

DALHOUSIE UNIVERSITY

Employee Behaviour and Sustainability in a Dining Hall at Dalhousie University

Environmental Science Undergraduate Honours Thesis

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Abstract

Due to the volume of food production, commercial-sized foodservice facilities are more energy and water-use intensive than office and classroom spaces. In addition, foodservices utilize large quantities of food and material inputs and impact waste diversion rates of these resources. Resource waste can be reduced by installing upgrades, such as water and energy efficient equipment, efficient lighting and improved heating, ventilation, and air conditioning systems; however, as operators of the kitchen, employees also have control over resource use. Little literature exists on employee behaviour and the sustainability of foodservice operations. This study explores sustainability issues at the Sherriff Hall Residence dining hall and kitchen areas at Dalhousie University. This study attempts to answer: 1) What behaviors in the dining hall impact sustainability objectives?; 2) What are the barriers that dining hall employees face in meeting sustainability objectives?; 3) What changes or programs could be implemented in order to reduce resource use and enhance waste diversion in the dining hall? Qualitative research methods employed include interviews with dining hall staff from the Sherriff Hall Residence, Aramark management at Dalhousie University and stakeholders from Facilities Management, Ancillary Services and Environmental Services. In addition, guided tours of the dining hall were completed with three key participants. A variety of behaviours which impact the sustainability of dining hall operations were documented, including behaviours that contribute to resource waste and improper waste diversion as well as behaviours which reduce these. Barriers to implementing sustainable behaviours in the dining hall were also identified, including: motivation, time, customer service, health and safety, knowledge, resistance to change, equipment and facilities, as well as external factors that are beyond employee control. Recommendations are made on training, enforcement, and changes in operational procedures.

Key words: sustainable, green, employee behaviour, university, dining hall, foodservice, kitchen

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1 – Introduction

1.1 – Motivation for Research

Foodservice operations are more water and energy use intensive than other facilities such as classrooms, offices spaces, and commercial buildings (Energy Information Administration, 2003; Gleick et al., 2003; United States Environmental Protection Agency, 2010). Commercial kitchens utilize large amounts of inputs, such as plastics and foods, and are responsible for the diversion of wastes created through their operations. Foodservice operations are therefore of interest when looking to increase the efficiency of resource use and enhance proper waste diversion.

Dalhousie University is interested in reducing the environmental impacts of its operations and improving life-cycle costs. Kitchen operations utilize a large amount of resources (energy, water, food, and products) and more efficient operations would decrease the utilization rates of these resources. Resource waste can be reduced by improving building systems such as improved kitchen lighting or installing energy and water efficient equipment as well as through regular maintenance of equipment. As operators of kitchen equipment and some building systems, dining hall employees also impact resource use. In addition, dining hall employees have control of waste flow through cooking practices and waste diversion. As such, Dalhousie University is interested in engaging the employees of the kitchens in increasing the efficiency of kitchen operations.

The impact of the behaviour of dining hall employees on achieving sustainability goals, such as reduced energy and water use and proper waste diversion, remains largely unstudied. In order to increase sustainability, employee behaviors as well as barriers in regards to resource efficiency and reduction should be identified. Programs should then be developed and implemented to work on identified issues. This research focuses on the behaviour of dining hall employees in regards to resource waste and waste diversion at Dalhousie University and seeks to suggest programs that could be implemented in order to increase kitchen sustainability. The term dining hall includes both the dining and kitchen areas of the residence meal hall.

1.2 – Background and Context

Part of resource waste can be reduced by installing efficient equipment; however, the behaviour of dining hall employees also impacts resource use. Examples of such behavioural impacts include, but are not limited to, leaving equipment on while not in use (idle time), leaving equipment doors open, not fully loading equipment before using, and leaving lights on (Efficiency Partnership, 2006; United States Environmental Protection Agency, 2010).

As commercial and institutional kitchens utilize a large amount of resources, the activities and resource use of this sector is of significance to Dalhousie University in terms of its reputation of a leader in sustainability but also in reducing operational costs. The term sustainability objectives will be used in this report to mean objectives which reduce the environmental impact of operations. This research focuses on the reduction of resource waste (water, energy, food, products) and enhancement of proper waste diversion (material diverted from the landfill).

There are eight full-sized kitchens owned by Dalhousie University as well as number of kiosks. Aramark manages four of the full-sized kitchens, those at the residences of Howe Hall, Risley Hall, Obrien Hall and Sherriff Hall, as well as many of the foodservice kiosks. Of the other full-sized kitchens owned by Dalhousie University, one is located in the University Club, two in the Student Union Building and one at the Nova Scotia Agricultural College. Two of the kitchens are managed by Chartwells, a foodservice company which operates at over 800 educational institutions across Canada (Chartwells Canada, 2013).

Aramark is a multinational corporation which operates in 22 countries and employs over 260,000 people worldwide (ARAMARK, 2011b). Aramark provides the following services to educational facilities, health care facilities, stadiums and arenas, and businesses: facilities management, hospitality management, dining and refreshments, and apparel (ARAMARK, 2011b). Aramark provides services to over 600 post-secondary educational institutions in North America (ARAMARK, 2011a). Aramark has stated their commitment to reducing their environmental impact of their operations through a number of facets (ARAMARK, 2011c). Aramark is committed to the “reduction of approximately 170 million pounds of emissions through implementation of energy and water conservation programs - equivalent to the annual emissions from 14,744 passenger vehicles” (ARAMARK, 2011c). Further details on these energy and water conservation programs were not able to be located on the Aramark website.

At the kitchens operated by Aramark at Dalhousie University, there are a number of programs focused on decreasing the environmental impact of their foodservice operations including recycling and composting initiatives, tray-less dining, and a program which focuses on procuring and promoting local, sustainable foods (Food Services at Dalhousie University, 2012).

They are also working with the university to replace some kitchen equipment with energy efficient equipment models and are interested in programs focused on engaging employees with sustainability initiatives (Derrick Hines, personal communication, September 27, 2012). At Dalhousie University, Aramark has over 200 employees including full-time as well as part-time staff (Derrick Hines, personal communication, September 27, 2012). Employees are of varying ages and backgrounds; many of the part-time employees are international student, with new students starting each year (Derrick Hines, personal communication, September 27, 2012).

1.3 – Literature Review and Knowledge Gaps

A green restaurant has been defined as one which procures, to varying amounts, green foods and implements green practices (Jang, Kim, & Bonn, 2011). Within this definition, green foods have been defined as locally grown or organically grown foods and green practices are defined as practices which utilize resources more efficiently, reduce waste and recycle (Jang et al., 2011). Green practices may include, but are not limited to, recycling and composting, utilizing energy and water efficient equipment, and utilizing green products such as cleaning supplies and packaging (Tanyeri, 2007; Wang, 2012). Reports regarding increasing reducing energy use and waste use in kitchens, especially in regards to commercial-sized kitchens, tend to focus on efficient equipment (Consortium for Energy Efficiency, 2010; Food Service Technology Center, 2010; Natural Resources Canada, 2012; United States Environmental Protection Agency, 2010) and the importance of regular maintenance (Efficiency Partnership, 2006; Natural Resources Canada, 2012; United States Environmental Protection Agency, 2010).

Kitchen behaviour has been recognized as important in reducing resources use in kitchens (Efficiency Partnership, 2006; Natural Resources Canada, 2012; United States Environmental Protection Agency, 2010). Examples of behaviours which impact resource use include leaving equipment on while not in use and equipment doors open (Efficiency Partnership, 2006; United States Environmental Protection Agency, 2010). Despite the recognition of the impact of behaviour on kitchen resource use, little research has been done in regards to the prevalence and dynamics of these behaviours. Additionally, barriers such as negative perceptions on work quality have been identified to constrain employee participation in sustainability (Kaplowitz, Thorp, Coleman, & Kwame Yeboah, 2012). However, no studies have specifically studied these barriers in the kitchen environment.

It has been recognized that changing employee behaviour in commercial kitchens is a low cost method of reducing energy use even though it is a time intensive process which requires patience and continual reinforcement (United States Environmental Protection Agency, n.d). It has been recommended that programs focused on employee participation in resource use should: communicate goals and reasons for the change in operations, collect employee input, measure and communicate resource use reductions, reward employees for participation, and have management who lead and encourage by consistently demonstrating the change in behaviour (North Carolina Department of Environment and Natural Resources, Division of Pollution Prevention, Environmental Assistance, Division of Water Resources, & Land-of-Sky Regional Council, Waste Reduction Partners, 2009; United States Environmental Protection Agency, 2007). While Suggestions of programs are included in reports on resource

efficiency in the work place, no detailed research has been done into what types of programs employees would like to see or the effectiveness of programs.

1.4 – Study

This study investigates the impact of human behaviour on sustainability objectives, such as the reduction of energy waste, water waste, food waste, product waste and improper waste diversion in the kitchens at Dalhousie University. In addition, it investigates the barriers faced by dining hall employees in meeting sustainability objectives as well as opinions of staff on potential changes which could be made to increase the sustainability of kitchen operations. Finally, this study investigates the interest of dining hall employees, including interest in training and education as well as their opinions on methods of education, training and promotion.

1.4.1 – Research Questions

This research explores sustainability in the dining hall in Sherriff Hall Residence at Dalhousie University, specifically in terms employee behaviour. In order to address this, the study attempts to answer:

In the dining hall located in the Sherriff Hall Residence at Dalhousie University:

- 1) What behaviors of dining hall employees impact sustainability objectives?;
- 2) What are the barriers that dining hall employees face in meeting sustainability objectives?;
- 3) What changes or programs could be implemented with the objective of altering employee behaviour in order to reduce resource waste and enhance waste diversion in the dining hall?

As time is a limitation, this research focuses specifically on one kitchen, Sherriff Hall. This was done to provide an in-depth look at the dining hall dynamics to be able to more fully understand employee behaviours, as they relate to sustainability objectives. Sherriff Hall was selected as it is the second largest kitchen at Dalhousie University campus; Howe Hall is the largest yet the context is more complex due to its provision of catering services (Derrick Hines, personal communication, September 27, 2012).

1.4.2 – Practical Implications of Study

The focus of the research is to investigate the stated research questions with the goal to increase the sustainability of foodservice operations at Dalhousie University. The results will be provided to Aramark management. Results provide information on the impact of employee behaviour on the sustainability of their operations and suggestions on the implementation of educational programs and operational changes. Recommendations made are based on the context of Sherriff Hall and therefore may have to be modified to fit into the potentially differing contexts of the other foodservice operations at Dalhousie University.

2 – Literature Review

This literature review will highlight the following key topic areas:

- The increasing interest, on the part of consumers, in shifting the foodservice industry to more sustainable practices;
- The environmental impacts of the foodservice industry;
- The ways in which the industry is working towards this shift to more sustainable operations;

- Employee behaviours which can impact the use of resources;
- Barriers which may exist to sustainable kitchen behaviours; and
- Programs focused on encouraging sustainable behaviour, both in the kitchen and in other work environments.

2.1 – Consumer Demand for Green Foodservice

The sustainability of foodservices is important to consumers and therefore greening of foodservice operations has become of interest in order to meet consumer demand. The National Restaurant Associations reports that, in general, the American foodservice industry is shifting towards more sustainable practices (Riehle & Grindy, 2012). The report states that the majority of restaurants plan to invest in more efficient kitchen technology in order to meet the consumer demand for more restaurants that use green practices (Riehle & Grindy, 2012). Similarly, the majority of foodservice providers have reported that they have noticed an increasing demand for green foods (Riehle & Grindy, 2012). A study of American consumers identified that the majority of consumers believe it is good for restaurants to employ practices to protect the environment and that dining in green restaurants helps to protect the environment (Schubert, Kandampully, Solnet, & Kralj, 2010). Research on consumers in Taiwan found that consumer awareness of a restaurant's green practices is important in whether or not a consumer will dine at a green restaurant, suggesting that restaurants should advertise such practices (Hu, Parsa, & Self, 2010). It was also found that consumers of a greater age, with greater income, and with higher levels of education were more likely to have the intention to dine at a green restaurant (Hu et al., 2010).

Studies suggest that both procurement of green foods and implementation of green practices are important to consumers; however, their relative importance may vary. One study identified, that to American consumers, it is more important that restaurants implement green practices, followed by procure green foods and lastly, make donations to environmental projects or pay fees to reduce environmental impacts of service (Schubert et al., 2010). On the other hand, college students in the United States have been found to be less concerned with green practices than with green food procurement (Jang et al., 2011). According to the National Restaurant Associations, over 40 percent of American consumers decide where they will dine depending on whether or not a restaurant employs green practices while over 55 percent of consumers are more likely to dine at a restaurant with green food options (Riehle & Grindy, 2012). A study of McDonald's consumers in Switzerland found that 67% of consumers prefer businesses which procure Swiss products and 70% of those individuals would eat at McDonald's more often if they procured local foods (Vieregge, Scanlon, & Huss, 2007). On the other hand, in small restaurants in the United Kingdom, it was identified that managers felt that although there is a trend towards green foods, this trend had not yet affected their businesses and so there was not yet a push to shift towards green foods (Revell & Blackburn, 2007).

Literature suggests that consumers may be willing to pay more when dining at a green restaurant. Research on consumers in Taiwan found that the majority of consumers were willing to pay 2% to 6% more and a third were willing to pay 8% to 12% more to dine at a green restaurant (Hu et al., 2010). Only approximately 38% of consumers at McDonald's in Switzerland would be willing to pay more if they procured local foods yet the majority of those who would pay more, would pay 10% more (Vieregge et al., 2007). In a comparative study, it

was found that more American consumers, over 75%, than Indian consumers, over 65%, were more willing to pay more at a green restaurant (Dutta, Umashankar, Choi, & Parsa, 2008). Of those willing to pay extra, more Indian consumers, over 60%, than American consumers, over 28%, were willing to pay an extra 10% or more (Dutta et al., 2008). These studies suggest not only to consumers want greener foodservices, that internationally restaurants could increase prices if they procure green food and employ green practices, which may assist with offsetting any additional costs of such practices.

