, cited The Free Store as a way to "integrate into New Zealand society." A third interviewee noted that "at The Free Store, you find what you need," whether it be food, emotional support, or family and friends.

- **The Free Store provides healthy options to those who otherwise may not be able to afford it**

In the beginning of this project, we weren't entirely sure what the people who attend The Free Store would be like. After our time volunteering, we learned many of the customers are employed and/or housed. However, it is clear from our literature review that employment doesn't necessarily imply food security. Many of the customers at the store could survive without the existence of The Free Store, but their quality of nutrition would certainly suffer. Our interview questions didn't directly ask about food available at the store, but 6 interviewees mentioned the quality of options provided. One customer said that during times when the store is closed, he has to eat chicken noodles to get by. A different customer said he used to survive on rice and soy sauce for weeks to months at a time before he knew about the store. Another customer responded to, "what impact has The Free Store had on your life?" with, "it's really good food... it makes it easier to eat well." A fourth customer said his favorite aspect of the store is that, "you get really good food for free."

- The Free Store promotes empathy and understanding for its customers and volunteers

The Free Store styles itself as a place welcome to people from all walks of life. This inherently presents opportunities to experience different cultures, perspectives and backgrounds without typical stigmas or barriers. Throughout our participant observation and interviews this theme was apparent time and time again, seen in comments from other customers and volunteers, but also in our own experience. At several points during the seven weeks, our team reflected on the fact that we would likely never meet, let alone hold meaningful conversations, with many of the people we interacted with if not for the opportunity to work on this project. Shown in Figure 4.4 are members of our team holding conversation with people at The Free Store. Additionally, several volunteers cited personal experiences as motivators for their participation in The Free Store. One supervisor said that they volunteer because “[they] used to be on the other side of the counter.” These factors result in an atmosphere that improves individuals’ compassion and insight into the lives of others. When asked about the impact of The Free Store on themselves, one volunteer said that they were “more open, empathetic, and understanding and confident to deal with people” as a result of their participation in The Free Store. Some volunteers who may not have seen changes in themselves remarked that they often see changes in others as a result of the compassion of The Free Store. For example, one volunteer mentioned an individual who has grown under the mentorship of a regular volunteer. This volunteer kept an eye on them and made sure they were completing tasks and feeling useful. The same interviewee exemplified this point further by citing a customer who has “become more social” since joining the community. This customer would previously stand alone in an isolated spot but now has truly become an important part of the community. These are just a few of the many examples of how The Free Store promotes empathy and understanding by breaking down the barrier between giver and receiver.



*Figure 4.4:* Members of our team interacting with people at the store

- **The Free Store provides structure for customers and volunteers**

For many customers, the store might be their only scheduled activity during weekdays. For one customer, he has been unemployed since finishing his studies at University. What he appreciates most about The Free Store is that you can contribute to the organization and community; even if you don't have a job you can find something to do. Another customer, who is on sickness benefit, turns up in line at least an hour early to hang out. He never gets food for himself, but he stays at the store as long as anyone. A German student on a gap year enjoys volunteering because it helps fill his time. It is unclear what his financial situation is like, but he was unemployed when he arrived in early February.

### 4.3 Discussion of Findings

During our time testing the methodology, we interviewed seven eatery employees and 15 members of The Free Store community. This section presents our findings from these methods as well as a discussion about the findings in the context of our overall project goal.

In carrying out our methodology we gathered information crucial to the development of our final deliverable, a methodology to assess The Free Store's impact that we will pass on to next year's project team. Our participant observation provided us with knowledge of general Free Store operation as well as the community it inherently comes with. We found that there was a technique when starting conversations with volunteers on runs and customers at the store. We also found that The Free Store has a very particular way of operating that directly affected how we conducted our further methodology. These findings allowed us to more easily conduct interviews in objective 2.