2.2 – Environmental Impact of the Foodservice Industry

There are a number of areas that could be focused on within the foodservice industry to reduce the industry's environmental impact. A life cycle assessment of the foodservice industry quantified the environmental impacts of the following subsystems, relative to the total environmental impact of the industry: food procurement, food storage, food preparation and cooking, and foodservice and operational support (Baldwin, Wilberforce, & Kapur, 2011). The assessment found that food procurement had the highest environmental impact, followed by foodservice and operational support services (Baldwin et al., 2011). Food storage and preparation subsystems had the smallest environmental impacts (Baldwin et al., 2011). While food procurement has such high environmental impacts, the foodservice industry often focuses on kitchen energy use when looking to decrease environmental impacts of operations (Baldwin et al., 2011). The author suggests that this could be due to the potential for cost savings or due to the lack of assessments which have identified areas of priority for the reduction of environmental impacts of foodservice operations (Baldwin et al., 2011).

Despite the greater relative environmental impact of food procurement in the foodservice industry, resource use in the other subsystems of the foodservice industry is still great. The United States Department of Energy found that, in 2003, commercial buildings which house foodservices consumed more energy per square foot than any other type of commercial building and approximately 3 times more than educational facilities (Energy Information Administration, 2003). The United States Environmental Protection Agency states that restaurants may use up to 7 times more and fast-food services may consume up to 10 times more energy per square foot than other commercial buildings (United States Environmental Protection Agency, 2010). In addition, foodservice operations consume a large amount of water and create waste (Consortium for Energy Efficiency, 2010). In California, kitchens account for approximately 6% of all water use in the commercial, industrial and institutional sectors, and 46% of water use in the restaurant industry (Gleick et al., 2003). On university campuses, foodservices use up to five times more resources than living quarters, in terms of water, energy and waste (Curry, 2008). In restaurants, it is estimated that 35% of energy is utilized for food preparation, 28% for heating, ventilation and circulation, 18% for sanitation, 13% for lighting and 6% refrigeration (United States Environmental Protection Agency, 2010). In California, it is estimated that in kitchens found in the commercial, industrial and institutional sectors 24% of water is utilized for dishwashing, 19% for ice making, 17% for pot cleaning, 17% for other unspecified uses or leaks, 14% for pre-rinsing dishes, and 9% for food preparation (Gleick et al., 2003). These studies demonstrate the amount of resources used by foodservice operations and therefore the need to focus on this area when looking to increase the sustainability of operations.

2.3 – Green Practices in the Foodservice Industry

Reports regarding increasing resource efficiency in kitchens, especially in regards to commercial-sized kitchens, focus largely on energy and water efficient equipment (Consortium for Energy Efficiency, 2010; Food Service Technology Center, 2010; Natural Resources Canada, 2012; United States Environmental Protection Agency, 2010). Regular maintenance has also been recognized as important and can result in significant reductions in energy use (Efficiency Partnership, 2006; Natural Resources Canada, 2012; United States Environmental Protection Agency, 2010). It is important to remove or replace unnecessary or inefficient equipment (Batty, Conway, Newborough, & Probert, 1988; United States Environmental Protection Agency, 2010). In the commercial, industrial and institutional sectors of California, it has been estimated that improving water-use efficiency through technology and behaviour changes in kitchens, without hindering the end result of use, could reduce water usage by 20% (Gleick et al., 2003).

Inconvenience, lack of time, and the perception of high associated costs have been recognized as barriers to green foodservice practices. A study of small firms in the United Kingdom documented that managers believed that increasing energy efficiency and reducing waste could be cost-effective, yet they were unsure of how to accomplish this (Revell & Blackburn, 2007). Managers did not feel that energy use was a large concern, did not know how they could cut energy use, and that savings from energy efficient equipment were not worth the original price of investment (Revell & Blackburn, 2007). In terms of green food procurement, managers felt that green foods are more costly and their availability inconsistent (Revell & Blackburn, 2007). For managers of restaurants in Taiwan, the removal of obstacles to

sustainable operations would be most important in allowing the shift to sustainable operations, followed by changing attitudes towards sustainable practices (Chou, Chen, & Wang, 2012). Government policies and programs, such as incentives or educational programs, could encourage the shift and reduce barriers (Chou et al., 2012). In addition, environmental education for employees could increase understanding of and positive attitudes towards sustainable practices (Chou et al., 2012). These studies suggest that even if there is interest in shifting towards green foodservices, there may be barriers such as cost, know-how, and attitude.

2.4 – Impact of Kitchen Behaviour on Sustainability

While part of resource waste can be reduced by installing efficient equipment and performing regular maintenance, the behaviour of staff also impacts resource use. Kitchen behaviour has been recognized as an important factor in the resource use of kitchens (Efficiency Partnership, 2006; Natural Resources Canada, 2012; United States Environmental Protection Agency, 2010). Examples of such behavioural impacts may include, but are not limited to, leaving equipment on while not in use (idle time), leaving equipment doors open, not fully loading equipment before using, and leaving lights on (Efficiency Partnership, 2006; United States Environmental Protection Agency, 2010). In one kitchen, employees utilizing the same equipment, for which they had not been trained, to do similar amounts of work resulted in significant difference in energy consumption due to operational behaviours indicating the impact that such behaviours can have (Batty et al., 1988). It has been recognized that changing employee behaviour in commercial kitchens is a low cost method of reducing energy use, even

though it is a time intensive process which requires patience and continual reinforcement (United States Environmental Protection Agency, n.d).

Kitchen equipment may be left on when not in use for a variety of reasons. A study of energy consumption and employee equipment use behaviour in five foodservice facilities documented that most equipment was turned on much earlier than required and left on all day, even though it was not in constant use (Batty et al., 1988). This was done in part to warm up the kitchens in the morning, as well as to ensure that equipment was ready for immediate use later on (Batty et al., 1988). It was noted in other research that kitchen managers preferred that equipment was left on all day as it takes a long time to warm up if turned off (Revell & Blackburn, 2007). These studies illustrate the impact of employee behaviours on resources use in the foodservice environment, and therefore the importance of employee behaviours when looking to increase the sustainability of operations.

2.5 – Barriers to Sustainable Kitchen Behaviour

Operational behaviours can become entrenched, suggesting that changes in behaviour will require constant reminders. In one kitchen, when employees became aware that energy use was being monitored, energy use dropped; however, energy use returned to previous levels within a few days suggesting that behaviour patterns are ingrained and that a change in behaviour would require frequent reminders (Batty et al., 1988). Similarly, in another kitchen, employees cooked early in the day and left food in hot-cupboards until lunch, which was attributed to the fact that the kitchen used to prepare breakfast and had yet to change daily operations; this again suggests the entrenchment of operational behaviours (Batty et al., 1988).

A number of barriers may hinder or prevent green practices. Physical barriers such as inconvenient kitchen set-up can lead to the development of inefficient behaviours (Batty et al., 1988). Constraint of physical space, such as a lack of space for multiple bins required for waste separation, can hinder the ability to implement green practices (Revell & Blackburn, 2007). Time constraints can also be a barrier to green practices. Staff may be too busy to complete extra tasks required, such as waste sorting (Revell & Blackburn, 2007). As noted above, staff may feel the need to leave equipment on so that it is ready immediately when needed (Batty et al., 1988; Kaplowitz et al., 2012). As noted in the context of laboratories, the perception of negative impact of energy conservation on quality of work may also present a barrier (Kaplowitz et al., 2012). Existing organizational procedures which make conservation practices more challenging may also act as a barrier (Batty et al., 1988). In addition, lack of knowledge, even in the presence of educational tools, on specific ways to conserve resources may also be a barrier to conservation (Kaplowitz et al., 2012). Lack of knowledge of direct impacts of behaviour on resource use may also be a barrier to understanding the importance of green practices (Kaplowitz et al., 2012). Even if employees are concerned with resource conservation, barriers or perceived barriers may prevent resource conservation practices from taking place (Kaplowitz et al., 2012). These studies highlight the fact that there are a number of barriers to green practices and that even if there is employee interest, there may be barriers which hinder the ability to follow through in their behaviour.

2.6 – Behavioral Change Programs

In order to better understand how to make changes toward more efficient procedures in kitchens, it is recommended that resource use and resource use behaviours are monitored

and that kitchen operational procedures are reviewed (Baldwin et al., 2011; Batty et al., 1988; Batty & Probert, 1989). Programs focused on employee participation in resource use reduction should communicate goals and reasons for the change in operations, collect employee input, measure and communicate resource use and reduction, reward employees for participation, and have management who lead by consistently demonstrating the change in behaviour (Batty & Probert, 1989; North Carolina Department of Environment and Natural Resources et al., 2009; United States Environmental Protection Agency, 2007). Staff should be trained in efficient equipment use specific to their work (Batty et al., 1988; Kaplowitz et al., 2012). Timed switches could also be utilized on equipment in order to control equipment use and alleviate staff from worrying about knowing when to turn equipment on (Batty et al., 1988), therefore decreasing the potential for behavioural impact on energy use. A shutdown schedule could also be implemented to ensure that lights and equipment get turned off at night (Efficiency Partnership, 2006). While the above suggestions have been made as to what types of programs could lead to behavioural changes, the effectiveness of such programs has not been evaluated.

2.7 – Knowledge Gaps

A review of environmentally related literature in hospitality journals by Myung et al. (2012) demonstrates that the field, in general, is understudied and that there is relatively little research which studies green practices in restaurants. The review suggests that environmental training and practices in the lodging industry is an important area for research (Myung, McClaren, & Li, 2012). Due to the impact of foodservice employee behaviour on sustainability aspects of the kitchen, environmental training in the foodservice industry should also be an

area for increased research. Despite the recognition of the impact of behaviour on kitchen resource use and potential for low-cost resource use reduction, little research has been done in regards to what behaviours impact the sustainability of operations and the effectiveness of programs focused on changing those behaviours.

3 – Methods

3.1 – Experimental Design

This research was focused on one dining hall in order to be able complete the study within a limited time frame while still providing a comprehensive look at the experiences in the dining hall relevant to the stated research questions. While work environments may differ significantly amongst foodservice operations at Dalhousie University as well as elsewhere, this research provides insights into employee experiences in the foodservice work environment which may exist in other foodservice operations. Experiences described may be observed in other foodservice operations found in similar contexts such as foodservice operations found in other North American universities.

Qualitative research methods employed include semi-structured interviews and guided tours of the dining hall; both the interviews and guided tours took place during January and February of 2013. Semi-structured interviews were utilized to ask specific questions relevant to each of the research questions, however, questions included in the interviews changed depending on the work responsibilities of the participant. Participants were able to ask for clarification during the interviews and the researcher added questions for further clarification

on topics brought up during interviews, including topics not included in the question list. This was done to allow for exploration of relevant experiences which may not have been identified beforehand. Some participants provided the researcher additional insight that was not specifically asked for. The guided tours were tours of the kitchens guided by the participant who commented on aspects they believed to be relevant to the research topic; tours took under fifteen minutes. The tours were utilized to gain a better understanding of the kitchen environment in Sherriff Hall to help provide clarity to interview responses and record observations relevant to the research questions. Two of the tours happened right after the interview with the participant while another happened within the same week. The two research tools utilized together allowed for insight that may not have been gained through just one of the tools as the guided tours allowed for observation and a better understanding of the dining hall environment.

3.2 – Study Setting

Research was completed in the dining hall of Sherriff Hall, which is a student residence at Dalhousie University. Sherriff Hall is one of the larger kitchens owned by Dalhousie University and as such, provides access to a higher number of participants than other campus dining halls. The largest foodservice operation at Dalhousie University, Howe Hall, is responsible for both catering and regular cafeteria services (Derrick Hines, personal communication, September 27, 2012). It is therefore a very busy environment and time for staff to participate in this research was identified to be less likely (Derrick Hines, personal communication, September 27, 2012). As such, it was recommended by Aramark management for this research to be carried out in

the Sherriff Hall Residence dining hall, the second largest foodservice operation at Dalhousie University (Derrick Hines, personal communication, September 27, 2012).

On average, the Sherriff Hall dining hall produces 7,975 meals per week (Brown, 2012). Approximately thirty to forty individuals are employed in the Sherriff Hall kitchen (Debbie Kline, personal communication, October 17, 2012). The kitchen employs both full-time and part-time staff, with mostly part-time staff working on the weekends (Debbie Kline, personal communication, October 17, 2012). Generally, during work hours, there is at least one cook working, two dishwashers, one person bussing tables and one person working at each food station (Debbie Kline, personal communication, October 17, 2012). Stations include the grill, home zone, deli/sandwich station and salad bar. There are employees who have worked in the kitchen for a long time period, some two decades, as well as staff who are relatively new employees, having worked in the dining hall for under a year (Debbie Kline, personal communication, October 17, 2012). Some employees are also Dalhousie University students, many of whom are international students (Derrick Hines, personal communication, September 27, 2012).

3.3 – Study Sample

Experience with processes that impact sustainability in the Sherriff Hall kitchen was the only characteristic required for participation in this study. All Sherriff Hall dining hall employees as well as Aramark management were invited to participate. In addition to Sherriff Hall employees, Aramark management and other stakeholders were included in order to add potentially valuable outside perspective. For example, while not a kitchen employee, an

employee in charge of maintenance may have valuable insight into maintenance issues in the kitchen which result in resource waste. While customers of the dining hall may possess the necessary characteristics for participation and valuable insight, they were excluded due to the volume of this group and time constraints.

Stakeholders that were not employees of the Sherriff Hall dining hall were identified by Rochelle Owen, the Director of the Office of Sustainability. The study attempted to utilize snowball sampling, a nonprobability sampling strategy which involves finding initial participants and then asking initial participants for recommendations of other individuals (Berg, 2009). Participants were asked for recommendations on further participants at the end of interview; however, all participants suggested other individuals who were already asked to participate and therefore no new participants were recruited in this way.