Interviews were conducted with each stakeholder group to identify common themes that could be utilized in the creation of larger scale surveys. Additionally, there are many inferences to be made from the results of coding our volunteer and customer interviews. Many of the top codes, i.e. the codes with the top numbers of hits from our interviews, were from the three themes identified by our team in the codebook. These themes were physiological needs, psychological/belonging needs, and self-actualization. The top four codes were from psychological/belonging needs, the fifth was categorized as physiological needs, and the sixth and seventh were categorized as self-actualization. We used this preliminary evidence to infer that The Free Store meets the three levels of need for volunteers and customers. This is what we originally hypothesized due to the community centric model of the store. As we learned from our interviews, people feel that they receive more from the store than just food. The Free Store is a place people can go to meet new people and have good conversation that they would not find in their own everyday life. Relating this back to our background research on the store, we knew they placed importance on relationship, but was not something we truly understood until seeing it in action. Something else we inferred was that our framework was successfully structured due to the fact that the themes, dimensions, and codes covered most of what people said in the interviews. Each code appeared at least once, and all of the important information from each interviewee was covered by one of the codes. This social framework should thus be successful when performing a full scale analysis of The Free Store. While there is evidence to draw these conclusions, more analysis is needed in order to confirm. This further analysis is discussed in our recommendations and is intended to be completed by a similar project team next year.

The analysis of economic and environmental impacts of The Free Store on the community was more straightforward than the social impact analysis. It basically involved counting people and food. We had difficulty in finding a suitable method for counting both as it is very hectic at The Free Store during operation. We wanted to find a method that could be used without disrupting normal operation for logical reasons.

In our attempts at counting the number of customers, we found that it is best done at the start of handout around 6:15 pm, with one person standing on the sidewalk of Willis Street. The sidewalk provided a good view of the queue while being out of the way of normal operation. These were important factors when coming to this decision. Other locations left part of the customer line blocked from view. Other counting times weren't an accurate representation of the number of customers, as many of them show up exactly at serving time. Any sooner would leave these people out. Any later would leave out those who are served first.

In our attempts at counting food, we quickly arrived at the multiplication method as the most effective. Counting individual food items was not feasible given the time constraints of sorting the collected food onto the shelves. Pictures of delivered food didn't work due to the difficulty of tracking whether or not items had already been photographed. This also can be attributed to the hectic nature of the container during food sorting time.

As far as counting the other items around the store, we found it difficult not to be sidetracked by conversations. Over the time period of the project we have gotten to know many members of The Free Store's community, which was great for our interviews, but impeded counting things. This position should be an isolated one which made it difficult to stay detached in a community where we were seen as somewhat well known. As seen in the table, only one of four counting days resulted in a complete list. At first, we believed the responsibility of counting could be entrusted to a team member with a volunteering role that day. We realized that counting requires its own role.

This project presented a challenging task of assessing the impacts of a food redistribution charity on a marginalized community. Not many studies exist in the literature on assessing the social impacts of such groups, and The Free Store's uncommon community centric approach further complicates the situation. Ultimately, we strove to ensure that our process was rooted firmly in the relationships we developed with members of the community to best capture a complete picture of the store.

### 4.3.1 Pilot Surveys

As our team's project was to create an analysis framework for a follow-up study, it was not our priority to gather large samples of data. One deliverable from our framework is suggested surveys for next year's team to use, both for eateries and members of The Free Store community. These should help improve the quantity of data collected for the follow-up study. The two subsections below explain how the questions in each survey were formed from our team's work.

- **Eatery Survey Justification**

This survey can be found in Appendix E. The first three questions of the survey aren't based on any of our previous works. It is simply to gather basic information. The next three questions are meant to assess why the eateries partner with The Free Store. Initially, our sponsors believed that



eateries likely saved money in some form, such as disposal cost, through the partnership. After interviewing seven eateries, none of them reported any financial benefit. Some eateries donate because they are socially conscious. Some donate because it comes at zero cost to them. In speaking with the supervisors of The Free Store, the general sense is that Benjamin Johnson, the founder, had to work hard to convince stores to donate in the early years of the store. As time went on, eateries began to reach out to the store instead of them having to recruit. Admittedly, it is more difficult to measure to social consciousness of an eatery owner through a survey compared to an interview. Next year's team may choose to alter these questions or supplement the findings with interviews. Question 7, "how do you feel about your partnership with The Free Store?" is aimed to be another method of measuring food recovered. The remaining questions are mean to evaluate the quality of the existing relationship between eatery and the store. Specifically, question 9 is included because multiple eatery owners went out of their way to praise the collection volunteers in interviews.