3.4 – Data Collection

3.4.1 – Participant Recruitment

Initially, Debbie Kline, the manager of the Sherriff Hall dining hall, briefly mentioned the study in a staff meeting that occurred in late November of 2012. The researcher then visited Sherriff Hall in early December of 2012 in order to discuss the project with staff while the majority were on lunch together. The researcher visited Sherriff Hall again in early January of 2013 in order to discuss any concerns and provide consent forms to employees. At this time, Debbie Kline identified employees that would be particularly valuable for the researcher to interview due to length of time working in the kitchen or amount of responsibilities assigned; the researcher then approached these employees individually to ask if they would like to

participate. All employees who had stated their interest arranged an interview time convenient to them with the researcher. Other stakeholders were identified by Rochelle Owen, the Director of the Office of Sustainability, and were contacted through e-mail and asked if they would like to participate in an interview.

3.4.2 – Informed Consent

Participants were made aware of the study and had chance to ask questions in advance of choosing whether or not to participate. The researcher provided consent forms to employees in early January of 2013, which they could choose to read on their own time as a number of the employees stated they preferred to be able to take the form home to be able to read it thoroughly. Before beginning the interview, the researcher discussed the research again with participants and encouraged participants to ask any questions they had and provided the participants with time to read and sign the consent form (Section 8.3).

3.4.3 – Guided Tours of the Dining Hall

Guided tours of the dining hall were conducted with three key informants for a better understanding of various aspects of the dining hall including the layout of the dining hall, existing facilities and equipment, as well as employee behaviours. All participants had previously participated in the interview, with two of the guided tours occurring directly following the interview. The participants guided the researcher through the dining hall and commented on various aspects they thought relevant to the topics discussed during the interview and the researcher asked any necessary clarifying questions and took notes on the

dining hall environment. All guided tours took approximately fifteen minutes or less. Data was recorded through notes taken during the tours.

3.4.4 – Interviews

Interviews were completed with both dining hall employees and other stakeholders. Aramark management was consulted and employees were allowed to participate during the work day at a time they identified which would not interrupt their work duties. One participant did not feel that they had time during the work day to participate in the interview and offered to stay after work to complete the interview. All interviews took place in Sherriff Hall in the dining hall away from other staff and public. Interviews with other stakeholders occurred at a time and place on the Dalhousie University campus of their convenience. Interviewees were told that interview may take up to forty-five minutes; there was restriction on time if participants wished for the interviews to take longer. The longest interview was an hour and three minutes and the shortest was fourteen minutes, with the majority taking between thirty minutes to an hour. The shortest interview was purposely cut short due to a clear language barrier as the participant had difficulty understanding the questions and it was clear that the participant felt uncomfortable.

During interviews, participants were asked questions in regards to daily routines and use of resources, perceptions of sustainability, perceived barriers to reducing the use of resources and proper waste diversion as well as their opinions as to the interest of staff in topics related to sustainability and the most effective method to teach and promote sustainability in the kitchen (Table 1 in section 8.4.1). Guidance for initial framework for interview questions was provided by interview questions used in a study of energy conservation

in university laboratories by Kaplowitz et al (2012); questions were edited according to literature review and to the dining hall context. For the most part, data was recorded using an audio recorder; one interview was recorded through notes taken during the interview.

3.5 – Participation and Characteristics of Participants

Twenty individuals participated in this research, including fourteen individuals who work within the dining hall and six other stakeholders. Dining hall employees who participated in the study represented all work areas of the dining hall including: the dining hall (eating area), dish room, kitchen, grill, home zone, deli/sandwich station, salad bar, and management. Some individuals currently work in more than one of these areas or have worked in various areas of the dining hall during the period of their employment. Participants included employees who were working regularly during the weekdays, weekends, as well as individuals who work both. Sixteen of the participants were working in a full-time capacity and four participants were working part-time. Stakeholders included participants from Aramark management, Facilities Management, Environmental Services, and Ancillary Services. Length of time worked in their position, or another similar position, ranged from less than a year to over twenty years. Twelve of the participants were male and eight were female.

Semi-structured interviews were completed with all twenty participants. Guided tours of the dining hall were completed with three participants, all of whom also participated in the interviews, and were identified to have detailed knowledge of all work areas in the dining hall due to the responsibilities associated with their position and/or length employment in the dining hall.

3.6 – Data Coding and Analysis

Data analysis was completed using the NVIVO qualitative analysis software to facilitate the analysis process. All audio files and notes were transcribed into electronic text files and uploaded to the NVIVO qualitative analysis software. Attributes of participants included in analysis were: sex, work position, length of employment in position, and whether they work full-time or part-time and on weekdays, weekends or both.

A priori codes were developed before data analysis based on findings from the literature review (Table 2 in appendix 8.5.1). All transcripts were read and coded; codes developed beforehand were utilized, however, inductive coding was used and a priori codes were altered and new codes were allowed to surface from the data (Denzin & Lincoln, 2005). Coding was then done a second time to ensure consistency of coding throughout the dataset (Table 2 in appendix 8.5.2).

3.7 – Delimitations and Limitations

Time was a limiting factor as all data collection and analysis needed to occur between January and March of 2013. Due to the time constraint, the research was delimited to include only the Sherriff Hall Residence foodservice operation. Ideally, more than one foodservice operation would have been included to have results that could be compared to see the difference between operations and to have a greater population for more general results that could be transferable to other operations. Guided tours of the dining hall were delimited to willing key informants and not all willing participants, again due to time constraints. While the behaviour of customers in the dining hall may impact sustainability in the kitchen and this

group may have valuable insight, the study was delimited to include only stakeholders which interact with the foodservice operations as part of their employment (dining hall employees, university employees, and Aramark management).

Validity of data collected depends on the honesty of participants and comfort in conversing with the researcher. To overcome the former, interviewees were made aware that all responses were to remain anonymous. To overcome the latter, the researcher visited the dining hall a number of occasions before beginning interviews to interact with employees first and the researcher scheduled interviews at a time and place of convenience to the participants. In addition, the researcher had previously resided in the Sherriff Hall Residence and was recognized by a few participants which may have made the participants more comfortable interacting with the researcher. Many participants interrupted the researcher to bring up their own insights, even when some of these were not brought up through the questions, asked for clarification when needed, and made jokes with the researcher, potentially illustrating the level of comfort on the part of the participants during the interview. In addition, there was the possibility that participants would not know how to answer questions during the interview; in order to overcome this, participants were given contact information of the interviewer should they have wished to bring up relevant information at a later time. This option was not utilized by any participants; however, one participant sought out the researcher during a visit to the dining hall to clarify an answer given during their interview.

4.0 – Results

4.1 – Behaviours

4.1.1 – Energy

Participants were asked about their use of equipment and lighting in the dining hall, their thoughts on energy consumption in the dining hall, and their thoughts on potential opportunities for reducing energy consumption and the barriers which exist to this. Responses to these questions identified behaviours in the kitchen which impact energy use.

Participants reported that some pieces of equipment are left on for the majority of the day, such as the sandwich grill, charbroiler, grills, steamer, holding cabinets, food warmers, and some ovens. Some of pieces of equipment, such as some of the ovens, were reported to be left on all day as they are constantly needed for food preparation. Participants discussed that other pieces of equipment, such as grills and fryers, are left on all day even if not in use as customers are able to order food in between the served meals and the equipment needs to be ready to go for that service. While the grill and charbroiler are left on all day for this service, it was reported that only half of these pieces of equipment are left on and the other half turned on as required. Two participants reported that they turn these pieces of equipment to low heat when not in use. Other pieces of equipment, such as the rotisserie and some of the ovens, are only turned on when required and turned off afterwards. Two pieces of equipment, the inductive cookers and dishwasher, were reported to automatically power down in between use. All equipment

was reported to be turned off at the end of the day; one participant mentioned that on rare occasions equipment has been accidentally left on overnight.

In general, many of the participants stated that equipment is turned off when possible. This behaviour is well illustrated by the response of one participant, "...there are two ovens that we have operating all day because we use them all the time for all kinds of different things. But generally... we just turn them on when we need them and we just shut them off after we finish... if we need an additional oven for something then we turn it on and then we shut it off." One participant noted that the equipment they use could be turned off at times when it is not being used nor needed for customer service, yet, currently it is left on during these times. One participant discussed telling other staff to turn off equipment if not being used, "I always tell them, 'If you don't have the oven in use, don't leave it on, just shut it off. Why waste it? It's like at home, you turn on your oven when you're going to do baking ... but after you finish, you shut it off.' I get very annoyed at people who don't think about that, but no, it works out well. People are pretty conscious of that."

Most participants responded that the doors on the walk-in refrigerator and freezer are normally closed. Three participants identified that the freezer door can sometimes be difficult to latch properly which may result in the freezer accidentally being left open if employees are not careful; this was also identified on two of the guided tours. The freezer is found at the back of one of the refrigerators and when left open, can cause problems with products in the refrigerator such as freezing and condensation. One participant said that they notice that the freezer door is left open on a daily basis and close it.

Four of the participants who use cooking equipment stated that it is full when being used; one participant said that sometimes the grill was full when used but not when utilized to make individual customer orders. Participants which elaborated as to why the equipment was usually full when utilized emphasized the volume of food prepared; one responded, "We're dealing with 1600 students here, they ain't got no half-fulls here, it's got to be full or else a lot of people will be going hungry."

Lights in the walk-in refrigerators and freezers are always left on during the day; no participants reported turning them off. Two individuals said that the lights should be left on, one said that it was a rule to leave them, three stated they did not know why they were left on, and one stated that there was no reason why they could not be turned off. Most participants reported that the lights in the walk-in refrigerators and freezers are turned off at night; one said that the lights are always left on. Inquiry as to whether lights in storage areas were generally left on or off when not in use solicited an array of responses: five participants responded that they were always or mostly off; five participants responded that they were always or mostly on; three participants responded that they are sometimes off and sometimes on. Respondents reported that lights are generally turned off at night; some participants mentioned that a few lights are left on either as safety lighting or for use after the dining closes either by janitorial staff, security personnel or by others for an unknown use. Two participants mentioned that sometimes lights in the dining hall are dimmed during the day when it is sunny outside. When asked if there were any rules about turning lights off, eight said that while not necessarily a rule, encouragement of this behaviour had been communicated, one person said that it was a rule, and one said that it does no matter whether lights are left on or turned off.

4.1.2 – Water

Nine participants mentioned seeing taps that were left running; this was also noted on one of the guided tours. One participant said they were unsure whether or not other employees do this but does not leave taps running themselves, one participant stated that taps should be turned off, and two participants stated that taps are not left running. Five of the employees who mentioned seeing taps running said that they or another employee turn taps off when they see this. Three participants mentioned that individuals will sometimes use more water than necessary for a given task. One participant explained how they teach new employees proper practices not to waste water, “When they first come, you have to kind of show them exactly what you do, what's the proper practice. I mean, they have the bucket in sink full of potatoes, they have the water running over it but they have this water running over it... I said, ‘Well, take the bucket, dump it out, refill it, change the water a couple of times.’”

When asked general questions about water consumption in the dining hall and how this could be reduced, four participants referenced the station in the dish room where dirty cups are placed upside-down in dish trays before going in the dishwasher and spouts of water run constantly underneath the cups to prevent a buildup of residue. Three participants noted that the waste associated with this system had been noticed and said it was supposed to have been changed; however, the action was still observed during two of the guided tours and mentioned by two participants that it was occurring at the time of the interviews. Two participants mentioned turning down the water flow while one stated that it ran constantly the entire day. In terms of using the dishwasher, one participant said that he made sure that loads going through the dishwasher were full while another participant said it had previously been noticed

that this type of behaviour was not happening and that dishes were being washed without a full load.

4.1.3 – Materials

When asked about the amount of materials that the dining hall goes through, such as plastics, cardboards and cans, and how the use of these materials could be reduced, many participants brought up the volume of packaging which the food arrives in. Three participants mentioned repurposing the plastic bags which bread products arrive in to store food; one participant's response illustrates this behaviour, "The bags that wraps come in...we use them for all kinds of things...storing things in, that saves on saran wrap and stuff like that and they're good serviceable bags...everybody just comes and gets one when they need it...they're useful for that, things that you would otherwise use a container and saran wrap for, you can put it in the Ziploc bag and it don't cost us anything." Three participants mentioned that they believe some employees use more saran wrap than necessary. One participant mentioned storing food in containers with lids in order to save on using saran wrap. Two participants mentioned using rags for cleaning which cuts down on the amount of paper used; another participant said they use a lot of paper because they prefer to use paper for cleaning rather than rags.

4.1.4 – Food

When asked about food waste in the dining hall and potential for reducing food waste, all participants which directly interact with the kitchen said that the pre-consumer food waste in the dining hall is pretty limited and many cited examples of actions they take to reduce food waste. Eleven participants also discussed the food waste monitoring program recently

emplaced in the dining hall. Three participants discussed cost being the motivator behind cutting down food waste, as illustrated by one participant, “So basically, if you ran an inefficient kitchen and you weren't watching what you cooked and waste a lot of food then all of a sudden that food's costing you a lot more money and then you'll be looking for more money for an increase on food plans, so it's not fair to students and/or other people who are paying at the door.” Clear bins for organic waste have been placed at each station and employees are to weigh their waste at regular intervals in order to eventually see how food waste could be reduced. Two participants said that they believe this has already made employees more aware of the food waste created. One participant was unsure how the information will be utilized and how the dining hall could be able to reduce food waste.

In terms of actions taken to reduce food waste, six participants discussed repurposing leftover food as part of other recipes when possible and bringing food leftovers to the chefs to ask how it could be reused, unless the leftover food was of a minimal amount. One participant mentioned that instead of throwing out the ends of bread loaves used for grilled cheese, the ends are saved and used in recipes such as stuffing. One participant said employees will eat the leftovers from lunch. Five participants also discussed the importance of predicting the required volume of food and not overproducing. Two participants discussed trying to balance preparing enough to have food ready on the line for customers without having leftovers. Three individuals also discussed the importance of not overcooking food. Six participants discussed the importance of diligence when cutting up produce either to only remove the inedible parts or to be able to utilize bruised produce by removing only the spoiled area; participants mentioned that some employees do this while others could be more conscious and one participant

discussed intervening and telling coworkers to be more diligent. One participant said that the dining hall sometimes receives food from suppliers that has already gone bad and that it then is wasted; another participant stated that employees are expected to check food obtained from suppliers at the door and reject any spoiled foods.

4.1.5 – Waste Sorting

All participants stated that waste is normally sorted properly. Some participants elaborated to explain proper waste diversion; two stated that tinfoil belongs in the garbage and that saran wrap should be placed in the garbage. For example, one participant stated, “I believe the paper you can recycle, but the plastic always goes in the garbage, everybody knows that.” Two participants stated that plastic packaging and saran wrap are put in the garbage yet could be recycled while one mentioned that they did put it in the recycling. A participant mentioned that sometimes small containers are placed in the garbage rather than recycling as they would have to be washed first; one participant said this was the same reason for putting plastic packaging and saran wrap in the garbage. Four participants mentioned seeing improper items in the compost, such as saran wrap and silverware. Four participants also mentioned seeing food waste in the garbage. During the kitchen tours, it was noted that a large amount of paper napkins were in the garbage rather than in the compost. This also surfaced in the interviews: two participants said that napkins and paper towels go in the garbage and one participant said that while they know that the napkins are compostable, there is an employee who does not believe that this is the case and will take them out of the compost to put them in the garbage. Three participants noted that if waste is not properly sorted than someone else would

intervene, however, one participant stated that no one would say anything if you did not sort waste properly.

4.1.6 – Maintenance

When asked about equipment maintenance and what employees do when they encounter issues with equipment or water leaks, all participants stated that employees report any issues to management or the head chef, who then contacts the appropriate individual to fix the problem. One participant mentioned that staff may assume that the problem has already been noticed and not report it or be discouraged from reporting problems if there was a delay in fixing previously reported issues. Another individual mentioned employees not dealing with leaks while waiting for the problem to get fixed and allowing water to run, rather than shutting the water off. One participant discussed difficulty with fixing issues that occur on the weekend; the participant gave the example of an incident when a pipe was leaking, however, no one was available to deal with it until Monday. When asked about maintenance, all participants discussed maintenance that occurs when there is a problem, either with water leaks or with equipment. Four participants discussed regular maintenance of the walk-in freezer and refrigerators. When asked if they thought maintenance needs to occur more often, five participants mentioned the need for new equipment and how this will reduce the amount of maintenance needed on equipment; this belief is exemplified by the comment of one participant, “We're looking possibly to get some new pieces of equipment in the next couple of months so as far as maintenance, we won't be needing any hopefully.” One participant discussed the need for new taps as many are leaking, however, that maintenance is too busy and it is not a pressing matter.

One participant expressed their belief that preventative maintenance would be done by kitchen management and employees on a regular basis. However, another participant expressed that equipment does not undergo preventative maintenance and their belief that it should, "I find equipment doesn't undergo maintenance anytime, really, I mean I think they should have preventative maintenance but they don't. It was never an issue that was ever brought up to me. I worked in another place that we had equipment that was maintained all the time... It's equipment that you need and you use every day that goes through a lot of wear and tear... I think it would avoid a lot of things like unexpected breakdowns." Another participant discussed the costs associated with preventative maintenance, "If we're living in a perfect world, you know, but we're not living in a perfect world... Now everybody looks at economics, if it don't break, why try to break it?... That's the reality of the real world. I can say, 'Well, okay, call the repair man just to see if this thing's going to break down next week.' Nobody does that." This sentiment was echoed by another participant who explained, "Sometimes it's very difficult to look at the big picture and see how much money you'd be saving down the road... in downtime and repair costs and efficiency... if doing proper maintenance to a motor means that motor's going to last year ten years instead of five years, well that's where you save but you don't always see it that way, you just see I'm spending all this money."

4.2 – Barriers

4.2.1 – Motivation

Many participants discussed care or interest as being a factor in whether or not they would act in a sustainable manner. Six individuals discussed the responsibility of individuals to make their own choices and ensure that they turn lights and equipment off when not needed, turn off taps, try to reduce food waste, and properly sort waste. Two participants discussed lack of time available for monitoring employee behaviour, leaving the responsibility for sustainable behaviour on the individual, and explained that this results in a variety of behaviours, depending on the individual level of concern. Five participants explicitly expressed their own personal interest or concern with environmental issues while two others discussed ideas about how conserve resources at length, suggesting an interest. Two participants discussed the insignificance of increasing sustainability in the dining hall if other operations and individuals are not sustainable. Three individuals also discussed the relative efficiency of their operations in comparison to individual household food preparation.

Cost was often discussed a motivator either towards sustainable behaviour or a barrier to it. Two participants discussed cost saving as a motivator to upgrade to more efficient equipment. Some also discussed the upfront cost of upgrades and maintenance as a barrier, even though it would be more cost effective in the long run. Three participants suggested that the dining hall would take more action to be efficient if responsible for a higher percentage of the utilities and waste service bills. Three also discussed cost savings as the motivator behind the recent monitoring of food waste to look for areas of improvements. Two participants

suggested that employees are not as concerned about the consumption of resources at work as they would be at home as they are not the ones responsible for the bill; on the other hand, two participants mentioned that they are accustomed to behaviour which saves resources as they do the same at home in order to save money. One participant discussed the need for Dalhousie University to make sustainability more of a priority in order to force Aramark into making operational changes to become more efficient; another discussed the need for Aramark to make it a priority, similar to the level of priority given to health and safety.

4.2.2 - Operational Constraints

Time constraints were discussed by participants as a barrier to being able to reduce resource use and properly sort waste. When asked about introducing discussions of sustainability to the dining hall, one participant stated that there would be “very unhappy people because when you are running around in the kitchen trying to get everything ready and you have to tip toe and turn off this light, I remember this light goes off, people get frustrated...” Time was mentioned as constraint to turning off equipment by six participants as there may not be enough time to allow it to heat up and be ready when needed. One participant noted that employees may tend to mix up the sorting of waste when rushed. Three participants mentioned that food waste may be higher at times when employees are in a rush and lack time to be diligent. In regards to saving water, three participants discussed multi-tasking and then forgetting that they had left the tap running; one participant mentioned having a sink flood because they forgot the tap was running.

Customer service was often mentioned as a barrier to being able to reduce resources use in the kitchen. When discussing energy consumption and the potential for reduction in energy use, eight participants discussed the need to constantly be ready to serve customers as the dining hall is open for students in between meal times and they are able to custom order individually. The result was described by one participant, "We have machinery that runs all day regardless if we're busy all day, but you can't help because you're offering a service so you have to be open and ready to go... You could probably turn it down at parts of the day but then they would have to wait til the thing came up again if you need it and of course, we are offering food service all day long." Four participants further explained that customers are in a hurry and that they could not make them wait for equipment to be turned back on to prepare their food.

Many participants discussed the importance of health and safety at some point during the interview. Six participants discussed health and safety or cleanliness in the work environment as a barrier to being able to reduce the use of water in the dining hall. When asked about waste of resources one participant responded, "Waste in water. Everything has to be washed, washed and washed and washed for all the bacteria that's in the world today and it costs a lot of water." Another health and safety concern which arose was the ability to turn off lights with full hands. When asked as to why lights are continuously left on the walk-in refrigerators and freezer, two participants stated that their hands are often full when entering or leaving and that having to turn on and off the light may create a hazard.

4.2.3 - Knowledge

A barrier to sustainability in the dining is a lack of knowledge on equipment or reasoning behind current practices. One participant discussed how new equipment is being chosen depending on factors which allow it to be used more efficiently such as a quick heat up time, however, it is the responsibility of the dining hall to utilize these aspects of the equipment appropriately in order to be efficient and that supervisors of the dining halls are to receive information on these features and pass that information onto employees. A participant expressed the ability to make improvements if proper use of efficient equipment occurred, “if the equipment is efficient enough and the staff are familiar with knowing how soon they have to turn it on, then we can make small changes on that and make small improvements there.” Some gaps in knowledge on equipment became apparent during the interviews. One participant expressed that they were unaware as to why lights were not turned off in the walk-in refrigerator and suggested that, “Because always there are people in and out. If you're going to switch back and forth, back and forth, back and forth, it's no good. You broke the handle or the light is turned out because you're on and off, on and off all the time. Maybe that's the reason. I don't know...” Two other participants stated that they believed that the lights inside of the refrigerator and freezer turned off automatically when they left and therefore did not turn it off themselves. One participant expressed that they were unsure as to what behaviour would actually be more energy efficient, “You can turn things off when they're not being used but sometimes it's like the ovens and things, since they're used so often, it doesn't seem worthwhile to shut them off and then heat them up again. So it's hard to know if that would be helpful or not.” In addition, six participants stated that they felt that time was a barrier to being

able turn off equipment; two of them also stated that they did not know how long it would take for equipment to heat up again once turned off and therefore were unsure if there was enough time to turn on equipment and for it to be ready again when required. One participant that stated that equipment was left on when it didn't necessarily need to be said that they were taught to leave it on by the previous employee in their position and they did not know the reasoning behind it because the equipment could be turned off.

Some participants discussed the importance of experience or knowledge of proper food preparation techniques in being able to reduce food waste. Five participants mentioned that a barrier to reducing food waste could be that some employees do not know how to properly cut up produce in order to avoid wastage. Participants also noted that knowledge on what to do with produce that may be bruised or food that is leftover is also important, as well as having experience in food preparation in order to prepare the appropriate amount of food and to avoid overcooking foods. One participant gave an example of this, "people in general may find a little spot on a banana or an orange or a grape fruit or an apple, and the first thing they do, they throw it in the garbage, but you could cut out that spot and recreate something with that orange or bananas or apples."

Five participants mentioned that waste may not be properly sorted by new employees and three participants stated that there could be room for improvement in training. All employees stated that everyone, including themselves, had a good understanding of proper waste sorting, however, it was apparent that there is actually some confusion over proper sorting (Section 4.1.5). One participant mentioned there may be gaps in training on waste sorting for new employees. Interestingly, five participants mentioned that while the dining hall

properly sorts waste, they were unsure as to what happens with the waste afterwards and some expressed skepticism as to whether it actually ends up being recycled. For example, one participant stated, "I'll say we are about ninety percent recycled here but what happens when it leaves here to be recycled? We don't have any proof that everything that we have in recycling bin is being recycled."

It was also expressed by some participants that employees may not understand the reasoning behind programs or operational changes directed at increasing sustainability, which may create a barrier to the implementation of such behaviour. For example, one participant stated that, "At one point we tried to leave the lights off in the storage room, maybe for Earth Hour or something, but it didn't last. People who don't know or understand would go around and turn lights back on." Two participants mentioned that employees may not have a full understanding of the new food waste monitoring program implemented and this may result in employees feeling as though they are being penalized and placing food waste in the garbage to avoid having a high weight of food waste.

4.2.4 - Resistance to Change

Participants discussed the difficulty in changing dining hall operations as a barrier to implementing changes towards sustainability. Two participants discussed employees feeling as though they are being penalized when changes arise and how sometimes employees can get defensive about changes. One participant discussed the challenge of changing the behaviour of employees who have been working in the industry for a long time. Another participant discussed this perception but in reality, how employees are able to adapt, "You have to be open to it because sometimes things do take a little more time, any routine that you change takes a

little more time when you first do it, but it becomes routine and you wonder why you ever worried about it, this is just something that you do and it usually doesn't take much more time in the long run once you become accustomed to it." Two participants discussed the complaints that arose when the dining halls first removed trays, both from staff and from customers who felt that they were being inconvenienced by having to get up for food multiple times, and how now there is no longer any issue with not having trays.

4.2.5 - Facilities and Equipment

All participants mentioned the old age of the equipment at some point during the interview. Eight participants discussed the need for new equipment in order to be more energy efficient and expressed that the inefficient equipment is probably what wastes the most energy in the kitchen. Five participants discussed the old baker's ovens which were left on practically all the time as they took a lot of time to heat up; they have recently been replaced with four new ovens which heat up rather quickly and are able to be turned off when not in use. Six participants also discussed the increased energy and water efficiency achieved with the new dishwasher which was replaced in the fall of 2012.

One participant expressed fear that equipment would not turn back on again if turned off, "Some of us are scared that if we turn it off, we're gonna need it... the ovens that we have, over fifty years old, you don't take a chance and turn it off until when you finish at night because half of the time, they ain't coming back on." A similar response was given in discussion about turning lights off in the walk-in refrigerators and freezer, "You got to understand that this is an old operation, sometimes you turn off the light and it won't turn back on." Some participants noted that some equipment problems make conserving energy or water more

challenging. For example, the difficult latch on the freezer door is a barrier to being able to properly close the freezer door (Section 4.1.1). Similarly, one participant discussed how having spray heads in the dish room with options for changing the type of flow could reduce the amount of water consumed. Another participant stated that many taps leak and need to be fixed.

Lighting controls were identified as barrier to being able to turn off lights when not in use; one participant mentioned that previously all of the lighting in the dining room was able to either be turned off or on, however, now they are able to dim the lights if it is sunny outside as well as turn only sections of the lighting on at a time. The same participant as well as one other discussed how lighting in the kitchen is controlled by a few switches and so they are unable to switch off the lights in some areas even if they are not in use.

All participants stated that the necessary facilities are in place for proper waste sorting, however, two individuals thought that it could be perhaps be made clearer through increased labelling. Five participants noted that the introduction of small containers for food waste as part of the new food waste weighing system has facilitated the proper sorting of organic waste. This is exemplified by the quote of one participant, "Suppose I'm not cutting vegetables... and it happens that I have a piece of zucchini in my hands. I don't go all the way to the green bin to put it. But now, because we have the buckets at each station, I don't have to go to the green bin... that will help a lot. It's right next to you so you have no reason to waste now or put them in the garbage." One participant mentioned that the dish room does not have a compost bin and therefore sometimes employees will throw food waste into the garbage.