- **The Free Store Customer or Volunteer Survey Justification**

This survey can be found in Appendix F. As explained previously, our interview structure for customers and volunteers of The Free Store was based on Maslow's Hierarchy of Needs. We asked open-ended questions to attempt to measure how well the store meets physiological, belonging, and self-actualization needs. The most common answers for each were turned into survey questions. Questions 2 through 5 are based on common answers to interview questions regarding physiological needs. These responses can be used for the economic analysis of the store. Questions 6-9 are based on common answers to interview questions regarding belonging needs. These responses can be used for the social wellbeing analysis of the store. Questions 10-13 are based on responses to interview questions regarding self-actualization needs. Even through interviews, we found it difficult to capture the store's impact at this level. It is difficult evoke responses from people that show how their personalities and character have changed and grown as a result of The Free Store. We found it much easier to ask longtime members of the community to reflect on changes and growth they have seen in the people around them. If next year's team finds the results of these surveys to be limited, they can use quotes from our interviews, or conduct their own to supplement findings.



# CHAPTER 5. Recommendations and Conclusion

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Based on our experiences and findings working with The Free Store and its community, we have developed a set of recommendations for The Free Store and future research teams to effectively capture and analyze the impacts of the store. Throughout our data collection, we have also identified additional recommendations that The Free Store could implement to improve operations or reach, whether it be from feedback via various stakeholder groups or our own observations.

## 5.1 Recommendations to The Free Store

In this section, we outline recommendations directed at The Free Store. The first portion of our recommendations consists of those directly related to our project objectives; ways to collect and analyze data about the impacts of The Free Store. The second portion consists of additional recommendations to improve operations or reach, beyond the scope of our objectives.

### 5.1.1 Recommendations to The Free Store to make data collection better

- We recommend that The Free Store develop a set of specific and strategic goals or outcomes in order to allow for a concise evaluation of impacts.

We recommend that The Free Store develop a set of specific strategic goals or outcomes in order to allow for a concise evaluation of impacts. At present, the store has a general mission statement and set of actions it vaguely strives to attain. However, without a formalized set of objectives, any assessment of The Free Store's impact must first endeavor to determine what it is The Free Store is attempting to accomplish, before then assessing it. Thus, a set of strategic goals allows for a focused assessment of The Free Store's impact.

Based on our findings, we believe that these strategic goals are as follows:

- i. Provide quality food at no cost to those who self-identify as in need
  - ii. Prevent excess food from Wellington eateries, cafes, and restaurants from going to landfill
  - iii. Provide a welcoming social space for individuals from different cultural and socioeconomic backgrounds
  - iv. Promote personal development and growth through volunteer opportunities and responsibilities
- We recommend that The Free Store establish a system of consistent contact with partner eateries

Throughout our data collection process, we found that several partner eateries were unfamiliar or out of date with The Free Store's operation and mission. As a result, it was challenging to gather rich information through interviews. At present it would be difficult to design a survey that could be easily administered with a high response rate. With a system of consistent contact, it would be easier to administer the surveys to each eatery in an effective manner.

When interviewing eateries, we asked, "why do you give food to The Free Store?" and one of the soup kitchens that donates answered "TFS fulfills a different need in the community than us, but there is a lack of cooperation on a managerial level". This is evidence that establishing a better

connection with the eateries would be beneficial. An additional benefit of improved communication is collection of several metrics that we wished to collect, such as the number of items, weight, or dollar value of food donated to quantify the store's environmental and economic impact. While there are ways to extrapolate these totals from data collected at The Free Store, it could potentially be simpler and more accurate if done by each eatery that donates. Establishing a system of contact is the first step in later setting up a system of community data collection. Finally, this could benefit eateries and their employees, as several expressed interest in learning or knowing more about the impact their donations had.

### 5.1.2 General Recommendations to the Free Store

Based on our findings we have several recommendations for the Free Store in general. These recommendations are presented with the intent of improving operation of the store.