4.2.6 - External Factors

During the interviews, many participants discussed factors which are beyond their control limiting their ability to reduce resource waste, such as the packaging which food comes, the behaviour of customers, and the unpredictable volume of customers.

When discussing the potential to reduce the amount of materials utilized in dining hall operations, five participants discussed the volume of food that the kitchen goes through and the packaging this food arrives to the dining hall in. Three participants stated that most products come in very large containers and minimal packaging; however, three participants stated that some of the goods arrive in an unnecessary amount of packaging, such as cucumbers or heads of lettuce wrapped in plastic. Four stated that there is not much that could be done to reduce the amount the packaging; one participant mentioned that this would be under the control of Aramark and could not be changed by individual dining halls or Dalhousie University.

In discussing the ability to reduce food waste, seven participants referenced the uncertainty with the amount of food to produce; this was discussed both in terms of the food produced in the kitchen for meals as well as for the self-serve line. Behaviour of customers was also often discussed as being a barrier to reducing food waste. One employee mentioned that if there is an imperfection on food, such as a scratch on a boiled egg, customers will not eat them and that some employees will attempt to repurpose this food while others will not. Two employees also mentioned that costumers will ask for something to be made and then never return to pick up their order. Six participants discussed the leftovers from customers that go to waste. Two participants felt that food waste was more significant on the part of the customers

rather than employees, as one illustrated, “They tend to take a lot of stuff that they cannot eat and then they throw it... so the waste control should be from the students rather than the kitchen employees”.

4.3 – Education, Enforcement and Encouragement

Employees were asked about past training or education on resource conservation or proper waste sorting at work as well as interest in receiving training. Three participants said they had received some sort of training on water or energy conservation; six said they would be interested receiving training and one said they did not need it. All participants mentioned having some sort of education on sorting waste; five said they would be interested in training and three said they were already aware and did not need further training. When asked about their interest in learning about environmental issues, three stated they are personally interested, three stated that, generally, employees are interested, and four stated that the part-time or student staff would likely be interested. When asked about their interest in learning about issues of sustainability specifically related to kitchen operations, two said they are not interested, four said, generally, employees are interested, one said students would be interested and one said that employees probably do not care but would be open to learning; one participant commented, “I think it should be presented whether people are interested or not.”

When discussing the potential for training and education, four participants noted that the dining halls currently receive a lot of training on health and safety and therefore it may be difficult to implement any additional training. Two participants suggested that topics related to

sustainability could be integrated into the health and safety talks as this is a time when it is already mandatory for employees to get together. Eight participants suggested it would be best to have some sort of group training or meetings; one of these participants suggested that it would be important to be able to talk and share ideas. Five others suggested that individual training and demonstration is more effective. Four participants stated posters and papers are usually overlooked and ignored, one said they would be good if new and attractive, and four said they posters are good for convenient reminders.

Eight participants discussed the need for daily enforcement and reminders from management. The need for rules and enforcement of rules was discussed by a two participants. As one participant suggested, "There should be... someone who's capable to make sure every employee follows the rules and try to maintain things, like to use less energy and all those things... everyone should follow them seriously... they should make a strict decision or strict rule... in that way every employee will be serious and make sure how they use energy and how they can reduce the waste." The important role that management plays in changing employee behaviour was illustrated by a participant, "So if everybody's getting trained, that's part one and then to ensure that everyone is still doing it. So, we can have all the facilities in place to do proper waste streaming and make sure that when it leaves the building it goes out but if a truckload stuff goes out to the dump and gets rejected because somebody's been putting plastic in it when they're not supposed to or vice versa, then that goes back to the on the job. It's great if everybody's on board when they get trained but they have to be supervised and maintain the behaviour throughout. So I think that's the key role for kitchen management is to

make sure that they're doing everything they can and that they're reporting to us the things that need to be fixed before it goes too far. “

In addition to increased training and enforcement, participants discussed the need for positive reinforcement and encouragement. Two participants mentioned utilizing water meters in order to benchmark and communicate progress in water use reduction. Eight participants also expressed their interest sharing opinions and ideas on how to increase sustainability in the kitchen; the interest of some was apparent as they provided specific examples as to how the kitchen could improve the sustainability of its operation.

5.0 – Discussion

The interviews discussed the behaviours of employees which impact the sustainability of dining hall operations, barriers to more sustainable behaviour, opportunities for improvement, as well as the possibility for training and education. It was found that there are employee behaviours which contribute resource use and improper waste sorting, however, there are also actions taken by employees to increase the sustainability of dining hall operations. It was also found that there are factors which act as barriers to sustainable employee behaviour. In addition, some employees are interested learning more about sustainability, both in terms of greater environmental issues as well as sustainability relevant to dining hall operations. This research identified employee knowledge gaps and provides insight into the opinions of employees as to the best way to increase the sustainable behaviour in the dining hall. This study provides a base of knowledge on the impact of employee behaviour on the sustainability of dining hall operations at Sherriff Hall and identifies ways forward to increase the

sustainability of operations; these findings may be insightful for various foodservice operations within Dalhousie University as well as foodservice operations elsewhere.

5.1 – Behaviours

It was noted that a variety of behaviours exist which impact the sustainability of dining hall operations. Variation in kitchen behaviour has previously been noted by Batty et al. (1998), who documented the impact of differences in equipment use on energy consumption. In this research it was noted that while, in general, equipment is turned off when not required for ongoing service or meal preparation, this is not always the case. Similar inconsistencies in behaviour were noted in terms of turning lights off; lights in the walk-in refrigerator and freezer are always left on during the day while lights in storage rooms are sometimes turned off and sometimes not. In terms of water use, some employees leave taps running and may use more than necessary when completing certain tasks, while others are diligent about not doing this.

A recent audit of the Sherriff Hall kitchen food waste characterization found that pre-consumer food loss from the kitchen accounts for 31% of avoidable food losses in the dining hall (Brown, 2012). Despite this, there seems to be the belief that there is little pre-consumer food waste and employees reported being careful in minimizing waste during food preparation and making effort to repurpose foods. Brown (2012) suggested that there is little communication between various stations to repurpose leftover foods; however, six participants discussed doing this. Some participants did note that not all employees are diligent about this or possess the necessary food preparation skills. It was suggested by participants that the new waste monitoring program could be increasing employee awareness of food waste, which may

account for the employee perception of little waste being created by their work despite the findings of Brown (2012), which suggest otherwise.

In terms of maintenance, it was made evident that the dining hall currently thinks of maintenance in terms of breakdowns, not preventative maintenance. The idea surfaced that new equipment will not require maintenance, or the same level maintenance, as old equipment. Regular maintenance should be considered, even with new equipment, as it can result in substantial reductions in energy use (Efficiency Partnership, 2006; Natural Resources Canada, 2012; United States Environmental Protection Agency, 2010).

5.2 – Barriers

It has previously been noted by Kaplowitz et al. (2012) that although concern for resource conservation may exist, barriers or perceived barriers may prevent sustainable behaviours from occurring (Kaplowitz et al., 2012). In this research, barriers were identified, including: motivation, operational constraints, knowledge gaps, resistance to change, equipment and facilities, and factors beyond employee control.

Care or interest was identified as a key factor in whether or not employees would act in a sustainable manner. Many participants either discussed their personal concern for sustainability or discussed ways in which they actively tried to reduce resources waste; many, however, mentioned that other employees may not be interested. It was identified that employees and foodservice operations may not be concerned with increasing the water and energy efficiency of operations or increasing waste diversion as they do not pay for the entirety

of utility and waste bills; these bills are shared with the university. It was also made clear that the potential for cost savings is currently driving the new program to reduce food waste.

Operational constraints of working in a busy environment focused on customer service were identified as key barriers to reducing energy consumption. It was noted that some pieces of equipment are left on all day either for ongoing use for meal preparation or for customer service. While it was noted that equipment gets turned off when possible, the dining hall is open for service in between meal times and some equipment, such as the grill, charbroiler and fryer, have to remain on for this service even though there may be few customers during this period. Concerns were reported as to whether or not equipment would be ready when needed if turned off and that customers would not be able to wait. This concern over equipment being ready when needed if turned off has been reported in other studies (Batty et al., 1988; Kaplowitz et al., 2012; Revell & Blackburn, 2007). In addition, most equipment is utilized at full capacity for cooking, unless when making individual customer orders. Participants felt there is a challenge to cook the appropriate amount of food so as to not run short but also not overproduce. The time constraint of working in a busy environment was identified to cause improperly sorted waste, higher food waste when lacking time for diligence, and forgetting that the tap is running when multitasking. The amount of time required for proper waste sorting has also been cited as a barrier in restaurants (Revell & Blackburn, 2007). This study also identified health and safety concerns with increasing the sustainability of operations; safety concerns were similarly noted in university laboratories by Kaplowitz et al. (2012).

Knowledge gaps were identified in a number of areas. Some participants discussed not being clear on how long it takes for equipment to heat up if turned off and whether or not

turning equipment off for a short period of time would be energy efficient; these knowledge gaps resulted in employees being unsure whether or not to turn equipment off. The need for employees at Sherriff Hall to be trained on proper equipment use and energy efficient use has been noted previously in a study which audited energy and water consumption in commercial kitchens at Dalhousie University (Khan, 2012). Lack of knowledge on the energy efficient use of equipment has previously been noted as a barrier to such behaviours (Batty et al., 1988; Kaplowitz et al., 2012). Some participants reported being unsure why the lights in the refrigerator and freezer are left on and speculated that the lights were automatic, that turning lights on and off often would damage the refrigerator and freezer, or that it was a safety hazard to have them off. Many participants reported knowledge gaps in effective water use and food preparation techniques to minimize waste. It was also clear that although all participants believed they were aware of proper waste sorting, knowledge gaps and uncertainties exist which lead to improper waste sorting.

Resistance to change was discussed in the interviews as being a barrier to increasing the sustainability of operations. When new programs or procedures are implemented, employees may get defensive if they think they are being penalized or they may not be compliant if the reasons behind changes are not properly communicated. The dish room provides an example of the resistance to change in behaviours. It was previously recommended that the dish room stop utilizing the spouts of water under the dish rack for cups and instead utilize the spray hose to rinse down the area periodically. Despite this, the situation was not changed at the time of research and was brought up by participants during interviews and guided tours. Return to previous behavioural patterns in the kitchen after an initial period of change was also noted by

Batty et al. (1988). This suggests that any changes need to be clearly communicated and constantly reminded to employees. One participant discussed realizing that their equipment was left on when it did not need to be, yet, has not changed this as that was the procedure they were trained on. The unquestioning of operational procedures, even if they are noticeably inefficient, was also noted by Batty et al. (1988). Similarly, participants which otherwise seemed concerned about resource conservation, were unaware as to why the lights in the walk-in refrigerator or freezers are always left on.

Facilities and equipment were often discussed as barriers to changing behaviour. Old equipment was cited as a barrier to being able to reduce energy consumption as it takes a long time to heat up and employees fear turning off the equipment and not being able to turn it back on. Problems with facilities, such as the difficult to close freezer door or leaking taps, were said to make resource efficient behaviour more challenging. Inconveniently located waste bins and lack of appropriate signage were said to act as barriers to proper sorting of waste; inconvenient facilities have been reported in other kitchens as a barrier to proper sorting (Revell & Blackburn, 2007). In addition, zoned lighting makes employees unable to control some lights individually and prevents those lights from being turned off when not required.

In discussing ways in which the dining hall could increase the sustainability of operations, many participants discussed factors beyond their control which limit their ability to reduce resource waste. The volume of packaging which food comes in was discussed as being beyond the control of the university foodservice operations, and the responsibility of Aramark. Volume of food waste from customers and unpredictable volume of customers were discussed as impacting the amount of food waste produced but being beyond the control of employees.

5.3 – Behaviour Change Programs

This research identified behaviours which contribute to resources waste and improper waste diversion that may occur due to a variety of barriers, some of which could be overcome through education, enforcement, and encouragement. Lack of motivation, knowledge, and resistance to change could be dealt with through increased communication with employees.

It was identified that there are knowledge gaps on proper waste sorting, efficient equipment use, and food preparation techniques such as efficient cutting. In addition, participants expressed their interest in learning more about environmental issues as well as sustainability in relevance to kitchen operations; if these topics were communicated with employees there may be an increase in interest and sustainable behaviours. Numerous participants either cited times when they had previously implemented an idea to reduce resource use or discussed their ideas for continuing to reduce resource use; therefore it may be of value to open up a dialogue for employee input as to the way forward. The value of employee input in programs focused on increasing resource conservation has been previously noted (United States Environmental Protection Agency, 2007).

There was an array of responses when asked which type of education employees find most effective; this may indicate that more than one form of education is required. It may be necessary to have group meetings for training on new topic, to communicate new programs, and gain input from employees, in addition to on the job training and clear demonstration of what is expected. As the ability to get employees together for training is limited, group level discussions and trainings could be tagged on to health and safety meetings which currently

happen on a regular basis. In addition, daily reminders and encouragement may be necessary so that behavioural changes actually occur and remain; this should come through information posted in an attractive manner as well as communication from management.

Confusion over current rules and procedures was identified, such as when lighting and equipment should be turned off. In addition, it was identified that although behaviour may be encouraged, it is not necessarily enforced. As such, clear rules and expectations need to be put in place as to what behaviour is expected. The recommendation that kitchens need to review operational procedures in order to promote sustainable behaviours has been made elsewhere (Baldwin et al., 2011; Batty et al., 1988; Batty & Probert, 1989). It was also identified that employees want more enforcement and reminders from management. The entrenchment of behaviours and resistance to change, as discussed previously, highlights the need for consistent monitoring and enforcement. In addition to enforcement, it is important that management leads the change by demonstrating the behaviour themselves (Batty & Probert, 1989; North Carolina Department of Environment and Natural Resources et al., 2009; United States Environmental Protection Agency, 2007).

It has been recommended that programs aimed to create sustainable behaviour change in the workplace should make sure to communicate reasons for change (Batty & Probert, 1989; North Carolina Department of Environment and Natural Resources et al., 2009; United States Environmental Protection Agency, 2007); the need for this has been clearly identified in this research with the noted non-compliance to implemented programs due to lack of understanding. In addition, it was identified that some employees want to monitor water use in order to benchmark and encouragement improvement; this has also been recognized an

important aspect of resource conservation programs (Batty & Probert, 1989; North Carolina Department of Environment and Natural Resources et al., 2009; United States Environmental Protection Agency, 2007).

When looking to upgrades in equipment and lighting, automatic features should be considered as it removes the potential for employees forgetting to turn things off and would alleviate safety concerns with lighting not being on when needed. The benefit of automatic features to reducing energy use has also been noted by Batty et al. (1988).

6.0 – Conclusion

This study explored employee behaviours which impact the sustainability of dining hall operations at the Sherriff Hall Residence dining hall at Dalhousie University. This research is important due to the recognized resource use rates of foodservice operations (Energy Information Administration, 2003; Gleick et al., 2003; United States Environmental Protection Agency, 2010). As identified in this research, foodservice operations, such as dining halls, utilize receive a great amount of inputs and therefore are important areas to look to improve waste diversion. Within the literature that exists on increasing the sustainability of foodservice operations, little research exists on employee behaviour, despite the fact that changing employee behaviour has been recommended as a strategy for increasing resource efficiency of foodservice operations (Efficiency Partnership, 2006; United States Environmental Protection Agency, 2010).

This research focused on the behaviour dining hall employees in regards to resource waste and waste diversion at the Sherriff Hall Residence at Dalhousie University in order to be

able to suggest programs that could be implemented in order to increase the sustainability of dining hall operations. The study sought to answer:

In the dining hall located in the Sherriff Hall Residence at Dalhousie University:

- 1) What behaviors of dining hall employees impact sustainability objectives?;
- 2) What are the barriers that dining hall employees face in meeting sustainability objectives?;
- 3) What changes or programs could be implemented with the objective of altering employee behaviour in order to reduce resource waste and enhance waste diversion in the dining hall?

This research was completed through semi-structured interviews with twenty participants, including both employees and stakeholders. This included fourteen dining hall employees and six stakeholders from Aramark management, Facilities Management, Environmental Services, and Ancillary Services. In addition, guided tours of the dining hall were completed with three key participants, all of whom were employees of the dining hall.

This study identified a great variety in the behaviours which impact the sustainability of dining hall operations. It documented both behaviours which contribute to resources waste and improper waste diversion as well as behaviours which reduce these factors. Employees reported taking their own initiative to increase the sustainability of operations as well as intervene when they observed other employees contribute to resource waste. Behaviours which contribute to resource waste, such as leaving equipment on when not required, were also identified. Some of these behaviours may exist due to the identified barriers to sustainable behaviour.

Barriers to implementing sustainable behaviours in the dining hall were identified, including: motivation, time, customer service, health and safety, knowledge, resistance to

change, equipment and facilities, as well as external factors that are beyond employee control. The need to provide quick and constant service to customers was identified as a major barrier to being able to reduce energy use. Time was identified as a barrier to energy, water and food use reduction as well as waste sorting. Knowledge was also identified as a major to all aspects of increasing the sustainability of operations.

Through the identification of behaviours and barriers discussed above, as well as opportunities for improvement, recommendations aimed at behavioural changes to increase the sustainability of dining hall operations were made. Knowledge gaps should be addressed through training and education, both within a group setting as well as one on one, with demonstration whenever possible. Rules and procedures need to be established and clearly communicated with employees, both in terms of what is expected as well as the reasoning behind any changes. In addition, daily reminders should be given through posters and management, along with enforcement where required. If possible, resource use and waste diversion should be monitored and benchmarks communicated with employees. When looking to upgrades in equipment and lighting, automatic features should be considered. In addition, the dining hall should reconsider maintenance to include preventative maintenance.

Further research is needed in the area of behaviour and its impact on the sustainability of foodservice operations. This research only looked at one dining hall; further research should explore this topic in other foodservice settings to see if there are similarities or differences in findings. Further research could also observe behaviours which impact the sustainability of operations, rather than relying on participants to report behaviours, as differences could be discovered. While this research explored what employee behaviours impact sustainability, it did

not quantify the impact of those behaviours; research could quantify the impact of various behaviours on water and energy consumption. In addition, while the study identified what participants believe to be the most effective way to train employees, research could be done to evaluate the effectiveness of any implemented programs.

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8.0 – Appendices

8.1 – Ethics Review Application

UNDERGRADUATE STUDENT SUBMISSION

RESEARCH ETHICS BOARDS
DALHOUSIE UNIVERSITY

This form should be completed using the guidance document http://researchservices.dal.ca/research_7776.html

SECTION 1. ADMINISTRATIVE INFORMATION

[File No: _____]
Office Use

Indicate the Research Ethics Board to review this research:

Health Sciences OR Social Sciences and Humanities

Project Title: Employee Behaviour and Sustainability in the Kitchens at Dalhousie University

1.1 Student researcher: Brittany Maguire

Department	Environmental Science		
Degree program	Combined Honours in Environmental Science and International Development Studies		
Email	brittany.maguire@dal.ca	Phone	(902) 809-1700

I agree to conduct this research following the principles of the Tri-Council Policy Statement *Ethical Conduct for Research Involving Humans* and consistent with the University *Policy on the Ethical Conduct of Research Involving Humans*.

Student signature:

1.2 Supervisor Name: Rochelle Owen

Department	Office of Sustainability		
Email	rjowen@dal.ca	Phone	(902) 494-7448

I have reviewed the attached ethics application prior to its submission for ethics review, including the scientific/scholarly methods of the research project which is described in the ethics application, and believe it is sound and appropriate. I will ensure this research will be conducted following the principles of the Tri-Council Policy Statement *Ethical Conduct for Research Involving Humans* and consistent with the University *Policy on the Ethical Conduct of Research Involving Humans*.

Supervisor signature:

1.3 Department/unit ethics review (if applicable). Minimal risk research only.

This submission has been reviewed and approved by the research ethics committee.

Authorizing name and signature:

Date of approval:

2.1 LAY SUMMARY [500 words]

In lay language, briefly describe the rationale, purpose, study population and methods.

Rationale: Kitchen operations utilize a great amount of resources (energy, water, food, and products). Efficient operations will impact the utilization rates of these resources. As such, Dalhousie University is interested in reducing ecological impacts, improving life-cycle costs, and engaging kitchen employees. As operators of kitchen equipment and some building systems, dining hall employees impact resource use. In addition, dining hall employees have control of waste flow through cooking practices and waste diversion. The behaviour of dining hall employees in achieving sustainability goals remains largely unstudied. In order to increase sustainability, employee behaviors, as well as barriers to resource efficiency and reduction, should be identified.

Purpose: The purpose of this research is to investigate the impact of dining hall employees behaviour on energy and water efficiency conservation and waste diversion. The study will aim to identify the perceptions of dining hall employees in regards to sustainable behaviour in the kitchen. Sustainability behavioural programs that could be implemented in Dalhousie kitchens will be explored.

Study population: This research will be done as a case study of the Sherriff Hall kitchen. This was determined as it is the second largest kitchen on campus and provides a larger population sample for the study than smaller kitchens. Research will not be conducted in the largest kitchen, Howe Hall, as that kitchen provides catering as well as regular cafeteria service and is a very busy environment. Due to this, it was recommended by Aramark staff that research be undertaken at Sherriff Hall as more time will be available for interaction with staff. Qualitative research methods will be used to gather data from staff (all positions) during weekday and weekend shifts.

2.2 RESEARCH QUESTION

State the hypotheses, the research questions or research objectives.

Research Questions:

Sustainability objectives would include items such as saving electricity, heat, and water and diverting waste from the landfill.

- 1) What kitchen behaviours impact sustainability objectives?; *prompt – impact can be positive or negative*
- 2) What are the barriers that dining hall employees face in meeting sustainability objectives?;
- 3) What changes or programs could be implemented in order to save energy waste, water waste, food waste and enhance waste diversion in the kitchen?

2.3 RECRUITMENT

2.3.1 Describe how many participants are needed and how this was determined.

The study will focus on all staff of one of the kitchens at Dalhousie, Sherriff Hall. Sherriff Hall employs roughly 20-30 full and part-time staff. Due to the nature of the research, the more participants from this specific location as well as other stakeholders, the more concrete the understandings and results will be. Aramark management will provide time during the work day for staff to participate. It is anticipated that over half of the staff at Sherriff Hall will be engaged.

2.3.2 Describe recruitment plans and append recruitment instruments. Describe who will be doing the recruitment and what actions they will take, including any screening procedures. Describe any inclusion / exclusion criteria.

Inclusion/ exclusion criteria: Any dining hall employees or stakeholders (for example: managers or maintenance staff) who are willing to participate are welcome.

Recruitment: Debbie Kline, the manager of the Sherriff Hall kitchen, will mention the study in a staff meeting. Details on the study will be provided to her (see Appendix 3.2.1). The student researcher, Brittany Maguire, will visit the Sherriff Hall kitchen in early December in order to discuss the project with staff during a meeting. Participants will be able to contemplate their participation over the holidays. The student researcher will visit Sherriff Hall in early January, 2013 in order to discuss any concerns and have participants read and sign consent forms. Other stakeholders, who are not employees or managers of the kitchen, will be determined based on recommendations from dining hall employees and Aramark management (snowball sampling). They will be contacted through e-mail and asked if they would like to participate in an interview (see Appendix 3.2.2). If so, a meeting will be coordinated to discuss the study and gain consent before conducting the interview.

2.4 METHODS AND ANALYSIS

2.4.1 Discuss where the research will be conducted, what participants will be asked to do and the time commitment, what data will be recorded using what research instruments (append copies). Discuss any blinding or randomization measures. Discuss how participants will be given the opportunity to withdraw.

Research will be conducted in Sherriff Hall. Two interview styles will be implemented. The first style will include asking dining hall employees questions as they continue with work. This enables easier demonstration of behaviours. In addition, interviews with staff, who are not on the cook line, will be done during their work day at a convenient time. These interviews will take place in Sherriff Hall, either in the dining hall or in another available room nearby. Interviews with other stakeholders will occur at a time and place of their convenience. In general, interviews should not take longer than 45 minutes. However, there will not be a restriction on time if participants wish for the interviews to take longer.

During interviews, participants will be asked questions in regards to daily routines and use of resources, perceptions of sustainability, and perceived barriers to sustainable changes as well as their opinions as to the most effective method to teach and promote sustainability in the kitchen. Data will be recorded using personal notes as well as audio recording, if participants consent.

Participants will be asked to read and sign consent forms before research will begin. When research is to begin (observation or interview) participants will be informed that they are still able to withdraw from participation. In addition, participants will be made aware that they do not have to answer any questions that they do not feel comfortable answering.

2.4.2 Describe your role in this research and any special qualifications you have that are relevant to this study (e.g. professional experience, methods courses, fieldwork experience).

The student researcher, Brittany Maguire, is undertaking this study as part of her honours degree Environmental Science and will be conducting all research. Last year, during a study abroad program in Ecuador through Trent University, the student researcher, took a course on Community Development which included some training on qualitative research methods such as field observation and interviews. For this course the researcher had to complete a number of small assignments using these methods as well as a semester long internship which included a number of interviews.

2.4.3 Describe plans for data analysis in relation to the hypotheses/questions/objectives.

Observational notes and audio records will be transcribed. Data will then be reviewed for themes in relation to each of the research questions and data will be coded within these themes. Where possible displays such as tallies or tables will be utilized to help interpretation of data. Quotes will be utilized to exemplify themes.

2.4.4 Describe and justify any use of deception or nondisclosure and explain how participants will be debriefed.

Not applicable

2.4.5 Describe any compensation, reimbursement or incentives that will be given to participants (including those who withdraw).

Not applicable

2.5 INFORMED CONSENT PROCESS

Describe the informed consent process (i.e. how and when the research will be described to the prospective participant and by whom, how the researcher will ensure the prospective participant is fully informed of what they will be asked to do). If non-written consent is proposed, describe why and the process. If a waiver of informed consent is sought, address the criteria in the guidance document and TCPS articles 3.7 and/or 5.5. Address how any third party consent (with or without assent) will be managed. Describe any plans for ongoing consent, and/or community consent. Discuss how participants will be given the opportunity to withdraw (their participation and/or their data, and any limitations on this).

Append copies of all consent forms or any oral consent script.

As discussed, Debbie Kline, the manager of the Sherriff Hall kitchen, will briefly mention the study in a staff meeting and let staff know that the student researcher, Brittany Maguire, will be visiting to discuss the study further. The student researcher will visit the Sherriff Hall kitchen in early December in order to discuss the project with staff during a meeting and again in early January, 2013 in order to discuss any concerns and have participants read and sign consent forms. Other participants, who are not employees, will be contacted by Brittany Maguire and will be met individually in order to discuss the study and read and sign the consent form.

When research is to begin (observation or interview) participants will be informed that they are still able to withdraw from participation. In addition, participants will be made aware that they do not have to answer any questions that they do not feel comfortable answering.

Consent forms for interviews and observation are attached (see Appendices 3.3.1 and 3.3.2).

2.6 PRIVACY & CONFIDENTIALITY

2.6.1 Describe how data will be stored and handled in a secure manner, how long data will be retained and where, and plans for its destruction.

Only researchers, Brittany Maguire and Rochelle Owen, will have access to data. All information provided will be attributed to participant numbers rather than any personal names. All identifying records (for example, the consent form) will be kept in a locked filing cabinet or in password protected documents. Written notes will be transcribed into electronic files on the student researcher's computer and notes will be shredded. Similarly, audio files will be stored on the student researcher's computer and deleted from the recording device. All will be stored on the student researcher's password protected computer and external hard drive. All data will be retained for one year after the end of the study (April 2013); at this point all electronic data will be deleted and paper records will be shredded.

2.6.2 Address any limits on confidentiality, such as a duty to disclose abuse or neglect of a child or adult in need of protection, and how these will be handled. Such limits should be described in consent documents.