- **We recommend that the Free Store opens multiple times during the holiday season**  
We recommend The Free Store opens more often over the holiday break that occurs during the several weeks before and after December 25. Currently the store does not open over this period of time due to constraints with restaurants closing and not enough food as a consequence. We believe the benefit to the community far outweighs the risk of not receiving enough food. Based on interview responses there are enough people who struggle during this time without the store open. Interview responses from eateries show that enough eateries are still open during this time to provide The Free Store with food. For example, one of our eatery interviewees stated that "The Free Store could be open during the holiday" when prompted with the question "Is there anything you would like to add?" As a simpler transition the store could choose to only open on Fridays for the necessary number of weeks. During normal operating season The Free Store typically collects the most food from eateries on Fridays. This is the likeliest day to provide the most people with food. Furthermore, due to uncertainties of the holiday season there may be either more or fewer volunteers available than usual. One volunteer explained to our team that many people would like to volunteer but can't due to work obligations. These people would likely have the time to volunteer over the holiday season, however. On the other hand there are likely many volunteers who would not be able to volunteer because of travel and general holiday season obligations. Therefore we are unsure how many volunteers would be able to cover the necessary shifts, but since there would be fewer eateries to collect from and less food to hand out, less manpower is needed to get everything done.
- **We Recommend that the Free Store records visited eateries on collection runs**  
We also recommend The Free Store creates a method for tracking the eateries collected from on each food run. Currently each trolley contains a list of eateries to collect from but no way to keep track of which eateries have already been visited. Through volunteering on food collection runs our team noticed that this system results in eateries being forgotten sometimes. This hurts The Free Store's relationships with the eateries because through our interviews we found that many eateries enjoy donating leftover food because of the ease to the system. When an eatery is missed on a collection run complications arise, such as the eatery's uncertainty why The Free Store did not show up and if they are going to show up the next day. Therefore, we believe The Free Store should ensure that the laminated lists are consistently updated and provide a dry-erase marker for

the volunteers to check off each eatery to ensure the collection from each one occurs. This will both sustain the relationships between the store and eateries as well as provide the store with the most food possible.

## 5.2 Recommendations for Future Research

In this section, we outline recommendations directed to future research. Due to the fact that we did not reach the point of refining our pilot survey we are urging for future research to develop its content and review its administration.

### 5.2.1 Developing and Administering the Pilot Survey

For surveying eatery employees, we recommend a sample of both drop off surveys and email surveys. This should include randomly dividing all the eateries that donate to The Free Store into two groups. Drop off surveys should be tested on group one and email surveys on group two. Drop off survey administration should include personal delivery to the manager and allowing them to read it over and ask questions while their team is still present. After responses are collected, the research team should enter them into Qualtrics, or similar software, for analysis. The second method of surveying should be administering online, where an email including the link to the survey is sent on behalf of our sponsor (Trochim, 2006). The survey content will remain the same. Our developed survey can be seen in Appendix E.

The next group of stakeholders includes the volunteers or workers of The Free Store. Two methods of conducting surveys are possibilities here. One method is to utilize a Facebook group that many volunteers are members of. This network is a plausible way of conducting mail surveys efficiently (Trochim, 2006). The survey link should be posted by the General Manager, Alana Hathaway. Her familiarity within the community should lead to a greater response rate compared to a link posted by the research team. Another method we recommend is administering the surveys in person before or after a volunteer's shift during which the researcher records responses directly into Qualtrics. Again, the survey content should remain the same between methods.

Lastly, for customers, we believe the best method of data collection in large volumes is through a conversation style survey. (Trochim, 2006). After conducting participant observation, the research team should have an established sense of familiarity amongst the customers. The team should conduct surveys in the same manner as they did with volunteers. Our developed survey can be seen in Appendix F.

- **Analyzing and Presenting Survey Results**

Our team recommends that future project teams conduct background research on statistical analysis and data presentation methods prior to arriving in Wellington. The ultimate goal of this 2-year project is to present The Free Store with information that reflects their impact on volunteers and customers. Hopefully, the data reflects positive effects on the community. This data can then be used for fundraising and other presentation purposes. Background knowledge on these topics will help next year's team see the complete picture of the project. If possible, the team should attend a fundraising meeting with the General Manager or otherwise seek their input for data presentation methods. We also recommend validating the survey questions by performing a psychometric

assessment. A psychometric assessment ensures that the questions asked in a survey are appropriate measures of the indicators or impacts they aim to measure (Phillips, S. Personal Communication, 8 February 2019).

### 5.2.2 Future Research in Economic and Environmental Impacts of The Store

Our team was able to identify areas of environmental impact for The Free Store. We also developed strong methods for gathering data in each of these aspects. However, our research with regard to environmental impact analysis was limited. Aside from the Oxford analysis on food recovery, we didn't find any similar tools to measure the impacts of items like plastic bags, single use cups, etc. A further analysis of these aspects would strengthen the methodology as a whole.

### 5.2.3 Future Research in Social Impacts of The Store

While we hope next year's project team gathers a sufficient quantity of social data from the framework we produced, there are some areas that may be explored further. Our framework successfully incorporated the data from our interviews, but a larger scale data collection that we have already recommended for next year's team may reveal dimensions or codes that are not found in the framework. Therefore, the framework would need to be refined and tested again until it suits the necessary social analysis.

## 5.3 Conclusion

The goal of this project was to create a methodology for assessing the environmental, economic, and social wellbeing impacts of The Free Store on the Wellington community. Our team completed this through conducting participant observation and structured interviews to gauge perceptions of the three main stakeholder groups: customers, volunteers, and eateries. Additionally, we examined methods to measure environmental and economic impacts mostly based on counting people and food. After we analyzed the results of these methods, we developed a complete methodology for analysis to recommend to The Free Store and next year's project team.

Through our analysis we found that certain themes became apparent after interviewing the stakeholder groups. These themes were physiological needs, psychological and belonging needs, and self-actualization, based on Maslow's hierarchy of needs. These themes became a part of our social analysis framework, which also included codes that were grouped into dimensions for analyzing interview responses. We utilized this framework when producing a pilot survey that we recommended for next year's project team to test. For this project team we recommended both this and other areas of further research. Our other recommendations were developed for The Free Store to both ease future data collection and improve operation in general.

Our ultimate goal is for the outcomes of this report to facilitate a full scale analysis of The Free Store's impact on the community in the coming year. This analysis would hopefully assist The Free Store in communicating with stakeholders and submitting funding requests. As the store has not yet conducted a comprehensive analysis, this would provide concrete data to present and legitimize the model. Beyond this, we hope an analysis such as this would influence government policy and eventually widen The Free Store's movement. One example of influencing policy would be providing benefits to eateries that donate to food redistribution organizations such as The Free

Store. If eateries have motivation to become a part of the movement it will be easier for the movement to spread. There will always be food going to waste while people go hungry every day, and The Free Store is just one organization contributing to the connection of the two problems to create a solution. Utilizing the results of the impending analysis of the store, the potential future impact of this movement can be extrapolated. This information would be vital in communicating the severity of the problem while demonstrating that there is a solution, but it is up to the world's community to come together and put it in action. We stress the importance of "community" because this concept is integral to The Free Store's model and the true movement cannot spread without it. The overall issue goes deeper than the matter of food; it is a problem of morality. It is a fundamental moral flaw in society where a basic human need goes unmet while a capitalist system with the means to address it fails to do so. At the same time, those struggling to meet physiological needs often face several other personal challenges. A community-based approach strives to break down the barriers between levels of society and provide a holistic sense of well-being beyond simply access to food. This effort endeavors not just to patch an issue but pave the way for a just and stable future. When we see people in need as friends to support rather than problems to solve that is when change can occur.

## CHAPTER 6. Reflections

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- **Jeremy Spittle**

I gave a lot of time and thought over autumn break as to how I would rank the 6 projects in our selection process. I texted and called every WPI graduate that I usually turn to for advice, some of whom had gone to Wellington for their IQP, some who hadn't. I can't recall making a more important decision since I had chosen to attend WPI, in no small part because of the IQP experience. After receiving all the advice, I sought, I decided on the project that I felt would have the greatest impact, as opposed to a more fun project that might be less work. I'm a big believer in evaluating decision making based on the process (or what you know at the time of the decision) versus the results (where things out of your control can take effect). Knowing what I know now, I made the right decision based on the results too. The first few days at The Free Store were certainly awkward and required a lot of emotional energy. But things got easier. Now there are too many small but meaningful moments to remember. Things like kicking a ball around the store parking lot with my sponsor and a school-age boy to heckling Sofia and Tori (while they're actually volunteering) with Van on the cement steps like we're Statler and Waldorf from the Muppets. And there's bigger moments like listening to a store customer tell you how they got through the darkest time in their life or sharing life plans with a German student on a gap year. Had we done nothing but volunteer for 7 weeks, I would've felt more impact than any amount of schooling could create. Above all these moments, I'll take away the awe-inspiring example set by the handful of people who made The Free Store what it is today. Nine years after its founding, their commitment that has resulted in dozens of changed lives makes me reconsider how I should spend the early years of my career. I don't know if The Free Store: Worcester is feasible, but the four of us could be the ones to find out.