Not applicable

2.6.3 Does your use of any survey company or software to help you collect, manage, store, or analyze data mean that personally identifiable information is accessible from outside of Canada?

No

Yes. If yes, describe your use of the company or software and describe how you comply with the *University Policy for the Protection of Personal Information from Access Outside Canada*.

2.6.4 Describe the measures to be undertaken for dissemination of research results and whether participants will be identified (either directly by name or indirectly). If participants will be quoted in reports from the data, address consent for this, including whether quotes will be identifiable or attributed. Describe how participants will be informed of results that may indicate they may be at risk (in screening or data collection), if applicable.

A short description of study results will be provided when the study is finished. Participants can provide an e-mail address at the end of the consent form to receive this directly. In addition, results will be provided to the kitchen manager, Debbie Kline and the food service director, Derrick Hines for use and dissemination to employees.

2.7 RISK & BENEFIT ANALYSIS

2.7.1 Discuss what risks or discomforts are anticipated for participants, how likely risks are and how risks will be mitigated.

There are minimal risks associated with participation this research study. Participants may feel discomforts during the observation or interview however participants will be made aware that they do not have to answer any questions that they do not wish to. In addition, they may feel discomfort if they feel they are being judged or evaluated during the study. The consent form states that they will not be evaluated during the study and that their input is valued and the researcher will also state this before beginning interviews and observation. All participants will be asked if they consent to direct quotation and will be made aware that quotes will remain anonymous.

There is a risk in using employee opinions and perceptions in this study as the final results will be given to their employers, Aramark management. In order to mitigate this risk, all responses will remain anonymous. All data transcribed will be labelled with participant numbers. In addition, if any negative information is identified the researcher will take caution to not associate any specific identifiers with such information. As stated in the consent form, if any unsafe practices are identified they will be brought to the attention of the research supervisor, Rochelle Owen, who will bring the practices to the attention of Aramark management. This will be done without including any identifying information to participants.

2.7.2 Identify any direct benefits of participation to participants (other than compensation), and the indirect benefits of the study (e.g. contribution to new knowledge)

Participating in the study might not benefit the participants; however, it will present a forum for discussion that they may appreciate. Participation in the study will help to contribute to understanding of how to increase sustainability in the kitchens at Dalhousie University. It also may increase understanding of the behavioural aspects of resource use and meeting sustainability objectives in kitchens in general.

2.8 CONFLICT OF INTEREST

Describe whether any conflict of interest exists for any member of the research team in relation to potential research participants (e.g., TA, fellow students), and/or study sponsors, and how this will be handled.

Not applicable

SECTION 3. APPENDICES

3.1 Appendices Checklist. Append all relevant material to this application. This may include:

- Recruitment Documents (posters, verbal scripts, online postings, any invitations to participate, etc.)
- Screening Documents
- Consent Forms
- Research Instruments: interview questions
- Debriefing Forms
- Permission Letters (Aboriginal Band Council, School Board, Director of a long-term care facility)

8.2 – Recruitment Documents

8.2.1 – Recruitment of Kitchen Employees

Information provided to Debbie Kline, kitchen manager at Sherriff Hall, to introduce study to employees during a staff meeting:

A Dalhousie student, Brittany Maguire, will be working on a project about sustainability in the kitchen. Specifically, she is interested in the use of energy, water, food and products as well as waste sorting. She wants to learn more about your thoughts on these areas. This is, in part, to explore what types of programs could be implemented in the kitchen in order to reduce energy waste, water waste, food waste and enhance waste diversion.

Brittany will be coming in to discuss this further early December and her project will start in the new year. She will be asking to do some observation in the kitchen and have conversations with employees individually. Everyone who is interested can participate. However, participation is voluntary and no one has to participate if they do not wish to.

Information to be shared with employees when Brittany Maguire visits in early December:

As Debbie Kline mentioned, I am an Environmental Science student here at the university. My name is Brittany Maguire and I am interested in working on a project about sustainability in the

kitchens at Dalhousie University, focusing on the Sherriff Hall. I appreciate you letting me come in and speak with you.

I am interested in the use of energy, water, food and products as well as waste sorting and how behaviour impacts these areas. In addition, I am interested in your experiences with these areas and any barriers you may perceive to conservation. This is, in part, to explore what types of programs you would like to see implemented in the kitchen in order to reduce energy waste, water waste, food waste and enhance waste diversion.

In order to do this research, I would like to be able to do some observation in the kitchen and conduct an interview with each person who is interested. This would take place in mid to late January, 2013. Observation would be done during less busy times of the day and would involve me observing general activity in the kitchen and asking some questions. Interviews would be approximately 45 minutes long and would occur here in Sherriff Hall during work hours at a time that is convenient for you. Individuals may choose to participate in one or both of these activities. All observations and answers would be recorded anonymously so that you would not be identified in any way in the results.

Everyone who interested is willing to participate in the study. However, participation is voluntary and no one has to participate if they do not wish to.

I will return in early January, 2013 so you can take the holidays to think about whether you would like to participate. If you would like to participate, I will have more detailed information in early January, 2013 that I will provide you. At that time, you will be required to read and sign a form of consent saying that you understand what you are being asked to do and have agreed to participate in the study.

Are there any questions or concerns?

Thank you for your time.

8.2.2 – Recruitment of Other Stakeholders

Most likely to be introduced through e-mail.

Hello _____,

I am an Environmental Science student here at Dalhousie University. My name is Brittany Maguire and I am working on a project about sustainability in the kitchens at Dalhousie University.

Particularly, I am interested in the use of energy, water, food and products as well as waste sorting and how behaviour impacts these areas. In addition, I am interested in employee experiences and any barriers they may perceive to conservation. This is, in part, to explore what

types of programs could be implemented in the kitchen in order to reduce energy waste, water waste, food waste and enhance waste diversion.

In order to do this research, I will be doing research in the kitchen as well as conducting interviews with other stakeholders. It has been recommended by ___ that I get in touch with you as you may have valuable insight for this research.

If you are interested, I would be interested in interviewing you at a time and place of your convenience during the month of January, 2013. The interview would be approximately 45 minutes long. Participation is completely voluntary and all observations would be recorded anonymously so that you would not be identified in any way in the results.

Please let me know whether or not you are interested.

Thank you for your time,
Brittany Maguire

8.3 – Consent Forms

8.3.1 – Consent Form for Interviews



CONSENT FORM FOR INTERVIEWS

Project Title: Employee Behaviour and Sustainability in the Kitchens at Dalhousie University

You are invited to take part in a research study being conducted by Brittany Maguire, an Environmental Science undergraduate student at Dalhousie University. Taking part in this research project is voluntary. You can leave the study at any time if you are uncomfortable. Aramark management has assured that there will be no impact on your employment if you decide not to participate in the research. The information below tells you about what you will be asked to do and about any benefit, risk, or discomfort that you might experience. You should discuss any questions you have about this study with Brittany Maguire.

Who Is Conducting the Research Study:

Brittany Maguire, a fifth-year Environmental Science undergraduate student, will be conducting the study. Rochelle Owen, the Director of the Office of Sustainability at Dalhousie University, will be supervising the research.

Purpose and Outline of the Research Study:

This research will investigate the impact of dining hall employee behaviour on energy waste, water waste, food waste and waste diversion. It will aim to identify the perceptions of dining hall employees in regards to sustainable behaviour in the kitchen. The study will also explore what types of programs could be implemented in the kitchens at Dalhousie in order to reduce energy waste, water waste, food waste and enhance waste diversion in the kitchens.

Sherriff Hall kitchen, on the Dalhousie campus, will be utilized as the kitchen study area. Observation and interviews with the staff of the Sherriff Hall kitchen will be used as research methods. These methods will be used to gain your valued input.

Who Can Participate in the Research Study:

All those who work in or with the Sheriff Hall kitchen may participate in the research. This includes kitchen staff, directors, managers and other stakeholders.

What You Will Be Asked to Do:

Your participation will help us to understand the following:

In a case study of the kitchen in Sherriff Hall at Dalhousie University,

- 1) What behaviours in the kitchen impact sustainability objectives? (For example: turning off lights or equipment)
- 2) What are the barriers that dining hall employees face in meeting sustainability objectives? (For example: time constraints)
- 3) What changes or programs could be implemented in order to reduce resource waste and enhance waste diversion in the dining hall? (For example: do you feel you have enough information about what waste should go where – compost versus waste stream?)

In order to assist with this research you are being asked to participate in a discussion with Brittany Maguire which will last approximately 45 minutes. This will be conducted during the month of January, 2013 at a time and location that is convenient and comfortable for you, which you will identify with Brittany Maguire.

Possible Benefits, Risks and Discomforts:

Participating in this study is voluntary. Participating in the study will help to contribute to understanding of how to increase sustainability in the kitchens at Dalhousie University.

There are minimal risks associated with participating in this research study. You do not have to answer any questions that you do not want to. Also, if you so choose, you may leave the interview whenever you like.

Compensation / Reimbursement:

Research will take part during a normal work day. You will not lose any pay for taking time to participate. You will not receive any additional compensation.

Privacy and Confidentiality:

Brittany Maguire will describe and share the findings of this research in her undergraduate thesis paper and potentially academic publication. Findings will also be highlighted in a presentation and poster session which will be open to the public.

Information that you provide to us will be kept private. You will not be judged or evaluated based on your answers. Only researchers, Brittany Maguire and Rochelle Owen, will have access to this information. All information provided will be attributed to participant numbers rather than any personal names. This ensures anonymity and this means that ***you will not be identified in any way in our reports.*** All identifying records (for example, this form) will be kept in a locked filing cabinet or in password protected documents. If you consent, the interview will be audio-recorded. Quotation will be utilized yet will remain anonymous.

If unsafe practices are identified during this study, they will be brought to the attention of the research supervisor, Rochelle Owen. Rochelle Owen will then bring them to the attention of Aramark management. In this event, the researcher, Brittany Maguire, will take precaution to make sure that no information that would identify a participant is provided. In this way, you or any other participant would not be associated with any concerns raised.

If You Decide to Stop Participating:

You are free to leave the study at any time. If you decide to stop participating at any point in the study, you can decide whether you want any of the information that has been contributed up to that point to be removed or if you will allow that information to be used.

How to Obtain Results:

A short description of study results will be provided when the study is finished. No individual results will be provided. Results can be obtained by including your contact information at the end of the signature page.

Questions:

If you have any questions or concerns about your participation in this research study please contact Brittany Maguire (at (902) 809 - 1700, brittany.maguire@dal.ca) or Rochelle Owen (at (902) 494-7448, rjowen@dal.ca) at any time with questions, comments or concerns about the research study.

If you have any ethical concerns about your participation in this research, you may also contact Catherine Connors, the Director of Research Ethics at Dalhousie University (at (902) 494-1462, or ethics@dal.ca).

Consent Form for Interviews – Signature Page

Project Title: Employee Behaviour and Sustainability in the Kitchens at Dalhousie University

I (the research participant) have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I agree to take part in this study which will include participating in an interview. I realize that my participation is voluntary and that I am free to withdraw from the study at any time.

I agree that the researcher may audio-record the interview Yes No

Participant's name: _____

Participant's signature: _____

Date: _____

Researcher's name: _____

Researcher's signature: _____

Date: _____

After having completed the interview:

I agree that the researcher may quote me directly, if I remain anonymous Yes No

By signing below, you are indicating that you agree to be quoted directly (you will remain anonymous) and you have discussed with the researcher if there is anything you said which you do not want included as a quote.

Participant's name: _____

Participant's signature: _____

Date: _____

If you would like to receive a short description of study results when the study is finished please provide your contact information below.

E-mail address:

8.3.2 – Consent Form for Participant Observation



CONSENT FORM FOR PARTICIPANT OBSERVATION

Project Title: Employee Behaviour and Sustainability in the Kitchens at Dalhousie University

You are invited to take part in a research study being conducted by Brittany Maguire, an Environmental Science undergraduate student at Dalhousie University. Taking part in this research project is voluntary. You can leave the study at any time if you are uncomfortable. Aramark management has assured that there will be no impact on your employment if you decide not to participate in the research. The information below tells you about what you will be asked to do and about any benefit, risk, or discomfort that you might experience. You should discuss any questions you have about this study with Brittany Maguire.

Who Is Conducting the Research Study:

Brittany Maguire, a fifth-year Environmental Science undergraduate student, will be conducting the study. Rochelle Owen, the Director of the Office of Sustainability at Dalhousie University, will be supervising the research.

Purpose and Outline of the Research Study:

This research will investigate the impact of dining hall employee behaviour on energy waste, water waste, food waste and waste diversion. It will aim to identify the perceptions of dining hall employees in regards to sustainable behaviour in the kitchen. The study will also explore what types of programs could be implemented in the kitchens at Dalhousie in order to reduce energy waste, water waste, food waste and enhance waste diversion in the kitchens.

Sherriff Hall kitchen, on the Dalhousie campus, will be utilized as the kitchen study area. Participant observation and interviews will be used as research methods. These methods will be used to gain your valued input.

Who Can Participate in the Research Study:

All those who work in or with the Sherriff Hall kitchen may participate in the research. This includes dining hall employees, directors, managers and other stakeholders.

What You Will Be Asked to Do:

In a case study of the kitchen in Sherriff Hall at Dalhousie University,

- 1) What behaviours in the kitchen impact sustainability objectives? (For example: turning off lights or equipment)
- 2) What are the barriers that dining hall employees face in meeting sustainability objectives? (For example: time constraints)
- 3) What changes or programs could be implemented in order to reduce resource waste and enhance waste diversion in the dining hall? (For example: do you feel you have enough information about what waste should go where – compost versus waste stream?)

In order to assist with this research you are being asked to consent to Brittany Maguire being present during a time while you are working and to her taking observational notes. During this, she may ask you a few questions. This will be conducted during the month of January, 2013. Observation will take place during a less busy time in the kitchen.

Possible Benefits, Risks and Discomforts:

Participating in this study is voluntary. Participating in the study will help to contribute to understanding of how to increase sustainability in the kitchens at Dalhousie University.