- **Sofia Reyes**

I can describe The Free Store as the steepest learning curve of my college career. In the past seven weeks, I have learned and grown so much as a student and as a person. Even though I had researched the store and their community my first day, I was still very nervous and did not know what to expect. Every day was different, every day I encountered different people and had different conversations. Every volunteer shift for the first two weeks was completely different. My conversations topics ranged from traveling and learning about the world to death and pain in some volunteer's life. I was able to learn so much from every single conversation I had. After all the conversations I had collecting food during the first two weeks I thought that there was no way I would learn more from this project. Little did I know I was going to learn so much more. First, I learned so much from my team. Our project was very abstract, and it took a lot to conceptualize our goal, but with hard work, we not only completed this project, we became very close friends. Second, I learned how to go completely out of my comfort zone to talk to individuals that I would not have talked to if it wasn't for The Free Store. The conversations I had lead me to develop strong connections with people who came to the store regularly, including the managers. For example, there was a volunteer that always helped organize the food inside the container. She was inside the container every time that I volunteered to hand out food. In the chaos and hecticness of the container, she was able to provide a sense of calmness and wisdom that helped me volunteer better.



In this project I learned about Kiwi culture and religion, I learn about the welcoming community of The Free Store and I learned that there is never a simple solution to any problem.

- **Tori Loosigian**

I would like to use this space to thank WPI for the incredible opportunity to immerse myself in the culture of another country while working with project sponsors who have such a powerful mission to make a positive change on the Wellington community. Throughout this project I have not only learned a great deal about conducting social science research, but also working with a diverse population. Becoming a part of The Free Store community has granted me the opportunity to hear stories, have great conversations, and become friends with people I never would have met otherwise. Our project was special because of the humanistic approach we took, and how important it was to first build relationships before conducting any project work. These relationships were integral to our project, but also grew into much more than that. Everyone was very welcoming and made us feel part of The Free Store's community as well as the Wellington community overall. When studying at such a rigorous and STEM driven university it is important to remember that in any career or life path one must remember to treat all people as people and be open to diversity and different ways of life. I have seen what an impact The Free Store has on people's lives and I hope that the work we have conducted here will contribute to showing others the massive impact The Free Store has on the Wellington community.

- **Van Harting**

WPI presents a unique academic environment and curriculum, for several reasons. With a nearly homogenous body of STEM students, opportunities are relatively scarce to interact with students with diverse academic and career goals. At the same time however, the IQP project provides the opportunity to consider human impacts and social context at a rigorous level that few other universities can match. In reflecting on my own goals, I've often considered paths beyond traditional engineering roles that can allow me to have a meaningful impact or pursue creative artistic expression. In working on this project, the experiences and conversations I have had have exposed me to a wide range of backgrounds and perspectives, from travelers volunteering in between looking for work, to PhD students in the social sciences, to people living on the street with passion for their art. The Free Store has provided a unique environment where I've been able to have these interactions in ways I am certain that another IQP sponsor or a typical travel experience could not have. Further, the work that I've gotten to do has made a tangible difference for a deserving community. From day to day operations, which address food inequity in several forms across Wellington, to our deliverables, which I hope will effectively help develop and expand the movement, the work I have done has felt worthwhile and rewarding since day one. The most challenging part of this project by far will be saying goodbye to the community that has so seamlessly welcomed our team, although I know there is always a space for us here, and eagerly await to see the outcomes of next year's analysis and fully intend on finding my way back to Wellington and The Free Store. I am inspired to look for ways I can help promote positive change in communities back home in Plymouth or Worcester, and have a much fuller understanding that there is often much more to a person's story than what can be observed on the surface. These

experiences have been deeply informative for me, and will hold great weight as I consider my future and the impact I would like to have.

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# Appendix A

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## **Eatery Owner Interview 2.0**

1. How did you hear about the Free Store? How did \*the eatery\* become involved?
2. How long have you been partnered with the Free Store?
  - a. And Why?
3. How familiar are you with TFS's mission/goals and TFS community?
  - a. Social / community development
  - b. Economic / charity, income supplementation
  - c. Environmental/food waste reduction
4. What do you see as the benefits to your partnership with the Free Store?
  - a. Financially?
  - b. Logistically?
5. Do you encounter any challenges through your partnership with the Free Store?
  - a. Financially?
  - b. Logistically?
6. Why do you donate to The Free Store?
  - a. Do you keep track of the food you donate?
7. Is there anything else you would like to add?

# Appendix B

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## Volunteer & Customer Interview 2.0

Thanks for taking time to speak with us. If you're unaware, we're working on a university project in partnership with TFS and part of the project is to learn about the perspectives of people in TFS community. We're going to ask you some questions, don't feel pressured to answer any of them. We won't use your name in any of our findings.

1. **Where are you from?**
  - a. How long have you been in Wellington? Why did you move here?
2. **How did you start at the TFS/How did you hear about TFS?**
3. **Can you tell me about the first time you came to TFS?**
  - a. What was it like?
  - b. How often do you come now?
  - c. What keeps you coming back?
4. **How does TFS fit in your day-to-day life?**
  - a. What would happen if TFS was closed? /What did you do over the holiday when TFS was closed?
  - b. What are some other places you get food from?
  - c. How did you feel during the holiday break?
  - d. Did you feel isolated? Did you miss people from TFS?
5. **Tell me about the TFS community.**
  - a. What are the good parts?
  - b. What are the bad parts?
  - c. How would you describe your role in the community?
6. **Do you enjoy hanging out with people of TFS?**
  - a. Can you tell me a little bit more about the relationships you've made with other people at TFS?
  - b. Do you think the community and conversations part of the reason you come here? Do you come just for food?
  - c. Who have you met/conversed here that you wouldn't have otherwise?
7. **How do you think TFS has impacted the Wellington community?**
  - a. Has anything changed because of TFS?
  - b. How have they changed? Do you think TFS is partially responsible for this growth?
  - c. What have you learned from other people at TFS?
8. **How has TFS impacted you or your life?**
  - a. Has anything changed because of TFS?
  - b. What change have you seen in people around TFS since you've been here?
9. **What is it that you appreciate most about TFS?**
  - a. What is your favorite aspect of TFS?
  - b. What do you think TFS does best?
  - c. What areas do you think TFS can improve?
10. **What do you appreciate about TFS staff?**
  - a. What specifically have they done to make you feel that way?
11. **Is there any other thing you would like to add?**

\* The colors in the questions above are divided into four different categories:

General
Physiological
Relationship
Self

## Appendix C

Social Framework			
Theme	Dimension	Name of Code	Description of Code
Physiological Needs	Food	Hunger	Interviewee wouldn't eat without The Free Store
		Stocking	Interviewee needed to stock up on food before TFS holiday
		Regular	Interviewee comes to TFS 3+ times per week
		Needy	Interviewee also gets food from similar charities
		Food Quality	Interviewee mentions good quality of food available at TFS or the value of getting 1st pick of food
		Essential	Interviewer infers that interviewee wouldn't have sufficient nutrition w/o TFS
		Non-Essential	Interviewer infers that interviewee uses TFS to supplement income, but could have sufficient nutrition w/o TFS
	Money	Supplementary	Interviewee mentions TFS helps them save on essential costs (i.e. rent, medical bills)
		Benefit	Interviewee mentions anyone at TFS being on government benefit
		Unemployed	Interviewee mentions anyone at TFS being unemployed
Psychological/Belonging Needs	Relationships of respect	Community	Interviewee enjoys community of TFS or spends time at TFS to hangout, not just to reserve their place in line
		Socializer	Interviewee enjoys meeting new people at TFS
		Behavioral expectations	Interviewee mentions the behavioral expectations or norms at TFS (no fights in line, sharing food, letting families go ahead, etc)
		Holiday blues	Interviewee mentions they missed social aspects of TFS over holiday/periods when TFS was closed
		Family	mention of "family" atmosphere