There are minimal risks associated with participating in this research study. You do not have to answer any questions that you do not want to. Also, if you so choose, you may ask Brittany Maguire to stop observation whenever you like.

Compensation / Reimbursement:

Research will take part during a normal work day. You will not lose any pay for taking time to participate. You will not receive any additional compensation.

Privacy and Confidentiality:

Brittany Maguire will describe and share the findings of this research in her undergraduate thesis paper and potentially academic publication. Findings will also be highlighted in a presentation and poster session which will be open to the public.

Information that you provide to us will be kept private. You will not be judged or evaluated based on your answers or behaviours. Only researchers, Brittany Maguire and Rochelle Owen, will have access to this information. All information provided will be attributed to participant numbers rather than any personal names. This ensures anonymity and this means that ***you will not be identified in any way in our reports.*** All identifying records (for example, this form) will be kept in a locked filing cabinet or in password protected documents. If you consent, the interview will be audio-recorded. Quotation will be utilized yet will remain anonymous.

If unsafe practices are identified during this study, they will be brought to the attention of the research supervisor, Rochelle Owen. Rochelle Owen will then bring them to the attention of Aramark management. In this event, the researcher, Brittany Maguire, will take precaution to make sure that no identifying information is provided. In this way, you will not be associated with any concerns raised.

If You Decide to Stop Participating:

You are free to leave the study at any time. If you decide to stop participating at any point in the study, you can decide whether they want any of the information that has been contributed up to that point to be removed or if you will allow that information to be used.

How to Obtain Results:

A short description of study results will be provided when the study is finished. No individual results will be provided. Results can be obtained by including your contact information at the end of the signature page.

Questions:

If you have any questions or concerns about your participation in this research study please contact Brittany Maguire (at (902) 809 - 1700, brittany.maguire@dal.ca) or Rochelle Owen (at (902) 494-7448, rjowen@dal.ca) at any time with questions, comments or concerns about the research study.

If you have any ethical concerns about your participation in this research, you may also contact Catherine Connors, the Director of Research Ethics at Dalhousie University (at (902) 494-1462, or ethics@dal.ca).

Consent Form for Participant Observation – Signature Page

Project Title: Employee Behaviour and Sustainability in the Kitchens at Dalhousie University

I (the research participant) have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I agree to take part in this study which will include being observed while at work. I realize that my participation is voluntary and that I am free to withdraw from the study at any time.

Participant's name: _____

Participant's signature: _____

Date: _____

Researcher's name: _____

Researcher's signature: _____

Date: _____

After having completed the observation:

I agree that the researcher may quote me directly, if I remain anonymous Yes No

By signing below, you are indicating that you agree to be quoted directly (you will remain anonymous) and you have discussed with the researcher if there is anything you said which you do not want included as a quote.

Participant's name: _____

Participant's signature: _____

Date: _____

If you would like to receive a short description of study results when the study is finished please provide your contact information below.

E-mail address:

8.4 – Research Instruments

8.4.1 – Interview Scripts

Script for Interviews with Employees

** These questions may be subject to change with the influence of additional information from observations or literature review prior to interviews being completed. In addition, interviews with other stakeholders will include some but not all of these elements and questions will be adapted depending on the interviewee.

Hello. Thank you for taking the time to meet with me.

As you are already aware, I am Brittany Maguire, a student here at the university. I am completing this research as part of my Environmental Science degree.

As we've already discussed, this project looks at sustainability in the kitchens at Dalhousie University. This project looks at sustainability specifically in terms of conserving water, energy and other resources as well as reusing resources in order to lessen the university's impact on the environment. This can be done by in doing things like turning off lights when not in use, recycling, composting etc.

Your input is valuable to this project and our understanding of the kitchen environment. I would like to remind you that I will not be judging or evaluating you based on your answers, and that your answers will have no impact on your employment. All findings will remain anonymous and you will not be identified in anyway.

If you get tired during the interview, just let me know and we can continue at a later date.

Table 1. Interview questions; altered depending on work duties of participants.

A)	Is it okay with you if I record our conversation today?
B)	I'd first like to ask you a few questions about your work in the kitchen. 1. What is the title of your position? 2. How long have you been working here? 3. What are the main responsibilities of your position?
C)	Could you describe what a regular shift would look like? If you prefer, you can also outline your day using paper and pen. 4. When do you normally start and what do you first when you arrive? 5. What are your main activities during the day and when do they occur? 6. When do you normally finish work and what is the last thing you do before you leave?
D)	I'd like to talk about the equipment you use during your work 7. What equipment do you use regularly? Let's talk about each individually. 8. When do you turn this equipment on? 9. When do you turn this equipment off? 10. Does it get turned off when not in use? a. If not, is there a reason why? b. If not, why not 11. When using this equipment, is it normally full? a. If not, is there a reason why? 12. Do you know how often equipment undergoes maintenance? a. Who does this? b. In your opinion, should it be done more often? 13. If you notice that something in the kitchen needs repair or there is a leak, what do you do? 14. Is there anything else you would like to share about the equipment?
*For employees who was dishes	15. Do have you control over the dishwasher settings (rinse cycle times, rinse pressure) a. If so, do you know if they are changed or checked regularly? b. What is the rinse cycle set at? (Is it at the manufacturer's minimum recommended setting?) c. What is the rinse pressure maintained at? (Is it at the manufacturer's specifications?) d. Do you use a power dryer? i. If so, do you think that it is set just long enough to dry the load or does it over dry?
*For employees who work in food	16. Do you use the fryers? a. If so, are back up fryers turned off during slow periods? b. Do they ever get overfilled? i. If so, why?

preparation	<ul style="list-style-type: none"> c. Do you know how often the fryer is degreased and who does this? d. Do you know how often the heating element is cleaned and who does this? <p>17. If you utilize ovens, how do you check to see if food is ready? (Do you open the over door or turn on the light?)</p> <p>18. Do you utilize the walk-in refrigerator or freezer?</p> <ul style="list-style-type: none"> a. Can you tell me how the door is normally closed? (Is it closed properly?) b. In your opinion, is the fridge or freezer ever overloaded? c. Are there spaces left between products in the fridge? d. How are food defrosted? e. Are the lights left on or off? <p>19. Do you utilize the griddle?</p> <ul style="list-style-type: none"> a. If it has multiple sections, are sections turned off when not currently in use? b. If is a double sided griddle, is it closed when not currently in use? <p>20. Do you utilize holding cabinets?</p> <ul style="list-style-type: none"> a. If so, are doors normally firmly shut? b. Are the cabinets turned off at night? <p>21. Do you utilize the steamer?</p> <ul style="list-style-type: none"> a. If so, are doors normally firmly shut? b. Does the steamer return to idle after cooking is finished?
E)	<p>I'd like to ask you a few questions about cleaning in the kitchen.</p> <p>22. Who does the cleaning in the kitchens? (dining hall employees or custodial staff)</p> <p>23. When do they do the cleaning?</p> <p>24. What types of products are used in cleaning?</p>
F)	<p>I'd like to ask you a few questions about lighting in the kitchen and dining hall.</p> <p>25. When in the morning do lights get turned on in each of the areas?</p> <p>26. Which lights get turned off at the end of the day? When?</p> <p>27. In general, are lights left on in rooms that are not being used? For example: closets, walk-in refrigerator.</p> <ul style="list-style-type: none"> a. If lights are left on, why? <p>28. Are there any rules or procedures in place about when lights should be turned on and off?</p> <p>29. Is there anything else you would like to share about lighting in the kitchen or dining hall?</p>
G)	<p>I'd like to ask you a few questions about waste in the kitchen.</p> <p>30. Have you ever thought about the waste in the kitchen?</p> <ul style="list-style-type: none"> a. If yes, can you tell me in what ways you have thought about this? b. What processes in the kitchen normally create waste? c. In your opinion, what processes or practices create the most waste? d. In your opinion, how could the kitchen reduce the production of

	<p>waste?</p> <ul style="list-style-type: none"> e. Can you think of any barriers or constraints on reducing the production of waste in the kitchen? <p>31. Do you think the kitchen produces a lot of food waste?</p> <ul style="list-style-type: none"> a. If yes, from what? b. Do you think food waste could be cut down? c. If yes, how? d. Can you think of any barriers or constraints on reducing food waste? <p>32. Does the kitchen use or throw out a lot of materials such as plastics, paper, cardboard etc.?</p> <ul style="list-style-type: none"> a. If yes, from what? b. Do you think material waste could be cut down? c. If yes, how? d. Can you think of any barriers or constraints on reducing material waste in the kitchen? <p>33. In your opinion, do you think waste in the kitchen is normally sorted properly?</p> <ul style="list-style-type: none"> a. When throwing something out do you have a good idea of what belongs where? For example the compost versus the recycling. b. Do you think coworkers have a good idea of what belongs where? c. Is there ever anything that prevents you from being able to properly sort waste? <p>34. Is there anything already in place to help proper sorting of waste?</p> <ul style="list-style-type: none"> a. If yes, does this help? <p>35. In your opinion, how could the kitchen further increase the proper sorting of waste?</p> <p>36. Could you tell me what happens with grease waste?</p> <p>37. Is there anything else you would like to share about waste in the kitchen or dining hall?</p>
H)	<p>I'd like to ask you a few more general questions about resource use in the kitchen.</p> <p>38. Have you ever thought about energy consumption in the kitchen?</p> <ul style="list-style-type: none"> a. If yes, can you tell me in what you have thought about? b. In your opinion, what are the practices or equipment in the kitchen that utilize the most energy? c. In your opinion, how could the kitchen reduce its energy consumption? d. Can you think of any barriers or constraints on energy conservation in the kitchen? <p>39. Have you ever thought about water consumption in the kitchen?</p> <ul style="list-style-type: none"> a. If yes, can you tell me in what you have thought about? b. In your opinion, what are the practices or equipment in the

	<p>kitchen that utilize the most water?</p> <p>c. In your opinion, how could the kitchen reduce its water consumption?</p> <p>d. Can you think of any barriers or constraints on water conservation in the kitchen?</p>
I)	<p>I'd like to ask you a few questions about employee interest in sustainability, both in general and in the kitchen. By sustainability I mean reducing the environmental impact of practices in the kitchen. This can be done by conserving resources, reusing resources, sourcing local and/or organic products, products with fewer chemical inputs, etc.</p> <p>40. What do you think would be an effective way of promoting sustainability in the kitchen?</p> <p>41. Would you be interested in having a forum to bring up your ideas about resources conservation and sustainability in the kitchen?</p> <p>a. If yes, what would you like that to look like?</p> <p>42. In general, do you think employees are interested in learning about environmental issues?</p> <p>43. Do you think employees are interested in learning about sustainability specific to the kitchen?</p> <p>44. Have you ever received any training or education about water or energy conservation at work?</p> <p>a. If yes, have you received any training or education specific to your work duties?</p> <p>b. Did you find the training interesting or useful?</p> <p>45. Would you be interested in (further) education about water or energy conservation at work?</p> <p>46. Have you ever received any training or education about sorting waste in the kitchen?</p> <p>a. Did you find the training interesting or useful?</p> <p>47. Would you be interested in (further) education about sorting waste in the kitchen?</p> <p>48. What do you think would be an effective way of educating employees about topics related to sustainability in the kitchen? For example, training sessions, posters, written information.</p> <p>49. Are there any improvements in sustainability of the kitchen that you would like to see that you feel can't be changed by dining hall employees?</p> <p>50. Do you feel that management has or will be helpful in increasing sustainability in the kitchen?</p> <p>a. If yes, in what ways?</p> <p>b. What could they do to be more helpful?</p> <p>51. Do you feel that there is anything done by management that makes it more difficult?</p> <p>a. If yes, what?</p> <p>52. Have you, or other staff, been impacted by any measures already</p>

	implemented to increase kitchen sustainability? a. If yes, in what way?
J)	This brings us to the end of the interview. Do you have any other comments or is there anything you would like to share that was not brought up?
K)	Do you have any suggestions of individuals for me to talk with who are not employees here in the Sherriff Hall kitchen that may have valuable insight into topics related to what we have discussed today?
L)	If you previously consented, you may be quoted anonymously. Are there any statements that you have made in this interview which you would prefer not to be quoted?

If you have any thoughts on our discussion today that you would like to provide to me at a later time, please feel free to use my contact information or ask to speak with me if I am here for interviews with other participants.

Thank you so much for your time. If you would like, a short description of study results will be provided to you when the study is finished. Your manager will also have these results as well a copy of my thesis.

8.5 – Data Analysis Codes

8.5.1 – A Priori Codes

Table 2. A priori codes used for data analysis.

Free codes	Tree codes	
	Situational Factors	Behaviours
Barriers	Control	Energy saving behaviour
Education	Convenience	Energy wasting behaviour
Opportunities	Customer service	Water saving behaviour
Management	Facilities	Water wasting behaviour
	Knowledge	Material saving behaviour
	Language	Material wasting behaviour
	Motivation	Food saving behaviour
	Potential for impact	Food wasting behaviour

	Skills	Improper waste sorting
	Technology	Proper waste sorting
	Time	

8.5.2 – Final List of Codes

Table 3. Final list of codes used in coding and data analysis; a priori codes (Appendix 8.5.1) were utilized, altered and combined with inductive codes.

Free codes	Tree codes	
	Situational Factors	Behaviours
Barriers	A lot of training	Energy use behaviour
Cleaning products	Accidental	Intervention of other staff
Communication	Automatic	Water use behaviour
Education and training	Awareness	Material use behaviour
Encouragement and promotion	Cleanliness	Food use behaviour
Enforcement	Constant use	Waste sorting behaviour
Good quote	Convenience	
Greater efficiency than individual food preparation	Cost	
Green washing	Customer service	
Individual responsibility	Equipment	
Maintenance	External factors	
Management	Facilities	
Monitoring	Habit	
Operation procedures and rules	Health and safety	
Opportunities	Knowledge	
Potential for impact	Language	

Sustainable food Upgrades	Memory Motivation Potential for impact Priority Resistance to change Time Turnover Volume	
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