		Friendship	Interviewee mentions somebody from TFS by name and/or people becoming friends in general
		Conversation	mentions enjoying interesting conversations at TFS
		Welcoming	Mentions TFS as a welcoming atmosphere/no prejudices/requirement
Self-Actualization	Generosity	Volunteer appreciation	Interviewee mentions an appreciation for volunteers
		Staff Appreciation	Interviewee mentions staff member by name
		Helping People	Interviewee mentions helping people as a reason for themselves or someone else to come to TFS
		Volunteer mindset	Interviewee mentions other volunteer opportunities
	Independence	Housed	Interviewee mentions someone who moved into better housing during time at TFS
		Responsibility	Interviewee mentions someone who volunteers to make good use of their time
	Growth/mastery	Change in self	Noticed change within themselves during time at TFS
		Change in others	Interviewee noticed change in others during time at TFS
		Conversation development	Mentions self or others come to TFS for conversation and would probably not socialize outside of TFS
		Volunteer development	Interviewee began at TFS primarily as a customer but started volunteering or created volunteering role at TFS
		Conversation invitation	Interviewee invited someone else at TFS into a conversation
	Other	Improvement	Areas TFS can improve
Reducing waste		Interviewee mentions something about reducing waste or helping the environment	
Wellington		"other" improvements in the Welly community	

# Appendix D

	A	B	C	D	E	F	G	H	I
1									
2				1 tonne = 1000 kg		bakery (other)	888	496	0.31
3	<b>day</b>	<b>date</b>	<b>total people</b>	<b>kg of bread dixon</b>	kg bread total	tonnes of bread total	CO2 emisson (kg)	water use (m^3)	land use (hectares)
4	not	real	65	10	54.16666667	0.05416666667	48.1	26.86666667	0.01679166667
5	these	are	60	8	40	0.04	35.52	19.84	0.0124
6	hypo	theticals	72	11	66	0.066	58.608	32.736	0.02046



# Appendix E

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## Pilot Survey for Eateries Donors at The Free Store

1. What is your current position?

\_\_\_\_\_

2. How long have you worked at your current position?

\_\_\_\_\_

3. How long have you been partnered with TFS?

\_\_\_\_\_

4. How would you describe the beginning of your partnership?

1 - I asked TFS if we could partner

5 - Benjamin or another TFS figure tried multiple times to convince me

5. Are there any financial benefits to TFS partnership? (i.e. waste disposal)

Yes    No

6. About how much food is leftover/donated every day?

\_\_\_\_\_ kg

7. How do you feel about your partnership with The Free Store?

Strongly approve    Somewhat approve    No Opinion    Somewhat disapprove    Strongly disapprove

8. Do you feel that your partnership makes a difference in preventing food waste?

Very untrue    Untrue    No Opinion    Somewhat true    True

9. How would you rate the collection volunteers from The Free Store

Very poor    Poor    Fair    Good    Excellent



## Pilot Survey for Customers and Volunteers at The Free Store

1. How long have you been coming to The Free Store?

—

2. How often do you come to The Free Store?

Never    Almost Never    Monthly    Weekly    Daily

3. Before weekends or holidays, do you ever take extra food in preparation for times when The Free Store will be closed?

Yes    No

4. Do you ever get food from places like a soup kitchen or food bank?

Yes    No

5. Has money saved as a result of The Free Store ever helped you pay costs like rent or medical bills?

Yes    No

6. Would do you feel about describing The Free Store community as family-like?

Strongly approve    Somewhat approve    No Opinion    Somewhat disapprove    Strongly disapprove

7. Would you describe anyone at TFS as your friend?

Yes    No

8. How often do you meet new people at TFS?

Never    Almost Never    Monthly    Weekly    Daily

9. Do you miss anyone at TFS during weekends or holidays?

Yes No

10. Have you ever volunteered at TFS?

Yes No

11. Was volunteering at TFS your first volunteer or work experience in your life?

Yes No

12. Have you ever noticed personal change or growth in another person at TFS?

Yes No

13. How does The Free Store affect your life?

No Affect    Minor Affect    Neutral    Moderate Affect    Major Affect